TOGAF® Series Guide

A Practitioners' Approach to Developing Enterprise Architecture Following the TOGAF® ADM

Prepared by The Open Group Architecture Forum

TOGAF® Series Guide

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Preface

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The TOGAF Standard is a proven enterprise methodology and framework used by the world's leading organizations to improve business efficiency.

This Document

This document is a TOGAF® Series Guide: A Practitioners' Approach to Developing Enterprise Architecture Following the TOGAF® ADM. It has been developed and approved by The Open Group.

About the TOGAF® Series Guides

The TOGAF® Series Guides contain guidance on how to use the TOGAF Standard and how to adapt it to fulfill specific needs.

The TOGAF® Series Guides are expected to be the most rapidly developing part of the TOGAF Standard and are positioned as the guidance part of the standard. While the TOGAF Fundamental Content is expected to be long-lived and stable, guidance on the use of the TOGAF Standard can be industry, architectural style, purpose, and problem-specific. For example, the stakeholders, concerns, views, and supporting models required to support the transformation of an extended enterprise may be significantly different than those used to support the transition of an in-house IT environment to the cloud; both will use the Architecture Development Method (ADM), start with an Architecture Vision, and develop a Target Architecture on the way to an Implementation and Migration Plan. The TOGAF Fundamental Content remains the essential scaffolding across industry, domain, and style.

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Acknowledgements

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Referenced Documents

The following documents are referenced in this TOGAF® Series Guide:

- ArchiMate® 3.1 Specification, a standard of The Open Group (C197), published by The Open Group, November 2019; refer to: www.opengroup.org/library/c197
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- The TOGAF® Standard, 10th Edition, a standard of The Open Group (C220), published by The Open Group, April 2022; refer to: www.opengroup.org/library/c220
- TOGAF® Series Guide: Architecture Project Management (G188), published by The Open Group, April 2022; refer to: www.opengroup.org/library/g188
- TOGAF® Series Guide: Integrating Risk & Security within a TOGAF® Enterprise Architecture, The Open Group Guide (G152), published by The Open Group, April 2022; refer to: www.opengroup.org/library/g152
- World-Class Enterprise Architecture, White Paper (W102), published by The Open Group, April 2010; refer to: www.opengroup.org/library/w102

Suggested Reading

- Cuypers Ataya: Enterprise Value: Governance of IT Investments, The Business Case, IT Governance Institute, 2006
- Peter Swartz: The Art of the Long View: Planning for the Future in an Uncertain World, Currency Doubleday, 1996
- Kees van der Heijden: Scenarios: The Art of Strategic Conversation, 2nd Edition, Wiley, 2005

Part 1: Introduction

1 Introduction

1.1 Overview

This Guide provides guidance on using the TOGAF framework to develop, maintain, and use an Enterprise Architecture (EA). This Guide is a companion to the TOGAF framework and is intended to bring the concepts and generic constructs in the TOGAF framework to life. This Guide puts forward an approach to develop, maintain, and use an EA that aligns to a set of requirements and expectations of the stakeholders and enables predictable value creation.

It is intended to take the TOGAF concepts and show how each Practitioner can use the same concept to (a) deliver useful EA for their Enterprise and (b) deliver improvements to EA Capability. This point is important: use the same concept. Not the same technique, not the same template, not the same process. The same concept. For example, evidence from prevalent practice shows that there is not a single EA team that didn't use a repository, whether the repository is a file folder or a fully-fledged installation of modeling and analytic software. If you are struggling with this point, stop and think about any preconceptions you are carrying into the conversation. For example, while reading, if you have a reaction similar to "but a real repository includes …", ask yourself if this is universally true. The concept of a repository is universal; the implementation varies.

The essential scaffolding of the TOGAF framework is the concepts. Everything else in the TOGAF framework is either an example or a starter set to get you moving. If you do not like the example, then you can take advantage of the modular structure of the TOGAF framework and substitute it. Leading Practitioners and users often take this approach. This Guide is about advising the Practitioner in making the universal structure of the TOGAF framework work.

This Guide is written for the Practitioner, the person who is tasked to develop, maintain, and use an EA. Choice of the term Practitioner is deliberate, reflecting the role, rather than one of the myriad job titles in an Enterprise the Practitioner may have.

This Guide is structured to provide the context, content, and rationale behind choices and steps that an EA Practitioner can consult at any point. When effectively used, a thoughtfully developed EA optimizes Boundaryless Information Flow™ within and between Enterprises based on open standards and global interoperability.

This Guide is explicitly about developing, maintaining, and, most importantly, using an EA. The range of potential Enterprises and purposes require a guide of this length to define the direction.[1] Following the approach suggested in the World-Class Enterprise Architecture White Paper (see Referenced Documents), the TOGAF Standard is routinely applied to develop architectures supporting strategy development, portfolio management, project planning and execution, and solution development. Collective experiences reflect that there is no one right EA deliverable, model, view, work product, or technique. Rather, the correct approach is specific to the purpose

[1] See the definition of Enterprise in Chapter 2. The important concept to keep in mind is that the term "Enterprise" is used as a boundary of analysis.

of the architecture development initiative. Anyone who suggests there is a single correct approach, model, view, work product, or technique is not providing the right advice for you to succeed. This Guide will help you, the Practitioner, to identify the approach that is appropriate to any particular purpose.

Developing, maintaining, and using an EA requires deep interaction with several specialized functions such as strategy development, budgeting, benefits realization, portfolio management, program & project management, and operational units. This Guide will:

- Introduce key topics of concern
- Describe the TOGAF Standard concepts related to the topic
- Show how it is related to developing, maintaining, and using an EA
- Discuss what the Practitioner needs to know
- Describe what the Practitioner should do with this knowledge

Even though this Guide has a logical structure, it is not simple task list. The depth and detail of the steps needed to be taken by the Practitioner are specific to the purpose and are iterative. The only variable is time spent for every step. As with all change work, listing what you need to know is not the same as defining the level of detail in the documentation.

Key decisions are made in an Enterprise following a business cycle. An architecture should inform and enable decision-making. Just align the delivery of architecture to the Enterprise's business cycle and the purpose of the architecture development initiative. The value is delivered when the architecture is used. It is plain and simple.

This Guide is divided into six parts, as follows:

Part 1: Introduction

This part contains this introductory part and a set of definitions.

Part 2: Guidance on Enterprise Architecture

This part addresses:

- What an Enterprise Architecture is and what it is used for
- Coordinating EA development across the EA Landscape
- Coordinating EA development with the business cycle

Part 3: Guidance on Developing an Enterprise Architecture

This part addresses:

- Using the ADM
- Developing an Enterprise Architecture to Support Strategy
- Developing an Enterprise Architecture to Support Portfolio

- Developing an Enterprise Architecture to Support Project
- Developing an Enterprise Architecture to Support Solution Delivery
- Special Cases

Part 4: Guidance on Using an Enterprise Architecture

This part addresses:

- What to do when you are hip-deep in solution delivery
- Architecture in action (agile Enterprise, response to incident, etc.)

Part 5: Guidance on Maintaining an Enterprise Architecture

This part addresses:

- Managing multiple simultaneous roadmaps
- What to do when you are hip-deep in solution delivery

Part 6: Appendices

This part presents:

- A list of useful tables related to frameworks, reference models, etc.

1.2 How to Use this Guide with the TOGAF Framework

The TOGAF framework provides essential universal scaffolding useful in a range of organizations, industries, and architectural styles. This Guide is designed to fill in what is not explicitly addressed by the TOGAF framework and provides an approach to interpret the standard. This does not suggest that the TOGAF framework is flawed. The TOGAF framework is designed to require interpretation or customization. It has to provide universal scaffolding. What is common and universal between all of the different examples provided in the definition of Enterprise? Essential scaffolding expressed as concepts.

One way to look at the TOGAF framework is that it is written for the expert theoretician – the person who thinks about the structure and practice of EA. The TOGAF® Leader's Guide to Establishing and Evolving an EA Capability (see Referenced Documents) is for the person tasked with establishing or evolving an EA Capability.

This Guide is written directly for the person who does the work: develops, maintains, and uses an EA. The person who is not worried about the theory, and who is not worried about how to structure or maintain an EA Capability. The person who develops, uses, and maintains a good EA.

While this Guide assumes no detailed knowledge of the TOGAF framework, it explores the core concepts of the TOGAF Standard. It places these concepts together in the context of using them to develop, maintain, and use an EA. This includes guidance on iteration, an EA Repository,

executing the ADM for the purpose of supporting Strategy, Portfolio, Project, and Solution Delivery, and performing effective governance of the development and use of the EA practice.

This Guide follows the approach of exploring the conceptual structures in the context of making use of them. This Guide assumes that you have established an EA Capability and have customized the TOGAF framework for your Enterprise.[2]

This Guide is part of the TOGAF Library.[3] Other documents in the TOGAF Library include the TOGAF® Leader's Guide to Establishing and Evolving an EA Capability. The TOGAF Library provides a complete interpretation of the TOGAF Standard to establish an EA Capability, develop the EA Capability team, and deliver a useful architecture to guide change and govern the Enterprise change initiatives.

1.3 Referenced Techniques

References to key literature and their techniques within this Guide are intended only to be representative. This Guide does not suggest that the referenced tools, techniques, and literature are definitive. Other tools, techniques, and literature can readily be substituted.

[2] For assistance customizing the TOGAF framework, see the TOGAF® Leader's Guide to Establishing and Evolving an EA Capability (see Referenced Documents), which provides in-depth commentary and guidance for executing the Preliminary Phase of the TOGAF ADM.
[3] The TOGAF Library is available at https://publications.opengroup.org/togaf-library.

2 Definitions

To share a clear understanding a few terms need to be defined distinctly from common English usage. The terms below are distinctly defined, and capitalized wherever found. They mean exactly these definitions and nothing else in this document.

2.1 Enterprise

The highest level of description of an organization used to identify the boundary encompassed by the EA and EA Capability.

Note: This definition is deliberately flexible and not associated with an organization's legal or functional boundaries. It must cover monolithic organizations and extended organizations that include separate organizations connected by a mission or supply chain, as well as operating entities within an organization. Consider an organization that uses outsourced partners to provide manufacturing, logistics, and support; a multi-national peacekeeping force; and a multi-billion-dollar division of a Fortune 50 firm. All are Enterprises.

2.2 Enterprise Architecture (EA)

As the focus of this Guide is to explain the TOGAF framework and the concept of Enterprise Architecture, it is better to define this concept in some detail. Succinct definitions tend to require specialized knowledge to understand the nuance. See Chapter 3 for a discussion of EA.

Two concise definitions that can be used are from Gartner and DoDAF. Gartner[4] defines Enterprise Architecture as: "the process of translating business vision and strategy into effective Enterprise change by creating, communicating, and improving the key principles and models that describe the Enterprise's future state and enable its evolution". DoDAF defines architecture as: "a set of abstractions and models that simplify and communicate complex structures, processes, rules, and constraints to improve understanding, implementation, forecasting, and resourcing".

While many in the EA profession find distinguishing the terms "architecture" and "architecture description" useful, this document does not make any such distinction.

2.3 Practitioner

The person tasked to develop, maintain, and use an Enterprise Architecture.

Note: This term reflects the role, rather than one of the myriad job titles that may apply.

[4] See https://psu.instructure.com/courses/1783235/files/77571925/download, August 12, 2008.

Part 2: Guidance on Enterprise Architecture

3 The Purpose of Enterprise Architecture

A quick perusal of the literature will rapidly highlight that there is no consistent understanding of what an Enterprise Architecture (EA) looks like, or how one uses an EA. Attempts to succinctly define EA speak of fundamental concepts, elements, relationships, and properties of a system. These attempts tend to carry a high level of specialized knowledge and often make little sense to non-specialists. Further, it can be argued that this is the result of many commentators focusing on the architecture they develop, with the implicit assumption that everyone should do the same. Understanding comes from purpose.

EA is a strategic tool that presents an approach to identify and address gaps between aspirations and reality, whatever drives the gaps. It accelerates the ability of an Enterprise to achieve its stated objectives. The tool comes with its method to use, taxonomy to support the directions, and resources needed to benefit from using the tool.

This chapter will address the following questions:

- Why is it important to develop an Enterprise Architecture?
- What is an Enterprise Architecture?
- How to use an Enterprise Architecture?

3.1 Why is it Important to Develop an Enterprise Architecture?

An EA is developed for one very simple reason: to guide effective change.

All Enterprises are seeking to improve. Regardless of whether it is a public, private, or social Enterprise, there is a need for deliberate, effective change to improve. Improvement can be shareholder value or agility for a private Enterprise, mandate-based value proposition or efficiency for a public Enterprise, or simply an improvement of mission for a social Enterprise.

Guidance on effective change will take place during the activity to realize the approved EA. During implementation,[5] EA is used by the stakeholders to govern change. The first part of governance is to direct change activity – align the change with the optimal path to realizing the expected value. The second part of governance is to control the change activity – ensuring the change stays on the optimal path.

The scope of the improvement drives everything that is done. A methodology that serves to validate both the objective and the change, ensuring that both are feasible, delivers the desired value, and in a cost-effective manner. An architected approach provides a rigorous planning and change governance methodology.

[5] A common trap is getting into efforts to fix terminology by using a different synonym. This is always done when people have added meaning, or special conditions, to a word. Implementation means "the process of putting a decision or plan into effect". Feel free to substitute transformation, change, program execution, or deployment if these words align with your preferences.

In its simplest terms, EA must describe the future state and the current state of the Enterprise. The description of the future state enables the right people to understand what must be done to meet the Enterprise's goals, objective, mission, and vision in the context within which the Enterprise operates. The gap between the Enterprise's current state and future state highlights what must change. A good EA facilitates effective governance, management, risk management, and exploitation opportunities. A list of gaps makes obvious what must change and the implications of that change: is the proposed project in alignment with what is needed? In alignment with priority? In alignment with the complete set of goals and objectives?

The preceding paragraphs highlight the conceptual scope of EA. This scope often leads to the assumption that EA is only used to answer the big questions. Nothing can be further from the truth. The same concepts, methods, techniques, and frameworks can readily be used to address the end state, preference trade-off, and value realization for big and little questions. The essential difference is not what you do; it is what the documented architecture looks like. The scope of the system varies; the detailed description of elements and properties vary. All of the concepts remain the same.

3.2 What is an Enterprise Architecture?

In short, EA provides the most effective path to realizing an Enterprise's strategy.[6] A good EA uses a holistic approach to translate strategy into a well-defined execution path, using appropriate analysis, planning, design, and implementation methods.

The purpose of EA is to enable the Enterprise to most effectively achieve the mission, business strategy, and goals through cycles of planning, design, deployment, and delivery of change. An architected approach provides a rigorous planning methodology that validates the business objectives, ensuring that they are feasible, deliver the desired business value, and their achievement is cost-effective.

Achieving this purpose comes from understanding the Enterprise, the context, the scope of change, and the value that will be realized. Using EA facilitates understanding. The Enterprise is described in consistent terms, highlighting fundamental parts and how they interact. Consistent terms enable like-with-like comparison. Potential changes to the fundamental parts are explored regarding the desired end-state and preferences. This understanding and analysis enable trade-off between competing preferences and potential changes that carry different costs and different benefits.

In short, a good EA enables stakeholders to knowingly strike the right balance between any competing set of preferences. It allows individual business units to innovate safely in their pursuit of business value delivery. At the same time, it ensures the needs of the organization for an integrated strategy are met, permitting the closest possible synergy across the extended Enterprise.

[6] Refer to Hambrick & Fredrickson: Are you Sure you have a Strategy? and Mintzberg et al: Strategy Bites Back (see Referenced Documents) for a very good discussion of what a strategy is. For the purposes of this Guide, Hambrick's position is found to be best suited. He focuses on what a strategy is used for and defines it as the central integrated, externally-oriented concept of how an Enterprise will achieve its objectives. A definition that architecture can support.

3.2.1 Introduction to the EA Landscape

The TOGAF framework uses a concept of the EA Landscape to refer to the complete set of descriptions for the EA. This Guide distinguishes EA Landscape from EA, because there will not be a single description in a comprehensive EA Landscape. At any point in time, a typical Enterprise will have several architectures described. Some architectures will address very specific needs; others will be more general. Some will address detail; some will provide a big picture. Some will address the same topics in different states (current, target, and transition), or different periods of time. To address this complexity, the TOGAF Standard provides a framework for organizing the EA Landscape. The EA Landscape identifies the boundary of all potential architecture, and associated constraints and guidance.

Many characteristics can be used to organize an EA Landscape. An essential concept to recognize is that any initiative to develop and maintain EA populates part of the EA Landscape. Over time, over multiple actions, the EA Landscape is filled and refreshed. Much of the commentary on iteration in the TOGAF framework is designed to address this point.

Instead of considering iteration regarding re-sequencing and looping the ADM, combine the TOGAF concept of an Architecture Project with the concept of the EA Landscape. Every Architecture Project knowingly develops just enough of the EA Landscape to serve the need at hand. The development is done in the context of prior architecture that guides or constrains the current work. Each Architecture Project will create, refine, and potentially change components in the EA Landscape.

When populated, the EA Landscape contains a description, constraints, or guidance that can be used. Without performing repeated information gathering, analysis, review, and approval, the Practitioner cannot proceed with confidence. Existing decisions, guidance, and constraints inform current architecture development. Best practice limits information gathering and analysis to the minimum necessary to address the question at hand. Effort spent on EA returns the highest value when the EA is used. The EA cannot be used until the architect is "done". All architecture development must be assessed against Time-To-Market (TTM). Filling in only the required parts of the EA Landscape, and following the constraints and guidance already in place, speeds TTM.

Four common independent characteristics frame the EA Landscape:

- **Breadth**: The subject matter covered by an Architecture Project. Breadth is easy to find confusing since it can refer to a wide range of subjects. Consider domain, organization, and initiative as examples. Breadth can be a hierarchy of specific subject areas. For example, an organization can be broken down through the organizational hierarchy. Subjects are supple. For example, addressing a specific initiative will include all impacted organizations, and an organization will address all impacted initiatives. Breadth is one of the most important scoping dimensions. It provides the Practitioner the context of their analysis.

- **Level of Detail:** The level of detail should be self-explanatory. It is easy to get carried away to explore and elaborate continually within the scope of a domain, organization, or initiative. As the architectures are developed, elaborate to the extent needed to answer the question at hand. A good enough answer to support a decision or directionally guide is sufficient to make progress. Always develop to the least detail required to address the purpose of the Architecture Project. Always keep in mind that working on more detailed architecture is guided and constrained by less detailed or superior architecture. Lastly, the

more detail required, the longer the TTM. Detail takes time to gather, analyze, describe, and get approved.

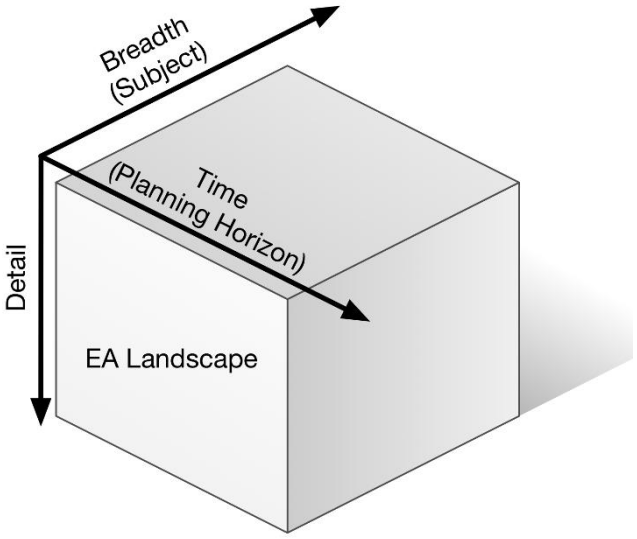

Figure 1: Characteristics of the EA Landscape

- **Time:** Every architecture development project will have a planning horizon; the point in time when you expect to reach the Target Architecture. Time creates challenges because the future is in motion. Typically, the longer the planning horizon, the less detailed the architecture. This is often true but does not provide a universal rule. Lastly, care must be taken where one or more transition architectures exist before reaching the planning horizon. The more detailed architecture must carefully conform to the guidance and constraints active at the point in time. This can be a challenge as the guidance and constraints change through different transition states.

- **Recency:** Each architecture description, specification, and view were created at a point in time. They are always built for a purpose, with an eye to the minimum information gathering and analysis to address the question at hand. All EAs age, often gracefully or suddenly. Recency is a hint that prior EA may need to be reviewed and either reaffirmed or replaced. A good repository can distinguish between architecture that is under development, architecture that has been approved, architecture that has been realized, and architecture that has been reaffirmed. During the development period, the architecture may be very current, but may not be valid for governance. Without approval, it should be considered as hints only. Recency may be used as an organizing factor for historical architectures.

The essential point is to recognize that EA Landscape contents are only developed when needed. Once approved, it constrains all further EA development and use of the EA. For a broader discussion of time, sequence, and business cycle, see Section 5.3.[7]

[7] The term "superior architecture" is used to refer the architecture created for broader scope and purpose. For the Architecture to Support Portfolio, the Architecture to Support Strategy is the superior architecture. When traversing transition states, the reaffirmed Target Architecture is the superior architecture.

The dimensions of the EA Landscape help us think about the EA. Keep in mind that, in most cases, it is easy to build a simplification that is not valid. Architecture Projects are not neat cubes similar to what is shown in Figure 2. A real representation would look more like a sea urchin – a consolidated center but with spikes going in all directions.

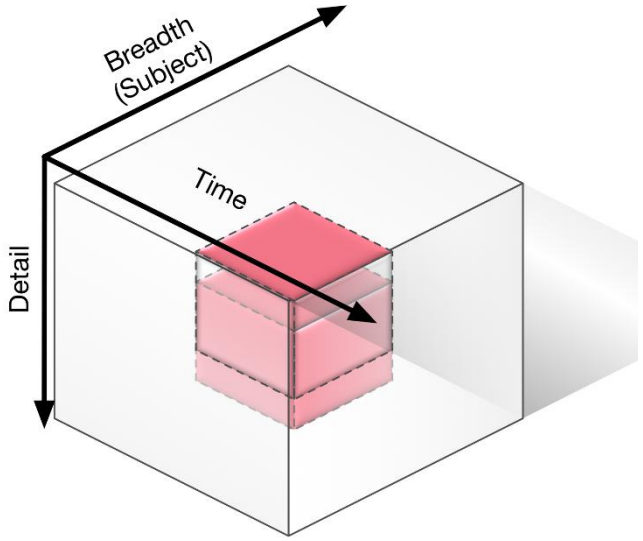

Figure 2: EA Landscape with an Architecture Project

Looking at Figure 2, the essential point is that the Architecture Project covers a specific portion of the EA Landscape – the portion defined regarding breadth, planning horizon, and detail. Prior work may already exist within the scope. The example does not cover the least or the most detailed layers, nor all time periods nor subjects. Rather the example addresses a specific portion of the landscape. The example Architecture Project will populate, or refresh, a portion of the EA Landscape. Because there is higher-level work, all work in the Architecture Project will be subject to the superior architecture. The example stops at a level of detail so the Practitioner will need to constrain the level of detail. Lastly, the example is within the total planning horizon of the Enterprise and will be constrained by what can and must be done within the planning horizon.

Complicating our lives, the superior architecture may exist either as an unrealized target, unrealized transition, or a realized current state. It must always be kept in mind that where there is not an explicit change in superior architecture, the current state probably remains valid. Lastly, this Architecture Project is a subset of the potential breadth of the scope of the EA Landscape. TTM is a key feature of useful architecture; Practitioners must stick to the scope (breadth, time, detail) of what they have been asked. Work outside the scope may be interesting, potentially even needed in the future, but is not within the scope of this architecture initiative.

The energy and efficacy of an EA team is diluted when it tries to be in every conversation by trying to do too much. The construct of a TOGAF Request for Architecture Work as the entry to Phase A exists to bound the current Architecture Project. The Request for Architecture Work tells the EA team that, within the context of the existing EA Landscape, its Enterprise is looking for a Target Architecture addressing a specific set of subjects at a necessary level of detail that can be accomplished within a particular planning horizon. A substantive output of the Architecture Project is to populate, replace, or reaffirm the contents of the EA Landscape. When

stakeholders accept the target, all further EA work, change planning, and change execution are governed by the approved architecture.

3.2.2 Introduction to Purpose

A purpose-based EA Capability model identifies four purposes that typically frame the planning horizon, depth and breadth of an Architecture Project, and the contents of the EA Repository. The purpose-based EA Capability model used in this Guide was introduced in the World-Class Enterprise Architecture White Paper (see Referenced Documents) and refined in the TOGAF® Leader's Guide to Establishing and Evolving an EA Capability (see Referenced Documents).

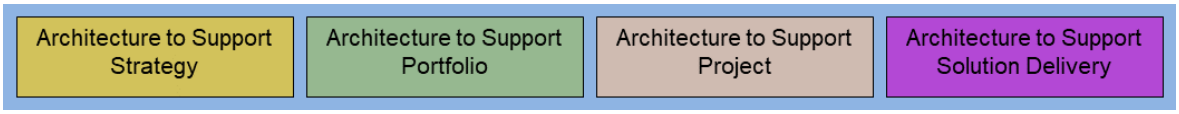

Figure 3: Purposes of Enterprise Architecture

Typically, there are four broad purposes of an EA Capability:

- **EA to Support Strategy:** Deliver EA to provide an end-to-end Target Architecture, and develop roadmaps of change over a three to ten-year period

  An architecture for this purpose will typically span many change programs or portfolios. In this context, architecture is used to identify change initiatives and supporting portfolio and programs. Set terms of reference, identify synergies, and govern the execution of strategy via portfolio and programs.

- **EA to Support Portfolio:** Deliver EA to support cross-functional, multi-phase, and multi-project change initiatives

  An architecture for this purpose will typically span a single portfolio. In this context, architecture is used to identify projects, and set their terms of reference, align their approaches, identify synergies, and govern their execution of projects.

- **EA to Support Project:** Deliver EA to support the Enterprise's project delivery method

  An architecture for this purpose will typically span a single project. In this context, the architecture is used to clarify the purpose and value of the project, identify requirements to address synergy and future dependency, assure compliance with architectural governance, and to support integration and alignment between projects.

- **EA to Support Solution Delivery:** Deliver EA that is used to support the solution deployment

  An architecture for this purpose will typically be a single project or a significant part of it. In this context, the architecture is used to define how the change will be designed and delivered, identify constraints, controls and architecture requirements to the design, and, finally, act as a governance framework for change.

Architecture for different purposes typically creates different contents in the EA Landscape with a different mix of characteristics. Table 1 summarizes the typical characteristics. Table 1 is developed to represent a scenario, where a strategist uses the same concepts, methods, techniques, and frameworks to develop EA to develop a roadmap that supports the direction of an Enterprise. The strategist's Architecture Project will drill down from strategy to creating a

portfolio that realizes the future state by supporting solution delivery. This table presents how the strategist or the architecture Practitioner's work addresses the four dimensions of the EA Landscape.

Table 1: Purpose and EA Landscape Characterization

Purpose	Breadth	Level of Detail	Time	Recency
Architecture to Support Strategy	No pattern. Some Strategy will have a broad impact while other Strategy will cover a narrow subject.	Not very detailed. May contain point constraints that are very detailed when the value is dependent upon tight control. Typically, more guidance than constraint.	Typically, looking ahead for a 3 to 10-year period when Target. Current Architecture to Support Strategy tends to have a short timeframe of validity.	Typically, the need to update and keeping current this architecture is highly variable.
Architecture to Support Portfolio	Will cover single subjects (the Portfolio).	Typically, not very detailed. May contain discrete constraints that are very detailed when the value is dependent upon tight control.	Typically, valid for 2 to 5-year period when Target. Current Architecture to Support Portfolio should be considered past its best-before date. A portfolio without a view to the future is pointless.	Typically, the need to update and keeping current this architecture is highly variable.
Architecture to Support Project	Narrow breadth, typically discrete Projects within a Portfolio.	Typically detailed. Will contain detailed constraints, that may not be fully supported by detailed architecture descriptions. Typically, more constraint than guidance is developed.	Typically, valid as a target for <2 years. Will have very long-lived timeframes as current (post realization).	Typically, will be retained in the EA Landscape for an extended period after transition from Target to Current.[8] In the absence of an Architecture Project, the architecture and associated constraints and guidance will continue indefinitely.

[8] A well-run EA Landscape will maintain components, as well as associated guidance and constraints, through their lifecycle. A typical lifecycle is to be introduced as a candidate, approved through governance as target, then convert to current following an Implementation Project.

Purpose	Breadth	Level of Detail	Time	Recency
Architecture to Support Solution Delivery	Typically, very narrow breadth.	Most detailed EA. Will contain the most detailed constraint. Typically, only constraints will be developed, as guidance will be carried forward from superior architecture.	Typically, valid as a target for <2 years. Will have very long-lived timeframes as current (post realization).	Typically, will be retained in the EA Landscape for an extended period after transition from Target to Current. In the absence of an Architecture Project, the architecture and associated constraints and guidance will continue indefinitely.

3.2.3 What an Enterprise Architecture Looks Like

EA exists to guide and constrain change planning and work to perform the change. The scope of work embedded in a Request for Architecture Work should identify the applicable characteristics of the EA Landscape. Over time, through multiple Architecture Projects, the EA Landscape is populated. This still does not tell us what actually gets written down, nor exactly what is produced.

In short, a Practitioner will need to document three things:

1. Models, in the EA Landscape
2. Views derived from the EA Landscape
3. Other useful things

In short, the architecture is the set of models, the components, and their relationships that comprise the scope of the EA Landscape under consideration. These models consistently describe the current and Target Architecture. In a theoretical world, a single unified model is produced. Typically, a set of models is produced. These discrete models will either have a jury-rigged linkage or rely on the expertise of those using the models to leap between them. Models can vary in formality, some strictly conforming to a semantically constrained structure, while others are quite flexible.

The primary purpose of the models is to facilitate the architect to understand the system being examined. Understand how it works today, understand how it can be most effectively changed to reach the aspirations of the stakeholders, and understand the implications and impacts of the change.

A secondary purpose is re-use. It is simply inefficient to re-describe the Enterprise. The efficiency of consistency is balanced against the extra energy to describe more than is needed, and to train those who describe and read the descriptions on formal modeling. The size, geographic distribution, and purpose of the EA team will dramatically impact the level of consistency and formality required.[9] Formal models are substantially more re-usable than informal models. Formal models are substantially easier to extend across work teams. The

[9] See "Managing your Enterprise Repository" in the TOGAF® Leader's Guide to Establishing and Evolving an EA Capability (see Referenced Documents).

penalty is that formal models require semantic precision. For example, regardless of the structure of an application in the real world, it must be represented in a model conforming to the formal definition. This representation is possible with a good model definition.

Architecture Projects may have unique aspects. Practitioners usually lose the ability to address Architecture Project-specific considerations in a standard representation. The reverse is also true; flexible definitions that directly support one analysis will not be shared nor communicated with others in the EA team. Often the unique aspects will not even be remembered by the author. Practitioners must trade off between re-use and optimal fit, and should ensure that they are optimizing for the entire EA team rather than personal preference.

Every model that is produced and maintained has a price in effort. When effort exceeds value, the price will be paid by hindering an Enterprise's ability to perform the effective change. Unnecessary models and analysis steal from guiding effective change. Every approach to modeling is designed to shed light on one or more aspects of the Enterprise. Typically, narrow, special-purpose models facilitate detailed analysis while broad models facilitate inclusive analysis. All approaches to modeling – formal/informal and broad/narrow – are trade-offs.

All EA Landscapes that support a broad range of purposes will be comprised of a set of models. This set could be contiguous or discrete, targeted for analysis or communication. A core unified model can provide a common bridge between discrete models. The more specific a model, the more important it is to an analysis. The more important a model to analysis, the more important is the need and clarity of linkage across models. Careful thought is needed to understand the long-term need for cross-linkage. Most analyses are performed repeatedly over a period of time for different purposes. Like informal models, jury-rigged or expertise-based linkage is a short-term answer that prohibits effective re-use.

Models are very useful for the architect. They form consistent representations of the parts of the world that must be understood and analyzed. Shorthand communication and consistent analysis reduce the TTM.[10] However, because models are partial representations of the whole, typically described with a limited language that requires experience to read, and often subject to constraints designed to show relationships, models tend to be ineffective to communicate usefully. Consider a balance sheet; it is a great model to outline part of an organization's financial position. It requires skill to read and is silent on the success, margin, or lifecycle of new products. Do not rush to deliver the models sooner than necessary.

Models are poor general communication tools. Good models are carefully constrained to exactly tell part of a story. They will carefully control the components available and the available relationships. They will enforce some attributes. They carefully render a complex environment into something that represents the world in terms it can be understood, optimized, and compared. They tend to require specialist knowledge, and often carefully constrain common terms in a way casual consumers do not align with.[11]

The best communication comes down to views, and "other useful things". Views have a specialized role in communicating the architecture and are discussed in Section 3.3.1. The phrase "other useful things" is purposefully open-ended. For example, it is normal to find that a high

[10] "Oh that process, it is a P3M, don't worry about it."

[11] For example, the term "strategy" is widely used; specifically within the OMG's Business Motivation Model. A high fraction of people who use the BMM trip over the term strategy. It holds a subordinate element in the model and the definition does not immediately resonate with common English. The BMM strategy definition "represents the essential Course of Action to achieve Ends – Goals in particular; it is accepted as the right approach to achieve its Goals, given the environmental constraints and risks".

fraction of useful communication is highlighting the value of the target state, acknowledgment of the scope of anticipated change, or clarifying the date value is expected. Most of the effective communication about an architecture will be "other useful things".

3.3 How to Use an Enterprise Architecture?

An EA is developed for one very simple reason: to guide effective change. Practitioners use models to provide a consistent analysis of complex systems. Models provide efficient long-term representation that enables like-with-like comparison – comparison of what is, what was, and what might be. The comparison that facilitates trade-off between potential changes that carry different costs and different benefits. Models provide understanding to people who understand the language, structure, and limitations of a model.

Guiding effective change is driven by who is using the architecture. Three broad communities use the EA: stakeholders, decision-makers, and implementers. Each of these communities uses the architecture differently.

When starting to talk about communication, the problem of terminology is the first obstacle faced. "Stakeholder" is a useful term, and multiple frameworks and methods use the term. Be aware of when you are carrying implied meaning from one framework, or approach, to another. This Guide follows ISO/IEC/IEEE 42010:2011 guidance on stakeholders which focuses the attention on those whose concerns are fundamental to the architecture, or architecturally significant.[12] Facilitating effective communication requires us to make a distinction between other communities who are interested in the architecture. A stakeholder holds approval rights on the target and the implementation; an implementer requires guidance and constraint; and a decision-maker holds execution rights on change. Practitioners are advised to develop views that address a stakeholder's concerns. Success of an architecture rests on the clarity and focus of the views produced. Its sole purpose is to communicate that the Target Architecture best satisfies the complex set of requirements the Enterprise has. Practitioners are best served when they preserve the distinction between stakeholders with approval rights and those needing most recent data points to create appropriate views of the concerns addressed by the EA. Without clarity on distinct roles, Practitioners complicate governance of the EA and the change projects.

3.3.1 Communicating with Stakeholders (Concern and View)

This Guide provides practical advice to a Practitioner on using the TOGAF framework. Stakeholders' concerns and views are one area where the theoretical constructs embedded in the TOGAF Standard are correct, but not directly translatable to use. The TOGAF Standard takes a formal modeling approach to understanding stakeholder, concern, and view; this has led some to interpret that all representations of architecture are views prepared for any conceivable interest. That interpretation is correct, just not helpful,[13] considering usefulness and TTM. This Guide will emphasize the point "do just enough to support key decisions at this moment". Getting more

[12] The term "stakeholder" is one where many practitioners have preconceptions. Part of the problem is formal definitions having to be broad to ensure that they properly include all reasonably conceivable stakeholders. In this Guide where a formal definition doesn't provide pragmatic guidance, it will move promptly to pragmatic guidance, and leave the discussion on semantic purity to others.
The TOGAF Standard definition aligns with ISO/IEC/IEEE 42010:2011: "an individual, team, organization, or classes thereof, having an interest in an enterprise or system".
The Project Management Institute (PMI) definition is: "an individual, group, or organization, *who may affect, be affected by, or perceive itself to be affected* by a decision, activity, or outcome of a project".

[13] Tell the inhabitants of Whitehorse, Yukon Territory that they live in southern Canada. Technically correct, but not helpful to any conversation with someone who knows they live in the North.

data and providing more detail may sound appealing. The only thing an architect does not have is time. Do the right things to the best level of detail to market the architecture, and make people use the architecture. If there is time, pursue creating the rest of the views and elaboration if and when necessary.

Further, stakeholders, views, and concerns are often explained in terms of a single architecture. Consider what an EA Landscape will actually contain: Multiple discrete architectures. Separated by purpose, detail, breadth, time, and recency. And then there is architecture states: current, transition(s), and target. An architect's first obligation is ensuring the architecture addresses the preferences of the Enterprise. When the Practitioner preserves the stakeholder's concern, the view to communicate with the stakeholder, and how the architecture will address their concern, something useful to govern against in addressing this obligation naturally emerges.

From a practical perspective, consider:

- **Stakeholder**: someone who has approval rights in the Target Architecture being explored by the current Architecture Project, and subsequently has decision rights to the suitability of the implementation
- **Concern**: a consistent set of subjects that capture the stakeholder's interests and act to consolidate requirements
- **View**: a representation of the EA Landscape that addresses a set of stakeholder's concerns; either describe how the architecture addresses the concerns or demonstrate how the associated requirements are met

The TOGAF concept of an Architecture Project provides context for both the development of new architecture and the change to realize it. By practically constraining the use of stakeholders to those with approval rights Practitioners enable governance, and more importantly governance in context.

This Guide constrains the concerns to a topic and addresses the stakeholder's power, interest, and requirements against this topic. This approach surfaces topic-based decision rights and provides the ability to perform a trade-off between competing requirements. The chapters discussing a walk through the ADM for different purposes will expand on the use of concerns. Pragmatically, most requirements will cluster in six to nine topic areas that are derived from the Enterprise's strategy. In fact, most concerns are consistent from one Architecture Project to another – they cluster around the central challenges the Enterprise is trying to address, such as agility, efficiency, IT complexity, or customer journey.

A consistent set of core concerns aligned to Enterprise priority facilitates focus on priority. Every Architecture Project brings to the fore Enterprise priorities and is in a position to demonstrate how this initiative is addressing the priority. Further, Practitioners are in a position to confirm consistency of requirement within a concern, and by stakeholder. Confirming consistency, or the lack, enhances the Practitioner's ability to discern the set of preferences the Enterprise is chasing.

Table 2 provides an extended TOGAF Stakeholder Map including concern and requirement. Missing requirements within a concern can either be a gap in information gathering or a demonstration the stakeholder is saying "this does not matter". Knowing requirement or lack of preference in relationship to power and interest directly facilitates trade-off. The trade-off is performed within a concern and between the concerns.

Table 2: Sample Stakeholder Map

	Concern 1			Concern 2		
	Power	**Interest**	**Requirement**	**Power**	**Interest**	**Requirement**
Stakeholder 1	High	Low		Low	High	
Stakeholder 2	High	High		Low	Low	
Stakeholder N	Low	High		High	Low	

Views address a stakeholder's concern about a specific architecture. In a perfect world Practitioners are able to use a single model directly. This is a mythical happy place. It will never be possible for a key issue such as agility or cost.

A view simply addresses a stakeholder's concern about an architecture. Often it is a potential architecture, and the view serves to help the stakeholder's potential target and associated change. This allows a stakeholder to put things in context and have confidence about the target and the change.

When stakeholders understand the architecture, the change, and the trade-offs, implementation governance is possible. Fail, and expect continuing issues as point answers highlighting one potential benefit without any compensating trade-off emerge throughout the planning and execution cycle.

When establishing the EA Capability, it is likely common classes of stakeholder were identified. If this was done essential concerns were likely identified.[14] These concerns represent the questions that the EA Capability is expected to answer, and may be considered mandatory. Successful high-functioning EA teams will maintain a library of viewpoints (see Appendix C) designed to address the questions they are expected to have answers for. Each viewpoint should identify the concern, the stakeholder(s), how the view should be constructed, and the information required to address the question.

Viewpoints are specialized communication to stakeholders that explicitly address a concern. Keep in mind that any associated requirements may not be satisfied by the architecture. The view is not a demonstration that the stakeholder should be happy; rather it is a demonstration of how the architecture addresses the concern.

3.3.2 Communicating with Implementers (Gap, Specification, and Control)

Implementers are typically poorly served. It is common to see implementers handed with a set of diagrams that represent the architecture. From these diagrams the implementers are expected to figure out the gaps they should fill, the architecture specifications they must conform to, and the controls they must implement. Implementers are better served when they are explicitly provided context, gap, architecture specification, and control.

The TOGAF Standard identifies a very useful concept for communication with anyone implementing the Architecture Contract. An Architecture Contract identifies the responsibility of

[14] See Customization of Architecture Contents and Metamodel in the TOGAF® Leader's Guide to Establishing and Evolving an EA Capability (see Referenced Documents), and Appendix B.

the implementation team to the Target Architecture's stakeholders. The most critical items to an implementer are:

- **Implementation Project context**: where does the project fit within the roadmap, what value or value dependency will the project provide?
- **Scope**: what work packages and gaps is the Implementation Project responsible for, as well as what gaps associated with any architecture components associated with the project scope is the project not responsible for?
- **Conformance**: what is the set of specific architecture specifications and controls the Implementation Project will be assessed against?

The essential component is to fulfill the purpose of the TOGAF Architecture Contract: link the Implementation Project to the target in terms of context, work required, and conformance test. Most critically, stop setting the implementers up by expecting them to work out what is expected and how the project's design and implementation will be assessed.

John Carver's policy governance approach[15] is one of the best for a Practitioner to follow. There are two imperative practices in Carver to follow. First, specifications should be exclusionary, highlighting what is prohibited, rather than mandating what is permitted. Second, specification compliance should be assessed through a reasonable interpretation test by a reasonable person.

Drafting specifications as exclusionary reduces the requirement for omniscience during architecture development and provides the maximum opportunity for creativity during implementation, whether the creativity comes from innovative thinking by the design team, new technology, new third-party services, or new processes. Understanding what is prohibited, assumes everything else is allowed. The key concept is if the architecture does not constrain a choice, or prohibit a choice, the choice is allowed.

Given that creativity is encouraged, Practitioners cannot expect that an implementation team can read minds and implement in the same way as envisioned. This forces the compliance assessment to be a test of reasonable interpretation. The best practice is always to link a specification to a requirement.[16] This allows the design, or implementation, to be assessed against a requirement/specification pair. The specification is in the context of what motivated the specification. Following this practice, every specification exists to deliver something, and the implementation can be value tested.

When Practitioners serve the implementation team well, the stakeholders are supported. Practitioners provide the big picture to guide projects implicitly to value production, and requirement/specification pairs to guide the projects explicitly to value. In both cases, the value being produced is directly traceable.

3.3.3 Communicating with Decision-Makers (Other Useful Things)

The last community who must be communicated to are decision-makers. Typically, decision-makers will have a strong overlap with stakeholders. This distinction is necessary to ensure that the stakeholder/concern/view construct is restricted to the approval of the target. The ability to have crisp governance of the target and approval is too important to blur the line and include other communications.

[15] Refer to John Carver: Reinventing your Board (see Referenced Documents).
[16] In the case of a control, it is always associated to the risk for the same reason.

Like communicating with implementers, communication to decision-makers often falls into the category of "other useful things". An architecture roadmap or the strategic architecture are empirical in nature. They are supported by conversations around "motivation statements", demonstrating how the scope of change aligns to goals including why each step is essential, the foundational nature of some of the Implementation Projects, employment of an appropriate compliance report for decision support, etc. Such conversations fall under "other useful things". It may not be possible to create appropriate models to support these communications.

Decision-maker communication will typically be aligned with:

- Timing
- Trade-off decisions
- Status
- Budget
- Compliance
- Confidence

Communication about timing is typically drawn from either the Roadmap, the Implementation & Migration Plan, or from Phase G. Timing speaks to when can the decision-maker expects activity to start, change something, complete something, or start to obtain value.

Trade-off decisions between stakeholders need to be communicated to others in the Enterprise. They are usually not involved in the trade-off. Communication about trade-off decisions is typically educational, serving to explain the trade-off decision. Critical conversations on trade-off by prior architecture and superior architecture will be held during Phase F, G, and H, informing decision-makers.

Status conversations are about the Architecture Project. The most important status conversations are about closing on an Architecture Vision in Phase A, resolving complex trade-off in Phases B, C, and D, and value, effort, and dependency conclusions regarding the Roadmap's work packages in Phase E. The status of value realization conversations will occur in Phase H. Depending upon the status of value, further conversations about architecture change requests, or initiating a new Architecture Project may occur.

Decision-makers have a deep interest in the budget. During Phase F's planning exercises some of the most complex trade-off decisions are made. Conversations with stakeholders during architecture and roadmap development revolve around value, effort, and risk. In Phase F spend is brought to the fore. Further, during Phase G budget control and availability will impact all Implementation Projects.

Best practice has decisions on non-compliance being made by stakeholders. They need to approve the recommendation to enforce the target, grant relief, or change the architecture. Communication about compliance is very similar to trade-off conversations. Also, when relief is granted, further conversations about scheduling a roadmap or implementation plan update should also occur.

Some of the most critical conversations with decision-makers are about confidence. The confidence they should have in the Roadmap and Implementation & Migration Plan, completing

the change, and realizing the value. All architecture is an approximation; no Practitioner can underestimate the importance of confidence.

3.4 Conclusion

In order to guide effective change, Practitioners have to understand complex systems and analyze the possible ways to improve the complex system against a set of usually contradictory preferences. In order to understand and analyze a complex system, good Practitioners will represent the system in a set of models. These models are the architecture – a description of the system in terms of components and their relationships. Over time, through multiple Architecture Projects, the EA Landscape is populated.

Using an architecture requires translation of the models to a form that is useful to non-specialists. Practitioners should not expect stakeholders, implementers, decision-makers, or anyone else to understand the models' specialized language, structure, and limitations.

Practitioners need to communicate with three broad communities: stakeholders, decision-makers, and implementers. Each of these communities uses the architecture differently.

Stakeholders are presented with views that address their concerns. This enables stakeholders to understand the architecture, engage in trade-off decisions, and finally approve the Target Architecture.

Implementers need to understand their project. First, where their project fits within the roadmap, and its role in producing value. Second, what work packages and gaps they are responsible for, as well as associated gaps they are not responsible for. Third, how conformance will be assessed.

Decision-makers' communication often falls into the category of "other useful things", where Practitioners communicate timing of change and value, prior decisions, status, budget, and confidence. All Practitioners need to keep in mind that informal communication, outside the scope of models, architectures, views, roadmaps, specification, or compliance recommendations, are the most important communication that will be undertaken.

An effectively communicated architecture is one that provides confidence. The importance of confidence cannot be underestimated. Confidence that the architecture and associated roadmap of change is the guidance the Enterprise should follow. With confidence, an Enterprise's leadership will use the EA to direct and govern effective change.

4 Business Cycle

All organizations have existing change processes. The EA team needs to be aligned with the organization's planning, budgeting, operational, and change processes.[17] The Practitioner must understand that a theoretically perfect world where the EA team is engaged in all change cannot be expected. In practice, the scope of the EA team will be limited to some purposes, or will only be engaged in some changes. The TOGAF Standard says you need to configure the ADM to align to your business. This is commonly interpreted to fit the ADM as an end-to-end process as an appendage to existing business processes. Instead, the architecture development processes need to feed, and support, the existing change processes. This means the ADM is used to deliver work products useful to other processes, and just enough of the ADM is used to deliver to other Enterprise processes.

4.1 Budget Cycle

For most organizations, the budget cycle controls change in the organization. Pragmatically, the EA team will be aligned to the budget cycle. Figure 4 shows a timeline view, depicting an alignment of key decisions made during a business cycle and the purpose architectures. EA for Strategy, Portfolio, and Project need to be completed before key milestones for budget decisions are made. EA for Solution Delivery is a continuous operation around budget control. The key takeaway is architecture before the decision. If you are trapped trying to architect after the decision, see Section 11.2.1.

Figure 4 provides a simplified budget cycle for structuring what is universal.:

- Budget Planning identifies what is needed and what new initiatives will be started
- Budget Preparation is typically a top-down and bottom-up activity – guidance about expectations and initiatives will be provided from the top, and each department will develop a spending request
- Budgets provided are the subject of further decision-making

  Allocating budgeted funds is a key step in executing change. A good budget is a financial embodiment of the organization's priorities for the current budget cycle. Prior to allocation to an Implementation Project everything is just an idea.
- Budget control is ongoing financial and benefits realization of an Implementation Project

[17] See Process Model in the TOGAF® Leader's Guide to Establishing and Evolving an EA Capability (see Referenced Documents).

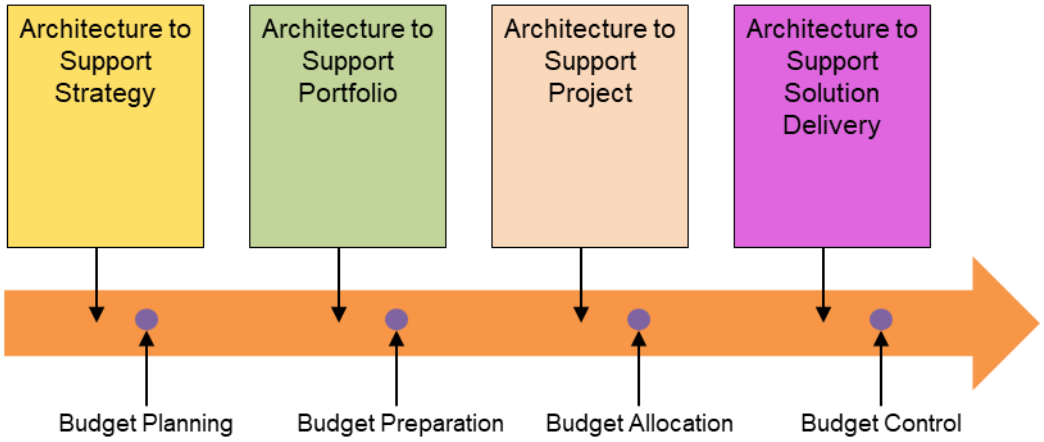

Figure 4: Business Cycle and Architecture by Purpose

Keep in mind that the simple unidirectional model allows us to see the interplay between key decision milestones. This Guide uses the phrase "Architecture to Support" deliberately. The change process executes with or without a functioning EA team. The pragmatic question is what an EA team can do to guide effective change.

As mentioned earlier in this Guide, it is best to tie everything to the budget cycle. The importance of good EA on guiding and constraining the change decisions is naturally noticed and highlighted. When there is no practical input from a good EA team before the decision an organization needs to take is made, the decision is still made. It might even be a good choice, but it was a less informed choice.

Keep in mind that in all EA the stakeholders, decision-makers, and implementers require effective support ahead of the decision. Good architecture that informs decision is infinitely more valuable than perfect architecture that follows decision and execution.

4.1.1 Budget Planning and Architecture to Support Strategy

The linkage between budget planning and Architecture to Support Strategy is a natural fit, that like many associations is not always correct. Part of the challenge is use of the term "strategy". Often the term is implicitly associated with the organization's strategy. Then without warning the same term is used for something far more specific, like the staff compensation strategy. At its most basic, a strategy is simply a "central integrated, externally-oriented concept of how to achieve the objectives".[18]

Like "stakeholder", a good definition encompasses a broad range of potential cases, without narrowing down to effective guidance. From an EA perspective, Practitioners are supporting strategy when exploring a longer-term target, and work will be used to identify a set of change initiatives. Guide the terms of reference for the initiatives so that the organization can direct and control execution through a portfolio of work. Typically, this type of work will align with budget planning, where the organization plans to spend on new initiatives or newly identified things. Table 1 identified that this work is typically only sufficiently detailed to provide guidance over a three to ten-year period and that the guidance will be valid for short periods of time. This is

[18] Refer to Hambrick & Fredrickson: Are you Sure you have a Strategy? (see Referenced Documents).

where organizations switch priority – the important element to recognize is the longer-term target is rarely shifting; what is shifting is where priority is placed.

Good Practitioners know they are supporting strategy when the priority pendulum slows; when the organization is able to balance between two or more competing impulses. Effective guidance helps the organization understand what is required for the complete set of its needs.

4.1.2 Budget Preparation and Architecture to Support Portfolio

The linkage between budget preparation and Architecture to Support Portfolio is one of the strongest linkages available. Given a set of change objectives, the organization is embarking on what is a good approach – what work must be funded, what work can be deferred, and what work should be deferred. Some of the most powerful guidance to effective change an EA team can provide is to support portfolio planning and investment decision.

Providing Architecture to Support Portfolio requires working outside the corporate planning and execution cycle. When everyone else is executing on this year's budget, the EA team must be working on next year's budget; they have to be ready with a roadmap at the start of the budget preparation process.

The key questions every portfolio and budgeting process struggles with is a priority. Most portfolio and budget cycles are swamped in noise and cheerleading. They desperately need to know what work, in what areas must go forward and why. What work can be safely deferred? What work must proceed as a package?

Some of the highest value work a Practitioner can provide is supporting portfolio and budget preparation.

However, it requires the roadmap to be available as the initial budget materials are being prepared, with an ongoing update from trade-off during the budget discussions. TOGAF Phase E and Phase F align directly to this use of Architecture to Support Portfolio. Phase E prepares the architecture roadmap for the budgeting process; work with all decision-makers in the budget preparation to finalize the Target Architecture, and the Implementation & Migration Plan.

A key use of the EA is to sustain a well-considered target. Budget and capacity to change determine what is planned for realization.

4.1.3 Budget Allocation and Architecture to Support Project

Architecture to Support Project is the first time you can see that work to effect change is about to be done. Before the release of funding to an Implementation Project, no change is going to happen. The classic alignment of this purpose in Phase F is the development of an Implementation Project business case or Implementation Project charter.

Architecture work facilitates the organization's final decision-making about the use of funding and other scarce change resources. The tendency of implementation teams to focus exclusively on the creation of tactical business value needs to be balanced with the roadmap purpose and value against the target. It is common for implementation teams to sacrifice substantive organization value to provide what might be considered "decorative" features to the operational team the implementers work with.

Balancing the bottom-up change needs with broader initiative needs is an important role. Will the organization's priorities and values be realized by a particular Implementation Project? If so, the organization's budget allocation process should release the funds. If not, parochial departmental interests are capturing scarce organizational improvement resources. Ensuring delivery of value is one of the most important reasons to perform Architecture to Support Project. If bottom-up business case justification built end-to-end efficiency, agility, or eliminated the need for transformation projects, no one would need the profession of EA.

The other role is ensuring completeness. Far too many projects build metaphorical half bridges; building everything but the last piece to cross the obstacle. The justification is usually to "make progress". Bluntly, an organization is not making progress when it embarks on a change it will not finish. The organization is simply wasting resources.

Figure 5: Half a Bridge

The TOGAF concept of the Architecture Contract provides the linkage between the value and the implementation through the target. The Architecture Contract provides traceability in terms of context, the complete work required, and conformance tests. Focusing attention on what will produce value and enabling architecture-supported governance is a chief outcome from Architecture to Support Project.

4.1.4 Budget Control and Architecture to Support Solution Delivery

Architecture to Support Solution Delivery is directly aligned with work to implement effective change.[19] In the business cycle, the budget control provides ongoing financial control and benefits realization. Architecture to Support Solution Delivery is directly aligned to the governance of the Implementation Project. Enabling direct association of spend with benefits realization is the contribution to the budget cycle.

Architecture to Support Solution Delivery is dependent on traceability through the EA Landscape. Definition of acceptable boundaries for design and implementation, as well as boundaries for design and delivery, facilitate procurement and third-party contracting.

Similar to Architecture to Support Project, Architecture to Support Solution Delivery will use the TOGAF concept of an Architecture Contract to constrain design and implementation choices tightly to value.

[19] This Guide is cognizant of repeated efforts to draw distinctions between "Enterprise Architecture" and "Solution Architecture", which seems to be driven by some attempts to associate EA to big thoughts and big initiatives. In practice it is a distinction that drives no changes in an effective EA team's organization and approach. This Guide treats it as a distinction without a practical difference.

Most Architecture to Support Solution Delivery will be performed in the TOGAF ADM Phase G. The need to fully iterate the ADM makes little sense when there is a superior architecture that develops the outline of the target, the stakeholders, a roadmap, and an implementation plan. If you are not getting value, you are creating busy-work and self-confusion about the ADM.

4.2 Business Cycle Conclusion

The business cycle is one of the core business activities that an EA team must align to. It provides a common reference point that is central to how an organization plans, authorizes, and executes change. Performing process alignment and alignment to other Enterprise frameworks is one of the central activities of establishing an EA Capability. For a broader discussion of other alignments, see the TOGAF® Leader's Guide to Establishing and Evolving an EA Capability (see Referenced Documents). This Guide uses the business cycle as a simplification of the myriad of business activities that an EA team supports, to align with the practical work requirements of a Practitioner.

5 Coordination Across the EA Landscape and EA Team

This chapter will address the following questions:

- What to expect in a well-run Architecture Repository & EA Landscape
- How is ADM iteration realized in practice?
- How to work in the context of superior architecture
- How are multiple states managed (candidate, current, transition, and target)?

5.1 What to Expect in a Well-Run Architecture Repository & EA Landscape

Note: In order to provide concrete examples of working in a repository, this Guide presents a few screenshots using a modeling tool. These represent one way that the challenges of a managing an EA Landscape can be met. As outlined in Section 1.3, this Guide does not mean to suggest that the referenced tool, techniques, and literature are definitive. These examples are intended to illustrate the TOGAF concepts. Other tools and techniques are available.

The TOGAF Standard identifies a broad set of materials that will be contained within the Architecture Repository. As a Practitioner, you will be directly concerned with the Architecture Landscape, Reference Library, Standards Library, Architecture Requirements Repository, and the Compliance Assessments in the Governance Repository. Typically, these are implemented by a modeling and analytic tool, and a file repository.

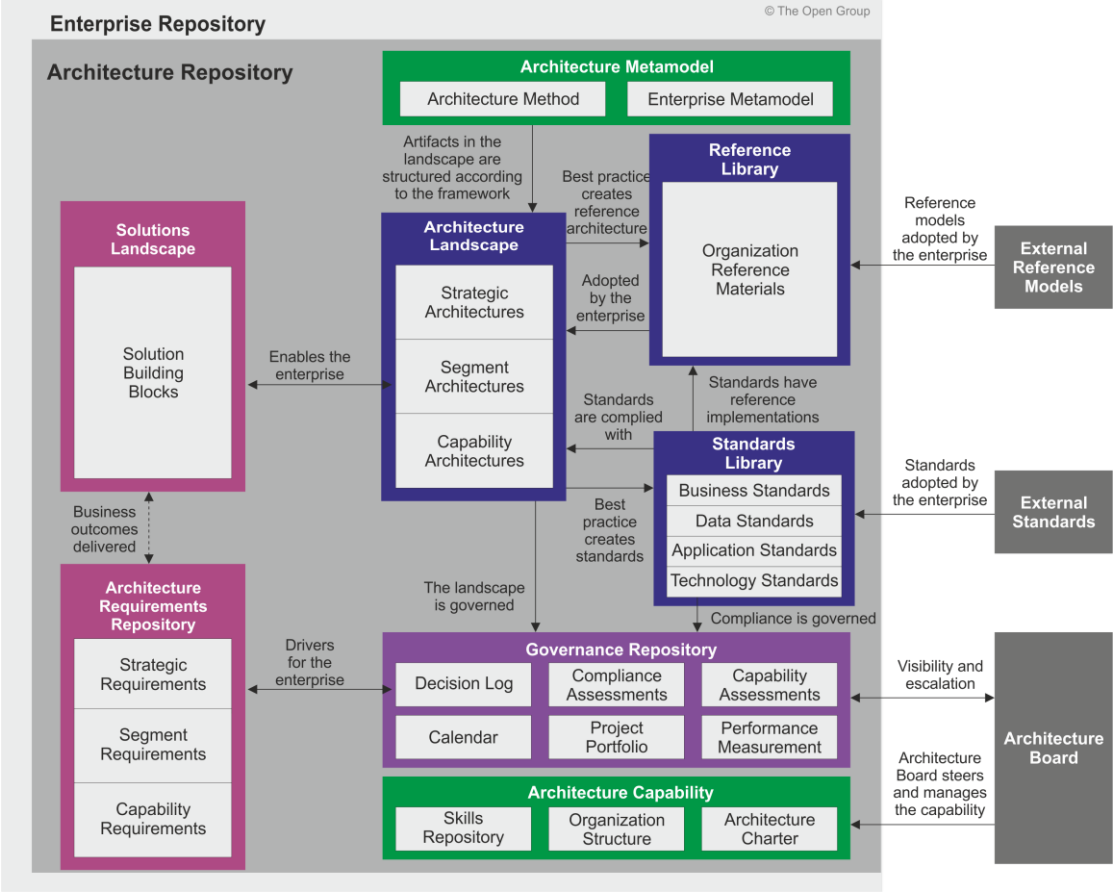

Figure 6: TOGAF Architecture Repository

A high-functioning EA team cannot deliver without using modeling and analytic software. Some Practitioners sketch diagrams casually as initial steps in understanding a system, or explaining one. Maintenance of a collection of sketches is not practical. It does not matter where they use a marker and 11" x 17" paper or spend hours connecting objects in drawing software, these sketches are not modeling and do not provide a meaningful contribution to the EA Landscape. Further, the gaps and errors inherent in casual sketching preclude considering the sketches as a model.

Do not confuse the guidance about managing an EA Landscape and EA Repository with commentary on effective communication. Most things an EA Capability needs to represent are complex. Visualization of complex situations to support the Practitioner, the stakeholder, and others that need to be communicated with is critical. Hand sketches are one of the most powerful communication tools available to a Practitioner. Beyond ideation it is a serious error to present poorly thought-out visualizations to stakeholders and decision-makers. This Guide strongly recommends the inclusion of information visualization skills in any EA team to address the needs of different communities – decision-makers, implementers, and stakeholders. One of the most significant challenges to developing a high-functioning EA team is overcoming poor information management and information presentation practice.

A significant factor that results in a well-run sustainable EA Repository is the ruthless minimization of information gathered and maintained. Any information that is not required for the current Architecture Project, or supports minimal traceability, should not be captured. EA

teams routinely drown in an information overload after capturing and maintaining extraneous information – information that is typically only useful for more detailed architecture analysis or implementation. Good Practitioners will not confuse ruthless minimization of work with skipping necessary work: all stakeholders' concerns must be addressed. Leading Practitioners will understand that stakeholder management is necessary and attention to non-key stakeholders is rarely on the critical path.

The three most powerful components of an EA Repository are the Architecture Requirements Specification, controls, and gaps. Managing the transition from levels of detail can be greatly simplified when, instead of modeling for the sake of building a comprehensive end to end model, its integrity is preserved, avoiding incomplete analysis for areas of the architecture where sufficient detail is not available. When there is sufficient detail to guide and constrain, the Practitioner's work is done.

The test of sufficiency is a function of fitness for purpose. Best practice governance has the architect demonstrate that the views produced for the stakeholders and any constraints and guidance are derived from the architecture. Stakeholders approve views, not architecture descriptions.

More detail is always available to be captured and represented in the architecture model; additional model kinds; additional refinement. When a Practitioner models for the sake of modeling, there is no endpoint. The test of success is whether the stakeholder's concern can be addressed. As an example, the Enterprise is attempting to improve agility – can the view demonstrate to the satisfaction of the stakeholder that this Target Architecture and all associated change delivers agility? When sufficient information is gathered, and analyzed to demonstrate agility, the Practitioner is done. When the implementer can be provided with a list of gaps that need to be filled, Architecture Requirements Specifications, and controls that must be followed, the Practitioner is done. Do not do the work that comes after the decision, or activity that you are currently architecting to support.

A high-functioning EA team will be supported by modeling and analytic software, as well as a document management system. Whether these software functions are provided in a single suite or a set of software tools is not material. A Practitioner requires the linkage between any models and documentation, as well as a space to perform necessary analysis to develop their candidate architecture.

What is produced is either a work product that is actively consumed or the intermediate work products the Practitioner needs to produce the requested work product. Table 3 provides a summary of work products that are actively consumed by key Enterprise processes.

Table 3: Partial List of Work Product Alignment with Key Processes

Practice Supports	Architecture to Support Strategy	Architecture to Support Portfolio	Architecture to Support Project	Architecture to Support Solution Delivery
Phase A Work Product: Vision	Key deliverable Before framing of a strategic planning session Refresh before initiation of program budgeting	Key deliverable Before start of budget planning	Often not used Activity to produce a vision overlaps with portfolio/program candidate architecture and roadmap Technique may be used at initiation of business case	Limited use Primary use is early in implementation cycle (via internal providers or execution partners)
Phase E Work Product: Candidate Architecture	During strategic planning session Refresh as required in program budgeting	Key deliverable Before start of budget planning Primary use is stakeholder acceptance of target and definition of gap	Before project initiation and finalization of business case Primary use is creation of Architecture Requirements Specification	Before engagement of execution partners (including internal providers) Primary use is creation of Architecture Requirements Specification
Roadmap	During strategic planning session Refresh as required in program budgeting	Before start of budget planning Refresh as required to support budgeting and program management	Limited use Can be used as an input to projects with multiple interactive changes	Before engagement of execution partners (including internal providers) Primary use is identification of required change, and preferences of how to execute change, to manage solution delivery partner selection and engagement
Phase F Work Product: Architecture Contract & Architecture Requirements Specification	Likely not used	Limited use	Key deliverable Before completion of project initiation	Key deliverable Before engagement and contracting
Implementation & Migration Plan	Likely not used	During portfolio budgeting Refresh as required to support budgeting and program management	Key deliverable Before project start	Key deliverable Before engagement and contracting

Practice Supports	Architecture to Support Strategy	Architecture to Support Portfolio	Architecture to Support Project	Architecture to Support Solution Delivery
Phase G Work Product: Compliance Assessment	Likely not used	Likely not used	Key deliverable At key points in project that allow reporting to stakeholders and obtaining decisions for non-conformance	Key deliverable At key points in project that allow reporting to stakeholders and obtaining decisions for non-conformance
Phase H Work Product: Value Assessment	Before governance review, framing a strategic planning session and program budget	Key deliverable Before governance review and program budgeting Refresh as required to support program management	Limited use Scope of significant architecture change and value often does not cleanly align to projects	Limited use Scope of significant architecture change and value often does not cleanly align to solution deployment

Successful Practitioners will strictly follow the first step of the architecture development phases (Phase B, Phase C, and Phase D) that says to select appropriate viewpoints. In order to select viewpoints, the Practitioner needs to know the stakeholder and concern. From these, the viewpoint that addresses the stakeholder/concern pair will identify the information necessary to address the stakeholder's concern. Any information that is not required information to address a stakeholder concern should not be gathered and analyzed. Extra information is pointless.[20]

When the Practitioner focuses on effective communication with stakeholders, implementers, and decision-makers, pointless activity is eliminated.

5.1.1 What to Expect in a Well-Run EA Repository: EA Landscape

One of the most challenging aspects of a well-run repository is managing transitions over time. In most simple terms, every architecture will exist in up to four states. The current state is what exists in the Enterprise today; this baseline provides the reference for all change. The target state[21] is what stakeholders have approved; this state provides the reference for governing all change activity. Transition states are partially realized targets between the current state in the target state. The candidate state is what has been developed by the EA team but has not been approved for a status sufficient to govern change.

In practice, transition and candidate states create the most complexity in an EA Repository. Conceptually exploring gaps is easy; only look at what changed between the current and target states. Consider the four characteristics of the EA Landscape: breadth, depth, time, and recency. Now mix in multiple states. Now mix in that as time progresses the architecture can change. Now mix in that different Architecture Projects can work on the same subject at different times

[20] At several points in this Guide, and other papers from the same authors, there are very statements about effective architecture practice. These statements are drawn from the experience of the authors and reviewers. Gathering, maintaining, and analyzing pointless information is no different than establishing an EA team for the wrong purpose. Eventually, it will be fatal for the EA team.
[21] Earlier this Guide used the term "end state". In reality, there is no end state for an Enterprise, unless it is terminating its operations. The Guide also used "future state" to indicate lapse of time to achieve and experience the improvement. From this point onward this Guide will use "target state" to indicate that it is the foreseeable best case scenario the Enterprise is striving to achieve. Having achieved, the same concepts and approach for trade-off can be applied or fine-tuned to new scenarios.

and different levels of detail. Variability is the nub of the information management problem. To be able to see the best set of required changes, the Practitioner must ruthlessly minimize the information maintained, and maximize the use of decision records.

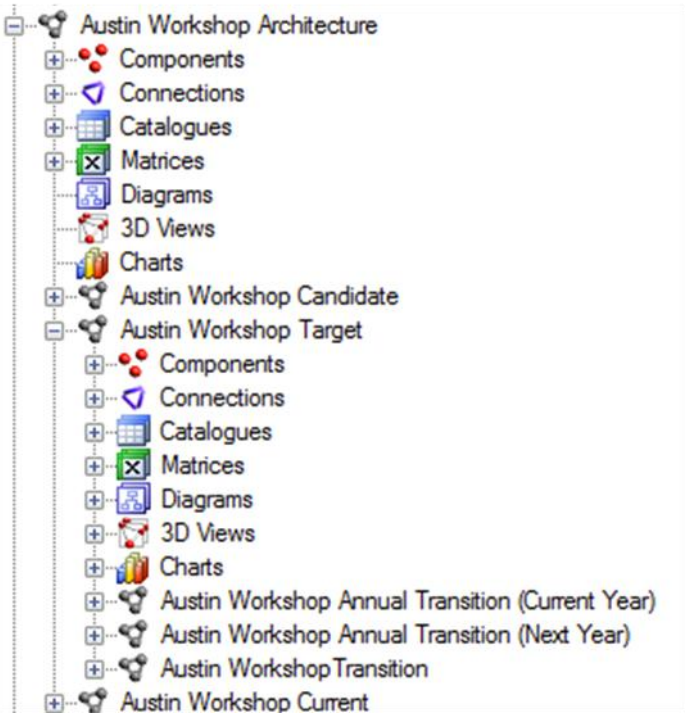

Figure 7: Example EA Repository

Figure 7 is a screenshot from an EA Repository. A common current state description of the architecture is maintained in the repository. This common current state is periodically updated and used as the basis of all gap analysis. The governance test is that the current state reasonably represents what is. The repository also contains a consolidated target state and several transition states. When Architecture Projects come to a close, their architecture descriptions are moved into the consolidated target state. As the current state, the consolidated target is used in all gap analysis. While there is variance between transition states in the consolidated target, the Practitioner is in a position to assess whether the current project is moving towards the Enterprise's preference.

Architecture under development creates an additional information management challenge. For every Architecture Project, create a separate container in the EA Repository. This container allows the Practitioner freely to explore candidate target state options, different trade-off decisions, and impacts without affecting any other Practitioner's work. A well-run EA Landscape will perform its modeling and analysis to support the decisions/questions at hand only to the extent necessary and nothing more. These Practitioners understand and execute with the notion that more detailed work would come from another architecture cycle, post-decision to discuss implementation. Figure 8 has separate architectures for an Architecture Project exploring a Portfolio, Project, and Solution Delivery.

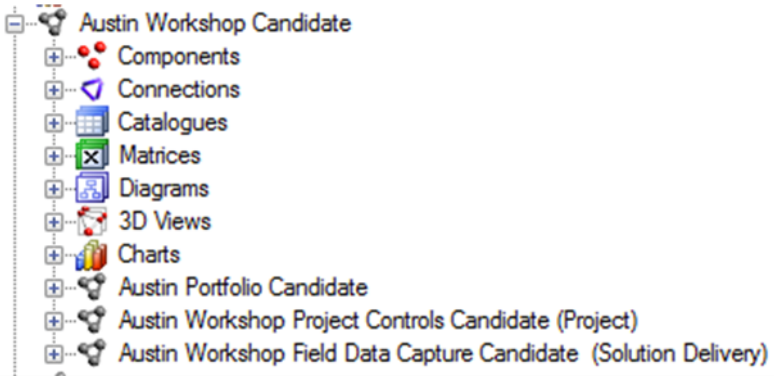

Figure 8: Multiple Candidate Architectures

Figure 7 and Figure 8 provide an example. Different EA modeling and analytic software, or even a different approach in an EA tool, would have different screenshots. The essential component is ensuring that the EA Repository supports different states, and provides flexibility for an architect to explore a potential future without impacting any other architect's work.

Supporting documents maintained must clearly identify their state. Without this ability, the Practitioner is pragmatically uncertain whether the document they are looking at is relevant, valid, or useful. They must readily allow the Practitioner to determine their recency. In practice, a candidate or target, or distantly realized current state architecture might be useful to the Practitioner. Usefulness is predicated on the "self-identification" of state and timeline. Without such markers, each supporting document is nothing but noise.

5.1.2 What to Expect in a Well-Run EA Repository: Reference Library

The Reference Library provides guidelines, templates, patterns, and other forms of reference material that can be leveraged in order to accelerate the creation of new architectures for the Enterprise.

The Reference Library of a well-run EA Repository is filled with accelerators. Accelerators speed time to market. A recurrent theme in this Guide is ensuring sufficient architecture work is produced to support decisions and actions about the Enterprise's change activity. The most precious resource in change activity is time.

There is a broad set of reference materials used by a Practitioner. Broadly there will be two sets of reference material distinguished on whether they are directly used in architecture development, or provide background material. The first are materials that are used within the EA Landscape. These will include reference models, reference architectures, and patterns. These reference materials provide proven approaches. Proven approaches are accelerators, as they do not need to be explored with the same rigor as a novel approach. For example, the IT4IT Reference Architecture and APQC's Process Classification Framework.[22] In both cases there is no need to invent a novel set of processes. This type of reference material provides a complete starter set, simplifies communication, and enables re-use within the EA team. Each Practitioner will use the same terms to describe a problem. Figure 9 provides an example of reference material available in an EA Repository to improve architecture development.

[22] American Productivity and Quality Center; refer to: www.apqc.org.

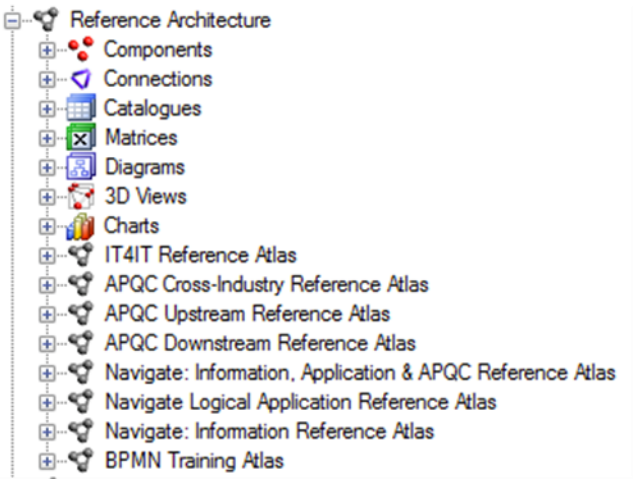

Figure 9: Reference Material in Modeling and Analytic Tool

Patterns, and other Architecture Building Blocks (ABBs), are typically indistinguishable to a Practitioner from other reference material in the EA Landscape. Whether brought in from reference sources, or created inside the organization, they provide a consistent and known way of approaching a problem.

The second set are documentary reference materials. This material may include white papers, discussions of EA Landscape reference material, templates, stock material, and guides. Again, reference material is an accelerator. Communication between Practitioners is improved when they have access to consistent background thinking. Communication outside the EA team is improved with consistency.

Figure 9 is a screenshot showing different reference architectures, and reference models, as discrete architectures. Maintaining discrete architectures allows the architect to be able to compare how the reference architecture was used in the current candidate or target against the base reference material. In longer-lived repositories, it is common to find multiple overlapping reference architectures. Consider an organization that uses APQC's Process Classification Framework as a base reference model. Should they implement a mainstream ERP, they will likely have work produced in the ERP vendor's process classification and the system integrator's process classification. Later, when the same organization adopts the IT4IT Reference Architecture, they will likely have another process classification.

Maintaining each of these has a clear reference in the modeling, and analytic software will allow future architects to understand the decisions made during architecture development and implementation governance, especially when only part of a reference is brought into architecture development and maintained in the architecture. This Guide acknowledges the need to integrate an architecture tool with tools supporting planning, solution delivery, solution validation, etc. A Practitioner may have to refer to documentation in such tools on occasion or provide appropriate traceability. The family of tools and integration is beyond the scope of this Guide.

Reference architectures, planning data, analytic data, etc. are normally supported by detailed documentation managed in a document management system. A Practitioner concerned with the purpose and rationale for complete or partial use of such data will seek the supporting documents, to use them appropriately for modeling or analysis. Do not get swayed by looking at

whether the Practitioner is likely to read them when creating the links to the document management system.

5.1.3 What to Expect in a Well-Run EA Repository: Standards Library

In a well-run EA Repository, the Standards Library will perform two functions. First, it provides a repository for the standards that the architecture must comply to. Second, it provides a repository for the standards imposed on all implementations by the architecture. The distinction is critical. One is used to test the architecture; the second is used to test an implementation.

In practice, these two sets of standards have to be separated. A simple example is provided by the PCI standards. An Enterprise that uses credit cards is subject to PCI standards. No Enterprise with a good EA will simply place PCI standards in a repository for an implementation to comply with. The question of how to comply is inappropriate for an implementation team. The compliance with PCI may be as simple as a standard derived from the EA that requires the use of a third-party payment processor ensuring that PCI subject information is not in the hands of the Enterprise. The latter is a standard derived from the EA.

It is common to extend the Standards Library to include selected products and third-party services. This pragmatic choice simplifies the governance of Implementation Projects where, in addition to an architecture requirement specification or control, there exists a product or service that conforms. To further the example above, rather than the Architecture Requirements Specification requiring the use of the third-party payment processor, a specific third-party payment processor can be placed in the Standards Library.

Where specific products and services are placed in the Standards Library, it is best practice to trace those choices directly to the Architecture Requirements Specification or control that brought these products and services to life. Without traceability to the architecture, product or service selection can be viewed as an arbitrary choice. One of the traps of architecting through product and service standards is the lack of traceability to the requirement or risk. When there is simply the specification of a product or service as an arbitrary choice, the governance process is dramatically complicated because alternative products or services can be considered on criteria other than those that lead to an architecture supported decision.

5.1.4 What to Expect in a Well-Run EA Repository: Architecture Requirements Repository

Managing requirements to the entire EA Landscape is one of the most complex activities facing the Practitioner. The first challenge is simply the breadth of detail; the second challenge is the overlapping nature of managing requirements across the EA; the third challenge is maintaining the repository over time; and potentially the fourth is integrating with other repositories.

One thing that is important to consider is that requirements appear radically different depending upon the purpose of the architecture and the level of detail. As an extreme example, Practitioners with experience in solution delivery architecture and implementation may not recognize requirements for architecture developed to support strategy as requirements. Practitioners used to implementation tend to be looking for very granular requirements to express statements of need. Be agile, be efficient, integrate the new division, and protect the market-leading differentiators are all examples of key requirements for Architecture that supports Strategy and Portfolio.

Leading practices find that a large number of requirements for Architecture that supports Portfolio and Project are normally captured in the form of scores. Ask the stakeholders to assess

the required efficiency, maturity, automation of a process, application, service or capability; score the required business fit or technical fit of applications; and score the preferred lifespan of the infrastructure. Best practice is to use a scale of one to five to capture their assessments. All of these scores are requirements; they clearly state the preferences of the stakeholders.

An important question in any requirements repository is whether these are architectural requirements or implementation requirements. The distinction can be fine, but it is a distinction with a very large difference. One of the tests that can be used for distinguishing between architecture and implementation design is whether the description can only be done one way, or can it be realized multiple ways. The former tends to be architecture, while the latter is implementation design. When an Architecture Repository is integrated with a requirements repository for implementation, use appropriate integration options to maintain traceability and integrity.

Many architecture requirements are remarkably long-lived. Especially when the requirement is articulating aspects of the Enterprise that differentiate it. When does a market leader who leads through customer experience want to relax the requirement requesting best-in-class customer experience? The real challenge for the Practitioner is translating market-leading customer experience into clear architecture specifications applied to components in the architecture. Herein lies one of the mental challenges when architecting for different purposes – the line between a requirement and a specification may be in who stated it. A requirement into a portfolio architecture aimed at market-leading customer experience may result in an architecture specification requiring that the information object "customer preference" be a common information object to the CRM, customer portal, and service desk. That specification reads like a requirement to the architect supporting solution delivery of the new CRM.

Requirements from higher in the organization also tend to be discussed using different names. It is common to speak of objectives and mandates, and treat them with special reverence. Likewise, the distinction between types of requirement – functional versus non-functional, business requirements versus technical requirements – is treated very seriously. In the final analysis, whether a requirement is a mandate, a non-functional requirement, or a business requirement, from the perspective of a Practitioner it is a statement of need that will be addressed in the context of the superior architecture and the set of objectives provided by all stakeholders.

One central activity Practitioners typically are not comfortable doing is assessing the validity of requirements. When the Practitioner has a well-described strategy, a portfolio that identifies gaps, and gap-filling work packages, it becomes easy to look at a requirement being injected in the project or solution delivery architecture and assess whether this requirement is in conformance with what the Enterprise priority is or whether this requirement conflicts with the superior architecture. Consider a portfolio initiative focused on improving agility for customer experience: this portfolio will identify a set of projects explicitly designed to improve some aspect of the customer experience and improve the ability of the Enterprise to change. As time progresses close to execution, it is common for requirements not aligned with the project's purpose to be injected into the process. The central element of requirements management is good governance. Practitioners are guardians of the statements of value.

When Practitioners have a good architecture identifying the target and transition steps along the way, requirements, and architecture specifications, may vary over time; be different in the target and the transition architectures. Imagine a portfolio roadmap that deliberately sacrifices customer experience for agility in the first transition. Then in the second transition the priority

switches and agility is sacrificed for customer experience. The conformance test to architecture requirement, and guidance on priority, switches. This Guide deliberately uses the term "sacrifice" because inherent in this requirements repository is clarity of precedence and priority. When clarity of precedence and priority is not available, data to guide trade-off early in the cycle is absent, hindering progress. Just as the assessment of precedence and priority shifts context to other decisions where a set of preferences are well defined and is closer to the organization most suited to make the choice.

Explicitly link the architecture specification to requirements, and trace the requirements to a stakeholder/concern pair to track the value and preference. This traceability is used in governance to assess how well the design and implementation choices address the stakeholder's value preferences.

Best practice EA Repositories facilitate traceability at every step of the architecture to the direction and priorities of the Enterprise. Practitioners are delivering some of the highest value when they are engaged in requirements management and trade-off. All smart stakeholders want all, want more, and for free. All smart stakeholders know they can't have it all, nor can they have it for free. What stakeholders don't know – and what the role of the Practitioner is – is to assist the stakeholders in understanding what they have to give up in order to realize different sets of preferences.

A Practitioner with a well-run EA Repository is in a position to maintain a comprehensive set of requirements in context. Requirements in context enable the Practitioner to work actively for the preferences of the stakeholders rather than architecting to a subset of the preferences of the stakeholders; or worse a set of preferences that the Practitioner personally prefers.

5.1.5 What to Expect in a Well-Run EA Repository: Compliance Assessments

Most EA Repositories are missing the most important component of a compliance assessment: gaps, Architecture Requirements Specifications, controls, and views that address concerns stakeholders find interesting. A well-run EA Repository will contain all of the components necessary to perform effective compliance assessments as well as the compliance assessments.

The first step of compliance assessment is clarity on what compliance will be assessed against. Best practice compliance assessments are tightly linked with the TOGAF concept of an Architecture Contract. The Architecture Contract identifies what an Implementation Project is expected to deliver and the set of constraints the project operates under. Without clearly documented expectations and constraints the Practitioner has failed the implementation team.

A well-run EA Repository will contain the equivalent of an Architecture Contract for every Implementation Project. See Appendix D for an example of an Architecture Contract. With clarity on expectation and constraint, compliance may be assessed.

TOGAF Phase G identifies two areas where compliance is assessed. The first is the scope of the project. Second is the actual implementation, whether designed or the performance change. Phase H contains a further value-based compliance assessment.

The first assessment in Phase G considers the scope of the Implementation Project compared to the gap, or work package, expected to be filled. The work package identifies which gaps are going to be filled. The singular purpose of the work package is clarifying the work necessary to address the gaps in the architecture. Good roadmaps developed as part of an Architecture Project support portfolio will house well described work packages. Well described work packages are

clear about gaps being filled, and the implementation strategy, or approach, of how the gap will be addressed. Where there is no architectural significance, no good Practitioner will bother constraining an Implementation Project with unnecessary guidance or constraint through the implementation strategy. Where the approach to addressing the gap is significant, a good Practitioner will always provide the appropriate guidance of constraint.

Performing scope, and implementation approach, compliance is the first step in protecting value. A good EA will provide clarity about the best path to maximized value for the Enterprise. Typically, maximized value to the Enterprise will not align with parochial preferences of the Implementation Project sponsor, or the implementation team. Frankly, if there was alignment, there would not be a need for an EA team. It follows that assessing the scope of an Implementation Project is the first place to protect value. Waiting until the project is funded and underway is indistinct from developing architecture after the decision; see Chapter 15.

The second Phase G compliance assessment confirms whether specific Architecture Requirements Specifications have been followed. The TOGAF concept of an Architecture Requirements Specification identifies what must be, what must be done, and what is prohibited. It provides the set of constraints on more detailed architecture development, design, and implementation.[23]

Phase H's compliance assessment is based on value realization. Typically, expected value will not be realized for a significant period of time after an Implementation Project has declared victory. Using the linkage provided by the Architecture Contract, recurrent value realization assessments can be performed. Maintaining the linkage from specification to stakeholder expectation facilitates consistent review.

Although a well-run EA Repository will be focused on demonstration of realizing value, traditionally most attention is placed on rule-following compliance. While rule-following is important, it tends to struggle with a consistent demonstration of value, unless it is assumed the value of following the rule is self-evident. Rule-following compliance assessment is common where the Architecture Requirements Specification eliminates all design and implementation choice. Focusing assessment on rule-following is also most likely to be tied to requests for relief from the rule because the total cost of the rule is not in alignment with available value; see Chapter 15.

Best practice is to go beyond simple compliance with the statement, to include compliance with intent. The purpose is again to protect the expected value of the Target Architecture. When a constraint is connected to a stakeholder requirement, the compliance assessment is able to assess how well the design and implementation choices deliver on expected value. Compliance assessments that indicate the implementation will fail to enable expected value are key inputs to future architecture development.

[23] An Architecture Requirements Specification can be delivered through different levels of detail and in multiple ways. For clarity, this Guide distinguishes use of an architecture specification to address a stakeholder requirement, from a control to address a risk. The semantic distinction is used to assess for value. Typically, stakeholder requirements have an up-side, where risks have a downside. This Guide typically divides architecture specification into four types: Principle, used to provide guidance on how to think about the decision; Pattern, used to provide a reusable approach to the decision; Standard, used to specify a correct approach to the problem, and Rule, used to specify a correct answer and eliminate any decision. The level of constraint required determines the type used by the Practitioner.

5.2 How is ADM Iteration Realized in Practice?

An often-misunderstood element of the TOGAF framework is the ADM and the concept of iteration. The TOGAF ADM graphic provides a stylized representation that is often misinterpreted as a linear waterfall process model. This approach leads to some of the most confusing diagrams and explanations. The TOGAF ADM is a logical method that places key activity steps together for the purpose of understanding relationship of activity and clarifying information flow. The classic TOGAF crop-circle diagram is a stylized path that demonstrates essential information flow.

The TOGAF ADM should not be understood as a processes model. The ADM graphic is a stylized representation showing essential information flows and is not a representation of activity sequence.

The important thing to realize is every time the EA team is undertaking any activity within the scope of the ADM it is executing a Phase and developing the contents of the EA Landscape. For example, if a Practitioner is working on roadmap development, the Practitioner is exercising the steps in the TOGAF ADM Phase E (Opportunities and Solutions). The Practitioner needs to consume the mandatory inputs and produce the mandatory outputs. This applies to all ADM phases.

Start with recognizing that the inter-dependent nature of developing a Target Architecture requires considering the entire architecture, resulting gaps, and resulting work to clear the gap simultaneously. No Practitioner can consider a change, without considering the impact on all other domains, the resulting set of gaps, and the resulting set of work to clear the gap.

Unfortunately, describing that level of interaction is not practical. To address the complexity, the TOGAF framework provides an ADM phase for each essential output. Best practice ensures Practitioners use effective information inputs and produce useful outputs.

Depending on what a Practitioner is requested to develop, an architecture for the Practitioner's work plan will vary. Consider the impact on which phases of the ADM would be used for the following requests:

1. Given that the organizational design, customer interface, and processes are to be left unmodified, what other changes would allow "moving to the cloud"?
2. What changes are required to switch from more than 50 independent organizations pursuing small projects, to an integrated company capable of organizing, and controlling, construction projects 100 times larger than the current average?
3. What changes are required to the core claims platform to allow a 300% growth in customers and transactions, and enable continuous change to policy terms?
4. Given that the ERP and current Finance & HR processes will be kept, what are the minimum changes to support allocating labor to capital projects?
5. How to integrate the acquisition with the minimum change, while sustaining both the current high-efficiency processes and the unique capability from the acquisition?
6. How to enable a third-party developer's agile approach, and Microservices, on the customer intimacy project?
7. How to modernize a particular platform without impacting anyone outside IT?

Each of these requests has been addressed using the TOGAF framework, and the techniques. Each started with a different purpose, and each traversed a distinct path that used a different configuration of the TOGAF ADM.

The only exception is Phase A; the Practitioner must start with Phase A. An Architecture Project must be initiated.

5.2.1 Phase A: The Starting Point

All architecture development needs to start with Phase A. Without the set-up inherent in Phase A Practitioners can expect to slide off-course and fail to deliver useful architecture.

The set-up essentials of Phase A are:

- **Define the scope of the Architecture Project**

  What problem are you solving? In terms of the EA Landscape (breadth and planning-horizon) and in terms of purpose, which will tend to confirm the necessary level of detail? Be completely clear where in the business cycle this architecture will be used.

- **Identify stakeholders, concerns, and associated requirements**

  Explore the EA Repository for superior architecture constraints and guidance. Do the Stakeholder Map. Be completely clear which stakeholders must be served and what they are worrying about.

- **Assess the capability of the EA team**

  Take a hard look at the EA team and confirm the ability of the team to deliver on this architecture development project. A good EA team covers gaps in experience, skill, and bias to deliver the architecture that is useful, overcoming weaknesses of few members of the team.

The completion essentials of Phase A:

- **Key stakeholder agreement on a summary of the target and the work to reach the target**

  Perform sufficient architecture development in all domains to enable you to communicate to the key stakeholders how the problem you have been assigned can be addressed and the scope of change to reach their articulated preferences. Be clear on the target, the value of the target, and the work to change.

Frankly, Phase A is routinely skipped, or skimmed. Good Practitioners know the key stakeholders agree on the summary target, the value, and the effort of change before any detailed work is undertaken. If key stakeholders won't agree at the outset, they are unlikely to agree after the Practitioners have performed a lot of work detailing what they do not want, delivered insufficient value, or will not agree to change.

Completing the outputs of Phase A requires exploring all of the domains – whether the exploration is to understand what should change, or where change is not an option to determine the impact of retaining current architecture.

Practitioners should not be surprised if there are multiple potential targets after the initial exploration. Having more than one approach to addressing the problem is acceptable to key stakeholders. It facilitates better trade-off when performing more detailed analysis. Keep in mind that until the target is finalized, the Practitioner is exploring the best potential future, not selling a particular future.

5.2.2 Essential ADM Output and Knowledge

A summary of the essential outcome and output is provided in Table 4. Keep in mind that the essential output is what stakeholders, sponsor, and boss' boss' boss wants. No-one wants an architecture; they want guidance on planning and executing an effective change. Practitioners use an architected approach to providing the best available guidance on effective change. The essential outcomes and outputs are derived from the objectives of the phase – the statement of why a Practitioner should perform this activity.

What the Enterprise values and consumes is typically different than what the Practitioner produces. Practitioners deliver an essential output. It is provided as views, roadmaps, architecture specifications, controls, and other useful things. Architecture is developed, and the EA Landscape populated. To do this, Practitioners require a set of essential knowledge. The Enterprise consumes effective guidance about and the ability to govern change.

Read Table 4 in conjunction with Table 3 to confirm whether for a particular purpose the output of the phase is already in existence, needs to be created, or is extraneous to the current Architecture Project. Good Practitioners will adjust their work accordingly. Table 4 lists only key outputs and outcomes. For an exhaustive list, refer to the TOGAF Standard. In order to achieve these outcomes, the Practitioner may have to perform more activities or create more deliverables than those listed in the table below. The intent is to keep the focus on what is pursued, not what is done.

Table 4: Essential ADM Outputs, Outcomes, and Knowledge

Phase	Output & Outcome	Essential Knowledge
Phase A: Architecture Vision	Sufficient documentation to get permission to proceed. Permission to proceed to develop a Target Architecture to prove out a summary target.	The scope of the problem being addressed. Those who have interests that are fundamental to the problem being addressed. (Stakeholders & Concerns) What summary answer to the problem is acceptable to the stakeholders? (Architecture Vision) Stakeholder priority and preference. What value does the summary answer provide?

Phase	Output & Outcome	Essential Knowledge
Phase B, Phase C, & Phase D	A set of domain architectures approved by the stakeholders for the problem being addressed, with a set of gaps, and work to clear the gaps understood by the stakeholders.	How does the current Enterprise fail to meet the preferences of the stakeholders? What must change to enable the Enterprise to meet the preferences of the stakeholders? (Gaps) What work is necessary to realize the changes, that is consistent with the additional value being created? (Work Package) How stakeholder priority and preference adjust in response to value, effort, and risk of change. (Stakeholder Requirements)
Phase E: Opportunities & Solutions	A set of work packages that address the set of gaps, with an indication of value produced and effort required, and dependencies between the work packages to reach the adjusted target.	Dependency between the set of changes. (Work Package & Gap dependency) Value, effort, and risk associated with each change and work package. How stakeholder priority and preference adjust in response to value, effort, and risk of change.
Phase F: Implementation and Migration Plan	An approved set of projects,[24] containing the objective and any necessary constraints, resources required, and start and finish dates.	Resources available to undertake the change. How stakeholder priority and preference adjust in response to value, effort, and risk of change. (Stakeholder Requirements)
Phase G: Implementation Governance	Completion of the projects to implement the changes necessary to reach the adjusted target state.	Purpose and constraints on the implementation team. (Gap, Architecture Requirement Specification, Control) How stakeholder priority and preference adjust in response to success, value, effort, and risk of change. (Stakeholder Requirements)
Phase H: Architecture Change Management	Direction to proceed and start developing a Target Architecture that addresses perceived, real, or anticipated shortfalls in the Enterprise relative to stakeholder preferences.	Gaps between approved target, or preference, and realization from prior work. (Value Realization) Changes in preference or priority. (Stakeholder Requirements)

5.2.3 Iteration

The ADM provides a model of activity that supports producing the essential output by producing one or more work products. The central question determines whether there is a need for the essential purpose of a phase on a particular Architecture Project. If so, you will enter the phase at some point in time. If the essential purpose is not needed or has already been addressed, then this Architecture Project does not enter the phase.

[24] Do not fixate on definition of the term "project" or what a project is. It is just an organizing effort for work to achieve an understood outcome. Your organization's internal definition of a project, and the label used, will be unlikely to align with anyone else's. My assistant refers to booking a flight as a project.

Most commentary in the TOGAF Standard on the iteration of the ADM is designed to address the point that if the Practitioner does not have the information at hand in the EA Landscape, the information must be produced. These commentaries speak in terms of activity rather than output. Instead of considering iteration in terms of re-sequencing and looping the ADM, the Practitioner should explore the EA Landscape. If the information required, in terms of subject, detail, time, and recency is available – move on. If not, produce the material required. To produce material, the Practitioner is exercising a TOGAF ADM phase.

As an example, see the stylized Gantt chart in Figure 10. This figure provides a process-oriented view of executing the ADM. The Gantt shows the inter-dependent nature of EA requires all ADM phases that develop a candidate architecture and test it for acceptance to be open simultaneously. The ADM phases stay open to address the information required; once it is provided they close. Also, regardless of where the Practitioner is in time or purpose or Architecture Project, if the Business Architecture is being developed the Practitioner is executing Phase B. Executing Phase B is all about addressing the stakeholder concerns from the perspective of the Business Architecture domain, identifying the gaps in the Business Architecture, and looking at impacts across the EA Landscape. The figure highlights that many of the steps in the ADM phases can be executed simultaneously. Good Practitioners will explore impacts and address stakeholder concerns across the entire architecture.[25]

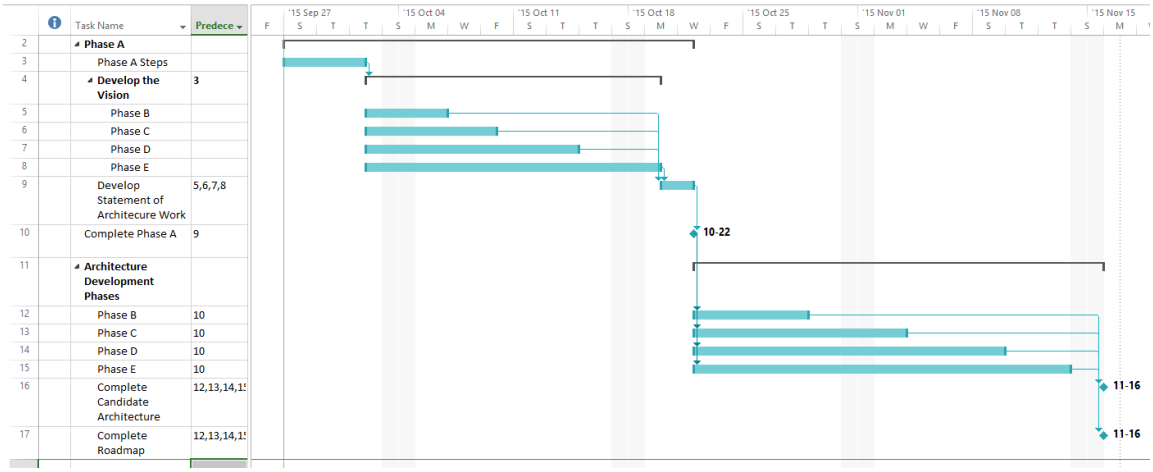

Figure 10: Stylized Architecture Development Gantt Chart

Consider the different purposes and a cascade through time as shown in Figure 4. When the plan in the stylized Gant chart in Figure 10 is applied to each purpose, it becomes clear that the Practitioner continually revisits the required phases, at the appropriate level of detail.

Most of the normal problem-solving models provide linear approaches with step gates. The linear approach helps us understand the process, and may represent the business cycle stage gates. However, they do not represent how people actually solve problems. Figure 11 is derived from Jeff Conklin's Wicked Problems & Social Complexity within Dialog Mapping (see Referenced Documents), and outlines a standard linear problem solving progression and how professionals typically address a problem. Testing the concept and potential implementation interactively is a best practice. Iteratively considering whether the high-level direction makes sense in terms of execution, and does execution make sense in terms of high-level direction?

[25] This does not suggest that one person does it all. Developing an EA is a team sport with specialist positions. Following the analogy, the team has to play the same game at the same time.

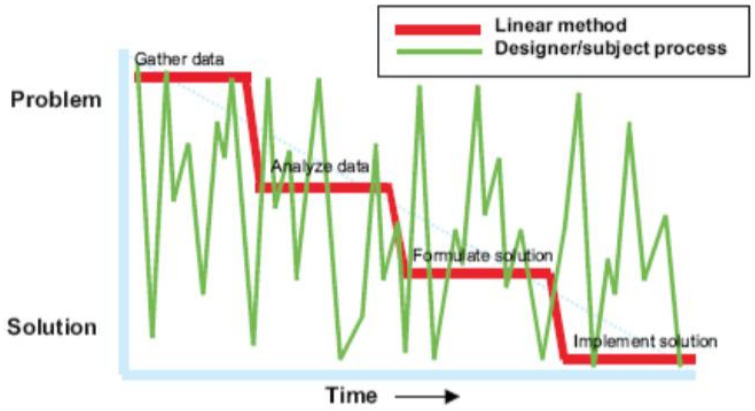

Figure 11: Problem Solving Approach (Derived from Conklin's "Wicked Problems")

All iteration is driven by the information needs of the current project. The process created is not dependent upon the work the EA Capability undertakes to produce, but the timing of completion. The essential question is when an EA Capability must deliver specific work products. Table 3 provides a summary of work products that are actively consumed by key Enterprise processes.

5.2.4 ADM Plan for Architecture to Support Strategy

The path to developing an Architecture to Support Strategy is a configured journey through the ADM. This path follows this journey:

- Understand context – evaluate capabilities
- Perform assessment and analysis
- Define approach to target state
- Finalize Architecture Vision/target state

The processes iterate through the ADM to deliver an architecture that clarifies a Target Architecture roadmap of change over a three to ten-year period. The roadmap will identify change initiatives and support portfolio and programs. It will set terms of reference for the initiatives and identify synergies. A key use is governing the execution of strategy via portfolio and programs.

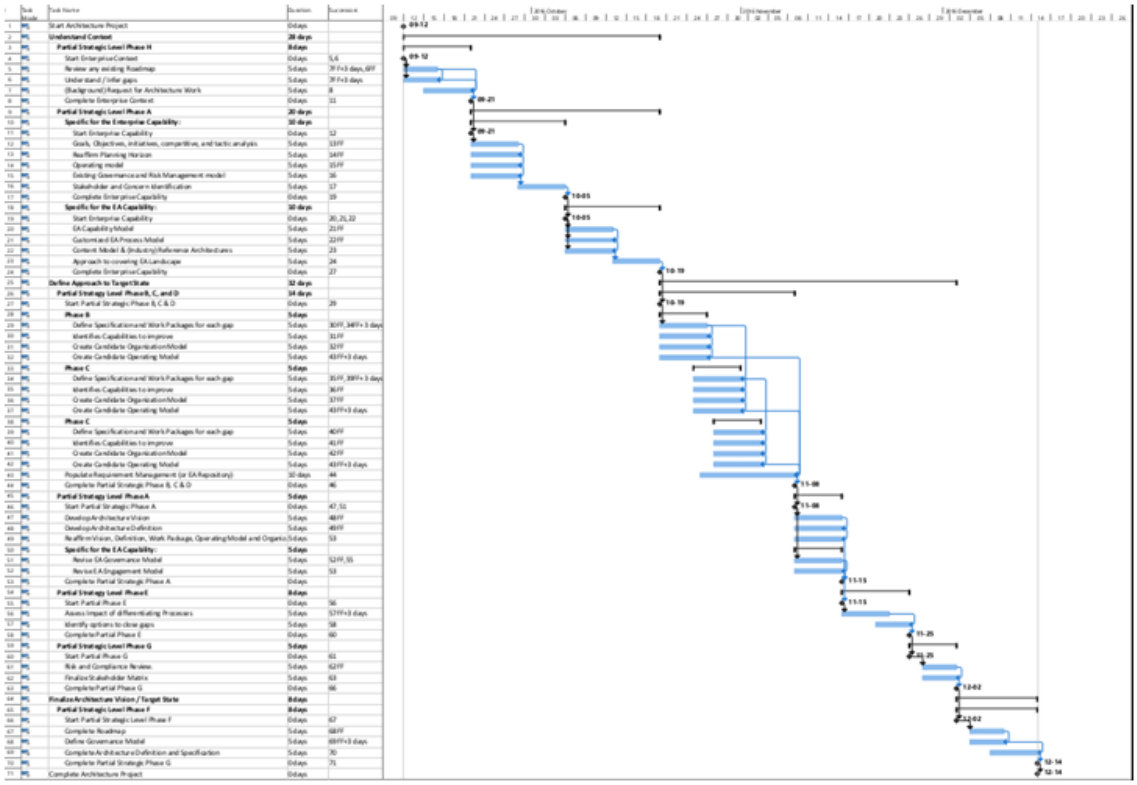

Figure 12: Sample Project Plan to Develop Architecture to Support Strategy

5.2.5 ADM Plan for Architecture to Support Portfolio

The path to developing an Architecture to Support Portfolio is a configured journey through the ADM. This path follows this journey:

- Group work packages to themes
- Balance opportunity and viability
- Run up to budget
- Drive confidence of delivery

Figure 13 provides a sample project plan to provide Architecture to Support Portfolio. This project plan is explored in Chapter 8.

The processes iterate through the ADM to deliver an architecture that refers to a single portfolio.[26] The boundary and purpose of the portfolio are derived from the superior architecture. It will identify projects that comprise the portfolio. The project terms of reference and approach are identified. A key use is governing the execution of projects within the portfolio.

[26] For the purpose of this discussion, this Guide uses "portfolio" to refer a collection of projects that work to a common outcome. Whether a Practitioner's organization uses initiative, portfolio, program, or some combination will be determined by the organization's approach to change, how it has structured its PMO, and how the Enterprise strategy is structured. It is not in the scope of this Guide to pursue the theoretical distinctions between appropriate use of these terms.

5.2.6 ADM Plan for Architecture to Support Project

The path to developing an Architecture to Support Project is a configured journey through the ADM. This path follows this journey:

- Ascertain dependencies
- Balance options and suppliers
- Finalize scope and budget
- Prepare for solution delivery governance

Figure 14 provides a sample project plan to provide Architecture to Support Strategy. This project plan is explored in Chapter 9.

The processes iterate through the ADM to deliver an architecture that refers to a single project. The boundary and purpose of the project are derived from the superior architecture. The EA will identify discrete gaps and work packages that have been packaged into a project that delivers measurable value on the architecture roadmap. Further, the measures of compliance with the architecture are provided. Architecture for this purpose will create the Architecture Contract. A key use is ensuring value realization of the Implementation Project.

5.2.7 ADM Plan for Architecture to Support Solution Delivery

The path to developing an Architecture to Support Solution Delivery is a configured journey through the ADM. This path follows this journey:

- Align implementers
- Guide delivery
- Realizing the solution

Figure 15 provides a sample project plan to provide Architecture to Support Solution Delivery. This project plan is explored in Chapter 10.

The processes iterate through the ADM to deliver an architecture that facilitates solution delivery. (See Section 4.1.4 for a discussion of the distinction between Enterprise and Solution Architecture.) This architecture is used to constrain how the change will be designed and delivered. It will clarify the purpose, gaps, and expected value that constrain all design and implementation. It will provide the controls and architecture requirements used to test conformance. It directly facilitates governance of implementation and operational change in the context of value realization.

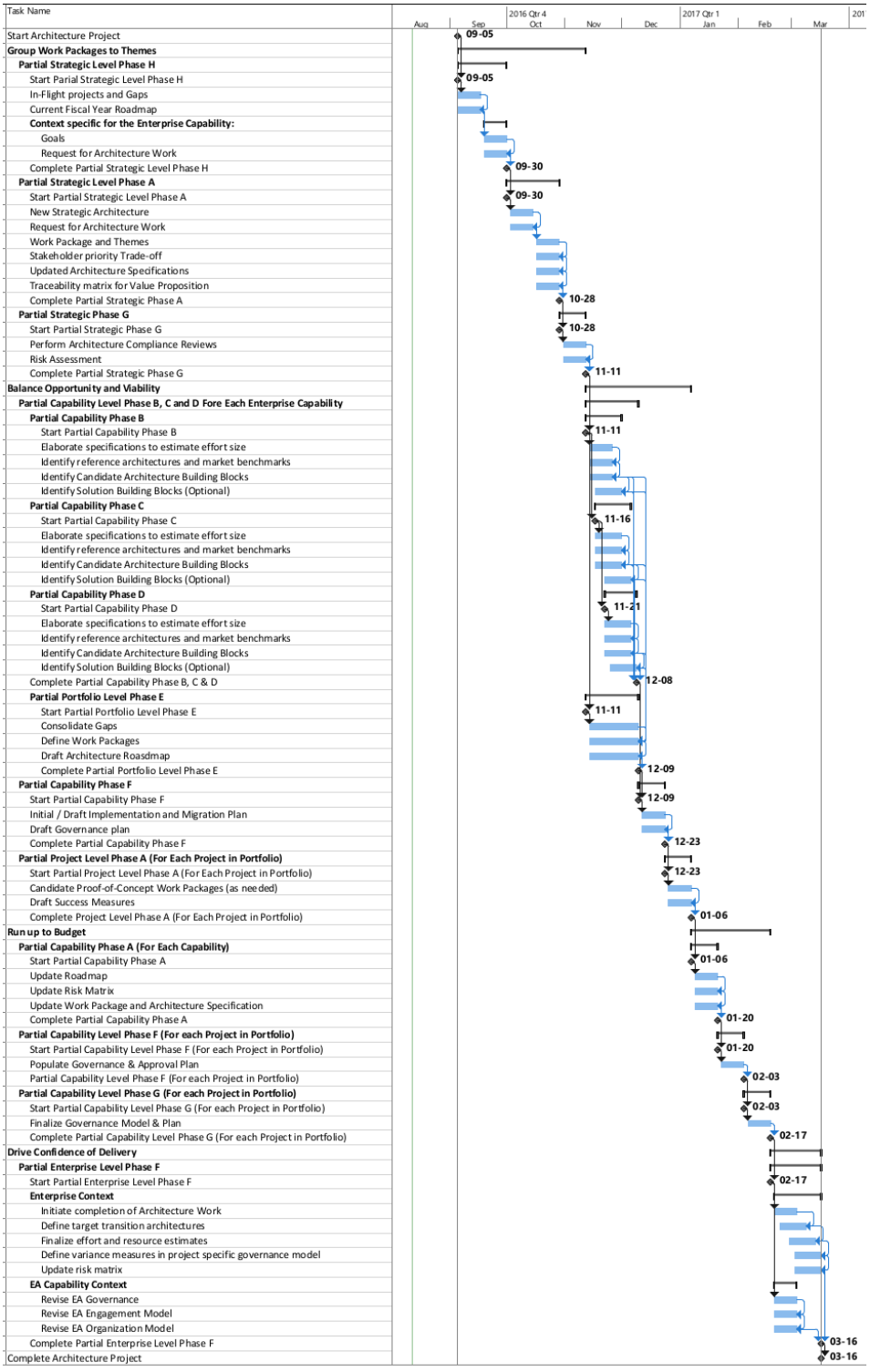

Figure 13: Sample Project Plan to Develop Architecture to Support Portfolio

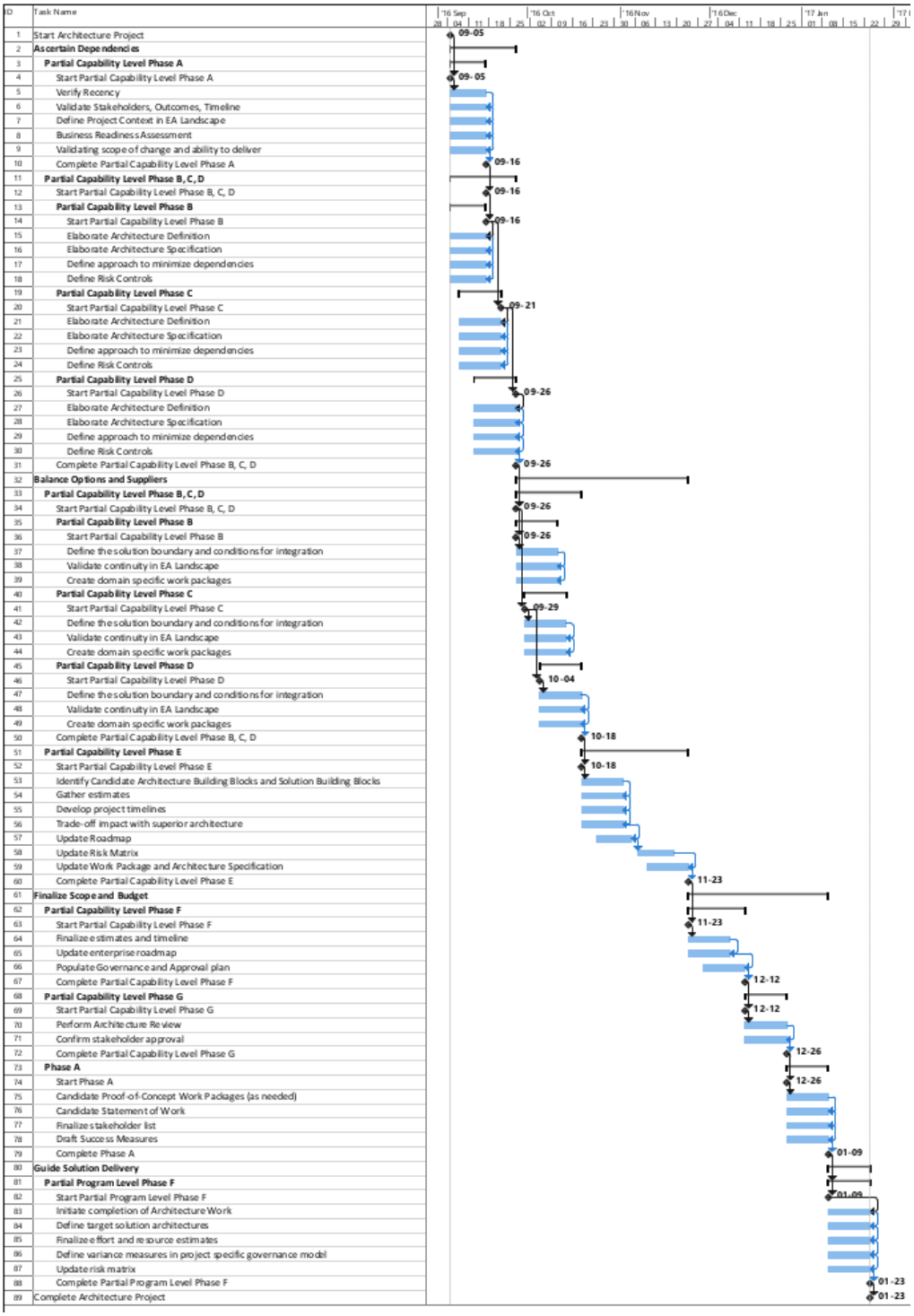

Figure 14: Sample Project Plan to Develop Architecture to Support Project

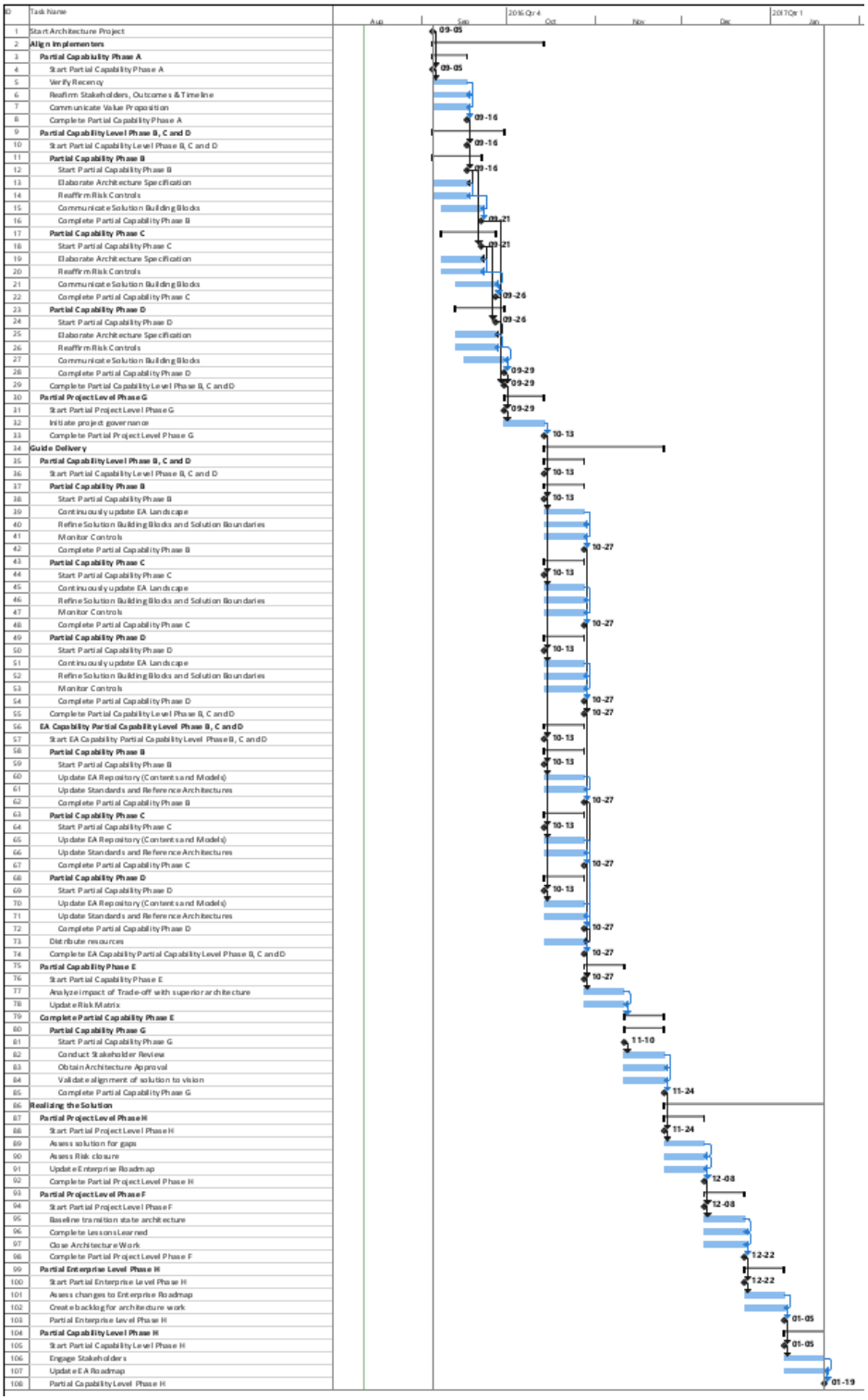

Figure 15: Sample Project Plan to Develop Architecture to Support Solution Delivery

5.2.8 Iteration Conclusion

At the start of this chapter, this Guide suggested that many Practitioners interpret the TOGAF ADM as a process model. If you did and continue to carry that notion, stop and think. The classic TOGAF diagram of the ADM is not an activity diagram. The TOGAF ADM is a logical method that places key activity steps together for the purpose of linking activity and information flow to produce specific outputs.

The important thing to realize is every time a Practitioner undertakes any activity within the scope of the ADM it is developing the contents of the EA Landscape. It is developing the EA Landscape through iteration. The phase being executed is the appropriate domain. If you remain stuck on trying to put the ADM in a one-pass linear order, you will draw bizarre looping phase diagrams. Think of the steps as a checklist.

5.3 Operating in the Context of Superior Architecture

The superior architecture always guides and constrains the development of more detailed architecture. As a quick summary, superior architecture is the less detailed approved target that overlaps in terms of breadth. This quick summary is complicated by the different states the superior architecture may actually exist in the EA Landscape.

The superior architecture may not perfectly align to detail, breadth, time-horizon, and recency. Further, the superior architecture may be in some mixture of current, transition, and target state.

Practitioners must treat the superior architecture as guides and constraints to current architecture development. Stakeholders have already approved the superior architecture in the EA Landscape; barring a material change, the Practitioner accepts prior work as cornerstones to build a current workaround.

Where there is a material change, both the current Architecture Project and the changes to the superior architecture must be properly approved and published through the governance process.

5.4 Managing Multiple States (Candidate, Current, Transition, and Target)

The Practitioner must track transition states across two characteristics: the first being time, and the second being a conformance test. Theoretically, it might be preferable to use transitions to track the value resting places and changes in conformance. Good practice is to architect to value resting states; a state where the Enterprise can receive value if all change activity is suspended. However, the pressure of the budget cycle forces us to use time is a pragmatic transition marker. Tracking to change in conformance facilitates the Implementation Project and operational change governance. To the extent possible, minimize transition states.

When considering transition states, the Practitioner needs to keep in mind the distinction between an Architecture Requirements Specification and an implemented system. Using the EA Repository as a CMDB confuses implementation record keeping and architecture. Practitioners have to keep in mind that many implementations or operational changes are not architecturally significant. See Chapter 15 for a discussion of the different roles involved in developing and using architecture.

5.5 Where are ABBs?

The TOGAF concept of the Architecture Building Block (ABB) is the effective Practitioner's friend. A good ABB facilitates time-to-market and completeness. As with most TOGAF definitions, knowing that an ABB is "a constituent of the architecture model that describes a single aspect of the overall model" doesn't immediately tell us what they look like in an EA Repository.

An ABB will look like whatever it must be to describe part of the overall architecture – efforts to carefully define the contents and structure of this concept will flounder on the variability and scope of what can be described within an EA Landscape. A building block is part of a greater whole that accelerates the effective description of the candidate architecture.

In some cases, it will be a re-usable description of part of the architecture; using it again enables the Practitioner to simply adopt a known successful way to address a problem. In this case, the ABB is complete in all regards, providing a complete description, and constraints that address repeated requirements. In other cases, it will not have the constraints and specifications predefined. In this latter case, the components of the description will be complete, but the detail will vary depending upon the requirements.

Part 3: Guidance on Developing the Enterprise Architecture

6 Approach to the ADM

The TOGAF Architecture Development Method (ADM) is the core of the TOGAF Standard. This method sets the TOGAF framework apart from every other EA framework because it contains the "how".

The path through and around the ADM phases to develop architectures for different purposes is not simple nor linear. The level of detail and specificity of each architecture is different. For instance, to develop an Architecture to Support Strategy, all that is needed is to follow a path from Phase A through Phase D at the strategic level. Not all the steps are executed, but logical entities that drive Business, Applications, and Technology Architectures are captured and defined. Architecture to Support Strategy provides an end-to-end view of the Enterprise and a candidate roadmap to achieve target state. The governance model, as articulated in the TOGAF® Leader's Guide to Establishing and Evolving an EA Capability (see Referenced Documents), is leveraged to trace the rest of the architectures and their alignment to target state.

6.1 Key Activity

All architecture development has a set of consistent key activity that is essentially unchanged for different purposes.

6.1.1 Stakeholder Engagement and Requirements Management

The TOGAF framework places requirements management and stakeholder engagement at the center of architecture development. Practitioners develop EA in accordance with the preferences and priorities of their organization's stakeholders. Architecture is never sold to a stakeholder. Stakeholder preferences are never manipulated.

Stakeholders own the architecture and the value preference and priority the architecture is expected to enable. Practitioners must completely submerge their preferences, biases, and priorities. Practitioners must act for their stakeholders.

This is one of the most difficult activities a Practitioner must perform. Good Practitioners are passionately engaged in the future of their organization, as well as participating in defining and realizing the target state. Practitioners typically perform several roles: they will act as Subject Matter Experts (SMEs) and agents for their stakeholders in addition to developing architecture – see Chapter 15 for a discussion of roles. As an SME, the Practitioner is a source of expert advice. As an agent, the Practitioner may speak on behalf of a stakeholder. In order to be successful when performing these roles, the good Practitioner must understand when they are acting in a different role and behave appropriately.

Effective requirements management is dependent upon clear traceability from the organization's vision, mission, business model, and strategies through the most detailed statement of requirement. In order to perform this, the Practitioner must carefully distinguish between direct

effective support and loose association. Things that do not best enable the complete set of stakeholder preferences are distractions from the main chance.

When engaging with stakeholders, Practitioners must maintain the complete set of every stakeholder's preference, and the implications of those preferences. Success requires abandoning absolute and entering the realm of satisficing. Bluntly, if there is a single obvious best answer, the organization's stakeholders do not need an architecture.

Effective engagement is based upon effective communication. Effective communication is based on the concept of view and viewpoint. Different stakeholders have different concerns about the architecture. These concerns must be addressed and represented effectively to the stakeholder to enable the stakeholder to approve the Target Architecture (see Table 2).

6.1.2 Trade-Off

One of the most valuable activities a Practitioner will perform during architecture development is facilitating the stakeholders' trade-off decision. Facilitating trade-off is often more valuable than finalizing an architecture description. Good architecture addresses complex problems. Complex problems[27] do not have clear, unambiguous best answers. Instead, they have reasonable compromises.

Trade-off requires a compromise between one stakeholder's preferences as well as between different stakeholders' preferences. Effective trade-off requires understanding value preference and priority as well as the scope of change necessary to realize the target.

As a rule, stakeholders underperform when that trade-off stands beyond their span of control or span of interest. In particular, stakeholders underperform when the trade-off involves the preferences of different stakeholders. Stakeholders typically overemphasize the institutional role and preferences of their portion of the organization.

Practitioners are most valuable facilitating trade-off between stakeholders and across organizational boundaries. This facilitation allows different stakeholders to effectively measure preferences, priorities, and costs that they do not intuitively understand. Best practice EA finds the best fit across competing preference, priority, and value. In facilitating the trade-off discussion, chase down all impacts and think through the end game needs. Work with the Enterprise risk management process to surface requisite dimensions. Think through all transition states. Leverage the architecture tool to handle the complexities of the EA Landscape and to accelerate the process.

Practitioners should not underestimate the value their organization receives from facilitation of trade-off across organizational boundaries.

6.2 Trade-Off Decisions

The most common interpretations of trade-off are "a balance achieved between two desirable but incompatible features; a compromise" and "losing one quality, aspect, or amount of something in return for gaining another quality, aspect, or amount". In developing an Enterprise Architecture, trade-offs are never about compromises, but about a question of when or the context. When the context or the objective of the Enterprise is poorly analyzed, some choices

[27] Refer to Jeff Conklin's Wicked Problems & Social Complexity within Dialog Mapping (see Referenced Documents).

will appear obvious or low-cost. Jumping to employ those choices as a viable candidate will result in sub-optimal achievement of the target or total failure of the initiative.

For example, when a Practitioner is exploring a candidate target architecture and discovers what appears to be an obvious improvement without a champion, they are likely to be jumping to a decision that is based on poor analysis. When faced with such circumstances, the Practitioner should look for the hidden value. Hidden value will never be described in terms of the obvious cost savings.

6.3 Phases B, C, and D – Developing the Architecture

Practitioners often find it surprising that the steps outlined in the TOGAF Standard to develop architecture in Phases B, C, and D are identical. The steps are identical because the approach to developing an architecture, confirming the work product developed fits, and confirming approval are identical. These steps are also mandatory. Steps can be skipped, but the final outcome could be at risk.

What changes from purpose to purpose, domain to domain, project to project, and EA team to EA team is the level of detail, precision, and formality. All Practitioners should use the steps as a checklist.

6.3.1 Select Reference Models, Viewpoints, and Tools

Avoid rework. Practitioners test with the following questions:

- Given a set of stakeholders and concerns, what information do you need to know about the system being examined to address their concerns?
- Given a set of information, how will you model, represent, capture, and analyze it?
- Are there reference models that allow you to skip to gathering and analyzing rather than inventing?
- What information is missing from the EA Landscape right now?

6.3.2 Develop Target, Baseline, and Gap

Just enough for the purpose. If the current state is accepted, the only reason to describe the baseline is to develop gaps. If stakeholders, or SMEs, dispute the current state, especially its fitness to objective, then describing current state to get an alignment is useful. Otherwise, let us re-iterate: only to the extent necessary to determine gaps.

Consider the limitation of restricting description to where there is a gap. If part of the EA Landscape will have no change, and is not needed for traceability, what useful reason is there for a Practitioner to spend time describing it?

A recurrent question is how to describe the current state. Frankly, use the exact same techniques as the candidate. Description using the same technique at the same level of detail enables identification of gaps. A gap is simply everything that changes.

6.3.3 Identify the Work to Reach the Target Considering Cost and Value

Without understanding the work required to reach the target, stakeholders will approve the impossible. Why wouldn't they want telepathy helmets and self-manufacturing products if they were free and easy?

The Practitioner is accountable for guarding value. A target provides an increase in value, at a cost of change. If you do not have an understanding of the work to reach the target, how can a Practitioner represent to a stakeholder that any target is a good idea and addresses the organization's preferences?

6.3.4 Resolving Impacts

Resolving impacts across the EA Landscape is one of the most important steps in managing the EA Landscape. The Practitioner explores the impact of their candidate architecture against other candidate architectures, transition states, the target state, and in-flight Implementation Projects. The Practitioner also works with the Enterprise risk management process to assess impact to the Enterprise's risk. Altogether, this is one of the most complex activities for an engaged high-functioning EA team. It requires a functioning EA Repository and solid analytic and reporting software. Every organization is a set of constantly changing interconnected parts. All architecture descriptions are approximations.

In practical terms, the more complex the EA Landscape is, the more difficult, and the more necessary, resolving impacts is. Practitioners attempting to manage an EA Landscape without an effective model and analytic tooling will struggle to resolve impacts. All impacts need to be resolved in terms of value expectation which is based upon clear traceability from the work required to realize the Target Architecture through the gap to the expected value.

Without care and attention to addressing the impacts across the architecture landscape in all of its states, the Practitioner cannot have confidence that their candidate architecture best serves the Enterprise.

Manage the information volume down to the minimum and constantly chase the minimum set of concerns that visibly support value in the eyes of key stakeholders.

6.3.5 Approval

Without approval by the stakeholders, no implementation governance is possible, and no governance of more detailed architecture is possible. Without approval, the Practitioner has a documented opinion. Stakeholders, SMEs, implementers, and decision-makers also have opinions.

Real approval is complex. Real approval should be complex. The Practitioner is assisting their organization select the best possible path against a set of competing preferences over time. They have taken the time to explore options and impacts.

With an approved Target Architecture, the future is defined, traceability to the objective is available, and trade-off has been performed. Good architecture trade-off explores options, cost, and benefits to reach the optimal answer for an organization. Often that answer is a compromise between competing interests.

6.3.6 Minimum Needed and Look in the EA Repository

Practitioners start and finish with the contents of the EA Repository.

Whenever analysis, or reporting, is needed, the first stop is the EA Repository. Practitioners should apply the following tests:

- Is the information that will address the question at hand already available?
- Is there a superior architecture that guides and constrains the task at hand?
- What is the minimum information needed to cover shortfalls in the EA Repository?

It does not matter whether the EA Repository is a well-structured modeling and analysis tool or a collection of presentations, start with the EA Repository. Gather and analyze the minimum to address the question at hand. Questions that do not have a clear line of site to understanding the system to address a stakeholder concern are beside the point. Good Practitioners are not paralyzed by the potential analysis that could be done; they perform the analysis that must be done.

6.4 ADM Conclusion

The TOGAF ADM sets the TOGAF framework apart from every other EA frameworks because it contains how to develop and use effective EA. It is not a simple nor a linear path around the ADM phases to develop the architectures for different purposes. It is, however, filled with tasks that are mandatory. Again, to skip tasks undertakes risks.

7 Walk Through Architecture to Support Strategy

7.1 Introduction

The objective of this architecture is to define an end-to-end Target Architecture and a roadmap to achieve it constrained by the planning horizon (normally three to ten years). This architecture will drive creation of several targeted change initiatives, define the boundary conditions for governance, and acceptance criteria for value reporting. Activities to develop this architecture will iterate the ADM at least once at the Enterprise level and once for the EA Capability.

On most occasions, EA initiatives are triggered in the middle of a business cycle. It is most likely performed by an Enterprise that has been operating for many years. A logical point to start the architecture work is to understand the rationale for EA work. Table 5 summarizes how the ADM phases are executed and to what outcome. The content of the table is discussed in detail in the rest of this chapter.

Table 5: Summary Table: ADM Phases and Architecture to Support Strategy

Topic	Mapping to TOGAF ADM Phase
Understand Context	Partial Strategic Level Phase H Enterprise context: • Review any existing roadmap • Understand/infer gaps • (Background) Request for Architecture Work Partial Strategic Level Phase A Enterprise context: • Goals, objectives, initiatives, competitive, and tactic analysis • Reaffirm planning horizon • Operating model • Existing governance and risk management model • Stakeholder and concern identification Context specific for the EA Capability: • EA Capability model • Customized EA process model • Content model & (industry) reference architectures • Approach to covering EA Landscape

Topic	Mapping to TOGAF ADM Phase
Perform Assessment and Analysis	Partial Strategic Level Phases B, C, and D Enterprise context: • Assess current and target operational levels for process, business terms, information systems (application, data, technology, etc.), and capabilities • Assess current and target levels for business and extended context, specific to the Enterprise • Identify candidate ABBs (optional) • Document and define the gulf between current and target Partial Capability Level Phases B, C, and D Enterprise context: • Assess current and target operational challenges, engagement with partners and suppliers • Organizational structure and stakeholder matrix • Reaffirm value proposition of the Enterprise Context specific for the EA Capability: • Revise EA content model • Revise EA Repository Partial Strategic Level Phase A Enterprise context: • Identify and analyze gaps • Identify viewpoints Partial Strategic Level Phase G Enterprise context: • Compliance review • Completeness and confidence assessment

Topic	Mapping to TOGAF ADM Phase
Define Approach to Target State	Partial Strategy Level Phases B, C, and D Enterprise context: • Define specification and work packages for each gap • Identify capabilities to improve • Create candidate organization model • Create candidate operating model • Populate requirements management (or EA Repository) Partial Strategy Level Phase A Enterprise context: • Develop Architecture Vision • Develop Architecture Definition • Reaffirm vision, definition, work package, operating model, and organization model for relevance Context specific for the EA Capability: • Revise EA governance model • Revise EA engagement Model Partial Strategy Level Phase E Enterprise context: • Assess impact of differentiating processes • Identify options to close gaps Partial Strategic Level Phase G Enterprise context: • Risk and compliance review • Finalize stakeholder matrix
Finalize Architecture Vision/Target State	Partial Strategic Level Phase F Enterprise context: • Complete roadmap • Define governance model • Complete architecture definition and specification

7.2 Understanding Context

Implicit roadmaps and direction have been used to execute the current year's initiatives. Most of them are meant to address a gap. Most likely the progress or the impact concerns triggered the need for architecture work. Document such concerns and initiatives as the draft Request for Architecture Work. Those concerns are probably valid even now.

When approaching Architecture for Strategy, achieving the goals of the Architecture Vision phase is arguably the most important step for achieving a proper rollout of the next phases of the ADM as well as setting the stage for success for subsequent architectures. An implicit constraint to developing the strategic architecture is the duration of planning horizon. The Target Architecture should be commensurate with the ability of the Enterprise to look into the future,

competition, investment strengths, etc. Another aspect is the existing models for governance and risk management. It may not be defined or stated explicitly. It is the fastest path to getting the efforts off the ground. If the EA Capability has not documented the model, spend the time to get it done.

The scope of a strategy architecture usually involves a wide breadth, a shallower depth, and a long timeframe. In order to define what is inside and outside the scope of the baseline and Target Architecture efforts, the following must be defined:

- The breadth, depth, and timeframe of the architecture landscape
- The level of detail to be covered in each of the architecture domains
- The partitioning characteristics of the architecture
- The known constraints
- The architectural assets to be leveraged, such as assets available elsewhere in the industry like frameworks, system models, etc.

As always, stay on top of what creates value for the Enterprise – meaning match the architecture to the problem at hand. The scope will limit the architecture to exactly what is needed to achieve the goals and no more.

A key deliverable to this step is the creation of a Stakeholder Map which should clearly state the stakeholder concerns, requirements, and viewpoints as well as their classification and level of involvement. Other inputs from gaining an understanding of stakeholders are cultural factors, which can help the EA team understand how to present and communicate the proposed architecture.

This step is very important to strategy architecture since having a clear understanding of stakeholder needs, interests, visions, etc. will dictate how strategy architecture is understood by its sponsors and guide the EA team to act accordingly.

From a strategy perspective, it is important to ask whether the context of a business aligns with the mission. Do the capabilities match to the project scope? Are we carrying baggage from a previous project or from a different part of the company that is outside the confines of the architecture? Knowing the context of the work can help fine-tune the vision of the strategy architecture.

Finally, validate that the models specified by the EA Capability to analyze processes, engage with stakeholders, and deliver the architecture are relevant and current.

7.3 Assess the Enterprise

This is the core of the effort required to deliver Architecture to Support Strategy. Working across the breadth of the Enterprise, identify, define, and articulate as clearly as possible the operational state. This analysis covers capabilities, business processes, information systems, technology, business terms, security, service providers, customer satisfaction, etc. For each of these, gather the desired operational state that would enable the Enterprise to achieve most or all of its objectives.

Completing the assessment may require use of techniques like Strategy Map or Five Forces. The outcome from such exercise will change the strategy statements and objectives. When the initial analysis does not provide the growth amplification expectations of the stakeholder, employ these techniques to guide the stakeholder to explore new ways to play in the market. The architecture being delivered is driving a change, but the analysis is just a path to identify a right change to introduce. Some or all work products created while developing the architecture may not go into the Architecture Repository or become a deliverable.

The assessment should be performed to address key concerns of the stakeholders. If the Enterprise is chasing agility, assess for current and desired[28] agility levels. If it is after operational stability, assess current and desired. If the need is the ability to replace suppliers with ease, assess it. It is perfectly acceptable to state that one or more capabilities or information systems or processes are not needed in the desired state. Likewise, it is acceptable to move a capability or service from being a differentiator from competition to "on par" with competition. These are indirect statements of direction the Enterprise is planning to take. Validate that the value proposition, objectives, and the assessment values for the desired state are consistent.

What the Enterprise is after is defined in the context and Request for Architecture Work. It is likely that stakeholders may state new concerns to be assessed. Refine and finalize the Request for Architecture Work after assessments. Remember that the goal is to capture just enough data to identify the gaps. How the outcome of each process, application, service, or capability measures against the concern is sufficient to complete the assessment. Going after who made the application or what version is deployed in the data center are noise and should be avoided.

The chasm between current state and desired state is the chasm the Enterprise has to cross to achieve its objectives. The chasm has to be acknowledged and agreed upon by all stakeholders.

In order to communicate what concerns were assessed across what capabilities, processes, information systems, etc., identify appropriate viewpoints. Validate that the team performing the assessment followed the documented EA processes and consulted requisite and relevant SMEs and stakeholders.

In order to provide confidence to the stakeholders of the completeness of analysis and resultant development of the target state and roadmap, have a detailed trail of the personnel consulted. Employ any of the standard techniques like interviews, surveys, inspections to gather the current and target state information. For each of these techniques, there are well researched metrics for the number of stakeholders and SMEs to be consulted. Completeness and confidence in the assessment is the Achilles heel of this architecture.

7.4 Define an Approach to Target State

With all the data gathered, look at the whole picture: where the Enterprise wants to go, the forces acting on the Enterprise from outside and within, resources it possesses, and finally the structural and behavioral changes needed. Each providing new specification. Each refining the view of the gaps. Some of the requirements may be not vetted against the desired state. As long as it is not in violation of the desired state and the objectives, it is a candidate that needs to be recorded.

[28] Use of the term "desired" is intentional to communicate the fact that it is difficult for a human to foresee and consider change parameters in the future. Until a consensus is reached across key decision-makers, data gathered during assessment is an opinion or a wish. Once confirmed, it becomes a candidate target state. Once funded or signed off, it becomes the target state.

An architect adds most value in correlating the facts, and identifying a potentially new operating model, organization model, and capabilities the Enterprise should invest and improve upon.

7.4.1 Confirm Enterprise Change Attributes

This step looks at how to implement an architecture taking the organization culture into consideration when assessing the business units and overall Enterprise in terms of their transition capabilities and skill sets. These assessments should be documented in an Implementation Factor catalog so that it can be used as an archive and record of decisions taken. Culture is very important to strategy architecture since strategies are long term, and often culture is set for the long term. Getting these two in sync is paramount to building a successful architecture. Other components of this step that are relevant to the strategy architecture include assessing the context that shaped the need for the strategy and performing a gap analysis of the Architecture Vision to the candidate architecture.

7.4.2 Develop Value Proposition

It is important that not only the value proposition for strategy architecture be understood by stakeholders but also the effort needed is accepted in its entirety. Consent and understanding should be manifested in a simple Solution Concept diagram that illustrates the major components of the solution and how the solution will positively impact the business. Since the value proposition is specific to stakeholder interests and concerns, it is important to pay close attention in this step as well-defined value propositions are key to strategy architecture success. For any architecture, sub-steps involve:

- Risk Assessment – leverage risk management processes to determine the level of risk appropriate to the vision
- Determine Value – link value to work packages as they pertain to stakeholders or stakeholder groupings
- Determine Key Performance Indicators (KPIs) – can be associated with concerns, risk assessment, and value

  Determining the KPIs is necessary in the strategy architecture in connection to governance.

Determining the value proposition and how it is linked to various stakeholders and deliverables will help formulate very high-level definitions of the baseline and target environments from multiple points of view. Strategy is all about high-level concepts, but agreement on these concepts is key for a successful vision to be formulated and adhered to.

7.4.3 Identify and Sequence Work Packages

Logically group the various activities into work packages. This way the missing business capabilities can be assessed and, in the solutions column, proposed solutions for the gaps and activities that might orient towards a new development can be recommended. This step allows us to prepare for solution delivery, as the new developments might already hint at using external service providers.

Having done the sequencing and sifting down to relevant architecture requirements, the candidate roadmap and candidate Target Architecture are ready to construct the Architecture

Vision. Create the initial version of the roadmap by consolidating the work packages from the previous steps while keeping in mind that this roadmap will link to subsequent phases. At the broadest level, the roadmap should define where the business wants to go, how it will get there, and by which means. Keeping an eye on the sufficient level of detail needed for this roadmap to be implemented should forbid the architecture to transition to different results.

7.5 Finalize Architecture Vision and Target Architecture

Tie-up any loose ends or mismatch in work packages and capabilities; resolve the impacts to the candidate architecture, and resolve impacts across the Target Architecture by performing stakeholder concern trade-off analysis. The roadmap should be significant in breadth for clear outcomes but shallow enough in depth to outline work packages without going into too much detail. The transition and migration plan must likewise demonstrate a minimum activity necessary to realize the roadmap. It is key to take the context of the Enterprise into account when formulating the implementation plan since there will be different approaches to consider depending on the business.

Sub-steps to follow for both of these points include:

- Context Assessment – assess the roadmap components and work packages in the context of the capability, value, and risk assessment
- Describe Candidate Transition Architecture – where there are significant points being changed in the Target Architecture along the roadmap, create a transition architecture that supports new models, identify building blocks to be used in the transition, identify views that address stakeholder concerns, and identify specifications
- Resolve Impacts Across the Architecture – determine the impact and interact with risk management to create a plan for the transition
- Perform Trade-off Analysis – interact with the requirements management process to update requirements and with risk management to update risk based on these trade-offs
- Have the Target State Approved by the Appropriate Stakeholder(s) – you do not have a roadmap until the organization has signed up to do the work. Without an agreement to do the required work you only have an intention to change

7.6 Conclusion

Communicate the Architecture Vision and populate the governance model and process with stakeholders, review cycle, and objectives. Ensure that stakeholders and decisions-makers understand, agree with, and provide the license to proceed with populating the EA Landscape. This license to proceed with the stated vision, Target Architecture, and the roadmap constrains and guides all future architecture work. Creation of a value chain, value streams, organization maps, strategy map, or balanced scorecard can be completed meaningfully when the Architecture to Support Strategy is ready.

A list of duplicative efforts that require rationalization and a graph of sustain and improvement capabilities are populated into the roadmap. The stakeholders have successfully directed the creation of the architecture and have populated the governance details for further detailing and

implementation of the architecture. This is the superior architecture[29] that will guide and direct the Architecture to Support Portfolio.

Success is measured by alignment on the target state and clear understanding by the decision-makers and stakeholders of the effort required to achieve the target state.

[29] Superior architecture is an architecture that constrains, guides, and directs population of the EA Landscape within the scope of the Request for Architecture Work. Architecture to Support Strategy is the superior architecture for Architecture to Support Portfolio. Architecture to Support Portfolio is the superior architecture for the Architecture Project. The Architecture Project is the superior architecture for Architecture to Support Solution Delivery.

8 Walk Through Architecture to Support Portfolio

8.1 Introduction

Almost all EA engagements, external or with an in-house EA team, are initiated for an Enterprise that has been in existence for a while. Whether explicitly initiated or acknowledged, an architecture is in place and solutions are being delivered against that architecture. Even when the Architecture to Support Strategy has been created for the first time, there are ongoing efforts and their impact that will have to be accounted for.

The primary objective of Architecture to Support Portfolio is to identify projects, identify dependencies and synergies, and prioritize and initiate the projects. From that perspective, it would appear that all of the work is confined to Phase F to complete the architecture work and transition to solution delivery work.

The Enterprise's solutions are delivered on a continuum. This continuum is split into four phases, all focused on achieving the objective to meet stated goals. These phases are:

- Stay on par with other players in the market for a given capability
- Maintain the edge a capability has over other players
- Create new differentiations in capabilities
- Create new markets and revenue streams

Once a new capability or a differentiation in a capability is achieved, the incremental advantage will have to be maintained.

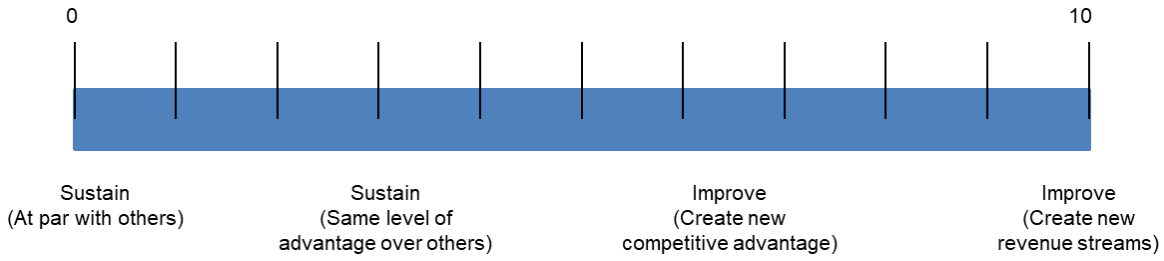

Figure 16: Capability and Project Continuum

It is imperative that Architecture to Support Portfolio takes into account an existing implicit or explicit Target Architecture and the impact driven by in-flight projects. Hence, in true sense, this work starts in Phase H of the ADM. The work is considered complete when all the specifications that constrain the Architecture to Support Project are defined, understood, and signed off. In other words, the need to perform Phase A for the solution delivery projects that are triggered by the portfolio is complete.

In doing to so, the architecture provides a data-driven approach to reduce the possibility of one set of decision-makers netting the majority of the available budget because of the way it has been in the past. This is achieved by developing appropriate models, like-to-like comparison, and incremental exploration of the EA Landscape to assess impacts and dependencies.

It is imperative that the Architecture to Support Portfolio concludes at least 30 days before the budget preparation. A best practice is to is offset this work by at least a quarter (three months) from the business cycle of the Enterprise.

Questions answered by this effort are:

- Is the architecture recent and current enough to guide decisions?
- What is the confidence that the allocated budget drives the Enterprise closer to target state?
- Are the controls on risks sufficient enough to trigger and guide viable alternate actions?
- How often is the solution delivered to be inspected to assure general correctness of direction?
- How to identify and initiate changes when any of the trade-off criteria are impacted?

When pivoting on program and project management concepts, a portfolio can include operational improvement efforts; not a clearly defined end-date for closure. The intrinsic value of the Enterprise is elevated when related and cohesive parts of the EA Landscape are improved. From an EA point of view, a portfolio addresses improvement of the intrinsic value and reduction of risk factors.

Table 6 summarizes the activities and use of appropriate steps from the ADM phases. The content of the table is discussed in detail in the rest of this chapter.

Table 6: Summary Table: ADM Phases and Architecture to Support Portfolio

Topic	Mapping to TOGAF ADM Phase
Group Work Packages to Themes (Section 8.2)	Partial Strategic Level Phase H • Enterprise context: • In-flight projects and gaps • Current fiscal year roadmap Context specific for the EA Capability: • Goals • Request for Architecture Work Partial Strategic Level Phase A Enterprise context: • Updated strategic architecture • Updated roadmap Context specific for the EA Capability: • Work package and themes • Stakeholder priority trade-off • Updated architecture specifications • Traceability matrix for value proposition Partial Strategic Level Phase G Enterprise context: • Perform architecture compliance reviews • Risk assessment

Topic	Mapping to TOGAF ADM Phase
Balance Opportunity and Viability (Section 8.3)	Partial Capability Level Phases B, C, and D For each capability or project in the portfolio: • Elaborate specifications to estimate effort size • Identify reference architectures and market benchmarks • Identify candidate ABBs • Identify Solution Building Blocks (SBBs) (optional) Partial Capability Level Phase E For each project in the portfolio: • Identify solution providers • Readiness assessment • Gather estimates • Assess viability and fitness of solution options Partial Capability Level Phase F For each capability in the portfolio: • Initial/draft Implementation and Migration Plan • Draft governance plan Partial Project Level Phase A For each project in the portfolio: • Candidate proof-of-concept work packages (as needed) • Draft success measures
Run Up to Budget (Section 8.4)	Partial Capability Level Phase A For each capability or project in the portfolio: • Update roadmap • Update risk matrix • Update work package and architecture specification Partial Capability Level Phase F For each project in the portfolio: • Populate governance and approval plan Partial Capability Level Phase G For each project in the portfolio: • Finalize governance model and plan

Topic	Mapping to TOGAF ADM Phase
Drive Confidence of Delivery (Section 8.5)	Partial Enterprise Level Phase F Enterprise context: • Initiate completion of architecture work • Define target transition architectures • Finalize effort and resource estimates • Define variance measures in project-specific governance model • Update risk matrix Context specific for the EA Capability: • Revise EA governance • Revise EA engagement model • Revise EA organization model

8.2 Group Work Packages to Themes[30]

The minimum dataset required to initiate this effort is:

- Current fiscal year's roadmap (to the extent available)
- List of in-flight projects and relationship to objectives
- Strategic architecture (gaps, work package, and candidate roadmap) for the next fiscal year, from Architecture to Support Strategy
- Catalog of stakeholders, decision-makers, and implementers
- Risk catalog

Note: The backlog from the current fiscal year is not of concern, as the Architecture to Support Strategy has accounted for them.

Given the context surrounding the Enterprise and the EA project, develop a Baseline Architecture from the current state architecture created by the superior architecture (Architecture to Support Strategy). The Baseline Architecture is not a physical thing. It is a point of reference in time, defining a metric and a measure to enable value reporting. The baseline is a collective

[30] Terms like "initiative", "portfolio", and "program" carry organizational connotations and often derail us from communicating the message. Most of the definitions derive from investment management concepts, which essentially states portfolio as a mix of assets that matches the objectives balancing risks against performance.
As defined by the Project Management Institute: "A *portfolio* is a collection of programs, projects, and/or operations managed as a group. The components of a portfolio may not necessarily be interdependent or even related, but they are managed together as a group to achieve strategic objectives." And: "A *program* is a group of related projects managed in a coordinated manner to obtain benefits not available from managing them individually."
According to Robert G. Cooper: "Portfolio is a dynamic collection of new and existing product or service development efforts, to allocate, de-prioritize, or regroup resources in response to dynamic opportunities, multiple goals, and strategic considerations, interdependence among projects, and multiple decision-makers and locations."
All of these definitions do not explicitly address the continuity and connectedness of the efforts in the context of an Enterprise. In order to stay away from such limitations, this Guide resorted to using "theme" to indicate that work packages should be grouped in such a way as to enable populating neighbors in the EA Landscape. One theme may populate the Operational Excellence capability landscape while another may populate the Financial Controls capability.

view that provides credit for value added by in-flight projects. All value assessment and trade-off shall be performed against the baseline.

The Baseline Architecture groups the in-flight projects against the new objectives defined in the Target Architecture. It is possible that in-flight projects may not align cleanly with the Target Architecture. When a project aligns to more than one objective, assigning credit from such an effort to all objectives to create the baseline will not impact the value reporting. The impact of gaps between current state and Target Architecture will invariably outweigh.

Using the Architecture Vision as reference and the list of work packages, develop a set of themes, if not previously defined by Architecture to Support Strategy (prior architecture work). It may be necessary to create multiple baselines, one for each theme. Themes are defined by factoring the current and target organizational structure, productivity, differentiation, and scaling objectives. The organization structure articulates stakeholders, decision-makers, and implementers, their interests and concerns. As the work packages are moved across themes, perform an assessment of impact to stakeholders, decision-makers, and implementers. The resulting grouping of the work packages can be suboptimal due to dependency on pending organizational change.

When performing EA activity for the first time in the Enterprise it is safe to assume that there were no target transition architectures that were used to create projects in the current year. The Target Architecture and gaps were inferred by whoever drove the budget preparation and budget allocation. Many of the in-flight projects could have a target completion date that extends beyond the next couple of business cycles. Altering the course of these initiatives takes time and, hence, suboptimal architectures in the first go around of the architecture effort. Revisit the gaps list created by the Architecture Project and work packages, and make appropriate adjustment due to in-flight projects and any inferred roadmap for the current fiscal year. Prioritizing, estimating, and sequencing of this list is the scope of work for the Architecture to Support Portfolio.

To identify the prioritization of the effort, build Table 7. Populating the table forms the basis for performing further elaboration of the EA Landscape. Any cell in this table without data conveys that the architecture is not complete.

Table 7: Work Package Grouping

Portfolio Theme	Work Package Name	Work Package Required	Importance	Impact Realization Timeline	Effort Required	Magnitude of Investment

The importance of a work package is carried over from the strategic architecture. The last three columns will be populated as the architecture is developed further. As noted earlier, the work package to "theme" association is made using the lens of improving intrinsic value of the Enterprise, populating cohesive parts of the EA Landscape.

Analysis of the mapping between portfolio themes and stakeholder concerns identifies the subset of stakeholders to engage for each portfolio. For each portfolio, reaffirm that there are no changes in the internal and external forces that created the work package. Identify resources required and track the resources that cross organizational boundaries. It is typical for most

organizations to require an elaborate process to move resources. Identification of such a need changes the dependencies and priorities of the work packages.

Using the stakeholder concerns from prior architecture work and the new grouping of the work packages, perform a trade-off analysis to quantify the changes to gaps and cascading impact on time to achieve the target state. Identify any new risks and develop appropriate controls. Using Table 7 and the mapping of work package to objectives via gaps, reaffirm that the value proposition delivered by the portfolio is aligned to the objectives.

The work packages carry an attribute to identify whether they are new or a carry-over from the current fiscal year's effort. From now on, the merits of the work package in shortening the path to target state drives decisions to invest. Continuation of the current efforts may be factored in, but they are not a determining factor. Now, a reasonable candidate Architecture Vision for each theme, and hence, a portfolio is created.

8.3 Balance Opportunity and Viability

The analysis and architecture development so far has been heavily focused on an inside-out approach. It is time to seek help outside the Enterprise. For the kind of changes being driven, potentially accelerating solutions might be available in the market – within the same industry vertical or otherwise. Technological developments and environmental changes might present new options to meet the needs of the work packages. Considering business cycles of suppliers, partners, and the Enterprise, it may be prudent to initiate identification of implementers now. These implementers are not decisions-makers or stakeholders. It is not good practice to include them in the stakeholder matrix.

Develop the Business, Information Systems, and Technology Architecture specifications to the extent needed to scout the market for options. The focus is more on identifying the motivations behind the solutions than identifying a solution. If the purpose is to transmit information digitally, identify whether imaging is not an acceptable option. This still leaves the option to innovate, if needed, the right fit at the solution delivery stage. A related question would be: is the transmission of data for record-keeping purposes or transaction management purposes? Such a motivation identifies attributes of the building blocks and potential reuse of solutions already employed in the Enterprise. Assess the solution options more from an exclusion point of view, rather than narrowing down to "the solution".

In elaborating the architecture, new risks and dependencies will arise, and so should appropriate controls. Develop a matrix of options, risks, and controls to enable viability analysis and trade-off with stakeholders. Keep populating the requirements management function with data from such elaborations. Identify the list of standards and reference architecture that can be leveraged or imposed as limiting conditions on the solution. Identification of such standards and architectures amplifies and drives specificity of the (constraints) architecture specification from the superior architecture. It may also provide an accelerated path to solution. Capture all possible attributes to inform trade-off analysis.

It is time to reach into the EA Repository for viewpoints, views, appropriate building blocks, and reference architectures to develop an approach to address the gaps. The viewpoints should provide a point of reference to the EA Landscape that is relevant for the stakeholder and decision-maker. Continuously validate that specifications for all work packages in the theme are elaborated equally, to the extent possible and necessary to decide the priority and resource needs.

Identify pockets where a solution may have to be invented. In such a case, create new work packages to perform proof-of-concept validations before scaling out. Understand that proof-of-concept work is actually implementation, not architecture. Architecture work is identifying the placeholder required to allocate appropriate funds and mitigate unknowns. The main focus of the Architecture to Support Portfolio is to maximize the mileage gained with available resources. The second objective is to identify conditions under with projected mileage gain is achievable. The third is to identify barriers to achieve the goal and build efforts to diminish the impact of such barriers. The final objective is to provide assurance of investment to reward ratio being unaltered. Populate the list of projects required to meet these four objectives.

Gather effort and resource estimates for all work packages. Revisit the dependencies across work packages. Identify the importance and impact of the work packages. The ability to authenticate the identity of the person carrying a ticket will vary with context. An Enterprise may have the same need for more than one scenario or portfolio. Or, in the case of boarding an aircraft, multiple agencies may have to be involved. Such work packages have high importance and impact, requiring early investments in the overall improvement cycle.

Perform an opportunity analysis factoring viable options to approach the solution. Remember, the focus is driving a baseline estimate and assurance of achievability of the target. The validation of the portfolio and the trade-off is focused on grouping by theme, related impact, and importance assessment. The decisions driven here impact the distribution of limited resources across the investment continuum.

8.4 Run Up to Budget

8.4.1 Internal Engagement

Other than line of business leaders, personnel from the office of the financial controller and Project Management Office (PMO) are key to driving the budget. The objectives of these two teams are fundamentally different, but converge once a year – the time of budget preparation. The convergence is around the trend on variance to budget. Enterprises develop guidance on year-on-year funding and budget trend based on statistical data, without any qualification for the value delivered. It is normal for the delivery or execution teams to ask for more than is needed or to keep the same level of ask, without sufficient demand, for fear of losing funding.

Another factor that could arise is the conflict due to gaps in the agility expectation of the service consumer (say sales team) and that of the service provider (say licensing and pricing team). Such a conflict creates duplication of capabilities and service in the guise of a different objective or effort name. Preparing for the budget, the EA team works to eliminate variations from such “opinions” or “duplications” of the past using gaps and work packages.

It is highly likely for the superior architecture to recommend organizational changes as well. In this case, the Human Resource (HR) team is going to play a more critical role in budget preparation than ever before. It is not the responsibility or the function of the EA team to drive decisions. EA has to frame the conversation and the directions to identify the right resources to lead and drive change. It is imperative that the engagement of all concerned internal teams – mainly HR, PMO, and finance – is key to the success of delivering the Architecture to Support Portfolio.

8.4.2 Has the Target been Reached?

Having driven confidence in reducing sources of artificial variance to budget, next to tackle is accuracy of the estimates. When the changes require a reasonable number of proof-of-concept efforts to be done or require employment of specialized services, veracity of the estimates would be questioned. In order to drive the level of confidence, it would appear that more time, more analysis, or more iterations are needed. Other than time, here is a short checklist that will indicate that it is time to stop iterating:

1. For each "theme", have the work packages been classified into a capability continuum (a work package cannot address both Sustain and Improve)?
2. Are the dependencies and cascading impact of work packages acknowledged by decision-makers and implementers?
3. Is there a contiguous elaboration and exploration of EA Landscape?
4. Have the mitigations and controls for risks (unknown events) been added to the portfolio?
5. Is there a blend of operational excellence and fitness for purpose within each theme?
6. Are there any recency concerns?
7. Is a raw estimate and contingency factor available (% buffer to account for market and external trends)?
8. Is the ratio of growth in breadth of coverage architecture specification to depth of coverage diminishing between iterations?
9. Is the variation in estimates between current and previous iteration less than the contingency factor?
10. How many of the efforts are one-time executions to support transformations?

The point of diminishing returns is met when positive responses are given to either (8) or (9) above. Mostly during the first two to three years after initiating an architecture-driven planning cycle, the EA team will run out of time before (8) or (9) could be met. Plan for recommending a discretionary spending bucket.

To complete the architecture work, update the architecture roadmap, risk matrix, architecture definitions, and specifications to the extent needed and necessary. As needed, consult and conduct reviews with SMEs and stakeholders to validate the direction. For each theme, define the governance plan and model that is acceptable to stakeholders and decision-makers.

8.5 Drive Confidence of Delivery

Useful architecture drives change and simplifies decision-making. The objective of budget preparation is to drive confidence of estimates, confidence of delivery against the roadmap, and garner the resources required to drive change. The set of prioritized work packages grouped by themes that traces to objectives drives confidence in responses to the "why" and "what" questions. The set of estimates that is backed by variance control drives confidence to the "how" and "how much" questions. Creating a set of project governance that reduces the chances of execution decisions delaying the time to target state serves the final objective of this architecture – balancing innovation and considered controls.

Develop just enough views, models, and specifications to support the budget request. These documents are supported by a matrix of accountable parties for delivery and accountable parties for acceptance, usage, and sign-off. Success measures are articulated in value terms – controls in cost measures, and risks and outcome in value measures.

Initiate activities to complete the architecture work. This involves populating the appropriate project vision documents, project architecture definitions, project stakeholder list, communication plan, and conditions that govern trade-off. Populate the data required by monitoring the system for each project, should the project be approved for execution. Populate the dependency matrix in accordance with the boundaries set for each project and the "theme". The Architecture Project cannot be completed until the Architecture to Support Project is delivered. Initiating the effort at this stage communicates the decisions at the strategy level that can be revisited in the future. The last validation is to define that the operating model (recovery-driven or engagement and continuity-driven) is aligned to the business model.

8.6 Request for Architecture Work Originating from a Random Idea from the Wild

In a well-run, creative organization many good ideas are not derived from gaps identified in the architecture. In these organizations, a Request for Architecture Work comes from someone with a good idea for improving the organization.

With a request from the wild, the Practitioner will typically engage with a strong champion and identify holes in the EA Landscape. There is little need to worry about bumping shoulders with other identified gaps and work packages. However, the champion often will have a limited, or myopic, view of the stakeholder's preferences and concerns.

The Practitioner must take care to stay within the context of the wild architecture development relying on the mission, vision, and strategy of the Enterprise. Requests from the wild should be expected to challenge the status quo. The inherent creativity is welcomed by good Practitioners. Without much guidance from the strategy or portfolio to constrain the architecture development, Practitioners must ensure that identification of the correct stakeholders is completed and that the concerns reflect the stakeholder's preferences and priorities – see Phase A: The Starting Point. Not all champions are stakeholders, and all Architecture Projects are subject to superior architecture.

There is a need for critical thinking around the preparation required to insert the architecture developed in response to a receipt of a Request for Architecture Work from the wild at the optimal point in the sequence of work within the Enterprise's roadmap, or implementation plan. Well executed, the organization is able to balance creativity and innovation with the benefit derived from clear understanding of dependency to value realization.

While most Requests for Architecture work from the wild are for Architecture to Support Project and Architecture to Support Solution Delivery, strong champions will drive a portfolio initiative.

8.7 Conclusion

Conduct periodic value assessment and reporting to communicate lessons learned and whether the portfolio created is delivering organic change, radical innovation, or maintains the status quo.

Implementation Projects deliver value a few quarters after the project is closed. It is the responsibility of those managing the portfolio to track and report value. Add to the portfolio an explicit backlog item to monitor and report value realized.

In the event this architecture is supporting a merger, acquisition, or divestiture activity, include explicit recommendations to tackle the impact of technology in easing the business operations, asset, and risk accounting.

Success is measured by alignment by the decision-makers on a number of concurrent streams, total resources required over the planning horizon period, and trade-off criteria.

9 Walk Through Architecture to Support Project

In this context, the architecture is used to clarify the purpose and value of the project, identify requirements to address synergy and future dependency, assure compliance with architectural governance, and to support integration and alignment between projects.

This chapter describes development of architecture for one project within a portfolio. The effort starts with identifying the context, the superior architecture that defines the visions, the scope, and the value the project should deliver. Without initial exploration about where the project sits inside of the EA Landscape, Architecture to Support Project is in a volatile state. It is the responsibility of the Practitioners working in the Architecture Project to gather hints of uncovered barriers to the project. The project lies inside the roadmap at some linear point in a sequence of work packages. There are many hints from the roadmap alone of where to see danger ahead and who to ask about any unknown warning signs.

The purpose is to highlight the level of detail, time, and breadth during the ADM cycle phases for developing an EA as a focus of support to project architecture and governance. Most of the effort happens in the context of Phase F.

Table 8 summarizes the activities and use of appropriate steps from the ADM phases. The content of the table is discussed in detail in the rest of this chapter.

Table 8: Summary Table: ADM Phases and Architecture to Support Project

Topic	Mapping to TOGAF ADM Phase
Ascertain Dependencies	Partial Capability Level Phase A Program context: • Verify recency • Validate stakeholders, outcomes, timeline • Define project context in EA Landscape Partial Capability Level Phases B, C, and D Enterprise context: • Assess the readiness of the Enterprise to absorb proposed solution • Assess the ability of the solution provider to deliver the solution • Ascertain the scope of change of the Implementation Project Program context: • Elaborate architecture definition • Elaborate architecture specification • Define approach to minimize dependencies • Define risk controls

Topic	Mapping to TOGAF ADM Phase
Balance Options and Suppliers	Partial Capability Level Phases B, C, and D For each capability: • Define the solution boundary and conditions for integration • Validate continuity in EA Landscape • Create domain-specific work packages Partial Capability Level Phase E For each project in the portfolio: • Identify candidate ABBs and SBBs • Gather estimates • Develop project timelines • Trade-off impact with superior architecture • Update roadmap • Update risk matrix • Update work package and architecture specification
Finalize Scope and Budget	Partial Capability Level Phase F For each project in the portfolio: • Finalize estimates and timeline • Update Enterprise roadmap • Populate governance and approval plan Partial Capability Level Phase G For each project in the portfolio: • Perform architecture review • Confirm stakeholder approval Level Phase A For each project in the portfolio: • Candidate proof-of-concept work packages (as needed) • Candidate Statement of Work • Finalize stakeholder list • Draft success measures
Prepare for Solution Delivery Governance	Partial Program Level Phase F Program context: • Initiate completion of architecture work • Define target Solution Architectures • Finalize effort and resource estimates • Define variance measures in project-specific governance model • Update risk matrix

For Architecture to Support Project, the critical focus points are:

- Scoping:

  — What is the origin for the receipt of a Request for Architecture Work?

— Where will I have overlap? Who are my neighbors (EA Landscape)?

— Where do I look (EA Landscape: depth, breadth, detail)?

— Are my stakeholders/portfolio guidance still relevant (recency)?

- Domain-specific stakeholders' concerns and architecture elaboration:

  — Viewpoints/Stakeholder Map

  — What do I need to know/solve for?

  — Resolve impacts across architectures

- Finalizing the target transition architecture and its value:

  — Creation of requirements and specifications

  — Securing a Request for Architecture Work for the solution delivery architecture

9.1 Ascertain Dependencies

Throughout the entirety of the ADM, it is recommended to have a close look at the superior architecture in the EA Landscape. It is possible that Practitioners of superior architecture have already specified a list of things which the Practitioners of the preceding architectures are able to pull down to include as new inserts of an architecture description.

There is not much need to explore a reason to do architecture when the purpose of the project has already been specified within a roadmap. The Practitioner may find that they already have a sufficient Architecture Vision from the work that has been done in the portfolio architecture. However, the Practitioner must take responsible action to confirm the Architecture Vision along with a number of portfolio-level Target Architecture components to assess the impact of recency (see Section 3.2.1).

Assessing recency is the pulse of the Architecture Project. It will involve looking "bottom-up" at the current work in the EA Landscape to assess the impacts of recency to prior EA. Look at the set of Architecture Visions from the Architecture to Support Portfolio. The following set of questions will guide assessing the impacts of recency to prior EA work for the purpose of use:

- What EA is parallel in development?
- Which targets are in the process of being realized?
- Which targets have been approved?
- What is effect of recency on prior EA?

After prior EA work has been reviewed, reaffirmed, or replaced, the effect of recency is reset and mitigates the risk to the Architecture Project significantly.

9.1.1 Project is not a Magical Place to Swap Out Stakeholders

Who are the complete set of stakeholders across the architecture? The stakeholders in the portfolio level will need to be reaffirmed.

It is common to find organizational leaders who, at the start of an Architecture Project, feel a strong need to replace the stakeholders identified in their superior architecture with stakeholders which have a high enough power to block or advance a project but not the architecture; see the TOGAF Standard – ADM Techniques (Classify Stakeholder Positions).

This will introduce new project-specific concerns into the architecture. It cannot be stressed enough, to hold on to the distinction between the stakeholders that have high power in the Architecture Project and those that have high power only in relation to the Implementation Project. At the end of the day, the Practitioner addresses the concerns of the empowered stakeholders holding the key to the success of the Architecture Project because they have the power to shape any Implementation Project in order to conform with the approved target. It may be useful to identify the project-specific stakeholders' concerns if we can solve for both and get something for free. Solving for an Implementation Project-specific concern is what can be called a "nice-to-have".

9.1.2 Stakeholders *versus* Key Players

Look at the previous Stakeholder Map from the portfolio. Assess recency. Map the complete set of stakeholders of the Architecture Project against their known concerns.

Do not include an Implementation Project-specific set of stakeholders (otherwise known as key players to the Architecture Project) in the Stakeholder Map. If desired, map the key players to any additional Implementation Project-specific concerns separately. Having more than one set of key stakeholders completely blocks the ability to perform trade-off.

9.1.3 Viewpoints and Requirements

The most important piece before doing any work; knowing what you need to know. Once you have a complete set of views which describe the stakeholders' concerns, you know exactly what you need to do, or at the very least, where to go look to find out what needs to be done.

When selecting viewpoints from the viewpoint library or developing new viewpoints, ask if the viewpoint represents the complete set of stakeholder concerns to the Architecture Project. Are all the stakeholders' classes representative of those which own the approval rights around the Target Architecture and decision rights around the Implementation Project?

Are the concerns consolidated and constrained into topic areas derived from the Enterprise's strategy, which will be consistent across Architecture Projects?

Does the viewpoint give a point of reference for what you need to know and where to look in the EA Landscape?

Once the Practitioner knows what information is needed and where to find it, it is safe to continue doing work without the fear of stepping on a figurative land mine.

Review the Architecture Repository for resources, especially architecture specifications, requirements, and work packages from the superior architectures to address the stakeholders' concerns for the Architecture Project.

9.1.4 Go Talk to the "Neighbors"

In developing a candidate architecture, the key to success is to be aware of the neighbors of the Architecture Project in the EA Landscape and to assess the "neighborhood" for recency. How much room is there for the Architecture Project until there would be an overlap or collide with another one?[31] When must you go and have a conversation with the neighborhood and assess their work for recency?

To add complexity, what is the current status of the neighboring architectures? Are the neighboring Architecture Projects approved, in transition, or becoming realized? You may not have to worry about rubbing shoulders with a neighboring Architecture Project until one of them enters a transition state.

Have the necessary conversations with the neighbors periodically to make the process of resolving impacts across Architecture Projects easier. The later these conversations with the "neighbors" takes place, the more likely the Practitioner will incur harder decisions, which would have been easily avoided; such as de-scoping decisions. The Practitioner must check the candidate architecture's flexibility to withstand the volatile environment shared with other Architecture Projects undergoing a number of transitional states.

9.1.5 Delivery and Acceptance Ability Assessment

This is an opportune time to assess the readiness of the organization to actually start to execute and realize the change. It involves identifying whether the work packages cover the necessary changes to business processes, operating procedure, training, and everything that has to happen once the solution is delivered. The assessment is narrowly focused to test the scaffolding the neighbors should have in place. A second set of assessment is the ability of the solution delivery team, internal or external, to deliver to the needs of the architecture specification. The project manager and the product owner are fully aware of the trade-off criteria to retain value; aware of dependencies from the neighbors to this effort and from this project to others; and the risks and controls to mitigate them.

9.2 Balance Options and Suppliers

Architecture to Support Project is to answer a set of problems in a box; the answers are expected to stay within the box. The Practitioner must elaborate all domain architectures just enough to assure that the architecture is addressing all of the work. The project cannot move forward until it is proven that the project will be a success. Gather the estimates of all resources required to deliver the project. All of the bridge will be built, not just some of the bridge. Remember, the focus is to clarify and confirm the purpose and value of the project. Part of the bridge does not serve any purpose or add any value.

The up-side is the Practitioners involved in the Implementation Project have blinders on that only allows them to see the distance from where they are standing to the horizon. The horizon is the work needed before implementation begins. In the context of the Implementation Project, the Practitioner's line of sight is always the horizon, including the distance to get there. It is already understood what "success" will look like, standing on the horizon. What is the work that will take us there?

[31] Is the Architecture Project in the Mojave Desert of the EA Landscape or in Abu Dhabi?

9.2.1 Performing Trade-Off

As the saying goes "you can't step in the same river twice"; the water's always changing, always flowing. Without discovery of where the candidate Target Architecture stands before finalization within the EA Landscape, it is harder to guide projects from running off waterfalls and large cliffs.

Only until the Practitioner looks "downstream" are they in a position to perform a trade-off, resolve impacts across the Target Architecture, and choose the smoothest course. Doing a consistent reconnaissance of the EA Landscape will enlighten the Practitioner to where the project can avoid disaster further down the river.

In order to perform, the Practitioner is chasing the barriers to deliver and realize value. This is too early to define the architecture for solution delivery. This is definitely not the place to define and design the solution. Implementation is not architecture. The architecture is assuring resilience to risks and guidance to implementers. Any recommendations of ABBs and SBBs to accelerate value realization and improve conformance are identified and included in an architecture specifications.

If it is discovered that the Implementation Project's candidate Target Architecture is impacting or will be impacted by a finalized Target Architecture of another project in-flight, always assess recency, confirm, and do a trade-off analysis. Keep in mind that when doing a trade-off analysis and resolving impacts across the Target Architecture that the Implementation Project is already heavily constrained and may need to mold a path down the river around the other projects that have been approved and have taken root along the river bank. Then, given any new discoveries to the Implementation Project, if any, create the architecture specifications for the Implementation Project to assure avoidance of overlap and conflict.

9.2.2 Managing the Current Approach towards Implementing the Change

Once impacts have been resolved, create the views necessary to convey to the stakeholders that their concerns have been addressed with the necessary constraints and guidance developed prior to initiation of solution delivery for it to be successful.

The Practitioner's analysis of the Target Architecture cannot have assessed every circumstance, or change option possible. There will always be an infinite number of things to discover about the Architecture Project. The Practitioner's job is to show that a sufficient level of scrutiny led to the deliverables of the Architecture Project for the solution delivery architecture to succeed. The Practitioner should only assess to the extent of avoiding major cliffs. Once you start assessing the Architecture Project for all the subtle bumps, you have exceeded the sufficient level of scrutiny and are wasting valuable resources.

Prove to the stakeholders that when the Architecture Project is consumed by the solution delivery architecture, their requirements have been met and changes to the Enterprise will be guided and constrained efficiently. Identify and secure approval for the resources necessary to begin allocating the budget for the solution delivery architecture to begin.

The Practitioner will know that the Architecture Project is a success upon receipt of the Request Architecture Work for solution delivery.

9.3 Finalize Scope and Budget

Implementation planning (Phase F) is the most critical piece in executing a walk through the ADM for the Implementation Project. Practitioners must rationalize for their Architecture Project what resources are required.

Package the project's architecture specifications, which includes the subsequent controls that mitigate the identified Implementation Project's risks. The package is then handed off to the Implementation Practitioner. It is the responsibility of the Architecture Project Practitioner to set up the Implementation Practitioner with everything they need to implement the project successfully.

If one or more work packages have not already been assigned to the Implementation Project, do so and seek approval. Be familiar with which gaps the work package(s) are filling and the purpose of their sequence in the roadmap. It may also be necessary to be familiar with the work packages the project will not be filling. Identify the risks within the work packages and subsequently within the Implementation Project.

Architect the "package" for the purpose of the Implementation Project. Create architecture specifications to the extent that an Architecture Project will not go off the rails on a crazy train. On the other hand, the railroads must not be easily scoured or constrained to the point of inflexibility of the volatile environment of the EA Landscape. Keep the Implementation Project on the tracks while maintaining the railways of the Architecture Project.

The Practitioner should package the architecture specifications including the principles, requirements, and controls within the context of the light shining down from the Architecture Vision of the portfolio, in the review of the Stakeholder Map, and the undertakings of the EA Landscape.

Refine the estimates and timeline for the project within the acceptable variance limits of the Enterprise. Cascade the update to project scope, trade-offs, and timelines to the Enterprise roadmap. Consult the requisite SMEs and stakeholders, and complete the architecture review. Populate the governance and approval plan for the solution delivery effort.

9.4 Prepare for Solution Delivery Governance

The maximum value is to be delivered by the Architecture Practitioner to the Enterprise in this step. Having finalized the scope and budget, make sure that the backlog information is complete for the project; trade-off, and decision criteria for the product owner, product manager, scrum master, or the project manager (whatever the role and title is) and the Implementation Practitioner is fully defined and understood; decision-makers and organizational leaders are fully aware of the barriers they must work to remove.

Any outstanding proof-of-concept work at this time should be limited to understanding an approach to the solution, not the architecture. Provide sufficient measurement criteria, indicators to warn of any variances, escalation, and deployment of SMEs, and implementation governance.

Initiate steps to close the Architecture Project. The Architecture Project's scope is limited to change management and governance. From that aspect, the project is not completed. This is also the time the architecture team and most of the Practitioners withdraw themselves from the limelight and pass the baton to Implementation Practitioners. Provide any required support for

the Implementation Practitioners to defend the project during budget allocation. The work is not complete until the budget is allocated and the Implementation Project charter is signed.

9.5 Project Request for Architecture Work Originating from the Wild

The most common Requests for Architecture Work from the wild are for Architecture to Support Project. The central question for the Practitioner is to identify the proposed project's alignment to expected value and the opportunity cost for the organization. See Section 8.6 for a discussion.

10 Walk Through Architecture to Support Solution Delivery

10.1 Introduction

The success of this architecture and its outcome are driven by the degree of coordination between Architecture Practitioner and the Implementation Practitioner. The Architecture Practitioner hands over a well constrained, yet with sufficient room for creativity and innovation, box to the Implementation Practitioner. It is the duty of the Implementation Practitioner to not break the box or to morph its shape or appearance. It is the duty and responsibility of the Architecture Practitioner to define the context of this box within the EA Landscape, defining all of the push and pull forces. The candidate Architecture Project is now the Target Architecture.

Note that there will be minimal discussion on Phase G in Table 9. All of these activities occur in the context of Phase G. The table informs how activities in other phases enable delivery of the solution and drive closure to an Architecture Project. Actual closure is triggered from Phase H, either identifying a new effort or signaling achievement of target state.

Table 9 summarizes the activities and use of appropriate steps from the ADM phases. The content of the table is discussed in detail in the rest of this chapter.

Table 9: Summary Table: ADM Phases and Architecture to Support Solution Delivery

Topic	Mapping to TOGAF ADM Phase
Align Implementers	Partial Capability Level Phase A Project context: • Verify recency • Reaffirm stakeholders, outcomes, timeline • Communicate value proposition Partial Capability Level Phase B, C, D Program context: • Elaborate architecture specification • Reaffirm risk controls • Communicate SBBs Partial Project Level Phase G Program context: • Initiate project governance

Topic	Mapping to TOGAF ADM Phase
Guide Delivery	Partial Project Level Phases B, C, and D Project context: • Continuously update EA Landscape • Refine SBBs and solution boundaries • Monitor controls EA Capability specific context: • Update EA Repository (contents and models) • Update standards and reference architectures • Distribute resources Partial Capability Level Phase E Project context: • Analyze impact of trade-off with superior architecture • Update risk matrix Partial Capability Level Phase G Project context: • Conduct stakeholder review • Obtain architecture approval • Validate alignment of solution to vision
Realizing the Solution	Partial Project Level Phase H Program context: • Assess solution for gaps • Assess risk closure • Update Enterprise roadmap Partial Project Level Phase F Project context: • Baseline transition state architecture • Complete lessons learned • Close architecture work Partial Enterprise Level Phase H Program context: • Assess changes to Enterprise roadmap • As required, create backlog for architecture work EA Capability specific context: • Engage stakeholders • Update EA roadmap

Simple guidance for the Implementation Practitioner is to keep an eye on the target of the superior architecture. Be absolutely clear what the architecture is trying to optimize and what it is being asked to deliver. It may be tempting to remove all sub-optimization choices in the current delivery cycle. Refrain. Validate that sub-optimization is intentional and future work will address such concerns. All it takes is one bad driver to upset miles of traffic. Understand that the Solution Architecture is one of the many concurrently moving parts in the Enterprise.

Top concerns to be addressed in developing and delivering this architecture are covered in the following sections.

10.1.1 Scoping

- What are the conditions under which a change can be triggered to architecture work?
- Having identified the neighbors and their interactions, what is the frequency of interaction and integration?
- What can and cannot give?
- Are the stakeholders and portfolio guidance still relevant (recency)?

10.1.2 Function Purity and Solution Innovation

- Are there multiple solution providers in this project? And who is providing what solution?
- What kind of detail is needed in the viewpoints to align solution providers and the superior architecture?
- How to drive integration across SBBs?
- How to select the best solution that aligns with the overall operating model (custom in-house, custom managed service, standardized managed service, standardized in-house)?
- What does governance mean in this context?

10.1.3 Handover and Closure

- When does the engagement end?
- What is the appropriate value report?
- What are the lessons learned and impact to gaps in EA?

10.2 Aligning Implementers

It is imperative that the Architecture Practitioner and Implementation Practitioner verify that the bottom-up view of the architecture aligns well on the "recency" measure. The next step is to validate the recency measure of the lateral set of architectures. The Architecture Project defines the boundary conditions to limit the impact to the overall architecture, accounting for all trade-off choices that would be made by the implementation architect. This doesn't mean that there cannot be changes to how each solution interacts with another. The impact does not require reprinting all of the training manuals and redoing the training schedule for the users of the solution.

In most cases, there would be more than one player; a solution provider and a solution consumer. The dynamic nature of business could ask for changes to the solution proposed mid-stream. The Architecture Project and hence the Solution Architecture clearly define the conditions that could trigger a change, stakeholder review, and architecture approval. A sizeable fraction of the projects will involve more than one solution implementer. Develop the architecture to identify,

clarify, constrain, and liberate each of the solution implementers from the other. The Solution Architecture articulates conditions for integration and acceptance of the total solution.

In-house or third-party solution implementers deliver against this architecture. When supplied by a third party, the onus is still on the in-house team to validate, integrate, and accept the solutions. At the end of the day, the consumers and end-users do not care who supplied the solution. Their question is: "Does this meet my expectations, does what it says, available as stated and defined?" Make sure that architecture, the governance plan and implementer are totally aligned on value proposition, conditions for trade-off, and the stakeholder matrix.

If the solution delivery project is validating a concept, the primary outcome is unearthing all points of failure; the secondary outcome is feasibility of the idea; and the tertiary outcome is scalability of the idea to meet usage demands. If the solution delivery project is building a bridge, its primary objective is enabling transportation under most environmental conditions; its secondary objective is to set terms of use. The variances across the solution delivery project are so vast that this Guide cannot provide a sufficient set of examples to emphasize alignment with neighbors and completing the bottom-up view.

There is the least amount of work done in Phase A. It is all about affirming scope, stakeholders, currency, and value proposition.

10.3 Guiding Delivery

Any SBB delivered by solution suppliers will have to be integrated with the rest of the ecosystem of the Enterprise. Until the solution is delivered and evaluated against future work (transition architecture n+1), it will not be clear that some of the current work could become an SBB. Do not work to create a building block. Assess and refine once the solution is delivered and put to work.

In terms of architecture styles and patterns available at the time of writing, you may consider each Microservice or an aggregation of Microservices (SOA service) as an SBB.

When the superior architecture indicates availability of ABBs and SBBs, reach into the Enterprise Repository to reuse and conform to the architecture. When the ABBs point to implementations outside the Enterprise, guide industry collaboration and context-specific trade-off to guide development and delivery of Enterprise-specific SBBs.

Critical to success of architectures is retaining the ownership of integrating solution blocks within the Enterprise. Delegating the responsibility to any other party will lead to project management and governance issues, resulting in failed architecture.

Architecture to Support Solution Delivery is where all realizations and regulatory compliance needs are met. Naturally, the next critical long-term success factor for the Enterprise is identification of core information and data that should be retained in-house. The superior architecture should define the "core" for the Enterprise. All other datasets need not be retained, mastered, or controlled by the Enterprise. This choice drives other decision points in the operating model. Should the solution be treated as a black box for the Enterprise (a managed service) or specialized in-house or an expert team employed? Superior architectures need not resolve this choice. The choice and selection of solution provider is made at the time of developing and delivering the solution. Some of the solution provider choices may be constrained by the Enterprise's preference to restrict the number of suppliers. The Practitioner

should not feel compelled to use a solution provider just because a constraint exists. Priority is fitness to deliver and accelerate time-to-market.

Choice of integration, definition of "core" information, and managed service versus in-house decisions guide the level of granularity needed to describe the architecture.

Populate the EA Landscape continuously; as each decision is made, the level of granularity of the architecture is arrived at, and interactions across solution blocks are defined. Quantifying and documenting the resource required by each solution block may not be the direct concern of the Implementation Practitioner or the Architecture Practitioner. Attributes like cost to procure, cost to deliver, and cost to operate are required by the Enterprise planning organization. It is a sensible option to capture these attributes within the EA tool. Financial investment data for each solution delivery project aids and reduces time to complete the trade-off analysis, roll-up and roll-down of budget, among other benefits.

It is not the recommendation of this Guide that resource allocation data for solution delivery projects be mastered in the EA tool or the EA team to take responsibility. This Guide is calling out a dataset that enables the Practitioner to be productive and purposeful. The source of truth for resource allocation should be determined by the Practitioner, following the guidance set by the Enterprise. A good content model and EA tool are normally capable of capturing this data point at the lowest level of granularity, and enable roll-up and trade-off analysis. It is the position of this Guide to use an EA tool to do the computations that inform and impact trade-off analysis, instead of using other methods to speed up the time to inform trade-off.

Another set of trade-offs and constraints that impact this architecture is the existence of solution families in the Enterprise. The choice of a supplier or technology for data hosting services or ERP package constrains other building blocks that can be employed in the project and sometimes across the Enterprise. Take an assessment of such solution families from the superior architecture. When not available, the Implementation Practitioner and the Architecture Practitioner should spend time identifying, analyzing, and escalating impact of choices on large functional areas like Enterprise resource management and planning.

Even though the Architecture Project defines the boundary and the interface, change is bound to happen. Continuous interaction with the Architecture Practitioner and Implementation Practitioner is required to proactively mitigate barriers.

The objective is to develop the architecture to the extent needed to govern the solution being delivered. Do not feel compelled to define the solution as well. Define and employ viewpoints necessary to communicate, guide, and govern the Solution Architecture. Monitor implementation risks and the controls being implemented for Enterprise risks. Every trade-off and implementation choice made impacts and potentially modifies the Target Architecture. Governing the selections impacts the gap in the Target Architecture, the roadmap, and therefore the Architecture to Support Portfolio of the following fiscal year.

Work performed to deliver the solution mainly spans Phases B, C, D, and E. Innovations, research, and alternatives considered and employed follow the steps in Phase E. It is just that they do not go through rigorous architecture control. The alternatives are constrained by the architecture specification. Hence, it is a question of the ability to operate within constraints and not about controlling the selection. Specification created by following the steps in Phases B, C, and D assures appropriate selection.

10.4 Realizing the Solution

Contractually, this is the post-rollout, warranty period. Depending on the solution delivery method used in the Enterprise, this may be a parallel path to Guiding Delivery. It is the period of putting the solution in the hands of the beneficiaries (customers, end-users, support personnel, partners, etc.). The engagement of the Architecture Practitioner comes to a conclusion or shifts gear only when the solution is put to use. Depending on the appetite of the Enterprise, successful usage may be defined as the first 30, 60, or 90 days.

At the end of this period, the Architecture Practitioner initiates a gap analysis between the realized architecture and the Baseline Architecture to be used for solution delivery. It is only at the end of this analysis that a determination can be made about releasing key resources – the project manager, the implementation architect, supplier representative, technology resources reserved for developing the solution, etc. Closure of the Architecture Project is achieved as soon as the Implementation Practitioner accepts the superior architecture. However, the oversight provided by the Architecture Practitioner is retained until the solution delivery completion criteria are met.

Use the basis provided by the Architecture Project to report the value realized from time to time. Document the lessons learned, mainly the gaps in the description of the superior architecture that were filled while delivering the Solution Architecture. Document controls and constraints that accelerated overall delivery of the solution.

Update the cascading impact of the project to the EA Landscape and roadmap. As needed, validate, close and update the Enterprise backlog.

10.5 Project Request for Architecture Work Originating from the Wild

Requests for Architecture Work from the wild for Architecture to Support Solution Delivery are typically not done. Instead, there is a fully-baked Implementation Project with a proposed solution. In this case the Practitioner has to assess the fully-baked solution against the superior architecture. This becomes more of fitment analysis with its own political implication. See Section 8.6 and Table 10: Example of Summary Governance Reporting for a broader discussion and assessment reporting example.

10.6 Conclusion

Many Architecture Practitioners fail in their role when supporting solution delivery. It is quite normal to confuse their role with SME, auditor, stakeholder, and proxy for the Enterprise stakeholder and decision-maker. Review Chapter 11 and Section 15.2.

The realized solution is the new baseline. It is the basis for evolving and analyzing the roadmap to the Target Architecture. All the development that happened in the Enterprise, and the industry, that were kept away from impacting solution delivery is added to the assessment set. This assessment is the next critical activity the Architecture Practitioner performs. It is this work that justifies closure of the current Architecture Project, Implementation Project, and resources. It also justifies the Request for Architecture Work for the next set of initiatives to achieve the target transition state (n+1). Involve all stakeholders, decision-makers, and implementers to complete the assessment, and gain the sign-off to close the effort.

Part 4: Guidance on Using an Enterprise Architecture

11 Jumping to Phase G

Many Practitioners will be regularly faced with their organization "Jumping to G". Many organizations select leadership on their ability to get things done. This creates a bias to action. Enabling effective change requires balancing predictable planned change with innovation and creativity.

Organizations that jump to Phase G will jump either because of organizational preference for visible action or execution failure by the EA team. In both cases, good Practitioners will respond to their organizational culture or to their failures. It is outside the scope of this Guide for Practitioners to discuss effective engagement and Enterprise processes; see the TOGAF® Leader's Guide to Establishing and Evolving an EA Capability (see Referenced Documents).

The chapter will address classic failure patterns:

- Missing the purpose
- Missing the business cycle
- Not doing architecture

This chapter will also identify how the Practitioner addresses unpredictable change resulting from innovation, creativity, and circumstance.

An EA is developed for one very simple reason: to guide effective change. Guiding effective change involves serving decision-makers and implementers. Architecture to Support Strategy, Portfolio, and Project are focused on supporting decision-makers and are directly tied to planning stages in the business cycle. Architecture to Support Solution Delivery is primarily aimed at implementers. When the Practitioner does not provide timely support for strategy, portfolio, and project, the organization will continue to make decisions using the information at hand on the day the decision must be made.

Without a good Target Architecture to Support Strategy, Portfolio, and Project, the organization has jumped to Phase G. Typically this happens for two reasons: misalignment and missing the purpose.

Actual misalignment is outside the scope of this Guide. For advice on the alignment of the EA, see the TOGAF® Leader's Guide to Establishing and Evolving an EA Capability (see Referenced Documents).

Most examples of misalignment in the industry are actually Practitioners missing purposes other than solution deployment.

11.1 Failure Pattern: Missing the Purpose

As clearly articulated earlier in this Guide, different purposes require different architecture. The actual work product and analysis project to produce a view demonstrating to a change leader

how a candidate architecture addresses agility for the purpose of strategy is radically different than for the purpose of solution deployment. Practitioners must adapt the basic structure and concepts to different purposes. Too much advice masks the essential differences by using terms such as high-level or aspirational or conceptual or logical. A good Practitioner will know how to distinguish high-level work for the purpose of strategy from high-level work for the purpose of solution delivery.

Every stakeholder and every concern are addressed in every purpose.

Practitioners miss the purpose when they tell themselves stories about breadth, depth, and timeframe. As discussed in Section 3.2.1, there is a set of rough guidelines regarding breadth, level of detail, and planning horizon. Further, regardless of the exact parts of the EA Landscape that must be addressed by any particular architecture development project, a Practitioner will find themselves without clean edges.

Architecture to support a purpose is typically aligned to support different points in the business cycle, and required to inform different decisions, as all work must be aligned to the purpose at hand. This may change the key work product's essential purpose, but is unlikely to substantially change which components in the architecture must be analyzed.

11.2 Failure Pattern: Missing the Business Cycle

Most leaders are interested in receiving effective advice about complex decisions. Usually, the Practitioners are waiting for an invitation to a planning process that will never come. Leaders may be surrounded by parochial champions who wish to pitch their pet projects. In response, they actively seek to reduce involvement in planning processes to those who provide useful, balanced advice and those they wish to hold accountable for the change.

Delivering architecture to support the business cycle requires being ahead of decisions. The Practitioner works ahead of the planning cycle (see Figure 4). For many Practitioners, working ahead of the planning cycle is an uncomfortable position. They must be focused on preparing for activities that no one else is thinking about.

For example, Architecture to Support Portfolio facilitates the budget process for an organization that operates an annual budget process. With such a cycle, the budget finalization is likely done near the end of the third quarter. This requires the budget planning to be done near the end of the second quarter, which requires the first draft of the candidate Target Architecture and candidate roadmap to be available for the second quarter. Stakeholders and decision-makers are then able to use the candidate architecture and candidate roadmap in planning and preparing their budget submission and defending their submission in any resulting budget negotiations. The Practitioner then needs to understand their candidate material is used, stretched, and changed through the entire budget preparation and negotiation. In short, the Practitioner is involved in iterating through Phase E and F through the second and third quarter.

Practitioners who are unfamiliar with the give-and-take typical in most organizations' planning processes will wait for clarity or decision. Both are only available at the end of the planning process, not in the middle. As a result, the Practitioner has missed their place in the business cycle.

11.2.1 Architecture after Decision

This Guide is designed to assist Practitioners to deliver useful architecture. Architecture produced after decisions is not only late but may cause conflict. At best, the architecture will validate the decision. Given the decision has already been made by leaders with the authority to make the decision, validation is pointless. At worst, the architecture will demonstrate the leaders made the wrong decision. It is technically useful to gain this knowledge and perform a course correction. The damage to the EA team and wasted time and effort executing the next steps following the decision are unlikely to be compensated by a better decision.

Practitioners adept at establishing value will be keenly aware of the impact time has on almost every value calculation. Lastly, Practitioners adept at estimating the cost of change will be keenly aware of how expensive misfires are on the ability of an organization to execute an effective change.

Few activities a Practitioner can perform are as dangerous as architecting after decision.

11.3 Failure Pattern: Not Doing Architecture

Practitioners will often fulfill multiple roles in the architecture development and change process. Chapter 15 identifies stakeholder, SME, architect, implementer, and auditor as the essential roles in architecture development. Practitioners will typically act as an agent for the stakeholder, making decisions by proxy through their understanding of the set of stakeholders' preferences. Many Practitioners, by way of their growth path, would have expert knowledge in specific domains; they will tend to provide advice and guidance as SMEs to stakeholders, other architects, and implementers. Some Enterprise's structure may demand a Practitioners to act as implementer. An implementer normally pays attention to details like product selection, configuration challenges, assuring quality and repeatability, etc. These tasks are often sufficiently time-consuming that the Practitioner does not have time to perform architecture.

Many EA teams fall into the trap of performing implicit architecture. The Practitioner is so busy acting as a stakeholder's agent, SME, and implementer that the architecture is never described and approved by a stakeholder. A work product that is really implementation design, and implementation specification and standards definition is provided as the end result of the "Architecture Project". These work products are the end result – they are not architecture.

Chapter 15 will discuss the need to deeply review implementation work products that exist unsupported by architecture description, views, and architecture specification. Bluntly, what evidence can a Practitioner provide that the implementation is in conformance with the architecture, provides the best available approach to addressing the stakeholders' preferences and the organization's mission, vision, value proposition, and objectives? The only choice is compliance by assertion.

Compliance by assertion is rife with personal bias and "tourist dashboard decisions".

Practitioners deliver value not by tripping over the correct implementation but by facilitating the complete set of stakeholders to understand the implications of their preferences in the context of the Enterprise's mission, vision, value propositions, and objectives. Whether this is done on the easy path by preparing views addressing concerns or by facilitating trade-off between competing decisions is immaterial. The absence of understanding means the architecture, and the value it enables, is fragile. The moment the Practitioner is unengaged on landscape, there can be no

expectation that the value will be sustained by operational teams and future implementation teams who are unaware of either preference, priority, or traceability to value.

Without an architecture, the Enterprise has no choice but to jump to Phase G – completely unprepared, with no ability to exercise implementation governance.

Not performing architecture to support decision-makers and implementers is the most pernicious practice a Practitioner can perform.

11.4 Managing Innovation, Creativity, and Circumstance

Top-down direction and planning provides part of the answer for a nimble organization. It provides the guidelines, constraints, and clarity required to make tactical decisions. Sometimes the correct decision is to embark on unplanned change.

Whether the Practitioner has arrived at implementation of change unprepared because of a failure or because of a good deliberate decision, the Practitioner still needs to provide useful support of the change activity. Stakeholders simply have to have less confidence that the project will deliver the expected value with the expected cost and the projected time. The range of unknown ones precludes high confidence.

This lack of confidence simply means the architecture has more uncertainty, or risk, associated with realizing the organization's objectives. At this point, Practitioners have to focus all of their energy on risk mitigation.

Pragmatically the Practitioner is going to be constantly performing a risk management function. Rather than diving into the details of implementation the Practitioner needs to find and expose uncertainty associated with the objective to provide tactical governance support. Every project will have some form of benefits statement. Every organization has some form of strategy. The Practitioner simply has to connect the dots without the benefit of any intermediate stepping stones. The important distinction here is that the Practitioner is not expected to correct the project regarding benefits statement and realization plan. The Practitioner is expected to mitigate uncertainty regarding realizing the benefits stated in the project.

TOGAF Phase G provides a step for this activity where the Practitioner provides guidance to the Implementation Project. The Practitioner must walk a line between guiding and performing implementation.[32] Implementers are expected to live within the constraints of the project; Practitioners are expected to look at the context of the project. The most valuable actions when the organization jumps to Phase G are identical to addressing rapid implementation methods such as agile. The Practitioner must focus on the scope of the Implementation Project, facilitating good decision-making in the context not of project benefits realization but of Enterprise benefits realization, and ensuring the stakeholders and implementers understand the implications of their choices regarding Enterprise benefits not driving them to make different choices. This is a very fine distinction and is it a reiteration of not fixing the project but ensuring stakeholders and implementation teams understand what can honestly be expected in terms of value and benefit.

Innovation and creativity are at the fore when an organization jumps to Phase G. Thoughtful architecture development providing guidance and constraints at the required level of detail will

[32] For a discussion of the different roles a Practitioner may play, see Section 11.3 and Section 15.2.

be missing. When the Practitioner's organization is in a hurry they are focused on receiving value through differentiation and experimentation. Typically, a sustained efficiency gain is not achieved without clarifying dependency. Practitioners should expect that organizations in a hurry are usually fully aware of the difficulty sustaining experiments across time and when scaled. Hence, the Practitioner must focus on value realization. Bluntly, this is not different than a more thoughtful approach: The stakeholders' preference and priority drives the architecture development.

In terms of the TOGAF ADM phases, the Practitioner will be running constant micro-iterations exploring discrete statements of value through to the implementation, with the purpose of clarifying the value expected and what in the implementation creates uncertainty. In order to perform this, the Practitioner will have to focus all attention on a narrow set of concerns on the critical path to value realization.

When the organization Jumps to Phase G, the Practitioner will routinely need to act as the stakeholders' agent. Practitioners must be keenly aware of the danger acting as both the architect and the stakeholders' agent. Care must be taken to guard against tunnel vision, personal bias, and "tourist dashboard decisions". Specialized reporting against the narrow set of concerns on the critical path to value and the Implementation Project form the control that mitigates lack of preparation and failing to separate duties.

12 Special Cases

12.1 Architecture in an Agile Enterprise

There has been a great deal of conversation about aligning to agile implementation methods. Ink has been spilled trying to align the phases of the ADM to these development methods. All of this conversation has blurred the line between implementation and architecture. The TOGAF Standard aligns to agile development in Phase G. Full stop.

A good Architecture to Support Portfolio, or Project, will identify what products the Enterprise needs, the boundary of the products, and what constraints a product owner has. In short, a good architecture defines the Enterprise's backlog.

Architecture to Support Project and Solution Delivery will have a set of constraints that limit the choices of the agile team. These constraints are where an individual product must bend to Enterprise issues and the parochial preference of a product owner is not valid.

Then Phase G, Implementation Governance: the Practitioner serves the stakeholders guarding the mission, vision, goals, and investment roadmap. In short, guarding Enterprise value.

12.2 Architecture for a Domain

A common failure path is for domain architects to work to a different purpose, or pretend that they are working on a different Architecture Project than the rest of the team. A domain[33] must fit into the whole of the EA. Also, the rest of the EA must fit with a domain. Anything else is a tourist dashboard decision (see Section 6.2).

A distinct domain is security. A security architecture only exists in reference to other domains and is best considered a concern. Practitioners will always address their stakeholders' security[34] and risk concerns.

12.3 Architecture in Response to an Incident

Something happened, and the organization's response is to fix it.

As a starting point the Practitioner should understand risk as the effect of uncertainty on reaching objectives, risk appetite, and risk tolerance. Achieving all objectives is uncertain, and an Enterprise's response is driven by risk tolerance and risk appetite.

The risk appetite provides guidance balancing the amount of risk taken to achieve an expected outcome. Risk appetite is typically expressed as a boundary on a risk/business impact and

[33] See Appendix F.
[34] For a detailed discussion, read the referenced Open Group Guide: Integrating Risk and Security within a TOGAF® Enterprise Architecture.

likelihood grid, or qualitative measures. For example, the Enterprise will risk $x for $y reward this year, or has zero tolerance for loss of life. A well understood risk appetite defines both the level of risk the organization is willing to accept as well as its strategy in defining this level. For risks above this acceptable level, it defines the strategy used for mitigation. Strategy for risk in excess risk appetite is typically transference or avoidance.

Risk tolerance addresses deviations from what is expected. In short, what to do when the Enterprise's uncertainty is exceeded. The most common expression of uncertainty is failure to achieve expectations. At this point, the Enterprise is certain it will not achieve its objectives.

An incident changes the stakeholders' preferences with regard to risk. This is a change in requirement, and the architecture must adjust. The central role of the Practitioner is to provide solid advice on what changes to the target, and the associated work to achieve the change will reach an acceptable certainty of reaching the stakeholders' objective. Practitioners should not be surprised when there are few changes that have an acceptable cost, and the stakeholder is faced with the option of canceling the objective or canceling the change.

Part 5: Guidance on Maintaining an Enterprise Architecture

13 Transition Architecture: Managing Complex Roadmaps

Until now, this Guide made the effort and process simple by describing most of the concepts using a linear time scale. It gave an impression that creating a well aligned set of work packages vectored by business cycle and planning horizon gives you potential transition states and a near linear roadmap. Recall this simple statement made in Chapter 5 in the context of the EA Repository: "Baseline provides reference for all change. The target state is what stakeholders have approved. Transition states are partially realized targets between current state and target state. Mix the four characteristics of the EA Landscape: breadth, depth, time, and recency. Mix the different Architecture Projects that can work on the same subject at different times and at different levels of detail." That's the only hint to indicate real-world complexity.

In addition to characteristics, other organizational factors that add to complexity are:

- Advancements and changes outside the Enterprise
- Shared services
- Collaboration with suppliers and partners, including portfolio ownership model
- Impenetrable dependencies
- Multiple geopolitical boundaries (fiscal calendars, regulations, cultures)
- Varying rate of maturity and growth of teams
- EA team model (federated, centralized, etc.)
- Availability of multiple solutions or announcement of end-of-life for products currently in use

This is the reality. One Enterprise roadmap gets broken down into segment, portfolio, or geography. The Enterprise will be pursuing more than one concurrent goal, say efficiency and retooling. For each business cycle, the roadmap is revisited to make adjustments, bottom-up and at times top-down. This is a clear use-case that drives the need for a good EA Repository: a repository that maintains the integrity of the current state and target state, but allows creation of variants.

13.1 Roadmap Grouping

Start with one version that supports the initial strategy. Flesh out the repository from strategy to project. Upon acceptance of the portfolio, create versions as necessary. Once the candidate versions are accepted, baseline both current and Target Architectures. Create multiple baselines of the current transitional state. Create copies of the architecture, one per variable, concern, or a related group of variables.

Use the same planning horizon to showcase the impact and outcome. The moment planning horizons change, analysis becomes complex and results in loss of continuity for most decisions.

Each distinct parent roadmap – say if there is a separate roadmap for European Union Operations and Australian Operations – name and identify them as such. Employ appropriate naming and versioning concepts for and derived roadmaps of those created for what-if analysis. Make it intuitive to identify discarded alternatives.

13.2 Comparing Architectures

The point of creating separate roadmaps is to align the scope of each Architecture Project. When the Enterprise has any one of the characteristic or organizational factors identified earlier in this chapter, it would make sense to create a separate Architecture Project and roadmap to deal with this complexity.

Employing a standard reference architecture for process, business terms, applications, etc., supports cross-project and cross-roadmap analysis. Using a standard model provides the flexibility required to map across implementation models of the solution suppliers. It also helps in evaluating bids and offers from potential suppliers. This is another place where use of ABBs would come in handy. Implementation and use of ABBs across projects can be analyzed with ease.

Basing all of the architectures on an implementation-neutral reference model allows impact of modifications to a specific architecture to be identified easily. As shown in Figure 17, the EA Repository tool could provide support to identify the change, whether it is to one of the attributes of an architectural component or a modification to the catalog of components. While working with a federated team, uses of such a tool and use of common reference models can go a long way to coordinate and communicate the impact of architecture changes. Within the roadmap, it is better to keep the analysis patterns consistent.

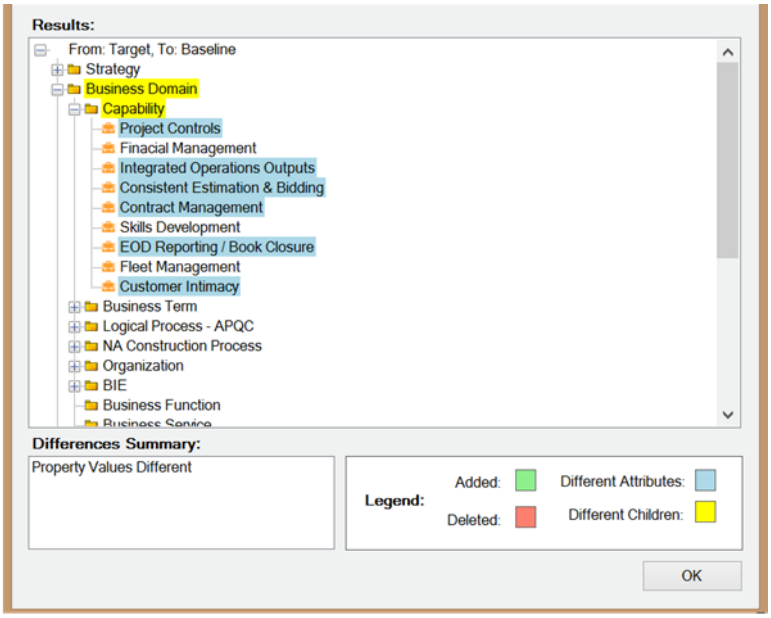

Figure 17: Using Repository for Managing Roadmaps – I

This same concept of comparing architectures can be used to create and analyze year-over-year modifications to the architecture. In Figure 18, the EA Repository tool in use allows the Practitioner to trace a change to the baseline or the revised version.

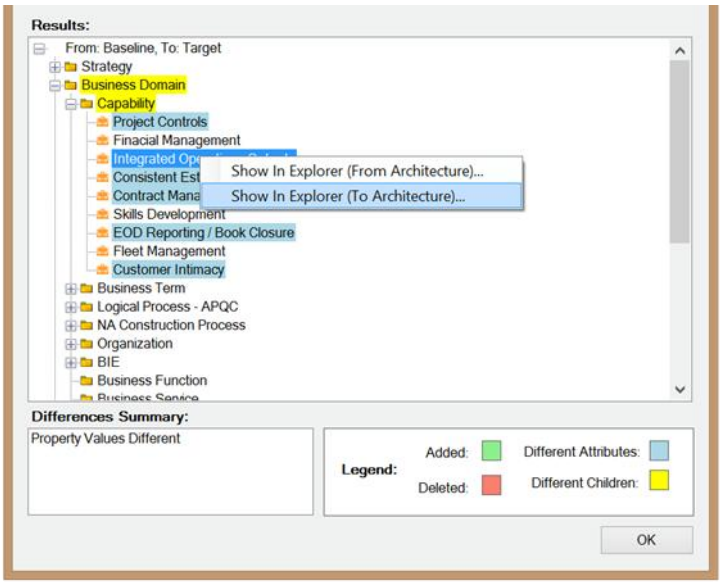

Figure 18: Impact Analysis of Architectures

When creating the roadmap, pay attention to impact of change. Any change, when introduced, will tarnish the efficiency, overall throughput, and sometimes call for duplicative investments. Such short-term negative impacts can mask deviations from the roadmap. Inject appropriate markers to identify any unintended sub-optimization or deviations from the roadmap. The value and outcome map should present the time to value and gain/loss at the end of the planning horizon.

13.3 General Guidance

A work package or an architecture specification that intersects more than one Architecture Project or change effort also introduces complexity. The environment for every Enterprise is highly dynamic, forcing a need for trade-off and expert judgment every so often. Implementation Projects are invariably insulated from all impact from developments in the external environment. Complexity happens because every transitional state is a fully functional and operational state for the Enterprise. The architecture and roadmap evolve to stay abreast or ahead of such external changes.

When starting afresh, the Practitioner potentially has the benefit of working with the limited set of information about the landscape. As the landscape is populated from ongoing Architecture Projects, continually pay attention to ruthless abstraction of detail. Set your biases and baggage aside. Set the stakeholder preference aside. It is all about the least and absolute necessary information to guide a choice. Keep the dataset consistent. Eliminate noise and distortions when performing analysis of architectures.

Common traps while creating roadmaps include incorrect scoping. The Architecture Project may exclude certain functions from the scope. Earlier chapters of this Guide explicitly warned you

not to stray away from the charter of the Architecture Project. The fine-print is that, if you identify a need, a gap, call it out – don't work on developing the architecture. It is the responsibility of the Practitioner to call out the dependency and document its existence and the disposition of the gap in the roadmap. Such deferred items will become its own roadmap. When developing architecture for this gap at a later date, make sure that you operate in a fixed block of time (same end dates as related roadmaps), not a fixed block of duration (say three years for each roadmap).

14 Phase H (Coordination and Business Cycle in Action)

An EA is developed for one very simple reason: to guide effective change. The change can be materialized only when it is adequately supported with resources. Every Enterprise has a business cycle that plans and allocates resources, normally one fiscal year. The fiscal year dates are inflexible and decisions will be made with the data available and reasonable judgment.

If the EA Capability has been requested by the Enterprise, it is an acknowledgement of the fact that "implicit" architecture and the resulting judgments that drove investments and changes are not delivering what the Enterprise wants. It is likely that the EA effort was kicked off after the budget allocation for the current business cycle or with very limited time to influence the decisions of the current business cycle. Do not waste time in the current cycle. Stay happy with the "implicit acknowledgement" and focus on building the data for the next cycle. Though not stated, the sponsor is looking to protect "future" decisions with EA. The moment the Practitioner realizes they are late for the next cycle, shift the time investment to refurbish the résumé of the entire team (see Section 11.2).

Phase H demands the Practitioner to identify the bottom-up drivers for change; change due to improvements in available technologies or conditions controlling the operations or environment of the Enterprise; and initiate the architecture work for the next target transition state (top-down driver). This does not mean that the Practitioner need to flesh out everything that is covered by the charter for the EA Capability or the budget.

Earlier chapters impressed upon "just enough architecture" and characteristics of the EA Landscape. Understand the capacity and capability of the team to scope the work. Remember, the definition of "Enterprise" is fungible and used to control the scope of analysis. If this is the first pass in developing the Architecture to Support Strategy, scope the effort accordingly. Define and distribute the work packages in proportion to the capability and readiness of the Enterprise. All of these are aimed at one thing – influencing and garnering the resources in the next cycle.

Tying everything to the budget cycle simply highlights the importance of good EA in guiding and constraining the change decisions. When there is no practical input from a good EA team before the decision an organization needs to take is made, the decision is still made. It might even be a good choice, but it was a less informed choice.

The moment there is awareness that data was available, but late, irrespective of the quality of the decision made, the EA team loses its relevance. It is a fail-fail scenario resulting in questioning the value and purpose of the EA team.

Depending on the size of the Enterprise (irrespective of the scope of the EA work), budget preparation may start two to four months before the start of the fiscal year. The Practitioner, the Implementation Project architect, and the Implementation Project manager need to play the role of SME to assess the ability of the implementation team to complete all the work packages at least two to four weeks before the start of budget preparation date.

Other than the first year of operation of the EA team, most subsequent architecture work is initiated from Phase H. Phase H provides ongoing review of value realization and monitoring of change. Change and failure to realize value provide entry points to the ADM. Never be late – four weeks before the start of budget planning is too late. The EA team needs to be aligned with the organization's planning, budgeting, operational, and change processes. Figure 19 shows a timeline view, depicting an alignment of key decisions made during a business cycle and the purpose architectures.

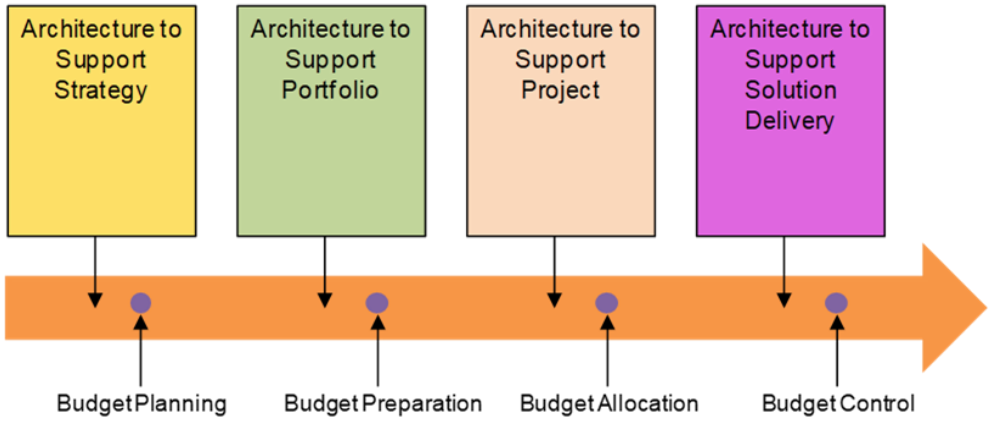

Figure 19: Business Cycle and Architecture by Purpose

Once the Practitioner's communication informs and influences the budget planning, the path forward is set. This superior architecture governs and constrains the rest of the activities.

The second most important activity is supporting budget control. The architect of the Architecture Project is the agent for the stakeholder for the implementation team; the architect is also the SME for the portfolio manager in validating the progress earned to value. It is common to see a Practitioner tripped by the duality of role in the budget control phase to lose focus on the budget planning activities. Never forget that the sole purpose of the Practitioner is to influence and guide change – not to get into the detail of implementation.

The EA team is intentional about every effort, irrespective of the name used – process improvement, operations, Keep-The-Lights-On (KTLO), growth, transformation, etc. Every effort and idea contributes to the Target Architecture. Even through the superior architecture constrains the Architecture to Support Portfolio and Project, nothing is committed and accepted as the next transition state until resources (budget) are allocated. Random ideas from the wild (see Section 8.6) will find their way into the process. The Practitioner watches like a hawk to identify such interesting work packages and triggers a review, trade-off, and governance of the "new" portfolio. Unless sufficient insight is gained about the "behavioral" patterns of the organization, it is difficult to discern "pet projects" and "random ideas" disguised as "bottom-up" effort from a legitimate initiative to bridge a gap. Perform a simple sniff test – is the architecture specification trying to accomplish more than one thing; stakeholder trade-off – are the concerns aligned or being accepted for lack of time to analyze. Create a change request and leave a bread crumb to revisit and stabilize the architecture in the next cycle.

Understand how the Enterprise employs discretionary funds; use them wisely. A practical approach would be guiding allocation of such discretionary funds for exploratory work packages, until the alignment to roadmap could be rationalized and included in the portfolio. Acceptance of such requests is an explicit change to the Target Architecture. Avoid as much as

possible. Follow the change management processes. No exceptions. The role being played by the Practitioner at this stage is more of a mediator and negotiator, applying the architectural knowledge. At the end of the day, the Practitioner is responsible and accountable for the stability and integrity of the architecture.

At the time of finalizing the allocation of funds, good architecture will speak for itself. The Practitioner need not be in the room to guide the decision. When the allocation happens, the decision-makers are validating that the project manager, portfolio manager, and the implementation architect fully understand and agree to deliver the outcome in conformance to the architecture. The decision-makers are already convinced of the need for the project and its outcome. If the Practitioner enters a scenario requiring change to the architecture, it is too late. The foundation is faulty. The Architecture Project and the Implementation Project cannot proceed. Go back to the architecture specifications and stakeholder concerns. Be prepared to face the consequence of incomplete work.

If the Practitioner had followed everything in this document up until Chapter 12, everything mentioned in this chapter should appear to be a foreign concept. Otherwise, start over with this document.

15 Architecture Governance

ISO/IEC 38500:2015[35] defines governance as: "a system that directs and controls the current and future state". The process by which direction and control are provided should imbibe equality of concern and transparency, protecting the rights and interests of the organization.

Governance is a decision-making process, with a defined structure of relationships to direct and control the Enterprise in order to achieve stated goals. The key difference between governance and management rests on the cornerstone of fiduciary and sustainable responsibility.

Most discussion on governance confuses management and governance. John Carver's Policy Governance is written to support public agencies, where there are often competing priorities and strong distinctions between those who pay and those who benefit. It is one of the best pieces of guidance a Practitioner can get. Lastly, John's work clearly distinguishes between governance and management. The parallels to EA governance are striking.

The development and use of EA must be governed. To define a customized governance approach, let us start to define the following:

- What is to be governed?
- Why should something be governed?
- When and who should decide on the recommended alternatives?

15.1 What is Governed and Why?

Two distinct things must be governed. First, the development of the Target Architecture. Second, all change within the scope of the Target Architecture. Without the first, the Practitioner cannot support their organization's leadership directing and controlling change. Without the latter, there was no point in developing a good target that provides an organization's best achievable course forward.

Central to the definition of governance is "directs and controls". Typically, the Practitioner and implementer are directed, and both are controlled by the stakeholder. This chapter will use the terms direct and control for focus.

15.1.1 Target Architecture

The TOGAF Standard provides a key concept to govern the Target Architecture: the Architecture Project.

The Architecture Project is used to direct and control the EA team to address issues in the Enterprise. An Architecture Project starts with a Request for Architecture Work. The primary control is Architecture Project management using the Statement of Architecture Work. For a

[35] ISO/IEC 38500:2015: Information Technology – Governance of IT for the Organization.

broader discussion of controlling the development of the Target Architecture, see the Architecture Project Management White Paper.[36]

In short, the Practitioner is directed to develop an architecture within a controlled scope. Within that controlled scope, the Practitioner is directed to the stakeholder's preferences. Preferences are expressed in terms of objective, priority, and specification. Best practice requirements management chases objective and priority as the baseline. The governance test will ask whether the Practitioner is addressing the stakeholder's concerns.

15.1.2 Implementation Projects and Other Change

The TOGAF Standard provides two key concepts to govern Implementation Projects and other change: the Architecture Contract and the Architecture Requirements Specification.

The Architecture Contract is used to direct and control the implementation team to work towards a deliberant future. Regardless of the document structure an Architecture Contract takes in a Practitioner's organization it will contain the same directional elements and provide a means to test compliance.

The Architecture Requirements Specification is used to direct and control the creativity of the implementation team. Every Architecture Requirements Specification enables control of the implementation team. Design, implementation, and other change choices can be tested against the Architecture Requirements Specification.

In short, the implementation team is directed to create changes with intentional value-based outcomes. Best practice governance enables the organization to control value realization.

15.2 Roles, Duties, and Decision Rights

Decision rights about the Target Architecture, relief, and enforcement are always vested in the architecture's stakeholders. The most common failure pattern is to confuse roles.

Each role is involved in the governance of developing and using architecture, with different accountability and decision rights. The roles are:

- **Stakeholder**: owner of the architecture

  Provides priority, preference, and direction. All decision rights about the Target Architecture, and any relief from and enforcement of the target, are vested in the stakeholders.

- **Stakeholder Agent**: representative of the stakeholder

- **Subject Matter Expert**: possesses specialized knowledge about some aspect of the Enterprise or the environment in which it operates

  Provides knowledge, advice, and validation of interpretation.

- **Implementer**: responsible for performing all change activity

[36] Architecture Project Management: How to Manage an Architecture Project using the TOGAF® Framework and Mainstream Project Management Methods (see Referenced Documents).

Scope of change is not relevant. Transformative capital projects and incremental operational changes are changes performed by an implementer. All decision rights about proposed implementation choices, such as design, product selection, and change sequence, are vested with the implementer.

- **Architect**: developer of the Target Architecture

  Provides recommendations when non-compliance with the target is determined.

- **Auditor**: performs systematic reviews of both the target and implementation

  Best performed at multiple stages to capture errors before the cost of correction exceeds potential value realization. All decision rights about compliance during the development of the architecture and implementation are vested with the implementer. Auditing can be performed within a formal structure such as an architecture governing board or by a peer reviewer. Auditing can also be self-performed but the role being performed needs to be clear in the mind of the individual and that they are acting in accordance with the role.

In many organizations, the Practitioner will fill the role of stakeholder agent, subject matter expert, and implementer. This typically occurs when the organization does not use architecture to direct and control change. Instead, the organization attempts to use skilled thoughtful individuals to make tactical decisions. The value is illusionary.

The governance process does not have to be a heavyweight bureaucracy. It is simply based on demonstrating sufficient traceability that the organization can have confidence in the target being the best path to reaching the Enterprise's preferences. With confidence, the Enterprise will enforce the target in deliberate change activity.

15.2.1 Target Checklist

Use the following checklist to execute architecture governance. Good Practitioners understand that only stakeholders can approve architecture. A good governance process will require the Practitioner to demonstrate the following when assessing a Target Architecture:

1.	Were the correct stakeholders identified?	Yes/No
		If yes, proceed.
		If no, direct the architect to engage with the stakeholders appropriate to the scope of the architecture being developed.
2.	Were constraints and guidance from the superior architecture taken into account?	Yes/No
		If yes, proceed.
		If no, direct the Practitioner to perform their job and take into account guidance and constraints from the superior architecture. Where the Practitioner identifies a conflict, obtain a recommendation on whether to grant relief from the superior architecture or enforce the superior architecture. This decision must be made by the superior architecture stakeholders.

3.	Do appropriate SMEs agree with the facts and interpretation of the facts in the architecture?	Yes/No
		If yes, proceed.
		If no, the Practitioner has to do their job and engage with the SMEs. Where the Practitioner identifies a conflict with, or between, SMEs, develop a recommendation for the stakeholders that they should have limitations in confidence.
4.	Do any constraints or guidance produced reflect the views produced for stakeholders and any underpinning architecture models and analysis?	Yes/No
		If yes, proceed.
		If no, the Practitioner needs to do their job and develop appropriate views that are consistent with analysis.
5.	Do the views produced for the stakeholders reflect their concerns and reflect any underpinning architecture models and analysis?	Yes/No
		If yes, proceed.
		If no, the Practitioner needs to do their job and develop appropriate views.
6.	Do the stakeholders understand the value, and any uncertainty in achieving the value, provided by reaching the target state?	Yes/No
		If yes, proceed.
		If no, the Practitioner needs to do their job and develop appropriate views, and other work products, then return to the stakeholders.
7.	Do the stakeholders understand the work necessary to reach the target state and any uncertainty (risk) in successfully accomplishing the work?	Yes/No
		If yes, proceed.
		If no, the Practitioner needs to do their job and develop appropriate work products and return to the stakeholders.
8.	Do the stakeholders understand any limitations in confidence they should have in the Target Architecture?	Yes/No
		If yes, proceed.
		If no, the Practitioner needs to do their job and develop appropriate guidance on the limitations in confidence and return to the stakeholders.
9.	Have the stakeholders approved the views?	Yes/No

If the answer to the last question is yes, the governance process is done. The architecture, associated view, architecture specifications, controls, and work packages are ready for publication in the EA Repository as an approved Target Architecture.

If the answer to the last question is no, then there is a decision on whether the Practitioner should rework the architecture or the Architecture Project should be canceled. Reworking the architecture typically requires the Practitioner to finally embrace the stakeholder's preferences. Rework may require more advanced trade-off.

15.2.2 Implementation and Other Change Checklist

When the architecture is being used, changes to the Enterprise are guided and constrained. Two factors impact governance of change. First, organizations operate in a dynamic environment, and the analysis of the Target Architecture cannot have assessed every circumstance or change option possible. Second, the target was produced for a purpose and may not have been developed to the level of detail required for the current use. The governance process requires flexibility. When non-compliance is identified, the Enterprise must either change the architecture, provide temporary relief from constraint, or enforce the architecture. If relief is not temporary, the Enterprise has chosen the worst available option: changing the target without bothering with analysis and approval.

Two governance roles are often performed by the Practitioner: the auditor and the architect. Compliance assessment is an auditor role. When non-compliance is identified, the architect needs to produce an impact assessment and recommendation on what to do. The recommendation will have three choices: First, enforce compliance; second, provide temporary relief; and third change the Target Architecture.

The choice in the recommendation will be driven by the impact assessment. Practitioners must assess impact on the same terms as the target was developed. Assessing on any other terms invalidates the assessment and recommendation.

Implementation governance assesses compliance. Compliance assessment needs to be done soon enough that course correction is viable. As identified in the walk-through chapters, compliance assessment against value and operational change are as important as project-driven change.

This checklist is designed to assist the Practitioner understand what must be demonstrated during the governance process to address a non-compliance report:

1.	Did the organization embarking on a change reasonably interpret the Target Architecture's guidance and constraints?	Yes/No
		If yes, their interpretation should be accepted as compliance and any issues addressed through a change to the architecture. This is a key point. Good architecture can have multiple implementation choices, and the implementer is not required to adhere to opinion. If the implementation choice is a reasonable interpretation, it should be judged compliant.
		If no, proceed.

2.	Do appropriate SMEs agree with the facts and interpretation of the facts in the impact assessment?	Yes/No
		If yes, proceed.
		If no, the Practitioner has to do their job an engage with the SMEs. Where the Practitioner identifies a conflict with, or between, SMEs, develop a report for the stakeholders identifying what limitations in confidence they should have in the impact assessment.
3.	Do appropriate SMEs agree with the recommendation to enforce the target, grant time-bound relief, or change the architecture?	Yes/No
		If yes, proceed.
		If no, the Practitioner has to do their job and engage with the SMEs. Where the Practitioner identifies a conflict with, or between, SMEs, develop a report identifying what limitations in confidence the stakeholder should have in the compliance recommendation.
4.	Do the views and other materials produced for the stakeholders reflect the impact assessment and reflect any underpinning architecture models and analysis?	Yes/No
		If yes, proceed to the stakeholders for approval.
		If no, the Practitioner has to do their job.
5.	Do the stakeholders understand any limitations in confidence they should have in the impact assessment?	Yes/No
		If yes, proceed.
		If no, the Practitioner has to do their job and provide the appropriate work products that highlight the impact of limitations in confidence and return to the stakeholders.
6.	Do the stakeholders understand the impact on prior expected value, and any change in certainty in achieving the value, provided by reaching the target state?	Yes/No
		If yes, proceed.
		If no, the Practitioner has to do their job and provide the appropriate work products that highlight the impact on expected value, and on uncertainly in reaching the expected value and return to the stakeholders.
7.	Have the stakeholders approved the recommendation to enforce the target, grant relief, or change the architecture?	Yes/No

If the answer to the last questions is yes, the organization should action the recommendation. How this is actioned is context and organization-specific. Where compliance is enforced, the governance process should look for evidence of a course correction to the Implementation Project. Lastly, where relief is provided, the Practitioner should ensure that future compliance

assessment and reporting take place to review time-bound relief. Without this step, the Enterprise has simply agreed to change the Target Architecture without the bother of approval.

If the answer is no, the stakeholder has spoken. A Practitioner can make the choice to try and convince the stakeholder through expanded information provided to the stakeholder. One of the common mistakes is that the Practitioner either switched terms of assessment from those used to develop the target, or failed to embrace the stakeholder's preferences when developing the impact assessment.

15.2.3 Long-Term Compliance Reporting

The chapters discussing walk-throughs for Architecture to Support Strategy, Portfolio, and Project all included assessments of in-flight change and consider using summary reporting with a high visual impact. Below is an example of reporting against constraints, expected value, and known gaps. In all cases, the assessment will return either not applicable, conformance, or non-conformance. Good Practitioners will look for binary tests: compliance and con-compliance (Red/Green) where possible. Where binary testing is not possible, a 1-to-3 scale (Red/Yellow/Green) should provide sufficient range to provide a summary report.

Table 10: Example of Summary Governance Reporting

	Constraint (Architecture Principle, Architecture Requirements Specification, or Control)	**Value (Best done in terms of the Enterprise's mandatory concerns)**	**Gap**
Current state: assess what the Enterprise has	Conforms	Fails to Deliver	Not Applicable
Implementation Project: assess project, design, and implementation	Violates	Not Applicable	Filling
Roadmap, portfolio, or program: assess plans and directions	Not Applicable	Delivers	Leaving Open

15.3 Conclusion

The Practitioner serves the Enterprise's stakeholders regardless of where they are employed in an organization. This requires the Practitioner to identify with and guard the stakeholders' preferences. Good Practitioners use their position in front of decisions and outside of the change program to guard value. In practice, a high fraction of governance is informal, with the Practitioner thinking as the stakeholders' agent and deciding when to push for compliance. For every change initiative, understanding and guarding the Enterprise's expected value is the most important and arguably the only job of architecture governance.

Part 6: Appendices

A Partial List of Modeling Approaches

Table 11 provides a list of modeling approaches. These examples are provided as a starting point for a Practitioner who needs to consistently describe some part of an Enterprise.

The EA community is filled with involved discussions of the distinction between language, notation, model kind, and model type. Such fine-grained distinctions are normally not useful. What is useful is describing something consistently.

These approaches may have a formal or informal metamodel, notation, or supporting method.

Table 11: List of Useful Modeling Methods

Reference Model & Reference Architecture	Use
4+1 architectural view model[37]	Can be used in Architecture to Support Solution Delivery. The four views of the model are logical, development, process, physical view, and use-case. Provides a nice simplified list of what you need to know and describe.
The ArchiMate Standard	Excellent fit for Architecture to Support Solution Delivery. Good fit for Architecture to Support Project.
Business Model Canvas[38]	Use is entirely driven by the scope of the value proposition. Commonly used for Architecture to Support Portfolio and Architecture to Support Project.
Business Motivation Model (BMM)[39]	Simplified is useful for Architecture to Support Project. Can be used for Architecture to Support Portfolio BMCs.
Business Process Model and Notation (BPMN)[40]	Can be used for Architecture to Support Solution Delivery. Limited fit for analysis required in architecture.
Kaplan Strategy Map[41]	Good for representing final strategy.

[37] Refer to Kruchten: Architectural Blueprints – The "4+1" View Model of Software Architecture (see Referenced Documents).
[38] See: http://businessmodelgeneration.com/canvas/bmc.
[39] See www.omg.org/spec/BMM/Current/.
[40] See www.omg.org/spec/BPMN/2.0/.
[41] Refer to Kaplan and David: The Balanced Scorecard (see Referenced Documents).

Reference Model & Reference Architecture	Use
Organigraphic	Very useful in looking at a governance model of an Enterprise. Use is driven by the scope being described. Commonly used for Architecture to Support Portfolio and Architecture to Support Project.
A3 Thinking[42]	Useful in summarizing Architecture to Support Project.
Unified Modeling Language (UML)[43]	Good fit for Architecture to Support Solution Delivery. In particular, useful in providing a standard way to visualize the design of a system.

[42] See http://sloanreview.mit.edu/article/toyotas-secret-the-a3-report/.
[43] See www.omg.org/spec/UML/2.5.

B Stakeholder/Concern Matrix

We recommend that a set of standardized classes of stakeholders, concerns, and associated viewpoints are maintained for each architecture purpose. This follows the advice of aligning the EA Capability with the questions that are expected to be answered.[44] This appendix provides a partial list of common stakeholders, concerns, and their alignment. These examples are provided as a starting point for a Practitioner who needs to address common questions.

Table 12 shows the relationships between the stakeholder classes and concerns for a single architecture purpose.

B.1 Common Stakeholder Classes

- **Senior Leaders** are those with responsibility for management and oversight

  This responsibility includes approving and realigning strategic initiatives, tracking a portfolio of projects, ensuring transformative benefits are realized, and meeting operational business goals.

- **Program/Portfolio Managers** are those with responsibility for management and oversight of strategic initiatives

  This responsibility includes approving and realigning projects, tracking project progress, and ensuring project benefits are realized.

- **Business Requirements Owners** are those responsible for identifying and expressing business requirements

  Typically, these stakeholders are responsible for some aspect of business operation.

- **Implementers** are those responsible for developing, integrating, and deploying the solution

- **Risk Owners** are those interested in risk

- **Business Partners** are those who are engaged to provide services sustaining a customer value proposition

  Note: The architecture may not be provided to business partners, but must be evaluated from their perspective.

- **Customers** are those who consume products and services

  Note: The architecture may not be provided to members, but must be evaluated from their perspective.

[44] See Customization of Architecture Contents and Metamodel in the TOGAF® Leader's Guide to Establishing and Evolving an EA Capability (see Referenced Documents).

B.2 Common Concern Classes

- **Agility**: what is the ability of the architecture to adapt to future unanticipated change?
- **Efficiency**: how does some aspect of the architecture contribute to efficiency of operations?
- **Differentiation**: how does some aspect of the architecture address enable differentiation?
- **Value**: what is the value of the architecture?
- **Value Proposition**: how does some aspect of the architecture address a value proposition?
- **Change Cost**: what is the impact of a change to the architecture in terms of cost of change?
- **Change Impact**: what is the impact, or scope, of a change to the architecture?
- **Alignment**: to what extent is the architecture aligned with priorities?
- **Feasibility**: what is the probability the architecture will be realized and sustained?
- **Dependability**: how will the architecture consistently deliver value and operate safely?
- **Control**: how will we protect assets in the architecture?
- **Specification**: what needs to be built?
- **Security**: will the architecture consistently address the risks and opportunities embedded in operations?
- **Confidence**: what confidence can be placed in the target?
- **Customer Intimacy**: is the Enterprise delivering products and services the customers want? What is the confidence that the new product or service will be liked by them?
- **Scalability**: Can the architecture and the Enterprise handle the range of demands and growth cycles?
- **Business Continuity**: Does the architecture provide the appropriate level of continuity needs relative to the Enterprise's needs?

For each intersection, a viewpoint is created the identifies the necessary information and communication required to address the concern. (See Appendix C.)

Table 12: Stakeholder Responsibility (Portfolio)

	Agility	Efficiency	Value	Value Proposition	Change Cost	Change Impact	Alignment	Feasibility	Dependability	Control	Specification	Security	Confidence	Customer Intimacy	Scalability	Business Continuity
Senior Leaders	X	X		X		X	X					X		X		X
Portfolio Managers	X	X		X		X	X	X					X	X	X	X
Business Requirements Owners	X	X		X		X					X	X	X	X		
Implementers						X		X		X	X		X		X	
Risk Owners						X		X	X		X	X	X		X	
Business Partner	X	X				X		X			X	X	X			
Customer	X			X								X	X	X		X

C Sample Viewpoint Library

We recommend that a Viewpoint Library is maintained to identify the standard concerns, stakeholders, and the information required to address the question. The information is typically drawn from one or more models. How the view should be constructed is purpose-specific.

Table 13 shows the relationship between the stakeholder classes and concerns:

Table 13: Viewpoint Library (Portfolio)

Concern	Stakeholders	View Construction	Information Required
Agility			
Efficiency			
Value			
Value Proposition			
Change Cost			
Change Impact			
Alignment			
Feasibility			
Dependability			
Control			
Specification			
Security			
Confidence			

D Architecture Contract Template

This template is maintained to standardize communication from an architecture to a solution delivery team.

Table 14 shows the relationship between the stakeholder classes and concerns.

Table 14: Solution Delivery Notebook

Section	Part	Purpose
Solution Summary		This section provides the summary of the solution. Central is: • What set of gaps in the architecture does the solution address? • Who are the stakeholders, relevant inbound requirements, and relevant specifications that address the requirements? • What are the risks, and the relevant controls that address the risks?
	Solution Concept Diagram	Describes the central problem and how the solution addresses the problem.
	Stakeholder Catalog	Identifies key stakeholders, their requirements, and any associated architecture specifications that constrain the design and implementation. This allows any design and implementation to be tested against stakeholder requirements by tracing the design and implementation to the requirement through the architecture specification.
	Risk Catalog	Identifies the risks applicable to the solution and the mitigating controls. This allows the design and implementation to be tested against risk though the mitigating control.
	Gap Catalog	Lists gaps that are addressed by the work package. This identifies what is in scope of the project and what is not in scope. Keep in mind there will routinely be additional gaps that are not addressed by a project that will need to be identified as such.

Section	Part	Purpose
Specification Summary		This section provides the summary for testing the design and implementation against the architecture and provides the basis of architecture governance. Specification conformance will be tested against: Requirement/specification pair Risk/control pair
	Implementation Strategy	Identifies the preferred approach to addressing the gaps or work packages, where a preferred approach will improve value realization.
	Architecture Specification	Identifies all the specifications that address a requirement. Specifications can be of many different types. Note that the specification can apply to anything in the architecture, but always traces to a requirement.
	Control	Identifies all the controls that mitigate a risk. Note that the control can apply to anything in the architecture, but always traces to a risk.
Architecture Description Summary		This section provides the summary of the Target Architecture using appropriate diagrams, catalogs, and matrices. This section is provided for reference.
	Business Architecture	
	Information Architecture	
	Application Architecture	
	Infrastructure Architecture	
	Security Architecture	
	Other specialized domain architecture depending on the specific organization needs	

E Another ADM Journey: Leader's Guide Capability-Based Planning Journey

This Guide has focused on aligning use of the TOGAF Standard to support four primary purposes driving the development of an EA. The journeys described in Chapters 7, 8, 9, and 10 provide purpose-specific journeys.

Practitioners will face many journeys through the ADM.

Table 15 is from the TOGAF® Leader's Guide to Establishing and Evolving an EA Capability (see Referenced Documents). It outlines a customized journey through the TOGAF ADM that is optimized for an EA Capability; it is easily adapted to other capability-based planning Architecture Projects.

As always, Practitioners identify the information they need to know to answer the question at hand. These answers either inform the next question and/or support a decision. Effective iteration of the ADM is not linear.

Table 15: Mapping EA Capability Development with ADM Phases

Topic	Mapping to TOGAF ADM Phase
Enterprise Context and EA Context	Partial Strategic Level Phase B Enterprise context: • Goals, objectives, initiatives, competitive, and tactic analysis • Operating model (partners, suppliers) • Explore what-if scenarios and scorecards EA context specific for the EA Capability: • Goals
Business Objectives for the EA Capability	Capability Level Phase A For the EA Capability: • Provide initial goals and objectives • Select a reference EA Capability and maturity model • Candidate EA Capability • Candidate operating model • EA Capability gap and priority roadmap

Topic	Mapping to TOGAF ADM Phase
Architecture Governance	Partial Segment/Capability Level Phase B For the Enterprise: • Enterprise Risk Management Model • Governance Model For the EA Capability: • Risk Management Model • Governance Model • Extend candidate operating model to include EA governance • Initial Architecture Partition Model • Trace to EA Capability goals
Alignment with Other Frameworks	Partial Capability Level Phase B & Partial Phase C (Data) For the Enterprise: • Reference models for key frameworks • Capability assessment of key frameworks For the EA Capability: • Framework touch-points • Extend candidate operating model to include other frameworks • Extend EA governance and EA risk management • Initial EA Content Framework aligned to other frameworks and EA governance • Candidate architecture partition model • Trace to EA Capability goals • EA Capability and key framework gap and priority roadmap
Customization of Architecture Contents and Metamodel	Capability Level Phase C (Data) For the EA Capability: • EA Content Framework • EA Content Metamodel • Viewpoint Library • Architecture Repository Model • Trace to EA Capability goals • Initial EA Content Framework and Architecture Repository gap
Organization Model for the EA Team	Partial Capability Level Phase B For the EA Capability: • EA organizational model • Select reference EA skills framework • Initial alignment with Enterprise job titles and roles • Initial accountability matrix for EA Content Framework and initial Architecture Repository • Organizational gap and priority roadmap

Topic	Mapping to TOGAF ADM Phase
Process Model	Partial Capability Level Phase B Capability Level Phase C (App) and Capability Level Phase D For the Enterprise: • Process model highlighting touch-points between EA Capability and Enterprise processes the EA Capability supports[45] • Performance matrix for key processes and organization • Accountability matrix for EA Content Framework and organization For the EA Capability: • Process model • Architecture Repository application model • Matrix for EA Content Framework and Architecture Repository Applications Architecture • Process and Architecture Repository gap and priority roadmap
Create the EA Capability	Capability Level Phase E Create a roadmap highlighting development of the EA Capability by changes in the: • Organizational model • Process model • EA Content Framework • Architecture Repository For the EA Capability: • Trace roadmap to EA Capability goals
Establishing and Evolving the EA Capability	Capability Level Phase F and Capability Level Phase G For the Enterprise: • Transition the EA Capability Roadmap to an Implementation & Migration Plan For the EA Capability: • Execute the Implementation & Migration Plan to build the EA Capability the Enterprise desires

[45] While this has been stressed in the guide, align to processes the EA Capability is expected to support based upon its purpose. Do not align to those it could support. Worst practice is to fret over linkage to processes the EA Capability *could* support.

F Evolving List of Domain Architectures

As the ecosystem in which an Enterprise operates and information technology evolves, specialty domain architectures will evolve. Table 16 documents a partial list of domain architectures and a short note about the domain. The list or the note about the domain should not be considered authoritative or comprehensive.

Table 16: Partial List of Domain Architectures

Domain Architecture		Short Note about the Domain Architecture
Business Architecture		Focuses on business motivations and business operations, linking customers, products, services, finances, suppliers, and partners. The linkages, relationships, and operational aspects are elaborated using the Enterprise's goals, objectives, strategies, business processes, and capabilities along with its rules and controls.
Security Architecture		An approach that clearly addresses the necessities and potential risks involved in a certain scenario or environment. It also specifies when and where to apply controls to eliminate or mitigate the barriers to attain the objectives, including sustainability and continuity of business.
Service Architecture		An approach to describe the purpose and method of interaction to get an outcome for the buyer/user. Includes clear articulation of the service availability, location, access control, response expectations, and usage methods.
	Human Machine Interaction Architecture	An approach to study and optimize the effort and understanding required by humans to work with machines and applications.
Information Systems Architecture		This is a logical grouping describing processes that are automated. The description includes information accessed and produced, infrastructure used to host applications that automates the processes, communicates across applications, or stores information. This is composed of all information, data, application, infrastructure, communications, and integration architectures.
	Information Architecture	A structural design and approach to help users (humans and machines) understand where data (text, audio, video, binaries) is, how to find it, what to expect, and how to use it to improve quality of decisions.
	Data Architecture	A description of policies, rules, or standards that govern which data is collected, how it is stored, arranged, integrated, and put to use. Organization of data is normally expressed in models.

Domain Architecture		Short Note about the Domain Architecture
	Application Architecture	Describes the behavior of a solution (automated or manual) applied to solve a business problem, how the solution interacts with other such solutions, and its users. It also describes how the solutions are organized, including its structural and behavioral elements.
	Infrastructure Architecture	A description of elements without which core business operations cannot take place. In generic terms, includes buildings and space for parking, power supply, heating, ventilation and air conditioning systems, dining area and restrooms (in other words facilities). In the information technology context, covers bare metal computing devices like servers, routers, switches, and disks.
	Communications Architecture	A network of people and machines that connects separate components of an organization. The primary focus of this architecture is to enable flow of information across the organization and rest of the world. Normally includes telephony, video conferencing, and automated response systems.
	Integration Architecture	A description of tools and techniques applied to enable applications to interact with each other using appropriate communications and infrastructure architecture. Its focus is on setting rules of engagement between applications including protocols and method, compliant with risk and security architecture.

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TOGAF® Series Guide

The TOGAF® Leader's Guide to Establishing and Evolving an EA Capability

Prepared by The Open Group Architecture Forum

TOGAF® Series Guide

The TOGAF® Leader's Guide to Establishing and Evolving an EA Capability

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Preface

The Open Group

The Open Group is a global consortium that enables the achievement of business objectives through technology standards. With more than 870 member organizations, we have a diverse membership that spans all sectors of the technology community – customers, systems and solutions suppliers, tool vendors, integrators and consultants, as well as academics and researchers.

The mission of The Open Group is to drive the creation of Boundaryless Information Flow™ achieved by:

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The TOGAF® Standard, a Standard of The Open Group

The TOGAF Standard is a proven enterprise methodology and framework used by the world's leading organizations to improve business efficiency.

This Document

This document is a TOGAF® Series Guide: The TOGAF® Leader's Guide to Establishing and Evolving an EA Capability. It has been developed and approved by The Open Group.

This Guide puts forward advice on establishing an Enterprise Architecture (EA) Capability that aligns to a set of requirements and expectations specific to each enterprise. It proposes an approach for the standing-up and enhancing of an enterprise's EA Capability based upon the established best practice contained within the TOGAF® standard, a standard of The Open Group.

This Guide is structured to provide the context, content, and rationale behind choices and steps that an EA Leader can consult at any point in time to set up, operate, or improve the value extracted from the practice of EA in the organization.

The intended audience for this Guide is as follows:

- Professionals who have been tasked with establishing and evolving an enterprise's EA Capability
- Business Leaders who are contemplating an investment in EA as a strategy
- Strategy and technology advisors to an enterprise's Leaders
- Professionals and experts who are enthusiasts in the field of EA or organizational transformation

This Guide is written directly for the person who is tasked with developing, sustaining, and evolving an EA Capability that delivers what their enterprise needs.

A high-functioning EA Capability optimizes Boundaryless Information Flow™ within and between enterprises based on open standards and global interoperability.

About the TOGAF® Series Guides

The TOGAF® Series Guides contain guidance on how to use the TOGAF Standard and how to adapt it to fulfill specific needs.

The TOGAF® Series Guides are expected to be the most rapidly developing part of the TOGAF Standard and are positioned as the guidance part of the standard. While the TOGAF Fundamental Content is expected to be long-lived and stable, guidance on the use of the TOGAF Standard can be industry, architectural style, purpose, and problem-specific. For example, the stakeholders, concerns, views, and supporting models required to support the transformation of an extended enterprise may be significantly different than those used to support the transition of an in-house IT environment to the cloud; both will use the Architecture Development Method (ADM), start with an Architecture Vision, and develop a Target Architecture on the way to an Implementation and Migration Plan. The TOGAF Fundamental Content remains the essential scaffolding across industry, domain, and style.

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- Skills Framework for the Information Age (SFIA), SFIA Foundation; refer to: www.sfia-online.org
- SOA Reference Architecture, a standard of The Open Group (C119), published by The Open Group, December 2011; refer to: www.opengroup.org/library/c119
- The Open Group Certified Architect (Open CA) Program: Conformance Requirements, Certification Program Documentation (X1411), published by The Open Group, October 2014; refer to: www.opengroup.org/library/x1411
- The TOGAF® Standard, 10th Edition, a standard of The Open Group (C220), published by The Open Group, April 2022; refer to: www.opengroup.org/library/c220
- TOGAF® 9 and DoDAF 2.0, White Paper (W105), published by The Open Group, July 2010; refer to: www.opengroup.org/library/w105
- TOGAF® and SABSA® Integration, White Paper (W117), published by The Open Group, October 2011; refer to: www.opengroup.org/library/w117
- TOGAF® Series Guide: Integrating Risk & Security within a TOGAF® Enterprise Architecture, The Open Group Guide (G152), published by The Open Group, April 2022; refer to: www.opengroup.org/library/g152
- World-Class Enterprise Architecture, White Paper (W102), published by The Open Group, April 2010; refer to: www.opengroup.org/library/w102

- World-Class Enterprise Architecture: A Leader's Approach to Establishing and Evolving an EA Capability, White Paper (W160), published by The Open Group, January 2016; refer to: www.opengroup.org/library/w160

Part 1: Introduction

1 Introduction

This Guide presents advice on establishing an Enterprise Architecture (EA) Capability that aligns to a set of requirements and expectations that are specific to each enterprise.[1] It proposes an approach for the standing-up and enhancement of an enterprise's EA Capability based upon established best practices. This approach follows a configured path through the TOGAF® Architecture Development Method (ADM).

This Guide is written for the EA Capability Leader, the person who is tasked to lead the effort to establish or evolve an EA Capability. We have selected the term *Leader* deliberately to reflect the role rather than any one of the myriad titles in an enterprise the Leader may have. This Guide is structured to provide the context, content, and rationale behind choices and steps that an EA Leader can consult at any point in time to set up, operate, and improve the value extracted from the practice of EA in the organization. A high-functioning EA Capability optimizes Boundaryless Information Flow™ within and between enterprises based on open standards and global interoperability.

Practicing EA requires in-depth interaction with several specialized functions such as strategy development, HR policies, and corporate accounting. This Guide:

- Introduces key topics of concern
- Defines the terms related to the topic
- Shows the terms that are related to an EA Capability
- Discusses what the Leader needs to know
- Describes what the Leader should do with this knowledge

This Guide transitions its focus between setting up a new EA Capability practice and evolving or re-establishing the practice. It is presented this way to reflect the reality of the state of EA prevalent in the industry at the time of writing.

This Guide is divided into six parts.

Part 1 (this part) is the introduction, including an assessment of the state of EA, definitions, and key concepts used in this Guide.

Parts 2 and 3 present a narrative that leads the reader through a series of topics and related steps to assist in stepping back from the current operational context to seek a broader perspective. Ideally, the contents of these first two parts should form a companion to the TOGAF ADM or

[1] The terms *business*, *company*, *organization*, and *enterprise* are often used interchangeably in various texts. This Guide uses the term *Enterprise* to refer to a logical entity that is taking part in an economic activity; i.e., one that involves some kind of risk/reward or new way of solving socio-economic problems. Likewise, the term *organization* is in reference to a group of personnel brought together to perform a set of tasks and deliver the outcomes defined for them. The term *business* is used to refer to the team that formulates and manages the outcomes that the Enterprise is set to do. And the term *company* is used only when it improves readability, though the definition remains that of an Enterprise.

similar architecture development processes, methods, or frameworks that an enterprise may choose to adopt. This Guide takes this approach deliberately. It focuses on outcomes without being distracted by implementation or evolution. This is done by simply focusing on what must be done and what needs to be achieved out of the steps.

Part 4 covers adoption of the EA Capability. This includes preparation and initiation activities required to establish or enhance the EA Capability that would be relevant to an enterprise.

Part 5 shows a simple mapping of how the TOGAF ADM can be practically used. This follows a "configuration" of the TOGAF ADM for architecting and establishing an EA Capability. It serves as an example to show how the TOGAF ADM could be customized to address the purpose for which an EA Capability is being established.

Part 6 contains appendices.

Not all scenarios or related fields discussed in this Guide will be relevant for every enterprise, and especially in the first attempts at creating an EA Capability. Establishing any capability is an iterative process. This Guide is intended as a starting point to create or evolve an EA Capability, when the purpose for performing EA changes, or when the charter for a team changes.

Even though this Guide has a logical structure, it is not designed as a simple task-list. The depth and detail of every step taken by the EA Leader is iterative, and the only variable is time spent for each step. As with all change work, listing what you need to know is not the same as defining the level of detail in documentation. This Guide provides a concise summary of what you need to know to establish the EA Capability in Table 9.

It is the EA Leader's judgment to consider the level of depth and documentation and how to iterate in a manner that best suits an enterprise. The intent of this Guide is that you read Chapter 4 (Enterprise Context and EA Context) and Chapter 5 (Business Objectives for the EA Capability) before making any judgment call on the approach to building an EA Capability.

Experience has shown that there is *no one right* EA Capability model. There are numerous examples of EA Capability being focused on strategy or portfolio or project or a combination of these. EA Capability has been aligned to organizational change leaders, supporting specific transformation efforts, or has focused on continuous improvement and change or embedded within an IT organization. This Guide will help the Leader of an EA Capability to identify an approach that is:

- Appropriate to the enterprise
- Appropriate to the context of the EA Capability
- Appropriate to the purpose of the EA Capability

This Guide presents a tailored approach to establish and evolve EA Capability, aligned to the TOGAF Preliminary Phase. The EA Capability is designed to deliver architectures for a purpose and to drive effective change. However, when presenting the concepts supporting each of the steps, the Guide presents a few leading alternative techniques and approaches. It is up to the Leader to identify and employ concepts or school of thought that best meets the needs of the enterprise.

The importance of aligning an enterprise's context to its purpose is paramount. It is dubious to suggest that there is a single, correct approach to align context to purpose and this Guide makes no suppositions to that effect.

1.1 How to Use this Guide with the TOGAF Framework

The TOGAF framework provides essential universal scaffolding useful to a range of organizations, industries, and architectural styles. Customization of the TOGAF framework is necessary to align to the enterprise's requirements and expectations. The question is how to customize the TOGAF framework.

The TOGAF framework is written for the practitioner, the expert, and in general the professional that would take the role of EA Capability leader; the person who thinks about the structure and practice of EA. This Guide is an interpretation of the TOGAF framework to support the Leader to establish or evolve an EA Capability – the person who is not worried about the theory, but who is worried about how to structure or maintain an effective EA Capability.

This Guide provides advice for establishing or enhancing an EA Capability based upon the TOGAF framework. Establishing an EA Capability is the purpose of the TOGAF ADM Preliminary Phase. This Guide follows the Preliminary Phase and provides in-depth commentary and guidance for executing the Preliminary Phase. This includes guidance on customizing and configuring the TOGAF ADM; defining a Content Framework; selecting, configuring, and customizing appropriate tools and techniques; and selecting, configuring, and customizing appropriate architecture practices.

1.2 The State of Enterprise Architecture

Research and survey by the Association of Enterprise Architects (AEA), the Corporate Executive Board (CEB), and Forrester during 2014 and 2015 present a wide spectrum of positive and negative impressions on the impact EA Capability has had on any enterprise.[2] The responses showcase different practice models for EA Capability as well as a range of maturity levels. There are instances of high-functioning EA teams that were formed several years ago, to continuous initiation and shutting-down of EA teams. The key message that EA Capability is a function of context and purpose is often lost, in practice and discussions.

To respond to the demands and needs of their stakeholders, organizations need to develop new and better ways of managing continuous change at ever-increasing pace to deliver significant value in a transparent manner. Organizations need an EA Capability as an integral capability to support continuous and transformational change processes. However, over the years, many

[2] The references in relation to this paragraph are as follows:

- The State of Enterprise Architecture in 2011, Forrester Research; refer to: https://go.forrester.com/blogs/11-11-28-the_state_of_enterprise_architecture_in_2011/
- The State of EA 2014: New Demands, Same Headcount, Forrester Research; refer to: www.forrester.com/report/The+State+Of+EA+2014+New+Demands+Same+Headcount/-/E-RES104542
- The State of EA 2016: Weak Enterprise Agendas Still a Fundamental Problem, Forrester Research; refer to: www.forrester.com/report/The+State+Of+EA+2016+Weak+Enterprise+Agendas+Still+A+Fundamental+Problem/-/E-RES121311
- Gartner 2015, EA Summit Proceedings; refer to: www.gartner.com
- Corporate Executive Board: see www.cebglobal.com/blogs/the-ea-organization-3-0/ and www.cebglobal.com/blogs/enterprise-architecture-you-dont-always-need-a-seat-at-the-table/

organizations have attempted to set up EA practices only to see them fail after a few years. In spite of these previous failures, enterprises repeatedly try to establish a successful EA Capability.

This Guide discusses a pragmatic and tested approach to establish, manage, and evolve an EA Capability based upon established successful practices. This Guide also presents an approach to successfully apply the practice of EA to amplify the value realized or re-establish the practice. This Guide presents various factors that influence the success of EA Capability.

2 Definitions

The following terms are highlighted and defined to distinguish them from their common English usage. As such, the terms below are distinctly defined and capitalized wherever found in this Guide. The Open Group intends for these definitions to be assumed when referenced in this Guide.

2.1 Enterprise

The highest level of description of an organization used to identify the boundary encompassed by the Enterprise Architecture and EA Capability.

Note: This definition is deliberately flexible and not associated with an organization's legal or functional boundaries. It covers monolithic organizations and extended organizations that include separate organizations connected by a mission or supply chain, as well as to the operating entities within an organization. Examples include the outsourced partners that provide manufacturing, logistics, and other support to an organization; a multi-national peacekeeping force; and a multi-billion dollar division of a Fortune 50 firm. All are enterprises.

2.2 Enterprise Architecture (EA)

Gartner defines Enterprise Architecture as "the process of translating business vision and strategy into effective enterprise change by creating, communicating, and improving the key principles and models that describe the enterprise's future state and enable its evolution".[3]

2.3 Enterprise Architecture (EA) Capability

The enterprise's ability to develop, maintain, and evolve an enterprise Architecture as well as its ability to use the architecture to govern change activity in the enterprise.

2.4 Capability

A management concept that facilitates planning improvements in the ability to do something that leads to enhanced outcomes. It enables the ability to measure resources employed and outcomes or goals achieved within a specified context.

Note: Formal modeling often requires a crisp definition. Without the recurrent formal model definition debates we would not have defined the term and relied upon the simplest standard English definition as "the ability or potential for an indicated use" and "something that has the potential to be improved".

[3] Gartner Clarifies the Definition of the Term "Enterprise Architecture" (see Referenced Documents).

2.5 Leader

The person tasked to lead the establishment and/or evolution of an EA Capability.

Note: This term reflects the role, rather than one of the myriad titles, that may apply.

3 General Concepts

This chapter describes the general concepts used throughout this Guide.

3.1 Who is an EA Capability Leader?

This Guide is written for a Leader – the person tasked to lead the establishment and/or evolution of an EA Capability. We have selected the term Leader deliberately to reflect the role, rather than one of the myriad titles in an enterprise the Leader may have. Key to the successful establishment of an EA Capability is the Leader's ability to step back from his or her current operational context to seek broader perspective before making a decision and then following through with the decision to lead the change.

This type of Leader takes into account multiple dimensions, like business drivers, organizational culture, and maturity, as well as the context within which his or her enterprise operates. Such a Leader is cognizant of the fact that their decisions are likely to live longer than their tenure in their current role. This person understands that there are multiple systems in play that interact with each other.

3.2 What is an Enterprise?

The TOGAF framework defines "enterprise" in the context of formal modeling. This Guide applies a different definition focused on defining the boundary of interest and activity. For the purpose of this Guide, an enterprise is the highest level of description of an organization used to identify the boundary encompassed by the EA and EA Capability.

This definition is deliberately flexible and not associated with an organization's legal or functional boundaries. It covers monolithic organizations and extended organizations that include separate organizations connected by a mission or supply chain, as well as operating entities within an organization. Examples include the outsourced partners that provide manufacturing, logistics, and other support to an organization; a multi-national peacekeeping force; and a multi-billion dollar division of a Fortune 50 firm. All are enterprises.

A given EA will align with the defined boundary of an enterprise. Whether that boundary is an exact match for an organization, a subset, or superset is not material. It is assumed that the EA Capability will align with the boundary of the enterprise and be able to deliver the EA.

An enterprise exists within a context; it has an interaction with what happens outside the enterprise. The context is different for public, governmental, or defense enterprises and private or commercial enterprises. Political, economic, social, technological, environment, and legal forces provide a context for the enterprise.

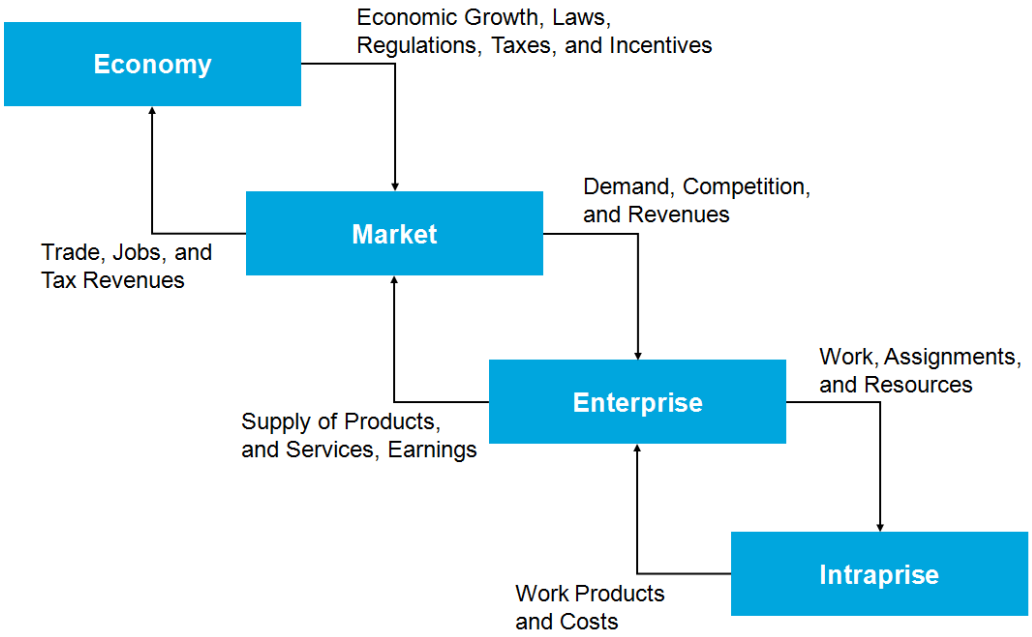


Figure 1: Context for Commercial Enterprise[45]

Public agencies, government, and defense organizations all benefit from EA. This Guide does not comprehensively address all nuances or outlier aspects for government, defense, or not-for-profit enterprises, mainly not to distract the reader with alternate methods or special focus. This Guide assumes that the reader is associated with a profit-making, publicly traded, public defense, or social sector enterprise. The reader will have to make a few adjustments to context and motivation if otherwise. This Guide may in the future be updated to focus on the special needs of public organizations.

3.3 What is an EA Capability and EA?

In short, an EA Capability is the ability to develop, use, and sustain the architecture of a particular enterprise, and use the architecture to govern change.

This Guide discusses establishing and evolving an EA Capability; it explicitly does not discuss an EA department or any other organizational element. The term C*apability* is often defined tortuously, most commonly when it is used as part of a formal analysis technique when definition must be precise and constrained. This Guide uses EA Capability as a management concept that facilitates planning improvements in the ability to do something that leads to enhanced outcomes enabled by the Capability.

In its simplest terms, EA is used to describe the future state of an enterprise to guide the change to reach the future state. The description of the future state enables key people to understand what must be in their enterprise to meet the enterprise's goals, objective, mission, and vision in

[4] Derived from a presentation entitled Enterprise Transformation – An Architecture-Based Approach, by William B Rouse at The Open Group Conference, January 2012.
[5] Intraprise – a geographically or logically defined grouping of autonomous functions within an enterprise with functions not necessarily reaching outside the boundaries of the enterprise. Several intraprises constitute an enterprise.

the context within which the enterprise operates. The gap between the enterprise's current state and future state guides what must change within the enterprise.

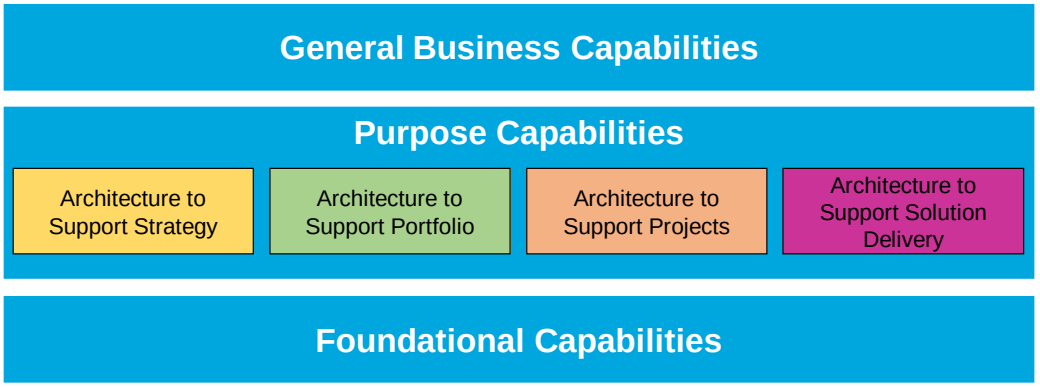


Figure 2: EA Capability Model[6]

Using the capability model in the World-Class Enterprise Architecture White Paper[7] as a base, we assume that an EA Capability is established specifically to support one or more purposes. Typically, there are four broad purposes of an EA Capability:

- **EA to support Strategy**: deliver EA to provide a target architecture, and develop roadmaps of change over a three to ten-year period

  An architecture for this purpose will typically span many change programs or portfolios. In this context, architecture is used to identify change initiatives and supporting portfolio and programs. Set terms of reference, identify synergies, and govern execution of strategy via portfolio and programs.

- **EA to support Portfolio**: deliver EA to support cross-functional, multi-phase, and multi-project change initiatives

  An architecture for this purpose will typically span a single portfolio. In this context, architecture is used to identify projects, and set their terms of reference, align their approaches, identify synergies, and govern their execution of projects.

- **EA to support Project**: deliver EA to support the enterprise's project delivery method

  An architecture for this purpose will typically span a single project. In this context, the architecture is used to clarify the purpose and value of the project, identify requirements to address synergy and future dependency, assure compliance with architectural governance, and to support integration and alignment between projects.

- **EA to support Solution Delivery**: deliver EA that is used to support the solution deployment[8]

  An architecture for this purpose will typically be a single project or a significant part of it. In this context the architecture is used to define how the change will be designed and

[6] Adapted from The Open Group White Paper: World-Class Enterprise Architecture and The Open Group White Paper: World-Class EA: A Leader's Approach to Establishing and Evolving an EA Capability (see Referenced Documents).
[7] The Open Group White Paper: World-Class Enterprise Architecture (see Referenced Documents).
[8] Delivery is the act of taking something to a place. Deployment is organizing and sending people or things to be used for a particular purpose. Architecture is supporting the act of delivery. Value is realized upon deployment and use of a solution. Hence, the difference is use of terms.

delivered, identify constraints, controls and architecture requirements to the design, and finally, act as a governance framework for change.

3.4 EA Lifecycle

Whether the enterprise is embarking on establishing an EA Capability for the first time, is enhancing or re-booting an existing EA Capability, this Guide provides an approach to lead the EA Capability lifecycle and maturity. In all cases, the best practice is to establish a roadmap that provides an end-state and a set of capability increments.

At the time of writing, the most common EA Capability industry practice is a re-boot after a failed attempt to establish an EA Capability.[9] When enhancing an existing EA Capability or performing a re-boot, it is recommended to perform the activities described in Chapter 4 (Enterprise Context and EA Context) and Chapter 5 (Business Objectives for the EA Capability). These activities assist in identifying the pitfalls prior efforts ran into, and strongly influence the external Communication Plan and Roadmap. The following questions exemplify oversimplified thinking in an EA lifecycle:

- Should the EA team be created first and then develop the capability with the team?
- Are charter and sponsorship good enough starting points?
- Is the best starting point for EA practice understanding the enterprise and its external interactions or understanding the team that chartered the EA Capability team?
- Is there a need for a formal toolset at the beginning of the initiative or is back-of-napkin documentation enough?

This Guide discusses such questions as pragmatically and generically as possible to frame a proper starting point. This Guide follows a best practice approach based upon work that has established some of the most successful long-lasting EA Capability teams.

3.5 EA and Other Fields

An EA Capability is normally established in an organization to bring about changes to the current method of operation. Achieving a transformation outcome demands analysis of the current state of the organization along with current industry trends. Implementation of recommendations from such analysis requires planning, funding, and monitoring. In the course of this journey, the EA enablers interact with business strategy, cash flow management, environmental and competitive sustainability, organizational design, information and physical security, and IT and operations management to name a few spaces. Within an enterprise, many

[9] The State of Enterprise Architecture in 2011, Forrester Research; refer to: https://go.forrester.com/blogs/11-11-28-the_state_of_enterprise_architecture_in_2011/.
The State of EA 2014: New Demands, Same Headcount, Forrester Research; refer to: www.forrester.com/report/The+State+Of+EA+2014+New+Demands+Same+Headcount/-/E-RES104542
The State of EA 2016: Weak Enterprise Agendas Still a Fundamental Problem, Forrester Research; refer to: www.forrester.com/report/The+State+Of+EA+2016+Weak+Enterprise+Agendas+Still+A+Fundamental+Problem/-/E-RES121311
Gartner 2015, EA Summit Proceedings; refer to: www.gartner.com.
Corporate Executive Board: see www.cebglobal.com/blogs/the-ea-organization-3-0/ and www.cebglobal.com/blogs/enterprise-architecture-you-dont-always-need-a-seat-at-the-table/.

of the functions of an EA Capability will be performed, even implicitly, by several organizations.

This Guide does not take the position that a specific EA organization will perform the process and provide resources and deliverables embedded within an EA Capability. However, this Guide, in the following chapters, introduces related resources and an approach to set, build, and evolve the practice of the EA Capability. Leaders frame a charter – the extent of overlap with related functions, sharing of responsibilities, and having the necessary organizational conversations at the enterprise.

3.6 Characteristics of EA

The World-Class Enterprise Architecture White Paper highlights that there is no single correct scope, level of detail, or purpose for an EA. Different enterprises will expect their EA to guide change at different levels within the enterprise.

Herein lies a pair of substantive challenges. First, recognizing that the range, scope, and scale of an EA are as broad as the scope and scale of enterprises and their change programs. Second, the ability to develop, use, and sustain the required EA will be equally as broad. Later in this Guide, various approaches to scope (strategy, portfolio, or project), the effort, and an approach to enhance the positive impact of EA are discussed.

The purpose of EA is to optimize the enterprise to realize a specific business strategy or mission. All optimization must be responsive to change. Optimizing an enterprise to best realize the business strategy or mission requires all components to work together. Achieving competitive advantage is possible when all components are optimized to the enterprise strategy or mission.

An EA that highlights the relationship between the components of an enterprise helps facilitate effective management and exploitation opportunities. EA provides a strategic context for the evolution of the enterprise in response to the constantly changing needs of the business environment.

Furthermore, a good EA enables the sponsors and the enterprise as a whole to achieve the right balance across conflicting demands. Without the EA, it is highly unlikely that all the concerns and requirements will be considered and addressed with an appropriate trade-off.

3.7 Referenced Techniques

Within this Guide, there are references to techniques and key literature created by thought leaders. This Guide is developed using reference materials that are freely available through standards organizations and academic publications. There is no promotion or reference to any commercial techniques or tools. There is often commercial material available for topics discussed in this Guide. It is up to the reader to seek them.

References to key literature and their techniques are intended only to be representative. The reader is expected to read and assimilate referenced publications for a full understanding of these related topics. This Guide only highlights why it is used and what outcome is expected. Further, this Guide does not intend to suggest that the referenced techniques and literature are definitive. Other techniques and key literature can readily be substituted. The literature referenced is part of

a body of knowledge that continuously evolves, and the reader is advised to explore updates to literature and techniques referenced in this Guide.

This Guide provides a summary of EA Content Frameworks, many of which are industry-specific, as starting points that can accelerate development of a Content Framework. See Appendix A (Partial List of EA Content Frameworks), Chapter 13 (Mapping the EA Leader's Guide to the TOGAF Framework), and Chapter 8 (Customization of Architecture Contents and Metamodel) for the discussion.)

To summarize, this Guide offers guidance on what should be considered, how to customize a version of the ADM to an enterprise context, and when to seek use of automation tools. It also provides a commentary on successful approaches to continuously evolve and grow the application of EA Capability to meet the evolving nature of the enterprise context.

Part 2: Guidance on Context

4 Enterprise Context and EA Context

To develop an EA Capability requires an understanding of the enterprise in question. The understanding gained through this exercise is the foundation for tailoring, prioritizing, and building an EA Capability. The focus of this chapter is to gain an understanding of the context and the need for an EA Capability to be built for the enterprise.

Every enterprise has a different context – the circumstances that led to its creation and current setting must be fully understood and assessed. Without an explicit understanding of an enterprise's context, there is a risk of carrying an implicit or derived context into the analysis, usually based upon prior experience or an enterprise's recent past. Proceeding with derived context often results in failure of the EA Capability. Creation of an EA Capability is often associated with change events, and must be aligned with the current context.

Questions that must be answered to have clarity about the enterprise context and an EA context include:

- What is the enterprise?
- What is the enterprise's purpose or mission?
- What is the enterprise's strategic position and approach?
- What is the enterprise's environment?
- What is the special context of the EA Capability?
- What architecture principles will drive choices?

Strategic business architecture involves understanding what the enterprise is, analyzing the purpose for the enterprise and success measures, along with its environment. Operational business architecture is about analyzing, documenting, and refining how the parts of the enterprise execute their work on a day-to-day basis.

Providing context requires strategic business architecture. Developing other capabilities uses the same understanding. Developing these descriptions is iterative. This chapter will describe why it must be iterative. The first principle of being iterative is to obtain the level of detail necessary to answer the question at hand, and, as the questions become more precise, to increase the level of detail captured.

Always revisit existing material to simply confirm that the content is current. Refine or update only when necessary. When existing principles are available, review the existing architecture principles to understand how the EA Capability has been framed regarding purpose, role, and engagement. It is too early in the process to start creating principles.

4.1 What is the Enterprise and What is its Purpose?

The very first activity is to define the enterprise. The term is defined as "the highest level of description of an organization used to identify the boundary encompassed by the EA and EA Capability". In practice, the enterprise is a boundary that identifies the outer limit that the EA and the EA Capability must address. In some cases the boundary will align with a corporation; it can align with an extended enterprise, including business partners in an organization's value chain; it can align with a set of organizations joined by a common mission, such as a multi-national peacekeeping force; lastly it can limit the boundary to part of an organization. The term is used flexibly to identify the boundary of the EA and remit of the EA Capability. The size of the enterprise is not a consideration.

What is included and excluded from the boundary of the enterprise impacts every aspect of an EA Capability. The Leader must ensure that the EA Capability addresses the complete scope of what is included the enterprise, and all related governance.

The second is to understand the enterprise's purpose. Private, public, or social enterprises will have distinct purposes. Private enterprises exist to generate value for their shareholders. The purpose will be drawn from the product and service they provide, and the industry segment in which they operate. Mission, or vision, statements will typically describe a purpose. Public and social enterprises typically have a purpose described in their mission or mandate.

Note: This Guide will operate on the assumption that the enterprise is a profit-making, public organization. This Guide also assumes that the EA Capability team is chartered to define the target architecture by the highest decision-making body (like the Board or the CEO), covering all departments, divisions, and geographies.

4.2 What is the Enterprise's Strategic Position, Approach, and Environment?

Structuring the EA Capability requires an understanding of how the enterprise works. To play in the market context, the enterprise defines how it competes and serves customers in its market – also known as the *strategic statement*. Exploring the enterprise context and the strategic position is done by understanding the following:

- Business Model
- Operating Model
- Organization Model
- Econometric Model
- Accountability Model
- Risk Management Model

Even when a strategy statement is available, the spirit and intent can be better understood by exploring these models. Development of the strategy for the enterprise rests with the Executive Board, the Chief Executive Officer (CEO), or the Chairman. The EA Capability team or its Leader may be asked to facilitate the strategy development session. The EA Capability Leader or the EA Capability team should not create or own the strategy statement of the enterprise. When

an explicit strategy statement is not available, explore the models presented below to understand whether the enterprise is operating under implicit interpretation. When the strategy is not stated explicitly or implicitly, it is upon the EA Capability Leader to request the Executive Board, CEO, or the Chairman to define the strategy.

4.2.1 Business Model and Operating Model

The business model for an organization changes to stay current with the economy and environment within which it operates. Michael E. Porter, in his 1979 article titled How Competitive Forces Shape Strategy,[10] stressed the needs to track external and internal factors. As described by Alexander Osterwalder,[11] the business model can be extended to build a comprehensive model for complex enterprises – customers, beneficiaries, partners, suppliers, and regulators – as follows:

- Purpose of business and value proposition to customers, beneficiaries, partners, suppliers, and regulators
- Channels of engagement with customers, beneficiaries, partners, suppliers, and regulators
- Internal and external activities that add value to customers, beneficiaries, partners, suppliers, and the enterprise
- Partnership activities and details of sharing cost and revenue
- Revenue models, including benefit realization streams
- Cost structures and their mapping to internal and external activities
- Planning cycle (when the investments will be made) and impact delivery cycle (who will realize what value and benefit at what point in time in the future)

The business model is an indicator of the cash flow and cash reserve management approach of the enterprise, including how it plans to stay in business for a conceivable period in the future. The smaller the financial margins, the higher the need for operational efficiency capabilities – lean but effective architecture to sustain the business. A higher profit margin is one of the several factors that results in poor sponsorship for a dedicated EA function. There are other factors like compliance, governance and risk, and challenges with long-term planning that may instigate a need for EA Capability to be built. When the team providing the EA Capability is aligned to an organizational unit that is operating as a cost function, sponsorship for the EA Capability will not be dependent on the financial margins of the organizational unit.

Identify the business model for the enterprise "as-is" today or the direction for the next few years. Business models evolve with economic and social maturity. Alexander Osterwalder discussed how disruption to an industry or a business model can be caused by altering any one of these aspects. The business model drives the selection of the appropriate operating model. As the business model changes, the operating model will have to be adjusted. Over the past few decades, as the highly inter-dependent global economy emerged, the nature of external forces and their impact on the operating model evolved as well. Some of the key literature on these forces are (see also Appendix C):

- The Living Company, by Arie De Geus

[10] How Competitive Forces Shape Strategy, by Michael E. Porter (see Referenced Documents).
[11] The Business Model Canvas, by Alexander Osterwalder (see Referenced Documents).

- The Structuring of Organizations, by Henry Mintzberg
- The Delta Model, by Dean L. Wilde II and Arnoldo C. Hax
- The Core Competencies, by C.K. Prahalad, Allen Hammond, and Stuart L. Hart
- The Fortune at the Bottom of the Pyramid, by C.K. Prahalad and Stuart L. Hart

An operating model is the conceptual representation or a description of how the enterprise executes its broad functions to achieve its stated purpose. The rationale behind how the enterprise executes its functions to achieve the stated purpose is called a business model. A pivot for a business model is the ability to manage cash flow and profitability considering how it functions, whereas an operating model is just the description of how it functions.

For example, a philanthropic organization's business model is about the activity to achieve a social goal – like availability of clean water to people hit by floods. Distinct business models would be aimed at raising funds to provide this service, put people in the field to directly deliver the social goal, or both. The operating model for this organization defines how awareness is maintained to raise money, how to respond to such needs, and to show results that the need is being met efficiently and effectively.

To get started with documenting business and operating models, consider the following pivots:

- Ownership of design of products and services, and how it is transferred to end-users
- How the products and services are charged (tactics to acquire customers)
- Diversity of products and channels employed

Operating models bridge the detailed organizational design with the strategy, values, and purpose of the enterprise. In simple terms, the operating model describes the internal expertise required and how the resources are managed to provide the services to customers of the enterprise.

There are several templates and references available for documenting the operating model – differentiated by industry or geography or by public, private, or social incorporation. It should be noted that some of the industry verticals (e.g., retail, wholesale, online, digital) have their own versions of operating model classification. The Center for Information Systems Research (CISR) model shown in Figure 3 is industry-neutral and focuses on patterns for *how* business processes are handled by the enterprise for growth and sustainability.

It is possible for the same firm to have more than one operating model. Common examples can be found in financial services or the Engineering, Procurement, Construction, and Management (EPCM) industry. A global banking and insurance company operating in, say, the United States, Brazil, and Germany may have a replication model – each country unit operates as its independent entity offering insurance and banking products and meets the needs of local demography and laws. Product design and financial structuring of these three units may replicate best practices of one another across each unit. The global holding company may be performing a coordination function to assure viability of the organization's business model to its investors.

While capturing the operating model, it is essential to explore and document the value of products or services or both delivered by the enterprise, its target market, value chain, revenue generation model, and the strategic advantage of the enterprise. Another dimension to consider

while creating the operating model is the core nature of the business such as a manufacturing, marketing, sales and distribution services, professional services, community business, or public utility core nature. Value chain and revenue generation models will be covered in detail later in this Guide.

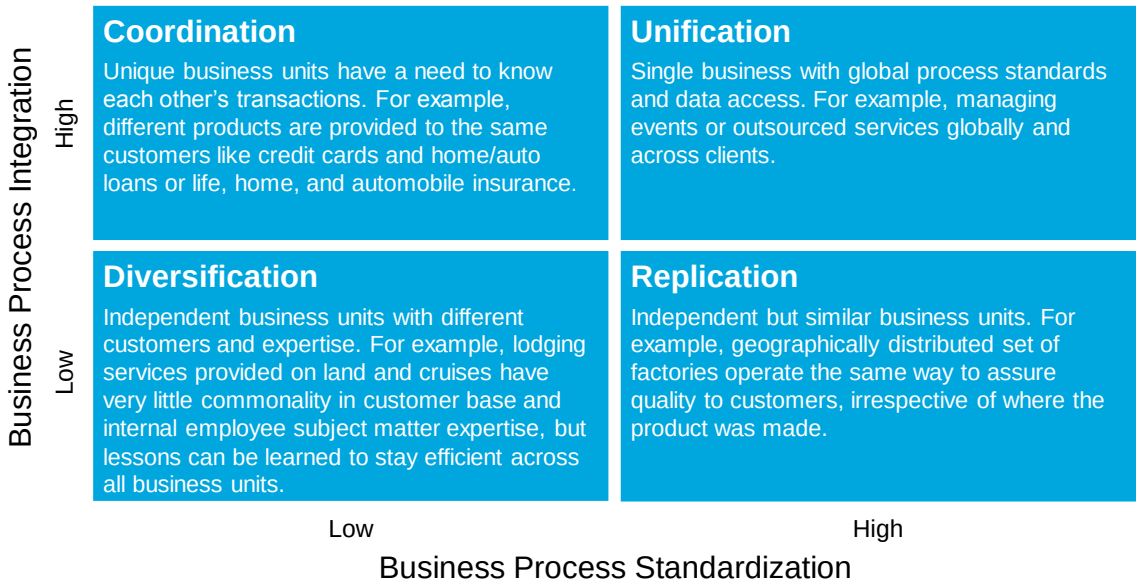


Figure 3: Operating Model[12]

The best way to capture and validate the operating model is by stakeholder analysis.

4.2.2 Operating Environment and Compliance, Regulations, Industry Standards

It is normal that the law catches up with practices of organizations to assure common good for the mass population. As innovations happen, the enterprise tends to believe that is it not under any compliance or regulatory restrictions. Though not apparent, functions like HR and finance always fall under some form of regulatory controls.

Simple research on some legal issues faced by the new enterprises disrupting global taxi operations in 2015 is an illustration of the tension between innovation, social balance, and law. An enterprise that is making new armor to protect human life is probably inventing new material for which no standards exist for mass production or testability. Just like medicinal drug formulation, this enterprise is also required to follow a protocol for development and validation before entering the live human trial phase. It is one of the responsibilities of the EA Capability Leader to educate the executives and other Leaders in the enterprise, where standards and compliance apply and where the enterprise is a pioneer if they are not acknowledging these needs easily.

It is a good practice to create a catalog of compliance needs, local and international regulations, and industry standards that apply to the enterprise.

[12] This diagram is adapted from Enterprise Architecture as Strategy: Creating a Foundation for Business Execution, by Ross et al. (see Referenced Documents).

4.2.3 Organization Model of the Enterprise

In most cases, the enterprise should have an organization model, and it is good enough for the EA Capability team to have it accessible. In the event the EA Capability's chartered scope is one business unit, product line, or geography, analysis discussed in the next few paragraphs should be limited to identifying dependencies and influences. Essentially, what the enterprise is must be defined in the context of what is being expected from the EA Capability effort.

An organization structure or organization model provides insights into leadership style, authority and center(s) of power, and values of the organization. It also informs lines of communication, local and global culture, segregation of duties, and resource allocations to achieve the stated mission and objectives of the enterprise. The model will provide insights into the kind of challenges the enterprise faces.

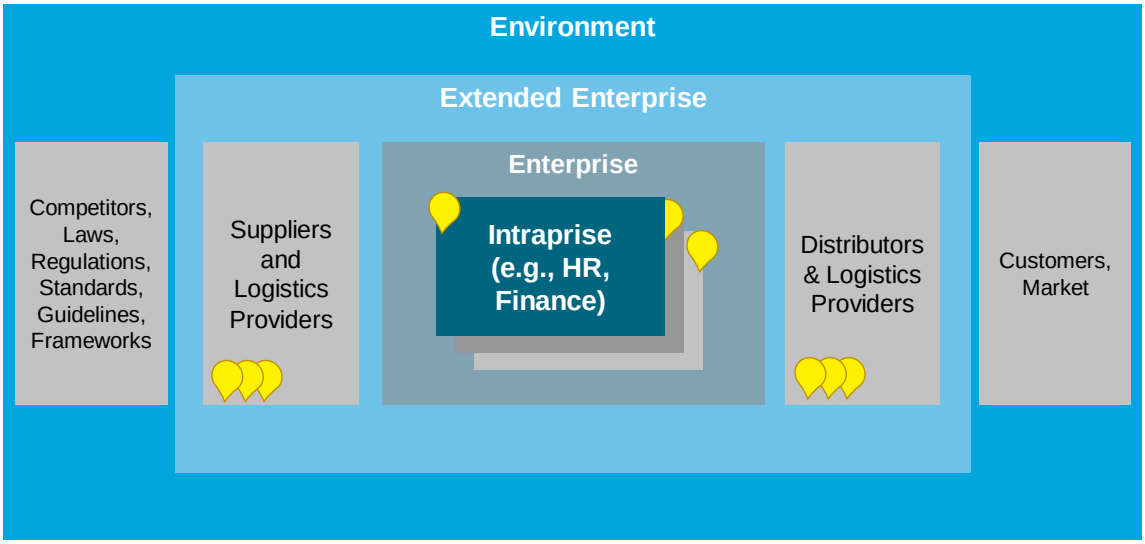


Figure 4: Extended Enterprise

Note: The yellow icons represent the geographical locations from where the teams could be operating.

Depending on the nature of business, the enterprise may be procuring raw materials or augmenting its work force via independent agents, partners, vendors, or all of the above. The Leader will have to create a catalog of key contacts and their locations for each type of "extension" to the enterprise. The version of organization model which needs to be documented may look like Figure 4, but this model is not an absolute reference.

The default organization model should reflect the lines of business or business units. Some of the other aspects to capture are locations, proximity to customer and interaction, value of innovation and data sovereignty (can employee, customer, partner, or revenue data be shared across geo-political boundaries), suppliers, and partners.

Performing an analysis of the current organization model informs how the enterprise prefers to employ human resources. Variants include grouping by skill set, by outcome, by line of business, or some by outsourcing non-essential functions. Understanding the mix of expertise and experience levels enables identification of intellectual property the enterprise wants to protect. Such analysis can be done in subsequent iterations of understanding the organization

model. Creating an extended view as shown in Figure 4 will enable development of alternate viable options for business architecture or cost structure management.

A *functional organization* essentially follows Porter's value chain model: marketing, sales, order management, product design, manufacturing, customer support, finance, HR, working as separate vertical units, brought together by business processes and interface procedures. Utility service providers are likely to have this model.

A *product-based organization* is pivoted by specific product lines, and products may not overlap with each other. Common functions like HR, finance, and marketing may either be duplicated by each product line or segregated as common or shared functions of the enterprise. Each product line is likely to have its organization head, sales, order management, product design, and manufacturing functions. Governmental organizations or organizations like General Electric with diverse products are likely to follow this model.

Organizations that are heavy on *project-based* execution are likely to have a *matrix* structure – where functional skill set specialization and maturity are managed by separate Leaders and product and operational needs are championed by different sets of personnel. Each execution effort will require functional and product leaders to agree upon team size and composition to complete the task at hand.

With each iteration, understanding the organizational model, clarity will emerge about the stakeholders, decision-makers, implementers, and functions of each organization. In the first pass through of this discovery, analysis, and documentation process, insights will be directional and indicative. As the depth of understanding of the organization model increases, quality and quantity of data for organization and functions will improve exponentially. This knowledge will enable development of appropriate models and views.

4.2.4 Scope the Impacted Teams

- Identify the core – those who are most affected and achieve most value from the work
- Identify the softly associated elements – those who will see change to their capability and work with core units but are otherwise not directly affected
- Identify the extended enterprise – those units outside the scoped enterprise who will be affected in their EA
- Identify communities involved – those stakeholders who are outside the scoped enterprise, and will be affected by the outcome delivered by the EA Capability – grouped by communities of interest
- Identify governance involved – including legal frameworks and geographies

Planning horizons are discussed later, at which point this Guide will go into the details of how time impacts the depth and breadth of detailing.

The level of detail regarding motivations, goals, success measures, and operational elements like toolset, inventory, data catalog, and solution provider should be scoped to meet the purpose of the EA Capability (Strategy, Portfolio, Projects, or Solution Delivery), and the planning horizon.

If it is decided to follow the Balanced Scorecard method, it is preferable to have the financial perspective defined for the whole enterprise, although a customer perspective may differ by

segment; i.e., it can carry some of the common goals for all segments. Process and learning/development perspectives should be specific to the departments or divisions with common objectives for people maturity.

As this Guide discusses the team delivering the EA Capability, it will deal with opportunities to pursue multiple capability architectures at the same time. As the transformation is executed via projects or programs, seams and glue within the enterprise will present themselves and parameters for trade-off decisions will be solidified. The process naturally becomes replicable and scalable.

4.2.5 Econometric Model

Econometrics provides empirical models to economic relations, applying observational and experimental methods. One of the areas of econometrics involves arriving at the right price for the products and services offered by the enterprise. For this Guide, discussions are limited to documenting how the enterprise defines economic value and cost of mitigating risks. Some of the sub-models that make up the econometric model include:

- **Accounting Model**: total cash accrued = sum of sources of income – sum of all expenses
- **Forecasting Model**: the estimation of future impact of current actions, with a given set of constrained variables or risks for income and expense

  Some of the risks the company would be handling are interest rate fluctuations, currency exchange rate fluctuations, inflation, and cost of raw materials. For example, a leading low-cost airline in the US managed its operational cost by placing appropriate investments in future fuel cost.

- **Planning and Allocation**: what are the trade-off criteria applied by the enterprise to distribute its investments across the enterprise?

  For example, an enterprise has identified that IT investments should not be more than 3.5% of the enterprise's total operating expense to maintain its overall operational efficiency. This constraint forces a trade-off between strategic and operational IT investments.

When it comes to operational expenses and building awareness around optimizations, models like chargeback and showback can be used as needed. For example, a leading IT service management vendor suggests using a showback system as a necessary step in the path to adopting cloud services.

Therefore, from an accounting perspective, the EA Capability team should be aware of:

- Ownership of the company – privately held *versus* publicly owned
- For-profit, not-for-profit, or governmental accounting principles
- Sources of funds for the enterprise or the team that the EA effort is impacting
- Controls for spending the funds – for the enterprise, the impacted team, and the EA Capability team
- How the spending on EA is accounted for in Operating Expenditure (OPEX), cost of product development, and the Cost of Goods Sold (COGS)

Some of the other dimensions to document are how the enterprise generates revenue and profit. A few generic models are:

- Creating products using intellectual property, including leveraging others' products and services

  For example, a paint manufacturer is creating a new product but uses machinery and products created by others. The formula for the paint is its intellectual property

- Buying, stocking, and reselling products made by other enterprises

  For example, a distributor sources paint and painting supplies in bulk and then distributes them to smaller businesses.

- Offering management, financial, legal, technical, or support services with thorough understanding of other organizations or industries

  For example, business services organization providing logistics consulting and implementation projects.

There are other ways to look at the revenue model based on how the enterprise views itself – like commerce and retail, subscriptions and usage fees, licensing, auctions and bids, advertising, data, transactions, intermediation, and freemium. These views are variations of the first three models.

It is possible that the enterprise may handle more than one such revenue generation model. Internally, any single division never has more than one revenue model. However, it is possible for one division to generate revenue from its intellectual property while other divisions may generate revenue by offering services in technology, general management, or project management domains. In such scenarios, understanding and separating by operating models will help define the right boundaries for the enterprise impacted by the EA Capability.

Investment priorities and spending patterns for the EA Capability will depend on the appropriate revenue and accounting model of the sponsoring unit of the enterprise. As the recommendations are turned into projects or operational efforts, the business and economic model of the enterprise will play a huge part in prioritization and rollout. This Guide provides detailed insights while discussing the governance model and process model for the EA Capability.

4.2.6 Accountability Model and Decision Model

An accountability model provides a balance between the sponsorship for the EA Capability and the expectations set for the EA Capability. This understanding is key to performing trade-off decisions across the stakeholder community. For example, when a change is made in the Generally Accepted Accounting Principles (GAAP), and an expected date for compliance is set, the decision to adopt the change either on the expected date or earlier is jointly decided by the Chief Financial Officer (CFO) and Legal Counsel for the enterprise. Likewise, the decision to upgrade recommended security software on a specific machine is best decided jointly by the data center administrator and personnel from the information security team. The EA Capability team normally operates in between the layers mentioned in these examples.

There is detailed management literature and research on this subject. Every enterprise has an accountability model and decision model, and a pattern to exercise this model.

The existence of these models is often not apparent to those who are not observant. The key focus is to understand the empowerment, freedom, political, and financial support provided to different stakeholders, the Leader, and the EA Capability to navigate competing priorities.

Depending upon the inclination of the enterprise, models like SCORE and RACI can be used to identify and document roles and accountability. The Project Management Institute (PMI) proposes a 2x2 matrix shown in Figure 5, which accounts for expectations, interests, the role in EA, and the role in the EA Capability for various members within the enterprise.

Documenting the accountability matrix reflects and informs key decision-makers on various business and architectural decisions. An effective approach is to ensure the role and accountability are identified to concerns, not the project. Different aspects of the project, or concerns, will have different accountability. It is important to define the organizational and decision-making boundaries, as the EA Capability will interact with various existing disciplines.

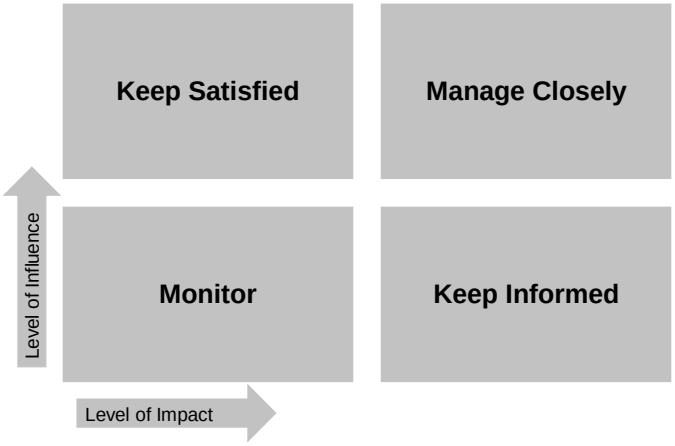


Figure 5: Project Management Institute Influence Matrix[13]

This may be the right time to consider who would be the right person to evaluate the effectiveness and impact provided by the EA Capability.

4.2.7 Risk Management Model

Central to best practice Enterprise Risk Management (ERM) is a very precise definition of the term *risk*. Within the risk management profession, risk is understood to be the: "effect that uncertainty has on the achievement of business objectives". EA is one of the key tools that can be employed to:

- Support best practice ERM
- Reduce organizational risk
- Improve sustainability and profitability

Enterprises typically employ a formal or informal ERM framework to assess and manage risk at the enterprise level, increasing the visibility and transparency of risks to allow an enterprise's management to make decisions on how to manage risk at an acceptable level for the enterprise. One of the essential steps to set up the EA Capability is to identify the risk management

[13] PMBOK® Guide, 5th Edition, Figure 13-4, p.397 (see Referenced Documents).

framework employed by the enterprise. The risk management model employed by the enterprise may not be apparent and might require some level of investigation.

From the EA point of view, there is a need to identify the risk appetite of the enterprise. Risk is a complex area, and central to an effective EA Capability. Consider an automobile insurance provider that is exposed to anti-theft technology introduced by auto manufacturers. While accepting this new technology, the enterprise may face a reduction in auto theft, hence lower cost of claims, or it may not work, leaving the current exposure level as-is. It may choose to perform additional anti-theft research, or employ data exchange with law enforcement and its competitors to validate and mitigate the unknown impacts. Find the pattern that is used.

For example, when the architecture roadmap includes adoption of a new technology or initiates a transformation effort is accepted for implementation, how does the enterprise approach and answer the following questions:

- Using the Innovation Adoption Model shown in Figure 6, where does the enterprise fall in the bell curve?

  It is possible that different parts of the enterprise may fall differently in this picture. It is essential to identify and catalog them.

- What is the deviation from projected costs that is considered acceptable?

  (For example, 10% for the first year plan, 25% for the second and third years.)

- Which kinds and sizes of projects should go through additional layers of governance?

- If a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis is performed by the enterprise, what are the threat mitigation strategies and how are the efforts being quantified?

- Does the enterprise accept single-point failures such as vendor lock-in and interest rate variations?

- How often does the enterprise review the risks and effectiveness of mitigation efforts, and where in the enterprise are these addressed?

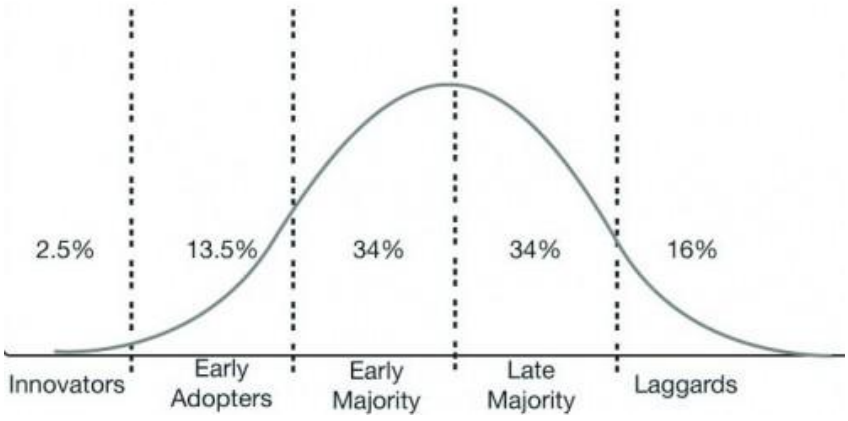


Figure 6: Everett Roger's Innovation Adoption Model (aka Technology Diffusion Model)[14]

[14] Diffusion of Innovations (1st Edition), E.M. Rogers (see Referenced Documents).

If the ERM approach at the enterprise is not clear, it is important to initiate an effort to define one. The ISO 31000 Risk Management standard and The Open Group Guide: Integrating Risk and Security within a TOGAF® Enterprise Architecture, a guide specifically developed by The Open Group Security Forum in collaboration with The SABSA Institute (see Referenced Documents), are starting points to do so. Through this chapter, the Leader has been advised to look at the broad enterprise context. Within the enterprise, the EA Capability will be heavily influenced by the context created by the financial accounting model, planning horizon, and EA principles.

Understanding the enterprise's purpose evokes key dimensions to consider. These agents specifically evoke the business rhythm and delivery schedule and value proposition guidelines for transformation efforts. They are critical agents to the design of the EA organization model and what kind of expectation the enterprise has for the EA Capability.

4.3 What is the Special Context for the EA Capability?

4.3.1 Financial Accounting Model

A Leader must identify and document the financial accounting model for the enterprise. The financial accounting model supports the business model and econometric model. There are two purposes to understanding the accounting model for the enterprise. The first is that it is the model that supports the economic purpose of the enterprise. Second, the accounting model helps to understand how the EA Capability is viewed – cost *versus* revenue function, Capital Expenditure (CAPEX) *versus* Cost of Goods Sold (COGS) *versus* Operating Expenditure (OPEX), or customer acquisition function *versus* operational efficiency (risk mitigation or capacity management) function.

Two major challenges for EA Leaders is to identify whether their work is considered as CAPEX and OPEX, and to find a way to balance the alignment of CAPEX and OPEX initiatives with the target architecture. The EA roadmap components will include both new building blocks as well as existing building blocks that have to be modified or decommissioned. The roadmap should include discrete steps to retrain, reallocate, or rehire resources for modification and decommissioning.

Some of the data points that can be derived from the accounting model are:

- An understanding of legal hierarchies – where credit-debit happens at the transactional level and where profits are accrued
- Silos and distribution of decision-makers and influencers
- Value measurement criteria for the EA Capability
- Investment amortization options while recommending projects
- Development of CAPEX versus OPEX, Return On Investment (ROI), Net Present Value (NPV), or Internal Rate of Return (IRR)-based trade-off guidelines

This list can keep growing depending on the enterprise's design, approach, and the depth of understanding of the team providing the EA Capability.

Any enterprise is likely to have more than one financial accounting model, to suit the geopolitical conditions of each of the locations. Identify the model, understand it, and leverage PMO and finance teams to formulate appropriate business case and ROI models.

4.3.2 Strategic Planning Horizon

The *planning horizon* is the number of years into the future the enterprise will project its business and investment strategies. Different enterprises will operate substantially different planning horizons for the same level of planning. Knowing that the enterprise will look one, three, five, or ten years into the future for change programs, improvement initiatives, or capital planning will directly inform the structure and process integration of the EA Capability. Aligned to purpose, the EA Capability will have to provide inputs to align with the horizon.

Each enterprise has a different appetite for its planning horizon. Keep in mind that if most of the time spent by the EA Capability is on improving the immediate future, this impairs the ability of the EA Capability to deliver value. Consider carefully the purpose and effectiveness of the EA Capability when establishing a planning horizon.

The planning horizon and refresh cycle need to meet multiple scenarios, and fidelity demands of content provides an indication of release cadence for EA work and the workload for the team providing the EA Capability. This Guide discusses some of the strategies for evolving the EA Capability to balance the effort on the planning horizon in a later chapter.

4.3.3 EA Principles

Often EA Capability is not a greenfield effort. Most enterprises have undertaken the initiative to establish an EA Capability more than once. In the event the enterprise has a greenfield EA Capability, the Leader should revisit this chapter after having read Chapter 5 (Business Objectives for the EA Capability). Whether EA Capability is being set up afresh or reinstated or evolved, one of the enduring guidelines is a set of EA principles.

Existing EA principles provide a special context for prior activity performed by an EA Capability. It is important to review the existing principles for two reasons. First, they provide a context of previous efforts to establish a successful EA Capability – they inform how the EA Capability was viewed, viewed itself, and what purpose it was explicitly, or implicitly, supporting. Second, to ensure that they align to the actual enterprise context for the current EA initiative. This review provides insights on how the EA Capability has been framed regarding purpose, role, and engagement.

Review questions to ask include:

- Do the existing architecture principles represent the enterprise context?
- Do they represent all organizational elements of the enterprise such as domestic and overseas, primary, and supporting activities?
- Do they represent the preferences of the organization to which the EA Capability team is, or was, aligned?

Principles will balance the enterprise context and purpose of the enterprise. Care must be taken to ensure that the principles used to inform the development of EA and change projects align to the organizational context. Care must be taken to ensure that the principles used to inform architecture development align to the organizational context.

Where the existing architecture principles do not reflect the current enterprise context nor any organizational elements of the enterprise, additional work will have to be performed in the roadmap to establish the EA Capability. At a minimum, a new set of architecture principles will have to be developed. Further, existing target architecture, compliance assessments, and roadmaps should be revisited and assessed against the new architecture principles.

A primary function of an EA Capability is to improve understanding, simplify complexity, and improve informed, consistent decision-making. By extension, architectural principles should be tied to the enterprise's values, goals, purpose, and strategies. These should inform, enable, and ground the enterprise on how to operate, transform, and grow. As a starting point, it is imperative that the team providing the EA Capability identifies and defines the situations when the consensus preference of the enterprise is to lean towards one trade-off. For example, the voice of the business outweighs the voice of the customer. Likewise, most decisions made in the context of EA are very difficult trade-off choices among two or more competing best, worst, or opposing options. A good set of architecture principles guides these choices and trade-offs.

EA principles should address the following purposes:

- **Enable decision-making** – it is important to set precedence during trade-off discussions and authority of tie-breaking if it must occur
- **Align the enterprise** – principles take subjectivity and bias out of the equation and drive critical conversations that are objective and aligned to the enterprise's values
- **Governance** – how will the enterprise ensure that the right decisions are surfaced at the right time and with the right decision-makers, and, moreover, how to monitor the decisions and approach taken to arrive at the decision?
- **Values and Culture** – provide a better understanding about the enterprise's culture and values; provide an approach and insight into how well the enterprise reacts to change

Keep in mind, anything the enterprise would perform during the normal course of business is not a principle. When the principle says "information is a valued asset", it is important to test the opposite statement "when information is not treated as a valued asset, informed decisions, and progress cannot be made", to validate whether the principle is valid.

5 Business Objectives for the EA Capability

In many regards, the two most important activities in establishing a successful EA Capability are understanding the enterprise context and the objective of the EA Capability. Too often, conversations about EA implicitly assume an enterprise context and a set of objectives. Participants in the conversation use the same words, with no common meaning, or shared expectations. Implicit assumptions invariably lead to failures. EA should endeavor to explicitly extract the enterprise context and set of objectives from the sponsor of the EA Capability, like the CEO or the CIO. Implicit deductions, though possible from certain documents, invariably misdirects the effort. Successful evolution of an EA Capability happens only when explicit alignment is continuously established and validated.

The purpose and objectives of the EA Capability will directly shape the EA organization model, the governance framework, the architecture contents, and the process model. Further, they will define whether the EA Capability is successful, or will follow the recurrent path of try, fail, and re-boot.

To have common understanding of the objectives and expectations, the following questions need to be answered:

- What is the EA Capability expected to achieve and why?
- What is the usage and application of the EA produced? For example, EA to support strategy, program, segment, capability, project, or third party.
- How is success going to be measured?
- Is the EA Capability doing the right thing for the enterprise context?
- What is the depth and breadth of the EA?
- What is the organization model of the EA Capability?

By approaching and answering questions, the purpose of the EA Capability and what it needs to be successful are framed. The Leader is in a position to separate wheat from chaff and focus on what is expected and what will be successful. Challenges regarding process integration and governance can be addressed. Challenges regarding organization model and existing resources are placed in stark relief.

Most sponsors for an EA Capability speak regarding financial goals or broad objectives (decrease cost of doing business, improve speed-to-market). Suyog Mahendra Shah[15] identifies that stakeholders may have different motivations and perspectives. The unaddressed gap between sponsors' objectives and stakeholder perspective results in failure. The thought process of stakeholders will have to be shifted from task-based or project-based to thinking regarding systems and enterprise level.

[15] The 2011 article Enterprise Architecture – Critical to Large Transformation Programs, by Suyog Mahendra Shah (see Referenced Documents).

A key first step for the EA Capability Leader is to play back the executive talk in explicit capabilities, go-to market approaches, or operational requirements. It is important to be specific to get alignment with the enterprise's values, goals, and strategies to have a common understanding of the objectives and expectations of the EA Capability.

5.1 What is Expected?

Where will the EA Capability team be engaged? How to validate that the EA Capability is doing the right thing?

A quick perusal of the literature on the role of an Enterprise Architect or EA Capability will leave no understanding of the role. At the extremes, the role is classified as an enabler of enterprise transformation or responsible for the selection of technical IT standards. This wide variance is responsible for most failures of an EA Capability. A mixed bag of expectations will result in improper scoping for work products and planning the evolution and development of the EA Capability.

In its simplest terms, EA is used to describe the future state of an enterprise to guide the change to reach the future state. The description of the future state enables key people to understand what must be in their enterprise to meet the enterprise's goals, objective, mission, and vision in the context within which the enterprise operates.

The gap between the enterprise's current state and future state highlights what must change within the enterprise. This gap is a function of the enterprise context and the scope of changes the enterprise sees.

5.2 What is the Depth and Breadth of EA?

Typically, there are four broad purposes[16] of an EA Capability:

- **EA to support Strategy**: deliver EA to provide a target architecture, and develop roadmaps of change over a three to ten-year period

  An architecture for this purpose will typically span many change programs or portfolios. In this context, architecture is used to identify change initiatives and supporting portfolio and programs. Set terms of reference, identify synergies, and govern execution of strategy via portfolio and programs.

- **EA to support Portfolio**: deliver EA to support cross-functional, multi-phase, and multi-project change initiatives

  An architecture for this purpose will typically span a single portfolio. In this context, architecture is used to identify projects, and set their terms of reference, align their approaches, identify synergies, and govern their execution of projects.

[16] Depth as used in this Guide relates to the level of detail each "purpose" architecture is scoped to explore based on its parent. Architecture for strategy scopes architecture for portfolio and cascades down. Architecture work for a particular purpose can be performed at any level of detail, although the extremes are rare. Always remember the distinction between scoping and outcome intent.

- **EA to support Project**: deliver EA to support the enterprise's project delivery method

  An architecture for this purpose will typically span a single project. In this context, the architecture is used to clarify the purpose and value of the project, identify requirements to address synergy and future dependency, assure compliance with architectural governance, and support integration and alignment between projects.

- **EA to support Solution Delivery**: deliver EA that is used to support the solution deployment

  An architecture for this purpose will typically be a single project or a significant part of it. In this context the architecture is used to define how the change will be designed and delivered, identify constraints, controls, and architecture requirements to the design, and finally act as a governance framework for change.

These four purposes frame the depth and breadth of an EA Capability's operations and need to sustain an EA repository. Within the scope of the purpose, the Leader must understand what is expected from an EA Capability. Questions to ask include:

- Where in this hierarchy is the EA Capability expected to support decision-making?
- Where in this hierarchy is the EA Capability expected to support governing change activity?
- Is there a priority of focus; for example, solution deployment over strategy?
- Is there a concern that current change initiatives are failing to deliver expected value?

Consider that one EA Capability may support a strategist or functional Leader defining where the enterprise is going. Another EA Capability may take the strategist's output and support governance activity to realize the changes specified by the strategist. Questions such as the above list help clarify the nuances of the purposes mentioned above. Given that different architecture projects may address different levels of detail, the way the EA Landscape is filled will vary. If plotted on a three-dimensional graph, at any given point of time, work being executed will look like a scatter diagram.

5.3 What is the Organization Model for EA Capability?

Most enterprises have some functioning EA Capability. The EA Capability is either being purposefully evolved or re-booted. In either case, the existing EA Capability needs to be assessed against expected purpose and objectives.

Questions to ask include:

- Does the existing EA Capability deliver recommendations before the required type of decision (budget, charter/business case)?
- Does the existing EA Capability provide support for governing follow-on activity against the decision?

- Does the existing EA Capability support all the desired decisions and governance support?

  When an EA Capability has previously been IT-centric, it is common to have its support for decision and governance constrained to the IT domain and its involvement in decision-making artificially elevated.

- The outputs of these questions will directly impact the process alignment, governance framework, and architecture contents – the gap between the existing EA Capability and the desired EA Capability will directly feed the roadmap to evolve the EA Capability into what the enterprise desires

The following tables, derived from the World-Class Enterprise Architecture White Paper, provide an indication of the engagement of different stakeholders with support for decision-making and governance.

Table 1 and Table 2 should be used diagnostically in conjunction with Section 10.1 (What are the Touch-Points with Existing Enterprise Processes?). The Leader will need to ensure that the EA Capability is properly aligned. The essential questions are:

- Does the EA Capability support the decision-making needs of key stakeholders?
- Does the EA Capability support the governance needs of key stakeholders?
- Does the EA Capability engage with the correct enterprise decision-maker and execution processes?

Table 1: EA Capability to Stakeholder Decision-Making Needs

Stakeholder Group	Relevance of EA Capability to the Stakeholder Group decision-making for the …			
	Strategy Purpose	**Portfolio Purpose**	**Project Purpose**	**Solution Delivery Purpose**
CEO	High	Low	Low	Low
Heads of Change	High	Medium	Low	Medium
Operational Executives	High	High	Low	Medium
CIO	High	High	Medium	High
Project Governance Bodies	Low	Medium	High	High
Program & Project Management	Low	Medium	High	High
Commercial & Financial Executives	Low	Medium	Low	High
Subject Matter Experts & Project Teams	Low	Low	Medium	Low
Chief Risk Officer	High	Medium	Medium	Low
Chief Compliance Officer	High	Medium	Medium	Low

Table 2: EA Capability to Stakeholder Governance Needs

Stakeholder Group	Relevance of EA Capability to the Governance activity for the …			
	Strategy Purpose	Portfolio Purpose	Project Purpose	Solution Delivery Purpose
CEO	High	Medium	Low	Medium
Heads of Change	High	Medium	Medium	Medium
Operational Executives	High	High	Medium	Medium
CIO	High	High	High	High
Project Governance Bodies	Low	Low	High	High
Program & Project Management	Low	High	High	High
Commercial & Financial Executives	Low	Low	High	High
Subject Matter Experts & Project Teams	Low	Low	Medium	Low
Chief Risk Officer	High	Medium	Medium	Medium
Chief Compliance Officer	High	Medium	Medium	Medium

As a rule, stakeholders will require different support for decision-making than for governance activity. An EA Capability that is not engaged in architecture to support strategy decision-making, but is engaged at the portfolio level, may provide support for governance activity against the strategy level. This Guide turns to the importance of alignment of the EA Capability team, given the expectations of outcomes at strategy, portfolio, project, or third-party engagement levels.

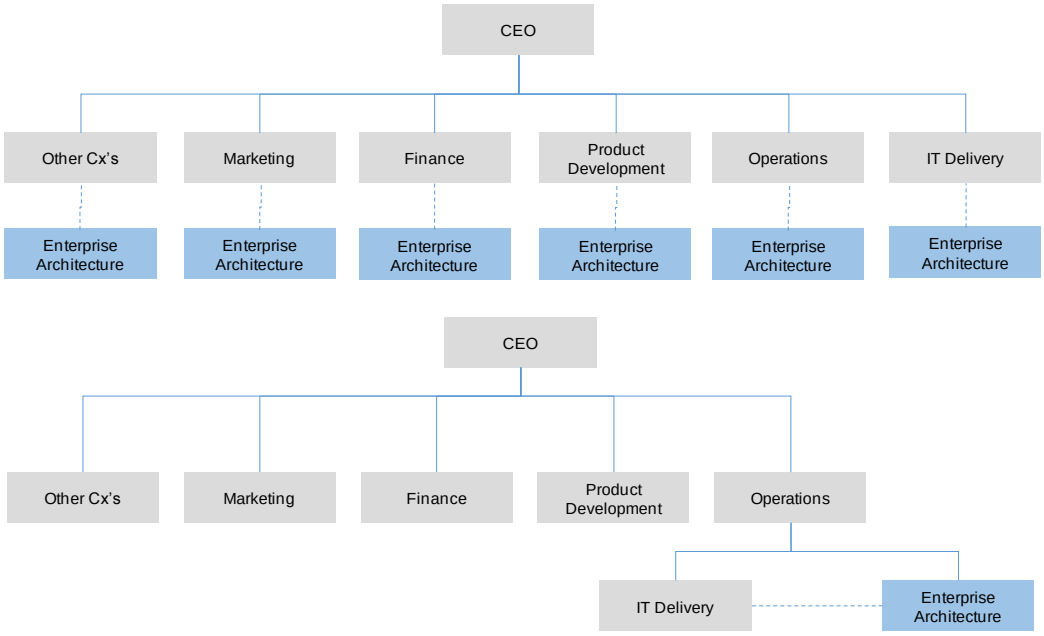
5.3.1 Alignment of EA Capability Team in the Organization Model

Most teams delivering an EA Capability today fall under one of the three variants – function-centric,[17] strategy-centric, or IT-centric, as shown in Figure 7. As with all conceptual models, there will be variations or hybrids specific to an enterprise. For example, participants in the team may be aligned to one team, and the contributing members may be aligned with line of business (function-centric) teams.

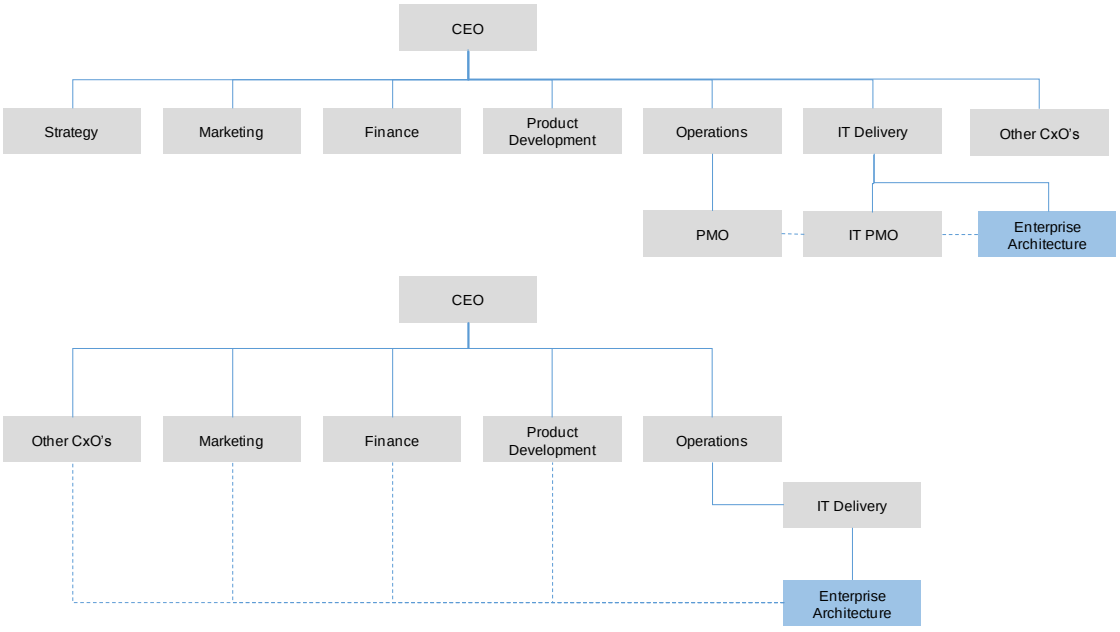
[17] Successful Leaders are linguistically nimble. Often particular techniques place extreme pressure on a word. Technique practitioners will instinctively defend the technique's value by defending the specialized use of key terminology. The term "function" is one such word.
This Guide distinguishes between words used in a general manner and when a specialized meaning is required. For "function", this Guide relies on a general meaning, referring to elements of an organization such as HR, Finance, Sales, Plant Management, and Operations as functions. See Section 4.2.3 on the function-based organization model or Merriam-Webster Dictionary's first meaning for function: "the special purpose or activity for which a thing exists or is used".
Successful Leaders need to be able to seamlessly switch back and forth between the specialized language of particular techniques and the generalized language of everyday communication.

The initial scope and impact of the EA Capability varies based on the model that is being followed in the enterprise. This alignment will impact the constitution of the architecture review board, governance model, and time to realize value.

Function-Centric EA



IT-Centric EA



Strategy-Centric EA

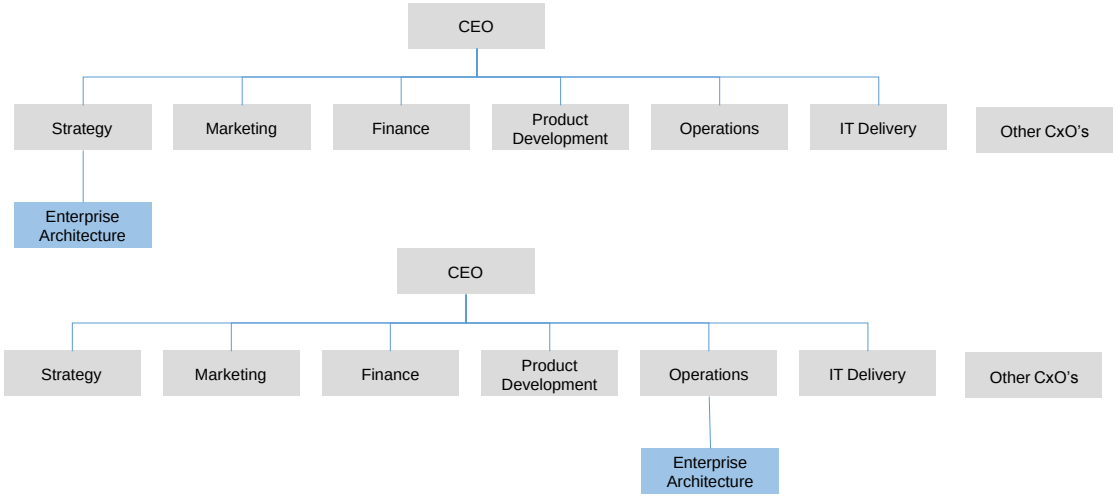


Figure 7: EA Team Common Organizational Placements

Each model supports a different set of objectives, empowerment, and constraints for the EA Capability team, as they are reflections of the outcome expectations from the EA. Having such a model does not preclude the charter for a team providing the EA Capability from addressing other aspects. When the expectation is such, there exists a possibility for alignment hierarchy for the EA Capability team to shift from one model to another as objectives and strategies change. The Leader must be cognizant of a coherent or mixed bag of expectations and charter to define appropriate execution methods.

A high-functioning EA Capability requires cross-discipline function behavior and engagement in other processes of the enterprise. These processes include corporate governance, fiscal control, customer and stakeholder engagement, and project management. Further, Martin van den Berg and Marlies van Steenbergen (2006)[18] highlight the need to cover individualistic architect functions like consulting, mentoring, commitment, motivation, and persistence. The EA Capability team must have sufficient capacity and diversity of domain knowledge, soft skills, and context to be successful.

5.4 How is Success Going to be Measured?

The enterprise's objectives directly translate into metrics for the EA Capability and are directly derived from the purpose of the EA Capability. Some metrics will be operational health while others will be derived from the enterprise's scorecard or strategy.

Recognize that not all EA Capability objectives are tangible and readily measurable. Consider an insurance company that says: "we need an architecture to make all of our customers be our promoters". This statement applies to the entire enterprise. Though it appears measurable, dimensions like type of customer (enterprise *versus* single human), neutrality, or cultural differences should be accounted for to arrive at specific measures. Likewise, it is possible that folks in the team providing the EA Capability, including the Leader, have some ideas that could

[18] Building an Enterprise Architecture Practice: Tools, Tips, Best Practices, Ready-to-Use Insights, by Martin van den Berg and Marlies van Steenbergen (see Referenced Documents).

appear relevant, immediately actionable, and to be common sense. Including such ideas in the list of objectives without validation is one of several death traps for EA Capability. Be prepared to embrace such objectives and classify them accordingly, before converting them into measures.

Some of the objectives may have to be met by other functions in the enterprise. Given the objectives and purpose, care must be taken to align processes, the organizational model, and governance. One of the many death traps for an EA Capability is confusing "supporting decision-making" with "decision-making". Consider an EA Capability that supports strategy: a team member lobbying to defund an effort considered risky has confused sound advice with ownership of the decision. This conflict is most common in IT-centric EA Capability and plays out in efforts to achieve elevated decision-making power without commensurate outcome responsibility. Confusing supporting a decision with empowerment and governance is simply wishful thinking.

Define success measures that reflect the level of empowerment, quality of outcome delivered, and impact expectations of the sponsor. For example, Gartner signals that EA Capability should present leadership with signature-ready recommendations. What kind of measure should a Leader attach to such an execution model?

Some questions that yield a wealth of insights to define the measures are:

- What would the enterprise do if the EA Capability did not exist?
- How will the enterprise track benefits realized at different levels of decision-making?
- Executive management is a directive function, and EA Capability is an advisory function. How do we measure the value of good advice?
- What would happen when EA Capabilities have a limited ability to deliver?

  In general, increased risk and lower levels of value created. Measures may be instability within the business, lower profits, poor investment success track record.
- How will benefits from mature EA Capabilities be realized at different levels of decision-making?

  How many recommendations have been accepted by decision authorities? What is the track record of risk identification and mitigation? Has the level of governance been commensurate with the business benefits to be realized?

Further, is the EA Capability being set up in response to a problem? The success measures will vary with the nature of the problem being solved. Common examples of problems to be solved include:

- Struggling expansion via Mergers and Acquisitions (M&A) and divestitures
- Stalled strategic growth in a specific market segment
- Impact of disruption
- Restructuring or retooling the enterprise
- Investor confidence problems from operational cost or unrealized R&D spend
- Inability to decide through information, communication, and technology complexity

- Inability to decide the balance of future gains against compromising business-as-usual
- Fear of recurrence of recent upheavals in supply chain, security, or IT project
- Perceived disruptive changes in operational practice (automation, cloud, outsourcing)

5.4.1 Revivalist and Bottom-Up EA Capability

It is easy to get caught in recurrent cycles of trial and error which ultimately repeat themselves when attempting to re-boot an EA Capability. In a re-boot or bottom-up scenario for EA Capability, it may often seem that the Leader is given the luxury to obtain answers to the questions the sponsors are identifying, albeit without budgetary support. Sometimes a change Leader gives the explicit sponsorship to make the enterprise a better place.

With bottom-up approaches, the challenge is to identify and deliver value to key decision-makers who have a passion to change the organization. If this is not accomplished from the outset, it is better to wait for decision-maker interest to align in the future. Attempting to deliver value before buy-in, in a bottom-up or self-initiation, though prevalent models, has wrought many challenges, as the Leader must act upon interpretation and assumption. When what is delivered is not valued by the potential sponsor, not only has the EA Capability team failed again, the team has wasted valuable resource. At a minimum, it is strongly recommended to understand the enterprise context and develop a value proposition to those in the enterprise who will sponsor a reviving EA Capability. It is strongly recommended to get proper buy-in, including financial allocation and resource commitments, before attempting to pursue a bottom-up approach to establish the EA practice. The Leader has to dig deeper for the reasons that prompted a need to re-initiate the effort. Consider the questions and answers about enterprise needs very carefully. Most of all, assume that the goal is to make the enterprise a better place.

The following are themes that can be used to deliver value and make the charter clear:

- Theme of "*foundations for future scale*": creating an implementable effort – like integrating disparate systems or enabling flexibility to update systems and applications independent of each other with a well-defined investment and timeline
- Theme of "*function clarity*": EA is about enablement and realization of alignment of business and technology functions; EA is not about monopolizing any one function – it is about collaborative success

  Create a charter and communicate terms of collaboration and collective success.
- Theme of "*risk reduction*": the very act of involvement in an economic activity is risky

  The probability of occurrence and impact is what constitutes outcome. Building a story from a recent "incident" that could have been avoided with the EA Capability, articulating a pattern providing cost avoidance, and minimizing impact on future occurrence.

It is imperative that the Leader validates the enterprise context and objectives of the EA Capability periodically. Every enterprise exists in a dynamic environment. It is important to check the purpose for each planning cycle that the EA Capability team supports. It is essential that the Leader checks the objectives and context once in the planning cycle and again in the middle of the cycle. Best practice EA is a continuous, adaptive, incremental, and iterative process.

Carve out an EA Capability that can succeed and thrive in the enterprise. Use the knowledge from understanding the context for the enterprise. If failure happens in the first attempt to make the business case, consider rebuilding the case after reading through Section 11.2 (Linking the EA Value Map to the Enterprise Value Map) and Chapter 12 (Establishing and Evolving the EA Capability).

Part 3: Guidance on Structure

6 Architecture Governance

The development and use of EA must be governed.

This Guide now turns to the enterprise's approach to decision-making, direction, and control. It discusses the process of governance, roles, and responsibilities as they pertain to the architecture process model in Chapter 10 (Process Model). Governance (decision-making, direction setting, and control) is addressed so early in this Guide to have clarity on the objectives. From this point onward, every action a Leader takes should be validated against this objective to stay relevant and focused on the outcome – not the ceremony of activities to be performed. A Leader should be very clear on what to report and to whom.

It is likely that the existing governance and support models of an enterprise will need to change to obtain the most value from the EA Capability. Understanding the enterprise's required architecture governance requires the following questions to be answered:

- What is the reporting framework?
- What is the decision-making approach?
- What is the risk management approach?
- What is the enterprise's approach to governance?

It is important to understand that governance applies to the development of a target architecture, how that target architecture governs change, and how the target architecture evolves.

6.1 Introduction to Governance

ISO/IEC 38500:2015[19] defines governance as: "a system that directs and controls the current and future state". The process by which direction and control is provided should take into account equality of concern and transparency, protecting the rights and interests of the business.

Governance is a decision-making process with a defined structure of relationships to direct and control the enterprise to achieve stated goals. The key difference between governance and management rests on the cornerstone of fiduciary and sustainable responsibility. To define a customized governance approach, let us start to define the following:

- What is to be governed?
- Why should something be governed?
- When and who should decide on the recommended alternatives?
- How does this link to the EA process discussed in Chapter 10 (Process Model)?

[19] ISO/IEC 38500:2015: Information Technology – Governance of IT for the Organization (see Referenced Documents).

Common mistakes to avoid are "fixing the blame" and "warned you before" processes and allowing weak policies that are focused on narrow-minded interests instead of securing the interests of the enterprise.

6.1.1 Key Characteristics

The following characteristics have been adapted from Corporate Governance by Ramani Naidoo[20] and are positioned here to highlight both the value and necessity for governance as an approach to be adopted within organizations and their dealings with all involved parties:

- **Discipline**: all involved parties will have a commitment to adhere to procedures, processes, and authority structures established by the enterprise
- **Transparency**: all actions implemented and their decision support will be available for inspection by authorized enterprise and provider parties
- **Independence**: all processes, decision-making, and mechanisms used will be established so as to minimize or avoid potential conflicts of interest
- **Accountability**: identifiable groups within the enterprise – e.g., governance boards who take actions or make decisions – are authorized and accountable for their actions
- **Responsibility**: each contracted party is required to act responsibly to the enterprise and its stakeholders
- **Fairness**: all decisions taken, processes used, and their implementation will not be allowed to create unfair advantages to any one particular party

Governance is about a hierarchy of decision-making that everyone commits to. Governance can be used to drive a set of behaviors. The act of observation by the governance team should not change the fact or how something is done. An observation results in some form of measurement. Define a set of measurements and metrics that can be used to achieve organizational objectives. Being transparent about why the measurement is being made and what mitigation options are available will drive positive behavior. Revisit the previous chapter to fine tune what to measure and why that measurement is needed.

Identify and define appropriate governance tiers to align what, how, when, and which tier gets escalated for relief. Absence of relief within each tier will result in loss of effective control and local autonomy. In general, lower tiers tend to be tactical in scope. Cross-cutting or higher tiers constrain lower tiers.

It is likely that the enterprise already has processes defined for some or all of the tiers shown in Figure 8.

[20] Corporate Governance: An Essential Guide for South African Companies, by Ramani Naidoo (see Referenced Documents).

Figure 8: Potential Governance Tiers

6.2 Essential Governance

A common failure pattern is to establish an EA governance board that believes it maintains decision rights about the target architecture, change to the architecture, relief, and enforcement. Decision rights about the target architecture, relief, and enforcement are always vested in the architecture's stakeholders. Successful teams providing the EA Capability make sure that even within the lowest tier (technology architecture governance), stakeholders own the decision rights. An EA governance board owns process, and a recommendation regarding completeness and confidence in the work that led to the target architecture.

The short decision-tree checklist for an EA board to require an architect to answer when assessing a target architecture is given below. Note that it may sound natural to start anywhere on this checklist or pursue answers to these questions simultaneously. Experience has shown this approach to create more work than making governance invisible; however, it has proved to be effective. Notice the choice of words at the beginning of the paragraph. This is a "decision-tree" presented in free flow text format for readability. All questions are mandatory. As in any decision-tree, a negative response may force you to re-enter the tree at a higher level.

1. Were the correct stakeholders identified? Y/N

   — If yes, proceed

   — If no, direct the architect to engage with the stakeholders appropriate to the scope of the architecture being developed

2. Were constraints and guidance from superior architecture taken into account? Y/N

   — If yes, proceed

   — If no, either exercise architecture governance to change superior architecture, obtain relief, or enforce the architecture by directing the architect to take into account guidance and constraints from superior architecture

3. Do appropriate subject matter experts agree with the facts and interpretation of the facts in the architecture? Y/N

   — If yes, proceed

   — If no, either direct the architect to engage with the subject matter experts or develop a recommendation for the stakeholders that they should have limitations in confidence

4. Do any constraints or guidance produced reflect the views produced for stakeholders and any underpinning architecture models and analysis? Y/N

   — If yes, proceed

   — If no, direct the architect to do their job

5. Do the views produced for the stakeholders reflect their concerns and reflect any underpinning architecture models and analysis? Y/N

   — If yes, proceed to the stakeholders for approval

   — If no, direct the architect to develop appropriate views

6. Do the stakeholders understand the value, and any uncertainty in achieving the value, provided by reaching the target state? Y/N

   — If yes, proceed

   — If no, direct the architect to develop appropriate views and return to the stakeholders

7. Do the stakeholders understand the work necessary to reach the target state and any uncertainty in successfully accomplishing the work? Y/N

   — If yes, proceed

   — If no, direct the architect to develop appropriate views and return to the stakeholders

8. Do the stakeholders understand any limitations in confidence they should have in the target architecture? Y/N

   — If yes, proceed

   — If no, direct the architect to develop appropriate views and return to the stakeholders

9. Have the stakeholders approved the views? Y/N

If the answer to the last question is yes, the EA board should approve the architecture for publication in the EA repository as the approved target architecture. Because the failure pattern is so embedded in practice we will re-iterate: there is no role for the EA governance board to debate, or approve, the contents of the target architecture and its constraints or guidance.

If the answer to the last question is no, the EA board should make a decision to either direct the architect to re-work the architecture usually through more advanced trade-off, or more often embracing the stakeholders' preferences, or cancel the architecture initiative.

When the architecture is being used, changes to the enterprise are being guided, or constrained. Two factors impact governance of change. First, organizations operate in a dynamic environment, and the analysis of the target architecture cannot have assessed every circumstance or change option possible. Second, the target was produced for a purpose and may not have been developed to the level of detail required for the current use. The governance process requires the ability to change the architecture, provide relief from constraint, and enforce the architecture.

The role of EA governance is to manage the process of assessing compliance. All change is subject to compliance reviews against the constraints and guidance in the target architecture. Typically, these assessments are performed on a periodic basis to assess the operationally changing current state, and associated with a project to assess project-driven change. Where there is non-compliance, the stakeholders have three choices: first, enforce compliance; second, provide relief; and third, change the target architecture.

The short checklist for an EA board to require an architect to answer when assessing a non-compliance report is:

1. Did the organization embarking on a change reasonably interpret the target architecture's guidance and constraints? Y/N

   — If yes, their interpretation should be accepted as compliance and any issues addressed through a change to the architecture

   — If no, proceed

2. Do appropriate subject matter experts agree with the facts and interpretation of the facts in the impact assessment? Y/N

   — If yes, proceed

   — If no, either direct the architect to engage with the subject matter experts or develop a recommendation for the stakeholders that they should have limitations in confidence

3. Do appropriate subject matter experts agree with the recommendation to enforce the target, grant time-bound relief, or change the architecture? Y/N

   — If yes, proceed

   — If no, either direct the architect to engage with the subject matter experts or develop a recommendation for the stakeholders that they should have limitations in confidence

4. Do the views produced for the stakeholders reflect the impact assessment and reflect any underpinning architecture models and analysis? Y/N

   — If yes, proceed to the stakeholders for approval

   — If no, direct the architect to develop appropriate views

5. Do the stakeholders understand any limitations in confidence they should have in the impact assessment? Y/N

   — If yes, proceed

— If no, direct the architect to develop appropriate views and return to the stakeholders

6. Do the stakeholders understand the impact on prior expected value, and any change in certainty in achieving the value, provided by reaching the target state? Y/N

   — If yes, proceed

   — If no, direct the architect to develop appropriate views and return to the stakeholders

7. Have the stakeholders approved the recommendation to enforce the target, grant relief, or change the architecture? Y/N

If the answer to the last questions is yes, the EA board should approve the non-compliance action recommendation for publication in the EA repository. Because the failure pattern is so embedded in practice, we will re-iterate: there is no role for the EA governance board to debate, or approve, the recommendation. Lastly, where relief is provided, the EA board should ensure that future compliance assessment and reporting take place to review time-bound relief. Without this step the enterprise has simply agreed to change the target architecture without the bother of an approval.

If the answer is no, the EA governance board has a difficult decision. In short, either the architect must be directed to expand the information provided to the stakeholders, or re-work the recommendation to embrace the stakeholders' preferences.

Design of the EA governance two essential practices must be done in the context of the enterprise's existing governance, reporting, and ERM practices.

6.3 What is the Current Reporting Framework?

Redrawing the existing processes to showcase various interactions happening in an enterprise will help identify what should be governed. Figure 9 shows possible governance boards that exist in an enterprise to manage internal and external interactions. These interactions impact the business and hence the EA. These interactions result in exchange of information within and outside the enterprise, brokered via different mediums. Each kind of information dissemination or consumption could enable value or pose risk. The governance framework defines who will direct and control what kind of information exchange and when.

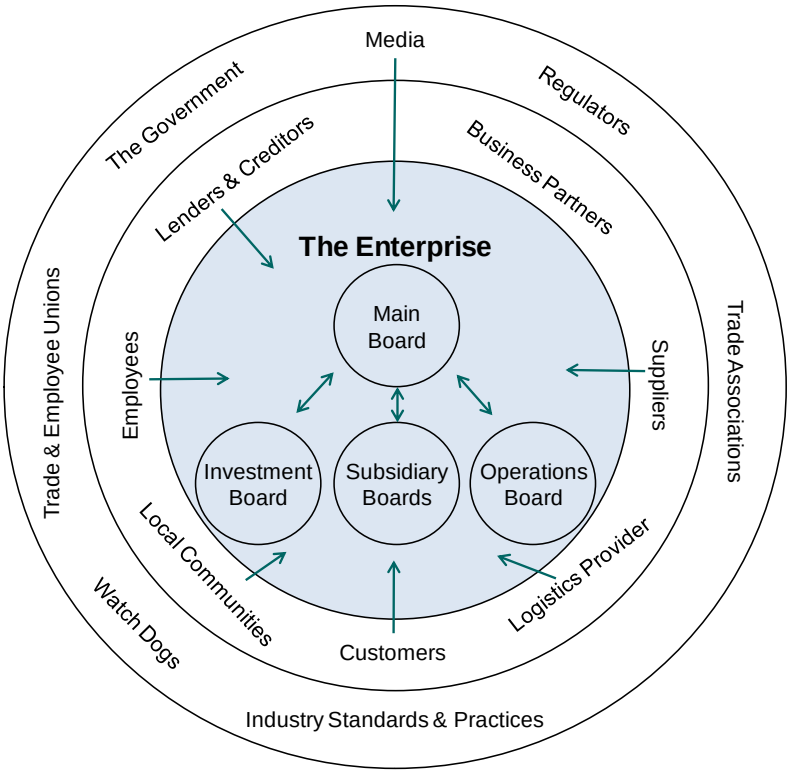


Figure 9: External and Internal Interactions Affecting Governance[21]

The governance framework should balance the needs of tactical and strategic operations of the enterprise. The enforcement responsibility and organizational level where enforcement happens will vary based on the charter for the EA Capability. The first step is to confirm the existence of existing governance mechanisms as shown in Figure 9, and determine which can be leveraged to include EA governance. At times, it may be possible to change the charter of an existing governance body to include architecture governance. In TOGAF terms, the architecture governance body is called the architecture board. The rest of the discussion in this chapter applies whether a Leader is creating a new or leveraging an existing body.

Governance is comprised of mechanisms, processes, and teams through which architects and stakeholders articulate their interests, exercise their legal rights, meet their obligations, and mediate their differences. The objective is to create a sustainable environment for inclusive and responsive processes to achieve the goals of the enterprise, mitigating all risks. To govern effectively and efficiently, basic policies, principles, and rules should be identified, created, and published. Having a set of architecture principles, standards, reference architectures, and best practice defined is useful. The principles defined should be commensurate with the size, complexity, structure, economic significance, and risk profile of the enterprise's operations.

6.4 What is the Current Risk Management Approach?

A central role of the EA Capability is to facilitate creation of an environment where operational risk can be optimized for maximum business benefit and minimum business loss. This requires

[21] The source for this material can be found at: www.applied-corporate-governance.com/best-corporate-governance-practice.html, adapted from Applied Corporate Governance (see Referenced Documents).

close integration with the enterprise's risk management approach and an understanding of the scope and interests of Enterprise Risk Management (ERM). Tight integration with ERM facilitates tilting the EA to improve realization of objectives, and the reduction of uncertainty.

Consideration of ERM in the context of governance is driven by the foundation that governance is a decision-making process, with a defined structure of relationships to direct and control the enterprise to achieve stated goals. The process by which direction and control is provided should imbibe equality of concern and transparency, protecting the rights and interests of the business.

The most common understanding of risk is derived from Information Security Management (ISM), which is largely focused on mitigating threat and vulnerability. While ISM is important, a broad understanding of ERM is required. Detailed understanding of risk and risk management can be gained from The Open Group White Paper: TOGAF® and SABSA® Integration.[22]

Central questions that need to be answered are:

- What is the enterprise's risk appetite?
- What is the enterprise's risk tolerance?

Associated governance questions include:

- Who agrees to a risk assessment?
- Who agrees to a risk treatment plan?

6.4.1 What is Risk?

The heart of effective risk management is managing to the expected objective. Every activity, operational activity, and change activity has an element of risk that needs to be managed, and every outcome is uncertain. Risk management is about reducing uncertainty. The ISO 31000 Risk Management standard definition of risk is the "effect of uncertainty on objectives". The effect of uncertainty is any deviation from what is expected.

Uncertainty typically involves a deficiency of information and leads to inadequate or incomplete knowledge or understanding. In the context of risk management, uncertainty exists whenever the knowledge or understanding of an event, consequence, or likelihood is inadequate or incomplete.

The EA Capability is focused on where the enterprise is going, and its path to change. A different future, and the changes required to realize such a future, are intertwined with the "effect of uncertainty on objectives". This requires close integration with the enterprise's ERM approach. Inherent in strong risk management is striking the balance between positive and negative outcomes resulting from the realization of either.

6.4.2 Core Concepts of Enterprise Risk Management (ERM)

The definitive standard for Enterprise Risk Management (ERM) – the ISO 31000 standard – outlines a risk management approach to aiding decision-making by taking account of uncertainty and the effect of this uncertainty reaching the enterprise's objectives. Following the ISO 31000 standard approach ensures that risk management is embedded deeply and firmly in all business activities. It also states that it is a continuous lifecycle rather than an isolated activity.

[22] TOGAF® and SABSA® Integration (see Referenced Documents).

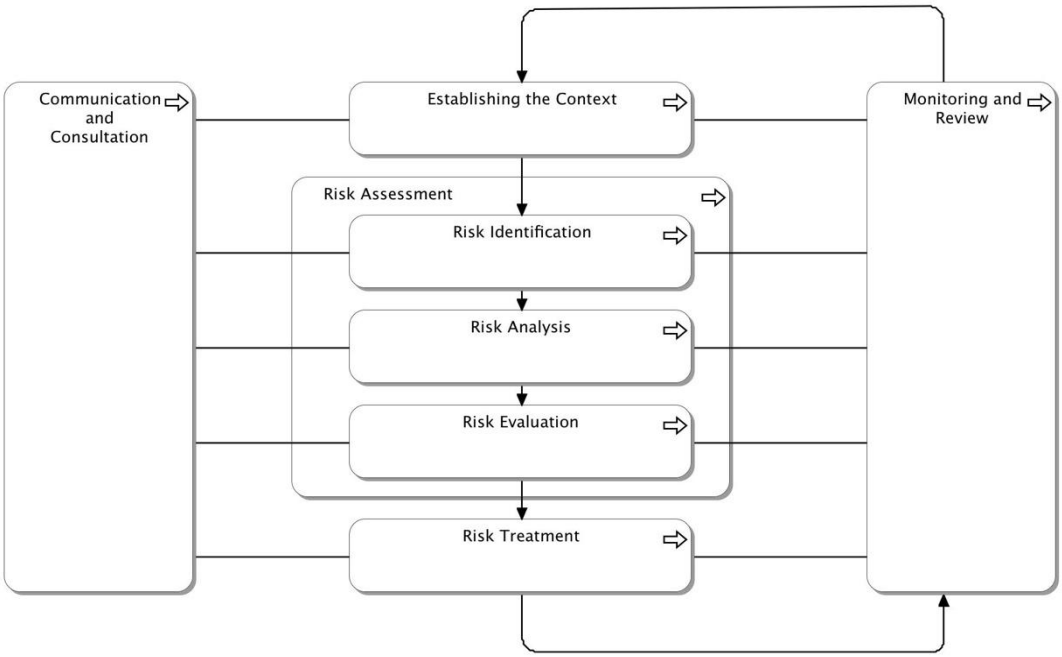


Figure 10: The ISO 31000 Standard Model for Risk Management[23]

6.5 Existing Governance Process

The process should be documented in such a way that information about when and which approval, enforcement, and relief mechanisms should be deployed should be as self-explanatory, transparent, and effective as needed. In selecting an existing governance body, consider the simplicity of process and its effectiveness.

At all levels of the governance process, it is essential that measurements, metrics, and rationale for relief be defined in business terms. Governing a portfolio by number of machines eliminated does not relate itself to a business outcome. Translate to something like cost optimization for the same operational capacity.

It is possible for a perception to exist in the enterprise that EA exists as an ivory tower or as an overhead organization, especially when EA is being re-booted after a failure. To not follow the rules in the first paragraph of this chapter would probably provide the reasons for such a perception. It is OK to go to market with full awareness and a plan for risk mitigation within the context of the enterprise's appetite and tolerance for risk instead of recommending "stoppage" of work against a theoretically risk-free approach. It is better to be ahead of the curve and influence the selection of better and viable alternatives during the feasibility study or initiation of an effort. Define the governance process so that it can achieve delivery proactively.

Governance often results in a change, either to current effort or future efforts. Organizational and architecture change management should account for triggers and provide a timeline to implement the change from governance decisions. Imagine opening a faucet for hot water in the morning. Other control mechanisms sense the opening of the faucet, and it takes a while for the

[23] Derived from the ISO 31000 Risk Management standard (see Referenced Documents).

hot water to start flowing out of the faucet – flushing out the cold water in the line. Governance operates in a similar way at times, and its process should also account for long lead times for corrective actions to take effect.

All governance decisions and scope are not the same – for example, business architecture decisions will impact operational processes and cost, or when the goal has to be restated, scope of impact and governance decisions are the same. Nor will the level of decision-making – operational to strategic – impact the scope of change.

6.5.1 Definition of Roles

Roles define those who get to participate and their span of control in which tier should be identified and defined. Just like the differences in skill set and approach to developing architecture and managing architecture, there are differences in execution style between architecture governance and management. Architecture management involves the development of policies and standards and the recommendation of scenarios under which they should be applied. This keeps the governance body informed of the context of the impact of architecture in a concise format.

There is an important distinction in practice. The governance body approves the policies, standards, and rules recommended by the architecture management team for the EA Capability, but does not approve the architecture. Only the set of stakeholders can approve an architecture and roadmap. An EA Capability governance body focuses on ensuring the process was followed; the appropriate stakeholders were engaged, and the materials produced are internally consistent. It is the responsibility of the EA Capability Leader to differentiate the role of these functions and identify qualified personnel. It is common that the functional head of an EA Capability is not the head of the architecture governance body.

7 Alignment with Other Frameworks

The TOGAF framework is one of several major frameworks used by most enterprises for architecture development. Alignment and interaction with other major enterprise frameworks is required for assurance of outcome and governance. These enterprise frameworks approach the enterprise with a different focus, purpose, and terminology.

This step requires the following questions to be answered:

- Is there a precedence of enterprise frameworks?
- What is the depth of commitment to different enterprise frameworks?
- How does the TOGAF framework fit in?

Getting stuck on semantics between definition of a framework, method, and technique at this point has stalled several EA Capability improvement initiatives. Avoid this pitfall and focus on creating a mapping to answer the questions above. The purpose of this activity is to identify how the enterprise approaches planning, execution, and governance functions and how committed the enterprise is to these approaches, how established the approaches are, and how it thinks about itself.

7.1 Create a Catalog of Frameworks

The first step is to create a catalog of such frameworks and their area of focus. This catalog should focus on planning and execution (Project Management Institute (PMI), PRINCE2, Six Sigma), information systems governance and operation (Lean, COBIT, ITIL), and management and measurement frameworks (Balanced Scorecard and SABSA Enterprise Risk). It is important to also include industry-specific frameworks (SCOR and eTOM) and industry-specific architecture content frameworks (BIAN, DoDAF, DNDAF) that provide a view of business process and capability and an architecture description.

Group the frameworks against the econometric, accountability, and execution models like risk, accounting, and planning. The grouping may create an overlap view similar to Figure 11. Rationalize what is needed from each framework, method, or technique for effective operationalization of recommendations from the EA Capability (attaining the target state).

All mapping exercises require understanding of an enterprise's depth of commitment to an approach. Many enterprises pay lip-service to a framework, adopting a few terminology elements and skipping substantive change. Focus all analysis and alignment on frameworks to which the enterprise is committed.

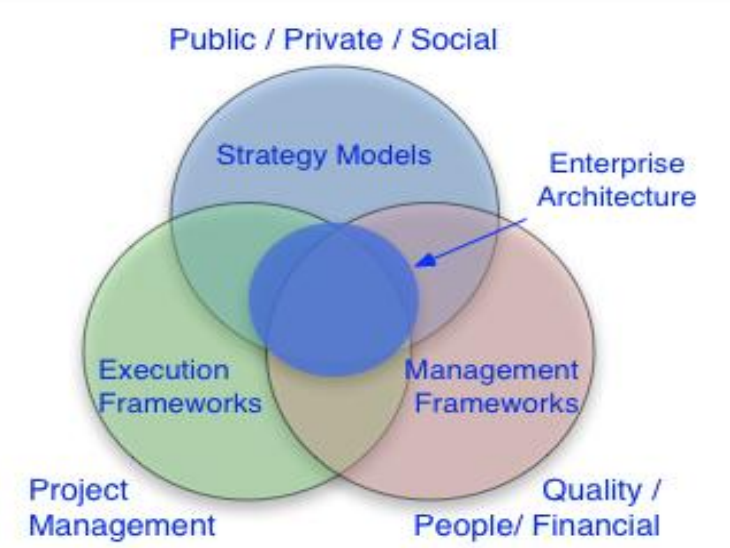


Figure 11: Relationships Across Framework Families[24]

7.2 Intersection with EA Capability

EA provides value in planning, change governance, and purposeful benefits realization. The depth of commitment to different frameworks will define how to adapt the EA Capability and the TOGAF framework.

This is an important concept. All of the outcomes that different frameworks provide regarding planning, change management, and benefits realization are required for a high-functioning EA Capability. Where they are provided, the EA Capability must fit in. Should there be a gap, the EA Capability must fill in. Adjust the roadmap to either fit the EA Capability into an existing capability or extend the EA Capability to fill a gap.

The next exercise is to understand the organizational dynamics to sequence the steps from one or more of these frameworks. As a starting point, The Open Group has published a set of mapping documents and White Papers to map the frameworks, methods, and techniques (see under "TOGAF" at www.opengroup.org/library/white-papers).

The scope of describing detailed fitting-in and filling-out options is beyond the scope of this Guide, as any reasonable exercise will vary dramatically across organizations. Further, the level of work explodes exponentially as differences in purpose and enterprise context are considered. This exercise provides an understanding of where the enterprise has gaps to effect best practice for change. The rest of the chapters in this Guide provide an insight into which touch-point from any of these frameworks should be considered for customizing the TOGAF ADM and aligning to an organization's culture.

[24] This figure is an abstracted view of the TOGAF Standard – ADM Techniques, Figure 3-1.

8 Customization of Architecture Contents and Metamodel

The TOGAF framework identifies two central concepts: a Content Framework and a Content Metamodel. The TOGAF Content Framework describes the types of work products that will be consumed and produced by an EA Capability. A subset of these will be a formal description or architecture description of a system including the components and their inter-relationships. This subset is the Content Metamodel. Both must be customized based upon the purpose of the EA Capability and the enterprise context.

An EA Capability focused on supporting decision-making for strategy will use a different set of work products than an EA Capability chartered to support governance of projects. This is a critical distinction. The Content Framework and Content Metamodel should be adjusted to align with the charter of the EA Capability. Further, the links between an EA Capability and other functions within an enterprise, such as finance, compliance, and operations aspects, require the EA Capability to fit-in and fill-out.

The TOGAF Content Framework identifies two sets of work products. First, work products that are used by others that impact planning, change governance, and purposeful benefits realization. Second, work products that are used within the EA Capability to produce the first set. An EA Capability produces value in direct relation to the consumed work products that improve planning, change governance, and purposeful benefits realization.

Understanding the EA Capability's information requirements requires the following questions to be answered:

- What is the EA Capability's purpose supporting decision-making and governance?
- What is the enterprise Content Metamodel?
- What is the structure of the architecture repository?
- Are there any other considerations pertinent to the enterprise?
- What are the authority, access, and planning divisions for the EA Capability?
- How formal should the documentation and work products of the EA Capability be?

For Leaders working for an enterprise that has a well-established Content Framework, such as defense with DoDAF, this chapter may not add value. Apart from the question of formality, all of the decisions regarding Content Metamodel and Content Framework have been made by DoDAF.

8.1 What is the EA Capability's Purpose Supporting Decision-Making and Governance?

With the understanding of the outcomes expected from the EA Capability, consider the information the EA Capability requires.

As a rule-of-thumb, the more high-level decision-making the EA Capability supports, the less detail and consistency are required in documentation and supporting information. The more it focuses on governance of change project and solution delivery activity, the more detail and consistency are required in supporting information and documentation.

The level of detail required will directly impact the choices on the structure of the architecture repository and how formal the team delivering the EA Capability needs to be. The need for detail and consistency drives formal architecture modeling techniques for traceability and consistent documentation stored in a well-structured repository.

Consider that detail and consistency come at a price regarding tooling, process integration, and skill within the team that delivers the EA Capability.

8.2 Are there Specific Questions to be Addressed?

EA Capability is established for a purpose. That purpose helps define the questions that the EA Capability is expected to answer.

Keep in mind that this Guide deliberately does not refer to an EA team or organization. It is very common that organizationally associated resources answer many of the questions asked of an EA Capability.

Some of the typical questions asked of the team delivering the EA Capability to support decision-making at a portfolio level include:

1. To execute on strategy "A", what are the the size and scope of impact on organizational changes, process, procedures, and technologies?
2. What if the enterprise switched the service provider from "A" to "B"? How soon can change be initiated and completed? Who should be involved? And so on.
3. What should be done in response to one of the technology suppliers changing its product?
4. A vulnerability has been identified in the product sourced from a key supplier. The supplier has provided a mitigation option. What is the exposure from the vulnerability? How soon should the fix be applied? What would be the potential impact during and after the mitigation process has been operationalized?
5. What are the possible root causes of complaints from the customers regarding product "A"?
6. How should the delivery against the portfolio be aligned to optimize operational cost?
7. How can the enterprise maximize differentiation by aligning delivery of the portfolio?
8. How can the enterprise minimize time-to-market by modifying delivery options on the portfolio?
9. How can the efforts on innovation be maximized by adjusting delivery against the portfolio?
10. What is the optimal level and ease of communication amongst technology and material suppliers to maintain the operational stability of the enterprise?

11. Is there any wasteful work done or latency introduced with any process flow related to delivery of products and services to customers?

Each of these questions requires the EA Capability to have different information. The different expectations from the team providing the EA Capability will shape the information that is required and the different work products to be produced. In short, these questions will identify the concerns that the EA Capability must address.

Successful, high-functioning EA Capability teams maintain a viewpoint library that identifies such questions, and the information the team providing the EA Capability must have to answer. The information to which the EA Capability team must have ready access will define the Content Metamodel and repository approach.

One of the steps in establishing a high-functioning EA Capability is defining the viewpoint library. Consider the purpose the EA Capability is being established to serve. This purpose will likely highlight classes of stakeholders and their consistent concerns. This set of consistent stakeholders and concerns will identify the information the EA Capability must have to answer stakeholder concerns. This will drive the design of the Content Framework, Content Metamodel, and the formality of the EA repository.

8.3 What Constitutes the Content Metamodel?

Regarding information management, the purpose defines what information the EA Capability must have at hand. In practical terms, information needs are derived from the viewpoint library and the information that supports the viewpoints. Consider what information is required to answer these two questions:

- How can the enterprise maximize the differentiation by aligning delivery of the portfolio?
- What should be done in response to one of the technology suppliers changing its product?

The Content Metamodel is used to structure architectural information in an orderly way so that it can be processed to meet stakeholder needs. The majority of architecture stakeholders do not actually need to know what the architecture Content Metamodel is and are only concerned with specific issues, such as: "How can the enterprise maximize differentiation by aligning delivery of the portfolio?".

The difficulty comes when, to answer this question, the EA Capability may need to answer:

- Which processes are orchestrated by the differentiating capability?
- Which processes require an application change?
- What functionality does an application support?
- What is the impact of using cloud infrastructure for the application on information security?

There are two approaches to defining the Content Metamodel. The most successful practice ensures that the central questions the EA Capability is established to address concern the focus. In this case, look at the questions the EA Capability is established to answer, and identify the concerns and the viewpoints that address these concerns. *The resulting viewpoint library defines the Content Metamodel.* Anything more is noise and results in unnecessary work in future.

Following this approach leads to smaller information demands and crisply focuses the EA Capability on expected value. Any expansion in the range of critical questions the EA Capability is expected to answer will expand the information requirements. The majority of Enterprise Architects and analysts who have gone ahead to capture more information than what is required have consistently failed.

An alternative practice is to use an established Content Metamodel. This approach enables the EA Capability to address a broader set of questions. However, this approach typically leads to a great deal of superfluous model development and information management. One of the key pitfalls to avoid is assuming that an existing Content Framework is complete and will answer the questions the enterprise is asking of the EA Capability. If you undertake to use an established Content Metamodel, in order to minimize information management, identify the minimum information the EA Capability requires.

In either case, it is important to keep in mind that the information needed is infinite, and resources are finite. Minimize the information the EA Capability must maintain and focus on the purpose for which the EA Capability was formed. Address just those key questions. Take comfort in the fact that development of the Content Metamodel and viewpoint library will feed the evolution of each other.

Every component that is added to the enterprise's Content Metamodel comes with relationships that must be maintained and comes with attributes that must be tracked. The number of interim architecture states and options multiplies the amount of information that must be maintained. To succeed, the Leader should identify and define the absolute minimum information the EA Capability must maintain to deliver the stated purpose.

Recommendation from collective experience of The Open Group is that the Leader should start with the most likely set of questions from sponsors and stakeholders based upon the enterprise context and the purpose of the EA Capability to build the viewpoint library.

Explore the minimum information needed to answer the most pressing and recurrent questions. When the questions appear to be hard to answer, refer to other models used in the enterprise like strategy development, operating model, business capability, process model, project management model, and systems development lifecycle model to validate whether they would provide the answers. Add only those additional reference models that are required to answer the new set of questions. As stated before, keep the scope limited to what is necessary and nothing more.

Consider what minimum information the EA Capability must have at hand, and what information it will need to gather upon demand. The information required at hand is the mandatory minimum. For the other information, ensure that there is a consistent way to gather and relate them to the mandatory minimum. This allows for traceability across more aspects of the enterprise.

The exercise is not to fill out all the information that might be needed in the future, but rather to identify the information that must be available to describe an EA to address the stakeholders' questions. Test the kind of catalogs, matrices, and diagrams required to capture, analyze, and answer the questions asked of the EA Capability.

The TOGAF Content Metamodel provides a good starting point for examining the information the EA Capability requires. It provides a list of common components and common possible relationships the EA Capability may want to keep track of (motivation, role, event, activity, location, resource, platform services) and a set of relationships. Explore the alternative Content

Frameworks listed in Appendix A (Partial List of EA Content Frameworks). They are designed to address different purposes that may better align with the EA Capability's purpose.

To answer these stakeholder questions, the EA Capability will have to employ more than one technique and approach, to collate, classify, and represent back visually, verbally, and with appropriate context. To answer these questions requires an understanding and maintenance of capability, process, and application functionality models and a roadmap with appropriate intersections.

It is rare, but possible, to have a narrow scope for the EA Capability that leads to deployment of a narrow-domain approach like UML and BPMN or a pre-packaged Content Metamodel. Keep in mind that value questions supporting decision-making for strategy and portfolio require understanding cross-domain and multiple dimensions. They preclude use of narrow domain and pre-packaged metamodels.

8.4 Information Managed by the EA Capability

Managing an EA repository is often performed with EA modeling tools. Each item that is being produced should have a lineage to the question that demands a response. The need for a formal modeling technique is directly related to the level of detail required.

The needs of the data collated and the decisions to be taken dictate the needs and approach of the repository and analytic tools. To manage and analyze large volumes of complex sets of data requires automation. It is prudent to have the Content Framework and Content Metamodel suitable for the enterprise and then look for formal tools that support the EA Capability. A high-functioning EA Capability will be asked questions that demand use of automation tools. Use the tools to provide defendable analytics to support decision-making and traceability to support governance.

It is normal that the EA Capability will not manage all of the information required to support the purpose for the EA Capability. Interlinking all the necessary information via information governance channels will reduce the effort required to collect and manage the information. The EA Capability team needs to maintain the catalog and taxonomy only. Using a taxonomy and catalog of items, analysis about the landscape of processes and technology can be performed consistently, providing consistent and rich insights.

Respective disciplines manage detailed data like project financials and technical specification of a robotic arm. To operationalize the ability to mine such varied, in-depth data, it may be necessary to automate the capturing, management, and visualization of insights.

In most cases, assumptions and constraints are time-bound. Depending on the organizational structure, EA may hold the entire repository of data required for analysis or it may just link the structures that enable business operations effectiveness analysis.

The EA Capability should ensure that the notations, vocabulary, and concepts reflected in the work products can be employed to communicate within and outside the enterprise. The demand for alignment to a common vocabulary and framework arises from a need to promptly answer decision-making questions and support governance decision-making.

See Chapter 13 (Mapping the EA Leader's Guide to the TOGAF Framework) to understand how answering questions raised in this Guide results in the population of the TOGAF Content

Metamodel and broader Content Framework. This mapping is provided as an example of how the types of information required, and the iteration of the TOGAF ADM, can be structured.

8.5 Managing the Enterprise Repository

Information management is a critical task for an EA Capability. It is all too easy for an EA Capability to drown in a flood of unintegrated information, usually separated into divergent documents. Effectively managing the EA repository is dependent on effectively limiting the information needed to manage, automate, and apply appropriate standardization.

The priority is to minimize the information collected and maintained. See Section 8.2 (Are there Specific Questions to be Addressed?), and Section 8.3 (What Constitutes the Content Metamodel?). Including nice-to-have information will pose a substantive sustainability burden on the EA Capability team. This burden is particularly troublesome for an EA Capability that is IT-oriented and structured for the purpose of supporting projects. For these, a common pitfall is attempting to include design and operational information as part of the EA repository. If the information is not required to support the purpose, the essential questions, or any mandatory viewpoints, what is the value in collecting it? Design and operational information does not help to answer architecture or governance decision-making questions.

The second priority is determining the level of standardization and automation. Standardization is distinct from automation. Standardization can be performed with appropriate templates and a document repository. Automation requires implementation of an EA modeling tool.

Before any effort is made to capture information, define acceptance criteria for the content regarding completeness, integrity, flexibility, understandability, and ease of sustainment.

Key factors to consider are the purpose, size, and geographic and organizational distribution of the EA Capability team and its stakeholders. The purpose of the EA Capability will drive the required level of repeatability of process, analysis, and representation, which in turn drives the level of standardization of the Content Framework. The geographic and organizational distribution of the EA Capability has the largest impact on the need for automation. A co-located organizationally unified EA Capability can rely far more upon informal collaboration than those who are organizationally and geographically dispersed. The need for automation drives deployment of multi-user model management and analytic tools.

Table 3: EA Repository Standardization Factors (Process *versus* Presentation)

How Repeatability Influences Standardization of the EA Content Framework			
EA to Support …	**Process**	**Analysis**	**Presentation**
Strategy	Low	Low	Low
Portfolio	Medium	Medium	Medium
Project	High	High	Very High
Solution Delivery	Very High	High	Very High

It is common to assume a high-functioning EA Capability requires a high level of repeatability. Purpose heavily impacts repeatability. Architecture to support strategy and portfolio has a strong tendency to be addressing unique questions, using divergent information, and not be tightly tied to predictable execution patterns. This is especially true for EA supporting portfolio. Where there is a low need for repeatability, high levels of standardization are a barrier to value creation.

Conversely, an EA Capability supporting solution delivery engagement requires an extremely high level of standardization. Effective engagement with a solution provider must be predictable to the enterprise and the solution provider. Repeatability will not be possible without a consistently used viewpoint library, information gathering and analysis, and mandated use of reference models and reference architecture.

Table 4: EA Repository Standardization Factors (Team Model *versus* Analysis Needs)

How the EA Team Organization Model and Analysis Needs Influence EA Repository Standardization			
EA to Support …	**Impact of Geographic Distribution**	**Impact of Federated Organization Model**	**Impact of Level of Complex Analysis**
Strategy	Limited Impact	Very Limited Impact	Very High
Portfolio	Some Impact	Significant Impact	Very High
Project	Significant Impact	Significant Impact	Low
Solution Delivery	Significant Impact	Massive Impact	Limited

There are EA Capability teams serving the entire spectrum – from supporting strategy to engaging with a solution provider (internal and external to the enterprise). Mostly, such teams are federated. These teams may be responding to financial planning questions, alignment with organizational goals, lifecycle tracking (project and operational management), and asset inventory tracking. Two kinds of EA team (Federated EA and Dedicated EA) have a significant need to standardize on taxonomy and data flow and be integrated across all toolsets (financial planning, contract management, project management, and asset tracking).

IT delivery is only part of the solution for the enterprise challenges. IT solutions alter enterprise processes and impact other organizations. Hence, an IT-focused team may require some level of continuity between portfolio planning and solution architecture development. Why an IT solution is being developed or modified and how the change is going to be absorbed by the enterprise are foundations the EA team must know.

In a well-run, creative organization many good ideas are not derived from gaps identified in architecture. In these organizations, a Request for Architecture Work comes from someone with a good idea for improving the organization. We call this the "Request from the Wild". Normally such a request will be proxied by a champion for the stakeholder. The champion may not have visibility into all aspects of the request. Such requests demand a great deal of critical thinking to identify the appropriate spot within the EA Landscape. The EA repository is the most important tool to accelerate the analysis and subsequent conversation with the stakeholder regarding the impact of this request on the EA Landscape and the portfolio.

Evaluate the charter and EA team model before embarking on automation of the EA repository. Consider the tax on team capacity due to lack of automation or limited automation, but do not overemphasize ease of governance. Automation should focus on productivity and collaboration, not control or decision-making.

It is good practice to focus formal modeling to supporting analysis. This drives the use of catalogs and matrices, with a very strong use of component attributes. Normally a graphical model is a barrier to strong analytics and the development of a strong architecture specification. In fact, the current and target states often have the same graphical objects and connections, while the attributes that define the characteristics of the components and relationships are different. Useful visualization routinely requires far more involved techniques than diagrams showing boxes and connections. Evolving the EA Capability and identifying transition states are highly dependent on data analytics work.

Utilizing budding architects and analysts to maintain and manage the EA repository is recommended both from a development standpoint and capacity management standpoint. It is beneficial to employ specialized graphic design resources to support the creation of effective diagram viewpoints in comparison to using out-of-the-box visualizations from EA tools.

9 Organization Model for the EA Team

Keep in mind that this Guide discusses establishing and evolving an EA Capability. This Guide does not suggest that creation of such a team would guarantee a successful outcome from the EA Capability. This Guide does not explicitly discuss an organizational element that could be designated as an EA department.

The required EA Capability must be supported by the correct organization, roles, and responsibilities. Of particular importance is the definition of boundaries between different EA practitioners and creating the organizational model that realizes the governance framework.

Creating an EA Capability team requires the following questions to be answered:

- How will the EA Capability be organized?
- What is the existing enterprise capability and EA Capability, on change planning and execution?
- What are the organizational gaps?
- What are the budget requirements?
- What are the key roles and responsibilities?

This chapter is about considerations to create the team structure for the EA Capability. This should not be confused with Organization Model of the Enterprise (Section 4.2.3), which is all about capturing the existing structure of the enterprise as a whole. At this point, if an EA Capability organization does not exist at the enterprise, reset this thinking – it is now an organization of one – composed of the Leader. When initiated by an executive sponsor, it is a team of two. How to go about building the rest of the team? The rest of this chapter is about factors to consider while creating a new team:

- What skill set should the team providing the EA Capability possess?
- What skill sets can be shared?
- How to approach roles and responsibilities?
- Should sub-teams be created? If yes, how to align all teams?
- What should be the team size and which factors influence alignment?
- How do we measure success and promote the team?
- What is needed to build the team or the value delivered?

9.1 Shared Roles and Alignment

Developing, implementing, and managing an EA practice requires multi-discipline engagement. To define the structure and capacity for the EA Capability, involvement of personnel executing business strategy development, project, program and portfolio management (both operations and IT), quality management (process and product), governance (financial, legal, others), and IT delivery functions should be defined. Rationale and engagement levels with other disciplines are discussed in Chapter 6 (Architecture Governance) and Chapter 10 (Process Model). It is more than likely that the enterprise already has individual people or teams that perform these functions embedded in other broader functions. To build cross-team alignment, it is necessary to identify the teams or individuals who perform strategy development and program management.

9.2 Alignment

Most likely, the sponsor of the EA Capability has already defined how the team interfaces with the rest of the enterprise. Figure 12 through Figure 14 below show some of the variants of organizational alignment of a team providing the EA Capability in the industry. They are used to convey an idea and do not account for preferences like customer segment, product lines, or country and geography an enterprise may have. It is likely that the enterprise is experimenting with EA and has chartered the Leader to work with external consultants and service providers. This Guide does not take into account where the professionals come from.

Table 5: Examples of Management Systems Integrating/Interoperating with the EA Capability

Examples of Management Systems with which the EA Capability must Integrate and Interoperate	
Business Strategy and Planning	Application Portfolio Management
Solutions Delivery	Finance
Business Intelligence	Technology Planning and Management
Security	Systems Planning, Management, Operations
Business Process Management	…

Its context provides an important part of the requirements and constraints on an EA Capability. In the case of the EA Capability, its interactions will be with the other management systems that support or govern the work of enterprise transformation.

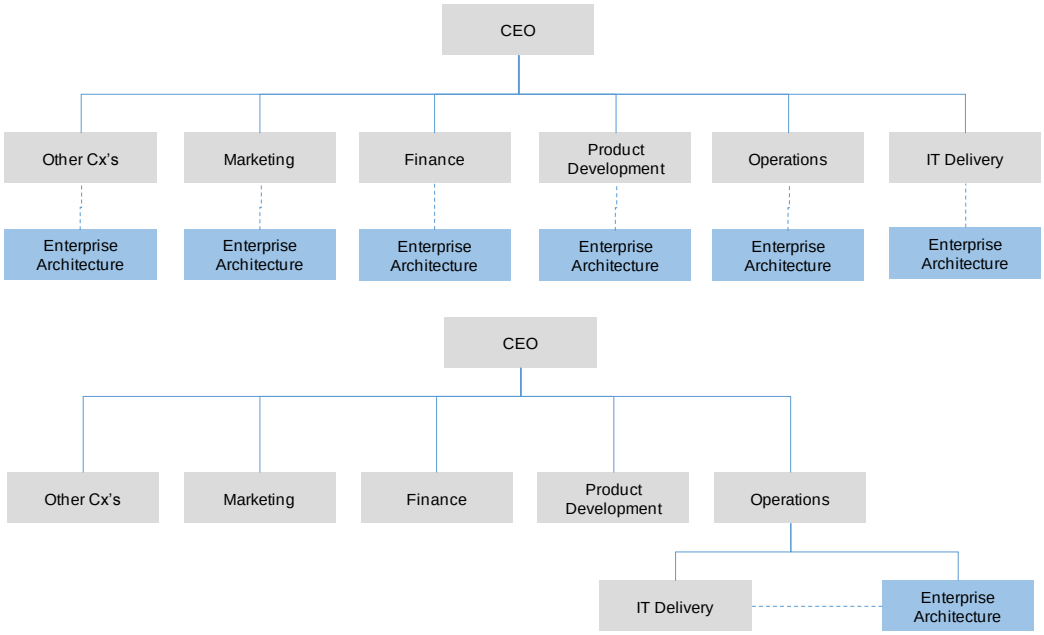
To keep the visualizations simple, teams like project management and quality are not called out explicitly. As they are also shared functions like EA, it is fair to assume they will also follow a model very similar to EA.

In a strategy-centric model, EA can be aligned with corporate strategy, overall operations, or finance. The team providing the EA Capability extends its services to the rest of the enterprise based on the charter (sustained growth, operational efficiency, cost and risk reduction).

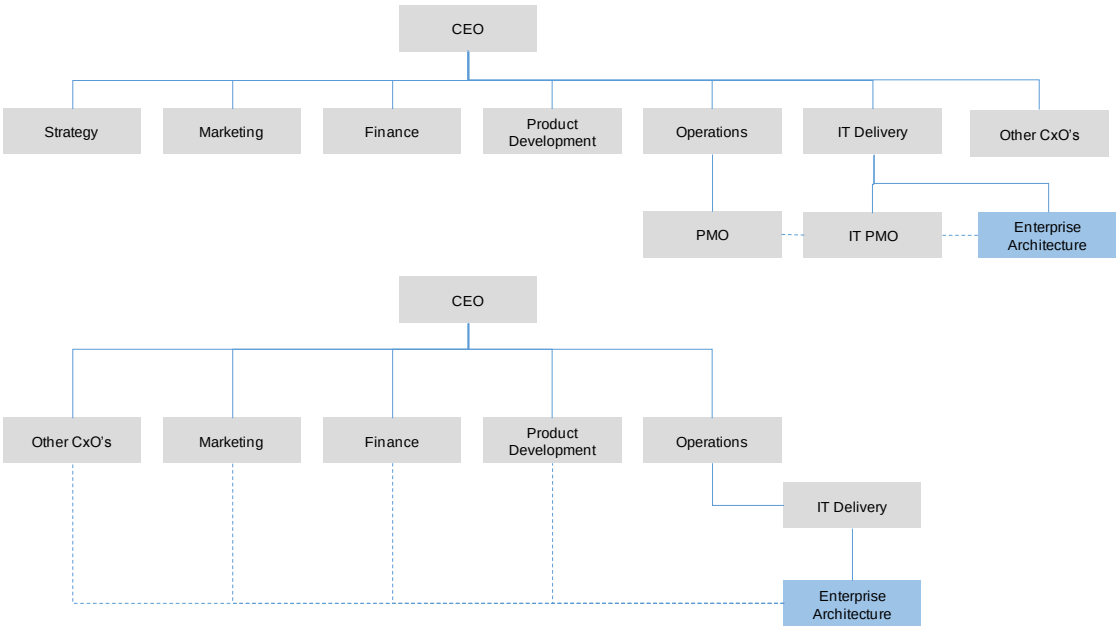
The charter of the EA Capability will determine the coordination and reporting structure the shared teams will have. Business objectives and empowerment provided by the sponsor are sources that will help to identify the alignment model. Variants of the alignment model shown below are not intended to suggest that all activities within an EA Capability should exist within one functional unit.

In a function-centric model, it is possible that EA is part of each of the functional verticals and one of the teams consolidates all EA activities. Another variant is EA could be part of the dominant or key function of the enterprise. In this variant, it may be prudent to draw members of the team providing the EA Capability from each of the functional units having extended responsibility for a common goal, from an HR management perspective, and report to respective functional or regional business leaders.

Function-Centric EA



IT-Centric EA



Strategy-Centric EA

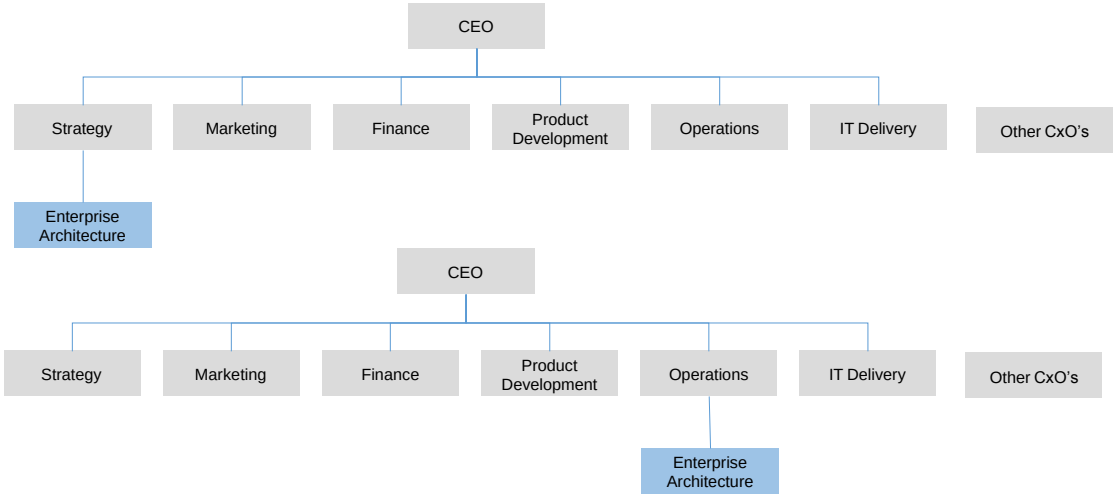


Figure 12: Possibilities for EA Team Alignment

In an IT-centric model, EA is normally aligned to the IT organization, irrespective of how it is named. The charter for the team may vary depending upon how IT is structured within the organization. When IT is aligned to the CFO, the charter for the EA team may be driving operational efficiency and cost control. When IT is aligned to delivery or marketing, the charter is more likely to focus on agility and efficiency. Understand the context, and draw members with process analysis and cost management expertise or deep functional knowledge of operations.

When there are multiple EA teams, there is one EA Capability and there should be one Leader. All teams should work under the guidance of this Leader and collaborate. The reporting and funding hierarchies of the teams can be separated from alignment and execution against EA Capability objectives.

9.3 Structure

The structure of the team providing the EA Capability depends on the activities to be performed against the charter. Figure 13 summarizes a high-level view of activities and suggests some of their relationships to each other. Skills required to build and use have different requirements with few overlaps.

The EA Capability must run efficiently, effectively, and in line with changing operational and financial practices. It is conceptually similar to operating any function in the organization. It consists of EA-specific activities and activities that are general to any business.

EA-specific activities are either foundational or purpose-specific. The nature of work done by the team providing the EA Capability invariably places them as a shared function. The team needs continuous input from impacted teams on relevance, efficiency, effectiveness, and growth – it is imperative to have common foundational elements of the EA Capability.

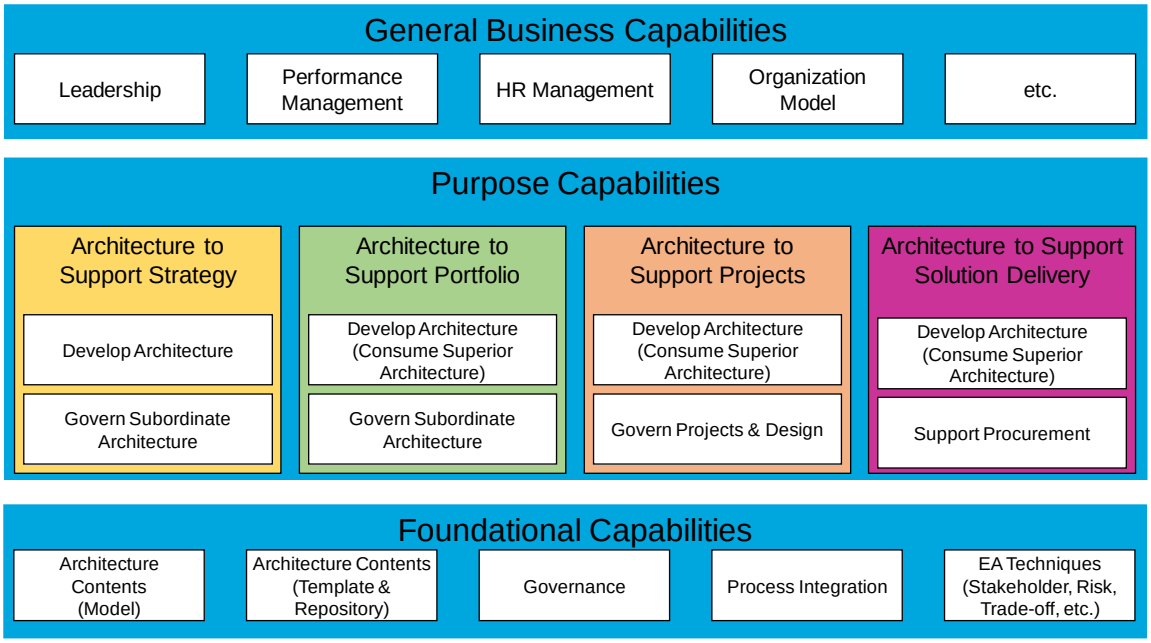


Figure 13: Decomposition of EA Capability Model

An interesting aspect of leading an EA Capability is the need to apply EA services to the EA Capability. This Guide is based upon the premise that a properly architected EA Capability out-performs an *ad hoc* organizational design. In fact, this Guide follows an approach applicable to architecture to support portfolio to define and describe the required EA Capability. The EA Capability will create and revise a unified EA strategy and accompanying EA plans, and will produce an integrated EA roadmap. This activity must grasp the current state and future direction of the business and its supporting systems, and have ongoing interactions with the people who are responsible for achieving the target state across several enterprise functions.

A certain amount of the EA Capability must be in place before architecture work can start; consequently, boot-strapping is necessary. For a budding EA Capability team, there will be an expectation to build a roadmap to develop the capability and to produce usable architecture. The Leader will have to pay attention and track these as separate efforts.

Well-formed EA Capability teams have specialists in each of the main domains like business, information, applications, technology, and security. Depending on organizational alignment, sponsorship, and funding, the team providing the EA Capability may employ specialists per suite of solution areas like enterprise resource planning, customer relationship management, sales force automation, core banking, and treasury. Other cross-disciplines to consider are strategic planners, financial and market analysts, line of business leaders, or subject matter experts, and service or support personnel. It is advisable to keep such functional specialists as part of an extended EA team. The core team is focused on strategies, processes, and advice.

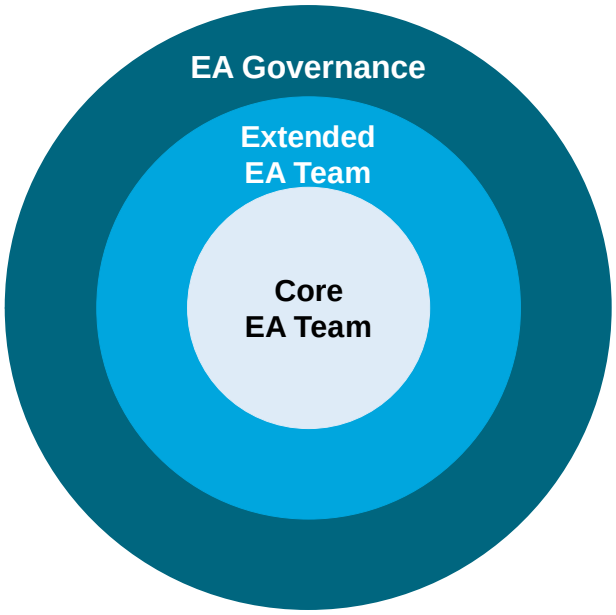


Figure 14: Teams Executing the EA Capability

This Guide now addresses the matter of having an architecture board or a governance council. Chapter 6 (Architecture Governance) discussed the composition of the team and its functions. Regarding the purpose and approach to staffing the architecture board, apply the separation of duties principle. The architecture board is equivalent to the "board of directors" of the EA Capability's business-in-a-business. Members of the governance team should have direct influence over the direction of the business or the outcome of the initiatives architected by the EA. This body sets and manages overall direction for the enterprise. It is not a successful pattern to embed rights for certain classes of architecture decisions in this body. For example, defining the constitution of an architecture building block, solution building block, or a trade-off decision around directory services or assembly line layouts is better decided at the extended EA team level.

The EA Capability, like any other business, must carry out a basic set of general actions. This includes things like finance and budgeting, team development, risk management, and performance management. All of these must be adapted to the specific EA Capability and enterprise. In most enterprises these functions are shared, and EA should benefit from tapping into these teams. Occasionally, to scale the reach of the EA functions, it may be necessary to franchise some of the activities to teams outside the team providing the EA Capability.

9.3.1 Roles and Responsibilities

Every enterprise has a predefined set of roles and responsibilities. If one already exists, use it, test waters, and refine it. While refining, start with defining roles and then think of titles. From a simple people portability and recruitment point of view, it is imperative that you keep the functional titles and roles in common with industry standard titles. It is best practice to separate functional titles from pay grades.

Consider context, charter, culture, clarity of expectations, collaboration, communication and co-ordination, separation of concerns, control, competence, and creative innovation while defining each of the roles and responsibilities.

There is sufficient literature in organization theory and design. Here are some quick pointers (see Referenced Documents):

- Policy Governance Model (ownership, accountability, authority, delegation), in Reinventing your Board: A Step-by-Step Guide to Implementing Policy Governance, by John Carver
- Star Model (strategy, people, structure, processes, and rewards – driving behavior, culture, performance), in Organization Design, by Jay R. Galbraith
- Six Box Model (purpose, structure, rewards, helpful mechanisms, relationships, and leadership), in Organizational Diagnosis: Six Places to Look for Trouble With or Without a Theory, by Marvin R. Weisbord
- Congruence Model (inputs, outputs, informal and formal organizations, people and work), in Managing Organizations, by David A. Nadler, Michael Tushman, and Nina Hatvany
- Multi-Relation Model, in A Causal Model of Organization Performance and Change, by Burke and Litwin

It is likely that the enterprise may not have a team model specifically for EA or for any architecture role. In such a case, consider the catalog of models (organization, process, information flow, infrastructure topography) to be created for the enterprise. If no one has been formally building and maintaining an organization model, the team providing the EA Capability should assume the responsibility until a formal owner is identified. Lack of such ownership is an architectural gap and should be part of the work packages to address.

When forward-looking technology research is not conducted (or it is being conducted, but not operationalized), the team providing the EA Capability should assume ownership until it can be moved to an appropriate owner. These activities may include validating vendor-supplied solutions, component design to be deployed on board an automobile, or be as complex as joint development of a tamper-proof credit card and Point of Sale (POS) solution.

9.3.2 Skills Framework

Governments and private forums within government like the US Department of Labor Occupational Outlook Handbook, the Skills Framework for the Information Age (SFIA), and The Open Group Certified Architect (Open CA) Program Conformance Requirements (see Referenced Documents) have defined detailed expectations for various architect roles. Some of these frameworks also provide a career and certification progression from beginner level architect to industry leading roles. Use these models before inventing one for the enterprise. It will simplify the engagement with the HR team.

9.3.3 Performance Evaluation (of the EA Capability)

The absence of an approach to evaluate architects has been a common hindrance to growth for many in this profession. In most organizations, the existing HR framework is likely to have value measurement and communication approaches. When an evaluation criteria does exist, it is invariably a measure of models, documents, and visualizations produced (local to efficiency of building the EA Capability). These are inadequate to communicate value delivered by the architects.

Some of the major categories to consider for defining value metrics are financial, risk reduction, benefit realization, growth and innovation, proactive readiness, development of organizational capability, and ease of change management. To be specific, consider how the professionals:

- Identify, define, and apply alternatives
- Tailor the basis for estimation of risk, controlling factors and assumptions, and extrapolations
- Eliminate waste; balance agility with innovation, operational stability, and sustainability
- Direct capital expenses planning
- Create a health map and propose corrective actions
- Perform the role of trusted advisor, mentor, or a sales person who expands the scope of the engagement
- Perform consistent enterprise impact assessments

9.4 Capacity

Architect skill growth invariably starts with domain-level specialization and branches into cross-domain expertise. Organizational structure, dynamics, or funding level may force the Leader to create capacity via federated or virtual teams. If the EA Capability is being resurrected, it would be difficult to discern qualified and semi-qualified architects embedded in various parts of the enterprise. Focusing on measures like adherence to objectives, EA process, and value creation approach have proven to surface the right talent to acquire both internally and externally.

Refer to the sample EA Capability models shown in Figure 22 and Figure 23. Develop a model to assess how many architects would be required to cover development of these EA Capabilities or apply parts of these EA Capabilities to achieve the business. Team members will be spending time to keep the architecture repository current or managing changes to the EA Capability and the enterprise. In addition to the skills framework, consider the talent mix to perform these activities while maintaining deep engagement with all stakeholders.

One of the most common mistakes in building capacity relates to the time required to coach and mentor. The architecture discipline is partly about delivery. Driving change in the thought process of leadership and delivery teams that everything is a trade-off, including that sub-optimization exists in the short term, consumes time. Such coaching invariably results in random disruptions inhibiting members of the EA Capability team to meet their schedule. Likewise, it takes time to mentor aspiring candidates. Mentors may be mostly productive, but mentee time should not be accounted as "available". Estimate overhead time before committing to delivery schedule or capacity.

Members of the EA Capability team may possess a level of maturity and capability to deliver against the business objectives and timelines. Experience has shown that organizational maturity is needed to understand and execute on the roadmap, and, if this is not understood, it can result in failure and over committing the team. Like performance criteria, define capacity assessment criteria like time, specialization, and maturity. If there is no measurement, there is no way to identify the need to add more or adjust focus.

As mentioned in the previous chapter, it is advisable to have a set of analysts as resources who can manage and curate the EA repository. It is advisable to employ a graphic designer, on an as-needed basis. While budgeting for the total spend on the EA Capability team, consider such part-time resource needs.

9.4.1 Recruiting to Build Capacity

When the EA Capability is being re-booted or the team providing the EA Capability is federated, it is likely that existing pools of architects would be inherited. It may be baggage or a bonus. There is value to institutional knowledge and rapport – only when balanced against tenure, awareness, and institutional bias. Irrespective of the latitude given to the Leader to build the team, a good approach to recruiting members of the EA Capability team is to follow the knowledge, skill, and talent framework. Also, pay attention to the personal growth path desire of the individual and balance it against the financial accounting model of the team providing the EA Capability. As much as the architect is required to present all facets of a problem or topic, the architect is also required to take a stand and argue on the merits and metrics. Look beyond the daily activities; look for diversity of domains and transferrable skills across business domains and problem patterns.

EA is not all about definitions of trade-off criteria to reduce risk or cost and to improve sustainability over a period. Understanding the organization's objectives, legal environment, financial model, and operating model clarifies that trade-off decisions normally cover more than one dimension. A retractable road barrier is a clear example of innovative design to avoid trading off security concerns against emergency and usability concerns. Enterprise Architects will have to look across the functional and departmental barriers of the enterprise, so that innovative alternatives or trade-off can be taken into account before presenting decision-ready options. It is recommended to have people of varying skills, but who have a common thread in thought process: how to set and follow trade-off analysis to deliver decision-ready recommendations. A deductive reasoning process is not the same as belief and bias-oriented black-and-white thinking. As times change, some of the concerns change as well. What used to be non-functional requirements – like visual appeal and performance – are becoming key functional differentiators (as of 2015-2016). A prerequisite for an individual to be an Enterprise Architect is the ability to keep current and be imaginative.

9.5 Scoping the Depth and Breadth of Business Impact with the EA Capability

The enterprise context, EA context, and purpose of the EA Capability drive the determination of scoping decisions. The EA Capability delivers optimal results when different aspects (like environment, strategy, internal and external interactions, automation, etc.) are handled the way they should be.

This section helps to answer the following questions:

- What are the possible approaches to understanding the enterprise (or the charter for the EA Capability)?
- Which method to partition the scope of work would be best for which industry or enterprise?
- Are there reference architectures and models that could be leveraged?

- What potential trade-off could result due to time dimension impact on scope?
- What if the scope is confined to IT only?

Earlier this Guide discussed enterprise, segment, and capability-based approaches for separation and scoping. These are natural mechanisms, if already available in your enterprise, that could be leveraged.

In order to deliver value, any business should have three scoping statements: customer demography or segment being addressed, products (vertical integration) delivered, and geography being covered. Likewise, EA should also address business capabilities, architectural or business domains, and solution coverage. The Leader will have to create a matrix of these in a grid, either follow a row or a column to arrive at the right size for the team, and to articulate the value being delivered by the EA Capability. Unless the variant chosen is proving to be a deterrent to deliver value, it is prudent to stick to one approach.

9.5.1 Value Chains, Value Streams, and Capabilities

The major approaches are capability, process, and value stream-based segmentation of the business. A capability-based system focuses on what sets the enterprise apart from the competition. In a value-centric system, the focus is on how to deliver the products and services to the customers. It is possible for the enterprise to follow value-based or capability-based models in two different business units or the same business unit in different geographies. For example, customer center operations may be managed as a capability whereas sales may be handled as a process.

In some businesses, terms like front-office, middle-office, and back-office are commonly used to describe the way operations are managed. Front-office means customer-facing operations like branches, counters, or vending machines where customers appear and interact. Back-office implies capabilities like logistics, infrastructure, legal, and finance. Middle-office can indicate nearly everything else. Even though different terms are used to describe value stream and capabilities, use of front, middle, and back office is a common variation.

In the event the enterprise does not have a value chain, value stream map, or capability map, but prefers to anchor on one of them, a good place to start would be the American Productivity and Quality Center (APQC) capability map or value chain or value stream map.

There are businesses like telecom and technology sales where the scope for capability or value stream definition may be constrained by a country; in China, Vietnam, and Thailand local regulations and market behavior are so different that they demand special treatment. Likewise, nuances in the mining industry demand that each mine be scoped differently for operational purposes, but the entire business has to be handled as one unit for strategy purposes.

In the event of managing a Merger and Acquisition (M&A) or divestiture activity, the scope may be just that: land the transition from two entities to one. When performing business as part of an alliance or consortium, scoping should be handled carefully to treat each of the legal entities participating in the alliance and the alliance as a whole in the context of respective legal boundaries.

Some businesses prefer to handle segmentation based on their portfolio of efforts such as growth markets and emerging markets. Such marketing taxonomy indicates geographical boundaries and a set of processes or capabilities to achieve business goals. From the EA Capability

standpoint, care must be taken to clarify the set of processes, capabilities, and geography that is within scope.

Identify the best suited analysis model for the enterprise – value chain, value stream, or capabilities. Validate whether the analysis model can be used to drive change and communicate the architecture. Align and define the EA team model to the appropriate analysis model and architecture delivery model.

9.5.2 Domains and Layers

This Guide discusses domains and layers for awareness and provides clarity on nomenclature. It is sufficient to know that domain knowledge constitutes criteria to staff the team.

Domains and layers are typical words in the dictionary of a technologist. The TOGAF framework suggests that the word "domain" should always be prefixed by a modifying noun to provide context; e.g., architecture domain, business domain, and security domain.

Domain can be defined in a different context as well. Industry-based business domain context for each enterprise is defined and a known context for the enterprise.

For the purpose of this Guide, the (architecture) domains are limited to business, data (and information), application, technology (infrastructure and integration), and security. This view is based on the meaning of the word domain as "a field of thought, action, influence". This definition is very similar to terms defined in the TOGAF framework. See Figure 15 for details on the scope of each of these architectural sub-domains.

A security architecture is a structure of organizational, conceptual, logical, and physical components that interact in a coherent fashion to achieve and maintain a state of managed risk. It is an enabler of secure, safe, resilient, and reliable behavior and upholds privacy at risk areas throughout the whole enterprise.

Security architecture components always have a relationship with other elements in the architecture. Thus, although the security architecture might be viewed as one architecture, it can never be an isolated architecture. That would be meaningless. After all, security is not the problem of security architects; it is a concern for the enterprise.

In the context of security architecture, risk can be operational or business-related. Security architecture contains a balanced view on risk: negative consequences are kept to an acceptable level, and positive opportunities are exploited to their maximum. The business-driven approach is key for the security architecture: business drivers offer the context for risk assessments. They define whether compliance with any control framework is necessary, and they justify the need for security measures.

In Figure 15, the visualization does not convey that one domain is a subset of the other. The idea is that integration and security domains touch business, data, application, and technology domains. Security architecture is a cross-cutting concern, pervasive through the whole EA.

As a cross-cutting concern, the security architecture impacts and informs business, application, data, and technology architectures. The security architecture may often be organized outside of the architecture scope, yet parts of it need to be developed in an integrated fashion with the architecture. See Figure 16 for a view of how the layers interact with each other, and a cross-cutting concern.

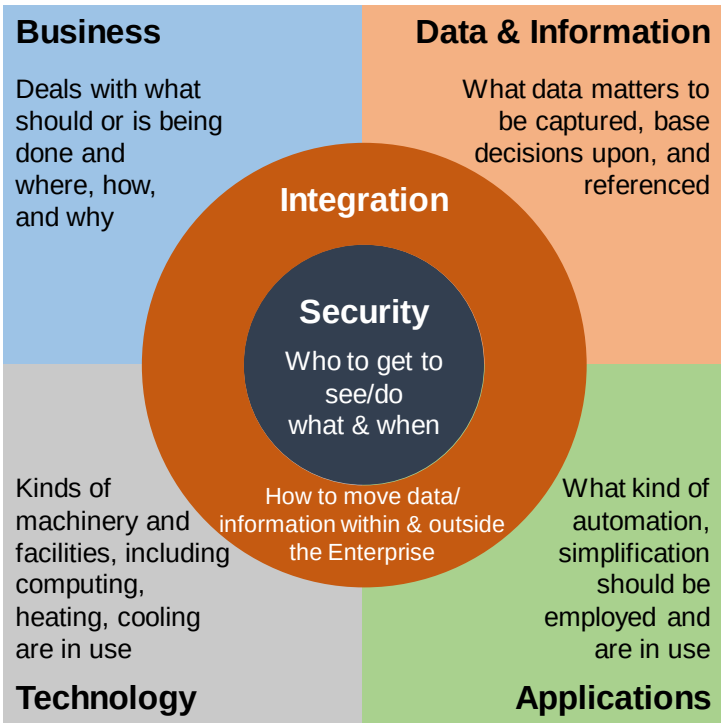


Figure 15: Commonly Accepted Domains

When dealing with function or strategy-specific EA efforts, it is preferable to consider domains first and, as needed, consider introducing the concept of (architecture) layers. When EA is IT-centric, use of layers to define standard guides may be useful for the enterprise. Layers are normally based on man-to-machine or machine-to-machine interactions. Commonly used layers are presentations or user experience (or client tier), service (end-points or front tier), business rule and logic (middle tier), integration and workflow (middle tier), and storage (data tier). As transitions happen to cloud, mobility, and the Internet of Things (IoT), the architectural layers in the IT landscape will change significantly.

The Open Group SOA Reference Architecture (see Referenced Documents) provides a logical solution view, which talks about consumers and providers who are brought together via consumer interfaces, business processes, services, service components, and operational systems. Consumers' loyalty, usability, and consumption are governed and assured by the quality of the service, enabling information exchange between participating members. The OSGi Alliance model, the OSI model based on the ISO/IEC 7498-1:1994 standard, or Functions, Flows (Processes), Layers, and Views (FFLV), are other concepts on technology or architecture layers that can be leveraged.

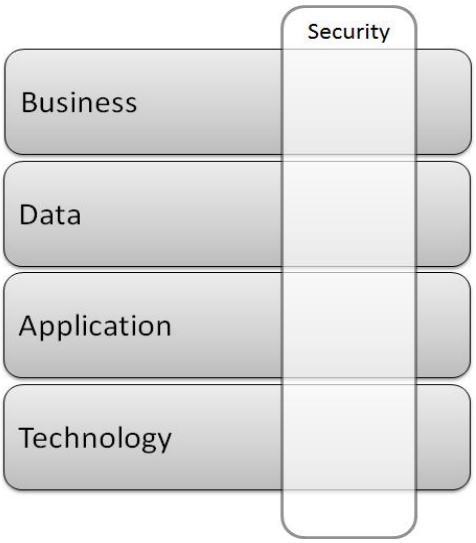


Figure 16: Security as a Cross-Cutting Concern through the Architecture

When communicating domain architectures, terms like conceptual, logical, and physical layers are used. Use of the term "layer" in that context is about level of abstraction in the detail being communicated in models and documentation about the architecture. Conceptual, logical, and physical explicitly indicate the intent of the level of detail that can be found in the architecture.

When defining the scope for architecture work, the terms enterprise, segment, and capability or project are used. Enterprise, segment, and capability classification is used to convey how the architecture project is scoped. Purpose-based classification is aimed at addressing the outcome of the architecture work. For a capability level, all four purposes apply. Always remember the distinction between scoping intent and outcome intent. When directing the EA team and when communicating with stakeholders, be specific and clear about the intent and purpose of the architecture work.

9.5.3 Depth and Breadth

Clarity in business objectives provides hints for what to focus on first: the entire breadth of the enterprise or specific areas. Building on the discussion about scoping the EA effort in Section 4.2.4, consideration to grow the enterprise via M&A or through organic expansion should be included. Objectives like due diligence for M&A would start with understanding all capabilities (breadth) and then go into each unit or capability stack (depth). Objectives like cost and incident reduction would start with a specific capability (depth) and then replicate the process across the business (breadth).

Sometimes, the size of the enterprise or the "span of control" of the sponsor may call for partitioning. The constraint is either capacity of the team providing the EA Capability or value proposition perceived by the sponsors. Either way, the only trade-off that can be made is time to cover the entire enterprise (or delivering value) against the ability to keep the architecture documentation current. When dealing with an enterprise structure where the EA lead is a coordinator across architects from various business units, a need for unification, standardization, or replication of standards, reference models, and reference architecture arises. Partitioning enables scale to cover the breadth. The Leader should drive clarity on principles to employ, approach to classification, and avoidance of duplicate architectural work in the unification or

diversification model. In these scenarios, there is a need to consider carving out a separate integration architecture effort.

The approach to scope the EA work is also called "partitioning" and each scoped slice is called an architecture partition. Architectures that are created to address a subset of issues within an enterprise require a consistent frame of reference so that they can be considered as a group as well as point deliverables. The dimensions that are used to define the scope boundary of a single architecture (e.g., level of detail, architecture domain) are typically the same dimensions used to integrate the subset of architectures.

9.5.4 Impact of Time Dimension on Scope

The capability map or value stream provides a pivot to build the end-to-end view of the enterprise. The level of detail to which they are explored depends on the scope. The strategy and operations of the business change with time. The impact could be in the partition that a team of architects is currently engaged, part of a backlog item, or part of those pending elaboration in the future. It is also possible that concurrent elaboration activities can occur, based on the EA team capacity. Pragmatically, the EA Capability must isolate the impact of changes across concurrent architecture efforts. A side-effect of such isolations or concurrent development is architecture in silos.

Having defined the boundary of the EA Landscape to be fleshed out, the approach to fleshing out the details contained within the EA Landscape should be approached differently. Defining the boundary sets the context for interoperability concerns. Details of the landscape set the context for purpose and outcome. One of the common failure patterns is to scope the architecture project efforts to flesh out the details of the EA Landscape without consideration of the impact to neighboring landscapes. The key principle that should never be compromised or traded-off is that EA is about a system of systems. Cross-system dependency and interaction management should take precedence over the needs of the project or success of the "scoped effort". Care must be taken to define the criteria for optimizing or sub-optimizing a particular area for the overall benefit of the enterprise.

Having executed on this chapter, use this checklist to assess progress made in developing the EA Capability.

- Trade-off criteria is defined and communicated as architecture principles, sub-optimization considerations, and collaboration needs: Y/N
- Team design, skill set, and resource assignment can be completed: Y/N
- Based on capacity of the team, number of iterations required to cover the scope in charter is defined: Y/N
- Performance evaluation of EA Capability team is defined and linked to objectives: Y/N

10 Process Model

It is a prerequisite to create a process model for EA Capability to integrate with the enterprise's operational processes and business cycle. To create a process model, a logical model of the TOGAF Architecture Development Method (ADM) should be transformed to align with appropriate processes of the business cycles with which the EA Capability interacts.

To provide an actionable process model, the following questions must be answered:

- What are the touch-points with existing enterprise processes?
- What are the strategy development processes?
- What are the portfolio and program management processes?
- What are the project initiation and management processes?
- What are the budgeting processes?
- What are the operational management processes?
- What are the change management processes?
- What are the governance processes?
- Are there any ERM processes?
- How is ADM iteration realized in practice (minimum or first time, by layer)?

10.1 What are the Touch-Points with Existing Enterprise Processes?

Enterprise planning and budgeting and the operational and change processes all have connections with the EA Capability. The nature of this connection will depend upon the purpose of the EA Capability identified in Chapter 5 (Business Objectives for the EA Capability).

This Guide uses a simple model for considering process integration – all planning and budgeting processes are considered as decision-making processes. Change and operational processes are considered execution processes. This simple model highlights the basic interaction of the process with the EA Capability. The type of decision-making and execution processes will direct the form of interaction.

In all cases, the critical process alignment is to have the EA Capability work products provided before a decision and before the beginning of change execution activity. Keep in mind the TOGAF framework concept of iteration; for example, the architecture work required to support budget planning, project planning, and solution delivery have different levels of detail. As the enterprise moves through a business cycle more detailed work is required. The correct EA needs to be done at the right time in the business cycle.

10.1.1 Decision-Making Process Integration Model

EA Capability provides advice and illuminates constraints to support the decision-making process of the enterprise. All planning and budgeting processes are considered as decision-making processes. The specific type of decision-making will direct the form of interaction. The interaction is divided into advice and constraints feeding decision-making, and reporting feeding governance of the decision.

Advice provided for decision-making is usually in the form of trade-off analysis, views, and an architecture roadmap. This advice leads to decisions, usually in the form of approval of a candidate architecture. Most constraints are prior decisions, often stated in the form of an architecture requirement specification.

Supporting governance activity, the EA Capability provides reporting within the scope of the target architecture on decisions made by the appropriate process. This reporting is used to confirm execution, drive change to the target architecture, or changes to execution.

Decisions direct the architecture support. Where there are subsidiary decisions the input will be guided and constrained.

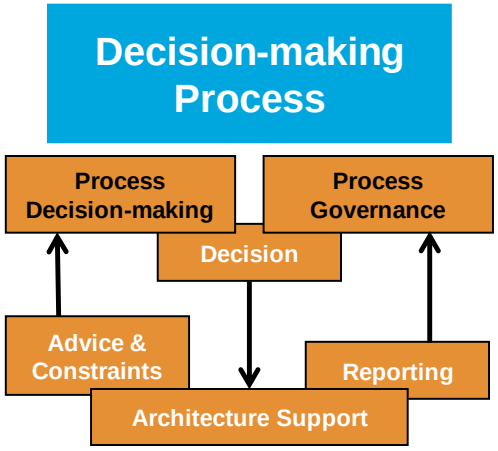


Figure 17: Decision-Making Process Integration

The interaction model described above and represented in Figure 17 remains constant with all decision-making processes. The interaction is dependent upon the type of decision-making process. The World-Class Enterprise Architecture White Paper classifies four decision-making processes with which an EA Capability can connect. The nature of this connection will depend upon the purpose of the EA Capability identified in Chapter 5 (Business Objectives for the EA Capability):

- Strategy development
- Portfolio/program planning
- Project planning
- Solution development

Section 10.1.3 through Section 10.1.9 provide a discussion of how the EA Capability engages with decision-making processes.

10.1.2 Execution Process Integration Model

For execution processes, the EA Capability provides advice, direction, and constraints. All change and operational processes are considered execution processes. The type of execution processes will direct the form of interaction.

Direction to execution processes is provided in the form of what needs to be done – gaps to be filled and work packages. Constraints are defined in the form of an architecture requirements specification. Advice is primarily provided in the form of implementation guidance and non-compliance recommendations. The set of advice, direction, and constraints is used in the execution of change efforts and operations.

Supporting the governance processes, the EA Capability provides reporting within the scope of the target architecture on changes made by the execution process. This reporting is used to confirm execution, identify potential need to change the target architecture, or introduce early changes to execution. Reporting is also provided to the appropriate decision-making processes.

Regardless of the type of execution process and major transformation project, the interaction model described above and represented in Figure 18 remains constant. The interaction is dependent upon the type of execution process, and when the execution is taking place. The World-Class Enterprise Architecture White Paper classifies four execution management processes with which an EA Capability can connect. The nature of this connection will depend upon the purpose of the EA Capability identified in Chapter 5 (Business Objectives for the EA Capability):

- Portfolio/program management
- Project execution
- Operational change
- Operations

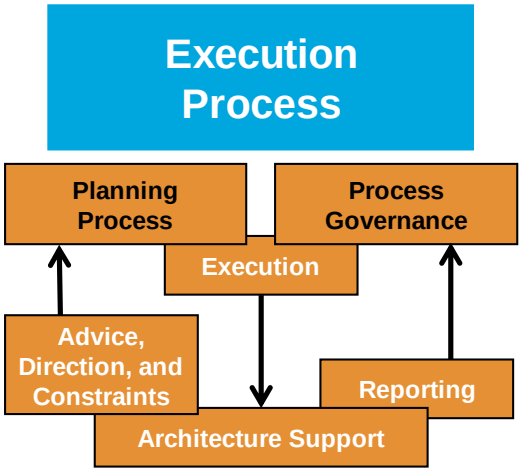


Figure 18: Execution Process Integration

Section 10.1.3 through Section 10.1.9 provide a discussion of how the EA Capability engages with execution processes.

10.1.3 Strategy Development Process

An EA Capability that is chartered to support strategy will be tightly integrated with strategy development processes. Strategic decision-making tends not to closely follow fixed cycles – this requires the EA Capability to be nimble.

Supporting governance will be reporting on execution against the roadmap and value realization embedded within the target architecture supported by the roadmap.

Predictable deliverables will be required before the budget planning process. Supporting strategy development decision-making would provide insight into the impact of the changes to existing initiatives, portfolios, and the extension of roadmaps. When the roadmap is extended, identify and recommend key work packages that deliver value.

10.1.4 Portfolio and Program Management Processes

An EA Capability chartered to support portfolio will be tightly integrated with portfolio/program planning and budget cycles. This requires the EA Capability to be working well ahead of the decision-making cycle to ensure that necessary advice is available during and throughout the budget process.

Governance of the portfolio and program execution is split between ensuring projects deliver on expected work packages and fill necessary gaps and reporting on success that creates the conditions for value realization.

Ad hoc work will be required to support portfolio and program management activity. Central activity is to support the ongoing alignment of approach, jockeying the enterprise roadmap to ensure that all dependency is addressed and synergy maximized.

10.1.5 Project Initiation, Project Management, and Change Management Processes

An EA Capability chartered to support solution delivery and project must be tightly integrated with the enterprise's project initiation process and change process. A common problem for enterprises embarking on EA Capability initiatives is aligning the EA Capability after project initiation – architecting after decision. Performing high-value work after decisions is impossible.

The second challenge is aligning with the change processes at the right level of detail. Many enterprises have change processes that are variable based upon the scope, objective, and sponsorship of the project. Best practice requires the EA Capability to engage ahead of decisions. Where the EA Capability supports strategy, portfolio, and program there is an additional governance activity. This activity is focused on highlighting misalignment of any change activity with the work packages and roadmap.

Two key elements of advice must be provided before initiation. First, the final definition of the project (architecture to support project), or the solution architecture (architecture to support solution deployment). Second, integration and alignment between projects within the context of their portfolio and program. Alignment with project and solution delivery requires a high level of *ad hoc* work to support project initiation and governance activity within a project.

Governance activity should be integrated within the project reporting and control scope. Best practice governance requires EA Capability personnel assigned to the project to remain neutral

and not report to the project. Performing effective governance requires independence from the pressures of project delivery.

Keep in mind that all change activity, whether a capital project or operational change, needs to be governed by the architecture requirements specification.

10.1.6 Budgeting Processes

One of the demands from the EA Capability is to support the budgeting process, either for the fiscal year or for the entire planning horizon. As always, the EA Capability will be operating before decisions, advice, and supporting governance are confirmed. Best practice support requires the EA Capability to deliver the initial version of its advice before the start of any budget conversations.

Integrating with budgeting processes is closely aligned with the integration for portfolio and program management processes.

10.1.7 Operational Management Processes

The primary association with operational processes is information capture during architecture analysis and ongoing governance of operational change.

The EA Capability requires connections with any operational processes that are within the scope of the EA Capability. The primary connection is gathering and identifying value realization metrics; for example, is the specified architecture generating the value expected by the stakeholders? This can be a difficult relationship with an operational team when the architecture is specifying a value that does not align with the parochial preferences of an operational team.

A secondary connection is operational change, and ensuring this change aligns with the architecture requirements specification.

10.1.8 Governance Processes

A high-functioning EA Capability is dependent upon engagement with the enterprise's governance processes. The EA Capability requires engagement at all points in the lifecycle of a target architecture.

Governance is required for both the focus of the EA Capability and the architecture projects undertaken. How the Leader directs and controls the focus of the EA Capability is critical to realizing the available value. A high-functioning EA Capability works on the optimal mix of architecture projects.

Approval of the target is one of the most important governance functions. IT-oriented teams routinely create an architecture board that is positioned with a decision-making role on both the target architecture and conformance of change projects. This pattern is unlikely to succeed, unless the EA Capability is restricted to IT functions, and specifically to infrastructure.

At the core of good architecture is the set of preferences expressed by stakeholders. The target architecture must address the optimal set of stakeholder requirements – this optimal set requires trade-off between stakeholder requirements. When the EA Capability is chartered to support strategy and portfolio, the decision-making body to perform the trade-off will constantly face the breadth and variety of cross-domain stakeholder requirements.

The most successful architecture boards work to control the process. A high-functioning architecture board will be structured to confirm that:

1. The EA Capability is working on the highest value architecture projects.
2. The EA Capability addressed the correct stakeholders for a given architecture project.
3. The EA Capability appropriately works with other implemented enterprise frameworks, such as ERM.
4. The architecture description, supporting model, views, and architecture requirements specification are internally consistent.
5. The implementation and migration plans conform to the roadmap.
6. The architecture contract associates the gap, work package, and appropriate architecture requirements specification to programs and projects.
7. Appropriate stakeholders review conformance reviews.
8. Decisions taken by a stakeholder based upon a non-conformance result in a change to the target architecture or the change initiative's execution approach, or an exception.

One of the most important activities of governance is reporting to appropriate stakeholders. This reporting needs to include:

- Conformance of baseline representation to target and expected value representation

Make sure that the views, dataset, and controls used for the target architecture and value of the target are used to represent the baseline as well. This might appear counter-intuitive. It is easier to communicate what did not exist or what was eliminated; hence the value of the baseline is less than the target.

- Conformance of implementation and migration plan to roadmap
- Conformance of realization activities (all solution delivery) to target architecture
- Conformance to architecture principles

Consider using summary reporting with a high visual impact. Below is an example of reporting against architecture principles. The same summary can be used for value, roadmap, and execution activity.

Table 6: Example of Summary Governance Reporting

	Principle 1	**Principle 2**	**Principle 3**
Portfolio: Assess the enterprise within the scope of a portfolio.	Conforms	Violates	Not Applicable
Project: Assess the enterprise within the scope of a project.	Violates	Not Applicable	Conforms
Component: Assess the components within the baseline architecture.	Not Applicable	Conforms	Violates

10.1.9 Enterprise Risk Management (ERM) Process

A central role of the EA Capability is to facilitate creation of an environment where operational risk can be optimized for maximum business benefit and minimum business loss. This requires close integration with the enterprise's risk management approach and an understanding of the scope and interests of ERM. Tight integration with ERM facilitates tilting the EA to improve realization of objectives, and the reduction of uncertainty.

In all cases, the EA Capability needs to test the candidate architecture, roadmap, and value against the ERM. While close interaction with a robust ERM process should be undertaken, Table 7 identifies key areas to test.

Table 7: Key Touch-Points with Enterprise Risk Management (ERM)

	Candidate Architecture	**Roadmap**	**Value Realized**
Key Risk Areas	Flags areas of special concern	Flags areas of special concern	Perform more detailed value assessment
Risk Appetite	Aligns with risk appetite	Aligns with risk appetite	Aligns with risk appetite
Business Impact Analysis	Not applicable	Roadmap aligns with & informs impact analysis	Not applicable
Risk Assessment	Performs as appropriate	Performs as appropriate	Value aligns with risk assessment

10.2 How is ADM Iteration Realized in Practice?

An often-misunderstood element of the TOGAF framework is actioning the ADM and the concept of iteration. The TOGAF ADM graphic provides a stylized representation that is often interpreted as a linear waterfall. To demonstrate the flexibility inherent in good practice, diagrams showing levels and fish-ladders up the waterfall have been used. The key point is that the ADM graphic shows essential information flow and is not a representation of activity sequence.

The important thing to realize is every time the EA Capability is undertaking any roadmap development; it is exercising the steps in the TOGAF ADM Phase E (Opportunities and Solutions). It is expected to consume the mandatory inputs and produce the mandatory outputs. This applies to all ADM phases. Simply don't worry about activity sequence; worry about information inputs and outputs.

Consider the stylized Gantt chart in Figure 19. The inter-dependent nature of EA requires all ADM phases that develop a candidate architecture to be executed simultaneously until the candidate architecture is tested for acceptance against the stakeholders' requirements. They close to allow specific elements of supporting domains to be completed. This provides a process-oriented view of ADM iteration.

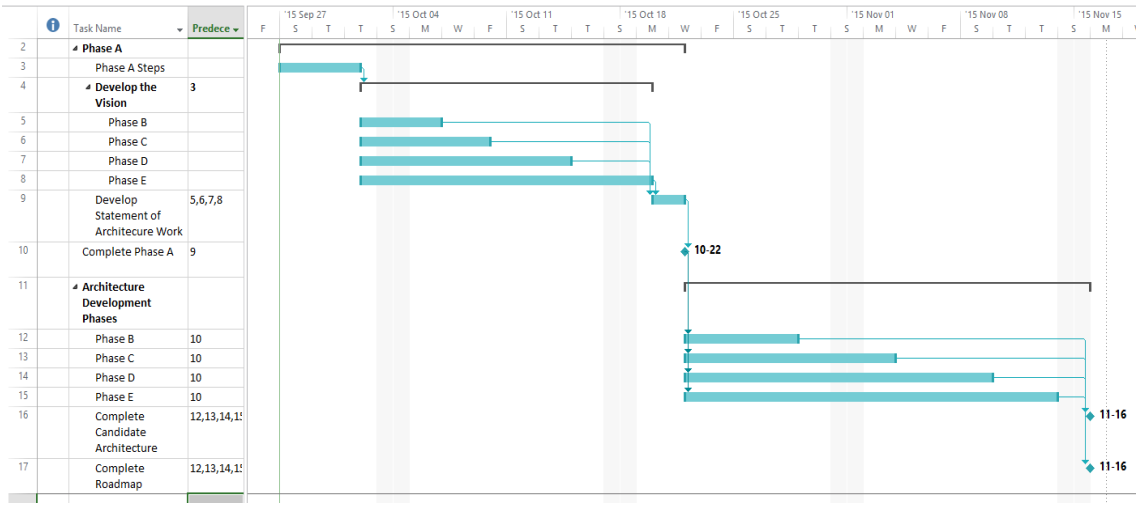


Figure 19: Stylized Architecture Development Gantt Chart

Keep in mind this is a simple stylized example. The real world is always more complex and aligns to the objectives that EA Capability is chartered to deliver.

The process created is not dependent upon the work the EA Capability undertakes to produce, but the timing of completion. The essential question is when an EA Capability must deliver specific work products. Table 8 provides a summary of work products that are actively consumed by key enterprise processes.

Table 8: Work Product Alignment with Key Processes

Practice Supports	Strategy	Portfolio/Program	Project	Solution Delivery
Phase A Work Product: Vision	Key deliverable Before framing of a strategic planning session Refresh before initiation of program budgeting	Key deliverable Before start of budget planning	Often not used Activity to produce a vision overlaps with portfolio/program candidate architecture and roadmap Technique may be used at initiation of business case	Limited use Primary use is early in implementation cycle (via internal providers or execution partners)
Phase E Work Product: Candidate Architecture	During strategic planning session Refresh as required in program budgeting	Key deliverable Before start of budget planning Primary use is stakeholder acceptance of target and definition of gap	Before project initiation and finalization of business case Primary use is creation of architecture requirements specification	Before engagement of execution partners (including internal providers) Primary use is creation of architecture requirements specification

Practice Supports	Strategy	Portfolio/Program	Project	Solution Delivery
Roadmap	During strategic planning session Refresh as required in program budgeting	Before start of budget planning Refresh as required to support budgeting and program management	Limited use Can be used as an input to projects with multiple interactive changes	Before engagement of execution partners (including internal providers) Primary use is identification of required change, and preferences of how to execute change, to manage solution delivery partner selection and engagement
Phase F Work Product: Architecture Contract & Architecture Requirements Specification	Likely not used	Limited use	Key deliverable Before completion of project initiation	Key deliverable Before engagement and contracting
Implementation & Migration Plan	Likely not used	During portfolio budgeting Refresh as required to support budgeting and program management	Key deliverable Before project start	Key deliverable Before engagement and contracting
Phase G Work Product: Conformance Assessment	Likely not used	Likely not used	Key deliverable At key points in project that allow reporting to stakeholders and obtaining decisions for non-conformance	Key deliverable At key points in project that allows reporting to stakeholders and obtaining decisions for non-conformance
Phase H Work Product: Value Assessment	Before governance review, framing a strategic planning session and program budgeting	Key deliverable Before governance review and program budgeting Refresh as required to support program management	Limited use Scope of significant architecture change and value often does not cleanly align to projects	Limited use Scope of significant architecture change and value often does not cleanly align to solution deployment

As mentioned in the World-Class EA Practitioner's White Paper, purpose-based architecture delivery exercises each of the ADM phases to the extent necessary, starts in Phase F, and performs work in Phase B, C, and D. Table 8 informs the Leader which deliverables are

important for which purpose-based architecture and from which phase the deliverable is produced. When designing the process model for the EA Capability, align the steps to develop the architecture to the business cycle and the deliverables required to support decision-making and governance processes.

Once the process model is created, use this checklist to validate completion of the customized EA method and a framework for related functions in the organization:

- Integration with enterprise processes that align to the purpose of the EA Capability is defined: Y/N
- The architecture process links the publication of work products to the overall rhythm of the business (budgeting cycle, planning cycle, change execution cycle): Y/N
- Documentation approach to architecture development, change, and communication is defined: Y/N
- The level of rigor built into the process to evaluate the alternative candidate architectures as well as execution method meets the expectation of the sponsor of the EA Capability: Y/N
- The process accounts for alignment and integration with other processes discussed in this chapter: Y/N
- The process provides governance of any roadmap to achieve selected target state, and the ability to course correct, or assure quality: Y/N

Leaving out any one of these will cause problems at later stages of execution, as the team will be splitting its capacity to address the process gap, build the architecture, and provide confidence to decision-makers.

Part 4: Realizing the EA Capability

11 Create the EA Capability Roadmap

A roadmap provides a set of possible paths and a preferred path to achieve the target state from the current state. The preferred path is arrived at via trade-offs considering the organizational maturity and needs resulting from the gap between current and future state. The process model created using activities in Chapter 10 (Process Model) is a tactical tool, whereas the roadmap is a communication tool. The roadmap should help to answer the following questions:

- What is required before an outcome can be produced?
- What kind of planning and decisions should be driven?
- What resources are required for the EA Capability to deliver?

11.1 Activities to Create a Roadmap

Over time several assumptions could change and result in continual modification of the target state. This chapter will discuss approaches that will assure attaining the objectives, the target state, and keeping changes to the target state to an absolute necessity. To establish this approach:

- Create a multi-year project plan for three distinct efforts – EA Capability management, project engagement for delivery of solutions, and maturity assessment and quality of EA Capability
- Manage the interaction between purposes of the EA Capability
- Manage the interaction between the developing EA Capability and the business cycle being supported
- Manage the interaction with architecture domains (business, data, application, technology, and security)
- Execute on the governance model with tighter alignment with the operating model of the business

To deliver value, a structured plan is needed – just like a work breakdown structure. An architecture capability implementation should be treated like any other project. The plan will have milestones, deliverables, and measures. The objective is to have a plan to sell value, not metrics, build organizational maturity not just EA Capability, and align with the rhythm of the business.

Establishing and enhancing an EA Capability is a multi-year initiative. The business environment morphs with time. A purpose-driven architecture generated based on an initial gap assessment is validated and updated each year. This periodic update also impacts the EA Capability. Rate and depth of change for the EA Capability may not be as significant as the changes to the enterprise. The roadmap for the EA Capability is also updated from time to time. Allocation of architects to purpose-based projects and development of the EA Capability

presents too many moving parts for the Leader. One of the common mistakes an EA Capability Leader makes is not realizing the need for a project manager to keep them close and true to plans, manage change, and ensure quality and timely delivery.

By definition, the roadmap presents alternative options and the preferred route from current state to target state. When modifications are made year-over-year, it might give an impression of chasing a moving target. The EA team should be able to trace the changes to the roadmap or creation of a new roadmap to the source of change; invariably the business environment and context change. Another mistake made is not retaining the rationale behind selection of a path. When driving change, it is important to keep track of the triggers and the interpretation.

One of the common mistakes to avoid is not creating a dependency matrix of the organization that takes into account governance reporting, as shown in Table 6, and touch-points with ERM, as shown in Table 7, to manage effort and flow of funds to initiate, execute, and achieve target state. Other dependencies are internal to architecture capability – detail of which business process, software and applications architecture, master data (customers, partners, suppliers, inventory, pricing) are available.

11.2 Linking the EA Value Map to the Enterprise Value Map

The value of EA is realized over a period. See the sample value driver document for business (Figure 20) and EA (Figure 21) below. Either a pictorial or verbal description of the value delivered by the EA Capability and the personnel constituting the EA Capability team along a timeline will be useful in creating the plan.

An EA Capability Leader requires a tight engagement with business leaders to understand, anticipate, and provide a path to deliver on their vision. Creating a structure that defines periodic engagement related to strategic concerns and operational concerns goes a long way in managing the workload of the team providing the EA Capability. The structure or engagement plan allows for shifting focus for one or more of the architects and analysts in the team. The EA Capability Leader should track the depth of engagement and depth of detail, completion of architecture artifacts, and value. As neither EA Capability nor value can be delivered in one step, tracking earned value is key to validating alignment to the roadmap. Forrester Research on EA value summarizes this best:

"*Your progress tracker should be able to quantify what is needed (gaps), prescribe where we should be by what timeline, why this prescription is better and how it can be put to practice, and finally how to collaborate with other architects to translate these 'prescriptions' into reality. Complement these with an innovation and 'get ahead' plan.*"

It is the communication plan that demonstrates all the detailed work undertaken by the architects. EA value realization communication should follow both the project release and planning horizon cadence. For example, if the enterprise has a quarterly project release schedule and follows a January to December fiscal funding plan, then the EA value (cost elimination, revenue increase, or value realized) communications should be sent in between the release dates of the two consecutive project schedules. Likewise, communications for future activities should be sent well before the beginning of the annual planning cycle.

Communicating EA Capability maturity may sound like an academic communication. However, a metric to show the value improvement over the previous communication period would suddenly make the maturity communication more attractive and meaningful. Complement the

cadence of business leader engagement by communicating how the maturity of the capability improved the efficiency of the organizational initiatives.

Members of the team providing EA Capability have two different day jobs – one to produce the artifacts and another to engage actively with technology and business leaders. The roadmap should consider the capacity of the team; articulate milestone dates to deliver on the objectives, and define appropriate checks and balances for the EA Capability and the projects it influences.

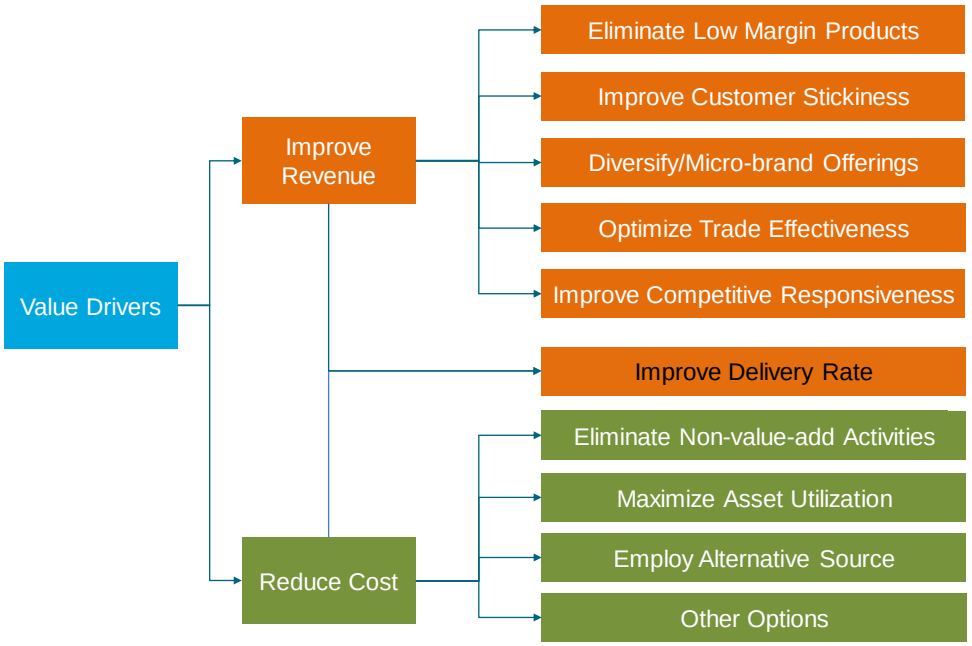


Figure 20: Sample Business Objective Diagram

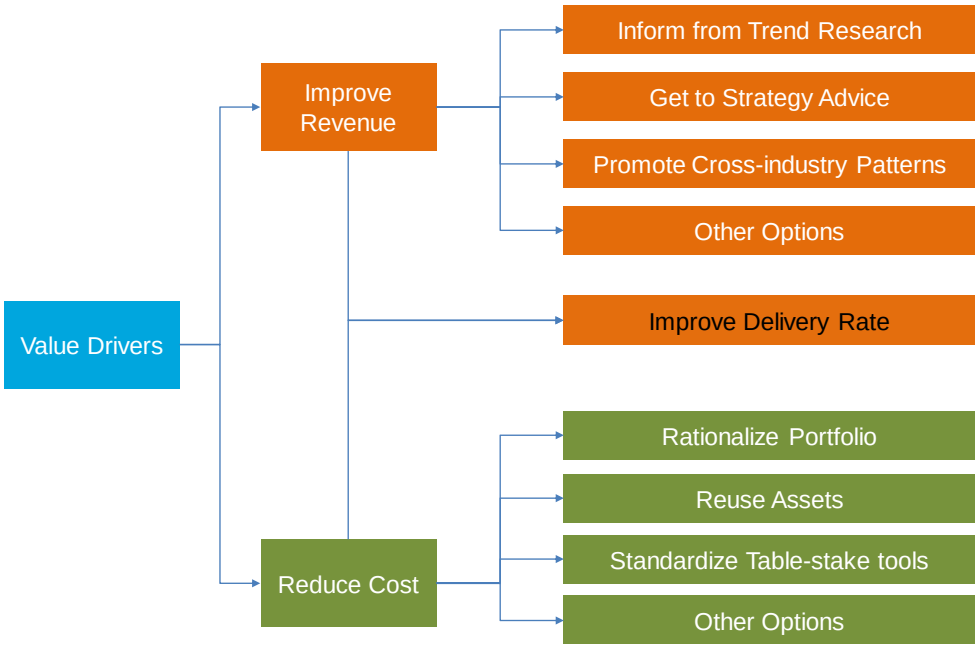


Figure 21: Modified Version of Business Value Diagram to Represent EA Value

A strategic enterprise roadmap links go-to market strategy milestones to business capability maturity milestones along with its related technology development and learning of personnel involved in the realization of the strategy. It is ideal if the team providing the EA Capability helped create this roadmap and supports all the data behind it. In situations where go-to market and business capability maturity milestones are predefined, having access to this view will inform the EA Capability team to create its roadmap for technology research and delivery.

Other dimensions to address on the roadmap are as follows:

- When each version of gap analysis findings and recommendations will be published
- When each version of the decision framework along with decision-ready recommendations will be published – it is preferable to align this with the planning horizon and project initiation or ideation cycles
- EA Capability improvement (recruitment, training)
- A plan to gain visibility into developments within and outside the enterprise impacting the EA Landscape
- A plan to acquire the right tools to use for EA
- A plan to use modern tools to be collaborative and communicative

11.3 EA Capability Model

The ratio of projects or resources employed in the enterprise is normally several magnitudes higher than the capacity of the team providing the EA Capability. To replicate key efforts of the team providing the EA Capability, a capability model provides the template with which the EA function can be scaled to cover the entire enterprise.

While there are some publicly available EA Capability models, such as NASCIO or the World-Class Enterprise Architecture White Paper, none of them can be directly applied to an enterprise. Context under which they were developed never really matches an enterprise, but they provide a great foundation. Experience shows that using existing capability models in the enterprise or publicly available models as a reference or base accelerates assessment, delivery, and adoption. Analyze these models in terms of the EA Capability context and purpose before selecting the base. Starting with a single model and adding or modifying to meet specific needs of the enterprise vastly reduces time to finalize.

When the capability models presented in the World-Class Enterprise Architecture White Paper or the one shown in this Guide are not adequate, start with the TOGAF ADM phases as the base: manage business architecture, manage data architecture, identify architectural opportunities, and identify alternate viable options.

EA is not a standalone capability. EA is supported by functions like HR, marketing, and product research. The capability model should specify such supporting functions and the extent to which they are leveraged. In the earlier chapters of this Guide, a need for engagement modes with all stakeholders of the EA Capability was addressed. Specific attention was paid to initiating projects and the factors that influenced creation of projects.

To complete addressing all aspects for managing EA as a capability, the Leader should:

- Define and measure the team's ability to respond to changes in business environment, based on what has been learnt from collective experiences of the team
- Define practices for planning, developing, collaborating, governing, and managing architecture knowledge for the enterprise
- Identity, specify, and rollout an approach to training, infrastructure (tools and equipment), and support needs for the team providing the EA Capability
- Establish an environment to handle errors, reflect on efforts to improve continuously, and an ability to use data insights for decision-making
- While addressing the above dimensions, care must be taken to balance processes becoming shackles that anchor EA efforts to the need for agility and culture to respond to business stimuli; the measurement of success should be about assuring quality of work (providing decision-ready recommendations) with cost-optimized processes

Here are some of the sample models that could help:

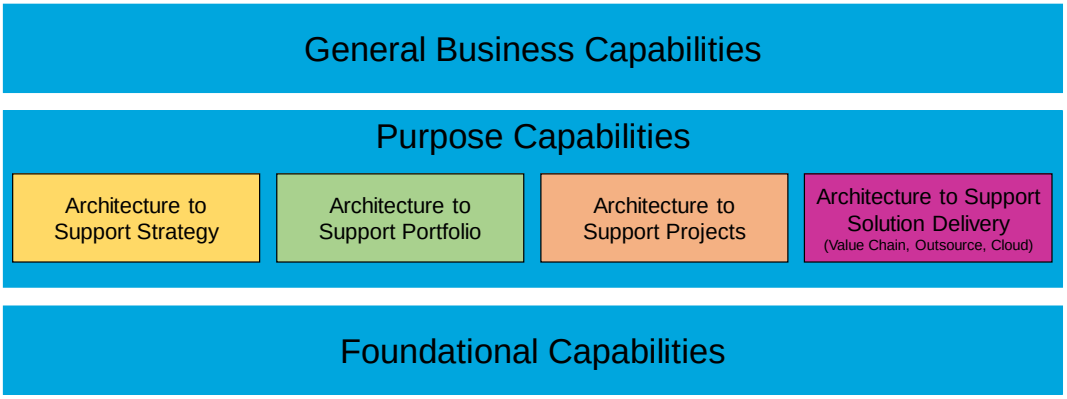


Figure 22: Sample EA Capability Model – I[25]

This model aligns to purpose. The purpose could be focused on operating EA or delivering value from EA *viz.*, operational capabilities, and separates common Foundational Capabilities or General Business Capabilities. The capabilities required to support each of the purposes are not presented in this Guide.

[25] Derived from the World-Class Enterprise Architecture White Paper.

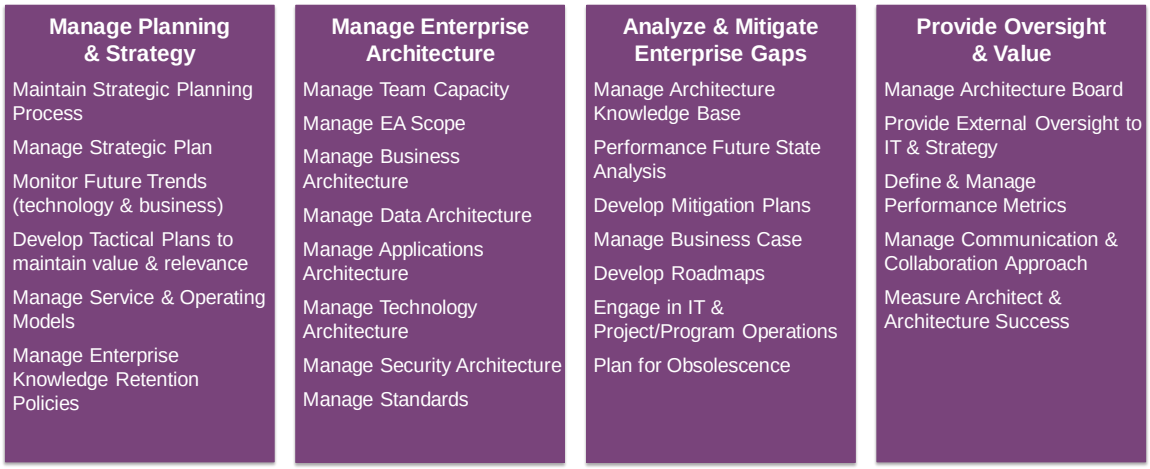


Figure 23: Sample EA Capability Model – II

The model shown in Figure 23 aligns to classic architecture domains and development of architecture to support strategy. When applied to an enterprise that manufactures packaging material for food products, "monitor future trends" would mean how to improve the shelf life of products using techniques developed for defense use. Inputs from such monitoring could call for changes to business and technology architecture – retooling the plants, scouting for new raw material suppliers, and new processes. Obsolescence of a product can arise from regulatory changes – like a ban on use of plastic bags or CFC-based coolants in air conditioners and refrigerators. In this connected world of distributed sourcing and just-in-time manufacturing, a focus on IT infrastructure is required to track any impacts arising from disruptions in the supply chain.

While a capability model makes it easy to establish an approach to measure the efficiency and outcome of the EA efforts, alternative approaches like process control or Balanced Scorecard are equally effective.

12 Establishing and Evolving the EA Capability

By defining the process to implement the EA Capability framework, governance framework, and a roadmap to implement and manage EA initiatives, there should be a blueprint to assure the outcome expected from the team providing the EA Capability. By defining the organization model for the EA Capability team and building the structure to capture and manage architectural contents, the team's ability to execute on the specified course of action (roadmap) is assured as well. Each of the chapters until now presented discrete topics of concern. This chapter is focused on providing the linkages across these topics to enable a "Sustainable EA" practice. It is better to use proven methods like a capability or value chain model to stitch the pieces together and formulate a management approach.

An EA Capability team is a collection of people (architects, analysts) who employ a set of common processes to manage the set of information about the organization to enable achievement of the enterprise's stated purpose. The EA Capability is the ability to develop, use, and sustain EA.

The enterprise's leadership are the EA Capability's customers. The Leader should articulate purpose, ethos, and delivery to its customers. Focus on the outcome the EA Capability will deliver; foundations for future scale and function clarity; and the flexibility to adapt and change with the enterprise's environment. Follow the same concepts of identifying the gaps, defining the constraints and controls, and incorporate the flexibility needed to periodically adapt the EA Capability when developing a roadmap.

This chapter deals with the concept of capability in the context of a management model that allows for innovative applications and redeployment across the enterprise.

12.1 Recap of Concepts

Up to this point in the Guide, generic leadership and management concepts relative to the EA Capability, including the incarnations it could have had in the past, were presented. Some of the key takeaways from that discussion are:

- Purpose of the EA Capability
- Development of, using, and managing architecture
- The relationship of EA with other disciplines within the enterprise
- It is necessary to refer to this Guide and the TOGAF ADM more than once to deliver value

Afterwards, the Guide discussed the importance of the organizational context and the need for an EA practice. During this conversation, differences between the organizational outcomes and team structure were discussed. While discussing process model, the Guide presented different organizational cycles and budgeting ceremonies. Likewise, governance, risk, reporting, and financial model presented views for implementation controls. We also discussed that the team

providing the EA Capability should assess why the architecture work has been initiated, readiness, and maturity in absorbing architectural information. This understanding drives the definition of the content model, viewpoints and views, and use of a repository.

Having gained knowledge about the organization and its intent to engage in economic activity (values and business motivations), the Guide discussed the objectives and need for setting up an EA Capability. One of the key principles to focus on is the value delivered to and iterated by the TOGAF ADM to the extent required to deliver value. It is imperative to scope the depth and breadth of the EA work commensurate with time and objectives. Later in this chapter, there is a discussion called Sustaining and Maturing (in Section 12.5) relating to leveraging the span of control the EA Leader currently has, expanding it, and thereby iterating the ADM cycle to keep adding value.

It may be a reality that there are people in the enterprise who perform architecture development without carrying appropriate titles or following a particular career path. Similar to following the money trail to create a forensic map of cash flow and value addition, following the artifacts will lead to where the architecture work gets done and who performs it. Creating a map of the diverse role titles to appropriate architecture domain roles will create a view of the architecture community. This is the community or extended team that the EA Leader should nurture and utilize to deliver EA Capability. To deliver on the charter, it is required to build the capability and capacity of the EA team, commensurate with the demand.

Then the Guide discussed selection, customization, and use of EA and related delivery assurance frameworks. It is important to identify and define the interaction points between product and service delivery strategy to the TOGAF ADM (or the customized architecture method). This can also be evolved as the breadth and depth of the mandate for EA work evolves. The following chapter discussed the need to have a governance model that balances how the team providing the EA Capability goes about development of architecture artifacts and how it engages with rest of the enterprise.

Finally, for the data that EA manages, the significance and need of structure, the Content Framework and Content Metamodel, and an automation tool were discussed.

12.2 Start with Purpose

In a world of multi-point competition, ease of availability of substitutes, and continuous pressure of quarterly fiscal results, organizations are forced to create waves of revenue models via new products and services, contractual commitments, or expansion of customer base.

Based on the alignment of the EA Capability team, the purpose for EA could be cost control, risk optimization, strategy development, or variants of these factors. Even if the charter evolves, expectation to deliver on the primary intent and focus generally does not go away. This assessment and grounding is based on the purpose for which the enterprise is engaged in the economic activity as well as why the team providing the EA Capability is formed.

Just like how the enterprise approaches identifying new models to generate revenue, suppliers of products and services to the enterprise also come up with different methods, models, or versions of their products to force changes to the ecosystem. Based on the assessment of the enterprise, the EA team will have to identify and project out when the enterprise will have to start engagement with these emergent technologies and concepts. The EA Capability team acts as subject matter experts in providing a review of the emergent concepts, technologies, and patterns

to the stakeholders and decisions-makers. Such review documents should align with the purpose for which the EA Capability effort was created.

One of the key advantages an Enterprise Architect has is the ability to look at the system under discussion without any bias to the views of the executives and implementers, customers or support personnel, and security or compliance officers or developers, technology or time. When an Enterprise Architect presents a balanced view, supported with rationale addressing future needs, trade-off conditions applied, accounting for culture of the company, teams generally gravitate towards common goals setting aside emotional favorites. Stakeholders invariably want this insight from the Enterprise Architects to validate that they are on the right path or to fail fast and course correct with the least sunk cost. The expectation is also that the Enterprise Architect provides an honest impact assessment and risk mitigation alternatives. Experience has shown that raising what could normally be perceived as the most uncomfortable set of questions instigates a chain of positive changes in the enterprise.

The EA team should create a periodic assessment of readiness the enterprise has for adopting EA practices or new technologies – the next leap of value delivery. This assessment helps the team providing the EA Capability to time the case for expansion of the charter. Ambitions for growth in charter as well as maturity aside, the goal is to ensure that the team providing the EA Capability stays relevant and current with the ecosystem and business needs.

12.3 Trusted Advisor and Instigator of Change

Most organizations today are not starting blue ocean strategies;[26] several of their initiatives are the $n+1^{th}$ attempt to solve a business problem. In such scenarios, when solution alternative evaluation or solution development efforts begin, modern lean methodologies do not lend themselves to view the broader context of the enterprise. An Enterprise Architect understands inter-dependencies within and outside the enterprise and can guide the teams to create appropriate points of isolation. An EA team should communicate clearly and continuously the shared vision for the enterprise and how all stakeholder groups are coming together behind that vision. Moving the focus of the vision from the typical inside-out view to an outside-in view elevates the thinking of key decision-makers. Instilling the thinking for points of isolation to manage change and to manage rapid response to market dynamics brings trust in the people and, hence, to the team providing the EA Capability.

EA Capability teams that focus and deliver key organizational transformations are statistically more successful than teams that focus on standards, reference architectures, processes, and governance structures. Such a demand at times has caused scale issues for the team providing the EA Capability. To scale, successful EA teams have employed techniques like franchising typical work such as impact assessment questions and trade-off considerations. To employ such techniques, the process should be well defined.

When engagement opportunities to land organizational changes or to franchise are not directly available, the development and publication of point of view documents has proven to be a successful technique to influence change. Monitoring and assessing which points of view get read and by whom presents the stakeholder interest. Tracking the changes those stakeholders

[26] For more on blue ocean strategy, see Blue Ocean Strategy: How to Create Uncontested Marketspace and Make the Competition Irrelevant, by Kim and Mauborgne (see Referenced Documents). Do not confuse this with green field work. Some efforts may be green field within an enterprise, but the pattern may have been solved elsewhere. There is value in such cross-pollination, and the EA team will play the role of a trusted advisor.

initiate results in peer-level acceptance. Communicate and share the credits of initiatives to establish the team as agents of change.

12.4 Change Management

As business dynamics change, organizations undergo change – informed by the team providing the EA Capability or otherwise. It is necessary for the EA Capability team to track changes in the external ecosystem and create point of view documents. To sustain and grow the EA Capability, the Leader should prepare a list of recommendations for the decision-makers about transformation(s) needed to keep the enterprise abreast or ahead of ecosystem changes. Some transformations may require a change in operating model and some just an alteration in product mix. The range of coverage in point of view documents may include changes in operating model, technology adoption, risk reduction, or the nature of services offered or trade-off criteria to mitigate. Depending on the charter, the EA Leader should indicate to the decision-maker when a hype would become a necessity or cost of adoption and risk of failure is balanced appropriately.

The trend since the new millennium is increased complexity of products and services that uniquely differentiate from potential current and future competitors. Some of these products and services reduce dependency on certain skill sets and some require new and specialized skills. Also, several products and services are being developed using deep collaboration with niche partners. The cost of collaboration has been falling, and diversity of service providers has been growing. Organizations have been shrinking the core and expanding at the edges. In such an era, success factors and competence drives the strategy based on how well the sets of activities performed by the enterprise dovetail with one another. When EA creates an enterprise map – that has the depth of capabilities, processes, technologies, training, investment flows – operational fit across teams and themes of strategy realization come to light. Once again, just like the advice provided to business, periodic development of the case for change of the EA Capability informs the team to update its skills and to stay ahead of rest of the enterprise.

In general, enterprise plans do not question the assumptions made for an effort nor do they justify clearly why something has to be done and when. Most of the business cases are based on the affordability of the enterprise to spend its resources. EA roadmaps present the reason for something to be done and present the alternatives – each with implications – tracing assumptions to predictive outcomes. In this approach, ease of change, validating change as time passes, and an assessment of "what the end looks like" can be painted clearly to guide organizational, product, or process change.

12.5 Sustaining and Maturing

To sustain and mature the EA Capability, the Leader should assess the capacity to execute and validate the possibility of change in charter or scope with the sponsors:

- A function-centric EA – focus would be on appropriate business and process architecture, technology sourcing, and cost of operations.
- A strategy-centric EA Capability – enablement of sustainable strategic advantage, leveraging technology as a business accelerator, balancing inside-out and outside-in perspectives. Irrespective of the nature of alignment, there is a need to have the members

of a team with varied styles of thinking and execution (star gazers, anthropologists, and planners).

- An IT-centric team – the challenges are going to be pivoted on CIO priorities: reducing cost of operations and agility to meet the business needs, keeping the ecosystem current with technological updates, and so on.

The styles of these people complement the enterprise capabilities at strategic (executive engagement), value addition (managing composition of the enterprise), and coordination (common services) levels. As one of the former CEOs of Shell Oil puts it: "*people are the difference*". EA – as much as it is about business strategy and technology – is people-centric. To grow the capability, the Leader's motivations should be grounded on people engagement. It is the responsibility of the Leader to nurture these three styles and find a balance for the people possessing them to be executing on a common set of principles and beliefs, namely: connectedness, inclusivity, and relevance.

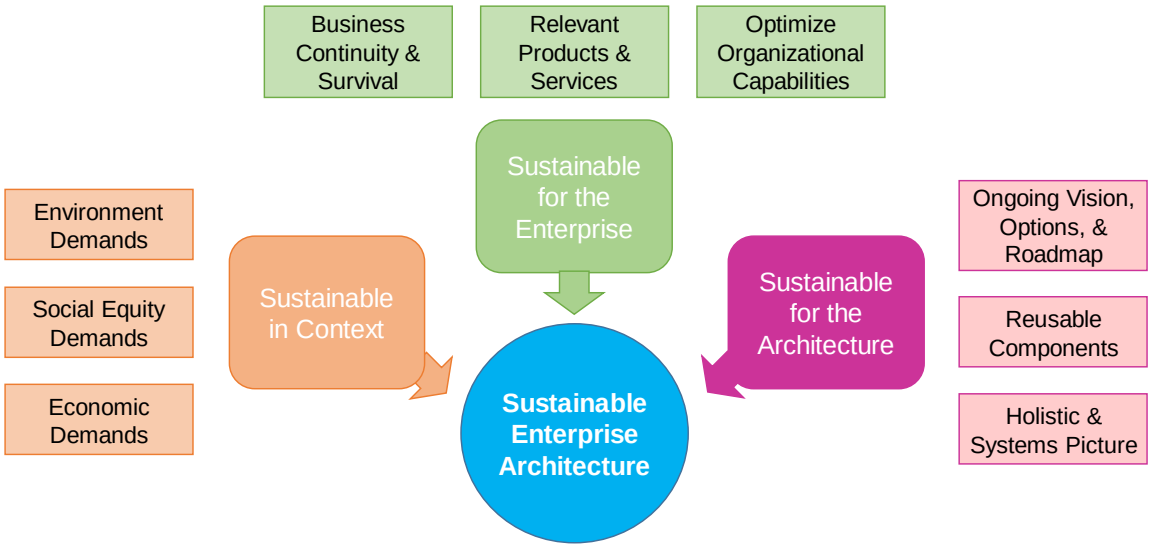


Figure 24: Sustainable EA

12.5.1 How to Engage and Promote Value Execution of the Internal Stakeholders

A team providing the EA Capability with adequate sponsorship has no cost or overhead to acquire new engagements. The challenge is that the buyer base of EA Capability is predefined – unless the enterprise decides to broaden its footprint. In this case, the focus should be about retention and repeat business from the same set of customers. Several techniques can be employed from the public relations and project management playbook to achieve this. Measure quantitatively and qualitatively to communicate every small improvement and value addition the EA Capability team has delivered in terms that are close to the primary and secondary consumer of the EA services. To sustain EA Capability, you need to focus on why, when, and how EA activities are performed and how the output produced by the team providing the EA Capability is being consumed and by whom.

When the sponsorship is challenging, the focus should be on soft-selling, like communicating the need to subscribe to a retirement or insurance plan. One of the successful methods employed when sponsorship has been insufficient is to develop a roadmap and an implementation plan with reasonable financial projections and present them to executives when annual budget

preparations are being initiated. Take time to understand or infer the strategy and direction of the enterprise from annual results, analyst calls, and objective statements of top 20 projects. Use this understanding to build a roadmap for at least one key business unit: if the focus is on improving sales, do it for marketing and sales; if the focus is operational cost management, create one for the operations team. There is heavy cost on acquiring sponsors. In a re-boot scenario, the cost is multi-fold higher.

In EA, there is no right, wrong, or singularity of approach. EA forces itself and its consumers to almost always think of trade-offs; it forces them to look at data to help navigate the chaos. What it achieves is removing the bias for repeatable process and cost optimization. It brings focus to consider all viable alternatives. The change in thinking of organizational leadership is an example of qualitative value addition. All architects in the team should think of developing a set of trade-off criteria that is current with strategic and operational challenges. Providing decision-ready alternatives creates better sponsorship and acceptance of an EA team.

Depending on the organizational culture, the EA team should question a few sponsorship assumptions, if the charter is not clear, and ask itself:

- What kind of financial control should the team providing the EA Capability have?

  There are differences in views – from managing just EA's operational cost (or considering the team providing the EA Capability as capital expense) to sponsoring technology research effort, all the way to validating every initiative for relevance and alignment to organizational goals.

- Should governance be used as a feedback mechanism for both architecture output and project conformance?

- Even though it is suggested earlier in this Guide to use the TOGAF ADM to the extent that immediate value can be realized and iterated, is it the right approach, given the culture of the enterprise?

- Given internal and external forces, should the EA operating model be target architecture or target operating model-driven?

- Should the planning be based on capabilities or process efficiencies and differentiation offered to customers?

- Depending on the charging model in the enterprise, what is the extent to which each of the project execution teams can be taxed for EA engagement?

One of the necessary periodic exercises is to move the focus of the enterprise and the team providing the EA Capability from rigor of documentation and static analysis to operational and strategic business outcomes. Experience shows that such a shift invariably results in increased sponsorship and demand for EA resources.

12.6 Building Community and Mentoring

There are a few things in the enterprise that are everybody's business – customer goals, quality goals, and EA. Every manager or product developer's decision has an impact on the goals of the enterprise. Procuring services or products from a supplier introduces friction between objectives and the operating model of the enterprise and that of the service provider. In addition to the risk

of engaging in an economic activity, the enterprise is now compounding its risk factors. Given the premise that EA reduces risk impact, objectives of service providers should be assessed periodically.

As the TOGAF ADM cycle is explored in iterations to achieve maturity, develop a playbook to replicate the success with new sets of players, not directly under the team providing the EA Capability's control. Success and sustainability of the team providing the EA Capability is determined by the belief of the next generation of personnel in the EA Capability team - the mentees of the team and that of the sponsor. Spreading the knowledge and practice of EA to new parts of the enterprise has never hurt the team providing the EA Capability.

Mentoring is one of the techniques to employ to achieve maturity and replication of EA efforts in other parts of the enterprise. Being a trusted advisor is a form of mentoring. Care must be taken to differentiate grooming budding architects and coaching organizational leaders. It is likely that architecture work happens in different parts of the enterprise, with people who don't have an architect title or are external to the enterprise. Develop deep and continuous engagement with such enthusiasts. Identify what aspects of the architecture work would become differentiators and intellectual property of the enterprise. Promote the differentiators and those who are developing and curating those assets.

Identify the annual training cycles or online courses that the enterprise employs to build talent. Build targeted 20 to 30-minute talks on specific topics to create a pipeline of learning. Depending on the size of the enterprise, augment such training topics with periodic architecture summits. Another approach is consideration for individuals going through technical specialty or architect certifications. Pay attention to what certifications are being pursued – architecture processes or architecture development. Differentiate expertise in architecture method and practice from thought leadership with architecture.

12.7 Tools and Techniques

In simple terms, create a standard operating procedure and execution process for the EA Capability. Tools without interoperability or seamless integration leave room for manual efforts and out-of-sync versions. Out-of-sync versions result in effort cleansing the information instead of effort delivering insights and intelligence. As a Leader, spend time and effort to get the right repository to hold the EA data with considerations for interoperability and reducing rework for downstream work.

Care must be taken to differentiate a project document repository and an EA repository. EA artifacts and project artifacts feed each other. Any tool or process that requires part of the work to be recreated in different tools will lead to failure of adoption.

Categories of documents and repositories to consider are:

- Diagram and visualizing tools for architecture
- Diagram and visualizing tools for solution and technology design
- Standards catalogs (industry, business domain, enterprise) and look-up tools to understand the details of the standard
- Readiness and maturity assessments and progression management tools

- Roadmap management tools, potentially with time series analysis capabilities
- Financial and investment analysis tools
- Architecture evolution management tools

Part 5: Mapping to the TOGAF Framework

13 Mapping the EA Leader's Guide to the TOGAF Framework

The EA Leader's approach described in this Guide can be mapped to two central elements in the TOGAF framework: the Architecture Development Method (ADM) and the TOGAF Content Framework.

The activity described in this Guide follows the ADM's Preliminary Phase; the Preliminary Phase is a customized path through the TOGAF ADM. This journey highlights a practical example of the TOGAF concept of iteration, answering the correct question at the right level of detail to inform the next question and decision.

The answers to the questions represent information that may be aligned with the contents of the TOGAF Content Framework. How this information is rendered is dependent upon:

- How the EA team is structured
- The tools it uses
- The nature of the EA Repository
- How the EA Capability performs information management

High-functioning teams will take a more rigorous approach to information management (EA Content Framework), employ a more formal architecture description discipline (EA Content Metamodel), and utilize purpose-built modeling and repository management tools (EA Repository). For more detail, see Section 8.4 (Information Managed by the EA Capability).

13.1 Mapping the EA Leader's Guide to TOGAF ADM Phases

The Preliminary Phase is designed as a customized journey of the TOGAF ADM. This journey is predicated on the best practice of developing EA. The ADM is not a linear process model; rather it is a logical method that places key activity steps together for the purpose of understanding the relationship of activity and clarifying information flow. In Table 9 several TOGAF ADM phases are entered iteratively. Partial indicates work only to the extent needed to answer the question at hand. More elaboration can be done in subsequent architecture work.

For a graphical representation of this journey see Figure 19. The graphic in Figure 19 focuses on Phase A. It highlights that in order to complete Phase A, some amount of work is needed in Phases B, C, and D. The ADM is used to develop the EA. There is no difference between exercising the ADM to architect an EA Capability, a finance capability, a portfolio, or an organizational strategy. We are using the concepts of ADM to support two different activities. Application of steps in ADM phases is limited by the context of supporting the EA Capability.

Table 9: Activity and Key Deliverables

Topic	Mapping to TOGAF ADM Phase
Enterprise Context and EA Context (Chapter 4)	Partial Strategic Level Phase B Enterprise context: • Goals, objectives, initiatives, competitive, and tactic analysis • Operating model (partners, suppliers) • Explore what-if scenarios and scorecards EA context specific for the EA Capability: • Goals
Business Objectives for the EA Capability (Chapter 5)	Capability Level Phase A For the EA Capability: • Provide initial goals and objectives • Select a reference EA Capability and maturity model • Candidate EA Capability • Candidate operating model • EA Capability gap and priority roadmap
Architecture Governance (Chapter 6)	Partial Segment/Capability Level Phase B For the enterprise: • Enterprise Risk Management Model • Governance Model For the EA Capability: • Risk Management Model • Governance Model • Extend candidate operating model to include EA governance • Initial Architecture Partition Model • Trace to EA Capability goals

Topic	Mapping to TOGAF ADM Phase
Alignment with Other Frameworks (Chapter 7)	Partial Capability Level Phase B & Partial Phase C (Data) For the enterprise: • Reference models for key frameworks • Capability assessment of key frameworks For the EA Capability: • Framework touch-points • Extend candidate operating model to include other frameworks • Extend EA governance and EA risk management • Initial EA Content Framework aligned to other frameworks and EA governance • Candidate architecture partition model • Trace to EA Capability goals • EA Capability and key framework gap and priority roadmap
Customization of Architecture Contents and Metamodel (Chapter 8)	Capability Level Phase C (Data) For the EA Capability: • EA Content Framework • EA Content Metamodel • Viewpoint Library • Architecture Repository Model • Trace to EA Capability goals • Initial EA Content Framework and architecture repository gap
Organization Model for the EA Team (Chapter 9)	Partial Capability Level Phase B For the EA Capability: • EA organizational model • Select reference EA skills framework • Initial alignment with enterprise job titles and roles • Initial accountability matrix for EA Content Framework and initial architecture repository • Organizational gap and priority roadmap

Topic	Mapping to TOGAF ADM Phase
Process Model (Chapter 10)	Partial Capability Level Phase B Capability Level Phase C (App) and Capability Level Phase D For the enterprise: • Process model highlighting touch-points between EA Capability and enterprise processes the EA Capability supports[27] • Performance matrix for key processes and organization • Accountability matrix for EA Content Framework and organization For the EA Capability: • Process model • Architecture repository application model • Matrix for EA Content Framework and architecture repository application architecture • Process and architecture repository gap and priority roadmap
Create the EA Capability Roadmap (Chapter 11)	Capability Level Phase E Create a roadmap highlighting development of the EA Capability by changes in the: • Organizational model • Process model • EA Content Framework • Architecture repository For the EA Capability: • Trace roadmap to EA Capability goals
Establishing and Evolving the EA Capability (Chapter 12)	Capability Level Phase F and Capability Level Phase G For the enterprise: • Transition the EA Capability Roadmap to an Implementation & Migration Plan For the EA Capability: • Execute the Implementation & Migration Plan to build the EA Capability your enterprise desires

[27] While this has been stressed in the Guide, align to processes the EA Capability is expected to support based upon its purpose. Do not align to those it could support. Worst practice is to fret over linkage to processes the EA Capability *could* support.

13.2 Mapping EA Content, EA Leader's Approach, and Metamodel

None of the questions or concerns raised in this Guide are purely technical or isolated to a single field or dimension. To deliver on the expectation of EA Capability, other frameworks and best practices should be brought together and customized to meet specific needs of the enterprise's environment, roles, and responsibilities.

Based on the activities discussed in this Guide, here is a sample mapping of information and where it maps to the generic TOGAF Content Metamodel.

Table 10: Mapping to TOGAF Content Metamodel

Note: Mapping is dependent upon the final metamodel.

Topic	Content	TOGAF Content Metamodel Grouping
Enterprise Context and EA Context (Chapter 4)	Goals, strategies, objectives, initiatives, success measures Plans (business, strategy, workforce, cash flow) Competitive and tactic analysis, operating model, what-if scenarios, scorecards Locations, partners, suppliers	Business Architecture Portfolio Management Project Management Financial Management
Business Objectives for the EA Capability (Chapter 5)	Strategies, objectives, initiatives, success measures	EA Capability and Maturity Model
Scoping the Depth and Breadth of Business Impact with the EA Capability (Section 9.5)	Process diagrams and models, service and servicing models, portfolio and investments, demand/need descriptions People, skills, organizational charts	Business Architecture EA Capability and Maturity Model Reference Architectures and Standards
Business Objectives for the EA Capability (Chapter 5) Alignment with Other Frameworks (Chapter 7) Organization Model for the EA Team (Chapter 9) Process Model (Chapter 10)	People, skills, organizational charts Customer interaction options, types/modes, tools, demands, security/privacy management plans, operational continuity plans Information system data – requirements, applications, tools, solutions, defects, methods/methodology Geospatial data IT networks and their connectivity/interaction maps	EA Capability and Maturity Model Requirement Management Operating Models Change Management Maturity Management Information Technology Lifecycle Management

Topic	Content	TOGAF Content Metamodel Grouping
Architecture Governance (Chapter 6) Process Model (Chapter 10)	Knowledge management plans, information exchange matrix, events and interactions list, roles, responsibilities, escalation plans	Risk Management Governance Model

Part 6: Appendices

A Partial List of EA Content Frameworks

Table 11 provides a list of alternative EA Content Frameworks. Specific mapping White Papers exist between the TOGAF Standard and BIAN, DoDAF, Frameworx, and SABSA (see Referenced Documents).

Table 11: List of EA Content Frameworks

Framework	Framework Description
AGATE	The France DGA Architecture Framework
BIAN	Banking Industry Architecture Network
Deloitte EAF	Deloitte Consulting Enterprise Architecture Framework
DNDAF	The Department of National Defence Architecture Framework (Canada)
DoDAF	The US Department of Defense Architecture Framework
FDIC-EAF	FDIC Enterprise Architecture Framework (US)
FEAF	Federal Enterprise Architecture Framework (US)
Frameworx	TM Forum
GEA	Government Enterprise Architecture – Queensland Government
MoDAF	The UK Ministry of Defense Architecture Framework
NAF	The NATO Architecture Framework
Navigate	Conexiam Enterprise Architecture Content Framework
NIST EA	NIST Enterprise Architecture framework (US)
NORA	Nederlandse Overheid Referentie Architectuur (The Netherlands)
OBASHI	The OBASHI Business & IT Methodology and Framework
OEAF	Oracle Enterprise Architecture Framework
PEAF	Pragmatic Enterprise Architecture Framework
PERA	Purdue Enterprise Reference Architecture Framework
SABSA	The SABSA Institute Enterprise Security Architecture

Framework	Framework Description
TEAF	Treasury Enterprise Architecture Framework (US)
UAF	United Architecture Framework (replacement for UPDM)
UPDM	United Profile for DoDAF and MoDAF
Zachman	Zachman Framework

B Maturity Models

Note that most maturity models use the term "maturity" to measure the ability of an organization to control change of a capability or process; common usage associates maturity with quality of delivery. We recommend you are very clear on your usage and objective when referencing a maturity model.

- US Department of Commerce (DoC) has developed an IT Architecture Capability Maturity Model (ACMM) to aid in conducting internal assessments
- Software Engineering Institute (SEI) Capability Maturity Model (CMM); refer to: http://cmmiinstitute.com/
- US Government's Office of the CIO Maturity Models; refer to: http://ocio.os.doc.gov/s/groups/public/@doc/@os/@ocio/@oitpp/documents/content/prod01_002340.pdf and http://ocio.os.doc.gov/ITPolicyandPrograms/Enterprise_Architecture/PROD01_004935
- National Association of State Chief Information Officers (NASCIO) EA Maturity Model; refer to: www.nascio.org/publications/documents/nascio-eamm.pdf
- Innovation Value Institute; refer to: http://ivi.nuim.ie/understanding-it-cmf and http://ivi.nuim.ie/service-management-capability-assessment
- US Government Office of Management and Budget's Enterprise Architecture Assessment Framework; refer to: www.whitehouse.gov/omb/e-gov/eaaf/

C Suggested Reading

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- Strategy Safari: A Guided Tour through the Wilds of Strategic Management, H. Mintzberg, J. Lampel, B. Ahlstrand, 2005
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Acronyms and Abbreviations

ACMM	Architecture Capability Maturity Model
ADM	Architecture Development Method
AEA	Association of Enterprise Architects
APQC	American Productivity and Quality Center
BIAN	Banking Industry Architecture Network
BPMN	Business Process Model and Notation
CAPEX	Capital Expenditure
CEB	Corporate Executive Board
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CISR	Center for Information Systems Research
CMM	Capability Maturity Model
COGS	Cost of Goods Sold
DNDAF	The Department of National Defence Architecture Framework (Canada)
DoC	Department of Commerce (US)
DoDAF	Department of Defense Architecture Framework (US)
EA	Enterprise Architecture
EPCM	Engineering, Procurement, Construction, and Management
ERM	Enterprise Risk Management
FFLV	Functions, Flows (Processes), Layers, and Views
GAAP	Generally Accepted Accounting Principles
IoT	Internet of Things
IRR	Internal Rate of Return
ITGI	IT Governance Institute
M&A	Merger and Acquisition

NASCIO	National Association of State Chief Information Officers
NPV	Net Present Value
OPEX	Operating Expenditure
PMI	Project Management Institute
PMO	Project Management Office
POS	Point of Sale
ROI	Return On Investment
SCOR	Supply Chain Operations Reference (model)
SEI	Software Engineering Institute
SFIA	Skills Framework for the Information Age
SWOT	Strengths, Weaknesses, Opportunities, and Threats
UML	Unified Modeling Language

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Enabling Enterprise Agility

The Open Group TOGAF® Series Guide

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Enabling Enterprise Agility

The Open Group TOGAF® Series Guide

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Preface

The Open Group

The Open Group is a global consortium that enables the achievement of business objectives through technology standards. With more than 870 member organizations, we have a diverse membership that spans all sectors of the technology community – customers, systems and solutions suppliers, tool vendors, integrators and consultants, as well as academics and researchers.

The mission of The Open Group is to drive the creation of Boundaryless Information Flow™ achieved by:

- Working with customers to capture, understand, and address current and emerging requirements, establish policies, and share best practices
- Working with suppliers, consortia, and standards bodies to develop consensus and facilitate interoperability, to evolve and integrate specifications and open source technologies
- Offering a comprehensive set of services to enhance the operational efficiency of consortia
- Developing and operating the industry's premier certification service and encouraging procurement of certified products

Further information on The Open Group is available at www.opengroup.org.

The Open Group publishes a wide range of technical documentation, most of which is focused on development of Standards and Guides, but which also includes white papers, technical studies, certification and testing documentation, and business titles. Full details and a catalog are available at www.opengroup.org/library.

The TOGAF® Standard, a Standard of The Open Group

The TOGAF Standard is a proven enterprise methodology and framework used by the world's leading organizations to improve business efficiency.

This Document

This document is a TOGAF® Series Guide: Enabling Enterprise Agility.

It has been developed and approved by The Open Group.

The high-level structure of this document is summarized as follows:

- Chapter 1 provides an introduction to this document, including what is meant by agility, the role of Enterprise Architecture, and its relation to agility
- Chapter 2 includes the terms and definitions for this document

- Chapter 3 describes the TOGAF Architecture Development Method (ADM) and how that relates to agility
- Chapter 4 looks at how architecture activities can be structured to support agility
- Chapter 5 considers how to execute Enterprise Architecture in an Agile environment

The audience for this document is Enterprise Architects requiring information on how to adapt and use the TOGAF framework to support an Agile enterprise.

About the TOGAF® Series Guides

The TOGAF® Series Guides contain guidance on how to use the TOGAF Standard and how to adapt it to fulfill specific needs.

The TOGAF® Series Guides are expected to be the most rapidly developing part of the TOGAF Standard and are positioned as the guidance part of the standard. While the TOGAF Fundamental Content is expected to be long-lived and stable, guidance on the use of the TOGAF Standard can be industry, architectural style, purpose, and problem-specific. For example, the stakeholders, concerns, views, and supporting models required to support the transformation of an extended enterprise may be significantly different than those used to support the transition of an in-house IT environment to the cloud; both will use the Architecture Development Method (ADM), start with an Architecture Vision, and develop a Target Architecture on the way to an Implementation and Migration Plan. The TOGAF Fundamental Content remains the essential scaffolding across industry, domain, and style.

About the Author

See the Acknowledgements section for more information on contributions to this document. Please note that affiliations were current at the time of approval.

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Referenced Documents

The following documents are referenced in this TOGAF® Series Guide.

(Please note that the links below are good at the time of writing but cannot be guaranteed for the future.)

[1] *The TOGAF® Standard, 10th Edition, a standard of The Open Group (C220)*, April 2022, published by The Open Group; refer to: www.opengroup.org/library/c220

[2] *Agile Manifesto*, 2001, by Kent Beck, et al.; refer to agilemanifesto.org

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[11] *TOGAF® Series Guide: The TOGAF® Leader's Guide to Establishing and Evolving an EA Capability (G184)*, April 2022, published by The Open Group; refer to: www.opengroup.org/library/g184

[12] *TOGAF® Series Guide: A Practitioners' Approach to Developing Enterprise Architecture Following the TOGAF® ADM (G186)*, April 2022, published by The Open Group; refer to www.opengroup.org/library/g186

Chapter 1. Introduction

This document describes in general terms how the TOGAF® Standard [1] can be adapted to support an "Agile enterprise". It is written to be applicable to any Agile delivery method that follows the commonly accepted Agile approach of iterative development through a series of sprints. It will be supported by other standards, guides, white papers, and case studies from The Open Group, which will provide more detail about specific approaches.

1.1. What is Meant by Agility and Why is it Important?

Enterprise agility is a commonly used term but the exact definition differs among practitioners. The most common characteristics include:

- **Responsiveness to change**: a flexible approach that anticipates and explicitly plans for change, typically involving short iterations and the frequent reprioritization of activities
- **Value-driven**: activity is driven by delivering value; priorities are continually re-assessed to deliver high-value items first and work on intermediate products and documentation is minimized
- **Practical experimentation**: a preference for trying things out and learning from experience as opposed to extensive theoretical analysis, sometimes characterized as "fail fast"
- **Empowered, autonomous teams**: skilled, multi-disciplinary teams work closely together, taking responsibility for their own decisions and outputs
- **Customer communication and collaboration**: working closely with the customer and adapting to their needs; valuing collaboration and feedback over formalized documentation and contracts
- **Continuous improvement**: the internal drive to improve the way an organization performs
- **Respect for people**: people are put first, above process and tools – they are treated with respect; flexibility, knowledge transfer, and personal development are high priorities

Regardless of how the term enterprise agility is defined, it is important because it enables an enterprise to better react to change by being more customer and product-centric, more efficient, and better able to ensure regulatory compliance.

The term Agile is typically associated with the Agile Software Development Process derived from the Manifesto for Agile Software Development [2]. While Agile principles and techniques can be applied to adapt the TOGAF framework, enterprise agility is a broader context than Agile. Therefore, additional techniques are employed in adapting the TOGAF framework to an Agile enterprise.

1.2. What is the Role of Enterprise Architecture?

Enterprise Architecture provides a framework for change, linked to both strategic direction and business value. It provides a sufficient view of the organization to manage complexity, support continuous change, and manage the risk of unanticipated consequences.

Enterprise Architecture is:

- A description of the elements within an organization, what they are meant to achieve, how they are arranged, how they perform in practice, and how they respond to change
- A framework (structure, approach, and process) for managing change to those elements and their arrangement; to continuously adapt to organizational change in line with strategy (goals and objectives) and circumstances (specific requirements)
- The practice of acting to manage and evolve the Enterprise Architecture at all levels of control, change, and pace

The TOGAF Standard is a framework for identifying and implementing change, and provides:

- A definition and description of a standard cycle of change, used to plan, develop, implement, govern, change, and sustain an architecture for an enterprise; see the TOGAF Architecture Development Method (ADM)
- A definition and description of the building blocks in an enterprise used to deliver business services and information systems (see the TOGAF Content Framework)
- A set of guidelines, techniques, and advice to create and maintain an effective Enterprise Architecture and deliver change through new Solution Architectures at all levels of scale, pace, and detail

1.3. The Demand for Agility is Not New!

The US Clinger-Cohen Act of 1996 was a major driver for the adoption of Enterprise Architecture because it required investment in new IT systems (in the US public sector) to demonstrate fit with existing systems. Almost immediately, it was recognized that it is not practical to develop a full Enterprise Architecture from the “top down”; it is necessary to structure work into smaller units to respond to the specific needs of the enterprise in a timely manner, and to have some form of “integration architecture” to ensure the pieces fit together and are aligned with the strategic direction of the enterprise.

The TOGAF framework has embraced the call to respond to the needs of the enterprise in a timely manner, through the concepts of “partitions” and “levels”. Partitions define how the work is broken down into multiple architecture initiatives. Levels define how the overall architecture can be developed at different levels of granularity and detail.

Each architecture initiative needs to be scoped to address the specific needs of the enterprise to be addressed.

The major scoping dimensions are:

- Breadth (subject matter): what is the full extent of the enterprise, and to what extent will this architecting effort deal with it?
- Depth (level of detail): to what level of detail should the architecting effort go?
- Time period: what is the time period that needs to be articulated for the Architecture Vision?

- Architecture domains: a complete Enterprise Architecture description should contain all four architecture domains (Business, Data, Application, Technology), but the realities of resource and time constraints often mean there is not enough time, funding, resources, or need to address them all

The TOGAF Standard allows users to use the TOGAF ADM in an iterative way. The ADM can be used to deliver value incrementally following different iteration approaches. The concept of iteration is deep-rooted within the TOGAF ADM; as described in the TOGAF Standard – Applying the ADM (Applying Iteration to the ADM) [1].

Iterative development, such as Agile practices like sprints with shorter iterations, is a useful technique to obtain early stakeholder feedback and results. It enables the Enterprise Architects to deliver value earlier and iteratively, whether in a planned or emergent manner.

Dividing work into sprints does not only mean dividing work into small pieces, but also learning by doing in short cycles and adapting the work accordingly.

1.4. How Does that Relate to Today's Imperative for Increased Agility?

There is an ongoing demand for the size and timescale of architecture segments and increments of capability to become ever shorter. This in turn is resulting in a tendency for enterprises to skip the development of Strategic and Segment Architectures, which in turn is resulting in some high-profile IT failures because of the unanticipated consequences of what appeared to be minor changes.

The TOGAF Standard recognizes the need to recursively break down the Enterprise Architecture into more granular levels that can be architected following an Agile approach.

Partitioning the architecture work is key for Agile delivery and implies the definition of segmentation based on the Strategic and Segment Architecture concepts as explained before.

These smaller pieces, that cover a specific area of the organization, can then be more easily specified and implemented following an Agile approach, enabling a cross-cutting view across the TOGAF domains.

The first step is to identify the segments scoped to address specific needs keeping the alignment with the Strategic Architecture. Once these segments have been identified they can be refined further into Capability Architectures that can be specified and implemented following an Agile approach.

These Capability Architectures, delivered in increments, can be used to iteratively construct the final outcome (product, service, or solution). These iterations can be conducted in parallel depending on the level of interdependency between them. And, as stated in the TOGAF Standard – Applying the ADM (Applying Iteration to the ADM), Capability Architectures corresponding to a Segment Architecture can also be performed in parallel.

The following chapters will explain these concepts in more detail; see in particular Section 4.1.

Chapter 2. Definitions

For the purposes of this document, the following terms and definitions apply. The definitions within the TOGAF Standard or the Merriam-Webster's Collegiate Dictionary should be referenced for terms not defined in this section.

2.1. Agile

To move/change quickly and easily, often to provide value-generating outcomes.

2.2. Agile Architecture

1. The "act" – the development of architecture that reacts quickly and easily to changes through the delivery of iterative architectures that provides incremental value-generating outcomes.
2. The "thing" – an architecture that is flexible; i.e., easy to change or adapt.

2.3. Agile Product Owner

A member of an Agile product team responsible for defining user stories and prioritizing the backlog, ensuring these are understood by other team members while maintaining the conceptual integrity of the features or components for the delivery team. In the TOGAF framework, product has a wider context, but is used here in the Agile product context.

2.4. Minimum Viable Architecture

An architecture that enables the delivery of product features with just enough content to be deployed in a given phase of a project and satisfies known requirements (especially quality attribute requirements), and no more.

2.5. Minimum Viable Product

The smallest possible outcome that generates acceptable learning, delivery of value to the customer (internal or external), and is a basis for future extension.

2.6. Product

An outcome generated by the business to be offered to customers. Products include materials and/or services.

Chapter 3. Overview of the TOGAF Architecture Development Method

The core of the TOGAF framework is the TOGAF ADM. At first sight, the iconic graphic of the TOGAF ADM reinforces the perception that Enterprise Architecture is a lengthy, “waterfall” process; see Figure 1.

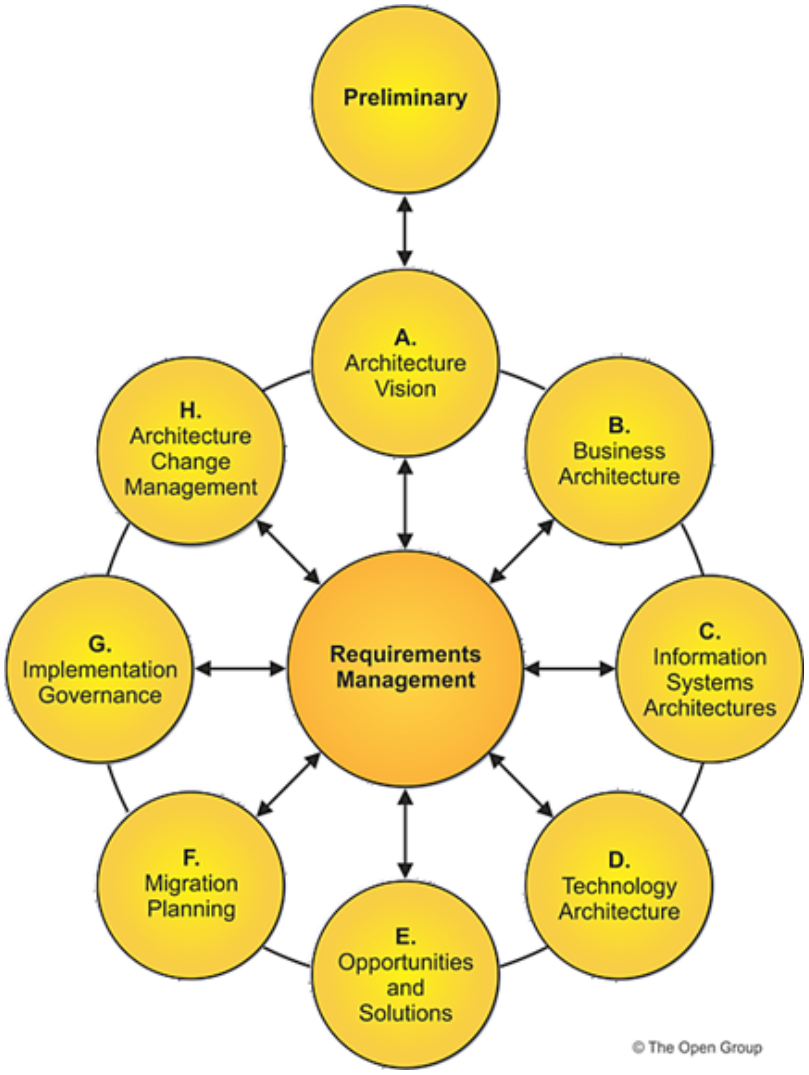

Figure 1. The TOGAF ADM

However, it is important not to infer statements from the TOGAF framework that are not present. The TOGAF ADM does not:

- Mandate that the steps must be performed in the sequence shown
- Mandate a “waterfall” process; i.e., that each phase must complete before the next begins
- Specify the duration of any phase or cycle of architecture development

The TOGAF framework *does* recommend that the ADM be adapted to meet the needs of the enterprise; agility is one such need.

The TOGAF framework shows how the ADM provides a tested and repeatable process for developing architectures. Rather than viewing the ADM graphic as a process model, it is helpful to view it as a reference model, which defines what has to be done in order to deliver solutions with a rational structure and to identify the interactions and relationships between components across the enterprise. Understanding these interactions and relationships is critical to reducing risk and optimizing the approach.

The core concepts of Enterprise Architecture shown in the ADM graphic are applicable in the most Agile of environments. Phases A-H around the circumference show how architecture is progressively developed and applied to the downstream delivery activities.

Fundamentally, the TOGAF Standard supports what architects do – they understand, specify, and govern. The phases of the ADM are:

- Understand
  - Phase A – Architecture Vision: understand the problem/opportunity, sketch the solution, and identify the broad transition approach
  - Phases B-D – Business/Information Systems/Technology Architecture: identify what is needed (Architecture Building Blocks (ABBs))

    During these phases, a recommended practice is to identify the potential solution implementations (Solution Building Blocks (SBBs))
- Specify
  - Phase E – Opportunities and Solutions: select from the candidate set of SBBs to best fit with the ABBs of Phases B to D and how they will interoperate to deliver the business service levels required, and the most appropriate implementation transitions
  - Phase F – Migration Planning: organize the resources to deliver the transitions in a controlled fashion
- Govern
  - Phase G – Implementation Governance: ensure the reuse/build/acquisition and deployment activities are properly organized and deployed in line with the agreed contract and specifications
  - Phase H – Architecture Change Management: ensure that the change is properly planned, structured, and delivers the business value that is expected

In the next chapter, more detailed guidance is given about how the ADM and other parts of the TOGAF framework can be applied in Agile environments.

Chapter 4. Developing Architecture in an Agile Way

4.1. Different Levels of Detail Enable Agility

The TOGAF framework presents a model identifying three levels of detail that can be used for partitioning architecture development:

- Enterprise Strategic Architecture
- Segment Architecture
- Capability Architecture

These levels are illustrated in Figure 2.

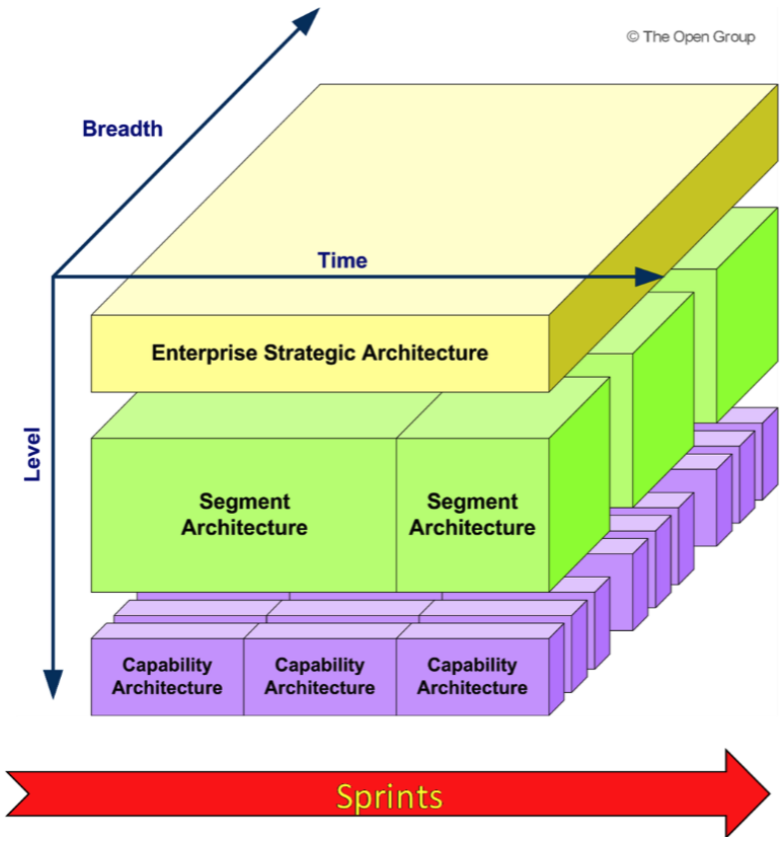

Figure 2. Summary Classification Model for Architecture Landscapes

This model must not be confused with the architecture domains; Business, Data, Application, and Technology Architectures may exist at all levels of detail.

Top-down, the *Enterprise Strategic Architecture* provides a high-level view of the area of the enterprise impacted by change. It enables understanding of the overall strategic direction of the enterprise at a high level, and must be sufficiently broad to establish the context within which the segments and

capabilities fit. It is necessary to plan and design the entire endeavor, and to avoid unanticipated consequences.

The middle layer, the *Segment Architectures*, typically provide direction at the portfolio, program, or product level. These large-scale segments are often aligned to natural boundaries of functionality.

The bottom layer, the *Capability Architectures*, are detailed descriptions of (increments of) business capabilities [3]. These may align to delivery sprints, or multiple sprints may be needed to deliver a capability. They are sufficiently detailed to be handed to developers for action. Sprints may occur at any level, but are most commonly associated with the delivery of capabilities or increments of capability. Sprints can occur in parallel.

A key consideration is that sprints are time-boxed and aimed at addressing a set of bounded objectives. The Capability Architecture increments should be tightly scoped to be achievable within sprint time boxes. More detailed guidance relating to sprints can be found in the TOGAF® Series Guide: Applying the TOGAF ADM using Agile Sprints [4].

The higher-level Enterprise Strategic and Segment Architectures should show the relationships and dependencies between capabilities and capability increments and provide the framework for planning and design, and the management of risk. They then provide the information needed to assess the impact of a proposed change. The Capability Architectures then show the relationship between capability increments.

Bottom-up, there is feedback from the implementation of capability increments which influences the higher levels. The Capability, Segment, and Enterprise Strategic Architectures may evolve as a result of experience gained from the deployment of each capability (or capability increment).

The Strategic Architecture is not static. It must evolve as the strategy of the enterprise evolves. In Agile enterprises, this will be more frequent than a “traditional” long-term strategic business plan.

It is vital to have appropriate governance to maintain the link between the business needs, Enterprise Architectures, and the Agile solution developments of the enterprise.

Two major factors to achieving successful agility at an enterprise level are:

1. Managing the scope, understanding when a new capability is needed, how much of the enterprise is impacted, and how different parts of the enterprise interact.
2. Having a sufficient understanding of the overall strategic direction of the enterprise, key business capabilities, and the relationships between them in order to minimize the risks of unanticipated consequences and piecemeal development, and identify any change which would detract from the overall strategy for the enterprise. This understanding facilitates an impact assessment of any proposed change.

4.2. Transition Architectures

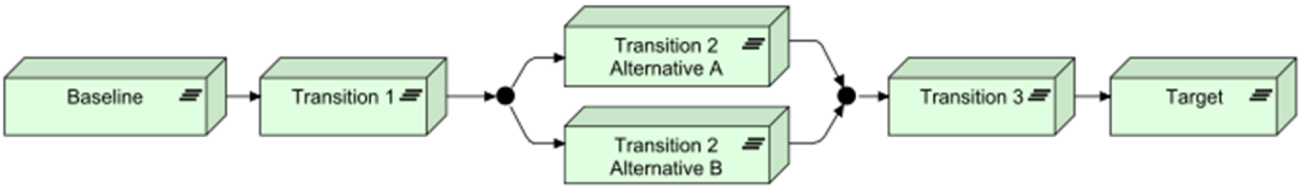

Figure 3. Transition Architectures

A *Transition Architecture* is a formal description of one state of the architecture at an architecturally significant point in time (see Figure 3), usually including a number of capability increments. It describes the roadmap to the desired outcome and ensures the stability of the complete system after its implementation. In Agile, the capability increments are usually implemented using sprints. Transition Architectures also provide a way of managing risk by helping to understand the incremental states of delivery. Transition Architectures are related to releases of business value to the stakeholders.

4.3. A Practical Approach to Structuring Agile Enterprise Architecture

A practical and proven approach to applying the multi-level approach through a hierarchy of ADM cycles is illustrated in Figure 4.

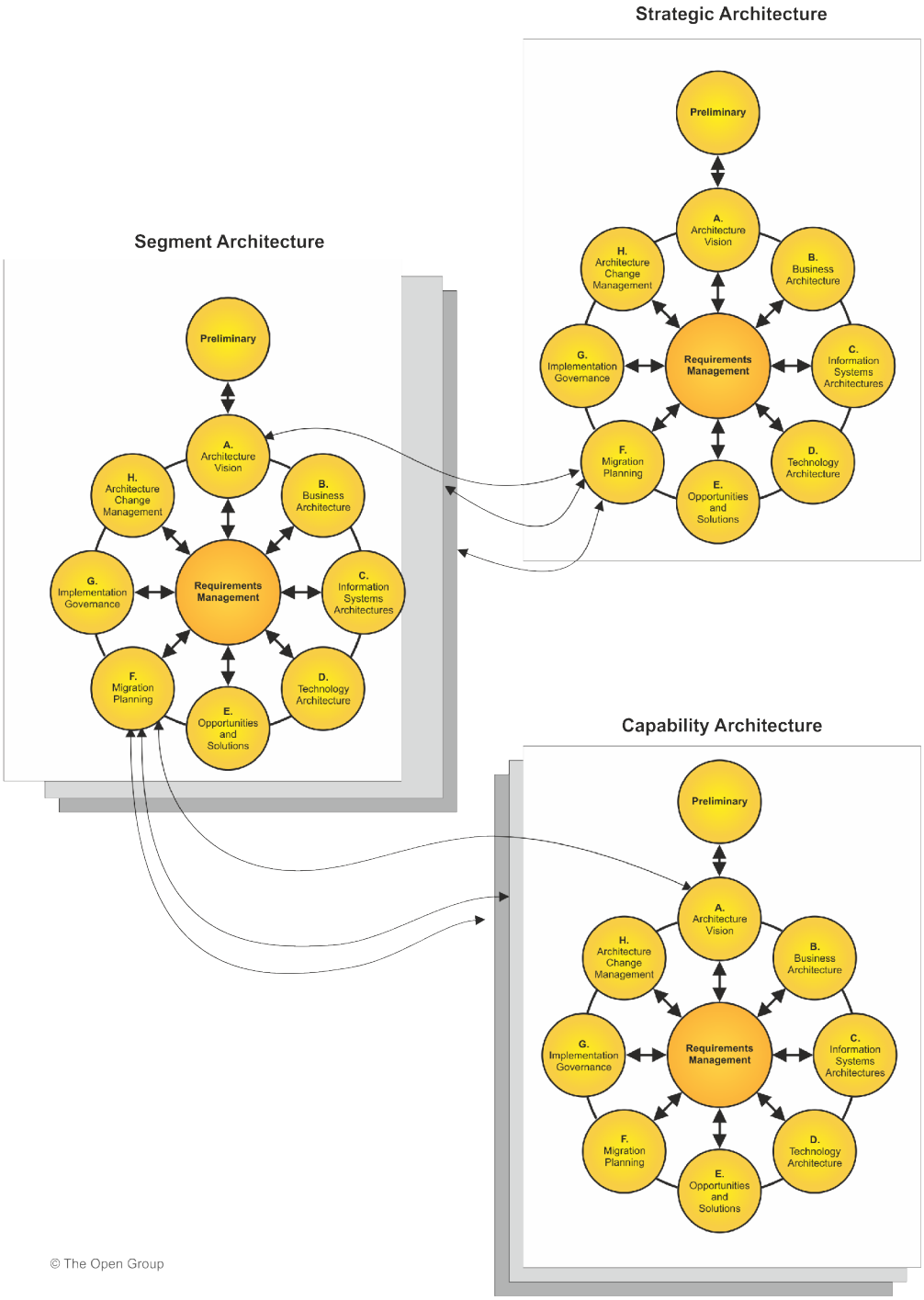

Figure 4. A Hierarchy of ADM Processes Example

As described in the previous section, TOGAF ADM phases do not have to proceed in sequence. The activities around defining Segment Architectures can start as soon as the relevant areas have been identified in the Strategic Architecture. Even if not all of these segments have been defined, architecture work can start in those that had already been identified. In a similar way, work on defining Capability Architectures need not wait until all Segment Architectures have been defined. Work on different segments and capabilities may proceed in parallel. The Strategic, Segment, and Capability Architectures are explained in more detail in Section 4.4.

Experience gained when developing a Capability Architecture should influence the higher-level

Segment Architecture. Experience gained when developing a Segment Architecture should influence the higher-level Strategic Architecture.

Agile delivery teams should collaborate closely with architects to ensure that the sprint teams understand and comply with architecture specifications (which may be expressed as guardrails or runways), and to enable rapid feedback to future architecture iterations.

It is important to keep in mind the big picture to ensure implementation teams remain aligned to the overall strategy. Therefore, a balance must be made between providing sufficient detail at each level, to give clarity and maintain alignment, *versus* exploring too much detail too soon ("Big Design Up Front" (BDUF)) without the benefit of feedback from delivery sprints. This is often referred to as the *Minimum Viable Architecture*.

4.4. Architecture Levels and Iterations

4.4.1. Strategic Architecture

In an Agile enterprise, Strategic Architecture is a high-level iteration supported by the TOGAF ADM Phase A, Architecture Vision. Strategic direction for the enterprise is defined in this iteration to support decision-making, and which may be further elaborated in Phase B to provide a high-level view of the organization landscape. It can also be used to identify required architecture and solution delivery capabilities.

Sometimes it is needed to also cover other TOGAF ADM phases, like B, C, and D, to have a clearer view on the whole landscape. In these cases, the iteration and architecture description should be high-level and not all TOGAF ADM phases will be needed.

This iteration provides identification and foundation for Segment Architectures, which can be delivered in parallel.

Key advantages for an Agile enterprise doing Strategic Architecture are:

- Provides understanding of the organization context needed to define the strategic themes, epics, and drivers; identify value streams, high-level requirements, and other broad features of the strategic direction and vision

  The Strategic Architecture provides a context for lower-level architectures.

- Confirms the basis to define guardrails for the product/service/solution delivery

- Identifies the high-level organizational capabilities necessary to deliver the entire endeavor: people skills, tooling, management tools, governance principles, etc.

- Provides an understanding of the organization landscape to shape migration planning roadmaps when loosely-coupled components are involved, thus providing the organization landscape to identify and implement the collaboration and integration needed between the relevant associated

teams

In the formation of these teams, consideration needs to be given to avoid following the organization's communication structure as the basis for the team structure. Instead the suggested approach is to consider shaping the enterprise's organization to make the Technology Architecture isomorphic with the Business Architecture.

- Input to define the backlog for the different segments (typically functional or organizational areas) that will be covered in subsequent iterations

The output of this iteration is used as input to define the backlog to be used in the different Segment Architectures.

4.4.2. Segment Architecture

A Segment Architecture is typically the specification of the product or business solution. It should be just enough architecture to identify features and functional and non-functional requirements – it may not be necessary to complete all ADM phases and steps, only the minimum needed to ensure outcomes are met. Several of these iterations can be delivered concurrently by different Agile teams. Delivery teams should be engaged during the definition of Segment Architectures to begin to build a common understanding of the solution to be delivered.

Key advantages for an Agile enterprise doing Segment Architecture are:

- Support for the definition of Capability-level backlogs
- Identify the capabilities/enablers and then the features and functionalities needed to deliver the product/service/solution
- Define the Key Performance Indicators (KPIs) needed ensure value is delivered in accordance with the vision and business objectives
- The final outcome should be the sufficient architecture to shape the products and solutions for every segment

  A segment consists of one or more products and SBBs. Just enough architecture should be delivered to enhance solution design, performance, and usability, and provide guidance for inter-team design and implementation.

- Specification at this level should be oriented to grouping things together at portfolio level to support Agile concepts that include epics, concurrent engineering, and planning for continuous delivery and integration of the target solution

Prototypes of the products or proofs of concept may be produced at this level to confirm that potential overarching solution patterns are possible.

Outputs of segment iterations are backlog items that will be the base upon which Agile teams can work

on the product and solution implementation.

This is consistent with one of the key topics mentioned in Section 1.1 about “practical experimentation”: a preference for trying things out and learning from experience as opposed to extensive theoretical analysis, sometimes characterized as “fail fast”.

4.4.3. Capability Architecture

Capability Architecture is the lowest level of architecture detail. It is intended to further elaborate the Segment Architecture to a level of detail sufficient to be used directly by delivery teams to implement the solution. Like Segment Architectures, many Capability Architectures may be developed in parallel.

Capability Architecture iterations support the definition of roadmaps based on architecture specifications considering the different elements and specifications for the target solution and addressing interdependencies. In a DevOps chain, Capability Architecture provides direct input to Continuous Integration (CI) and Continuous Deployment (CD). Capability Architecture outputs may be specific to one feature delivery and therefore to one delivery team (for example, a definition of some functional behavior), or may be cross-cutting across many features and teams (for example, a definition of an Application Programming Interface (API) management approach).

A Capability Architecture delivered by a sprint or even by a set of sprints depending on the scope should be incrementally and iteratively integrated into a delivery pipeline.

Key advantages for an Agile enterprise doing Capability Architecture are:

- Provides just enough detail from the higher-level architectures to define the implementation, and provides feedback to update the higher levels where necessary
- Developed Just-In-Time (JIT), to provide a forward “solution runway” for delivery sprints to consume, while avoiding unnecessary constraints
- Defines and refines the user stories that will be implemented by the different Agile teams
- Enables quality assurance and compliance activities for the solution deployment
- Enables traceability to confirm that the original objectives of the Strategic Architecture are being met

The final outcome from the Capability Architecture is the solution specification that will be constructed and deployed on demand following the architecture guidelines, metrics, and compliance considerations by Agile teams.

In this context, Agile delivery refers to delivering architecture specifications in an Agile way that will support subsequent Agile implementation (Agile solution delivery).

One important remark is the need to address the “fail fast” approach through the Strategic, Segment, and Capability Architectures; therefore, even though not explained in detail, the continuous review and retrospective of the specifications delivered should be tested so the adjustments needed can be addressed on time. For this retrospective to succeed it is key to have cross-level collaboration and

governance (this will be explained in detail in the next section). Therefore, having interdisciplinary autonomous teams is key. For more details on retrospective and sprint planning and reviews, see Section 3.2.2 in the TOGAF® Series Guide: Applying the TOGAF ADM using Agile Sprints [4].

So, at the level of Capability Architecture and based on the landscape and vision provided by the Strategic and Segment Architectures, the conception for a solution of any type can also be designed and prototyped with the objective to be tested in the implementation environment or internally very quickly. This is a good way to keep an active outside-in view and harvest input to put together a new and appealing solution. To succeed in this, it is very important to work with interdisciplinary teams to have not only a technical view or a new product but, above all, the business view.

4.4.4. Governance in Architecture Iterations

Architectural governance is necessary to ensure that solutions stay on track to achieve business targets (refer to KPIs from the Strategy level) and compliance and regulatory requirements. It also ensures the integrity of the overall endeavor through successive levels of architecture and solution implementation. Governance is also a key component of risk management. It is often through governance activities that wider impacts of local changes are recognized and addressed. Governance also has a role in providing feedback up through architecture levels where unforeseen difficulties have emerged at lower levels or during implementation.

The practical application of governance should be a collaborative and continuous effort between architecture teams at different levels, and between architects and delivery teams. In broad terms, the role of the governor is more that of an intelligent advisor embedded within a team rather than an occasionally visiting policeman. Governance should not be deferred until the final iteration before implementation, otherwise the benefits of an Agile approach are likely to be lost through rework and delays.

The value that Enterprise Architecture governance provides to Agile Architecture is to provide the set of principles and policies to guide the implementation (the guardrails mentioned in the Strategic level), the set of standards and compliance considerations. It also ensures that appropriate governance structures and approval are in place in a way that does not constrain the pace of Agile development. Again, the architect has a more consultative role in this space since they should also be checking that just the required level of architecture descriptions are in place to guide the further implementation (avoiding BDUF). Governance is also key to maintaining good communication and engagement between the different autonomous teams, providing guidance while giving them the required freedom to deliver.

4.5. ADM Levels and Phases Mapped to Agile Concepts

As previously described, the TOGAF ADM can be applied to deliver architecture iterations in parallel and partitioned across different levels of detail and change using Strategy, Segment, and Capability Architectures that can be also developed using techniques such as SAFe and Scrum.

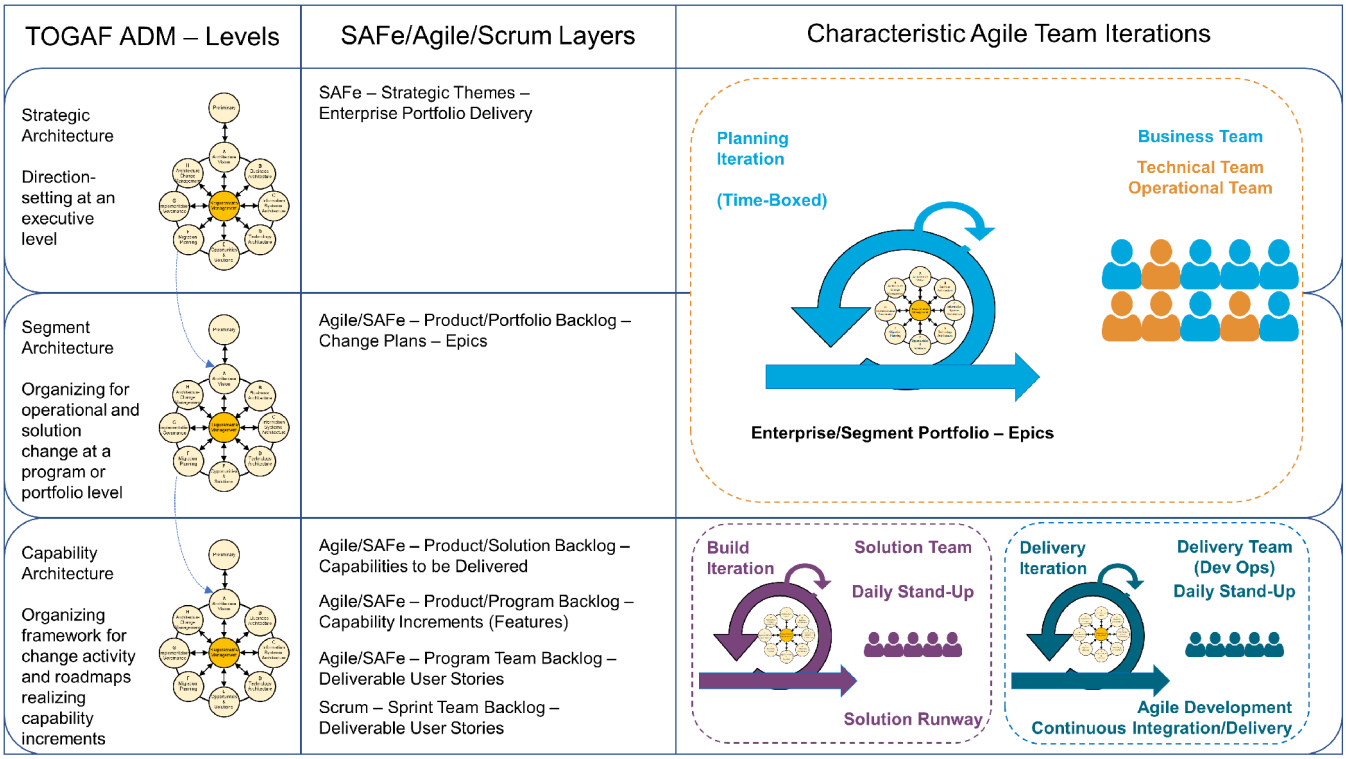

Figure 5. ADM Levels Mapped to Agile Delivery Concepts

Agile techniques consider that development and delivery work can progress based on one integrated team across all levels (business, technical, solution, build, and delivery) working in single connected sprints or across the types of boundaries shown in Figure 5[1] that may have connected but distinctly separate styles of sprints. The exact arrangement will depend on the complexity and scale of each enterprise and the implementation of the Agile approach.

In applying the TOGAF ADM, each level of planning and delivery may cycle through all of the TOGAF phases from A to G but each of the three levels will often focus on specific elements of the cycle. In the **Strategic level**, the focus is more on the Preliminary Phase (if architecture capability changes are needed) and Phases A and B to provide the basis to define the cross-enterprise and strategic change time horizon view. This generates a series of strategic high-level plans known as courses of action.

Agile techniques typically address this with concepts such as high-level strategic themes, and the highest level of an enterprise product portfolio backlog. In this level, interdisciplinary teams (business and technical teams and those that create, implement, and operate) must be involved to develop an Enterprise Architecture that meets both the business goals and objectives of the enterprise and is also potentially deliverable.

In the **Segment level**, the focus is on partitioning the courses of action across the relevant organization units (based on an understanding of the desired business capabilities and value streams and following each enterprise's chosen approach to partitioning – capability/product, service/process, or function etc.) such that the work of delivering the change can be effectively and efficiently organized. Where the information acquired by performing Phases A and B is insufficient for this activity there may be more emphasis on further exploring Phases B, C, and D in greater detail.

Work can be approached by factoring work to self-organizing teams at various levels (in line with the chosen organization unit structure) along with a high-level iteration through Phases C and D, that provides more detailed information for the product or solution delivery, going deeper into smaller organization areas (segments). Outputs of this iteration are the Epics that reflect large or long-running user stories, and the segment-based initial portfolio and/or backlog. The output from this level can be used to test and experiment with new products (if necessary), delivering descriptions for prototypes to test ideas into the relevant segment market.

In the **Capability level**, a more specific solution-oriented architecture specification, including the ABBs, is identified through Phases B, C, and D, covering both the functional and non-functional aspects of the solution to be implemented. These architecture specifications are then further developed in Phases E and F as the basis for the SBBs, and their integration into the desired solutions/services/products. These are finalized and their associated contracts are then developed to direct their reuse/acquisition/build and deployment. The implementation units are aligned with increments of capability that will deliver specific outcomes such that each “chunk” of work produces an implementation of agreed value with the relevant stakeholders and sponsors. This approach to fast continuous implementation at the smallest level of capability creates a Transition Architecture of deliverable units similar to the sprints in the lowest level of backlog in the Agile style approaches. This smallest level of capability is often referred to as *Minimum Viable Product* in Agile style approaches.

The backlogs are (if needed) usually refined down to an equivalent of the Scrum concept of a sprint backlog of deliverable sprints that will be ready for implementation in weeks, or at most one month. These sprints will take the specification from the equivalent of the TOGAF Phases A and/or B, C, D, and E through to implementation. The focus is on creating integrated teams and environments such that the further design, build, implementation, and operation processes interact seamlessly enabling continuous integration and implementation as delivery of each unit of the Minimum Viable Product is completed.

The Capability level is operationally completed in Phase G, Implementation Governance. This ensures that the agreed contracts have delivered the expected capability, in line with the contractual agreements, and that all of the required information for operating and changing the product/solution/service is properly created, stored, and made accessible to support faster and higher quality change in the future. The Capability level confirms benefits realization in Phase H, Architecture Change Management. This ensures that operational and business performance is evaluated to confirm that the value has in fact been delivered and that the users of the product/solution/services are satisfied with the business outcomes of that capability increment. It further ensures that the evolving or completed wider Segment and/or Strategic-level change projects are operating within the appropriate boundaries (or guardrails) set up when planning the change.

There may be pressure to move forward beyond the end of the runway defined by the Capability Architecture at a given point in time. This can store up problems in the management of poorly documented or architecturally dislocated products/solutions/services in the future. This is a type of technical debt, and like any debt, needs careful management to ensure that the debt does not get out of control. This should be addressed in Phase H, Architecture Change Management.

4.6. Set-Based Concurrent Engineering

Set-Based Concurrent Engineering (SBCE) from Lean Product and Process Development [5] can be accommodated by adapting the TOGAF framework. Both the Open Agile Architecture™ Standard [6] and SAFe® promote the practice of SBCE. In SBCE, the overall solution is divided into a number of sub-systems, broad targets are established for each sub-system, and multiple alternatives for reaching those targets are identified and developed concurrently. The set of alternative designs is evaluated iteratively over time, eliminating weaker options in each iteration, until the final, strongest design is selected. For each alternative, enough architecture is done to properly assess the competing alternatives, ensuring that good decisions are made. Architectural alternatives and elaborations are done using ADM iteration cycles and sprints. An ADM iteration is done for each alternative, with only enough architecture done within the iteration to evaluate the trade-offs for that alternative. When an alternative is selected, ADM iterations and sprints are done to further elaborate the architecture for the selected approach. Further explanation on how to handle alternatives using the TOGAF Standard can be found in The Open Group TOGAF Standard [1] – ADM Techniques, Chapter 10, “Architecture Alternatives”.

These iteration cycles with accommodation for SBCE support an Agile delivery style. For instance, a Segment Architecture could be defined in Agile sprints and each one of those sprints would be an ADM iteration cycle.

4.7. Selecting Delivery Styles

This document describes how to apply the TOGAF methodology and framework within an Agile delivery environment. However, different delivery styles exist, and it may be that some projects or programs are not appropriate for Agile delivery. The TOGAF Standard is intentionally flexible to accommodate these different styles.

The TOGAF ADM is a framework with a set of possible elements that can be applied to different scales of change, from meta to micro.

- The meta change is the evolving enterprise state space; large-scale change is the evolving backlog, project, or program in scope
- The micro change is the delivered transition; small-scale change is the delivery unit of each transition within the large-scale change

The meta/micro cycle distinction is usually of characteristic delivery style, dependent upon the needs of each change activity; such as:

- Rapid style: solution – iteration
- Agile style: backlog – sprint
- Robust style smaller-scale: PRINCE®: project – stage
- Robust style larger-scale: Managed Service Provider (MSP): program – project

4.7.1. The Three Delivery Styles

Agile is one of the three broad lifecycle delivery approaches which can work in concert with the TOGAF Standard. These provide for a proportionate and controlled approach for delivering change at an effective pace, and in response to the appetite for business transitions. However, agility is not just about using sprints; it is about the right balance of approaches based on the needs of the enterprise.

There is both a faster type of approach (*Rapid*), and a slower type of approach (*Robust*). It is normally the case that any meta change of scale and consequence (a backlog of sprints in Agile, a series of transitions in the TOGAF Standard) will have a series of iterations of packages of work that will often involve all three types of change lifecycle. Also note that the Robust approach incorporates elements of Agile where appropriate and the Agile approach incorporates elements of Rapid where appropriate. They are essentially used in a nested manner depending on the complexity and scale of a specific change.

Table 1 shows the characteristic profiles of projects related to each approach. The table is a general guide not a rigid statement, and acts as a guide for considering an effective approach for each meta/micro delivery cycle and each enterprise/change activity will decide how best to approach that change. Agile product management is discussed in Chapter 5.

The three main lifecycle delivery approaches that can be broadly identified are:

- Rapid – near immediate implementations of simple components (e.g., extended prototyping such as Rapid Application Development (RAD))
- Agile – fast cycles of component delivery for specific bounded functionality (e.g., Java™ Application Description (JAD), Dynamic Systems Development Method (DSDM®), Agile)
- Robust (risk and architecture-driven) – longer-term delivery of complex, large-scale components, interoperable across the breadth of a segment or an enterprise (e.g., managed projects or programs such as PRINCE2 and MSP)

Table 1. Characteristic Delivery Lifecycle Change Approaches and their Profiles

	Rapid	**Agile**	**Robust**
Small scale	Y	Y	N
Large scale	N	N	Y
Simple	Y	Y	N
Complex	N	N	Y
Tried technology	Y	Y	Y
New technology	N	Y	Y
Stable business process	Y	Y	Y
Changing business process	N	Y	Y
Skills already in place	Y	Y	Y

	Rapid	Agile	Robust
Skills needed to be developed	N	Y	Y
New solution	N	Y	Y
Extension of existing solution	Y	Y	Y
Integration of existing building blocks	Y	Y	Y
Integration of existing running services	Y	Y	Y
Short-term change horizon	Y	Y	Y
Long-term change horizon	N	N	Y
Time-driven project (shorter time frame)	Y	Y	N
Time-driven project (longer time frame)	N	N	Y
Cost-driven project	Y	Y	Y
Quality-driven project	N	N	Y
Function-driven project	N	Y	Y
Structure/architecture-driven project	N	N	Y
Low Risk	Y	Y	N
High Risk	N	N	Y

Note that for any project of some scale or complexity, each chunk (sprint, iteration, stage, transition, etc.) may require a different approach such that the project may well incorporate all of these approaches based on the specific circumstances.

In most changes there will be a significant, if not greater, number of transitions implemented using Agile style approaches. Occasionally pure speed is needed (Rapid). In some changes, really careful (Robust) approaches will be chosen when there is high risk or significant consequences associated with the change. When the Agile delivery lifecycle is the most appropriate approach it integrates well with the TOGAF Standard and the delivered sprints represent the transitions defined in the standard that move towards the evolving and changing Target Architecture. Again, the TOGAF Standard does not take an abstract position on which of these delivery lifecycle approaches is best for a meta or micro iteration. Rather, in its Architecture Change Management phase, it provides the structures and controls within which an enterprise can have true agility and choose the best approach for each specific change situation.

The concept of fast-focused change underlying Agile is powerful but not singular. There are many paces not just one pace. Often many dependent elements need to be put into place to enable even the simplest of functions in an effective manner. For example, in the world of athletics there are four main paces:

- Sprint
- Middle distance

- Long distance
- Marathon

Each of these paces has their place depending on the situation encountered. Using the wrong pace is not just less than good, it often means total failure. Within any one project, high levels of risk may require slower paces of change to ensure that each element has properly managed that risk; while lower levels of risk may enable a solution to be implemented more quickly. Within any change program, different iterations will often need to be addressed at different paces. It is expected that each iteration will be identified as having an appropriate pace and then be organized to deliver at that pace.

Early Agile approaches, such as Scrum, emphasized the delivery of small units of delivery in short sprints at a fast pace. (Note that later Agile approaches, such as SAFe, have broadened this to include larger units of delivery with more content working at different paces.) However, this does not apply in many situations. In large complex situations that are strongly-coupled, stateful, pessimistic, and controlled in nature (such as Nuclear Power Stations, Aircraft Control Systems, or non-repudiation situations) many teams may have to be involved and require significant levels of control and direction. There is a reason why the most important element of a successful large-scale military organization is logistics (organization, consistency, and delivery at scale – potentially in a hub-and-spoke architecture, as in efficient goods delivery) and not commando units (which do have their place and are very effective when used in the right situations, but not at scale).

4.8. Agility at the Highest Levels of Architecture

As Figure 6 shows, the highest level of architecture begins with an architecture vision and strategy at the enterprise level, which provides a long-term view of the target state and surrounding business landscape. The development of the vision and strategy can be done in an Agile style, through multiple iterations as architects collaborate with their business partners. Typically, architecture delivered at this level is visionary and conceptual, and often provides a lot of flexibility to architects who use this vision to prepare more detailed architectures. The release of such high-level deliverables can span a long duration, and an indicator of organizational agility is the speed with which vision and strategy can change.

The speed of change also depends on the impact of the change. Changes that are non-disruptive to the current vision and strategy are relatively quick and easy to complete. Changes that create a huge pivot in the current strategy and vision should be assessed to see how much disruption they may cause to the currently derived or in-flight architectures. Such changes could have a trickle-down effect as many derived architectures at lower levels are impacted. The frequency and the amount of changes to the architectures at the highest levels should be less than those at the lower levels. How much change is feasible depends on the organization's tolerance to the amount of agility.

Business partners and architects collaborate constantly to produce transition state architectures and align on the aspirational target states. Architects should also align to business goals and evolve the architectures such that every transition state provides an incremental business value.

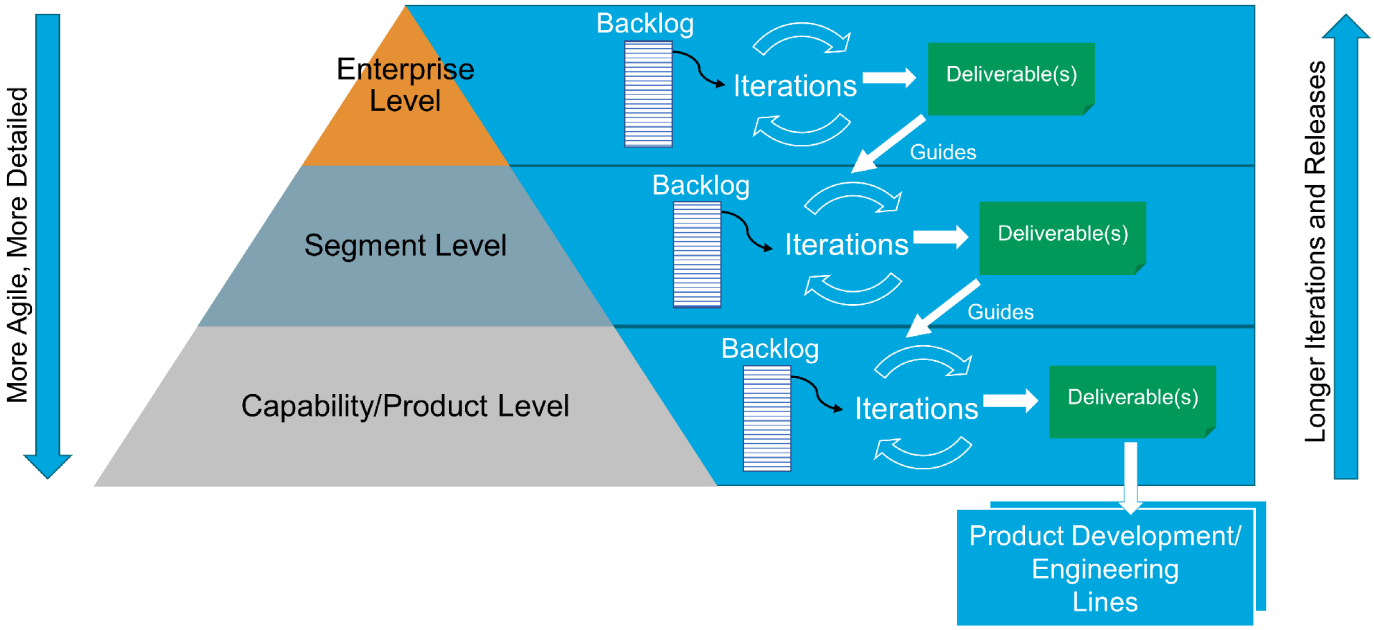

Figure 6. Agility at Different Levels of Architecture

[1] SAFe/Agile definitions taken from the Agile Alliance Glossary; refer to: https://www.agilealliance.org/agile101/agile-glossary

Chapter 5. Using Agile Product Management Techniques

Many techniques have become popular within Agile product management that can be beneficial when applied to the TOGAF ADM. This chapter describes some of those techniques and how they can be applied.

5.1. Establishing the Enterprise Architecture Capability

As discussed in the previous chapter, Agile Enterprise Architecture uses an iterative, incremental approach to create architecture artifacts. Specific skills and management approaches must be put in place for this to succeed. The primary objective of the Preliminary Phase of the ADM is to establish or adapt the Enterprise Architecture capability to the specific architecture work to be carried out. Some considerations for the Preliminary Phase in Agile delivery are:

- Agile Architecture requires a much closer focus on the outcomes, involving a shift from a project to a **product-centric** approach
- While most Agile efforts take place in the solution space, techniques that address the problem space, such as design thinking and business model canvassing, help to shape the architecture direction to achieve the solution

  Requirements often come on a JIT basis, requiring iterative evaluation to reaffirm the problem definition (TOGAF ADM Phase A) and the architecture approach to arrive at the desired solution (TOGAF ADM Phases B, C, and D).
- This produces an holistic architecture approach with less individual focus on the “domains” of architecture (Business, Data, Application, and Technology) and more emphasis on collaborative views across all domains focused around the required product
- This will require changes to the way that Enterprise Architecture and product development is managed and governed

The Preliminary Phase includes the establishment of a set of Architecture Principles (general rules and guidelines intended to be enduring and seldom amended) that inform and support the ways in which an organization sets about fulfilling its mission. The Architecture Principles for any style of architecture reflect the specific characteristics of that style. The principle of a single product owner should be established in this phase to ensure that requirements are clearly articulated and understood, and to prioritize the Agile development of the system components in later phases.

Chapter 5 of the Open Agile Architecture Standard [6], “Intentional Architecture”, sets out principles that intentional architecture within Agile delivery should follow.

5.2. Product Development and Architecture

As shown in Figure 7, a traditional, generalized view of Enterprise Architecture contains a number of stages.

Figure 7. Traditional Stages of Enterprise Architecture

In terms of the TOGAF ADM:

- Phase A defines the problem
- Phases B, C, and D define the baseline and target
- Phases E, F, and G deploy the target
- Phase H manages change

In an Agile environment it is likely that these activities will be a continuously managed process with activities proceeding in parallel, as shown in Figure 8.

It is not necessary to complete the problem definition before starting other activities. Enough of the problem needs to be defined to provide context for other activities. As other activities are initiated, work can proceed to further elaborate and extend the problem definition.

Clearly, there are dependencies. It is not possible to deploy any part of the target until the parts of the baseline and target describing that part of the target have been sufficiently defined.

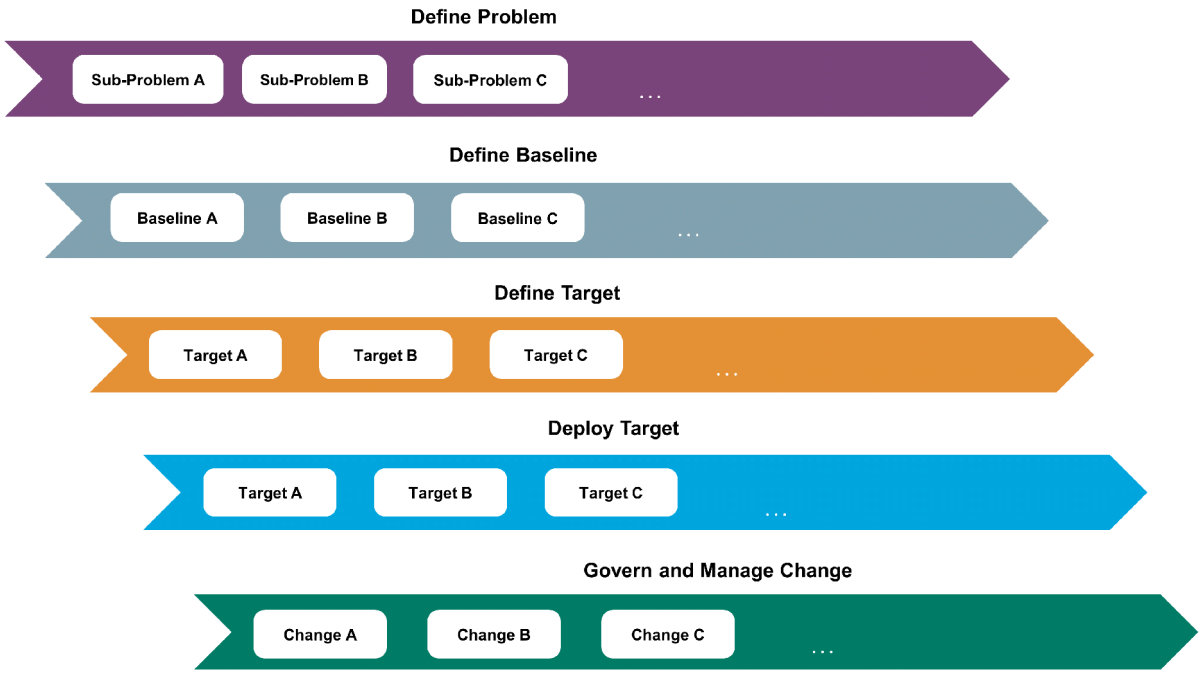

Figure 8. Stages of Enterprise Architecture in an Agile Environment

More practical guidance about different architecture styles of support can be found in the TOGAF Standard [1] – Applying the ADM.

5.2.1. Define Problem

> "Identify the key stakeholders and their concerns/objectives, and define the key business requirements to be addressed."
>
> — The TOGAF Standard

> "The level of detail addressed in Phase A will depend on the subset of scope and goals associated with this iteration of architecture development."
>
> — The TOGAF Standard

A sufficient understanding of the strategic goals of the enterprise is a prerequisite for any activity, to ensure that individual activities do not undermine those goals.

How to improve agility at this stage:

- Identify the product owner
- Seek to develop a high-level Strategic Architecture quickly, with only the detail required to plan more constrained activities
- Use one of the many available Agile tools and techniques to characterize the problem and define

the specific set of requirements to be addressed; such as:

- Business requirements
- Customer journeys
- Design thinking: an approach for defining a problem or finding novel and innovative solutions

  Table 2 describes the key characteristics of design thinking.

  Table 2. Design Thinking

Practices	Thinking Styles	Mentality
Human-centered approach; e.g., people-based, user-centered, empathizing, ethnography, observation	**Thinking by doing**; e.g., early and fast prototyping, fast learning, rapid iterative development cycles	**Combination of divergent and convergent approaches**; e.g., ideation, pattern finding, creating multiple alternatives
Collaborative work style; e.g., multi-disciplinary collaboration, involving many stakeholders, interdisciplinary teams	**Abductive reasoning**; e.g., the logic of "what could be", finding new opportunities, the urge to create something new, challenging the norm	**Reflective reframing**; e.g., rephrasing the problem, going beyond what is obvious to see what lies behind the problem, challenging the given problem
Holistic view; e.g., systems thinking, 360 degree view on the issue	**Integrative thinking**; e.g., harmonious balance, creative resolution of tension, finding the balance between validity and reliability	**Experimental & explorative**; e.g., the license to explore possibilities, risking failure, failing fast
Ambiguity-tolerant; e.g., allowing for ambiguity, tolerance for ambiguity, comfortable with ambiguity, liquid and open process	**Optimistic**; e.g., viewing constraints as positive, optimism attitude, enjoying problem solving	**Future-oriented**; e.g., orientation towards the future, vision *versus* status quo, intuition as a driving force

- Epics
- Business Model Canvas: a management tool for understanding the fundamental characteristics of the business; see the template in Figure 9. For more details, refer to the TOGAF® Series Guide: Business Models [8].

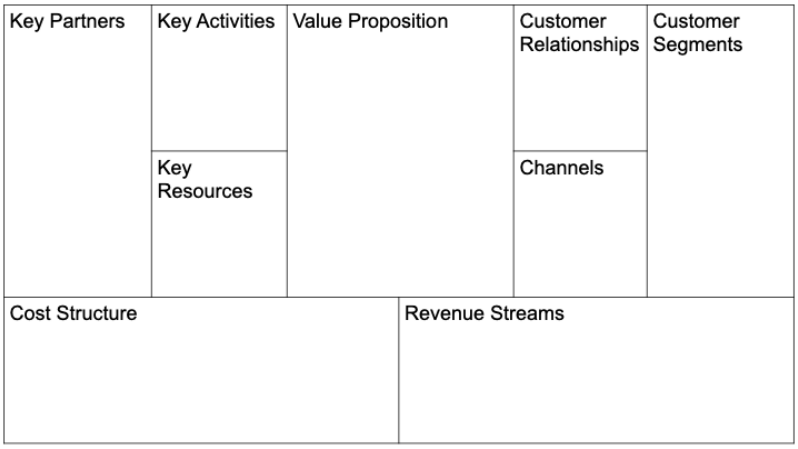

Figure 9. Business Model Canvas

To ensure that "just enough" architecture is done:

- Focus on the required outcomes
- Define the Minimum Viable Product that the enterprise can offer to its customers

Identify new business opportunities considering new trends in business and technology, taking an outside-in approach considering customer demands and competitor activities.

> "Agile Architecture shall use marketing and design methods to discover how customers are likely to use products and services. Jobs-to-be-done analysis, customer journey mapping, and design thinking are examples of methods used by Agile enterprises. Design thinking, which is a human-centered approach, incorporates human cognition and emotion as key aspects of the value definition."
>
> — The Open Group Open Agile Architecture Standard, Axiom 2: Outside-In Thinking

Value shall be specified from the standpoint of the customer. A value stream shall be identified for each product or service family from concept to launch and from order to delivery. Enterprise Architecture should support value stream definition and also the business capabilities needed to fulfil the need.

5.2.2. Define Baseline

The scope and level of detail to be defined will depend on the extent to which existing elements are likely to be carried over into the Target Architecture.

Agile development is high risk in the absence of a sufficient understanding of the baseline.

How to improve agility at this stage:

- Progressive development of the Baseline Architecture

- Understand the big picture
- Segment the problem
- Develop detail as required to support subsequent work
- Consider defining the target first to scope work on the baseline

The key measure is understanding the Minimum Viable Architecture necessary to manage trade-offs and risk.

5.2.3. Define Target

The scope and level of detail to be defined will depend on the relevance of the business elements to attaining the Target Architecture Vision, and on whether architecture descriptions exist.

How to improve agility at this stage:

- Progressive development of the Target Architecture within the context of the big picture
- Focus on the Minimum Viable Product
- Develop detail as required to support subsequent work – only the needed detail ("just enough architecture")
- Be guided by the enterprise strategy and prioritized backlog

Again, the key measure is understanding the Minimum Viable Architecture.

Once the problem space has been described then a more detailed architecture specification has to be delivered to describe the Business, Data, Application, and Technology building blocks needed. These will become the input items for a program backlog. Product managers and product owners are key stakeholders in this stage.

As described in Chapter 4, Segment and Capability Architecture concepts can be applied where necessary to decompose the problem into smaller pieces to provide a more progressive and iterative delivery. The functional and non-functional components of the architecture are decomposed into user stories which make up the architecture backlog. User stories are prioritized by the product owner in consultation with the Agile team. Those stories prioritized as "must have" collectively become the Minimum Viable Architecture.

Once some initial architecture specifications are available, these will define the SBBs and begin to build the sprint backlog; i.e., they become the intentional architecture. Intentional architecture is a set of purposeful, planned architectural strategies and initiatives, which enhance solution design, performance, and usability and provide guidance for inter-team design and implementation synchronization.

5.2.4. Develop Target

Ensure that the systems development method enables feedback to the architecture design.

Adopt one of the many successful Agile development methods:

- Make sure that people have the necessary skills
- Ensure that there is appropriate collaboration and governance to deliver the desired business value

How to manage risk:

- Maintain linkage to architecture descriptions
- Ensure sufficient feedback to assess conformance to architecture
- Maintain Transition Architectures through an efficient and Agile change management process

5.2.5. Govern and Manage Change

(Drivers for change) Experience with previously delivered project increments.

Governance should be embedded within sprints, and as part of sprint retrospectives and sprint planning:

- Provide guidance to solution construction to keep within guardrails and follow the solution runway
  - Guardrails may be technical boundaries or constraints such as specifying standard components to be used, performance and capacity limits, or technical policies
  - The runway is the architectural definitions or technical superstructure that will be consumed in future system construction sprints
- Assess the impact of change on higher-level architectures
- Gain feedback to evolve higher-level architectures based on experience of each sprint (capability increment)

Once solution implementation has started, the architecture team should refine the governance metrics that will be applied to test compliance against the Target Architecture. This compliance could be composed by Objectives and Key Results (OKRs) to ensure value is being delivered and also to ensure alignment with standards and regulations.

As defined in the O-AA™ Standard [6], OKRs spell out the company's priorities in terms of specific accomplishments and performance improvements. The objectives consist of a clearly defined qualitative change, while the key result is a specific, often quantitative performance target that must be met. Agile organizations should set OKRs annually and assess progress against them on a quarterly basis.

Change is an inherent part of Agile delivery, and architecture governance can help to maintain alignment between delivery teams and alignment with higher-level architectures. If a change is large, then a pivot may be necessary, but an assessment should be made at the first high-level iteration to be sure the final objective and value delivery is not lost, and if necessary to adjust business priorities and interdependencies.

5.3. Architecture, Product Development, and Delivery

In an Agile environment and within supporting organizations that have adopted an Agile delivery approach, it is likely that the activities presented in Section 5.2 will be a continuously managed process handled in parallel and focusing more on the outcome with architecture as the vehicle to support product delivery.

For an Agile approach the stages to follow are similar but performed in a different way. Enterprise Architecture iterations support this product definition and product architecture.

The problem is defined at the Strategic and Segment level, then at the Segment and Capability level a target is defined, and at the Capability level a target is deployed by Agile teams supported by the architect and the Capability Architecture definition.

As explained in Section 4.4, at the Strategic level a high-level architecture specification is defined – strategic themes, epics, that will guide the subsequent problem definition. At the Segment level, the backlog is defined in alignment with the strategic definition (problem definition). This backlog should be refined further to produce the sprint backlog that will be delivered using any Agile technique. This Agile delivery is supported by a Capability Architecture supporting Agile solution delivery.

5.3.1. Identification of a New Need – Define and Identify the Problem

Apply Enterprise Architecture principles and stakeholder assessment, supported by other techniques like design thinking, to identify new business opportunities considering the new trends in business and technology, taking an outside-in approach to consider customer demands, and assessing what competitors are doing.

As stated in Axiom 2, Outside-In Thinking, in the O-AA Standard [6], Agile Architecture shall use marketing and design methods to discover how customers are likely to use products and services. Jobs-to-be-done analysis, customer journey mapping, and design thinking are examples of methods used by Agile enterprises. Design thinking, which is a human-centered approach, incorporates human cognition and emotion as key aspects of the value definition.

Another important consideration is to perform a business readiness assessment, to adopt a new emerging technology that might be related with the new business need identified, and also to consider regulatory and compliance – adherence to standards and corporative principles is also a key consideration while defining the problem.

Agile Architecture should identify the enterprise value streams. Value shall be specified from the standpoint of the customer. A value stream has to be identified for each product or service family from concept to launch and from order to delivery. Enterprise Architecture should support the value stream definition and also the business capabilities needed to fulfill the need.

5.3.2. Define Target

Once the problem space has been described then a more detailed architecture specification has to be

delivered to describe the Business, Data, Application, and Technology building blocks needed – this specification will be the input for a product backlog definition. Product managers and product owners are key stakeholders in this process.

In order to provide an Agile approach, it is also necessary to segment the problem.

The Segment and Capability Architecture concepts should be applied to decouple the problem into smaller pieces so that the specifications will be delivered in an Agile way.

The features depicted in the architecture will be useful to define priorities for the product backlog and to identify any interdependencies that will facilitate the definition of the sprint backlog.

Once the architecture specifications have been finished, they will provide the input to define the SBBs and to shape the final solution following the partitions concept – this solution definition is the input for the sprint backlog definition and conforms the basis for the intentional architecture that will support Agile implementation.

Once the Agile teams start the delivery process based on the architecture descriptions, Enterprise Architecture teams should refine the governance metrics that will be applied to test compliance. This compliance could be composed through OKRs to ensure value is being delivered and also to ensure alignment with standards and regulatory compliance.

Governance activity should not be made in isolation, so every time an Agile team delivers an output a retrospective should be made, and the governance process should be part of that sprint iteration retrospective and planning.

On the other hand, change management should also continue during the whole process since changes could have an impact in any of the iterations described above. Therefore, these changes should be identified in a dynamic way so changes can be applied quickly to avoid further delays in the process.

If a change is too big or disruptive, then analysis at the first high-level iteration should be carried out to be sure the final objective and value delivery is not lost and the proper adjustments in priorities and interdependencies can be made.

An important concept to follow for Agile Architecture is intentional architecture, which specifies a set of purposeful, planned architectural strategies and initiatives to enhance solution design, performance, and usability and provide guidance for inter-team design and implementation synchronization.

In Figure 10, intentional architecture is delivered as part of the Capability Architecture specification and it is aimed to provide guardrails to support implementation.

The output of the Strategic Architecture gives input to define the product backlog that is defined in further detail in the Segment Architecture. At the Capability Architecture level, the spring backlog is defined and also the intentional architecture that will guide implementation (deploy target).

Change management will address any new requirements and features and will support the refinement

and prioritization for the product backlog, for them to be distributed in different releases.

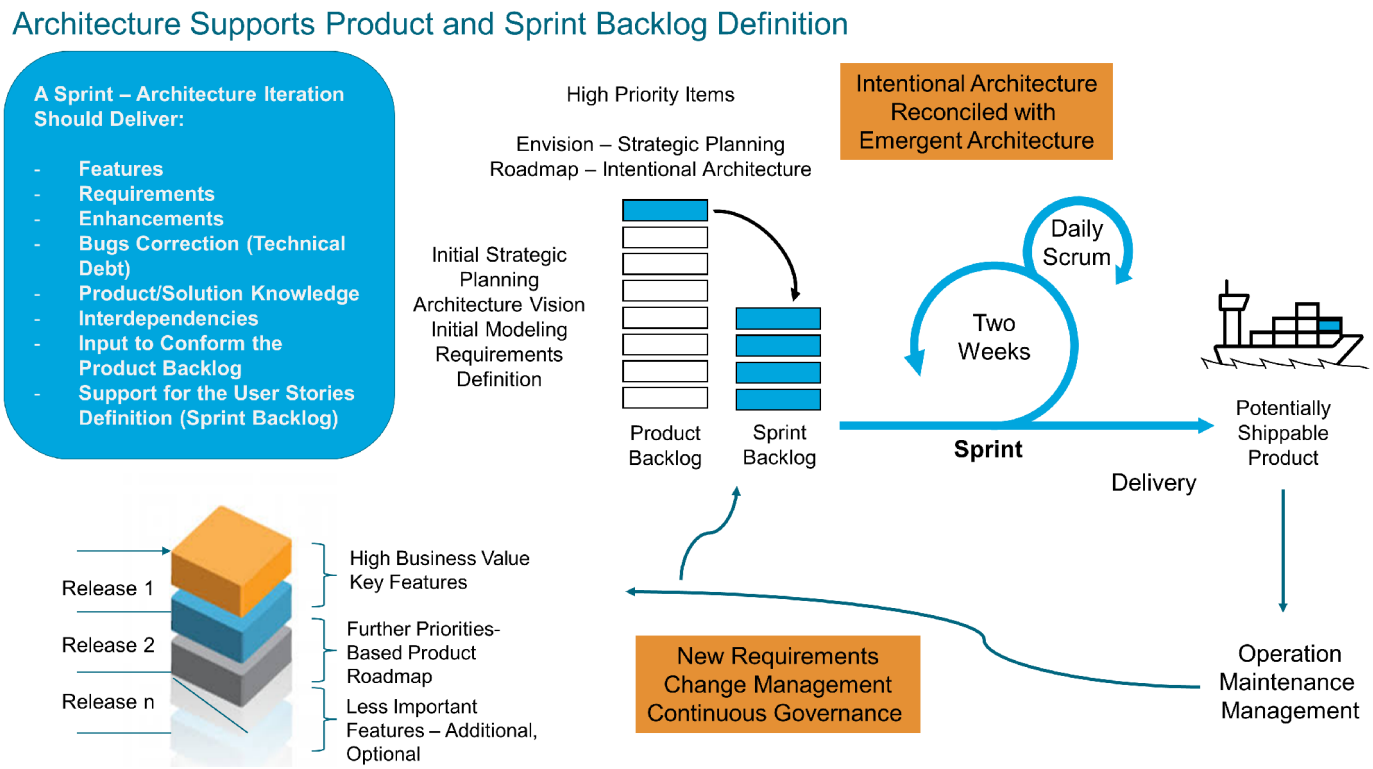

Figure 10. Agile Architecture and Product Development

5.3.3. Projects *versus* Products

Project and product management are closely related, but in general *product* management is a broader discipline than *project* management. Product management covers the full lifecycle of discovery, development, delivery, long-term support and maintenance, and disposal, although disposal is often a relatively trivial step with digital products. Within this product lifecycle, there are likely to be a number of projects and processes invoked; e.g., a project for each major product deliverable, and a process to handle support requests from product users. Figure 11 shows the relationship between products and projects.

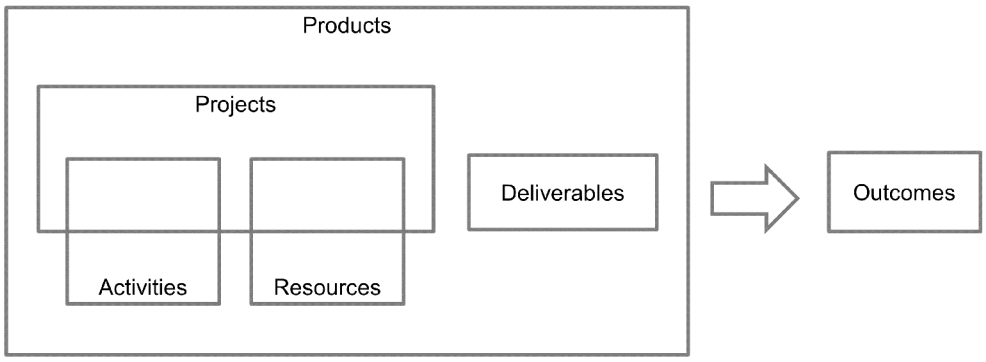

Figure 11. Products and Projects, based on Figure 43 from the Digital Practitioner Body of Knowledge™ Standard

For further information on product management techniques, refer to the DPBoK™ Standard [9].

5.4. Architecture Artifacts

The TOGAF Standard – Architecture Content describes the TOGAF Content Framework. In general, the artifacts and their relationships apply equally to Agile delivery as to other delivery lifecycle approaches. However, the tooling and format may need to be adapted for Agile delivery.

5.4.1. Automation of Enterprise Architecture

The implementation of TOGAF architecture artifacts can be accelerated with the use of Enterprise Architecture tools. These tools can collect business operational data in real-time and build/enhance architecture models. Using Artificial Intelligence (AI) algorithms, they can optimize the models. The tools also enable ideation and collaboration between the users by showing the impact of adopting various digital technologies. Most importantly, these tools enable the Enterprise Architecture to quantify and measure transformation changes to the architecture.

5.4.2. Minimalistic Artifacts

Artifacts and their templates should contain the minimum content that is consistent with their purpose, and no more. The progressive, iterative development of architecture described in previous sections of this document can be realized by producing the artifacts using a series of templates of increasing detail and/or scope. For example, a first artifact from Phase B, Business Architecture, might contain just the Baseline Architecture, or for large projects, this could be further divided into an overview artifact followed by a series of artifacts with more detailed descriptions.

5.5. TOGAF ADM Phases and Artifacts Supporting Product Architecture

- **Preliminary Phase**
  - Define the Enterprise Architecture organization capabilities and maturity model to support an optimized Business, Data, Application, and Technology Architecture, especially if they respond to disruptive trends from the market; for example, new value propositions to evolve the organization into digital product offerings and the customer journey mapping for their delivery
  - Define the Enterprise Architecture principles and governance framework to support the Architecture Vision
  - Define the changes needed at the organizational level to adapt the organization capabilities and structure to implement the business value and to support development and deployment in an efficient and effective way; for example, adapting to fulfill Agile methodologies for application/system/portfolio delivery when and if necessary

    A new model for organizational structure might be needed which implies new roles, skills, and capabilities and a new organizational model cross-cutting organizational units and aimed at having autonomous self-empowered Agile teams. This will allow organizations to scale their Agile development.

- Artifacts needed:
  - Organization map; refer to the TOGAF® Series Guide: Organization Mapping [10]
  - How to set an Enterprise Architecture capability; refer to the TOGAF® Series Guide: The TOGAF® Leader's Guide to Establishing and Evolving an EA Capability [11]
- Organizational principles – review and adapt if needed

- **Phase A: Architecture Vision**
  - Define the business value proposition and strategy in alignment with the organization strategy and mission
  - If the whole company strategy needs to be redefined to fulfill the new trends this needs to be addressed in the Architecture Vision phase
  - Artifacts needed:
    - Strategy and motivation models, depicting product strategy to support Capability-level decision-making
  - Additional support:
    - How to adapt the ADM to support strategy architecture and decision taking; refer to the TOGAF® Series Guide: A Practitioners' Approach to Developing Enterprise Architecture Following the TOGAF® ADM [12]
    - Value stream and business capability modeling, business model guides for high-level model of the product; refer to the TOGAF® Series Guide Set: Business Architecture [7]
  - At this stage it is very important to vision the Enterprise Architecture as modular so its delivery and support will be more efficient and easier to change
- **Phase B: Business Architecture**
  - Applied to define the key features and benefits aimed to solve the problem space and build the solution space
  - Requirements definition and translation into functional and non-functional requirements – and define the product target market, features, and value proposition for each
  - Design the value streams and business capabilities needed to deliver the product
  - Artifacts needed:
    - Value stream, business capabilities, connected with the organizational map, information map to identify key information needed – business models like BMC and also the business operational model
  - Model the customer journey for the different audiences; refer to the TOGAF® Series Guide Set: Business Architecture [7]
- **Phase C: Information Systems Architectures**
  - Information needed to deliver the product features and to handle relevant customer segments – information that will be needed to build and support the product in its different delivery stages

and also to market and sell the product to the target audiences and customers: customer profiling

- Refine the customer journey map with the information needed and the data analytics needed

- **Phase C: Application Architecture**
  - Map the product functional features with the capabilities needed for the product to be delivered into the market
  - Artifacts needed:
    - Mapping the functions with application components and services
  - The key to applying architectural patterns based in micro-services and loosely-coupled components, making them easier to develop, deliver, and maintain and with clear integration points, is to pursue effective integration and delivery
- **Phase D: Technology Architecture**
  - Technology or technical platforms to support product development, delivery, and maintenance – the approach depends on the kind of product: if it is an application or software system then it will be the technological platforms supporting the application components and services; if the approach is a cloud-based service then the approach should be adapted to fulfill that

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Using the TOGAF® Standard in the Digital Enterprise

The Open Group TOGAF® Series Guide

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Preface

The Open Group

The Open Group is a global consortium that enables the achievement of business objectives through technology standards. With more than 870 member organizations, we have a diverse membership that spans all sectors of the technology community – customers, systems and solutions suppliers, tool vendors, integrators and consultants, as well as academics and researchers.

The mission of The Open Group is to drive the creation of Boundaryless Information Flow™ achieved by:

- Working with customers to capture, understand, and address current and emerging requirements, establish policies, and share best practices
- Working with suppliers, consortia, and standards bodies to develop consensus and facilitate interoperability, to evolve and integrate specifications and open source technologies
- Offering a comprehensive set of services to enhance the operational efficiency of consortia
- Developing and operating the industry's premier certification service and encouraging procurement of certified products

Further information on The Open Group is available at www.opengroup.org.

The Open Group publishes a wide range of technical documentation, most of which is focused on development of Standards and Guides, but which also includes white papers, technical studies, certification and testing documentation, and business titles. Full details and a catalog are available at www.opengroup.org/library.

The TOGAF® Standard, a Standard of The Open Group

The TOGAF Standard is a proven enterprise methodology and framework used by the world's leading organizations to improve business efficiency.

This Document

This document is a TOGAF® Series Guide to Using the TOGAF® Standard in the Digital Enterprise. It has been developed and approved by The Open Group. This document sets out to answer two overarching questions:

1. How do Enterprise Architecture and the TOGAF Standard enable the digital enterprise?
2. When and how to apply TOGAF methods and best practices to guide a digital enterprise through its stages of development, which the Digital Practitioner Body of Knowledge™ Standard refers to as the emergence mode?

The high-level structure of this document is as follows:

- Chapter 1 provides a high-level introduction to this document in terms of how established Enterprise Architecture practices bring value to digital enterprises at all scales
- Chapter 2 describes how Enterprise Architecture and the TOGAF® Standard bring valuable tools to digital enterprises of all sizes
- Chapter 3 provides an alignment of terminology between the TOGAF Standard and the Digital Practitioner Body of Knowledge
- Chapter 4 provides details on applying Enterprise Architecture and the TOGAF Standard to the contexts described in DPBoK™ Standard
- Appendix A lists Enterprise Architecture benefits
- Appendix B lists principles from the TOGAF Standard
- Appendix C shows how Enterprise Architecture services package TOGAF activities to deliver value on demand in two major categories: internal-centric and customer-centric
- Appendix D further illustrates the connections between the TOGAF Standard and the DPBoK Standard

The audience for this document is those undertaking the roles of both Enterprise Architects and Digital Practitioners. For Digital Practitioners it communicates what architecture practices would help to grow their digital enterprise, and how to interact with the Enterprise Architecture community to get them. For those undertaking an Enterprise Architect role it provides guidance on supporting the digital enterprise.

A side benefit, therefore, of addressing two audiences, each with different cultures and approaches, is sharing information about each community to facilitate cooperation and productive engagements.

About the TOGAF® Series Guides

The TOGAF® Series Guides contain guidance on how to use the TOGAF Standard and how to adapt it to fulfill specific needs.

The TOGAF® Series Guides are expected to be the most rapidly developing part of the TOGAF Standard and are positioned as the guidance part of the standard. While the TOGAF Fundamental Content is expected to be long-lived and stable, guidance on the use of the TOGAF Standard can be industry, architectural style, purpose, and problem-specific. For example, the stakeholders, concerns, views, and supporting models required to support the transformation of an extended enterprise may be significantly different than those used to support the transition of an in-house IT environment to the cloud; both will use the Architecture Development Method (ADM), start with an Architecture Vision, and develop a Target Architecture on the way to an Implementation and Migration Plan. The TOGAF Fundamental Content remains the essential scaffolding across industry, domain, and style.

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Andy Ruth started his IT career in the 1970s as a technical expert in both consulting and staff roles. Over the next two decades he rose up through the technical ranks, from the role of architect and through the ranks of management to become a manager of managers. In the mid-1990s, he shifted from delivering IT capability to delivering training; speaking at conferences, and writing books and training for covering the IT space. Toward the end of the 1990s, Andy joined Microsoft to create the Microsoft Certified Architect program and to manage the architect role for the consulting group. In the last few years, Andy has employed his talents to grow standards, training, and tools for the architecture community. In his spare time, he manages an apprenticeship program that helps others to enter the workforce or grow their career.

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Heidi Hasz has more than 25 years of experience in IT Architecture, working on initiatives from efficiency improvements and cost takeout to green fields. Heidi began her IT architecture career in California for IBM where she helped Fortune 500 clients to establish an Enterprise Architecture and an Enterprise Architecture practice. In 1998, IBM transferred her to The Netherlands to lead cross-border enterprise infrastructure optimization engagements. During her time at IBM, she was a member of the IBM IT architecture worldwide knowledge center responsible for developing and delivering the IBM architecture methodology and intellectual capital repository. Currently, Heidi is a TOGAF® trainer and architecture course developer working on the initial release of a digitally-enabled accredited TOGAF course.

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Referenced Documents

The following documents are referenced in this TOGAF® Series Guide.

(Please note that the links below are good at the time of writing but cannot be guaranteed for the future.)

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This document does not contain any normative references at the time of publication. These may be added in a future release.

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1. Introduction

This document sets out to answer two overarching questions:

1. How do Enterprise Architecture and the TOGAF® Standard (see *Referenced Documents*) enable the digital enterprise?
2. When and how to apply TOGAF methods and best practices to guide a digital enterprise through its stages of development, which the Digital Practitioner Body of Knowledge™ Standard (see *Referenced Documents*) refers to as the emergence model?

The TOGAF Standard supports strategic decision-making and a sustainable delivery of architecture specifications to support organizations to become a digital enterprise. It can be used in the Individual/Founder, Team, Team of Teams, and Enduring Enterprise contexts in the DPBoK™ Standard to inform and make decisions. The implementation of the TOGAF Standard is always adapted to fit the scale, culture, and operation of the organization in which it is used.

This document provides insight on how to adapt the standard to support the digital enterprise in alignment with the DPBoK Standard concepts and contexts of the emergence model.[1]

1.1. Overview

This document describes how and when Enterprise Architecture, using the approach defined in the TOGAF Standard, can be used to enable a digital enterprise. The experience and knowledge collected and cataloged in the TOGAF Standard has come from years of experience by people around the globe who have built and run the IT portions of companies around the world. The lessons learnt can be used to minimize the growing pains from which maturing digital enterprises will likely suffer.

The structure of this document uses the four contexts and descriptions from the DPBoK Standard to describe the different stages or maturity levels through which a digital product and digitally-based company might transition.

Chapter 1 provides an introduction to the Enterprise Architect and the Digital Practitioner along with their perspectives and the strategy to connect them. The document presents guidance using a “peek-ahead” approach so a digital enterprise maturing from one context to the next can appropriately apply the TOGAF Standard and Enterprise Architecture to “look ahead” in preparation for transitioning from context to context. It also describes the importance of delivering Enterprise Architecture through a service delivery model – the Enterprise Architecture as a service strategy.

Chapter 2 describes why Enterprise Architecture using the TOGAF Standard should be applied in a digital enterprise, and describes using each to reactively and proactively manage and avoid technical debt. It also describes how, as digital products mature and operational excellence is needed, both can be used to mature a product and a company.

Chapter 3 provides clarity for the terminology used by the TOGAF Standard and the DPBoK Standard. It also points out definitions commonly used by The Open Group for any terms used in the document that

the reader might want to review.

Chapter 4 comprises the bulk of the content as it reviews the four contexts used by the DPBoK Standard and describes what Enterprise Architecture can contribute during each context. It also describes the Enterprise Architecture principles, capabilities, and services that support each context. Finally, the chapter describes which parts of the TOGAF ADM and TOGAF Series Guides apply to each context to assist with further guidance.

1.2. The Digital Practitioner and the Enterprise Architect

The DPBoK Standard describes the skills needed to operate a successful digital enterprise, including digital product delivery.

New business models resulting from a combination of digital technology, combined with digital ways of working, are transforming economies and societies worldwide. Digital investments are critical for modern organizations. Participating in their delivery (i.e., working to create and manage them for value) can provide prosperity for individuals, communities, and public and private enterprises. Learning programs worldwide are under pressure to produce an increasing number of qualified professionals to meet voracious workforce demands. Skill requirements have undergone a seismic shift over the past 20 years; Digital Practitioners require a wide variety of skills and competencies, including cloud architecture and operations, continuous delivery and deployment, collaboration, Agile and Lean methods, product management, and more.

The DPBoK Standard is intended to support the development of the Digital Practitioner. It seeks to provide guidance for both new entrants into the digital workforce as well as experienced practitioners seeking to update their understanding on how all the various themes and components of digital and IT management fit together in the new world. The Enterprise Architect can use the DPBoK Standard to understand culture, leadership practices, and product development. They can use that information to create a rapport with product teams and discover where they can provide an architectural service to product teams. They can also use this standard to better understand what artifacts are created and how to harvest them in the context of the emergence model from the DPBoK Standard.

Every Digital Practitioner wants and expects their company to be a wild success and to grow exponentially from a founder state to an enduring enterprise as described in the DPBoK Standard emergence model. But what happens when, as it grows, they are faced with the complexity of coordination across multiple teams and potentially across multiple lines of business? What happens when every contract with every business or customer needs a legal review, when they face compliance and regulatory concerns, or when they are the target of litigation?

The Digital Practitioner can use this document and the pointers to specific methods defined in the TOGAF Standard as a sort of “peek-ahead” tool. This document provides guidance that helps the Digital Practitioner complete the Enterprise Architecture tasks that are defined in the DPBoK Standard. It indicates/suggests current best practices so that decisions with long-term consequences are well-informed and set for success as they mature to a large enterprise with several hundred or thousand employees. As the company and teams grow and make decisions that impact their product, they can leverage the hard-earned lessons from the generations of practitioners that came before them. By

reviewing where the TOGAF Standard has tools, templates, and processes to complete the tasks discussed in the DPBoK Standard, they will have tools necessary to grow successfully through well-informed decisions.

1.2.1. Context and Background

The perspectives of the Digital Practitioner and the Enterprise Architect are often different. Moreover, they may operate in ways that introduce conflict between them due to goals that are at odds. For instance, the goal of the Digital Practitioner is to deliver customer value as quickly as possible, learning and updating rapidly based on customer feedback, and minimizing effort and attention outside of this learning cycle as much as possible. The goal of the Enterprise Architect is to know and maintain enough information about the ecosystem in which they operate to provide enough of the right information as possible for leadership to make well-informed decisions, and provide correct and informed guidance to product teams.

The TOGAF Standard and the DPBoK Standard each evolved during two different computing eras. That is challenging enough, but we are also in a time of extreme business disruption. One of the drivers of this disruption is the steep fall in price of computing and bandwidth, including in mobile devices. This represents an opportunity to deliver digital value at dramatically lower costs than in the past. Businesses see the value of having digital products to offer to their customers. or, even if they do not see the value, they see the competitive disadvantage they will face if they do not embrace digital products, as their competitors will take advantage of the fall in cost of digital delivery. Would you even consider banking with a bank that did not have a mobile app? Would you ever think of flying with an airline that did not offer online reservation and check in?

Enterprise Architecture and the TOGAF Standard began to evolve at a time when on-premise data centers with large systems were in use and the Internet, virtual machine environments, and cloud-based resources were just evolving. Software and hardware cost money, had long cycles for procurement, and needed to be placed in data centers that had to plan for space, power, and cooling. Everything had to be planned and executed correctly for the intended business outcome to become reality. When available, buying software was preferred to building software so the code base for commodity IT capability was someone else's problem and the product teams could focus on features that provided a competitive advantage. Experimentation and quick (or any) failure typically meant failure of the initiative. If an initiative was canceled after it was started, there was a very real risk of having purchased assets that never created a revenue stream.

We have now entered an age where digital products and services are a primary way the enterprise goes to market. The DPBoK and TOGAF Standards both support the age of digital products. Founders and product owners have a clear digital value proposition for their market. Their product teams own and focus on smaller microservices that are integrated into larger solutions. These offer the ability to rapidly respond to market feedback through reuse of their components in larger solutions. When a feature is released, it has an Application Programming Interface (API) so that automation and easy integration is possible. Relevant ideas and innovation come primarily from two sources:

- The product team must contain one or more people with a deep knowledge of the systems and the software they work on; what is possible with their current technology deployment, and where the

technical debt inhibits feature release

- The product team must collect insights directly from the end users

These changes are combined with the dominance of the Internet, virtual machines, cloud-based resources for rent, open source software and tools, and innovation occurring at break-neck speed being commonplace in most industries and businesses. Product teams delivering digital capability focus on code output above all else. The code must translate to end-user value. Anything that takes the focus away from developing and delivering code and new features is considered a lost opportunity. Upfront planning and driving product development through end-user feedback are expected. Experimentation and quick failure are not only encouraged, but also expected.

Along with the positives of developing better digital products more quickly, there are some consequences that need attention. Today's digital products can become tomorrow's technical debt. Digital products built without consideration of some big picture can result in unintended consequences; for example, privacy and security breaches, and high costs of integration and interoperability.

In this document we provide Enterprise Architecture guidance to anyone shifting from an inside-out view to an "outside-in" view, from a project to product focus, or adopting more Agile and Lean approaches to software delivery. This document provides those practicing Enterprise Architecture with the insights needed to rethink their approach. They should ask themselves if each process and artifact they require is necessary to bring value to the digital enterprise, or if it is a legacy of past organizations and practices. It provides the Digital Practitioner with the guidance needed to leverage Enterprise Architecture to successfully complete the steps and tasks described in the DPBoK Standard while managing risks.

1.3. Strategy

In looking at the DPBoK Standard, the subject of building a digital enterprise, and how Enterprise Architecture and the TOGAF Standard specifically support the digital enterprise, it became obvious that a shift in focus would be useful. This resulted in spelling out two specific Enterprise Architecture strategies that are used throughout this document:

- **The peek-ahead strategy**

  The first strategy is to move from a "do it if, and after, the architect says OK" to a "do it with the architecture enablement" approach. Enablement comes in the form of using just enough guidance on risks, standards, and best practices to deliver the minimum viable digital product per context, while looking ahead to ensure that a smooth transition to the next context is enabled. This is not meant to stop progress, but rather to ensure that decisions are taken today with appropriate understanding of potential problems and difficulties. This strategy can be done by someone undertaking the role of an architect. Even in the Individual/Founder Context of the DPBoK Standard, the individual/founder provides the business analysis delivered by an Enterprise Architect, even if it is done in an *ad hoc* fashion.

- **Enterprise Architecture as services strategy**

  The second strategy further supports enablement by moving from producing architectures, and gating progress, to developing just enough architecture on demand to support the operations tempo of the digital effort. This is accomplished through an Enterprise Architecture services delivery model provided by those undertaking the Enterprise Architect role. This is done in an enabling-consulting fashion. This is especially significant:

  - At the Team of Teams level where the architect can serve to improve cross-team communication and reduce the cognitive load of teams working together
  - In a larger organization that offers consultative services to founders/teams as part of an innovation/incubation strategy

These two strategies along with the guidance contained in this document will improve the probability of success for the digital enterprise in any organization.

[1] The DPBoK Standard, Section 5.2.

2. Why the TOGAF Standard Supports the Digital Enterprise

2.1. Introduction

The TOGAF Standard began to evolve at a time when server hardware and networking equipment needed to be purchased; data center space, power, and cooling needed to be planned for, and product licenses negotiated and purchased. Technology infrastructure had to be well-planned and in place in the early stages of a project to allow for adequate lead time. Now, there are alternatives to purchasing and staging hardware and networking, and many product licenses are open-source licensing.

While the environment has changed, the business functions needed to deliver an IT capability still exist. These functions still require an understanding of the concepts behind the business process, and an approach or methodology to accomplish their associated tasks. The TOGAF Standard and Enterprise Architecture are relevant to understand business functions and the tasks that must be completed by people in order to enable the business functions.

The need for companies to evolve into digital enterprises can be linked to a variety of drivers, least of which is the rapid change in technologies that lend themselves to new ways of working, socializing, and entertaining. The Enterprise Architecture capability and the TOGAF Standard support Agile software delivery environments. An Enterprise Architecture should be seen as supporting and enabling the Agile environment in delivering and enhancing digital products and services quicker and easier by providing insight into various areas; including:

- Reactively managing technical debt as the result of sprints in a cohesive and connected fashion
- Proactively managing technical debt and anticipating Agile development needs by:
  - Identifying standards and reusable standard components that support shortened Agile development cycles
  - Appropriate governance or guardrails to oversee the reuse of components
- Managing matured digital products and delivering operational excellence by:
  - Simplifying complexity in the digital ecosystem using the TOGAF Architecture Development Method (ADM)
  - Establishing an Enterprise Architecture capability that drives operational excellence in the management of digital products and services
  - Institutionalizing Agile development methods by enabling them as another framework used in the organization

Having an Agile culture and using Agile delivery methods does not necessarily lead to products with *Agile characteristics*. Agile delivery must balance the business value of early delivery to market [2] with the future value of leveraging and connecting to other components in the ecosystem that would add value to the product. As a result, a more appropriate approach to developing an Agile backbone may

be one that looks at the enterprise, particularly in the Team of Teams and Enduring Enterprise contexts of the DPBoK Standard. In other words, the TOGAF Core Concepts and ADM. For more information on Enterprise Architecture supporting Agile delivery using the TOGAF Standard; see the TOGAF® Series Guide: Enabling Enterprise Agility (see *Referenced Documents*). Often the quickest delivery involves solutions that are not easily adaptable with other features and difficult to connect to other components in the ecosystem that would add value to the product.

It is important to consider that for organizations to become digital they must improve their digital offerings with products and services that offer additional value not considered by competitors. To achieve this, experimentation is important, using iterative test-and-learn approaches to identify new digital products. Enterprise Architecture is well-suited to support this experimentation, providing the alignment of business objectives to the digital vision; for example, by applying techniques like design thinking. The use of architecture alternatives to select different potential implementation roadmaps is also a plus. More details on how to handle architecture alternatives can be found in the TOGAF Standard – ADM Techniques (see *Referenced Documents*), Chapter 10, “Architecture Alternatives and Trade-Off”.

2.2. Reactively Managing Technical Debt

> “Technical debt (also known as design debt or code debt) is a concept in software development that reflects the implied cost of additional rework caused by choosing an easy solution now instead of using a better approach that would take longer.” Wikipedia® (see *Referenced Documents*)

> “The issue is that there is not just the typical hack, the technical shortcut that is beneficial today, but expensive tomorrow that creates technical debt. (A not uncommon tactic in feature factories.) There is also a kind of technical debt that is passively created when the Scrum team learns more about the problem it is trying to solve. Today, the product team might prefer a different solution by comparison to the one the team implemented just six months ago. Or, the product team upgrades the definition of “done”, thus introducing rework in former product increments. No matter from what angle you look at the problem, you cannot escape it, and Scrum does not offer a silver bullet either.” Scrum.org™ (see *Referenced Documents*)

One area of Agile development that can be helped by an Enterprise Architecture approach is the management of technical and architectural debt. Technical debt is not bad, but a debt may bring a short-term benefit at the cost of future delay and inflexibility in bringing new features to market.[3]

Once you incur technical debt, you have to do something with it. This can be considered as reactively managing technical debt. Many technical debt issues can be dealt with in the product backlog by having the principle that technical debt is tracked and continually paid down as part of items in the sprints. However, there are other forms of technical debt that are better dealt with from an enterprise perspective because of their extremely complex or cross-cutting nature, which may be better managed using Enterprise Architecture and/or following the approaches in the TOGAF Standard. Other forms of technical debt that do not require Enterprise Architecture or approaches from the TOGAF Standard are technical debts that can be mitigated by following software or middleware patterns. This approach

might be preferred to simplify maintainability. Technical debt of this nature can also appear in the technology domain.

An approach based on the TOGAF Standard is also well-suited to identifying technical debt incurred due to redundancy. As all products are based in the same digital ecosystem, multiple Scrum teams may have run into the same "architecture roadblocks". Using the TOGAF ADM as an Enterprise Architecture approach should uncover these overlaps and not only address the issues specific to particular product architectures, but also gain insight into fundamental and systematic deficiencies in the digital ecosystem itself. This can enable teams to develop or acquire solutions to address issues from which multiple products might suffer.

2.3. Proactively Managing Technical Debt

In principle, technical debt is avoidable, but in practice it is incurred. However, the amount of debt that an organization takes on can be proactively managed. The TOGAF Standard has a number of features that, when applied at the enterprise level, can help in the proactive management of the infrastructure. In *Digital Transformation Strategy to Implementation using The Open Group Standards* (see *Referenced Documents*), debt is described as:

"The gap between desired state and current state is a liability – a debt incurred by the enterprise. When trade-off decisions result in adding to the backlog of work, the architect and the enterprise are wilfully increasing the chasm between current and target state – an increase in debt. Using assessments from maturity and service design, the practitioner constrains and guides the enterprise from tripping up during trade-off decisions. It also provides insights and compels the enterprise to involve all skill verticals – Human Resources, Finance, Product and Service lines, Strategy, etc."

When creating a strategy to proactively manage technical debt by using the TOGAF Standard, consider the following:

- Standards include internally agreed upon ways of implementing systems and some of those can help to proactively manage technical debt

  Some standards are driven by government regulations and are subject to audit, such as General Data Protection Regulation (GDPR), SWIFT®, BASEL II, and BASEL III. Other standards are adopted as best practices. Regardless of their origin, once adopted as a standard they can cut across product domains and often the entire ecosystem. Identifying standards and managing the lifecycle of the standards removes some of the guess work for Scrum teams. Beyond identifying the standards used, communicating them, and making them visible, the Enterprise Architect stands ready to assist Scrum teams in using the standards. In a rigid culture, a formalized Architecture Board examines the use of standards in architectures and implemented systems. However, in Agile development environments, the architecture board acts more like guardrails to ensure the systems avoid implementation decisions that are difficult and expensive to reverse, or that can lead to integration and operational excellence issues. Components used in solutions that are not internally developed will have standards and a standards lifecycle which will impact the maintainability of digital products.

- An Architecture Repository and Enterprise Continuum are assets to the digital enterprise that Agile delivery teams can use to make more informed design choices and to use proven designs from their own company

  While Agile processes do not focus on documentation, a large part of the TOGAF Standard does focus on documenting and analyzing the environment. Product architectures can make use of components that are not developed, managed, or controlled by the environment, and the Enterprise Continuum provides a way to classify and organize components that enhance the sustainability of a digital product.

- Digital Practitioners concern themselves with capabilities to support the digital enterprise as described in *The Seven Levers of Digital Transformation* (see *Referenced Documents*), not just the digital products and services, and IT and delivery layers

  TOGAF Standard techniques can be applied to product architectures, such as stakeholder management, business transformation readiness assessment, risk management, and several other competency areas described in the DPBoK Standard.

2.4. Mature Digital Products and Operational Excellence

Digital products and services have a lifecycle from inception to retirement. The length of the lifecycle is dependent on its viability to its ecosystem. The strength of Agile processes lies in the evidence-based testing of features, which means that some experiments will be a success. For the products that fail for one reason or another the long-term consequence of their viability is not relevant. It is the product that has proven its viability without necessarily being engineered for sustainability or deeply embedded integration, which may require rework to address integration into the larger ecosystem.

A new digital product triggers a chain of events. Products that incorporate any sort of technology are constantly evolving. If they are not evolving, they are becoming obsolete. The evolution of products and services is driven by ever-increasing value to the customer. Value can be measured from many perspectives, but one common perspective is the capability of the product or service to connect to other things.

The TOGAF Standard can be used to manage and mature digital products, and to help deliver operational excellence. However, at times it can feel like quite a challenge as Agile processes focus on delivering code over documentation and the TOGAF Standard centers much of its methodology around artifact collection and management.

Although there can be a feeling amongst agilists that there is no need for architecture, the authors of this document assert that there is. It may be that the architecture is not understood, or written down, or it may be a poorly designed architecture; but as long as there is a system, there is an architecture. Without suggesting a best practice for architecture documentation, each architecture description can be plotted on the matrix described in Figure 1.

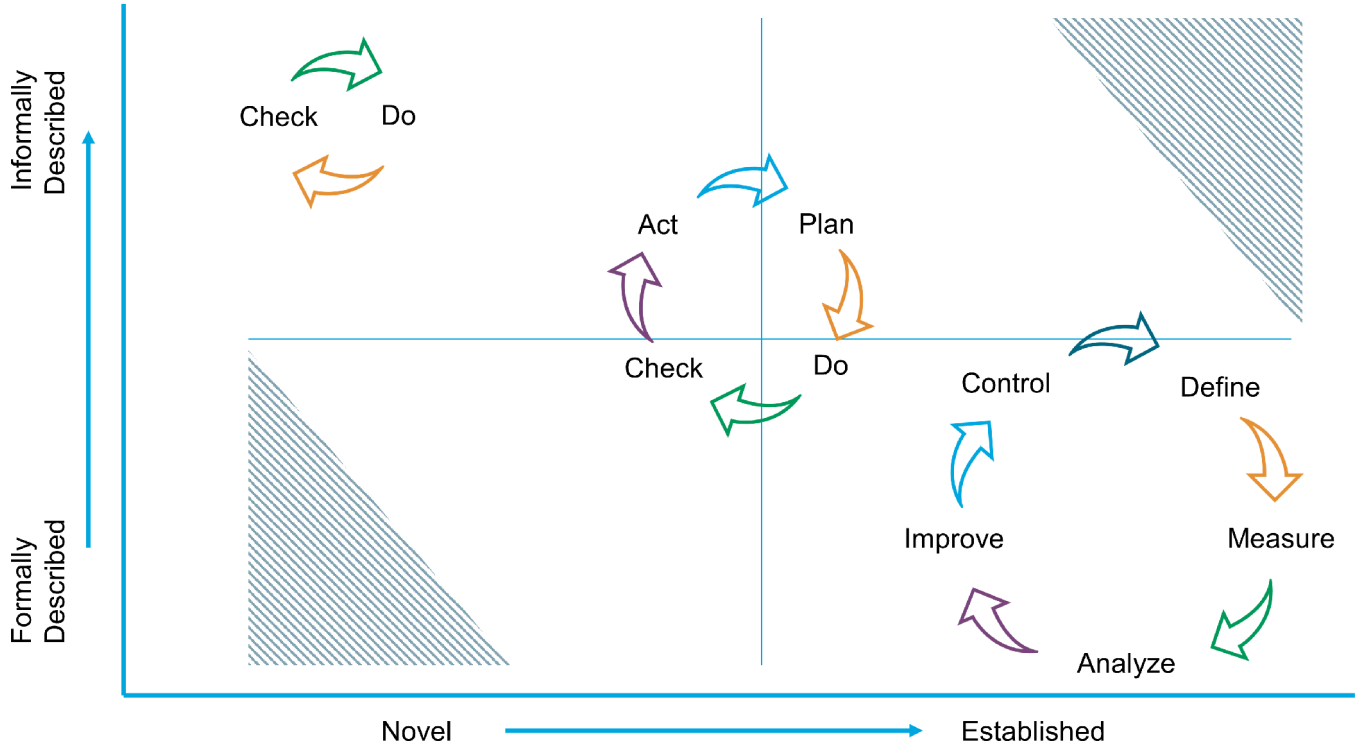

Figure 1. Example of Documentation Matrix

A system, whether large, small, simple, complex, just invented yesterday, or as old as the punch card mainframes, has an architecture. And that architecture has a description; we can describe it visually, verbally, or in a written form.

The job of the architect is to do just enough architecture, just in time. The TOGAF Standard describes what the architecture description should contain, such as information about stakeholders, concerns, views (for example, the views of stakeholders – to address their concerns), and viewpoints. Separate and apart from the evolutionary state of the architecture is the form of architecture measured by its formality, which is a separate measurement of its completeness, soundness, and robustness. Obvious problem areas are the extremes, when:

- The system (and its architecture) is complex and undocumented (insufficient architecture)
- There is an "architecture mandate" for every potential system, product, or idea before we have even tested its viability (too much architecture)

The architect should have the experience to be able to apply a format of architecture that achieves the best result within the context of the architectural environment.

2.5. Simplifying Complexity (The TOGAF ADM)

Digital products must adapt to their evolving ecosystem or they will lose their value. The digital products might become inefficient, obsolete, or too expensive to maintain. A well-constructed ecosystem that is adaptable, scalable, and flexible is the purpose of an architecture.

The TOGAF ADM provides guidance for understanding and describing the larger digital ecosystem in

the form of Enterprise Architecture. The TOGAF Standard can also be used to partition the ecosystem into segment architectures, while digital products can be described as solution architectures.

As digital products and services increase in complexity, more rigorous forms of architecture can and should be applied to maintain the “Agile” aspects of digital products. The question becomes how much rigor to apply? Using guidance available in the TOGAF Standard, the Digital Practitioner can mitigate slow-downs in continuous delivery caused by complexity; for example, by evangelizing the rigorous and structured development of reusable components that are relatively easy to integrate. Conversely, the architect can select TOGAF components that help to address complexity and deselect components that are over-engineered for the context in which they are operating. The TOGAF Standard states that it should be adapted and “right-sized” for smaller or less complex environments.

Most importantly, the TOGAF Standard focuses on business outcomes described as valuable to the customer or end user. This aligns with how the value of digital products and services are measured. However, the Agile approach of “you build it, you operate it” may not be operationally efficient, especially when the digital product begins to embed itself into the core operational model of the technology infrastructure. The TOGAF Standard provides the framework that accommodates not only product architectures but entire capabilities in which the product participates.

[2] The DPBoK Standard, Section 6.6.2.2.9, “Cost of Delay”.

[3] The DPBoK Standard, Section 6.2.2.2.3, *“Front Load the Development Process”: “Poor decisions made early in the development process have negative consequences that increase exponentially over time because reversing them later in the lifecycle becomes more and more difficult”*.

3. Terminology Alignment

The terminology used in the TOGAF Standard and the DPBoK Standard does not conflict in definition and usage. However, as you might expect, there are terms that are used in one that are either currently not used or not relevant in the other.

Table 1 provides a list of some of the key terms focused on the digital enterprise and used in the DPBoK Standard.

Table 1. Terminology Alignment between the TOGAF and DPBoK Standards

Term	DPBoK Term[4]	TOGAF Term[5]
Application Component	The term component is used in a more general way in the DPBoK Standard; therefore, there is no conflict.	An encapsulation of application functionality aligned to implementation structure, which is modular and replaceable. It encapsulates its behavior and data, provides services, and makes them available through interfaces. An application component usually maintains a data component. It is enabled by technology services provided by technology components.
Architecture	Both standards share the same definition.	1. The fundamental concepts or properties of a system in its environment embodied in its elements, relationships, and in the principles of its design and evolution. (Source: ISO/IEC/IEEE 42010:2011; see *Referenced Documents*) 2. The structure of components, their inter-relationships, and the principles and guidelines governing their design and evolution over time.

Term	DPBoK Term[4]	TOGAF Term[5]
Digital Enterprise	An enterprise characterized by: 1. The creation of digitalized products or services that are delivered fully digitally; e.g., digital media or online banking. 2. Where physical products and services are obtained by the customer by digital means; e.g., online car-sharing services.	There is no specific TOGAF definition for digital enterprise; however, the definition provided in the DPBoK Standard is a special type of enterprise, as defined in the TOGAF Standard. The TOGAF Standard considers an enterprise to be any collection of organizations that have common goals, operating at all scales.
Digital Strategy	The DPBoK Standard does not define digital strategy; however, it implies that a digital strategy is one which aspires to lead to a successful digital enterprise.	The term is not defined in the TOGAF Standard; therefore, there is no conflict.
Digital Technology	IT in the form of a product or service that is digitally consumable to create or enable business value.	The term is not defined in the TOGAF Standard; therefore, there is no conflict.
Digital Transformation	The radical, fundamental change toward becoming a digital enterprise.	The term is not defined in the TOGAF Standard; therefore, there is no conflict.
Digitalization	The application of digital technology to create additional business value within the primary value chain of enterprises.	The term is not defined in the TOGAF Standard; therefore, there is no conflict.
Digitization	The conversion of analog information into digital form.	The term is not defined in the TOGAF Standard; therefore, there is no conflict.
Process	An ordered, countable set of activities; an event-driven, value-adding sequence that can be measured and improved.	This term is used and there is no conflict. A process represents a sequence of activities that together achieve a specified outcome, can be decomposed into sub-processes, and can show the operation of a business capability or service (at the next level of detail); see the TOGAF Standard – Applying the ADM (see *Referenced Documents*). The definitions do not contradict each other.

Term	DPBoK Term[4]	TOGAF Term[5]
Service	This term is not defined in the DPBoK Standard; therefore, there is no conflict.	A repeatable activity; a discrete behavior that a building block may be requested or otherwise triggered to perform. An element of behavior that provides specific functionality in response to requests from actors or other services.
Technology Component	The term component is used in a more general way in the DPBoK Standard; therefore, there is no conflict.	1. A technology building block: a generic infrastructure technology that supports and enables application or data components (directly or indirectly) by providing technology services. 2. An encapsulation of technology infrastructure that represents a class of technology product or specific technology product.

The following terms are relevant to both the TOGAF Standard and the DPBoK Standard, and definitions are provided that can be used to frame conversations:

- **Digital standard (or guide)**: A publication that helps an enterprise succeed as a digital enterprise; i.e., one that primarily delivers value through digital means (sometimes called a “digital-first” business model)
- **Emergence model**: An organization of information where topics are related to the organizational complexity or scale of the enterprise (Source: The DPBoK Standard, Scaling Model)
- **Principle**: A qualitative statement of intent that should be met by the architecture (Source: The TOGAF Standard – ADM Techniques, Section 2.3: “Components of Architecture Principles”)

[4] Terms taken from the DPBoK Standard, Chapter 2: “Definitions” unless otherwise stated.

[5] Terms taken from the TOGAF Standard – Introduction and Core Concepts, Chapter 4: “Definitions” unless otherwise stated.

4. How the TOGAF Standard Supports the Digital Enterprise

4.1. Introduction

This chapter provides a detailed overview of the four contexts of organizational evolution per the DPBoK Standard and their relationship to Enterprise Architecture and the TOGAF Standard. This chapter answers the questions:

- What are the four digital enterprise contexts, at a very high level?
- What can Enterprise Architecture contribute in these contexts?
- Which Enterprise Architecture principles support the digital journey per context?
- Which Enterprise Architecture capabilities and services support Digital Practitioners in each of these contexts?
- Which TOGAF ADM phases, TOGAF artifacts, and TOGAF Series Guides support the DPBoK contexts?
- What is the connection between the TOGAF Standard and the DPBoK Standard?

The strategy for answering this last question is to present a set of Enterprise Architecture services that package the right set of activities within the TOGAF Standard to deliver value to the digital enterprise as needed per context of the emergence model. What is listed is a minimal set of Enterprise Architecture services that deliver Enterprise Architecture capabilities for decision-making in each context to ensure risk is understood, and to “peek-ahead” in preparation for going to the next context.

4.2. The DPBoK Standard

The DPBoK Standard identifies four contexts of organizational evolution toward a digital enterprise:

- Context I: Individual/Founder
- Context II: Team
- Context III: Team of Teams
- Context IV: Enduring Enterprise

The DPBoK Standard presents these contexts as levels, where the enterprise moves from an earlier context to the next level of success. This is described as an emergence model where only the knowledge and activity essential to the level is presented, with enough foreshadowing, to prepare for the transition to the next level of emergence. It is our strategy to support this emergence model with Enterprise Architecture through our peek-ahead strategy. So, not only does the Enterprise Architect support the specific context, but also considers the next level and informs the Digital Practitioners of ways to position themselves to evolve. At the higher levels of the emergence model, the Enterprise Architect can play an essential primary role in enabling cross-team communication without adding to

the cognitive load of the individual teams. In addition, the Enterprise Architects can ensure that the risks are clearly identified and communicated so that decisions can be made with an appropriate understanding of potential problems and difficulties.

Each of these contexts is described below in separate sections and for each the role of Enterprise Architecture is summarized along with a list of candidate Enterprise Architect services which might be leveraged by the Digital Practitioner to support their efforts.

4.2.1. Context I: Individual/Founder

The Individual/Founder context addresses *"minimum essential concerns they must address to develop and sustain a basic digital product"*. This context represents the bare minimum requirements of delivering digital value.

The DPBoK Standard key topics for this context are:

- **Conception of digital value**

  Architecture is often used as a communication medium. Architecture models communicate very well. Also, the Enterprise Architect is a communicator and considered a key enterprise networker.

- **Digital infrastructure and related practices** (the essential infrastructure and process choices to quickly deliver value to the market)

  The Enterprise Architecture provides the necessary descriptions to communicate the infrastructure available and its appropriate use for both development and delivery. The Enterprise Architect can also help to identify existing infrastructure approaches for individuals/founders that may be embedded in larger organizations, and to communicate vetted technical requirements to the infrastructure organization to ensure preparation for new workloads. To clarify: in Context 1 (and Context 2 as well) there are usually not dedicated architects. Instead, architecture is a role, an activity, or the responsibility of the team, to be performed when – and only when – it is needed.

- **Agile development and continuous delivery practices**

  Enterprise Architecture is often used to support and provide answers to questions about Agile development and continuous delivery. Enterprise Architects, if available to individuals/founders, are often approached to provide guidance in these areas on demand, based on their practical experience.

  In this context it is expected that Enterprise Architecture efforts must support the project to deliver digital products/solutions effectively and efficiently. To support this context, the person acting as the Enterprise Architect has a role to assure that risk is understood and that decisions are made with an understanding of risk.

  For example, when an individual/founder proceeds with the development and deployment of a new digital product they must be informed of risks associated with the inadvertent release of

information that is either sensitive or classified. Also the individual/founder may need guidance on ease of use, assistance with timely delivery, and guidance on technologies that can assist or deter.

More details about the TOGAF Standard supporting enterprise agility can be found in the TOGAF® Series Guide: Enabling Enterprise Agility (see *Referenced Documents*) and in the TOGAF® Series Guide: Applying the TOGAF® ADM using Agile Sprints (see *Referenced Documents*).

Enterprise Architects need to deliver this support in an on-demand, service-oriented manner to meet the operating tempo of the individual/founder. Some areas where the Enterprise Architecture and the TOGAF Standard could support the creation of a digital strategy include:

- Identifying digital offerings or digital value using an outside-in view that focuses on the customer or end user first
- Distinguishing strategy from the business model, and communicating the strategy to support a corporate brand identity
- Helping to distinguish between the problem space and the solution space
- Helping to shift from requirements to outcome-oriented and outcome-centered thinking in product delivery and value delivery to customers through value streams and capabilities identification
- Increasing or enhancing operational excellence by supporting and providing guidance for operational improvements

  This includes modeling operations and defining a realistic improvement roadmap; collaborating on models to ensure a complete picture of the company from supplier to end-user support, product ideation through retirement, and throughout the value stream with demarcations for cost and revenue. Examples of this type of output or outcome include a business model canvas, business scenarios, value stream and business capabilities mapping, product and service modeling, use cases, and business cases, specifically around requirements management:

  - Digital security, security architecture, risk management, and Enterprise Architecture governance to provide the company protection from harmful events
  - Creating a digital stack by identifying the supporting capabilities for the digital offering, as well as the digital stack and associated interdependencies
  - Defining the digital lifecycle through the service, application portfolio, and security infrastructure lifecycle viewpoints

4.2.2. Context II: Team

The team has a single mission and a cohesive identity, but does not need a lot of overhead to get the job done. The Team context covers the basic elements necessary for a collaborative product team to achieve success while remaining at a manageable human scale. Establishing team collaboration as a fundamental guiding value is essential to successful digital product development. Even with a few new people comes the need to establish product direction more clearly, so people are building the right thing. The team is all in the same location, and can still communicate informally, but there is enough

going on that it needs a more organized approach to getting work done.

The collaboration level represents the critical Team-level experience. Establishing team collaboration as a fundamental guiding value is essential to successful digital product development. The insights of the Agile movement and related themes such as Lean are primary in this context.

The DPBoK Standard highlights the following areas of interest within the Team context:

- **Product Management**
  - Product architecture has been a staple for assisting product management decisions

    Enterprise Architecture can provide architecture models that map to a given digital product profile. Additionally, Enterprise Architecture makes interdependencies explicit, assuring an holistic view of the digital product.

- **Work Execution Management**
  - Enterprise Architecture is often used to depict processes and workflows in very simple to very complex levels of detail

    In the Team context very simple models can be constructed to help communicate workflows and processes; not the entire answer for work management, but a good way to communicate within a small team.

- **Operations Management**
  - Enterprise Architects have been significant contributors to those managing operations

    Indeed, whenever you see a control board you are seeing a visual depiction of the connection between the operations architecture and real-time data about operations. In the Teams context a single digital product may need an architecture model to depict how operations are expected to run while the actual digital product is running and while the team is working on the continuous delivery of improvements to that product.

In the Team context the Enterprise Architecture efforts must support the project to deliver digital products/solutions effectively and efficiently in an environment where there are more people involved – communication is essential. In the Team context the Enterprise Architect has an even greater role to assure that risk is understood and that decisions are made with an understanding of risk. And, given the greater number of people involved in the Team context, the Enterprise Architect has an additional role to ensure efficacy of communication and collaboration. So, modeling and documenting become more important to have a common shared understanding to support product management, work execution, and operations understanding.

For example, when a team proceeds with the development and deployment of a new digital product they must not only be informed of data risks, they must also have a shared understanding of those risks among team members. Also critical in a team environment is to ensure a common and shared approach to requirements understanding to avoid different team members moving on different

priorities. For the small teams typically working in this context, the approach should be lightweight communication in full support of the team's tempo.

Enterprise Architects help to communicate risks and mitigations when dealing with data security, guidance on ease-of-use, assisting with requirements understanding, assisting with timely delivery, and providing guidance on technologies that can assist or deter. Enterprise Architects should deliver this support in an on-demand, service-oriented manner to meet the operating tempo of the team.

4.2.3. Context III: Team of Teams

Coordinating across a team of teams is the main concern that people in an Enterprise Architect role need to address using Enterprise Architecture and the TOGAF Standard. Too often, coordination mechanisms (such as overly process-centric operating models) degrade team cohesion and performance. It is important to balance overcomplex coordination with the need to ensure the success of a family of digital products.

The Team of Teams context is a natural evolution of the Teams context, but one where the number of people and digital products involved generates complexity. Coordinating across a team of teams is the main concern and, too often, coordination mechanisms degrade team cohesion and performance. Communication is again key to ensure successful collaboration and value delivery.

The Team of Teams context is where the traditional strengths of Enterprise Architecture increase significantly in value through identifying and enabling essential interactions between teams while minimizing the cognitive load of those interactions for the team members.

The DPBoK Standard key topics for this context are:

- **Organization and cultural factors**

  Organizational, and especially cultural, issues are often significant drivers in shaping process design, especially in international or multi-jurisdictional enterprises. In certain cases, it might be necessary to respect cultural differences through different means. The means might include altering basic processes, different approaches to stakeholder interaction and management, or altering designs. When an organization is described in terms of value generation, many cultural issues can be managed simply by respecting the constituent parts of the organization. Enterprise Architecture helps to resolve all of these concerns.

- **Coordination and process mechanisms**

  Enterprise Architecture is used to depict processes and control mechanisms. It is used to identify and eliminate choke points and for continuous process improvement.

- **Investment and portfolio consequences of a multi-team structure**

  Enterprise Architectures that depict portfolios of products are critical resources in portfolio management. The holistic depiction of interdependencies, value generation, and cost, etc. support portfolio management decision-making.

Other areas where Enterprise Architecture and TOGAF Standard expertise can be used to remove friction from company operations and growth include:

- Identifying key drivers for the transition from a unitary team to a team of teams
- Identifying the basics of coordination problems and providing a solution that solves it, which includes spotlighting the pros and cons of traditional process management
- Identifying the basic product/function spectrum of organizational forms
- Identifying important cultural factors and concepts for measuring and changing culture

In the Team of Teams context, Enterprise Architecture and the person in the Enterprise Architect role continues to ensure that risk is understood and communication is effective. Yet, given the greater number of digital products involved in a Team of Teams context, the Enterprise Architect has the additional role of ensuring that the digital products work together, leverage each other, and are appropriately coupled; thus, modeling and documenting the move from a specific digital product to portfolios of digital products that require interoperability.

Additional areas where Enterprise Architecture and the TOGAF Standard provide support include where Enterprise Architecture:

- Can be applied to support cross-activities and interdependencies between teams following a portfolio view
- Supports cross-activities and interdependencies between teams following a portfolio view in alignment with, and supported by, the IT4IT™ Standard
- Delivers the high-level view and landscape, and identifying the current and target organization maturity level for the digital enterprise
- Supports digital product and service catalog definition
- Provides capability-based planning and process management guidance

4.2.4. Context IV: Enduring Enterprise

The Enduring Enterprise context is about how to manage an enterprise that has been successful and is now faced with the realities of operating a sustainable business over periods of time longer than the next product cycle; see the DPBoK Standard (see *Referenced Documents*), Section 6.4: *"However, what may be less obvious is that scaling up in size also means scaling out in terms of timeframes: concern for the past and the future extend further and further in each direction. Organizational history is an increasing factor, and the need to manage this knowledge base can't be ignored. The organization is fulfilling responsibilities set in place by those no longer present and is building product and signing service contracts to be fulfilled by those who will come after".*

The DPBoK Standard highlights the following areas of interest within the Enduring Enterprise context:

- **Governance, risk, security, and compliance**
  - Managing risk, including security risk, is often accomplished through governance and

compliance

Compliance criteria can be derived from internal (to the company) sources, and external sources (such as laws and regulation). Good Enterprise Architectures provide compliance criteria that must be used to assess compliance of business processes, information technology, and human resources (though admittedly little is done in Enterprise Architecture on the human resource side today other than specific certifications). The assessments should guide information governance decisions.

- **Information management**
  - A critical domain in any Enterprise Architecture is the Information Systems domain, which covers data and application architecture; this domain is here to guide information management issues
- **Architecture and portfolio management**
  - Enterprise Architectures that depict portfolios of product are critical resources in portfolio management

    The holistic depiction of interdependencies – value generation, cost, etc. – supports portfolio management decision-making. Given the costs of Enterprise Architecture, this activity itself represents something within a portfolio that should be managed in the Enduring Enterprise context.

To support enduring enterprises, the Enterprise Architecture expands its role into overall strategy and governance. It must support what was presented immediately above, as well as support other enterprise issues such as handling third parties, impact analysis on mergers and acquisitions, etc.

Specific areas of enabling an enduring enterprise that the DPBoK Standard may or may not address but are relevant and can be leveraged from Enterprise Architecture and TOGAF Standard guidance and experience include:

- Establishing additional feedback mechanisms for steering, managing risk, and assuring performance at scale and ever-increasing time horizons and increasingly complex ecosystems; for example, governance, risk, security, and compliance
- Founding and maturing information management across the company
- Fostering an architecture-driven and portfolio management culture

Specific areas of supporting strategy/portfolio/projects/solution delivery that the DPBoK Standard may or may not address but are relevant and can be leveraged from Enterprise Architecture and the TOGAF Standard guidance and experience include:

- Defining architecture as a competency area
- Defining concepts, quality levels, and implementation guidance for architecture, digital strategy, and portfolio creation and management

- Defining and establishing Agile Enterprise Architecture
- Implementing Enterprise Architecture and the TOGAF Standard governance framework to support digital governance
- Providing architectural guidance that evolves data from information into knowledge that provides value to the company and adapting the trio to fulfill digital enterprise needs
- Providing portfolio support in the creation and connectedness between portfolios
- Adapting an existing or new Enterprise Architecture capability to support an Agile and digital organization
- Adapting Enterprise Architecture and the TOGAF Standard to fit its delivery style into Agile approaches and digital product creation and offerings
- Adapting Enterprise Architecture to support business strategies that are digital, and providing the required capabilities to deliver the digital offering, as well as supporting product and service digitalization

4.2.5. Need More Detail?

The following subsections provide further detail:

- Section 4.3 summarizes the relevant Enterprise Architecture and TOGAF principles per context
- Section 4.4 summarizes the relevant Enterprise Architecture capabilities and Enterprise Architecture services per context
- Section 4.5 summarizes the relevant TOGAF ADM and TOGAF Series Guides per context

And Appendix D further rationalizes the positive connections between the TOGAF Standard and the DPBoK Standard.

4.3. How to Apply TOGAF Principles per Context

This section answers the questions:

- What principles from Enterprise Architecture and the TOGAF Standard support the approach of the DPBoK Standard toward a digital enterprise?
- How are these concepts applied in a digital enterprise context in general?

The following subsection identifies the TOGAF principles that directly support the intent of the DPBoK Standard and, in general, how and where they are applied in various emergence levels (contexts) of a digital enterprise. This is called the “principles aspect” of looking at the digital enterprise and the TOGAF Standard. Consideration was given to each of the principles from the TOGAF Standard, as listed in Appendix B.

Figure 2 identifies which of the TOGAF principles are most applicable to each of the contexts of the DPBoK Standard. Descriptions of the principles and how they apply to the DPBoK contexts follow the

matrix. If a principle is assessed as applicable to an earlier context it applies to all other later contexts.

Principles from the TOGAF Standard \ DPBoK Contexts	Context I: Individual/Founder	Context II: Team	Context III: Team of Teams	Context IV: Enduring Enterprise
Principle 2: Maximize Benefit to the Enterprise	x	x	x	x
Principle 3: Information Management is Everybody's Business				x
Principle 4: Business Continuity				x
Principle 5: Common Use Applications			x	x
Principle 6: Service Orientation		x	x	x
Principle 10: Data is an Asset			x	x
Principle 11: Data is Shared			x	x
Principle 12: Data is Accessible			x	x
Principle 15: Data Security	x	x	x	x
Principle 16: Technology Independence			x	x
Principle 17: Ease-of-Use	x	x	x	x
Principle 18: Requirements-Based Change		x	x	x
Principle 19: Responsive Change Management	x	x	x	x
Principle 20: Control Technical Diversity			x	x
Principle 21: Interoperability			x	x

Figure 2. TOGAF Principles Mapped to DPBoK Standard Contexts

NOTE This mapping should be used as a reference and for general guidance. What principles are finally selected will depend on the specific situation.

The following principles from the TOGAF Standard that support the DPBoK Standard are presented per digital enterprise context.

4.3.1. Enterprise Architecture Principles: Individual/Founder

For each of the TOGAF principles, rationales, and implications given here, the individual/founder should assess the specific scenario for the following subjects and seek out Enterprise Architecture support when a particular subject is in play.

Principle 2: Maximize Benefit to the Enterprise

Decisions are made to provide maximum benefit to the enterprise as a whole.

- **Rationale**

  This principle embodies “service above self”. Decisions made from an enterprise-wide perspective have greater long-term value than decisions made from any particular organizational perspective.

  Maximum Return on Investment (ROI) requires information management decisions to adhere to enterprise-wide drivers and priorities. No group will detract from the benefit of the whole. However, this principle will not preclude any group from getting its job done.

  Principle 2 should be written on the heart of every founder – “How do I maximize the value of my enterprise?”, whether this is someone working on an incubator “enterprise” in a larger organization, the head of a digital team that has just been spun out of a parent, or the classic two people in a garage.

- **Implications for the Digital Enterprise**

  To support this principle in this context the Enterprise Architect and Enterprise Architecture must become enablers for decision-making, giving consideration to the following:

  - Supporting planning and information management decisions with an analysis of quality enterprise information
  - Communication of the greater benefit to the entire enterprise in contrast to local benefits when needed
  - Supporting application development priority-setting from an enterprise perspective
  - Applications component sharing across organizational boundaries
  - Governance

Principle 15: Data Security

Data is protected from unauthorized use and disclosure. In addition to the traditional aspects of national security classification, this includes, but is not limited to, the protection of pre-decisional, sensitive, source selection-sensitive, and proprietary information.

- **Rationale**

  Open sharing of information and the release of information via relevant legislation must be balanced against the need to restrict the availability of classified, proprietary, and sensitive information. Existing laws and regulations require the safeguarding of national security and the privacy of data, while permitting free and open access. Pre-decisional (work-in-progress, not yet authorized for release) information must be protected to avoid unwarranted speculation, misinterpretation, and inappropriate use.

- **Implications for the Digital Enterprise**

  The Enterprise Architect can support the assessment of this scenario and help with mitigation. The Enterprise Architect can also support decisions regarding the digital product architecture to avoid issues.

  - The **aggregation of data** may generate data security issues

    The aggregation of unclassified or insensitive data can result in classified or sensitive data that may put the organization at risk.

  - The **storage-use of classified or sensitive data** requires special consideration of the digital product

Principle 17: Ease-of-Use

Applications are easy to use. The underlying technology is transparent to users, so they can concentrate on tasks at hand.

- **Rationale**

  The more a user has to understand the underlying technology, the less productive that user is. Ease-of-use is a positive incentive for the use of applications. It encourages users to work within the integrated information environment instead of developing isolated systems to accomplish the task outside of the enterprise's integrated information environment. Most of the knowledge required to operate one system will be similar to others. Training is kept to a minimum, and the risk of using a system improperly is low. Using an application should be as intuitive as driving a different car.

- **Implications for the Digital Enterprise**

  The Enterprise Architect should have a good understanding of the requirements for and best practices to meet common look-and-feel requirements.

  - **Common look-and-feel requirements**

    Applications may be required to have a common "look-and-feel" and support ergonomic requirements; hence, the common look-and-feel standard must be designed and usability test criteria must be developed.

  - **User interface complexity**

    Guidelines for user interfaces should not be constrained by narrow assumptions about user location, language, systems training, or physical capability. Factors such as linguistics, customer physical infirmities (visual acuity, ability to use keyboard/mouse), and proficiency in the use of technology have broad ramifications in determining the ease-of-use of an application.

Principle 19: Responsive Change Management

Changes to the enterprise information environment are implemented in a timely manner.

- **Rationale**

  If people are to be expected to work within the enterprise information environment, that information environment must be responsive to their needs.

- **Implications for the Digital Enterprise**

  In the digital environment the Enterprise Architect can be an invaluable asset in helping to ensure that pitfalls to change can be addressed up front. The Enterprise Architect has a more holistic view and knowledge base so can be consulted on many of these issues to ensure responsive change management if needed.

  - Processes for managing and implementing change must be developed that do not create delays

4.3.2. Enterprise Architecture Principles: Team

For each of the TOGAF principles, rationales, and implications given here, the team leader should assess the specific scenario for the following subjects and seek out Enterprise Architecture support when a particular subject is in play.

Principle 6: Service Orientation

Digital products should follow a service-oriented design which mirrors real-world business activities comprising the enterprise (or inter-enterprise) business processes.

- **Rationale**

  Service orientation delivers enterprise agility and enables Boundaryless Information Flow™.

- **Implications for the Digital Enterprise**

  The Enterprise Architect should be prepared to assess the appropriateness of using service orientation for the digital product(s) and provide guidance on implementing them if chosen. The Enterprise Architect should consider the following:

  - Service and microservice representation utilizes business descriptions to provide context; the information provides guidance used for service orchestration
  - Service orientation places unique requirements on the infrastructure, and implementations should use open standards to realize interoperability and location transparency
  - Implementations are environment-specific; they are constrained or enabled by context and must be described within that context
  - Consider if governance of service representation and implementation is required in this context

Principle 18: Requirements-Based Change

Only in response to business needs are changes to applications and technology made.

- **Rationale**

  This principle will foster an atmosphere where organizational changes (business and business support environment) should happen in response to customer and market needs (outside-in view). This is to ensure that business value is the basis for any proposed change. However, a change in technology may provide an opportunity to improve the business process and, hence, improve the value delivered to customers.

- **Implications for the Digital Enterprise**

  In digital enterprises requirements are handled somewhat differently than traditional methods. This principle is embodied in the digital enterprise and Agile development concepts of the "outside-in" view where customer experience trumps technology-driven decision-making. The Enterprise Architecture should consider:

  - Whether funding a specific effort based on response to customer and market needs should be governed based on risk to the enterprise
  - Whether change management has been considered

4.3.3. Enterprise Architecture Principles: Team of Teams

In addition to the principles from the prior contexts, the following are relevant TOGAF Standard principles, their rationale, and implications in the digital enterprise context.

Principle 5: Common Use Applications

The development of applications used across the enterprise is preferred over the development of similar or duplicative applications that are only provided to a particular organization.

- **Rationale**

  Duplicative capability is expensive and proliferates conflicting data.

- **Implications for the Digital Enterprise**

  When an enterprise is in a Team of Teams context great care must be taken to balance the quick delivery of new digital products with the risk of increasing technical debt and the cost of integration and interoperation. Judicious consideration of the following should result in advice to the digital teams based on risks:

  - Organizations which depend on a capability that does not serve the entire enterprise should consider changing over to the replacement enterprise-wide capability, if it exists
  - Organizations should not develop or acquire capabilities for their own use which are

similar/duplicative of enterprise-wide capabilities; in this way, expenditures of scarce resources to develop essentially the same capability in marginally different ways will be reduced

Principle 10: Data is an Asset

Data is an asset that has value to the enterprise and is managed accordingly.

- **Rationale**

  Data is a valuable corporate resource; it has a real, measurable value. In simple terms, the purpose of data is to aid decision-making. Accurate, timely data is critical to accurate, timely decisions. Most corporate assets are carefully managed, and data is no exception. Data is the foundation of our decision-making, so we must also carefully manage data to ensure that we know where it is, can rely upon its accuracy, and can obtain it when and where we need it.

- **Implications for the Digital Enterprise**

  In the Team of Teams context this principle is recommended. This is one of three closely-related principles regarding data: data is an asset; data is shared; and data is easily accessible. The Enterprise Architect can help ensure that data and information are leveraged throughout the enterprise and/or that artificial boundaries are not put in place which deter enterprise leverage. The Enterprise Architect also takes on an education task to ensure that all teams within the enterprise understand the relationship between value of data, sharing of data, and accessibility to data. Data management is key for the digital enterprise in this context. Data discovery, consistent quality, data supporting new product and services design, data protection, self-service access, and scalable solutions are some of the key considerations. Data analytics is key to defining customer profiling for a better understanding of customer needs, supporting the definition of the digital offering. Consideration is given to the following:

  - Organizational capabilities which produced new data (not shared among other organizations) should assess the utility of this data to the enterprise
  - Cultural transition from “data ownership” thinking to “data stewardship” thinking
  - Data-information stewardship is important because obsolete, incorrect, or inconsistent data could be passed to enterprise personnel and could adversely affect decisions across the enterprise

Principle 11: Data is Shared

Users have access to the data necessary to perform their duties; therefore, data is shared across enterprise functions and organizations.

- **Rationale**

  Timely access to accurate data is essential to improving the quality and efficiency of enterprise decision-making. It is less costly to maintain timely, accurate data in a single application, and then share it, than it is to maintain duplicative data in multiple applications. The enterprise holds a

wealth of data, but it is stored in hundreds of incompatible stovepipe databases. The speed of data collection, creation, transfer, and assimilation is driven by the ability of the organization to efficiently share these islands of data across the organization.

Shared data will result in improved decisions since we will rely on fewer (ultimately one virtual) sources of more accurate and timely-managed data for all of our decision-making. Electronically-shared data will result in increased efficiency when existing data entities can be used, without re-keying, to create new entities.

- **Implications for the Digital Enterprise**

  As stated, this principle as well as the principles that data is both an asset and is easily accessible are closely related, hence the implications are basically the same. For this principle, consideration should be given to the following, again balancing value and risk:

  - A common set of policies, procedures, and standards governing data management and access for both the short and the long term:
    - In the short term: standard data models, data elements, and other metadata that define this shared environment and develop a repository system for storing this metadata to make it accessible
    - In the long term: common data access policies and guidelines for new application developers ensure that data in new digital products remains available to the shared environment and that data in the shared environment can continue to be used by the new digital products
    - For both the short term and the long term: common methods and tools for creating, maintaining, and accessing the data shared across the enterprise are useful
  - Trade-off with data security – under no circumstances will the data sharing principle cause confidential data to be compromised

Principle 12: Data is Accessible

Data is accessible for users to perform their functions.

- **Rationale**

  Wide access to data leads to efficiency and effectivenes in decision-making, and affords a timely response to information requests and service delivery. Using information must be considered from an enterprise perspective to allow access by a wide variety of users. Staff time is saved and the consistency of data is improved.

- **Implications for the Digital Enterprise**

  The implications of this principle are basically the same as for the above; data is an asset and data is shared. For this principle, consideration should be given to the following, balancing value and risk:

- The ease with which users obtain information
- The way information is accessed and displayed must be sufficiently adaptable to meet a wide range of enterprise users and their corresponding methods of access
- Limiting the misinterpretation of information

Principle 16: Technology Independence

Applications are independent of specific technology choices and therefore can operate on a variety of technology platforms.

- **Rationale**

  The independence of applications from the underlying technology allows applications to be developed, upgraded, and operated in the most cost-effective and timely way. Otherwise, technology, which is subject to continual obsolescence and vendor-dependence, becomes the driver rather than the user requirements themselves. Realizing that every decision made with respect to IT makes us dependent on that technology, the intent of this principle is to ensure that digital products are not dependent on specific hardware and operating systems software.

- **Implications for the Digital Enterprise**

  When an enterprise is in a Team of Teams context, great care must be taken to balance the quick delivery of new digital products with the risk of increasing technical debt and the cost of integration and interoperation. Technology independence helps to manage the risk of technical debt. Judicious consideration of the following should result in advice to the digital teams based on risks:

  - Digital product portability
  - Commercial Off-The-Shelf (COTS) and Government Off-The-Shelf (GOTS) offerings may be technology and platform-dependent
  - Enablement of legacy applications to interoperate
  - Middleware to decouple applications from the underlying platform

Principle 20: Control (Manage) Technical Diversity

A key driver of the overall reorientation to digital has been that things like cloud and infrastructure as code frameworks drive down the acquisition and deployment cost of infrastructure. The emergence of the concept of “Infrastructure as Code” has reduced management complexity and the costs of deploying infrastructure. However, as the enterprise scales to larger contexts, there is a real, non-trivial cost required to manage multiple processing environments. Limiting the number of supported components may simplify maintainability and reduce costs as the enterprise reaches the Team of Teams and Enduring Enterprise contexts, where budgeting and management issues start to overlay product time-to-market considerations.

- **Rationale**

  The business advantages of minimum technical diversity include the standard packaging of components, predictable implementation impact, predictable valuations and returns, redefined testing, utility status, and increased flexibility to accommodate technological advancements. Common technology across the enterprise brings the benefits of economies of scale to the enterprise. Technical administration and support costs are better controlled when limited resources can focus on this shared set of technology.

  On the other hand, there is value to be exploited by digital enterprises in new technologies that specifically assist the digital enterprise. Using new technologies may, or may not, improve schedules. The trade-offs need to be considered.[6]

- **Implications for the Digital Enterprise**

  Managing technical debt is an important job to ease growing larger contexts, particularly to the Team of Teams context where coordination and resource allocation across teams becomes critical. The Enterprise Architect can again apply their broad knowledge of the various technologies in play and help make better decisions early on. So if controlling technical debt is a desire while considering the cost of delay, then getting the Enterprise Architect to help address the following will be beneficial:

  - Technology choices could be constrained by the choices available within the technology blueprint or the technology blueprint can be enhanced with new digital technologies
  - Procedures for augmenting the acceptable technology set to meet evolving requirements will be supported by the Enterprise Architect.

Principle 21: Interoperability

Software and hardware should conform to defined standards that promote interoperability for data, applications, and technology.

- **Rationale**

  Standards help to ensure consistency, thus improving the ability to manage systems, improve user satisfaction, and protect existing IT investments, thus maximizing ROI and cost reduction. Standards for interoperability additionally help to ensure support from multiple vendors for their products, and facilitate supply chain integration.

- **Implications for the Digital Enterprise:**

  A team of teams creates many digital products leading to an increase in probability of need for interoperation. To facilitate this the Enterprise Architect can help digital teams in the following areas:

  - Interoperability standards and industry standards

- Governance for setting standards, reviewing and revising them, and granting exceptions on use

4.3.4. Enterprise Architecture Principles: Enduring Enterprise

The following are the related TOGAF Standard principles, their rationale, and implications in the digital enterprise context.

Principle 3: Information Management is Everybody's Business

All organizations in the enterprise participate in the information management decisions needed to accomplish business objectives.

- **Rationale**

  Information users are the key stakeholders, or customers, in the application of technology to address a business need. In order to ensure information management is aligned with business, all organizations in the enterprise must be involved in aspects of the information environment. The business experts from across the enterprise and the technical staff responsible for developing and sustaining the information environment need to come together as a team to jointly define the goals and objectives of IT.

- **Implications for the Digital Enterprise**

  In this context the Enterprise Architect can perform the valued role of bringing different stakeholders together and coordinating the necessary collaboration to manage the digital enterprise from an holistic perspective. The Enterprise Architect must enable:

  - Operation as an enterprise team where stakeholders, including customers, need to accept responsibility for managing the information environment
  - Identification of the right resources to implement this principle

Principle 4: Business Continuity

Enterprise operations are maintained in spite of system interruptions.

- **Rationale:**

  As system operations become more pervasive, we become more dependent on them; therefore, we must consider the reliability of such systems throughout their design and use. Business premises throughout the enterprise must be provided with the capability to continue their business functions regardless of external events. Hardware failure, natural disasters, and data corruption should not be allowed to disrupt or stop enterprise activities. The enterprise business functions must be capable of operating on alternative information delivery mechanisms.

- **Implications for the Digital Enterprise:**

  In the Enduring Enterprise context business continuity is a priority. Supporting risk management is

therefore a priority of the Enterprise Architect, supported by a high-quality Enterprise Architecture. The areas of consideration include:

- Dependence on shared-system applications mandates that the risks of business interruption be established and managed:
  - Management includes but is not limited to periodic reviews, testing for vulnerability and exposure, or designing mission-critical services to ensure business function continuity through redundant or alternative capabilities
- Recoverability, redundancy, and maintainability within the Enterprise Architecture to support timely design
- Digital products must be assessed for criticality and impact on the enterprise mission in order to determine the level of continuity required, and what corresponding recovery plan is necessary

4.4. Enterprise Architecture Capabilities and Services

Enterprise Architecture capabilities can be described as the ability to realize something within certain constraints and under certain conditions. Enterprise Architecture services are the delivery mechanism for Enterprise Architecture capabilities. In this section, we list the Enterprise Architecture capabilities supported by the TOGAF Standard that could be of use in each of the contexts of the DPBoK Standard, and then describe the Enterprise Architecture services that deliver those capabilities. The capabilities identified here were honed by analyzing both the implications of the principles in the prior section and the content from the DPBoK Standard – fundamentally by asking the question: “What Enterprise Architecture capabilities would be useful here?”.

Enterprise Architecture capabilities can be written in a manner such as: the Enterprise Architecting ability (skilled people, repeatable process, and material) to {do x} under circumstances {y} within time window {z}. Of course an Enterprise Architecture service can be engaged to deliver an Enterprise Architecture capability in any of the contexts, however it is understood that the emergence model does not need all services in all contexts.

	Requirements Elicitation and Understanding Services	Stakeholders Management Services	Business Value Assessment and Analysis Service	**Architecture Planning Services**	Architecture Project Planning Services	Architecting Tailoring Services	**Design Support Services**	Architecture Vision and Strategy Definition Services	Architecture Modeling and Documentation Services (MVA)	Architecture Integration Services	Architecture Compliance Dev. Services (Bus, Info, Appl, Infra, Systs, ...)	**Development Support Services**	Architecture and Standards Guidance Service	Compliance Assessment and Analysis Service	Change Management Services	Release Support Services	**Enterprise Support Services**	Portfolio Management Support Services (inc. Asset Mgmt, Acquisitions)	Risk Management Services	Sustainability Management Support Services	Enterprise Analysis and Assessment Services	Capability Planning Support Service	**Enterprise Architecture Practice Development Support Services**	Enterprise Architecture Development Process Improvement Service
Context I: Individual/Founder		x	x										x						x	x				
Context II: Team		x	x										x		x				x	x				
Context III: Team of Teams		x	x		x	x		x	x	x			x		x	x		x	x	x	x			
Context IV: Enduring Enterprise		x	x		x	x		x	x	x	x		x	x	x	x		x	x	x	x	x		x

Figure 3. Enterprise Architecture Services to DPBoK Standard Emergence Model

Figure 3 summarizes the Enterprise Architecture services that should be considered per context to deliver Enterprise Architecture capabilities. The following sections elaborate on the Enterprise Architecture services and Enterprise Architecture capabilities most pertinent for each context. The Digital Practitioner would be wise to consider using the Enterprise Architecture services listed per context. The Enterprise Architecture service provider must consider the context and deliver in a timely manner, in line with the operation tempo of the given context.

4.4.1. Enterprise Architecture Capabilities and Services: Individual/Founder

Enterprise Architecture capabilities that would be useful in this context include:

- The ability to assess and communicate the digital value of a proposed digital product
- The ability to communicate available and appropriate digital infrastructure for Agile development and the delivery of a proposed digital product (*aka* the digital infrastructure architecture and accompanying application architecture, addressing common look-and-feel, ease-of-use)
- The ability to communicate technical requirements to digital infrastructure managers
- The ability to respond to questions concerning risk on demand; e.g., change, privacy, and security risk
- The ability to communicate minimum business and technical standards for the digital product (covering security, human factors, technology, etc.)

To support the Individual/Founder context, the following Enterprise Architecture services should be considered:

- **Business Value Assessment and Analysis Service**
  - Provides on-demand assessment and analysis of business value based on the current state of the landscape

    This service delivers:

    - Competitive assessment report
    - Capability assessment report
    - Value *versus* risk matrix
- **Stakeholders Management Services**
  - Provides capabilities to identify, understand, decide upon, and engage stakeholders based on the scope of a given effort

    This service delivers:

    - Stakeholder identification report
    - Stakeholder engagement strategy and plan
    - Stakeholder needs report
- **Sustainability Management Support Services**
  - Provides on-demand analysis and recommendations for ensuring that sustainability is being addressed throughout programs required to meet the business goals of an organization over a time horizon based on the current state of the enterprise

    This service delivers:

    - Sustainability assessment report
    - Sustainability recommendations
- **Architecture and Standards Guidance Service** (for digital infrastructure; Agile development, deployment, and delivery)
  - Provides guidance to developing organizations on using the architecture, standards, and how they are implemented

    This service delivers:

    - Business recommendations
    - Policy recommendations
    - Technical recommendations

- **Risk Management Services** (specifically change management, data privacy, and security)
  - Provides analysis, assessments, and recommendations for risk mitigation based on the goals of the organization

    This service delivers:

    - Risk identification report
    - Risk assessment report
    - Risk mitigation report

NOTE	Each of these, and subsequent services must be provided in a timely manner to support the operational tempo of the effort. The limited context of the effort must be used to scope the depth of any analysis that would support execution of the service.

4.4.2. Enterprise Architecture Capabilities and Services: Team

In addition to the Enterprise Architecture capabilities in the prior context, the following Enterprise Architecture capabilities would be useful in the Team context:

- The ability to assess interoperability and transparency needs (stakeholder needs)
- The ability to understand the impact of changes in digital product implementation
- The ability to understand all interdependencies
- The ability to understand the operational view of the business and development

Of the Enterprise Architecture capabilities identified in previous contexts, the following Enterprise Architecture capabilities would be taken to a greater level of precision:

- The ability to communicate available and appropriate digital infrastructure for Agile development and the delivery of a proposed digital product (*aka* the digital infrastructure architecture and accompanying application architecture, addressing common look-and-feel, ease-of-use, service orientation – including orchestration)
- The ability to respond, on demand, to questions concerning risk; e.g., change, privacy and security risk (no service governance and/or no change management)

In addition to the services from the Founder context, the following additional Enterprise Architecture service should be considered:

- **Change Management**
  - Provides recommendations for developing holistic change management plans
    - People impact recommendations
    - Processes impact recommendations
    - Technologies impact recommendations

The following are Enterprise Architecture services previously identified, but will be done with increased precision and granularity in this context:

- **Stakeholders Management Services**
  - Provides capabilities to identify, understand, decide upon, and engage stakeholders based on the scope of a given effort

    This service delivers:

    - Stakeholder identification report
    - Stakeholder engagement strategy and plan
    - Stakeholder needs report (deeper focus on interoperation and integration)
- **Sustainability Management Support Services**
  - Provides on-demand analysis and recommendations for ensuring that sustainability is being addressed throughout programs required to meet the business goals of an organizational over a time horizon based on the current state of the enterprise

    This service delivers:

    - Sustainability assessment report
    - Sustainability recommendations (deeper focus on reuse)
- **Architecture and Standards Guidance Service** (for digital infrastructure; Agile development, deployment, and delivery)
  - Provides guidance to developing organizations on using the architecture and implementing standards

    This service delivers:

    - Business (model) recommendations (deeper focus on operational view)
    - Policy recommendations
    - Technical (model) recommendations (deeper focus on service orientation and interdependencies)
- **Risk Management Services**
  - Provides analysis, assessments, and recommendations for risk mitigation based on the goals of the organization

    This service delivers:

    - Risk identification report (deeper focus on governance and change management)
    - Risk assessment report (deeper focus on governance and change management)
    - Risk mitigation report (deeper focus on governance and change management)

4.4.3. Enterprise Architecture Capabilities and Services: Team of Teams

In addition to the Enterprise Architecture capabilities in the prior context, the following Enterprise Architecture capabilities would be useful in the Team of Teams context:

- Prior capabilities that could be deeper:
  - The ability to respond to questions concerning risk on demand; e.g., data governance, standards compliance governance
  - The ability to communicate minimum business and technical standards for the digital product, especially data access and sharing standards, application portability, interoperation, middleware
- New capabilities in this context:
  - The ability to understand the various parts of the organization and their part in the organization's value stream
  - The ability to understand sourcing opportunities
  - The ability to understand processes in place
  - The ability to understand the bigger operational picture of the digital portfolio
  - The ability to understand reusable assets (processes, services, components, data) for a particular digital product

In addition to the Enterprise Architecture services from the Team context, the following additional Enterprise Architecture services should be considered:

- **Architecture Project Planning Services**
  - Provides a resourced project plan and statement of architecture work at the appropriate level of detail that matches the organization's change process

    This service delivers:

    - Statement of Architecture Work, including scope
    - Resources and tools
    - Expected activities to support and enable
- **Architecting Tailoring Services**
  - Maps out how Enterprise Architects provide value and evolve the architecture data in lockstep with an organization's processes

    This service delivers:

    - Course of action, covering:
      - Iteration
      - How to address the landscape with various levels (strategic, segment, capability, etc.)

        - Tailoring for frameworks, styles, and/or constraints to produce the right deliverables at the right time

- **Architecture Vision and Strategy Services**
    - Documents the vision that drives the architecting efforts including articulating the value proposition and Key Performance Indicators (KPIs)

      This service delivers:

        - Expected business value
        - Expected performance improvements
        - Intent to support
        - Intended uses of the architecture and value
- **Architecture Modeling and Documentation Services** (MVA)
    - Provides modeling of architectures (Minimum Viable Architecture (MVA)) whether Enterprise, Business, Information, Application, Technology, Infrastructure, Systems, or Solution Architecture

      This service delivers:

        - Baseline, Target, or Transition Architectures
- **Architecture Integration Services**
    - Provides analysis (across landscape, dependencies, gaps, and solutions) of relevant architectures that pertain to a particular project based on a given update to a particular architecture; for example, to ensure that all the interrelated architectures work together

      This service delivers:

        - Updates to all relevant architectures
- **Digital Product Release Support Services**
    - Provides on-demand guidance on release issues based on the current state of the enterprise

      This service delivers:

        - Release guidance
- **Portfolio Management Support Services** (including Asset Management, Acquisitions)
    - Provides on-demand analysis and recommendations for the portfolio of investments required to meet the business goals of an organization over a time horizon based on the current state of the enterprise:
        - Prioritization of portfolio items report
        - Acquisition recommendation and rationale

- **Enterprise Analysis and Assessment Service**
  - Provides support to various enterprise processes such as portfolio management, program management, project management, change management, risk management (impact), etc. honed for specific subjects such as readiness, concepts, risks, capabilities, governance, impact, process optimization, security, laws and regulations

    This service delivers:

    - Assessment report
    - Recommendations
    - Supporting information

The following are Enterprise Architecture services previously identified, but will be done in more depth in the Team of Teams context:

- **Architecture and Standards Guidance Service**
  - Provides guidance to developing organizations on using the architecture and implementing standards.

    This service delivers:

    - Business recommendations
    - Policy recommendations (especially data access and sharing standards)
    - Technical recommendations (especially data access and sharing standards, application portability, interoperation, middleware)
- **Risk Management Services**
  - Provides analysis, assessments, and recommendations for risk mitigation based on the goals of the organization

    This service delivers:

    - Risk identification report (focusing on data governance, standards compliance governance)
    - Risk assessment report (focusing on data governance, standards compliance governance)
    - Risk mitigation report (focusing on data governance, standards compliance governance)

4.4.4. Enterprise Architecture Capabilities and Services: Enduring Enterprise

In addition to the Enterprise Architecture capabilities in the prior context, the following Enterprise Architecture capabilities would be useful in the Enduring Enterprise context:

- The ability to understand mergers and acquisitions
- The ability to understand the bigger operational picture of the enterprise

- The ability to understand the components of the enterprise; services, interdependencies, costs, data usage
- The ability to understand enterprise impact; e.g., optimize for the enterprise, trade-offs
- The ability to identify mission-critical people, processes, and systems
- The ability to understand what it takes to maintain the business when stressed
- The ability to identify and rationalize stakeholder needs across the enterprise

Of the Enterprise Architecture capabilities identified in previous contexts, the following Enterprise Architecture capabilities would be deeper:

- The ability to respond to questions concerning risk on demand (deeper)
- The ability to assess interoperability and transparency needs (deeper)
- The ability to understand all interdependencies (integrating people, process, and technology)
- The ability to understand the various parts of the organization and their part in the organizations value stream (across the enterprise)

In addition to the services from the Team of Teams context, the following Enterprise Architecture services should be considered:

- **Architecture Compliance Development Services** (Business, Information, Application, Infrastructure, Systems, etc.)
  - Provides specific and actionable compliance criteria for an architecture whether Enterprise, Business, Information, Application, Technology, Infrastructure, Systems, or Solution Architecture

    This service delivers:

    - Compliance criteria
    - Guidance for compliance
    - Recommendations for evidence
- **Compliance Assessment and Analysis Service**
  - Provides assessments and analysis of how standards identified in the pertinent architectures are being implemented

    This service delivers:

    - Solutions assessment reports
    - Interoperability assessment report
- **Capability Planning Service**
  - Provides an holistic view of all it takes to improve and/or to provide specific capabilities

This service delivers:

- Capability report detailing steps to improve or develop a new capability (people, process, technology, etc.) with roadmaps

- **Enterprise Architecture Development Process Improvement Service**
  - This service provides an assessment of, and recommendations for improving, the delivery process of an Enterprise Architecture service provider

    This service delivers:

    - Assessment report
    - Recommendations for improvement

The following are Enterprise Architecture services previously identified, but will be done in more depth in the Enduring Enterprise context:

- **Business Value Assessment and Analysis Service**
  - Provides on-demand assessment and analysis of business value based on the current state of the landscape

    This service delivers:

    - Competitive assessment report
    - Capability assessment report
    - Value *versus* risk matrix
- **Stakeholders Management Services**
  - Provides capabilities to identify, understand, decide upon, and engage stakeholders based on the scope of a given effort

    This service delivers:

    - Stakeholder identification report
    - Stakeholder engagement strategy and plan
    - Stakeholder needs report (deeper focus on interoperation and integration)
- **Architecture Integration Services**
  - Provides analysis (across landscape, dependencies, gaps, and solutions) of relevant architectures that pertain to a particular project based on a given update to a particular architecture; for example, to ensure that all the interrelated architectures work together

    This service delivers:

    - Updates to all relevant architectures

- **Enterprise Analysis and Assessment Service**
  - Provides support to various enterprise processes such as portfolio management, program management, project management, change management, risk management (impact), etc. honed for specific subjects such as readiness, concepts, risks, capabilities, governance, impact, process optimization, security, laws and regulations, etc.

    This service delivers:

    - Assessment report
    - Recommendations
    - Supporting information
- **Risk Management Services**
  - Provides analysis, assessments, and recommendations for risk mitigation based on the goals of the organization

    This service delivers:

    - Risk identification report (focusing on data governance, standards compliance governance)
    - Risk assessment report (focusing on data governance, standards compliance governance)
    - Risk mitigation report (focusing on data governance, standards compliance governance)

4.4.5. Enterprise Architecture Services Emergence Model

The matrix in Figure 4 summarizes the Enterprise Architecture services per context. It constitutes the Enterprise Architecture Service Emergence Model.

	Stakeholders Management Services	Business Value Assessment and Analysis Service	Architecture Project Planning Services	Architecting Tailoring Services	Architecture Vision and Strategy Services	Architecture Modeling and Documentation Services (MVA)	Architecture Integration Services	Architecture Compliance Development Services	Architecture and Standards Guidance Service	Change Management	Compliance Assessment and Analysis Service	Release Support Services	Portfolio Management Support Services	Risk Management Services	Sustainability Management Support Services	Enterprise Analysis and Assessment Services	Capability Planning Support Service	Enterprise Architecture Dev Process Improvement Service
Context IV: Enduring Enterprise	***D***	***D***	**P**	**P**	**P**	**P**	***D***	**N**	**P**	**P**	**N**	**P**	**P**	***D***	**P**	***D***	**N**	**N**
Context III: Team of Teams	**P**	**P**	**N**	**N**	**N**	**N**	**N**		***D***	**P**		**N**	**N**	***D***	**P**	**N**		
Context II: Team	***D***	**P**							***D***	**N**				***D***	***D***			
Context I: Individual/Founder	**N**	**N**							**N**					**N**	**N**			
Legend:																		
N - newly introduced EA Service																		
P - previously introduced EA Service																		
D - previous EA Service, but deeper																		

Figure 4. The Enterprise Architecture Service Emergence Model

4.5. TOGAF Artifacts and Series Guides

4.5.1. Mapping to the Individual/Founder Context

NOTE For modeling, the TOGAF viewpoints can also be delivered using the ArchiMate modeling notation in the ArchiMate® 3.1 Specification; see *Referenced Documents*.

Table 2. Mapping to the Individual/Founder Context

Capabilities – Aspects	**TOGAF ADM Phase – Artifacts**	**Mapping to The Open Group Library (see *Referenced Documents*)**
Enterprise Architecture and the TOGAF Standard supporting the definition of a digital strategy	Preliminary Phase and Phase A: strategic and motivation models Strategy and business entities from the TOGAF content metamodel used at this level are: goal, objective, measure, driver, course of action, value stream, and business capabilities	Open Business Architecture (O-BA) – Part II TOGAF® Series Guide: Business Capabilities TOGAF® Series Guide: Value Streams TOGAF® Series Guide Business Architecture Set Why Business and IT Must Co-Create Strategy for a Digital Enterprise
Enterprise Architecture providing the organizational landscape to understand context and support the digital products positioning / digital product definition	Phases B, C, and D: high-level landscape view High-level models to understand and provide a systemic view for the area of concern at the Individual/Founder level specially to identify dependencies with other related areas Base for an intentional architecture – scale to cover just a segment of the organization or the whole landscape – apply the minimum needed in the model (MVA) Entities that can be applied from the TOGAF content metamodel can be found in Figures 2-1 and 2-2 in the TOGAF Standard – Architecture Content; see *Referenced Documents*. Entities grouped in Business Architecture, Information Systems Architecture, and Technology Architecture.	TOGAF® Series Guide Business Architecture Set The TOGAF Series Guide applied at solution level aimed to scale to cover a more general landscape: TOGAF® Series Guide: A Practitioners' Approach to Developing Enterprise Architecture Following the TOGAF® ADM

Capabilities – Aspects	**TOGAF ADM Phase – Artifacts**	**Mapping to The Open Group Library (see *Referenced Documents*)**
Identify key capabilities needed to support the digital offerings (platforms and leverage latest trends)	Phases B, C, and D: more detailed views – applied per segment, aimed to scale from solution level to a portfolio or program level Entities that can be applied from the TOGAF content metamodel can be found in Figures 2-1 and 2-2 in the TOGAF Standard – Architecture Content. Entities grouped in Business Architecture, Information Systems Architecture, and Technology Architecture. Value streams, capabilities map, information mapping, technology landscape, information systems landscape Artifacts and tools to address digital technology adoption	TOGAF® Series Guide Business Architecture Set – Business Capabilities, Value Streams, Organization Mapping, Information Mapping, Business Models Information Architecture: Business Intelligence & Analytics and Metadata Management Reference Models TOGAF® Series Guides applied at solution level aimed to scale to cover a more general landscape: TOGAF® Series Guide: A Practitioners' Approach to Developing Enterprise Architecture Following the TOGAF® ADM TOGAF® Series Guide: Digital Technology Adoption: A Guide to Readiness Assessment and Roadmap Development Open Agile Architecture™ Standard, see Chapter 10: "Building Blocks Overview"

Capabilities – Aspects	**TOGAF ADM Phase – Artifacts**	**Mapping to The Open Group Library (see *Referenced Documents*)**
Digital services identification and design at different levels, customer-facing, digital platforms, and backend systems – service portfolio definition	Phases B, C, and D Business, information, and technology services identification Applied per segment or domain aimed to scale to cover portfolios, programs, and the overall organization Entities that can be applied from the TOGAF content metamodel can be found in Figures 2-1 and 2-2 in the TOGAF Standard – Architecture Content. Entities grouped in Business Architecture, Information Systems Architecture, and Technology Architecture.	TOGAF® Series Guide Business Architecture Set TOGAF® Series Guide: A Practitioners' Approach to Developing Enterprise Architecture Following the TOGAF® ADM How to Use the TOGAF® and IT4IT™ Standards Together TOGAF® Series Guide: Using the TOGAF® Framework to Define and Govern Service-Oriented Architectures Open Agile Architecture™ Standard, see Chapter 4: "Architecture Development"

Capabilities – Aspects	**TOGAF ADM Phase – Artifacts**	**Mapping to The Open Group Library (see *Referenced Documents*)**
Customer focus: customer information/data management and profiling, value chain, and value stream	Phases B, C, and D: applied to map and support Customer journey definition Customer profiling Customer data management Value stream and capability mapping for customer journey support Entities that can be applied from the TOGAF content metamodel can be found in Figures 2-1 and 2-2 in the TOGAF Standard – Architecture Content. Entities grouped in Business Architecture, Information Systems Architecture, and Technology Architecture, especially the following: value streams, business capabilities, course of action, business information service, business services, contracts, events, products, actors, roles, function, and organization unit.	TOGAF® Series Guide Business Architecture Set Customer Experience-Driven Enterprise Architecture: How to Revitalize your DSP Business Open Agile Architecture™ Standard, see Chapter 4: “Architecture Development” Open Agile Architecture™ Standard, see Chapter 10: “Building Blocks Overview”

Capabilities – Aspects	**TOGAF ADM Phase – Artifacts**	**Mapping to The Open Group Library (see *Referenced Documents*)**
Product leadership: product design – the TOGAF ADM applied to define a product architecture from project to product focus Operational excellence: Enterprise Architecture supporting operational improvements (operational model definition and improvement)	Phases B, C, and D applied to deliver a product architecture; refer to the artifacts in the previous rows applied to the product architecture Entities that can be applied from the TOGAF content metamodel can be found in Figures 2-1 and 2-2 in the TOGAF Standard – Architecture Content. Entities grouped in Business Architecture, Information Systems Architecture, and Technology Architecture.	Open Agile Architecture™ Standard, see Chapter 4: “Architecture Development” Open Agile Architecture™ Standard, see Chapter 10: “Building Blocks Overview” TOGAF® Series Guide Business Architecture Set TOGAF® Series Guide: Enabling Enterprise Agility, see Chapter 5

4.5.2. Mapping to the Team Context

NOTE	For modeling, the TOGAF viewpoints can also be delivered using the ArchiMate modeling notation in the ArchiMate® 3.1 Specification.

It is important to note that the recommendations provided in Section 4.5.1 are also applicable at the Team level since the approach and models are suitable to scale.

So in this mapping, the emphasis is on how to support coordination across teams.

Table 3. Mapping to the Team Context

Capabilities – Aspects	**TOGAF ADM Phase – Artifacts**	**Mapping to The Open Group Library (see *Referenced Documents*)**
Enterprise Architecture supporting projects/Agile delivery teams Enterprise Architecture supporting work execution applying Agile methodologies and DevOps	The TOGAF ADM applied in an Agile way Preliminary Phase and Phase A to support user stories and epics – intentional architecture – Enterprise Architecture supporting Agile teams	TOGAF® Series Guide: Enabling Enterprise Agility TOGAF® Series Guide: Applying the TOGAF® ADM using Agile Sprints How to Use the ArchiMate® Modeling Language to Support TOGAF® Framework Projects Open Agile Architecture™ Standard

Capabilities – Aspects	**TOGAF ADM Phase – Artifacts**	**Mapping to The Open Group Library (see *Referenced Documents*)**
Enterprise Architecture capabilities applied to support product management and operations: Business Architecture value stream and capabilities offered/managed by business unit(s) Capability-based planning Enterprise Architecture/the TOGAF ADM and project management Organizational maps – information maps Value streams and business capabilities	Phases A and B applied to support strategy definition and business landscape to support teams Value streams – business capabilities mapping Organizational maps Business process improvements Platform structure analysis	TOGAF® Series Guide Business Architecture Set – Business Capabilities, Value Streams, Organization Mapping, Information Mapping, Business Models The TOGAF Series Guide applied at solution level aimed to scale to cover a more general landscape: TOGAF® Series Guide: A Practitioners' Approach to Developing Enterprise Architecture Following the TOGAF® ADM Capability-Based Planning Supporting Project/Portfolio and Digital Capabilities Mapping Using the TOGAF® and ArchiMate® Standards TOGAF® Series Guide: Architecture Project Management

Capabilities – Aspects	**TOGAF ADM Phase – Artifacts**	**Mapping to The Open Group Library (see *Referenced Documents*)**
Product Management – Enterprise Architecture supporting product definition and architecture – product definition and discovery	Phases A and B for product definition Phases C and D to identify capabilities to support product delivery Project to product shift to support product management reflected in Phases E and F for product planning and Phases G and H for product governance and change management Product – process – services and platform models as supporting artifacts	Open Agile Architecture™ Standard, see Chapter 4: “Architecture Development” Open Agile Architecture™ Standard, see Chapter 10: “Building Blocks Overview” and Chapter 14: “Product Architecture” TOGAF® Series Guide Business Architecture Set applied to define a Product Architecture TOGAF® Series Guide: Enabling Enterprise Agility, see Chapter 5

4.5.3. Mapping to the Team of Teams Context

NOTE For modeling, the TOGAF viewpoints can also be delivered using the ArchiMate modeling notation in the ArchiMate® 3.1 Specification.

It is important to note that the recommendations provided in Section 4.5.1 are also applicable at the Team level since the approach and models are suitable to scale.

So in this mapping, the emphasis is on how to support coordination across different teams.

Table 4. Mapping to the Team of Teams Context

Capabilities – Aspects	**TOGAF ADM Phase – Artifacts**	**Mapping to The Open Group Library (see *Referenced Documents*)**
Enterprise Architecture applied to support cross-activities and interdependencies between teams following a portfolio view	Preliminary Phase and Phase A to support user stories and epics – intentional architecture – Enterprise Architecture supporting Agile teams and Agile team of teams at portfolio level High-level iteration Phases B to D to provide the high-level landscape to support team of teams and address interoperability issues. Governance support – architecture guardrails definition Entities that can be applied from the TOGAF content metamodel can be found in Figures 2-1 and 2-2 in the TOGAF Standard - Architecture Content. Entities grouped in Business Architecture, Information Systems Architecture, and Technology Architecture and also in architecture realization (Content framework).	TOGAF® Series Guides applied at the program and portfolio level: TOGAF® Series Guide: A Practitioners' Approach to Developing Enterprise Architecture Following the TOGAF® ADM Open Agile Architecture™ Standard, see Chapter 4: "Architecture Development" Open Agile Architecture™ Standard, see Chapter 10: "Building Blocks Overview" TOGAF® Series Guide: Enabling Enterprise Agility, see Chapter 5 World-Class EA: Governors' Approach to Developing and Exercising an Enterprise Architecture Governance Capability
Enterprise Architecture supporting programs / portfolios – service management delivery aligned with the IT4IT Standard	High-level iterations Phases B-D to provide the portfolio and service landscape for every team and for the set of teams – supported by the high-level general view of the landscape described above Entities that can be applied from the TOGAF content metamodel can be found in Figures 2-1 and 2-2 in the TOGAF Standard – Architecture Content. Entities grouped in Business Architecture, Information Systems Architecture, and Technology Architecture.	TOGAF® Series Guides applied at the program and portfolio and project level: TOGAF® Series Guide: A Practitioners' Approach to Developing Enterprise Architecture Following the TOGAF® ADM TOGAF and IT4IT guides: Seamless Service Delivery and the IT4IT™ Standard How to Use the TOGAF® and IT4IT™ Standards Together

Capabilities – Aspects	**TOGAF ADM Phase – Artifacts**	**Mapping to The Open Group Library (see *Referenced Documents*)**
Enterprise Architecture to deliver the high-level view and landscape and to identify the organization maturity level for the digital enterprise	Preliminary Phase applied to address maturity level for the digital enterprise	TOGAF Series Guide applied to define the Enterprise Architecture capability to address the digital enterprise: TOGAF® Series Guide: The TOGAF® Leader's Guide to Establishing and Evolving an EA Capability TOGAF maturity models and skills management guides applied – adapted to address the digital enterprise: TOGAF® Series Guide: Architecture Maturity Models TOGAF® Series Guide: Architecture Skills Framework TOGAF® Series Guide: Digital Technology Adoption: A Guide to Readiness Assessment and Roadmap Development

Capabilities – Aspects	**TOGAF ADM Phase – Artifacts**	**Mapping to The Open Group Library (see *Referenced Documents*)**
Enterprise Architecture supporting digital product and service catalog definition - Application portfolio management - Service portfolio management - Digital portfolio management - Capability-based planning - Process management	Phases B, C, and D Artifacts and views supporting portfolio definition for digital products	TOGAF Series Guide applied at the program / portfolio level: TOGAF® Series Guide: A Practitioners' Approach to Developing Enterprise Architecture Following the TOGAF® ADM Capability-Based Planning Supporting Project/Portfolio and Digital Capabilities Mapping Using the TOGAF® and ArchiMate® Standards Open Agile Architecture™ Standard, see Chapter 4: "Architecture Development" Open Agile Architecture™ Standard, see Chapter 10: "Building Blocks Overview" and Chapter 14: "Product Architecture" TOGAF® Series Guide Business Architecture Set applied to define a Product Architecture TOGAF® Series Guide: Enabling Enterprise Agility, see Chapter 5

4.5.4. Mapping to the Enduring Enterprise Context

NOTE For modeling, the TOGAF viewpoints can also be delivered using the ArchiMate modeling notation in the ArchiMate® 3.1 Specification.

It is important to note that the recommendations provided in Section 4.5.1 are also applicable at the team level since the approach and models are suitable to scale.

So in this mapping, the emphasis is on how to support coordination across different teams.

Table 5. Mapping to the Enduring Enterprise Context

Capabilities – Aspects	**TOGAF ADM Phase – Artifacts**	**Mapping to The Open Group Library (see *Referenced Documents*)**
Enterprise Architecture and the TOGAF Standard supporting strategy/portfolio/projects and solution delivery - Architecture as a competency area – the DPBoK Standard, Section 6.4.3 - Architecture, Digital Strategy, and Portfolio Agile Enterprise Architecture - Enterprise Architecture capabilities adapted to support the Agile and digital organization - Enterprise Architecture and the TOGAF Standard – new delivery style following an Agile approach and supporting digital product offerings	The TOGAF ADM applied in an Agile way Preliminary Phase and Phase A to support user stories and epics – intentional architecture – Enterprise Architecture supporting Agile teams Preliminary Phase and Phase A: Strategic and motivation Phases B, C, D: high-level landscape view – MVA Base for an intentional architecture – scale to cover the enduring enterprise Phases B, C, D: more detailed – applied per segment aimed to scale from solution level to a portfolio or program level Value streams, capabilities map, information mapping, technology landscape, information systems landscape The TOGAF content metamodel applied depending on the views needed	Open Business Architecture (O-BA) Standard The TOGAF ADM applied at the strategy and program level TOGAF® Series Guide Business Architecture Set – Business Capabilities, Value Streams, Organization Mapping, Information Mapping, Business Models The TOGAF Series Guide applied at solution level aimed to scale to cover a more general landscape TOGAF® Series Guide: A Practitioners' Approach to Developing Enterprise Architecture Following the TOGAF® ADM TOGAF® Series Guide: Enabling Enterprise Agility How to Use the ArchiMate® Modeling Language to Support TOGAF® Framework Projects Open Agile Architecture™ Standard, see Chapter 10: "Building Blocks Overview" and Chapter 14: "Product Architecture"

Capabilities – Aspects	**TOGAF ADM Phase – Artifacts**	**Mapping to The Open Group Library (see *Referenced Documents*)**
Information / Data / Information Architecture guidance in progress – adapted/used to fulfil digital enterprise needs	Phases B and C to identify business information capabilities and data capabilities	Information Architecture: Business Intelligence & Analytics and Metadata Management Reference Models TOGAF® Series Guide: Information Mapping Open Agile Architecture™ Standard, see Chapter 18: Data Information and Artificial Intelligence
Enterprise Architecture and the TOGAF governance framework supporting digital governance	Phases G and H applied following an Agile approach Digital metrics definition	TOGAF Standard governance content: World-Class EA: Governors' Approach to Developing and Exercising an Enterprise Architecture Governance Capability Open Agile Architecture™ Standard, see Chapter 8: "Agile Governance"
Enterprise Architecture supporting the business strategy (digital) and providing the required capabilities to deliver the digital offering – supporting products/services digitalization	Phases B, C, and D to define the portfolios, values streams, and capabilities Adaptation needed to cover digital product portfolio definition	Open Business Architecture (O-BA) – Part II TOGAF® Series Guide Business Architecture Set – Business Capabilities, Value Streams, Organization Mapping, Information Mapping, Business Models TOGAF® Series Guide: A Practitioners' Approach to Developing Enterprise Architecture Following the TOGAF® ADM Open Agile Architecture™ Standard

[6] More details about the factors and consideration for the adoption of new technologies can be found in the TOGAF® Series Guide: Digital Technology Adoption: A Guide to Readiness Assessment and Roadmap Development; see *Referenced Documents*.

A: Enterprise Architecture Benefits

- More effective and efficient business operations:
  - Lower business operation costs
  - More Agile organization
  - Business capabilities shared across the organization
  - Lower change management costs
  - More flexible workforce
  - Improved business productivity
- More effective and efficient digital enterprise and IT operations:
  - Extending effective reach of the enterprise through digital capability
  - Bringing all components of the enterprise into a harmonized environment
  - Lower software development, support, and maintenance costs
  - Increased portability of applications
  - Improved interoperability and easier system and network management
  - Improved ability to address critical enterprise-wide issues like security
  - Easier upgrade and exchange of system components
- Better return on existing investment, reduced risk for future investment:
  - Simplify the business ability to deliver value through technology
  - Maximum ROI in existing business and IT infrastructure
  - The flexibility to make, buy, or out-source business and IT solutions
  - Reduced risk overall in new investments and their cost of ownership
- Faster, simpler, and cheaper procurement:
  - Buying decisions are simpler, because the information governing procurement is readily available in a coherent plan
  - The procurement process is faster – maximizing procurement speed and flexibility without sacrificing architectural coherence
  - The ability to procure heterogeneous, multi-vendor open systems
  - The ability to secure more economic capabilities

B: Principles from the TOGAF Standard

- Principle 1: Primacy of Principles

  Statement: These principles of information management apply to all organizations within the enterprise.

- Principle 2: Maximize Benefit to the Enterprise

  Statement: Information management decisions are made to provide maximum benefit to the enterprise as a whole.

- Principle 3: Information Management is Everybody's Business

  Statement: All organizations in the enterprise participate in information management decisions needed to accomplish business objectives.

- Principle 4: Business Continuity

  Statement: Enterprise operations are maintained in spite of system interruptions.

- Principle 5: Common Use Applications

  Statement: Development of applications used across the enterprise is preferred over the development of similar or duplicative applications which are only provided to a particular organization.

- Principle 6: Service Orientation

  Statement: The architecture is based on a design of services which mirror real-world business activities comprising the enterprise (or inter-enterprise) business processes.

- Principle 7: Compliance with Law

  Statement: Enterprise information management processes comply with all relevant laws, policies, and regulations.

- Principle 8: IT Responsibility

  Statement: The IT organization is responsible for owning and implementing IT processes and infrastructure that enable solutions to meet user-defined requirements for functionality, service levels, cost, and delivery timing.

- Principle 9: Protection of Intellectual Property

  Statement: The enterprise's Intellectual Property (IP) must be protected. This protection must be reflected in the IT architecture, implementation, and governance processes.

- Principle 10: Data is an Asset

  Statement: Data is an asset that has value to the enterprise and is managed accordingly.

- Principle 11: Data is Shared

  Statement: Users have access to the data necessary to perform their duties; therefore, data is shared across enterprise functions and organizations.

- Principle 12: Data is Accessible

  Statement: Data is accessible for users to perform their functions.

- Principle 13: Data Trustee

  Statement: Each data element has a trustee accountable for data quality.

- Principle 14: Common Vocabulary and Data Definitions

  Statement: Data is defined consistently throughout the enterprise, and the definitions are understandable and available to all users.

- Principle 15: Data Security

  Statement: Data is protected from unauthorized use and disclosure. In addition to the traditional aspects of national security classification, this includes, but is not limited to, protection of pre-decisional, sensitive, source selection-sensitive, and proprietary information.

- Principle 16: Technology Independence

  Statement: Applications are independent of specific technology choices and therefore can operate on a variety of technology platforms.

- Principle 17: Ease-of-Use

  Statement: Applications are easy to use. The underlying technology is transparent to users, so they can concentrate on tasks at hand.

- Principle 18: Requirements-Based Change

  Statement: Only in response to business needs are changes to applications and technology made.

- Principle 19: Responsive Change Management

  Statement: Changes to the enterprise information environment are implemented in a timely manner.

- Principle 20: Control Technical Diversity

Statement: Technological diversity is controlled to minimize the non-trivial cost of maintaining expertise in and connectivity between multiple processing environments.

- Principle 21: Interoperability

  Statement: Software and hardware should conform to defined standards that promote interoperability for data, applications, and technology.

C: Services Proposed for the TOGAF Standard

The following are Enterprise Architecture services that package TOGAF activities to deliver value on demand. There are two major categories: one is customer-centric and the other is more internal to the architecting community. This document focuses on customer-centric Enterprise Architecture services.

Table 6. Enterprise Architecture Service Categories and Descriptors

Descriptor (cols) Categories (rows)	**Typical Customer**	**Typical Provider**	**Deliverable(s)**	**Desired Result**
Customer-Centric				
REQUIREMENTS ELICITATION AND UNDERSTANDING SERVICES	Product managers	Enterprise Architect with requirements understanding specialty	Stakeholder concerns Requirements Assessments (value, ability, etc.)	Solid outside-in view of requirements and value for solutions balanced among stakeholders
DESIGN SUPPORT SERVICES	Program-level decision-makers	Enterprise Architect builder/modeler	MVA (including standards and compliance criteria, roadmaps) for programs Compliance guidance Compliance reports	Better design decisions Successful programs and projects
DEVELOPMENT SUPPORT SERVICES	Project-level decision-makers	Enterprise Architect builder/modeler	MVA (including standards and compliance criteria) for projects/products Compliance guidance Compliance reports	Better product decisions Successful products

Descriptor (cols) Categories (rows)	Typical Customer	Typical Provider	Deliverable(s)	Desired Result
ENTERPRISE SUPPORT SERVICES	C-level management	Enterprise analysts using Enterprise Architecture as a tool	Answers to questions Assessment reports Recommendations	Better enterprise decisions Lower risk
Internal-Centric				
ARCHITECTURE PLANNING SERVICES	Architecture team leaders	Experienced Enterprise Architect	Architecture project plans	Resourced architecture team
ENTERPRISE ARCHITECTURE PRACTICE DEVELOPMENT SUPPORT SERVICES	Architecture organization decision-makers	Enterprise Architecture practice experts	Enterprise Architecture capability assessments Enterprise Architecture capability improvement recommendations	Highly skilled and organized Enterprise Architecture practice organization (internal or external)

C.1. Requirements and Elicitation

This service category contains candidate services that enable requirements understanding – taking a step beyond requirements management, these services help get closer to real needs, which will deliver greater business value.

Table 7. Requirements Elicitation and Understanding Services

Service Examples	Service Description	Deliverables
Business Value Assessment and Analysis	Provides on-demand assessment and analysis of business value based on the current state of the landscape	Competitive assessment report Capability assessment report Value *versus* risk matrix

Service Examples	Service Description	Deliverables
Stakeholders Management	Provides capabilities to identify, understand, decide upon, and engage stakeholders based on the scope of a given effort	Stakeholder identification report Stakeholder engagement strategy and plan Stakeholder needs report

C.2. Architecture Planning

This service category contains candidate services that enable well-planned and executed architecture projects in support of organization change. These services would typically be provided in the beginning of a “project”, whether large or small, waterfall, or Agile.

Table 8. Architecture Planning Services

Service Examples	Service Description	Deliverables
ADM Tailoring	Maps out how Enterprise Architects provide value and evolve the architecture data in lockstep with an organization’s processes	Course of action, covering: • Iteration • How to address the landscape with various levels (strategic, segment, capability, etc.) • Tailoring for frameworks, styles, and/or constraints to produce the right deliverables at the right time
Architecture Project Planning	Provides a resourced project plan and statement of architecture work at the appropriate level of detail that matches the organization’s change process	Statement Of Architecture Work, including scope Resources and tools Expected activities to support and enable

C.3. Design Support

This service category contains candidate services that enable good design decisions in support of organization change. These services would typically be provided after a project has been funded, whether large or small, waterfall, or Agile. These services include the development of MVAs and associated analysis to support the design decisions.

Table 9. Design Support Services

Service Examples	Service Description	Deliverables
Architecture Compliance Development	Provides specific and actionable compliance criteria for an architecture, whether Enterprise, Business, Information, Application, Technology, Infrastructure, Systems, or Solution Architecture	Compliance criteria Guidance for compliance Recommendations for evidence
Architecture Integration	Provides analysis (across landscape, dependencies, gaps, and solutions) of relevant architectures that pertain to a particular project based on a given update to a particular architecture; for example, to ensure that all the interrelated architectures work together	Updates to all relevant architectures
Architecture Modeling	Provides modeling of architectures (MVA), whether Enterprise, Business, Information, Application, Technology, Infrastructure, Systems, or Solution Architecture	Baseline, Target, or Transition Architectures
Architecture Vision and Strategy Definition	Documents the vision that drives the architecting efforts including articulating the value proposition and KPIs	Expected business value Expected performance improvements Intent to support Intended uses of the architecture and value

C.4. Development Support

This service category contains candidate services that enable good development decisions in support of organization change. These services would typically be provided during the development phase of a project, whether large or small, waterfall, or Agile. These services focus on answering questions and providing enterprise analysis in support of development decisions.

Table 10. Development Support Services

Service Examples	Service Description	Deliverables
Architecture and Standards Guidance	Provides guidance to developing organizations on using the architecture and implementing standards	Business recommendations Policy recommendations Technical recommendations
Change Management	Provides recommendations for developing holistic change management plans	People impact recommendations Processes impact recommendations Technologies impact recommendations
Compliance Assessment and Analysis	Provides assessments and analysis of how standards identified in the pertinent architectures are being implemented	Solutions assessment reports Interoperability assessment report
Release Support	Provides on-demand guidance on release issues based on the current state of the enterprise	Release guidance

C.5. Enterprise Support

This service category contains services that enable good enterprise decisions in support of organization change. These services could be provided independent of any individual project. These services focus on answering questions and providing enterprise analysis in support of more strategic decisions.

Table 11. Enterprise Support Services

Service Examples	Service Description	Deliverables
Capability Planning Support	Provides an holistic view of all it takes to improve and/or to provide specific capabilities	Capability report detailing steps to improve or develop a new capability (people, process, technology, etc.) with roadmaps

Service Examples	Service Description	Deliverables
Portfolio Management Support	Provides on-demand analysis and recommendations for the portfolio of investments required to meet the business goals of an organization over a time horizon based on the current state of the enterprise	Prioritization of portfolio items report Acquisition recommendation and rationale
Risk Management	Provides analysis, assessments, and recommendations for risk mitigation based on goals of the organization	Risk identification report Risk assessment report Risk mitigation report
Sustainability Management Support	Provides on-demand analysis and recommendations for ensuring that sustainability is being addressed throughout programs required to meet the business goals of an organization over a time horizon based on the current state of the enterprise	Sustainability assessment report Sustainability recommendations
Enterprise Analysis and Assessment	Provides support to various enterprise processes such as portfolio management, program management, project management, change management, risk management (impact), etc. honed for specific subjects such as readiness, concepts, risks, capabilities, governance, impact, process optimization, security, laws and regulations, etc.	Assessment report Recommendations Supporting information

C.6. Enterprise Architecture Practice Development Support

This service category contains candidate services that enable the development and management of an Enterprise Architecture practice. These services are focused on improving the Enterprise Architecture capability.

Table 12. Enterprise Architecture Practice Development Support Services

Service Examples	Service Description	Deliverables
Enterprise Architecture Development Process Improvement	This service provides an assessment of, and recommendations for improving, the delivery process of an Enterprise Architecture Service Provider	Assessment report Recommendations for improvement

C.7. Services Mapped to ADM Phases

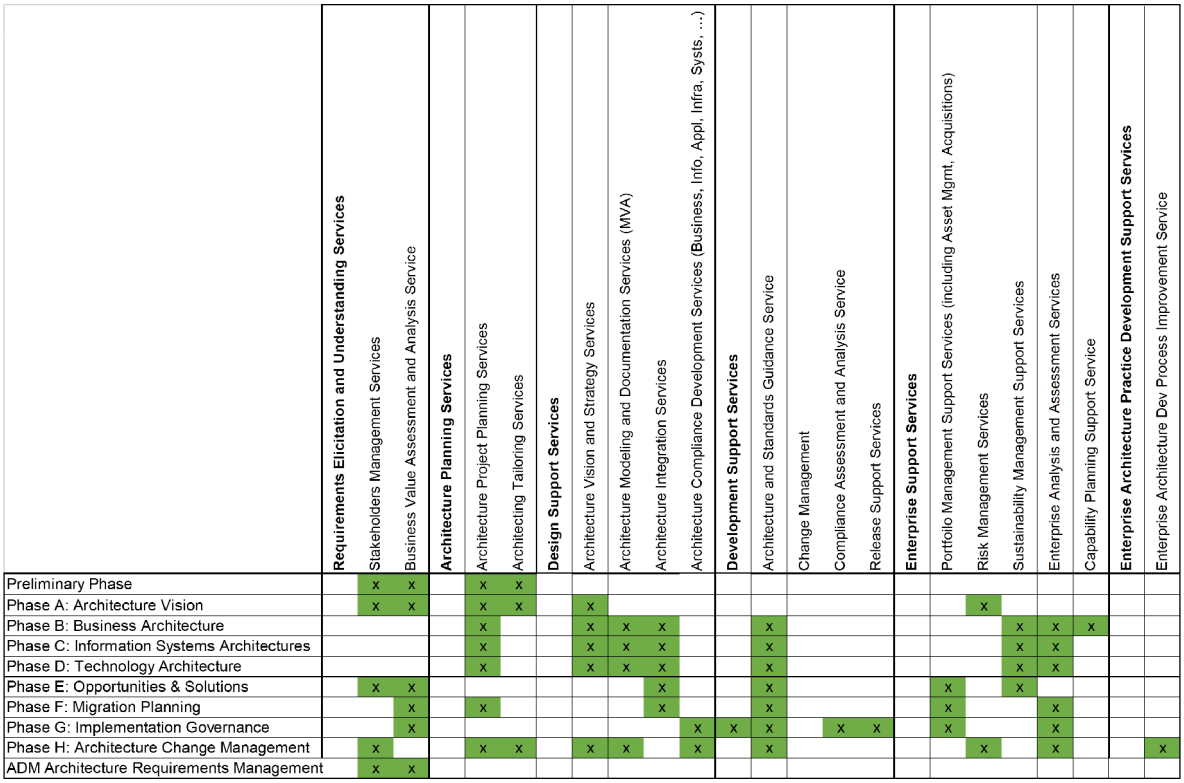

Figure 5. Enterprise Architecture Service to ADM Phase

D: Rationalizing the TOGAF and DPBoK Standards

This appendix provides another view that might further clarify the answer to the question: “Is there a conceptual alignment of the TOGAF and DPBoK Standards?”

The DPBoK Standard, Section 4.9: “Compatibility with Enterprise Architecture”, describes the connection between the digital enterprise and Enterprise Architecture as:

> As part of the paradigm shift to digital, it is important to have a clear understanding of which existing capabilities can be retired, and which new ones will be needed. In some cases, organizations may need to deal with all these changes while keeping their current legacy platform and supporting applications. Integrating new capabilities with existing ones in an effective and efficient way requires a clear landscape and overall view of the organization context. This is provided by Enterprise Architecture.
>
> — The DPBoK Standard

The DPBoK Standard further identifies the following topic areas that can be used for aligning a digital enterprise and Enterprise Architecture concepts and practices:

- **DPBoK alignment area**: A systemic view of organizational reality, capabilities, and dependencies
- **DPBoK alignment area**: Recognizing and communicating internal and external context, integrating the “outside-in” and “inside-out” views
- **DPBoK alignment area**: Driving strategic alignment and synergy among organizational components
- **DPBoK alignment area**: Enabling innovation while also managing technical debt

The following subsections summarize the concepts in the TOGAF Standard that supports these alignment areas between the digital enterprise and Enterprise Architecture/the TOGAF Standard. Within the subsections we consider two aspects:

- **Benefits aspect** – considers the general benefits of Enterprise Architecture which support the digital enterprise since the TOGAF Standard has evolved specifically to realize them

  This is accomplished by listing the benefits of Enterprise Architecture that guide the content of the TOGAF Standard and highlighting the specific benefits that relate to the digital enterprise. Having said that, it isn’t a stretch to notice that all the benefits of Enterprise Architecture relate to the digital enterprise, at least indirectly. Consideration was given to Enterprise Architecture benefits listed in Appendix A.

- **Enterprise Architecture services aspect** – where proposed Enterprise Architecture services, if deployed, would support the subject DPBoK Standard alignment area

Consideration was given to the candidate Enterprise Architecture services proposed for the TOGAF Standard listed in Appendix C.

Enterprise Architecture services are delivered by architects (or someone in the role of architect) to provide Enterprise Architecture capabilities. Careful consideration should be given to the matter of whether a skilled architect is on a team to deliver those capabilities. Especially in Contexts I and II, team dynamics work best with skilled experts being on the team in contrast to being engaged from an outside source. As the enterprise grows in complexity to the Team of Teams and Enduring Enterprise levels, the value of engaging external Enterprise Architecture services increases.[7]

In looking at these aspects and their support for the DPBoK Standard alignment areas, we observe the following:

- Each of the following aspects lists benefits and proposed Enterprise Architecture services for each of the DPBoK Standard alignment areas
- The elements in the lists support the notion of Enterprise Architecture being a valuable asset for the digital enterprise, with slight changes in the delivery of the Enterprise Architecture capability needed
- It is recommended that the person in the role of Enterprise Architect utilizes a service delivery model to provide Enterprise Architecture services that help the company to realize the benefits in a timely manner, one where delivery is done in support of the digital enterprise tempo

D.1. Organizational Reality, Capabilities, and Dependencies

Each of the following aspects lists benefits and proposed Enterprise Architecture services that support the DPBoK Standard alignment area.

D.1.1. Aspect: Enterprise Architecture Benefits

- **More effective and efficient business operations** – business capabilities are shared across the organization
- **More effective and efficient digital enterprise and IT operations** – to extend the effective reach of the enterprise through digital capability, and to bring all components of the enterprise into a harmonized environment
- **Faster, simpler, and cheaper procurement** – create an environment where buying decisions are simpler, because the information governing procurement is readily available in a coherent plan

D.1.2. Aspect: Enterprise Architecture Services

- **Requirements Elicitation and Understanding Services** – Stakeholders Management Services
- **Design Support Services** – Architecture Integration Services, Architecture Modeling, and Documentation Services (MVA)
- **Enterprise Support Services** – Portfolio Management Support Services (including Asset

Management, Acquisitions), Risk Management Services, Sustainability Management Support Services, Enterprise Analysis and Assessment Services, Capability Planning Support Service

D.2. Integrating “Outside-In” and “Inside-Out” Views

D.2.1. Aspect: Enterprise Architecture Benefits

- **More effective and efficient digital enterprise and IT operations** – extending the effective reach of the enterprise through digital capability, and bringing all components of the enterprise into a harmonized environment

D.2.2. Aspect: Enterprise Architecture Services

- **Requirements Elicitation and Understanding Services** – Stakeholders Management Services
- **Design Support Services** – Architecture Vision and Strategy Services, Architecture Modeling and Documentation Services (MVA)
- **Enterprise Support Services** – Enterprise Analysis and Assessment Services, Capability Planning Support Service

D.3. Strategic Alignment and Synergy

D.3.1. Aspect: Enterprise Architecture Benefits

- **More effective and efficient business operations** – business capabilities shared across the organization, more flexible workforce, and improved business productivity
- **More effective and efficient digital enterprise and IT operations** – extending effective reach of the enterprise through digital capability, bringing all components of the enterprise into a harmonized environment, and improved interoperability and easier system and network management
- **Better return on existing investment, reduced risk for future investment** – reduced complexity in the business and IT

D.3.2. Aspect: Enterprise Architecture Services

- **Requirements Elicitation and Understanding Services** – Business Value Assessment and Analysis Service
- **Development Support Services** – Architecture and Standards Guidance Service, Change Management, Release Support Services
- **Enterprise Support Services** – Portfolio Management Support Services (including Asset Management, Acquisitions), Sustainability Management Support Services, Enterprise Analysis and Assessment Services, Capability Planning Support Service

D.4. Enabling Innovation While Managing Technical Debt

D.4.1. Aspect: Enterprise Architecture Benefits

- **More effective and efficient digital enterprise and IT operations** – bringing all components of the enterprise into a harmonized environment, increased portability of applications, improved ability to address critical enterprise-wide issues like security
- **Better return on existing investment, reduced risk for future investment** – reduced complexity in the business and IT, maximum ROI in existing business and IT infrastructure, reduced risk overall in new investments and their cost of ownership

D.4.2. Aspect: Enterprise Architecture Services

- **Design Support Services** – Architecture Compliance Development Services (Business, Info, Application, Infrastructure, Systems, etc.)
- **Development Support Services** – Compliance Assessment and Analysis Service
- **Enterprise Support Services** – Enterprise Analysis and Assessment Services, Risk Management Services

[7] *Team Topologies: Organizing Business and Technology Teams for Fast Flow*; see *Referenced Documents*, Chapter 5.

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TOGAF® Series Guide

Integrating Risk and Security within a TOGAF® Enterprise Architecture

Prepared by the Security Forum, a Forum of The Open Group®, in collaboration with The SABSA® Institute

TOGAF® Series Guide

Integrating Risk and Security within a TOGAF® Enterprise Architecture

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In 2019, it was agreed to reclassify the document as a TOGAF Series Guide. This TOGAF Series Guide does not change the content of the previous edition(s).

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Preface

The Open Group

The Open Group is a global consortium that enables the achievement of business objectives through technology standards. With more than 870 member organizations, we have a diverse membership that spans all sectors of the technology community – customers, systems and solutions suppliers, tool vendors, integrators and consultants, as well as academics and researchers.

The mission of The Open Group is to drive the creation of Boundaryless Information Flow™ achieved by:

- Working with customers to capture, understand, and address current and emerging requirements, establish policies, and share best practices
- Working with suppliers, consortia, and standards bodies to develop consensus and facilitate interoperability, to evolve and integrate specifications and open source technologies
- Offering a comprehensive set of services to enhance the operational efficiency of consortia
- Developing and operating the industry's premier certification service and encouraging procurement of certified products

Further information on The Open Group is available at www.opengroup.org.

The Open Group publishes a wide range of technical documentation, most of which is focused on development of Standards and Guides, but which also includes white papers, technical studies, certification and testing documentation, and business titles. Full details and a catalog are available at www.opengroup.org/library.

The SABSA® Institute

The SABSA Institute is the professional member and certification body for Enterprise Security Architects of all specialisms and at all career levels. It governs the ongoing development and management of SABSA intellectual property and the associated certification and education programs worldwide.

The SABSA Institute envisions a global business world of the future, leveraging the power of digital technologies, enabled in the management of information risk, information assurance, and information security through the adoption of SABSA as the framework and methodology of first choice for commercial, industrial, educational, government, military, and charitable enterprises, regardless of industry sector, nationality, size, or socio-economic status, and leading to enhancements in social well-being and economic success.

Further information on The SABSA Institute can be found at www.sabsa.org.

The TOGAF® Standard, a Standard of The Open Group

The TOGAF Standard is a proven enterprise methodology and framework used by the world's leading organizations to improve business efficiency.

This Document

This document is a TOGAF® Series Guide to Integrating Risk and Security within a TOGAF Enterprise Architecture. It provides guidance for security practitioners and Enterprise Architects who need to work with the TOGAF Standard, a standard of The Open Group, to develop an Enterprise Architecture. It has been developed and approved by The Open Group Security Forum.

Integrating security and risk management in Enterprise Architecture strongly supports The Open Group vision of Boundaryless Information Flow™, by informing well-justified design decisions, which maximize business opportunity whilst minimizing business risk.

This document is structured as follows:

- Chapter 1 provides a high-level introduction to this Guide, introducing the topic of Enterprise Security Architecture, how it relates to Enterprise Architecture, and how this Guide supports the TOGAF Standard
- Chapter 2 describes the relationship with other IT security and risk standards
- Chapter 3 describes the concept of Enterprise Security Architecture in detail; it describes Information Security Management (ISM) and Enterprise Risk Management (ERM), two processes used by Security Architects
- Chapter 4 describes Security Architecture, which is a cross-cutting concern, pervasive through the whole Enterprise Architecture
- Chapter 5 explains in detail the core security concepts and how they can be applied for each phase of the TOGAF ADM

The intended audience for this document is as follows:

- Enterprise Architects, Security Architects

More information is available, along with a number of tools, guides, and other resources, at www.opengroup.org/architecture.

About the TOGAF® Series Guides

The TOGAF® Series Guides contain guidance on how to use the TOGAF Standard and how to adapt it to fulfill specific needs.

The TOGAF® Series Guides are expected to be the most rapidly developing part of the TOGAF Standard and are positioned as the guidance part of the standard. While the TOGAF Fundamental Content is expected to be long-lived and stable, guidance on the use of the TOGAF Standard can be industry, architectural style, purpose, and problem-specific. For example, the stakeholders, concerns, views, and supporting models required to support the transformation of an extended enterprise may be significantly different than those used to support the transition of an in-house IT environment to the cloud; both will use the Architecture Development Method

(ADM), start with an Architecture Vision, and develop a Target Architecture on the way to an Implementation and Migration Plan. The TOGAF Fundamental Content remains the essential scaffolding across industry, domain, and style.

Trademarks

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(Please note affiliations were current at the time of approval.)

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Where appropriate, this Guide includes excerpts from the SABSA® Blue Book [2] and the TOGAF® and SABSA® Integration White Paper [13], with the full approval and permission of The SABSA Institute.

Referenced Documents

The following documents are referenced in this TOGAF® Series Guide:

(Please note that the links below are good at the time of writing but cannot be guaranteed for the future.)

[1] The TOGAF® Standard, 10th Edition, a standard of The Open Group (C220), published by The Open Group, April 2022; refer to: www.opengroup.org/library/c220.

[2] SABSA® Blue Book: Enterprise Security Architecture: A Business-Driven Approach, by John Sherwood, Andy Clark, David Lynas, 2005.

[3] The SABSA® Institute: www.sabsa.org.

[4] ISO/IEC 27001:2013: Information Security Management; refer to: www.iso.org/iso/home/standards/management-standards/iso27001.htm.

[5] ISO/IEC 27002:2013: Information Technology – Security Techniques – Code of Practice for Information Security Controls; refer to: www.iso.org/iso/catalogue_detail?csnumber=54533.

[6] ISO 31000:2009: Risk Management – Principles and Guidelines; refer to: www.iso.org/iso/home/standards/iso31000.htm.

[7] IEC 31010:2009: Risk Management – Risk Assessment Techniques; refer to: www.iso.org/iso/catalogue_detail?csnumber=51073.

[8] ArchiMate® 3.1 Specification, a standard of The Open Group (C197), published by The Open Group, November 2019; refer to: www.opengroup.org/library/c197.

[9] Open Information Security Management Maturity Model (O-ISM3), a standard of The Open Group (C102), published by The Open Group, February 2011; refer to: www.opengroup.org/library/c102.

[10] Control Objectives for Information and Related Technology (COBIT®), Version 5.0, IT Governance Institute, 2012.

[11] An Enterprise Architecture and Data Quality Framework, Jerome Capirossi, NATEA Consulting and Pascal Rabier, La Mutuelle Generale, 2007; accessed at: http://innovation-regulation2.telecom-paristech.fr/wp-content/uploads/2007/05/DEDM13_An-Enterprise-Architecture-and-Data-quality-framework.pdf.

[12] Modeling Enterprise Risk Management and Security with the ArchiMate® Language, White Paper (W150), published by The Open Group, January 2015; refer to: www.opengroup.org/library/w150.

[13] TOGAF® and SABSA® Integration: How SABSA and TOGAF complement each other to create better architectures, White Paper (W117), published by The Open Group, October 2011; refer to: www.opengroup.org/library/w117.

[14] Open Enterprise Security Architecture (O-ESA): A Framework and Template for Policy-Driven Security, The Open Group Guide (G112), published by Van Haren Publishing, April 2011; refer to: www.opengroup.org/library/g112.

[15] Risk Taxonomy (O-RT) Version 2.0, a standard of The Open Group (C13K), published by The Open Group, October 2013; refer to: www.opengroup.org/library/c13k.

[16] Risk Analysis (O-RA), a standard of The Open Group (C13G), published by The Open Group, October 2013; refer to: www.opengroup.org/library/c13g.

1 Introduction

Enterprise Architecture (including Security Architecture) is all about aligning business systems and supporting information systems to realize business goals in an effective and efficient manner (systems being the combination of processes, people, and technology). One of the important quality aspects of an Enterprise Architecture is information security and the way this can be managed. For too long, information security has been considered a separate discipline, isolated from the business processes and Enterprise Architecture.

A Security Architecture is a structure of organizational, conceptual, logical, and physical components that interact in a coherent fashion in order to achieve and maintain a state of managed risk and security (or information security). It is both a driver and enabler of secure, safe, resilient, and reliable behavior, as well as for addressing risk areas throughout the enterprise.

However, an Enterprise Security Architecture does not exist in isolation. As part of the enterprise, it builds on enterprise information that is already available in the Enterprise Architecture, and it produces information that influences the Enterprise Architecture. This is why a close integration of Security Architecture in the Enterprise Architecture is beneficial. In the end, doing it right the first time saves costs and increases effectiveness compared to bolting on security afterwards. To achieve this, Security Architects and Enterprise Architects need to speak the same language. That language is introduced in this Guide, which describes how to integrate security and risk into an Enterprise Architecture. It provides guidance for both security practitioners and Enterprise Architects working with the TOGAF® standard, a standard of The Open Group [1], to develop an Enterprise Architecture.

Figure 1 summarizes this Guide. It shows how Enterprise Architecture and Enterprise Security Architecture relate to each other, highlighting the core security and risk concepts that are used in Information Security Management (ISM) and Enterprise Risk Management (ERM). These concepts are listed in the center column, and form a set of foundation concepts that complement and enhance the TOGAF Standard. Concepts with an underscore in the figure are additions to the TOGAF framework and brought in by ISM or ERM.

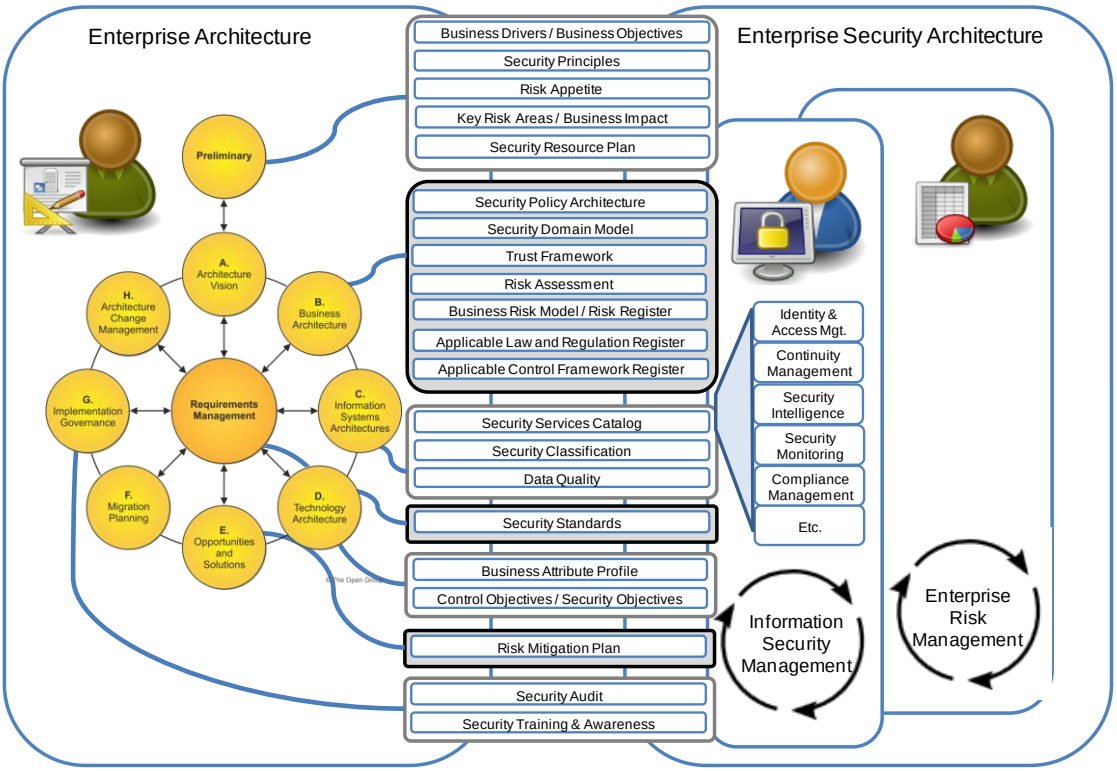

Figure 1: Essential Security and Risk Concepts and their Position in the TOGAF ADM

1.1 How does this Guide Support the TOGAF Standard?

This new content takes the security activities in the current TOGAF Standard [1] to a higher conceptual level. The goal of this approach is to explain how the TOGAF method and framework can be tailored to make use of an existing Enterprise Security Architecture in order to address security and risk properly.

This approach is business-driven and supports the integration of two processes: ISM and ERM. This process orientation will improve understanding of the security concepts and activities at different phases through the TOGAF Architecture Development Method (ADM). The business orientation will contribute to justification of the security components.

In this approach, it is foreseen that a lot of additional security practitioner guidance needs to be developed. This Guide provides the basis for that work. By using a common foundation this will deliver an internally consistent and practical way of working.

1.2 What about Risk Management?

Risk management in the TOGAF Standard primarily focuses on architecture project risk. This is only one type of risk. The scope of ERM, as presented in this Guide as part of the Enterprise Security Architecture, is much broader. It includes business, system, information, project, privacy, compliance, and organizational change risk, among other categories, too.

This Guide describes the broader concepts of ERM and how to integrate them into the TOGAF Standard. In particular, this work focuses on all aspects of operational risk – the risks that a business faces in day-to-day operations that are based on operational capabilities that are produced as the result of Enterprise Architecture work. It is intended that by paying more attention to operational risk downstream of the delivery of Enterprise Architecture work products, the utility, quality, and effectiveness of those work products will be improved and enhanced.

The Enterprise Security Architecture contains a balanced view on risk: negative consequences are kept to an acceptable level and positive opportunities are exploited to their maximum. The business-driven approach is key for the Security Architecture: business drivers offer the context for risk assessments; they define whether compliance with any control framework is necessary, and they justify the need for security measures.

This Guide is explicitly looking at risk within the context of best practice ERM. It is written for practitioners who expect to use best practices and are prepared to read and consider carefully the language within a profession. Like all professions, the risk management profession evolves and improves. Central to best practice ERM is a very precise definition of the term "risk". Over the last 15 years risk management has moved the professional definition from thought leadership, to leading practice, to well established best practice. Risk definition is embedded within mainstream risk management international standards, such as ISO 31000:2009 [6], best practice guides, and derived industry-specific guides, such as the Global Association of Risk Professionals Financial Risk Manager certification.

There is a difference between the commonly accepted definition of "risk" and the risk management professional definition of the term. Within the risk management profession "risk" is defined to be the "*effect that uncertainty has on the achievement of business objectives*". For many information security practitioners, this definition can feel uncomfortable: In their discipline, "risk" is usually regarded as threat-bound and therefore a negative attribute.

Since this Guide is aimed at the core concepts of the TOGAF Standard as an Enterprise Architecture framework, the definition of risk used is as defined in ISO 31000:2009. This definition allows for the usage of the term in subsequent practitioner guidance that focuses only on the narrower usage of risk as a negative; for example, in the information security risk management area, where the uncertainties are generally always negative outcomes.

1.3 Where is the Controls Checklist?

First of all, integrating security is not a matter of selecting controls from a checklist. We advocate a holistic approach towards security, so that a trustworthy, robust, reliable, secure, and risk-managed architecture is delivered. To do this, the Enterprise Security Architecture makes sure that tight cooperation is obtained between the ADM and the processes for ISM and ERM. Therefore, most of the security concepts in this Guide refer to things needed to set up security properly.

However, designing the operational security is part of the architecture as well. In the architecture context, security controls are bundled into security services. A security service can be seen as an Architecture Building Block (ABB). In the TOGAF Standard, ABBs capture architecture requirements that both direct and guide the development of Solution Building Blocks (SBBs). This can apply to all four of the TOGAF domain architectures: Business, Data, Application, and

Technology. In the same way, security services capture security requirements and guide the development of sub-services and components.

Examples of security services are:

- Identity & Access Management
- Continuity Management
- Security Intelligence
- Digital Forensics
- Audit
- Network Monitoring
- Compliance Management
- Training & Awareness Programs, etc.

The security services are positioned in the logical layer of the SABSA® architecture framework, which is developed in Phase C (Information Systems Architectures) of the TOGAF ADM. The Security Services Catalog provides the actual description of those security services.

To support security practitioners in actually designing and using the security services, a Security Services Catalog is needed. For Security Architects, the Security Services Catalog is a register that supports filling in the logical layer of the SABSA architecture framework with security controls. Unlike existing control frameworks that contain requirements, the Security Services Catalog describes security building blocks that actually deliver protection. This architecture approach enables smooth integration of information security in the Enterprise Architecture.

The standardized approach contributes to the professionalization of the security management organization and facilitates a more efficient, cost-effective way of working. One of the main advantages of the Security Services Catalog is that offers a common terminology and reference framework for the domain of security management allowing better cooperation between the parties concerned.

2 Relationship to Other IT Security and Risk Standards

This chapter documents relationships among selected standards in this subject area.

2.1 ISO/IEC 27001:2013: Information Security Management

"*ISO/IEC 27001:2013 is a standard that specifies the requirements for establishing, implementing, maintaining, and continually improving an information security management system within the context of the organization. This International Standard also includes requirements for the assessment and treatment of information security risks tailored to the needs of the organization.*" [4]

The core concepts of ISO/IEC 27001:2013 are taken as a basis for the ISM process in this Guide. This explains a sound security management process and helps readers to understand the logic behind specific risk concepts that are needed in the TOGAF framework. However, no fixed mapping has been made to that standard. It is seen as one of the good references that is very useful for this work.

2.2 ISO 31000:2009: Risk Management – Principles and Guidelines

ISO 31000:2009 [6] sets out principles, a framework, and a process for the management of risk that are applicable to any type of organization in the public or private sector. It does not mandate a "one size fits all" approach, but rather emphasizes the fact that the management of risk must be tailored to the specific needs and structure of the particular organization. It has a related standard IEC 31010:2009 [7] that describes examples of qualitative risk assessment methods.

The core concepts of ISO 31000:2009 are taken as a basis for the ERM process in this Guide. Just as with ISO/IEC 27001:2013, no fixed mapping has been made to that standard but it is seen as one of the good references that is very useful for this work.

2.3 National Cybersecurity Frameworks

Internationally there are many country-specific cybersecurity standards. A leading example is the NIST Cybersecurity Framework, introduced in 2014. This framework aims to help organizations in critical infrastructure sectors to reduce risk, and protect their critical infrastructure. The NIST Cybersecurity Framework groups security functions into these five areas: Identify, Protect, Detect, Respond, and Recover. Many of the security and risk concepts introduced in this Guide and in future work (including the Security Services Catalog) will be highly useful to Security Architects in critical infrastructure areas seeking to integrate security and risk into their TOGAF Standard practices, and into their Enterprise Architectures.

2.4 COBIT®

"*COBIT 5 provides a comprehensive framework that assists enterprises in achieving their objectives for the governance and management of enterprise IT. Simply stated, it helps enterprises create optimal value from Information Technology (IT) by maintaining a balance between realizing benefits and optimizing risk levels and resource use. COBIT 5 for Information Security builds on the COBIT 5 framework in that it focuses on information security and provides more detailed and more practical guidance for information security professionals and other interested parties at all levels of the enterprise.*" [10]

COBIT 5 for Information Security is regarded as a relevant framework for security governance. However, in this Guide the structure of ISO/IEC 27001:2013 is used because that is a broader recognized definition of a security management system.

2.5 O-ESA

The Open Enterprise Security Architecture (O-ESA) standard [14], published by The Open Group in 2011, is a reference Security Architecture and guide to building a security program. While it contains useful information on information security governance, security principles, and technology components and services needed in Security Architectures, this reference architecture can be also applied to support the implementation of security and risk in Enterprise Architectures using the TOGAF Standard.

2.6 O-ISM3

The Open Information Security Management Maturity Model (O-ISM3) standard [9], published by The Open Group in 2011, describes a process-based approach towards building and operating an Information Security Management System (ISMS). Successful operation of the ISMS is generally a prerequisite for Enterprise Architectures to meet the security objectives established by an organization. A chapter of the Security Architecture Practitioners Guide will be devoted to the relationship between Enterprise Architecture, the TOGAF Standard, and ISMSs. The O-ISM3 standard defines security services as strategic, tactical, or operational processes, and provides a metrics-based approach to continuous improvement of the processes. Many of the services or processes described in the O-ISM3 standard are expected to be referenced in the Security Services Catalog Project as well.

2.7 Open FAIR

The Open FAIR Body of Knowledge comprises the Risk Taxonomy (O-RT) Standard [15] and the Risk Analysis (O-RA) Standard [16]. These standards help organizations to better measure their information security and operational risks. The Open FAIR quantitative risk analysis approach is highly useful during threat assessments and helps to understand the impact of threat mitigation options during the ADM cycle. Open FAIR can be thought of as a tool or technique in analyzing risk throughout the TOGAF ADM.

2.8 SABSA®

SABSA is a methodology for developing risk-driven enterprise information security and information assurance architectures and for delivering security infrastructure solutions that support critical business initiatives. It is an open standard, comprising a number of frameworks, models, methods, and processes. As an Enterprise Security Architecture framework, it allows for the usage of existing standards and practices (such as ISO/IEC 27001:2013, COBIT, and ISO 31000:2009) within the Security Architecture. SABSA is free for use by all, with no licensing required for end-user organizations that make use of the standard in developing and implementing architectures and solutions.

SABSA is well described in the SABSA® Blue Book [2]. In addition, new SABSA thinking is published at www.sabsa.org [3]. The fundamental idea behind SABSA is that the Security Architecture is there to facilitate the business. This is in line with TOGAF concepts.

3 Enterprise Security Architecture

A Security Architecture is a structure of organizational, conceptual, logical, and physical components that interact in a coherent fashion in order to achieve and maintain a state of managed risk. It is an enabler/driver of secure behavior, safe behavior, resilient behavior, reliable behavior, and upholding of privacy at risk areas throughout the whole enterprise.

Security Architecture components always have a relationship with other elements in the architecture. Thus, although the Security Architecture might be *viewed* as one architecture, it can never *be* an isolated architecture.

The risks managed by the Security Architecture are of various kinds. Two important ones are business risk and operational risk. The Security Architecture contains a balanced view on risk: negative consequences are kept to an acceptable level and positive opportunities are exploited to their maximum. The business-driven approach is key for the Security Architecture: business drivers offer the context for risk assessments; they define whether compliance with any control framework is necessary, and they justify the need for security measures.

For true integration of security in the architecture, a system engineering approach should be used. This means that security and risk are considered as soon as possible in the system engineering development lifecycle of the subject in question. At each phase in the development lifecycle, appropriate security and risk-related activities are conducted. These activities might vary from high-level advice and guidance in the early phases up to detailed security checks in the final phase. In this way, a secure operational system can be achieved that is reliable, safe, resilient, and respectful of privacy concerns. In addition, it leads to secure behavior.

In the operational phase, the security aspects of the architectures should be monitored, assessed, and reported. Although this operational phase generally does not begin until the first iteration of the TOGAF ADM is complete, it is during the ADM Phases G and H that the capabilities to measure security need to be designed and incorporated.

The adjective “Enterprise” before “Security Architecture” indicates the abstraction layer that the Security Architecture addresses. The concept of “enterprise” implies business alignment at the highest level, rather than at local levels. The TOGAF Standard defines “enterprise” as the highest level of description of an organization and typically covers all missions and functions. It further states than an enterprise will often span multiple organizations. For example, an enterprise could be a government agency, a whole corporation, a division of a corporation, a single department, or a chain of geographically distant organizations linked together by common ownership.

The Enterprise Security Architecture seeks business alignment of the security measures with the business objectives. It does so by defining relationships between the components on the different architecture layers, thus providing traceability and justification. The Enterprise Security Architect typically makes use of ISM and ERM processes to develop the deliverables and to interact with stakeholders.

3.1 Enterprise Risk Management

The Information Technology security and information security industry has evolved over its lifetime a view of operational risk that is concerned only with threats, vulnerabilities, and loss events (negative impacts). However, as noted earlier in Section 1.2, this Guide uses the ISO 31000:2009 [6] definition of "risk", an "uncertainty of outcomes", and risk management is presented as striking a balance between positive and negative outcomes resulting from the realization of either opportunities or threats.

3.1.1 Definition of Risk

Risk is the "*effect of uncertainty on objectives*" (ISO 31000:2009 [6]).

The effect of uncertainty is any deviation from what is expected – positive and negative.

Understanding the term "risk" is central to understanding the broader concepts of ERM, and the role of effective Enterprise Architecture and Enterprise Security Architecture. In this Guide we define risk in line with ISO 31000:2009. Risk is the effect that uncertainty has on the achievement of business objectives. The uncertainty is concerned with predicting future outcomes, given the limited amount of information available when making a business decision. This information can never be perfect, although our expectation is that given better quality information we can make better quality decisions. Every decision is based on assessing the balance between potential opportunities and threats, the likelihood of beneficial outcomes *versus* damaging outcomes, the magnitude of these potential positive or negative events, and the likelihood associated with each identified outcome. Identifying and assessing these factors is known as "risk assessment" or "risk analysis". "Risk management" is the art and science of applying these concepts in the decision-making process. Risk can be seen at the strategic long-term level (overall direction of the business), the medium term tactical level (transformation projects and programs), and at the operational level (regular day-to-day operational decisions, processes, and practices). The objective of risk management is to optimize business outcomes to maximize business value and minimize business losses. Risk can be seen at any level in the business stack (see Figure 2), but is always driven top-down from assessment of business value and its optimization.

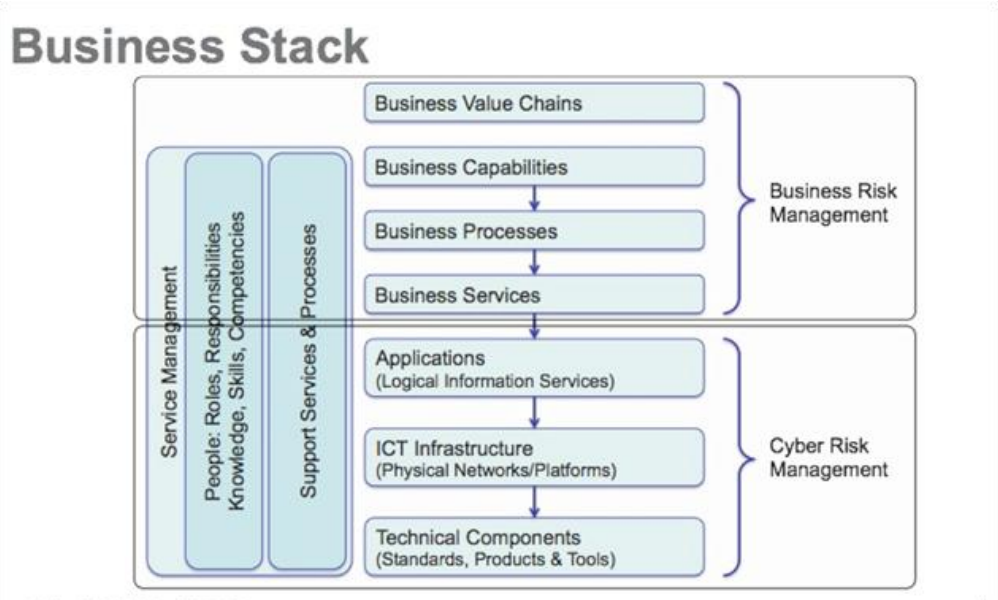

Figure 2: Business Risk *versus* Cyber Risk Areas

Uncertainty typically involves a deficiency of information and leads to inadequate or incomplete knowledge or understanding. In the context of risk management, uncertainty exists whenever the knowledge or understanding of an event, consequence, or likelihood is inadequate or incomplete.

This balanced view of risk is also embedded in SABSA, including the enabling of benefits arising from opportunities as well as the control of the effects of threats. Arguably, the sole role of the Enterprise Architect is to create an operational environment in which operational risk can be optimized for maximum business benefit and minimum business loss.

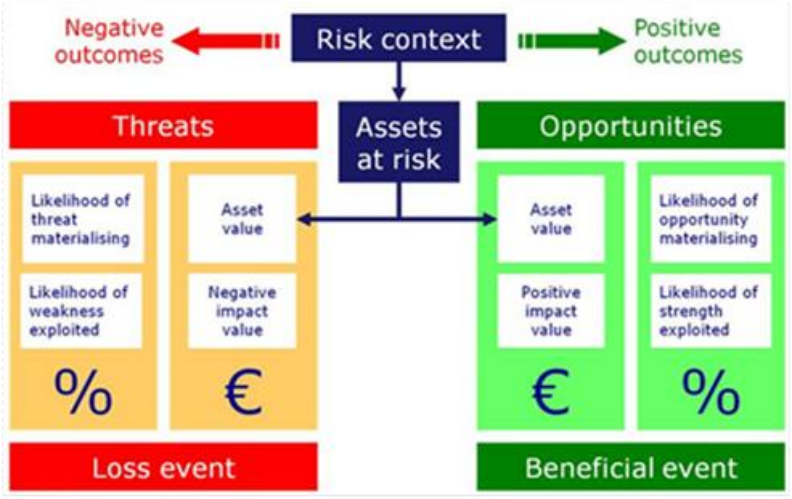

Figure 3: The SABSA Operational Risk Model

Operational risk is concerned with the threats and opportunities arising in business operations. SABSA is an architectural and operational framework for reaching out to opportunities and enabling positive outcomes to attain defined business targets and managing negative outcomes of loss events to within an enterprise's tolerance towards risk – namely their risk appetite.

3.1.2 Core Concepts for Enterprise Risk Management

According to ISO 31000:2009, the risk management process aids decision-making by taking account of uncertainty and the possibility of future events or circumstances (intended or unintended) and their effects on agreed objectives. It also gives a risk management process model, as illustrated in Figure 4. The ISO 31000:2009 approach makes it clear that risk management should be embedded deeply and firmly in all business activities. It also states that it is a continuous lifecycle rather than an isolated activity. This definition of risk management is adopted in this work.

The heart of this definition is that effective risk management is about managing to the expected objective. Every step has an element of risk that needs to be managed and every outcome is uncertain. ERM is about reducing uncertainty.

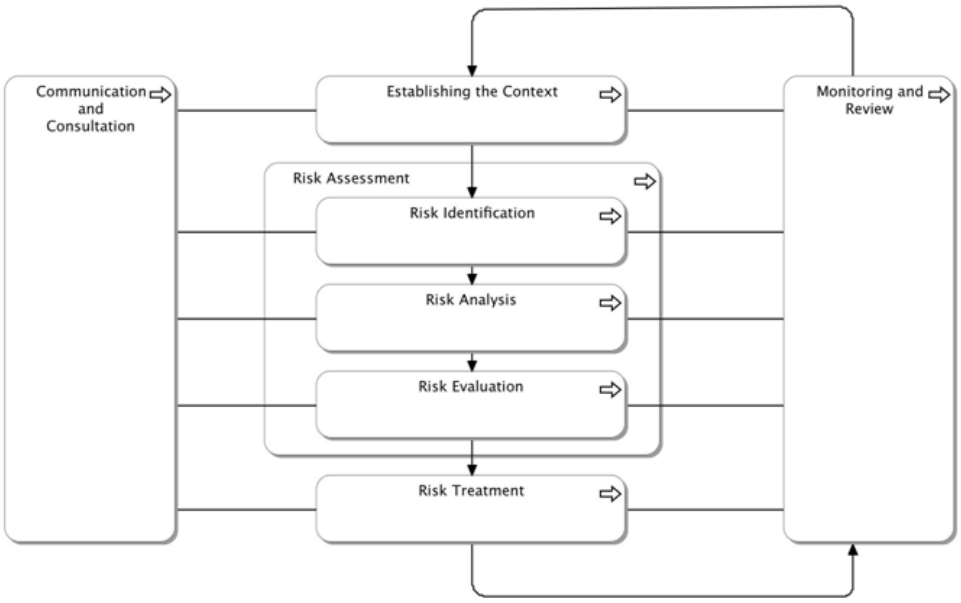

Figure 4: ISO 31000:2009 Model for Risk Management (Derived from[6])

The following concepts are important for ERM:

- Key Risk Areas
- Business Impact Analysis
- Risk Assessment
- Business Risk Model/Risk Register
- Risk Appetite

- Risk Mitigation Plan/Risk Treatment Plan

3.2 Information Security Management

Information Security Management (ISM) is a process that defines the security objectives, assigns ownership of information security risks, and supports the implementation of security measures. The security management process includes risk assessment, the definition and proper implementation of security measures, reporting about security status (measures defined, in place, and working), and the handling of security incidents.

3.2.1 Security

For many security practitioners, security is based on three core pillars: Confidentiality, Integrity, and Availability – also known as the CIA triad. These work pretty well in a technical environment where information systems need to be classified in order to determine the security requirements that apply. Classification can be achieved according to the confidentiality scheme (high-medium-low). Especially in the financial industry, these schemes for security classification based on the CIA triad are pervasive through the whole organization.

However, when talking with business owners it often turns out that these terms are meaningless to them. They have a clear understanding of which people are allowed to access which systems, but they don't use these "security" terms for that. In addition, the three terms are too broad. It's possible to rank every security concern under one of those three terms. The fact that they are so broadly defined is also their weakness: they can mean something completely different in two different environments.

For example, "Availability" can stand for:

- **Up-time** – a minimum up-time of a system of 99.9% during business hours
- **Responsiveness** – a minimum response time of 0,01 milliseconds for each transaction
- **Archived** – a guaranteed storage time of 7 years for healthcare data
- **Erased** – all data on servers should be made unrecoverable before they are sent to trash
- **Recoverable** – if the system fails due to a calamity, it should be restored within 24 hours

This example illustrates that Availability can have all kinds of meanings, depending on scope and context. It also illustrates that terms that are more specific are at our disposal that specify the type of concern we need to address. If the terms are so complex and need to be analyzed each time to determine what we really mean, then why should we keep using those terms? The terms Confidentiality, Integrity, and Availability are overloaded, used by many people for different purposes. We need a more specific concept.

Therefore, in this work we move away from the narrow CIA triad to a very rich terminology that is both specific and business-friendly. This is offered by the SABSA Business Attribute model, as described in the section "Requirements Management". Business Attributes offer a flexible and powerful way of expressing the security concerns of the business owners.

The Business Attribute model also allows for measurement of efficacy. The efficacy of a security measure is considered in relation to the risk it mitigates. An enterprise cannot determine

how much it will be willing to spend on securing an asset until it understands the asset value. For example, the use of that asset in an application and the concomitant risk the asset is exposed to as a result, will determine the true requirements for security. Additionally, the organization's tolerance for risk is a factor. In other words, the question asked should not be: "Is it secure?", but rather: "Is it secure enough?". The latter is ultimately a question to be answered by risk evaluation.

To give a more down-to-earth idea of what security encompasses, some generally accepted areas of concern for the Security Architect are given:

- **Asset Protection** – the protection of information assets from loss or unintended disclosure, and resources from unauthorized and unintended use
- **Risk Assessment** – determining what risks we face, measuring them to determine their likelihood and impact, and then accepting, mitigating, or transferring the risk according to the organization's risk appetite
- **Access Control** – who are you and what activity are you allowed to do under which conditions?
- **Audit** – does the operational environment operate in accordance with the requirements?
- **Availability** – the ability to function without service interruption or depletion despite abnormal or malicious events

3.2.2 Privacy

Privacy is the ability of an individual or group to seclude themselves, or information about themselves. The boundaries and content of what is considered private differ among cultures and individuals, but share common themes. The domain of privacy partially overlaps security, including, for instance, the concepts of appropriate use, as well as protection of information.

In general, directives on privacy demand that personal data should not be processed at all, except when certain conditions are met. These conditions fall into three categories: transparency, legitimate purpose, and proportionality.

3.2.3 Core Concepts for Information Security Management

According to ISO/IEC 27001:2013 [4], the ISM system preserves the security aspects of information by applying a risk management process, and it gives confidence to interested parties that risks are adequately managed. The ISM system is part of and is integrated with the organization's processes and overall management structure. The standard specifies the requirements for the ISM system.

The following core security concepts are relevant for the ISM process. Their descriptions as well as their relationship with the TOGAF ADM are given later in this Guide. Their role in the ISM process will be described in the Security Architecture Practitioners Guide. They are listed here in order to enumerate the core information security concepts that should be part of the TOGAF Standard. The main categories of ISO/IEC 27001:2013 are used to understand better how the concepts are related.

Context of the Organization

- Security Domain Model
- Business Drivers/Business Objectives
- Applicable Law and Regulation Register
- Applicable Control Framework Register
- Trust Framework

Leadership

- Security Policy Architecture

Planning

- Security Principles
- Business Attribute Profile
- Control Objectives/Security Objectives
- Data Quality
- Business Risk Model/Risk Register
- Security Services Catalog

Support

- Security Resource Plan
- Security Training & Awareness
- Security Standards

Operation

- Security Classification

Performance Evaluation

- Security Audit

Improvement

- (no new security concept)

3.2.4 Operational Security Processes

Operational controls are designed during TOGAF ADM Phases B, C, D, and E. ADM Phases F and G provide guidance on the definition of metrics that would be used later during the project operations. This is why the operational security processes are introduced in the design phase as part of the Security Services Catalog.

The consequence is that operational security processes, such as digital forensics, security intelligence, and security analytics, will be found in the architectures as part of the Security Services Catalog. Security intelligence provides the means to analyze and measure enormous amounts of data and deliver meaningful incident information to the right people across the organization.

4 Security as a Cross-Cutting Concern

Security Architecture is a cross-cutting concern, pervasive through the whole Enterprise Architecture. It can be described as a coherent collection of views, viewpoints, and artifacts, including security, privacy, and operational risk perspectives, along with related topics like security objectives and security services. The Security Architecture is more than a dataset; it is based on the ISM and ERM processes.

The TOGAF ADM covers the development of the four architecture domains commonly accepted as subsets of an Enterprise Architecture: Business, Data, Application, and Technology. The Security Architecture interacts with all four of them and is therefore called cross-cutting.

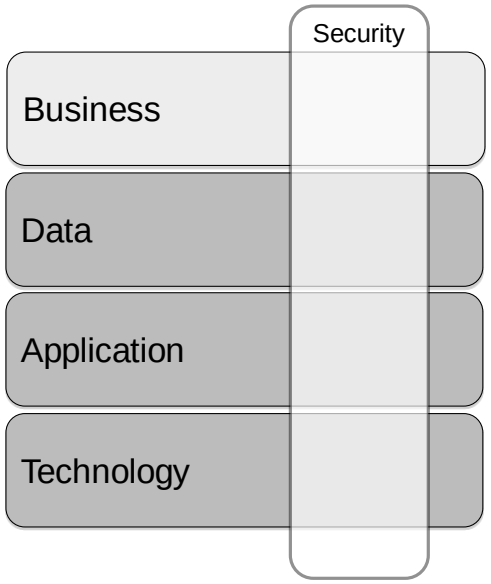

Figure 5: Security as a Cross-Cutting Concern through the Architecture

As a cross-cutting concern, the Security Architecture impacts and informs the Business, Data, Application, and Technology Architectures. The Security Architecture may often be organized outside of the architecture scope, yet parts of it need to be developed in an integrated fashion with the architecture. These touch-points will be explained in the next chapter.

5 Security and Risk Concepts in the TOGAF ADM

The TOGAF ADM contains the concept of "artifacts" (work products) that are consumed or produced by each phase. To match this, the core concepts of the Enterprise Security Architecture are expressed in TOGAF terminology and related to TOGAF concepts, which will ensure correct embedding of the relevant risk and security concepts at the appropriate ADM phases. A complete overview of all selected SABSA artifacts is given in Figure 1.

These core security concepts are explained in more detail in the following sections for each TOGAF ADM phase. Besides the description, the location in the "Architecture Framework" is given. That can be in the TOGAF Standard – if it's already there – or in the Enterprise Security Architecture. The Enterprise Security Architecture is used here as a generic Security Architecture concept, encompassing both ISM and ERM.

5.1 Preliminary Phase

The Preliminary Phase establishes the security context required to guide the Security Architecture design. To build the security context, the following security artifacts need to be determined during this phase. These artifacts can be integrated into existing architecture documentation.

5.1.1 Business Drivers/Business Objectives

Location in the Architecture Framework: This is the subset of TOGAF business drivers affecting security, presented as an integral part of the overall architecture business drivers (The TOGAF Standard – Architecture Content: Architecture Deliverables).

In O-ISM3 [9], this is called the business objectives. Every organization exists for specific purposes that require it to set goals and meet certain obligations. Business objectives, ranging from aspirational goals to regulatory compliance, may originate internally, or be imposed by an external party such as the government. Their achievement depends on many factors, one being information security. Some examples of business objectives are:

- Paying the payroll on the 1st of every month
- Paying all incoming invoices within a certain timeframe

5.1.2 Security Principles

Location in the Architecture Framework: Security Principles is the subset of Business Principles addressing Security Architecture. This is presented as an integral part of the overall Architecture Principles deliverable (The TOGAF Standard – Architecture Content: Architecture Deliverables).

Security Principles, like other Architecture Principles, will provide valuable guidance to making business decisions to comply with the enterprise's risk appetite. In essence, the usage of Security

Principles does not differ from the usage of Architecture Principles. Examples of Security Principles will be given in the Security Architecture Practitioners Guide.

5.1.3 Risk Appetite

Location in the Architecture Framework: Enterprise Security Architecture: ERM.

Risk appetite describes the enterprise's attitude towards risk and provides decision-making guidance to the organization to balance the amount of risk taken to achieve an expected outcome. The risk appetite could be expressed as, for example, a boundary on a risk/business impact and likelihood grid, profit, and loss measures or qualitative measures (zero tolerance for loss of life or regulatory compliance breaches). Risk appetite can also be represented by suitably worded Security Principles, or produced as a stand-alone deliverable if a key stakeholder exists who needs to approve it specifically. It defines both the level of risk the organization is willing to accept as well as its strategy in defining this level. For risks above this acceptable level, it defines the strategy used for mitigation (transference, avoidance).

5.1.4 Key Risk Areas/Business Impact Analysis

Location in the Architecture Framework: Enterprise Security Architecture: ERM.

Note: Risk classification is described in the TOGAF Standard – ADM Techniques (Risk Management) and is focused on risk of the architecture projects. This document extends the concepts of risk and risk assessment.

During the Preliminary Phase, addressing key risk areas provides a context for architecture projects. During an architecture project in Phase A, this should be confirmed.

The business impact analysis can be applied in all domains and against the architecture roadmap, and is a powerful tool for determining fitness of the architecture and roadmap. A business impact analysis points out the potential damage (or profit) to the business that can be expected if inappropriate and insufficient information security is applied. It (only) defines what kind of impact is relevant to the business process and should be avoided, not the likelihood of this impact occurring. The deliverable is a list of the key risk areas within the architecture scope. This information is input to the risk assessment.

5.1.5 Security Resource Plan

Location in the Architecture Framework: the TOGAF Standard – Architecture Development Method, Preliminary Phase and Phase A.

Resource planning for architecture work for the entire architecture team is addressed in the Preliminary Phase when the Enterprise Architecture team is defined and established. In Phase A it is addressed where the capability of the architecture team is assessed against the architecture project.

Based on the scope of the Enterprise Architecture team's responsibility and the scope of any architecture project, it will identify the required security resources to deliver the security elements of the architecture.

A key part of defining the Enterprise Architecture team is establishing the expected role and mandate of the Security Architect. Best practice Security Architecture integrates security and

risk within all domains. Integral to this is establishing the governance process for the Security Architecture within the context of the Enterprise Architecture governance process.

Answering the following questions will assist in identifying the security and risk resources required in the team, and on an architecture project:

- What are the common security or risk-related concerns?
- Do key and influential security or risk-related stakeholders exist who require specific security views?
- Does the architecture address high-risk areas, or is the risk appetite low?
- Can security support be requested on an as-needed basis from an existing security team or are dedicated Security Architecture resources required as part of the overall architecture team?

During the Preliminary Phase it is decided which security artifacts are really needed in the Enterprise Architecture and which will be created by whom. It might not be necessary to deliver all security artifacts in order to address security properly. The reverse applies too: delivering all artifacts does not guarantee that security is taken care of properly – more artifacts may be required.

For enterprise-level architectures, the artifacts need to be created based on discussions with key stakeholders; preliminary assessments carried out by the architecture team; and assessing relevant statutes, applicable jurisdictions, legislation, and regulations.

For capability-level architectures, existing sources might be available. For instance, an enterprise-level security policy or risk assessment describes the security principles, risk appetite, and key risk areas for a particular context.

5.2 Phase A: Architecture Vision

In general, Phase A: Architecture Vision describes enough of the TOGAF ADM Phases B, C, and D to ensure that key stakeholders can agree to a vision of the end-state, which represents a solution to a defined problem.

In Phase A sufficient security-specific architecture design is carried out to:

- Satisfy the security stakeholders that the end-state does not represent any unknown or unacceptable risk and aligns with corporate policies, standards, and principles
- Satisfy business stakeholders – in particular those who control the budget – that the Security Architecture is instrumental in enabling and supporting the overall architecture required to deliver the business opportunities and benefits identified with the right balance between risk, compliance, and business benefits

In Phase A, it is essential to identify the complete list of all stakeholders, their concerns, and associated requirements for approval of the architecture. All stakeholders will have security and risk concerns and associated requirements. Separating security stakeholders ensures that the architecture will address a subset of stakeholders and a subset of requirements.

The stakeholder requirements are gathered to determine the security blueprint needed to address the various concerns the stakeholders have. The security blueprint is defined at a level giving sufficient assurance to the stakeholders that the final artifacts and deliverables will address their concerns appropriately. The ADM phases related with architecture descriptions complete the blueprint and add the required detail.

Stakeholders typically have value concerns related to the Security Architecture. Value may be measuring items such as reduced risk and enablement of the overall architecture. The Business Attribute Profile[1] can be useful as a basis for the business case. As a specific Business Attribute Profile may not yet be available, the SABSA-provided Business Attribute Profile can be used as a starting point. A scenario-based approach may be used to obtain stakeholder approval.

The viewpoints and business cases must build on Security Principles, drivers, key risks, and risk appetite and should be an integral part of the overall Architecture Vision deliverables.

5.3 Phase B: Business Architecture

The security elements of Phase B: Business Architecture comprise business-level trust, risk, and controls, independent from specific IT or other systems within the specific scope of the architecture engagement.

The security-related Business Architecture artifacts are described below.

5.3.1 Security Policy Architecture

Location in the Architecture Framework: Enterprise Security Architecture: ISM.

The Security Policy Architecture (or Framework) contains a set of security policies that express the security strategy. It assigns ownership and accountability for security and risk management. It also addresses the linkage and hierarchy of operational risk management in general with the various security aspects such as business continuity, information security, system security, and physical security.

5.3.2 Security Domain Model

Location in the Architecture Framework: the TOGAF Standard – Introduction and Core Concepts (Glossary of Supplementary Definitions: Information Domain). Complete text: "Grouping of information (or data entities) by a set of criteria such as security classification, ownership, location, etc. In the context of security, information domains are defined as a set of users, their information objects, and a security policy."

Note: The concept of information domain corresponds with the definition of a security domain below.

A security domain represents a set of assets that could be described by a similar set of business attributes. In other words, the security domain groups the assets with the same security level that fall under the jurisdiction of one security policy. In addition, the security domain model helps in defining responsibility areas where responsibility is exchanged with external parties. It can also

[1] See Chapter 6 (pp.87-97) of the SABSA® Blue Book [2].

be used to distinguish between areas of different security or trust levels. A security policy authority is responsible for setting and implementing the security policy within the domain.

If the business model of the organization does encompass federation with other organizations, the extent of the security federation should be established at this point in the process. This is the case when organizations have data objects or activities in common. Contractual federation agreements should be examined for their security implications and agreements. It may be necessary to establish joint architecture meetings with other members of a federation if they belong to the same security domain.

5.3.3 Trust Framework

Location in the Architecture Framework: Enterprise Security Architecture: ISM.

Trust relationships are the basis for doing business with other parties. The trust framework describes trust relationships between various entities in the architecture domain and on what basis this trust exists. Trust relationships can be unidirectional, bidirectional, or non-existent. The onus for assessing trust is the responsibility of those choosing to enter into the contracts and their legal counsel. It is important to note that technology (e.g., digital certificates) cannot create trust, but can only convey in the electronic world the trust that already exists in the real world through business relationships, legal agreements, and security policy consistencies.[2]

5.3.4 Risk Assessment

Location in the Architecture Framework: Enterprise Security Architecture: ERM.

Although the TOGAF Standard – ADM Techniques (Initial Risk Assessment) describes one method of administrating the result of a risk assessment, the actual act of assessing risk and the ways to do that are not described. Therefore, this concept is augmented by this document for use with the TOGAF Standard.

A risk assessment is the activity of determining the risks that are relevant to an asset or objective. A qualitative risk assessment delivers a listing of relevant risk scenarios with a high-level prioritization (high-medium-low), whereas a quantitative approach seeks for numeric determination of the risk. This is commonly based on identified threats, their likelihood of materializing, and the impact of an incident. A deliverable of a risk assessment is the Business Risk Model.

5.3.5 Business Risk Model/Risk Register

Location in the Architecture Framework: Enterprise Security Architecture: ERM.

The Business Risk Model is a Risk Register. It determines the cost (both qualitative and quantitative) of asset loss/impact in failure cases. It is the result of a risk assessment, based on identified threats, likelihood of materializing, and impact of an incident. Business impact should be aligned with the definitions in the Business Attribute Profile, which act as pseudo-assets. Security classification should be carried out at this stage based on the risks identified. The business risk model is a detailing of the risk strategy of an organization. The classification of the

[2] The Open Group published a Guide to the Trust Ecosystem in January 2014 that describes the need for a trust ecosystem, a taxonomy for trust, as well as the impact of trust on business relationships and contracts (available at www.opengroup.org/library/g141).

information determines the maximum risk the business is willing to accept, and the owner of the information decides what mitigation is enough for his/her information.

5.3.6 Applicable Law and Regulation Register

Location in the Architecture Framework: Enterprise Security Architecture: ISM.

The Applicable Law and Regulation Register contains the specific laws and regulations that apply within the scope of the Enterprise Architecture engagement, based on the business function inventory. It is kept up-to-date, following legal and regulatory changes. This register is important for compliance purposes.

Whether the business function is subject to regulation depends upon the functionality of the system as a whole and the data collected or maintained. In addition, the jurisdiction where the supporting systems or services are deployed, where the users reside, etc. is relevant information. It may be wise to obtain legal counsel regarding these obligations at the outset of activities.

5.3.7 Applicable Control Framework Register

Location in the Architecture Framework: Enterprise Security Architecture: ISM.

The Applicable Control Framework Register contains the suitable set of control frameworks that best satisfy the requirements and address the risks related to the engagement scope and context. Control frameworks contain requirements and/or mandatory security measures. Examples of control frameworks are ISO/IEC 27001:2013 [4], ISO/IEC 27002:2013 [5], COBIT [10], PCI-DSS, Common Criteria, etc.

Factors that drive the selection of control frameworks are:

- Mandatory certifications, due to the nature of the business process or the industry
- Way of working of the internal ISM process – this is often inspired by ISO/IEC 27001:2013 but might mandate additional control frameworks as well
- Marketing objectives – customers may ask for specific control framework certifications
- Support for security audits

5.4 Phase C: Information Systems Architectures

The security elements of Phase C: Information Systems Architectures comprise functional security services and their security classification.

The artifacts are described in more detail below.

5.4.1 Security Services Catalog

Location in the Architecture Framework: Enterprise Security Architecture: ISM.

Note: The TOGAF Standard has a Business Services Catalog that is a list of the enterprise's business services and their functional and non-functional requirements. It is used to analyze the functional and non-functional requirements. The Security Services Catalog

stores and provides more kinds of information about each service, so this needs to be introduced.

The Security Services Catalog is a list of services that provide security-specific functionality as part of the overall architecture. Unlike control frameworks that contain requirements, the Security Services Catalog describes security building blocks that actually realize the security goals. It provides a common terminology and reference framework for the domain of security management. The Security Services Catalog contains conceptual definitions of the services, as well as operational information about implementation and usage.

Examples of security services are:

- Identity & Access Management
- Continuity Management
- Security Intelligence
- Digital Forensics
- Security Analytics
- Audit, Network Monitoring
- Compliance Management
- Training & Awareness Programs, etc.

This is the area of security that most security practitioners will recognize. One of the main advantages of the Security Services Catalog is that it is a common terminology and reference framework for the domain of security management allowing better cooperation between the parties concerned.

5.4.2 Security Classification

Location in the Architecture Framework: Enterprise Security Architecture: ISM.

Security classification is a label attached to an asset, according to a classification scheme. In most cases, this scheme is defined and described in the corporate information security policy and the classification is based on one or more characteristics of the asset.

Keep in mind that the asset can be any relevant component of the architecture. Assets include business service, a capability, information, an information system service, physical data component, or physical technology component. The security classification determines the security requirements that apply to the asset; for example, regarding access control, confidentiality, or availability. It is a means to implement the security policy.

5.4.3 Data Quality

Note: From an Enterprise Security Architecture perspective, data quality[3] requirements are an integral part of the security requirements and so are the related risk assessment and selection of measures.

Data quality is a key factor in operational risk management. Some of the key attributes that contribute to data quality are accuracy, relevance, timeliness, currency, completeness, consistency, availability, and accessibility. Safeguarding data quality starts with a clear overview on the datasets in question. For each dataset, ownership and responsibility for the quality of data needs to be assigned. The owner authorizes people or processes that are trusted for a certain activity on the data under certain circumstances. It might also be necessary to change information systems in order to handle the data properly. Finally, each of the key attributes should be measured based on log and performance data.

5.5 Phase D: Technology Architecture

In most cases, the development of specific Technology Architecture security artifacts is not necessary, as long as it incorporates the relevant security controls and mechanisms defined in earlier phases. The Security Architect must ensure that the required controls are included in the Technology Architecture and verify whether the controls are used in an effective and efficient way. This includes the technology for the provision and regulation of system resources, such as electric power, processing capacity, network bandwidth, and memory.

A security stakeholder may request the creation of a specific Technology Architecture security view or deliverable that describes all security-related technology components and how they inter-relate. This view should explain which business risks are mitigated by what technology, providing justification for the technology.

5.6 Phase E: Opportunities and Solutions

In defining the roadmap, where the sequence of gaps to be addressed is determined, it is imperative that security and risk are evaluated. Ensure the stakeholders' security and risk concerns are addressed in the analysis. Confirm that risk owners are consulted. The value expected to be delivered by work packages should include measures related to security and risk value to ensure the roadmap addresses the complete set of business goals and drivers.

The security building blocks defined in the previous phases become SBBs in this phase so that more specific implementation-oriented requirements and specifications are defined. A whole solution design might be needed at this stage.

The Security Services Catalog of the Baseline Security Architecture probably contains existing security services or security building blocks that meet the requirements. For example, if the requirement exists for application access control, an existing central authentication service might be used to fill that in. The efficacy of existing security services and controls earmarked for re-use must be verified to ensure that the end-state contains security measures, which work and integrate well.

[3] This document addresses the TOGAF Standard, 10th Edition which does not sustain a distinction between data and information. When your architecture makes a clear distinction, all references to data are appropriate for information.

5.6.1 Risk Mitigation Plan

Location in the Architecture Framework: Enterprise Security Architecture: ERM.

Note: In the TOGAF Standard, 10th Edition risk mitigation is done for transition risks, but it is not explained how this should be created or what possible risk mitigation strategies there are, so this document provides additional guidance on this issue.

The Risk Mitigation Plan contains activities to mitigate risks. It is the implementation of the risk mitigation strategy, which could aim to increase the level of control, transfer the risk to another party, avoid the risk by changing the business activity, delay the risk, compensate for the risk, etc.

The broader sense of risk is addressed by the ERM process in this phase. The scope includes the latest information security risks as identified during the risk assessments that are done earlier in the ADM (in Phase B). This is where the risks get "solutioned" or "treated". The Risk Mitigation Plan should also consider risks that appear as a result of the new architecture.

5.7 Phase F: Migration Planning

Migration is itself a business process that needs to be secured. The migration strategy should include a risk assessment and a Risk Mitigation Plan. In Phase F, the Risk Mitigation Plan is limited to the transition. These concepts have already been mentioned in earlier phases of the ADM. Migration of live environments should always include regression planning so that there is a way to reverse out a failed migration. This is an essential part of risk management.

In addition, migration planning should include a security impact analysis to understand any security impacts of the target state of the change.

5.8 Phase G: Implementation Governance

Security Architecture implementation governance provides assurance that the detailed design and implemented processes and systems adhere to the overall Security Architecture. This ensures that deviations from Architecture Principles and implementation guidelines don't create any unacceptable risk.

The following artifacts are relevant in this phase.

5.8.1 Security Audit

Location in the Architecture Framework: Enterprise Security Architecture: ISM.

Security audit includes security reviews of implemented processes, technical designs, developed code, and configurations against policies and requirements. It also includes security testing, comprising functional security testing, performance testing, and penetration testing.

5.8.2 Security Training and Awareness

Location in the Architecture Framework: Enterprise Security Architecture: ISM.

Security training and awareness means that sufficient training is provided to ensure correct deployment, configuration, and operations of security-relevant subsystems and components; including awareness training of all users and non-privileged operators of the system and/or its components. It is critical for a proper, continuous, and secure performance.

In many control frameworks, security training must be followed and results documented to demonstrate due diligence. Substantiated corrective actions or sanctions are needed in cases where exploits or errors compromise security objectives.

5.9 Phase H: Architecture Change Management

Phase H does not produce tangible security outputs but defines two processes essential for continued alignment between the business requirements and the architecture: risk management and architecture governance. Even though they are not formal artifacts, they are added here to emphasize their importance.

ERM is the process in which the existing architecture is continuously evaluated regarding changes to business opportunity and security threat. Based on the results of this process, the current architecture might deem it unsuitable to mitigate changed or new risks, or it might constrain the business too much in exploiting new opportunities. In that case, a decision on architecture change must be made.

Architecture governance is the process in which decisions are made on changes to the existing architecture, either by minor changes in the current iteration or by means of a completely new iteration. This is explained in the TOGAF Standard – Enterprise Architecture Capability and Governance (Architecture Governance Framework). Changes related to risk and security should be an explicit part of that framework. Large changes to the architecture should include a security impact analysis.

Change is driven by new requirements or changes in the environment. For instance, changes in security requirements can be caused by changes in the threat environment, changed compliance requirements, or changes due to discovered vulnerabilities in the existing processes and solutions. Changes required due to security-related causes are often more disruptive than a simplification or incremental change.

Due care must be taken in deciding whether a security change triggers a new iteration though the TOGAF ADM cycle – for instance, when enterprise risk appetite changes – a seemingly small security requirement change can easily trigger a new architecture development cycle.

An example of where changes can be applied within the existing architecture is when security standards or requirements change. This is usually less disruptive since the trade-off for their adoption is based on the value of the change – that is, evaluation of the risk – the trade-off between the opportunity for business improvement, the perceived threat to the business in security terms, and the threat posed by the change itself, which would perhaps be very disruptive and expensive. This is an excellent example of where the SABSA concept of balancing risks can be applied to decision-making.

It is therefore essential that the architecture change board or any other governance structure that is responsible for applying appropriate architecture change management comprises suitable security skilled individuals.

5.10 Requirements Management

Requirements Management plays a central role in architecture work. This is recognized in the TOGAF Standard. The purpose of Requirements Management is to identify, store, maintain, and communicate business requirements through the different phases of architecture development by means of a controlled and repeatable process. In addition, operational performance is monitored against target requirements. This is not explicitly addressed in the TOGAF ADM but lies within Phase H: Architecture Change Management, and the continual validation of Requirements Management.

The TOGAF method validates and updates business requirements in every stage of an architecture development project. However, the TOGAF Standard does not provide a required technique for describing or documenting requirements. Such a technique is present in SABSA, which presents its unique Business Attribute Profiling technique as a means to describe requirements effectively. This section describes the use of Business Attribute Profiling with respect to security requirements management, along with the benefit this technique offers for Requirements Management in general.

5.10.1 Business Attribute Profile

Location in the Architecture Framework: Enterprise Security Architecture: ISM.

Business Attribute Profiling is a SABSA requirements engineering technique that translates business goals and drivers into requirements using a risk-based approach. Some important advantages of this technique are:

- Executive communication in non-IT terms
- Traceability mapping between business drivers and requirements
- Performance measurement against business-defined targets
- Grouping and structuring of requirements, which facilitates understanding and oversight by architects

The SABSA Business Attribute Profile is at the heart of the SABSA methodology. It is this requirements engineering technique that makes SABSA truly unique and provides the linkage between business requirements and technology/process design. See the SABSA® Blue Book [2].

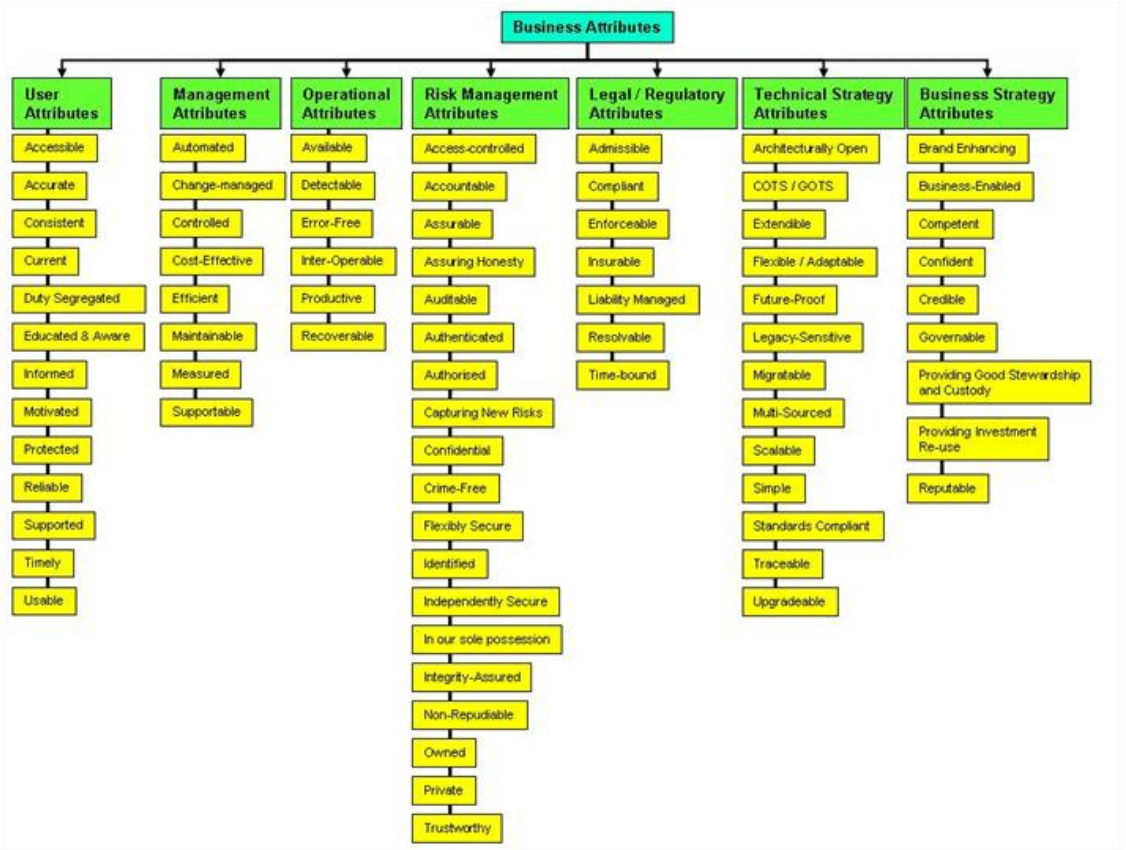

Figure 6: Example of a SABSA Business Attribute Taxonomy

Each SABSA Business Attribute in the example taxonomy of Figure 6 has a detailed generic definition and some suggested guidelines for applying metrics to that attribute, not included in this overview. A Business Attribute Profile is built by the architects, using the taxonomy as a guideline. The objective is to document the relevant attributes for the business case in hand, redefining each selected attribute in terms of the business case, developing a measurement approach, specific metrics, and performance targets, again related to the business case. The model is flexible and adaptive. When needed, new attributes and new definitions should be added to fulfill the business requirements. Thus, although the method is well defined, the Business Attribute taxonomy can be extended as much as is appropriate and each Business Attribute Profile is highly customized according to the business case being considered by the architecture team.

An integral part of the SABSA Business Attribute Profile is the selection of metrics to set targets, so that performance can be measured in the operational phase ("did you hit the target?"). The business analyst can choose to either use the suggested metrics in the detailed examples, or create new metrics if that seems more appropriate. Eventually, the creation of a real-time operational risk dashboard is possible that monitors performance of operational capabilities against the predetermined performance targets, and provides early warnings of up-coming risk events that may require management intervention.

In O-ISM3, performance targets are called "security targets". As well as expressing security objectives in terms of what matters to the business, O-ISM3 defines the tolerable deviations. All O-ISM3 objectives (business and security) must include their security target. This is the maximum deviation from the desired outcome that management tolerates before taking corrective action. O-ISM3 can support any specified variance. This enables the O-ISM3 program to support and manage both aspirational objectives (whose allowable deviations may be very high) and critical objectives (where there is usually a very narrow compliance range).

Security targets are normally defined in terms of frequency of occurrence and threshold cost. The allowable business impact of missing objectives reflects the trade-off against other priorities and objectives. Security targets show what the organization expects from its information security investment. In a way, management's act of defining security targets also specifies its risk appetite.

5.10.2 Control Objectives/Security Objectives

Location in the Architecture Framework: Enterprise Security Architecture: ISM.

A control objective (sometimes called a security objective) is a desired state of security for a given process, person, activity, system, or dataset. It differs from a security requirement since an objective is a goal that the ISM process aims to fulfill. This control objective might not exactly match the security requirement. Control objectives are linked to business attributes.

O-ISM3 documents the contribution of information security towards meeting business objectives through using a dependency analysis. The output of the dependency analysis is a list of security objectives that form the basis for design, implementation, and monitoring of the ISMS. They also form the business objectives for the security component when planning Enterprise Architecture. Security objectives, derived from business objectives, state explicitly how information security contributes to business objectives.

Some examples of security objectives derived from the business objective "Invoicing all products and services provided" are:

- Invoices are accessible only to the accountancy and collection teams
- Paid invoices are kept for three years and destroyed after no more than four years

5.10.3 Security Standards

Location in the Architecture Framework: the TOGAF Standard – Architecture Content (Standards Library) provides a repository area to hold a set of specifications to which architectures must conform. The standards can apply at every architecture domain in the TOGAF Standard. Security standards can be added to this existing catalog as well.

The Security Architecture provides guidance on which security standards to use in which situation. Whether a security standard applies is decided by the business owner or business analyst. If so, the standard is applied to the architecture work through the Requirements Management process. The standard can dictate security controls for the Business, Data, Application, or Technology Architecture.

Standards are needed to ensure that many different components can be integrated to form a larger system. Different types of standards exist, such as regulatory standards, technical

standards, etc. An example is the PCI-DSS standard that applies for businesses in the payment card industry, the ETSI standards that apply in the telecom industry, etc. It is also worth noting that security standards may be externally imposed, or they may be internally developed.

5.11 The TOGAF Architecture Content Metamodel

The TOGAF Architecture Content Metamodel includes the necessary concepts to model ISM and ERM. Existing entities, such as business service and information system service, are adapted by having ISM and ERM-specific attributes.

5.12 Use of the ArchiMate® Modeling Language

The ArchiMate language [8] supports ISM and ERM modeling. This is described in The Open Group White Paper: Modeling Enterprise Risk Management and Security with the ArchiMate® Language [12]. An example of the risk model in the ArchiMate language is given in Figure 7.

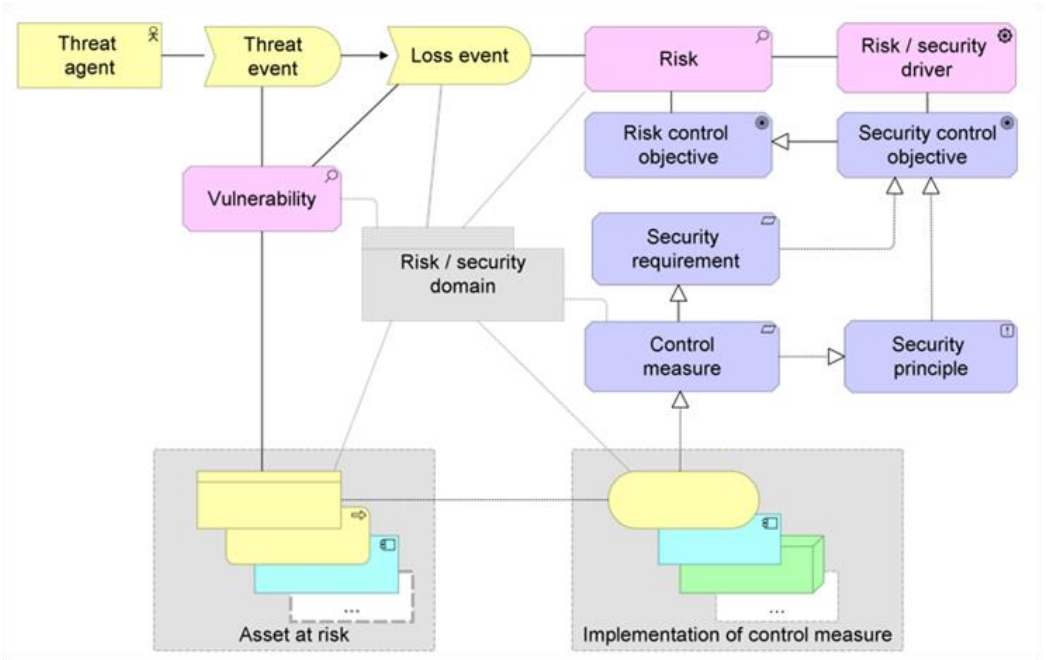

Figure 7: Modeling Risk and Security in the ArchiMate Language

Acronyms

ABB	Architecture Building Block
ADM	Architecture Development Method
ERM	Enterprise Risk Management
ETSI	European Telecommunications Standards Institute
ISM	Information Security Management
ISMS	Information Security Management System
O-ESA	Open Enterprise Security Architecture
O-ISM3	Open Information Security Management Maturity Model
O-RA	Risk Analysis Standard (Open FAIR)
O-RT	Risk Taxonomy Standard (Open FAIR)
PCI-DSS	Payment Card Industry Data Security Standard
SBB	Solution Building Block

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TOGAF® Series Guide

Business Scenarios

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Preface

The Open Group

The Open Group is a global consortium that enables the achievement of business objectives through technology standards. With more than 870 member organizations, we have a diverse membership that spans all sectors of the technology community – customers, systems and solutions suppliers, tool vendors, integrators and consultants, as well as academics and researchers.

The mission of The Open Group is to drive the creation of Boundaryless Information Flow™ achieved by:

- Working with customers to capture, understand, and address current and emerging requirements, establish policies, and share best practices
- Working with suppliers, consortia, and standards bodies to develop consensus and facilitate interoperability, to evolve and integrate specifications and open source technologies
- Offering a comprehensive set of services to enhance the operational efficiency of consortia
- Developing and operating the industry's premier certification service and encouraging procurement of certified products

Further information on The Open Group is available at www.opengroup.org.

The Open Group publishes a wide range of technical documentation, most of which is focused on development of Standards and Guides, but which also includes white papers, technical studies, certification and testing documentation, and business titles. Full details and a catalog are available at www.opengroup.org/library.

The TOGAF® Standard, a Standard of The Open Group

The TOGAF Standard is a proven enterprise methodology and framework used by the world's leading organizations to improve business efficiency.

This Document

This document is a TOGAF® Series Guide to Business Scenarios. It has been developed and approved by The Open Group.

Business Scenarios provide a mechanism to fully understand the requirements of information technology and align it with business needs. This is accomplished through the analysis of business processes, supporting IT components, and information flow requirements. Business Scenarios are an essential tool used by the successful manager to achieve Boundaryless Information Flow™.

The document supersedes G261: Manager's Guide to Business Scenarios.

More information is available, along with a number of tools, guides, and other resources, at www.opengroup.org/architecture.

About the TOGAF® Series Guides

The TOGAF® Series Guides contain guidance on how to use the TOGAF Standard and how to adapt it to fulfill specific needs.

The TOGAF® Series Guides are expected to be the most rapidly developing part of the TOGAF Standard and are positioned as the guidance part of the standard. While the TOGAF Fundamental Content is expected to be long-lived and stable, guidance on the use of the TOGAF Standard can be industry, architectural style, purpose, and problem-specific. For example, the stakeholders, concerns, views, and supporting models required to support the transformation of an extended enterprise may be significantly different than those used to support the transition of an in-house IT environment to the cloud; both will use the Architecture Development Method (ADM), start with an Architecture Vision, and develop a Target Architecture on the way to an Implementation and Migration Plan. The TOGAF Fundamental Content remains the essential scaffolding across industry, domain, and style.

Trademarks

About the Authors

(Please note affiliations were current at the time of approval.)

Terence (Terry) Blevins, Fellow of The Open Group; Owner of Enterprise Wise LLC

Terence Blevins, a Fellow of The Open Group, is owner of Enterprise Wise LLC and a semi-retired Enterprise Architect. He is currently a Director of The Open Group Governing Board.

He has been involved with the architecture discipline since the 1980s, mostly while he was Director of Strategic Architecture at NCR Corporation. Terence has been involved with The Open Group since 1996 when he first was introduced to the Architecture Forum. He was co-chair of the Architecture Forum and a frequent contributor of content to the TOGAF® standard, including the Business Scenario method.

Terence was Vice-President and CIO of The Open Group where he contributed to The Open Group Vision of Boundaryless Information Flow™.

He holds undergraduate and Masters degrees in Mathematics from Youngstown State University. He is TOGAF® 8 Certified.

Mike Lambert, Fellow of The Open Group

Mike was one of the pioneers of the TOGAF® standard. As Chief Technical Officer for The Open Group, he was the Technical Editor for the IEEE 1003.0 architecture standard in the late 1980s and responsible for the development of the TOGAF Standard with The Open Group until the publication of the TOGAF 8 standard. Mike joined X/Open Company Limited (one of the predecessors of The Open Group) in 1984 from ICL, where he had a variety of roles leading up to Chief Architect for OMAC 29, ICL's flagship product for the Manufacturing Industry and Design Authority for all ICL's vertical application products. As Chief Technical Officer in X/Open and The Open Group, Mike was responsible for technical strategy and presided over the initial standardization of the UNIX® operating system.

On leaving The Open Group in April 2003, Mike was appointed as the first Fellow of The Open Group, in recognition of his extensive contribution to the development of Open Systems and Architecture. Between 2003 and 2005, Mike continued to work closely with The Open Group, as Forum Director of the Messaging Forum and providing secretariat services to the Architecture Forum. Between 2005 and 2015, Mike was Chief Technical Officer and Principal Instructor for Architecting-the-Enterprise Ltd., with specific responsibility for the development, delivery, and quality of the Architecting-the-Enterprise TOGAF training business. Between 2004 and 2011, Mike was a Lecturer in Information Systems and Enterprise Architecture at undergraduate and postgraduate level at the University of Reading.

In 2005, Mike was given an award for Excellence in Teaching by the University of Reading.

In 2012, Mike was awarded the Lifetime Achievement award by The Open Group.

Acknowledgements

The Open Group gratefully acknowledges the authors – Terry Blevins and Mike Lambert – and also past and present members of The Open Group Architecture Forum for their contribution in the development of this document.

Referenced Documents

The following documents are referenced in this Guide:

- The TOGAF® Standard, 10th Edition, a standard of The Open Group (C220), published by The Open Group, April 2022; refer to: www.opengroup.org/library/c220
- TOGAF® Series Guide: Business Capabilities, Version 2 (G211), published by The Open Group, April 2022; refer to: www.opengroup.org/library/g211
- TOGAF® Series Guide: Business Models (G18A), published by The Open Group, April 2022; refer to www.opengroup.org/library/g18a
- TOGAF® Series Guide: Value Streams (G178), published by The Open Group, April 2022; refer to: www.opengroup.org/library/g178

1 Introduction

A key factor in the success of an Enterprise Architecture is the extent to which it is linked to business requirements, and demonstrably supporting and enabling the enterprise to achieve its business objectives. Any architectural effort must begin with a baseline view of the needs to be fulfilled by the solution or solutions. Consider guiding the construction of a warehouse building without understanding why the warehouse is needed. This could result in a fine warehouse solution for housing large-scale mechanical parts; however, the need was a warehouse for household goods. Creating an architecture without understanding "why" typically results in mismatches between solutions and needs.

The Business Scenario method is a technique to validate, elaborate, and/or change the premise behind an architecture effort by understanding and documenting the key elements of a Business Scenario in successive iterations where:

- Each iteration requires planning, data gathering, analysis, documentation, and review
- Each iteration should improve one or more of the key elements
- Iterations are repeated until your understanding is fit-for-purpose for deciding to move forward

Not examining all elements of a Business Scenario carries a risk of producing an incomplete solution, but care must be taken not to iterate unnecessarily.

The Business Scenario method may be used at various stages of developing an Enterprise Architecture – principally the Preliminary, Architecture Vision, and Business Architecture phases – but in other architecting phases as well, if required, to derive the characteristics of the architecture directly from the high-level requirements of the business. The technique is used to help identify, understand, and document business needs, and thereby to derive the business requirements that the architecture development has to address. These business requirements are documented as a Business Scenario.

A Business Scenario is a uniform description of:

- Real business problems
- The business and technology environment in which those problems occur
- Value streams enabled by capabilities
- The desired outcome(s) of proper execution
- The human and computing components (the "actors") who provide the capabilities

A good Business Scenario is also "SMART":

- **Specific**, by defining what needs to be done in the business
- **Measurable**, through clear metrics for success

- **Actionable**, by:

  — Clearly segmenting the problem

  — Providing the basis for determining elements and plans for the solution

- **Realistic**, in that the problem can be solved within the bounds of physical reality, time, and cost constraints

- **Time-bound**, in that there is a clear statement of when the solution opportunity expires

Chapter 9 provides detailed examples of outcomes that should be considered. Whatever outcomes are used, the idea is to make those outcomes SMART.

Below are further notes on Business Scenarios and the Business Scenario method:

- Business Scenarios are not just about IT, even though that was their genesis

  Business Scenarios are just as much about understanding business value, value streams, and business outcomes and what resources in general are required to improve the value streams and meet outcomes to deliver business value.

- Business Scenarios are not specific to the IT industry, rather the technique can be applied to help understand the requirements in any industry such as Healthcare, Transportation, Oil and Gas, Lottery, etc.

- Business Scenarios are not just relevant to big problem areas; the technique can be applied to very large general problems areas such as standards for National Lotteries, or very small focused problem areas such as retail Point of Sale upgrades

- Business Scenarios, just like architectures, are not the end game – the end game is achieving the desired business outcomes

  Thus, there must be a downstream path for using the Business Scenario to drive the architecture work which must faithfully drive implementation of solutions.

- Business Scenarios are statements at a specific time and should be updated to reflect significant changes

Business Scenarios are *not*:

- Use-cases (as in OMG, Rational SW, …); use-cases are:

  — More detailed descriptions of human to computer interaction

  — Typically used in software development projects

- Business models nor business cases nor Business Scenario plans (as in Forbes …):

  — However, a Business Scenario can be informed by a company's business model

  — A SMART Business Scenario can inform a business case and/or a business model and/or Business Scenario plan

- SPIN (as in Situation, Problem, Implication, Need Payoff selling strategy):

  — SPIN is a sales technique that can be used to gather information for a Business Scenario

— A Business Scenario can provide the seller some relevant “context” for a SPIN engagement

- A substitute for any typical engineering specifications (as from IEEE):

  — Which are much more detailed, material-specific, and tied more to science

2 Benefits of Business Scenarios

A Business Scenario is essentially a complete description of a business problem, both in business and in architectural terms, which enables individual requirements to be viewed in relation to one another in the context of the overall problem. Without such a complete description to serve as context:

- There is a danger of the architecture being based on an incomplete set of requirements that do not add up to a whole problem description, and that can therefore misguide architecture work
- The business value of solving the problem is unclear
- The relevance of potential solutions is unclear

Also, because the technique requires the involvement of business line management and other stakeholders at an early stage in the architecture project, it also plays an important role in gaining the buy-in of these key personnel to the overall project and its end-product – the Enterprise Architecture.

An additional advantage of Business Scenarios is in communication with vendors. Most architecture today is implemented by making maximum use of Commercial Off-The-Shelf (COTS) software solutions, often from multiple vendors, procured in the open market. The use of Business Scenarios by a customer can be an important aid to vendors in delivering appropriate solutions. Vendors need to ensure that their solution components add value to an open solution and are marketable. Business Scenarios provide a language with which the vendor community can link customer problems and solutions. Besides making obvious what is needed, and why, they allow vendors to solve problems optimally, using open standards and leveraging each other's skills.

Creating a Business Scenario takes time and effort and if done right there is a return on this investment summarized in the following list. If not done, or done wrong, more of the same issues will exist between solutions developers and the actual business.

- Better solutions – by understanding the real needs and how solving these needs are valued by the business, solutions can be brought to bear that are clearly aligned to the business and enable new capabilities

  By meeting with the leaders of the business and bringing better solutions to the table, a relationship develops that is repeatable, resulting in a virtuous cycle of bringing in new capabilities.

- Faster to realize capabilities – by understanding the real needs, and the timeline requirements associated with fulfillment of those needs, solutions can be brought to bear in a timed sequence rather than in a single big-bang approach

  This results in faster implementations of incremental value aligned to business needs. This is also consistent with Agile and DevOps approaches to solving problems.

- Cheaper costs – by understanding real business needs and addressing them incrementally the ultimate savings are in costs – both costs saved and costs avoided

  Examples of costs saved are implementing only what is needed and eliminating redundancy. Examples of costs avoided are eliminating the costs of failed implementations and lowering the costs of integration and interoperation.

3 Creating the Business Scenario

3.1 The Overall Process

Creating a Business Scenario involves the following, which ultimately documents the elements of a Business Scenario depicted in Figure 1:

1. Identifying, documenting, and ranking the problem driving the scenario
2. Identifying the business and technical environment of the scenario and documenting it in scenario models including value streams and business capabilities
3. Identifying and documenting desired outcomes (the results of handling the problems successfully); get "SMART"
4. Identifying the human actors (participants) and their place in the business model
5. Identifying computer actors (computing elements) and their place in the technology model
6. Checking for "fitness-for-purpose" and refining only if necessary

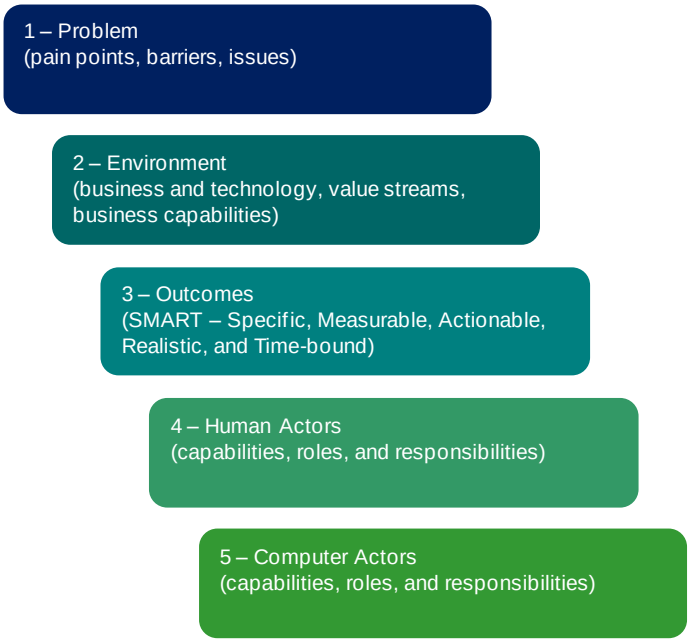

Figure 1: Creating a Business Scenario

Below are explanations of a few key terms:

- **Outcomes** are the changes, benefits, learning, or other effects that happen as a result of what the project or organization offers or provides
- **A capability** is an ability that an organization, person, or system possesses

When developing a Business Scenario, this means the ability to achieve an outcome within a known environment through application of human and/or material resources in a value stream

- **A business capability** is a particular ability or capacity that a business may possess or exchange to achieve a specific purpose or outcome
- A **value stream** is a representation of an end-to-end collection of value-adding activities that create an overall result for a customer, stakeholder, or end user

  When developing a Business Scenario, this is a set of activities that a firm operating in a specific industry performs in order to deliver a valuable product or service for the market.
- A **value proposition** is "a clear statement of the concrete results a customer will get from purchasing and using your products and/or services. ... It is focused on outcomes. Your value proposition statement details the value you provide in an easy-to-remember synopsis that your client can easily grasp and remember. … your value proposition … *should relieve their pain …*"[1]

  Value propositions are not explicitly documented in a Business Scenario; however, the importance of understanding a customer's Business Scenario to a solutions provider cannot be understated.

A Business Scenario is developed over a number of phases that formulate, verify, and refine a premise of the business requirements driving an effort. Each phase is comprised of steps to plan the phase, gather information, analyze information gathered, document the results, and review the results of the Business Scenario, as depicted in Figure 2.

In each phase, each of the elements of a Business Scenario (listed above) is successively improved. The refinement phase involves deciding whether to consider the scenario complete and go to the next phase of the TOGAF Architecture Development Method (ADM), or whether further refinement is necessary. This is accomplished by asking whether the current state of the Business Scenario is fit for the purpose of carrying requirements downstream in the architecture process.

The three phases of developing a Business Scenario and steps are described in detail in Figure 2 and Section 3.2.

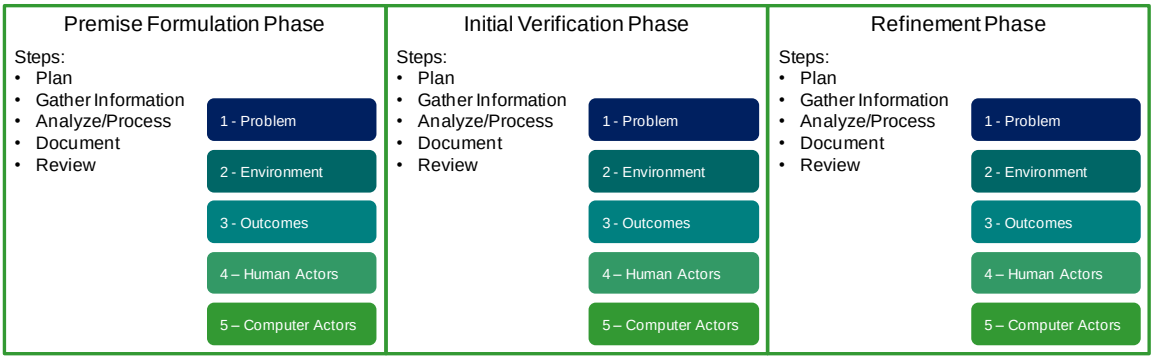

Figure 2: Phases and Steps of Developing a Business Scenario

[1] Taken from www.kinesisinc.com/how-to-write-a-powerful-value-proposition.

3.2 Steps

Since the steps are repeated in each phase they are described first. Within the phase descriptions any specific emphasis about the steps will be described if necessary.

3.2.1 Planning Step

The Planning step is used to ensure each iteration is well orchestrated as a mini-project, to get the right people and resources onboard, and to prepare all those involved.

Activities to be considered to plan include:

- Identify buy-side and customer-side participants
- Decide best data collection mechanism for gathering data (surveys, workshop, etc.)
- Set project constraints – time, people, money and document in project plan
- Identify sponsor by name
- Configure team
- Identify who is needed for roles (PM, BSC, BSA, BSE, etc.)
- Identify target buy-side representatives by name
- Identify target supply-side representatives by name
- Engage the buy and supply sides and ensure they are on-board
- Add tasks for dealing with logistics throughout the plan
- Set realistic target dates in a timeline for each step
- Hold a team meeting to get on the same page
- Update project plan – including notes, dependencies, etc.

3.2.2 Gathering Step

The Gathering step is where information is collected on each of the areas in Figure 1. The objective is to obtain valid data to shape, confirm, and/or deny the premise driving the effort. If information gathering procedures and practices are already in place in an organization – for example, to gather information for strategic planning – they should be used as appropriate, either during Business Scenario workshops or in place of Business Scenario workshops.

Multiple techniques may be used in this step, such as information research, qualitative analysis, quantitative analysis, surveys, requests for information, etc. As much information as possible should be gathered and preprocessed "off-line" prior to any face-to-face workshops (described below). For example, a request for information may include a request for strategic and operational plans. Such documents typically provide great insights, but the information that they contain usually requires significant preprocessing. The information may be used to generate an initial draft of the Business Scenario prior to the workshop, if possible. This will increase the understanding and confidence of the architect, and the value of the workshop to its participants.

A very useful way to gather information is to hold Business Scenario workshops, whereby a Business Scenario consultant leads a select and small group of business representatives through a number of questions to elicit the information surrounding the problem being addressed by the architecture effort. The workshop attendees must be carefully selected from high levels in the business and technical sides of the organization. It is important to get people that can and will provide information openly and honestly. Where a draft of the Business Scenario already exists – for example, as a result of preprocessing information gathered during this step, as described above – the workshop may also be used to review the state of the Business Scenario draft.

Sometimes it is necessary to have multiple workshops: in some cases, to separate the gathering of information on the business side from the gathering of information on the technical side; and in other cases simply to get more information from more people.

When gathering information, the architect can greatly strengthen the Business Scenario by obtaining "real-world examples"; i.e., case studies to which the reader can easily relate. When citing real-world examples, it is important to maintain a level of anonymity of the parties involved, to avoid blame.

Activities to consider in the Gathering step include:

- Create questions you believe should be answered
- Gather data that is openly available or employ early surveys
- Preprocess openly available data – note this is time-consuming
- Develop strawman "understanding" of the key elements based on open data
- Update questions for gaps
- Prepare all material to guide the gather mechanism
- Implement chosen information gathering mechanism
- Hold one or more workshops (if chosen method is a workshop)
    - — Get general agreement from stakeholders on the subject and scope of the problem
    - — Get champions from stakeholders and get them to supply names of representatives
    - — Send invitations and questions to invitees prior to workshop
    - — Obtain a facilitator and recorder
    - — Create an agenda
    - — Create workshop materials – including a "strawman" Business Scenario
    - — Prepare room with flip charts, U-shape table, white board, conference hook-up as appropriate
    - — Hold the workshop and capture all information from the workshop electronically

3.2.3 Analyzing Step

The Analyzing step is where a great deal of real Business Architecture work is actually done. The objective of this step is to develop a uniform view of the key elements of a Business Scenario. This is where the information that is gathered is processed and documented, and where the models are created to represent that information, typically visually.

The Analyzing step takes advantage of the knowledge and experience of the Business Scenario consultant using past work and experience to develop the models necessary to depict the information captured. Note that the models and documentation produced are not necessarily reproduced verbatim from interviews, but rather filtered and translated according to the real underlying needs.

In the Analyzing step it is important to maintain linkages between the key elements of the Business Scenario. One technique that assists in maintaining such linkages is the creation of matrices that are used to relate business processes to each of:

- Constituencies
- Human Actors
- Computer Actors
- Issues
- Objectives

In this way, the business process becomes the binding focal point, which makes a great deal of sense, since in most cases it is business process improvement that is being sought.

Activities to be considered in the Analyzing step include:

- Collect all raw data in one place and lock it as read-only
- Create a separate spreadsheet to collect all relevant data per key element
- Copy raw data into a raw data column(s) of the appropriate spreadsheet per key element
- Textual data collected must iteratively transform and normalize raw data – semantics!
  - — Break compounds into single points
  - — Using affinity analysis, synthesis, and abstraction transform raw data into a normalized list
  - — Using further affinity analysis create categories for the list
  - — Each transformation step should be recorded in spreadsheet
- For calculable data:
  - — Build the mechanisms to aggregate the data as findings – do the math!
- Create a new spreadsheet to build a matrix linking all the key elements
- Perform business and capability analysis to generate a set of business and technical requirements

- For each of the key elements assess answers for completeness and correctness
- Draft models of data collected as appropriate

3.2.4 Documenting Step

The Documenting step is for documenting the results and having the document edited for readability from the viewpoint of an average person, and also for developing models to support the text. The goal in this step is to create a record of reference.

Activities that should be considered in this step include:

- Draft the document and include models as drawings
- Conduct an informal internal review of content
- Update draft document and models
- Have the document proofread and edited

3.2.5 Reviewing Step

The Reviewing step is where the results are fed back to the sponsors of the project to ensure that there is a shared understanding of the full scope of the problem, and the potential depth of the technical impact. The goal is to get buy-in or stop.

Multiple Business Scenario workshops or "readout" meetings with the sponsors and involved parties are recommended. The meetings should be set up to be open and interactive. It is recommended to have exercises built into meeting agendas, in order to test attendees' understanding and interest levels, as well as to test the architect's own assumptions and results.

This step is extremely important, as the absence of shared expectations is in many cases the root cause of project failures.

Activities that should be considered in this step include:

- Vet the models and documentation
- Consider readout sessions
- Capture results
- Update document and models
- Identify internal and external reviewers by name
- Allocate specific sections to specific reviewers
- Craft review guidelines
- Send notification to reviewers
- Conduct a formal review of content
- Final update document and models

- Poll the stakeholders on moving forward based on the document

3.3 Phases

The steps above are repeated in the following phases that go from creating a premise to having a Business Scenario that has been approved by the leaders of the business. This Business Scenario document is then placed in the Requirements Repository as the high-level requirements statement that drives the architecture work downstream and is used to validate the quality of the architecture.

3.3.1 Premise Formulation Phase

Every effort starts with some notion of a problem and an approach to dealing with a problem. For example, an enterprise might have the problem of disparate systems that do not communicate and they may have the notion that to address the problem they may implement an Enterprise Resource Planning (ERP) system. This proposition is an example of a premise. This premise in essence presumes an answer to an unstated question – do ERPs actually reduce my problem of all my systems that do not interoperate? Sometimes this premise and the unstated question do not get examined, which can be a critical mistake. In this phase we attempt to develop an understanding of the premise and unstated question or questions that need to be examined to ensure an architecture project is on point.

Objectives

Document the proposition behind the effort being considered along with targeted stakeholders which could elaborate upon, or validate, the proposition.

Approach

The approach here is to consider and document the motivation behind the effort, the likely stakeholders, their unstated questions, and to get their interest in engaging in the Business Scenario process to describe their problems.

Input

What is driving an effort? It could be a fully documented project, or something as simple as an idea or concept. It also could be the lack of something; for example:

- No clear understanding of business need
- Problem looking for a solution
- Solution looking for a problem
- Dominance of technology speak
- Target market not identified
- “We just don’t know how to start”

Output

Premise, key questions that need answered to validate the premise, and a list of stakeholders willing to help validate and detail the premise. This output is used in the next phase to plan, manage, and execute the validation phase.

3.3.2 Initial Verification Phase

Engaged stakeholders are a critical success factor to any significant change. And the earlier the engagement, the better the chances of success. This can be seen in most of the latest trends in development approaches such as Agile and DevOps. The Initial Verification phase takes the current premise, key questions, and targeted stakeholders and engages those stakeholders to validate and/or improve the understanding of the real problem and the real questions that need be addressed in order for a project to lead to a success.

Objectives

Document a draft and incomplete Business Scenario based on input from actual stakeholders, though not necessarily representative of a market segment.

Approach

The approach here is to get face-to-face with various stakeholders and examine their real business issues. It is best to get sample stakeholders from different organizations to understand what business issues are shared.

Output

Draft Business Scenario document with recommendations on next steps.

3.3.3 Refinement Phase

Having the stakeholder needs faithfully captured is important, but it mustn't be done to the exclusion of moving forward. We have all heard of paralysis by analysis. This phase helps get a good enough statement of the business requirements.

Objectives

An agreed statement of the business requirements, documented in the Business Scenario, along with an agreed path forward including commitments for developing to and preferring standards documented in the architecture.

Approach

The approach in this phase is to iteratively refine the understanding until there is agreement on proceeding along the lines suggested in the document.

Output

Released Business Scenario document with recommendations on the next steps that will feed the architecture process.

4 Contents of a Business Scenario

The documentation of a Business Scenario should contain all the important details about the scenario. It should capture, and sequence, the critical steps and interactions between actors that address the situation. It should also declare all the relevant information about all actors, specifically: the different responsibilities of the actors; the key pre-conditions that have to be met prior to proper system functionality; and the technical requirements for the service to be of acceptable quality.

There are two main types of content: graphics (models) and descriptive text. Both have a part to play:

- Business Scenario models capture business and technology views in a graphical form, to aid comprehension; specifically, they relate actors and interactions, and give a starting point to confirm specific requirements
- Business Scenario documents capture details in textual form; a typical contents list for a Business Scenario is given below

Version History		
Contents		
Preface (general background and why use the Business Scenario method)		
1.		**Executive Summary**
	1.1	"So What?" or why is this Business Scenario needed?
	1.2	Who will use this Business Scenario? "So that …." or how used?
2.		**Document Roadmap**
3.		**Business Scenario**
	3.1	Background of Scenario
	3.2	Purpose of Scenario
	3.3	Definition of Terms (what does *x* mean)
	3.4	Development of the Business Scenario
4.		**Business Environment**
	4.1	Constituencies
	4.2	Business Drivers

	4.3	Business Process (*aka* Value Stream)
	4.4	Human Actors and Roles
	4.5	Relationship to Processes
5.		**Technical Environment**
	5.1	Technical Process (*aka* Value Stream)
	5.2	Computer Actors and Roles
	5.3	Relationship to Processes
6.		**Business Scenario Analysis**
	6.1	Problem Summary
	6.2	Issues/Pain Points
	6.3	Desired Outcomes
	6.4	Information Flow
	6.5	Requirements
	6.6	Principles and Constraints
	6.7	Resulting Architecture Models
7.		**Prioritized Areas for Standardization**
	7.1	Priorities by Process Area
	7.2	Suggested Starting Points
8.		**Summary and Next Steps**
Appendix A		**Additional Information**
Appendix B		**Referenced Documents**
Appendix C		**Workshop Notes**
Appendix D		**Acknowledgements**

5 Contributions to the Business Scenario

It is important to realize that the creation of a Business Scenario is not solely the province of the architect. As mentioned previously, business line management and other stakeholders in the enterprise are involved to ensure that the business goals are accurately captured. In addition, depending on the relationship that an organization has with its IT vendors, the latter also may be involved to ensure that the roles of technical solutions are also accurately captured, and to ensure communication with the vendors.

Typically, the involvement of the business management is greatest in the early stages while the business problems are being explored and captured; while the involvement of the architect is greatest in the later stages and when architectural solutions are being described. Similarly, if vendors are involved in the Business Scenario process, the involvement of the customer side (business management plus Enterprise Architects) is greatest in the early stages, while that of the vendors is greatest in the later stages when the role of specific technical solutions is being explored and captured. This concept is illustrated in Figure 3.

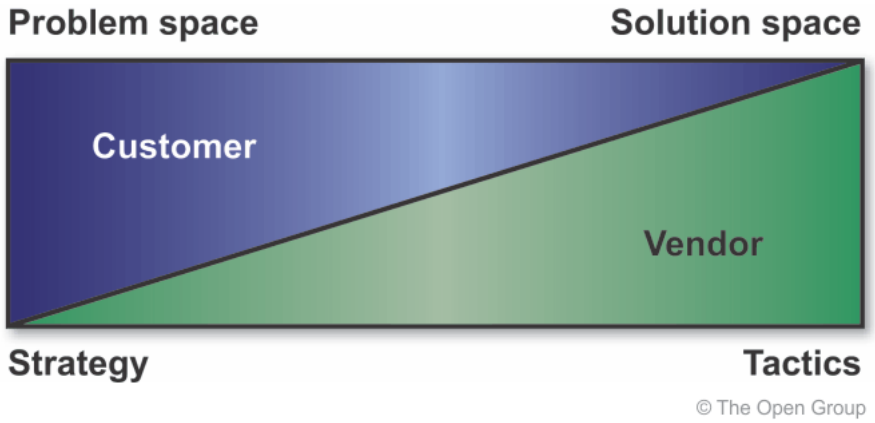

Figure 3: Relative Contributions to a Business Scenario

Vendor IT architects might be able to assist enterprise IT architects with integration of the vendor's products into the Enterprise Architecture. This assistance most probably falls in the middle of the timeline in Figure 3.

6 Business Scenarios and the TOGAF ADM

Business Scenarios figure most prominently in the initial phase of the TOGAF ADM cycle, Phase A: Architecture Vision, when they are used to define relevant business requirements, and to build consensus with business management and other stakeholders. They are also used in the Business Architecture phase to derive the characteristics of the architecture directly from the high-level requirements of the business.

The business requirements are referred to throughout all phases of an ADM lifecycle, as part of the TOGAF ADM Requirements Management, illustrated in Figure 4.

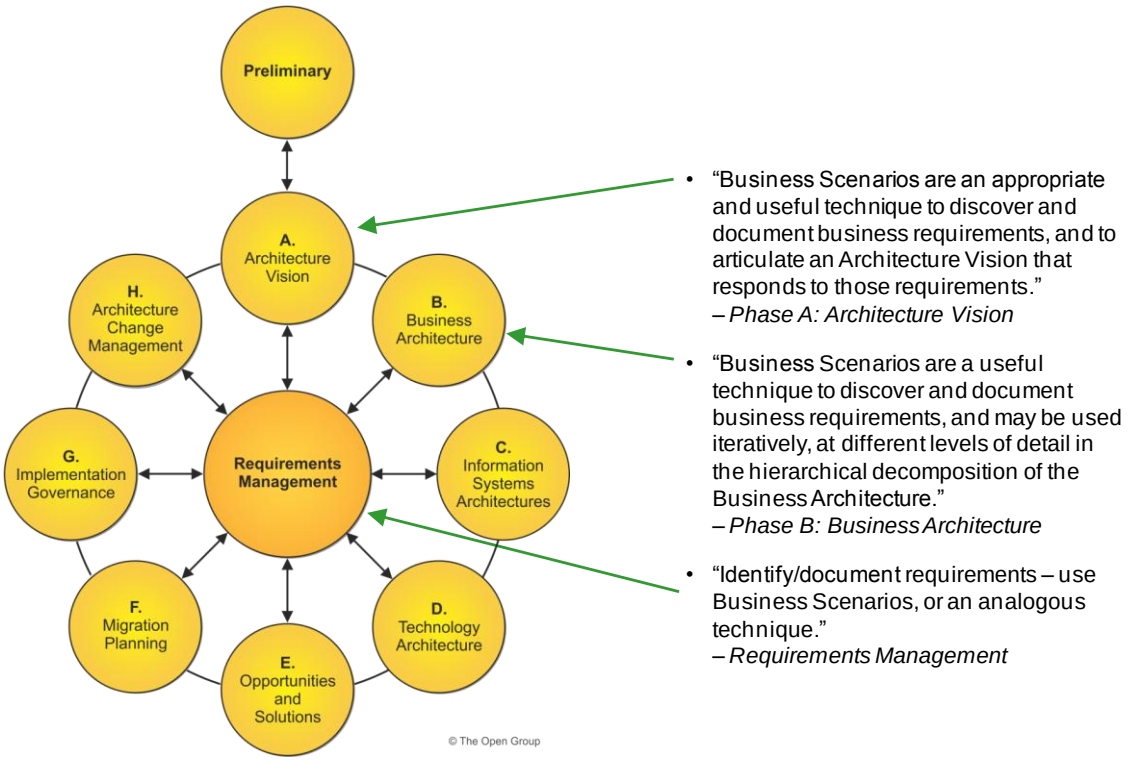

Figure 4: Relevance of Requirements throughout the TOGAF ADM

Business Scenarios can also be used in any ADM phase, if there is a need to derive requirements. For example, they can be used in the Preliminary Phase to define requirements for establishing an Enterprise Architecture capability.

Because business requirements are important throughout all phases of the ADM cycle, the Business Scenario technique has an important role to play in the TOGAF ADM, by ensuring that the business requirements themselves are complete and correct.

7 Developing Business Scenarios

7.1 General Guidelines

The stakeholders (e.g., business managers, end users) will tell you what they want, but as an architect you must still gain an understanding of the business, so you must know the most important actors in the system. If the stakeholders do not know what they want:

- Take time, observe, and record how they are working today
- Structure information in such a way that it can be used later
- Uncover critical business rules from domain experts
- Stay focused on what needs to be accomplished, and how it is to be accomplished

This effort provides the anchor for a chain of reason from business requirements through to technical solutions. It will pay off later to be diligent and critical at the start.

7.2 Questions to Ask for Each Area

The Business Scenario workshops mentioned in the Gathering step are really structured interviews. While there is no single set of appropriate questions to ask in all situations, the following provides some guidance to help Business Scenario consultants ask good questions.

7.2.1 Identifying, Documenting, and Ranking the Problem

Is the problem described as a statement of *what* needs to be accomplished, like steps in a process, and not *how* (with technology "push")?

If the problem is too specific or a "how":

- Raise a red flag
- Ask "why do you need to do it that way?" questions

If the problem is too vague or not actionable:

- Raise a red flag
- Ask "what is it you need to do, or will be able to do if this problem is solved?" questions

Ask questions that help to identify where and when the problem exists:

- Where are you experiencing this particular problem? In what business process?
- When do you encounter these issues? During the beginning of the process, the middle, the end?

Ask questions that help to identify the costs of the problem:

- Do you account for the costs associated with this problem? If so, what are they?
- Are there hidden costs? If so, what are they?
- Is the cost of this problem covered in the cost of something else? If so, what and how much?
- Is the problem manifested in terms of poor quality or a perception of an ineffective organization?

7.2.2 Identifying the Business and Technical Environment and Documenting in Models

Questions to ask about the business environment:

- What key process suffers from the issues? What are the major steps that need to be processed?
- What is the location/scale of internal business departments?
- What is the location/scale of external business partners?
- Are there any specific business rules and regulations related to the situation?

Questions to ask about the current technology environment:

- What technology components are already presupposed to be related to this problem?
- Are there any technology constraints?
- Are there any technology principles that apply?

7.2.3 Identifying and Documenting Objectives

Is the "what" sufficiently backed up with the rationale for "why"? If not, ask for measurable rationale in the following areas:

- Return on investment
- Scalability
- Performance needs
- Compliance to standards
- Ease-of-use measures

7.2.4 Identifying Human Actors and their Place in the Business Model

An actor represents anything that interacts with or within the system. This can be a human, or a machine, or a computer program. Actors initiate activity with the system; for example:

- Computer user with the computer

- Phone user with the telephone
- Payroll clerk with the payroll system
- Internet subscriber with the web browser

An actor represents a role that a user plays; i.e., a user is someone playing a role while using the system (e.g., John (user) is a dispatcher (actor)). Each actor uses the system in different ways (otherwise they should be the same actor). Ask about the humans that will be involved, from different viewpoints, such as:

- Developer
- Maintainer
- Operator
- Administrator
- User

7.2.5 Identifying Computer Actors and their Place in the Technology Model

Ask about the computer components likely to be involved, again from different points of view. What must they do?

7.2.6 Documenting Roles, Responsibilities, Measures of Success, and Required Scripts

When defining roles, ask questions like:

- What are the main tasks of the actor?
- Will the actor have to read/write/change any information?
- Will the actor have to inform the system about outside changes?
- Does the actor wish to be informed about unexpected changes?

7.2.7 Checking for Fitness-for-Purpose and Refining, if Necessary

Is there enough information to identify who/what could fulfill the requirement? If not, probe more deeply.

Is there a description of when, and how often, the requirement needs to be addressed? If not, ask about timing.

8 Business Scenario Documentation

8.1 Textual Documentation

Effective Business Scenario documentation requires a balance between ensuring that the detail is accessible, and preventing it from overshadowing the results and overwhelming the reader. To this end, the Business Scenario document should have the main findings in the body of the document and the details in appendices.

In the appendices:

- Capture all the important details about a Business Scenario:
  - — Situation description and rationale
  - — All measurements
  - — All actor roles and sub-measurements
  - — All services required
- Capture the critical steps between actors that address the situation, and sequence the interactions
- Declare relevant information about all actors:
  - — Partition the responsibility of the actors
  - — List pre-conditions that have to be met prior to proper system functionality
  - — Provide technical requirements for the service to be of acceptable quality

In the main body of the Business Scenario:

- Generalize all the relevant data from the detail in the appendices

8.2 Business Scenario Models

Remember the purpose of using models is to:

- Help comprehension
- Give a starting point to confirm requirements
- Relate actors and interactions

Keep drawings clear and neat:

- Do not put too much into one diagram

- Simpler diagrams are easier to understand

Number diagrams for easy reference:

- Maintain a catalog of the numbers to avoid duplicates

9 Guidelines on Goals and Objectives

9.1 The Importance of Goals

One of the first steps in the development of an architecture is to define the overall goals and objectives for the development. The objectives should be derived from the business goals of the organization, and the way in which IT is seen to contribute to meeting those goals.

Every organization behaves differently in this respect, some seeing IT as the driving force for the enterprise and others seeing IT in a supporting role, simply automating the business processes which already exist. The essential thing is that the architectural objectives should be very closely aligned with the business goals and objectives of the organization.

9.2 The Importance of SMART Objectives

Not only must goals be stated in general terms, but also specific measures need to be attached to them to make them SMART, as described earlier.

The amount of effort spent in doing this will lead to greater clarity for the sponsors of the architecture evolution cycle. It will pay back by driving proposed solutions much more closely toward the goals at each step of the cycle. It is extremely helpful for the different stakeholders inside the organization, as well as for suppliers and consultants, to have a clear yardstick for measuring fitness-for-purpose. If done well, the ADM can be used to trace specific decisions back to criteria, and thus yield their justification.

The goals below have been adapted from those given in previous versions of the TOGAF Standard. These are categories of goals, each with a list of possible objectives. Each of these objectives should be made SMART with specific measures and metrics for the task. However, since the actual work to be done will be specific to the architecture project concerned, it is not possible to provide a list of generic SMART objectives that will relate to any project.

Instead, we provide here some example SMART objectives.

9.2.1 Example of Making Objectives SMART

Under the general goal heading "Improve User Productivity" below, there is an objective to provide a "Consistent User Interface" and it is described as follows:

"*A consistent user interface will ensure that all user-accessible functions and services will appear and behave in a similar, predictable fashion regardless of application or site. This will lead to better efficiency and fewer user errors, which in turn may result in lower recovery costs.*"

To make this objective SMART, we ask whether the objective is specific, measurable, actionable, realistic, and time-bound, and then augment the objective appropriately.

The following captures an analysis of these criteria for the stated objective:

- **Specific**: the objective of providing "*a consistent user interface that will ensure all user-accessible functions and services will appear and behave in a similar, predictable fashion regardless of application or site*" is pretty specific; however, the measures listed in the second sentence could be more specific
- **Measurable**: as stated above, the objective is measurable, but could be more specific; the second sentence could be amended to read (for example): "*this will lead to 10% greater user efficiency and 20% fewer order entry user errors, which in turn may result in 5% lower order entry costs*"
- **Actionable**: the objective does appear to be actionable; it seems clear that consistency of the user interface must be provided, and that could be handled by whoever is responsible for providing the user interface to the user device
- **Realistic**: the objective of providing "*a consistent user interface that will ensure all user-accessible functions and services will appear and behave in a similar, predictable fashion regardless of application or site*" might not be realistic; considering the use today of PDAs at the user end might lead us to augment this objective to ensure that the downstream developers don't unduly create designs that hinder the use of new technologies – the objective could be re-stated as "*a consistent user interface, across user interface devices that provide similar functionality that will ensure …*"
- **Time-bound**: the objective as stated is not time-bound; to be time-bound the objective could be re-stated as "*by the end of Q3, provide a consistent ...*"

The above results in a SMART objective that looks more like this (again remember this is an example):

"*By the end of Q3, provide a consistent user interface across user interface devices that provide similar functionality to ensure all user-accessible functions and services appear and behave in a similar way when using those devices in a predictable fashion, regardless of application or site. This will lead to 10% greater user efficiency and 20% fewer order entry user errors, which in turn may result in 5% lower order entry costs.*"

9.3 Categories of Goals and Objectives

Although every organization will have its own set of goals, some examples may help in the development of an organization-specific list. The goals given below are categories of goals, each with a list of possible objectives, which have been adapted from the goals given in previous versions of the TOGAF Standard.

Each of the objectives given below should be made SMART with specific measures and metrics for the task involved, as illustrated in the example above. However, the actual work to be done will be specific to the architecture project concerned, and it is not possible to provide a list of generic SMART objectives that will relate to any project.

9.3.1 Goal: Improve Business Process Performance

Business process improvements can be realized through the following objectives:

- Increased process throughput
- Consistent output quality
- Predictable process costs
- Increased re-use of existing processes
- Reduced time of sending business information from one process to another process

9.3.2 Goal: Decrease Costs

Cost improvements can be realized through the following objectives:

- Lower levels of redundancy and duplication in assets throughout the enterprise
- Decreased reliance on external IT service providers for integration and customization
- Lower costs of maintenance

9.3.3 Goal: Improve Business Operations

Business operations improvements can be realized through the following objectives:

- Increased budget available to new business features
- Decreased costs of running the business
- Decreased time-to-market for products or services
- Increased quality of services to customers
- Improved quality of business information

9.3.4 Goal: Improve Management Efficacy

Management efficacy improvements can be realized through the following objectives:

- Increased flexibility of business
- Shorter time to make decisions
- Higher-quality decisions

9.3.5 Goal: Reduce Risk

Risk improvements can be realized through the following objectives:

- Ease of implementing new processes
- Decreased errors introduced into business processes through complex and faulty systems
- Decreased real-world safety hazards (including hazards that cause loss of life)

9.3.6 Goal: Improve Effectiveness of IT Organization

IT organization effectiveness can be realized through the following objectives:

- Increased rollout of new projects
- Decreased time to roll out new projects
- Lower cost in rolling out new projects
- Decreased loss of service continuity when rolling out new projects
- Common development: applications that are common to multiple business areas will be developed or acquired once and re-used rather than separately developed by each business area
- Open systems environment: a standards-based common operating environment, which accommodates the injection of new standards, technologies, and applications on an organization-wide basis, will be established; this standards-based environment will provide the basis for development of common applications and facilitate software re-use
- Use of products: as far as possible, hardware-independent, off-the-shelf items should be used to satisfy requirements in order to reduce dependence on custom developments and to reduce development and maintenance costs
- Software re-use: for those applications that must be custom developed, development of portable applications will reduce the amount of software developed and add to the inventory of software suitable for re-use by other systems
- Resource sharing: data processing resources (hardware, software, and data) will be shared by all users requiring the services of those resources – resource sharing will be accomplished in the context of security and operational considerations

9.3.7 Goal: Improve User Productivity

User productivity improvements can be realized through the following objectives:

- Consistent user interface: a consistent user interface will ensure that all user-accessible functions and services will appear and behave in a similar, predictable fashion regardless of application or site; this will lead to better efficiency and fewer user errors, which in turn may result in lower recovery costs
- Integrated applications: applications available to the user will behave in a logically consistent manner across user environments, which will lead to the same benefits as a consistent user interface
- Data sharing: databases will be shared across the organization in the context of security and operational considerations, leading to increased ease-of-access to required data

9.3.8 Goal: Improve Portability and Scalability

The portability and scalability of applications will be through the following objectives:

- Portability: applications that adhere to open systems standards will be portable, leading to increased ease-of-movement across heterogeneous computing platforms – portable

applications can allow sites to upgrade their platforms as technological improvements occur, with minimal impact on operations

- Scalability: applications that conform to the model will be configurable, allowing operation on the full spectrum of platforms required

9.3.9 Goal: Improve Interoperability

Interoperability improvements across applications and business areas can be realized through the following objectives:

- Common infrastructure: the architecture should promote a communications and computing infrastructure based on open systems and systems transparency including, but not limited to, operating systems, database management, data interchange, network services, network management, and user interfaces

- Standardization: by implementing standards-based platforms, applications will be provided with, and will be able to use, a common set of services that improve the opportunities for interoperability

9.3.10 Goal: Increase Vendor Independence

Vendor independence will be increased through the following objectives:

- Interchangeable components: only hardware and software that have standards-based interfaces will be selected, so that upgrades or the insertion of new products will result in minimal disruption to the user's environment

- Non-proprietary specifications: capabilities will be defined in terms of non-proprietary specifications that support full and open competition and are available to any vendor for use in developing commercial products

9.3.11 Goal: Reduce Lifecycle Costs

Lifecycle costs can be reduced through most of the objectives discussed above. In addition, the following objectives directly address reduction of lifecycle costs:

- Reduced duplication: replacement of isolated systems and islands of automation with interconnected open systems will lead to reductions in overlapping functionality, data duplication, and unneeded redundancy because open systems can share data and other resources

- Reduced software maintenance costs: reductions in the quantity and variety of software used in the organization will lead to reductions in the amount and cost of software maintenance – use of standard off-the-shelf software will lead to further reductions in costs since vendors of such software distribute their product maintenance costs across a much larger user base

- Incremental replacement: common interfaces to shared infrastructure components allow for phased replacement or upgrade with minimal operational disturbance

- Reduced training costs: common systems and consistent Human Computer Interfaces (HCIs) will lead to reduced training costs

9.3.12 Goal: Improve Security

Security can be improved in the organization's information through the following objectives:

- Consistent security interfaces for applications: consistent security interfaces and procedures will lead to fewer errors when developing applications and increased application portability; not all applications will need the same suite of security features, but any features used will be consistent across applications
- Consistent security interfaces for users: a common user interface to security features will lead to reduced learning time when moving from system to system
- Security independence: application deployment can use the security policy and mechanisms appropriate to the particular environment if there is good layering in the architecture
- A 25% reduction in calls to the help desk relating to security issues
- A 20% reduction in "false positives" detected in the network (a false positive is an event that appears to be an actionable security event, but in fact is a false alarm)

9.3.13 Goal: Improve Manageability

Management improvement can be realized through the following objectives:

- Consistent management interface: consistent management practices and procedures will facilitate management across all applications and their underlying support structures; a consistent interface can simplify the management burden, leading to increased user efficiency
- Reduced operation, administration, and maintenance costs: operation, administration, and maintenance costs may be reduced through the availability of improved management products and increased standardization of the objects being managed

10 Roles

In order to develop a Business Scenario, there are multiple roles that need to be filled. There are roles that can be filled by the same person, so the sum of the roles means you may not need that many people. Configuring the people to perform the roles is something that should be done in the Planning step:

- Project Manager: plan, execute, and monitor a project that results in a documented and vetted Business Scenario in time and on budget
- Business Scenario Consultant: guide the project so that it is moving in the right direction to result in a quality Business Scenario
- Business Scenario Analyst: apply data gathering and analysis techniques that result in consensus views of the elements of a Business Scenario
- Business Scenario Author: produce a faithful and objective narrative description of the Business Scenario
- Business Scenario Editor: take a draft and produce a high-quality publishable document deserving of The Open Group brand identity
- Business Scenario Facilitator: conduct well-orchestrated meetings and workshops that result in satisfied and fulfilled attendees
- SME Contributors: provide expert advice and content in a specific subject germane to the propose premise
- SME Reviewers: review and provide objective and constructive recommendations pertaining to the Business Scenario document
- Host: provide the welcome environment for participants that represents the impetus for the effort to reassure attendees to be open
- Sponsor: represent the executive-level “buy side” of the importance of moving forward with the effort to reassure attendees that they will support the effort and its follow-up
- Workshop Primary and Secondary Questioner: ask probing planned and follow-up questions that pull out information germane to the subject
- Workshop Recorders: faithfully capture the answers to questions and notes of workshops and meetings

11 Checklists

11.1 Checklist – Premise Formulation

- ☐ Have a simple premise
- ☐ Have initial capstone question
- ☐ Have a candidate sponsor
- ☐ One or more triggers present:
  - ☐ No clear understanding of business need
  - ☐ Problem looking for a solution
  - ☐ Solution looking for a problem
  - ☐ Dominance of technology speak
  - ☐ Target market not identified
  - ☐ "We just don't know how to start"
- ☐ Identified target buy-side participants
- ☐ Identified target customer-side participants
- ☐ Engaged target supply-side participants
- ☐ Engaged target customer-side participants

11.2 Checklist – Plan

- ☐ Named Project Manager
- ☐ Named Business Scenario Consultant
- ☐ Selected data gather mechanisms
- ☐ Set project constraints:
  - ☐ Time
  - ☐ People
  - ☐ Money
- ☐ Resourced engagement activities

- Resourced logistic activities
- Resourced other roles
- Held initial team meeting
- Set up the dependencies
- Established a reasonable timeline
- Documented in a project plan
- Resourced logistic activities:
  - Meeting and workshop logistics
  - Practice sessions
  - Staging
  - Contingencies
  - Follow-ups
  - Greasing the wheels
  - Thank you notes

11.3 Checklist – Gather

- Questions are crafted
- Data that is openly available is gathered
- Preprocessed data that is openly available
- Developed strawman of the key elements
- Data gathering material prepared
- Participants named
- Participants on board
- Taken steps to maintain desired anonymity
- Considered:
  - Workshop(s)
  - Surveys
  - Interviews
  - Focus groups
  - Market research, etc.

If workshop:

- Have an agenda
- Workshop scripted and rehearsed:
  - Facilitator and host
  - Questioners and recorders
- Room prepared (as appropriate):
  - Flip charts
  - U-shape table
  - White board
  - Conference hook-up
- Invitations and instructions sent to SMEs
- Prepared to capture all information electronically
- Considered two separate workshops (buy-side and supply-side)

11.4 Checklist – Analyze

- All data collected in one place and locked as read-only
- Prepared worksheets per element to analyze text
- Prepared worksheets per element to analyze calculable data
- Populated worksheets with raw data
- Transformed textual into normalized and categorized list
- Done the math
- Prepared a unifying matrix to connect all key elements
- Assessed for completeness and correctness:
  - Should be at least one outcome for each pain point
- Generated a set of business and technical capabilities
- Drafted models of data collect
- Drafted text of the results

11.5 Checklist – Document

- Named a primary author:

- Should have been done in the Planning step
- Named the editor:
  - Should have been done in the Planning step
- Drafted the document
- Included models as drawings in the document
- Described the models in text form
- Numbered drawings
- Used a modeling language:
  - The ArchiMate® modeling language
- Articulated the business-oriented issue and the desired outcomes
- Have a “so what”
- Have a “so that”
- Conducted an informal internal review of content
- Updated draft document and models
- Proofread and edited for business folk

11.6 Checklist – Review

- Named the internal reviewers
- Named the external reviewers
- Allocated specific sections to specific reviewers
- Provided formal instructions to reviewers
- Formally managed change requests
- Agreed on updates
- Polled stakeholders on path forward
- Updated document and models for publication
- Sent document to publication process
- Sent participants publication status and thank you notes

12 Techniques and Tips

The following tips and techniques can be used in various situations during workshops and analysis:

- Use real-world examples
- Use exercises to solve a real and relevant issue
- Use roundtables and ensure you solicit everyone's views
- Use active and reflective listening
- Use brainstorming with affinity analysis in meetings
- Use "introduce your neighbor" technique
- Use "we believe" exercise
- Use money or "credits" voting for prioritization
- Consider using multi-voting and/or rank ordering
- Consider using role play
- Consider using alternative analysis with a decision matrix
- Check the checklist

12.1 On Active and Reflective Listening

- Use whenever you want to ensure that someone is being heard – not just by you, but by everyone
- Active listening from Wikipedia®:
  - — A communication technique used in counselling, training, and conflict resolution, which requires the listener to feed back what they hear to the speaker, by way of re-stating or paraphrasing what they have heard in their own words, to confirm what they have heard and, moreover, to confirm the understanding of both parties
- Reflective listening from Wikipedia:
  - — A communication strategy involving two key steps: seeking to understand a speaker's idea, then offering the idea back to the speaker, to confirm the idea has been understood correctly; it attempts to "reconstruct what the client is thinking and feeling and to relay this understanding"

12.2 On Brainstorming and Affinity Analysis

- Use when you want to engage the entire team to put out ideas
- Brainstorming:
  - — A structured technique to gather all participant ideas – it is not a free-for-all
  - — Describe the exercise subject
  - — Describe rules for brainstorming
  - — Ask everyone to jot down their thoughts on the subject (set some limit like "in one sentence")
  - — Proceed to get each participant's ideas one at a time and record on sticky notes in a roundtable manner
  - — Post sticky notes
  - — Do affinity analysis on ideas
- Affinity analysis:
  - — A means to identify and group similar or related ideas
  - — Useful to faithfully combine many ideas into a manageable list

12.3 Introduce your Neighbor

- Use when you want to build a team from a group that doesn't know each other well
- Pair people up; e.g., Al and Betty
- Have them chat and introduce each other for a few minutes:
  - — Limit to five minutes maximum
  - — Ask them to chat about name, where they live, business, hobbies, etc.
- Then go around the room and have them introduce each other:
  - — Al introduces Betty and Betty introduces Al
  - — Have all participants introduced
  - — Have facilitator pair up if there is an odd number of participants

12.4 We Believe

- Use when the team is not converging or they are arguing in a non-constructive way
- Take a step back and go to the original premise
- Ask "do we believe in this?"

— If not what do "we believe in"?

- Maintain a list of "we believes"
- Limit the list to important beliefs
- These "we believes" could become or lead to principles

12.5 On Money or Credit Voting Prioritization

- Use when you want to get a sense of what people will really put their resources into
- Use fake money or "credits"
- Give each person a budget:

  — Can't spend over the budget

  — Can apply to one item, or more

  — If you have other rules then announce them
- Ask participants to allocate their budget against a list:

  — Can do anonymously (preferred)

  — Make it real by asking everyone to be prepared to defend their allocation as if defending it to their boss
- Tally the budgets
- Expose the results and discuss

12.6 On Multi-Voting and Rank Ordering Prioritization

- Use whenever you want to get to a consensus view on the priority of items in a list
- Multi-voting:

  — Structured system where votes are taken in successive steps where each step reduces a list ultimately to three to five items
- Rank ordering:

  — Where items on a list are ranked 1 to *n* and the average of all the ranking produces a collective view

12.7 On Role Play

- Use when you want to expand people's perspectives and especially consider another perspective:

  — Often useful if you want two people or two groups to think about another person's or another groups views

- Describe a situation and put two viewpoints on the table
- Ask a person or a group to take a specific role within that situation and describe their views and concerns:

  — Put a supplier in the situation of a buyer

  — Put a buyer in the situation of a supplier

  — Put a patient in the role of a doctor

  — Put a doctor in the role of a patient

12.8 On Alternative Analysis and Decision Matrix

- Use when there are too few approaches on the table, maybe looking as if there may be bias towards a given approach
- Brainstorm alternatives and put in a normalized list
- Put list items in a matrix with additional columns for:

  — Cost

  — Required resources

  — Contribution to problem

  — Feasibility

  — Calculated Rank
- Ask people to rank each cell 1 (worse) to 5 (best)
- Add weight if necessary and calculate

Alternative	Cost (weight =1)	Resources (weight =1)	Contribution (weight =1)	Feasibility (weight =1)	Calculated Rank
Alt 1					
Alt 2 …					

13 Summary

Business Scenarios help to address one of the most common issues facing executives: aligning significant transformation, such as those supported by IT changes, with the business.

The success of any major project is measured by the extent to which it is linked to business requirements, and demonstrably supports and enables the enterprise to achieve its business outcomes. The Business Scenario method is an important technique that may be used at various stages of defining an Enterprise Architecture, or in support of any other major project, to derive the characteristics of the architecture directly from the high-level requirements of the business. Business Scenarios are used to help identify and understand business needs, and thereby to derive the business requirements that the architecture development, and ultimately the solution, has to address.

However, it is important to remember that Business Scenarios are just a tool, not the objective. They are a part of, and enable, the larger process of architecture and downstream development. The architect should use them, but not get lost in them. The key is to stay focused – watch out for "feature creep", and address the most important issues that tend to return the greatest value.

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