



The TOGAF® Standard, 10th Edition — A Pocket Guide

The Open Group Guide

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The Open Group 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, tools 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.

This Document

This is the Pocket Guide to the TOGAF® Standard. It is intended to provide an overview of the contents and purpose of the TOGAF Standard in a condensed form. As such it does not cover every aspect of the standard in detail, but provides highlights and key reference information. It is organized as follows:

- Chapter 1 provides an introduction to the TOGAF Standard, the TOGAF documentation, the TOGAF framework, and guidance on how to read the standard
- Chapter 2 describes the general how-to information provided in the TOGAF Standard
- Chapter 3 describes the guidance provided in the TOGAF Standard to support the establishment of an Enterprise Architecture team
- Chapter 4 describes the guidance provided in the TOGAF Standard for specific topic domains, including Security Architecture, Business Architecture, Data/Information Architecture, Agile Methods, and Reference Models and Method
- Chapter 5 describes the TOGAF Fundamental Content documents provided in the TOGAF Standard
- Chapter 6 describes the TOGAF Architecture Development Method, describing the ADM phases
- Chapter 7 describes a typical baseline of ADM deliverables
- Appendix A contains the glossary and acronyms used in this document

The audience for this document is:

- Enterprise Architects, Business Architects, IT Architects, Data Architects, Systems Architects, Solutions Architects, and senior managers seeking an introduction to the TOGAF Standard

This document is suitable both for readers approaching the TOGAF Standard for the first time, as well as those familiar with the standard.

Conventions Used in this Document

The following conventions are used throughout this document in order to help identify important information and avoid confusion over the intended meaning:

- Ellipsis (...)

Indicates a continuation; such as an incomplete list of example items, or a continuation from preceding text.

- **Bold**

Used to highlight specific terms.

- *Italics*

Used for emphasis. May also refer to other external documents.

About the Authors

This document builds on materials from the TOGAF Standard published by The Open Group. The authors listed here have prepared this document. See the Acknowledgements section for more information.

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He is a member of the IEEE, USENIX, and the Association of Enterprise Architects® (AEA). He holds an MSc in Computer Science from University College London.

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1. Introduction

This chapter provides an introduction to the TOGAF® Standard, an open, industry consensus framework for Enterprise Architecture.

Topics addressed in this chapter include:

- An introduction to the TOGAF Standard
- The structure and content of the TOGAF documentation
- An overview of the TOGAF Standard
- The TOGAF Library
- An overview of the TOGAF framework
- How to read the standard

1.1. Introduction to the TOGAF Standard

The TOGAF Standard is a framework for Enterprise Architecture. Put simply, it is a standard approach for developing, approving, using, and maintaining Enterprise Architectures. It applies to all Enterprise Architecture practices. It is based on an iterative process model supported by best practices and a re-usable set of existing architectural assets.

The TOGAF Standard is developed and maintained by members of The Open Group, working within the Architecture Forum. The original development of the TOGAF Standard, Version 1 in 1995 was based on the US Department of Defense Technical Architecture Framework for Information Management (TAFIM). Starting from this sound foundation, The Open Group Architecture Forum has developed successive versions of the TOGAF Standard at regular intervals and published each one on The Open Group public website. Successive versions have represented the current state of stable, scalable, best practice.

This version builds on previous versions of the TOGAF Standard, expanding and updating the material available to architecture practitioners to assist them in building a sustainable Enterprise Architecture.

1.2. Structure of the TOGAF Documentation

The TOGAF documentation set is structured to address the transition from common universal concepts to the unique configuration within an organization. It includes the formal TOGAF Standard and a broader body of knowledge in the TOGAF Library, as shown in Figure 1.

The TOGAF Standard represents today's stable, scalable, best practices, with concepts and guidance that apply across industries, scale, and pace of change. This is expected from a standard – proven practices, stable concepts, and being actionable. The TOGAF Standard provides a body of proven practices addressing its broad uses. The TOGAF Fundamental Content includes the universal concepts of Enterprise Architecture. The TOGAF Series Guides take these concepts and make them actionable. Together, the TOGAF Fundamental Content and the TOGAF Series Guides are the TOGAF Standard.

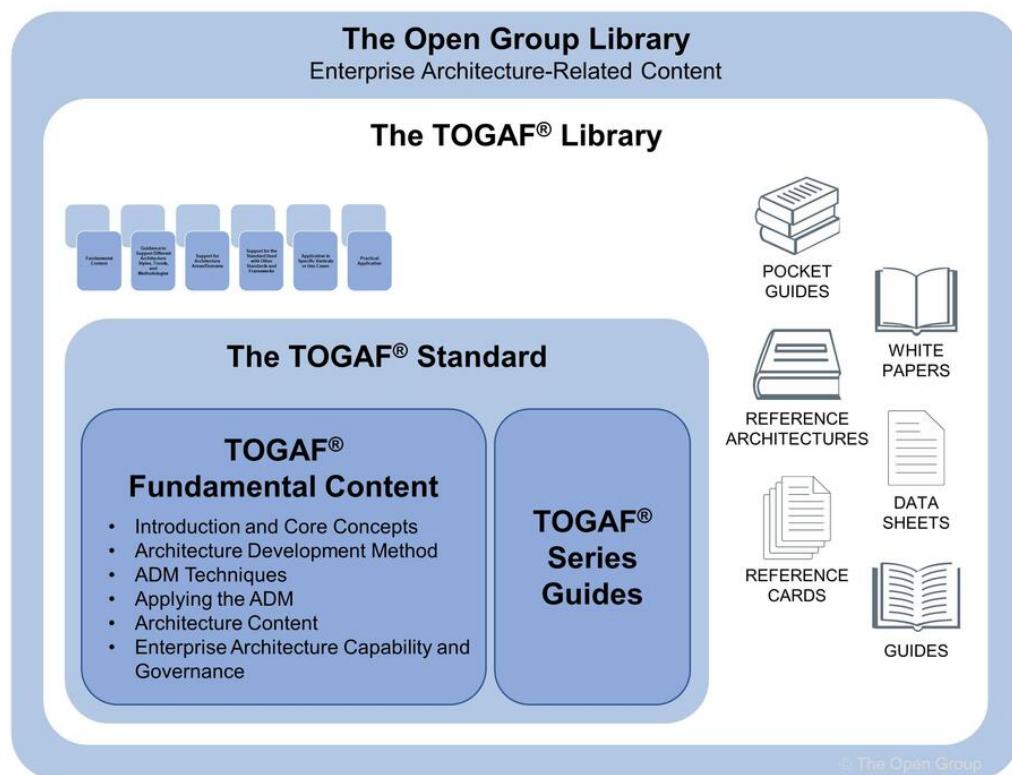


Figure 1. The TOGAF Documentation Set

The intent of dividing the TOGAF Standard into these separate documents is to allow for different areas of specialization to be considered in detail and potentially addressed in isolation. Although all the constituent documents work together as a whole, it is also feasible to select particular documents for adoption while excluding others.

The TOGAF documentation set structure is modular. There is a clear hierarchy from the universal concepts in the TOGAF Fundamental Content, to the stable best practices in the TOGAF Series Guides, to emerging ideas in the TOGAF Library. The structure of the TOGAF documentation set makes the adoption of your optimal method easier.

1.3. An Overview of the TOGAF Standard

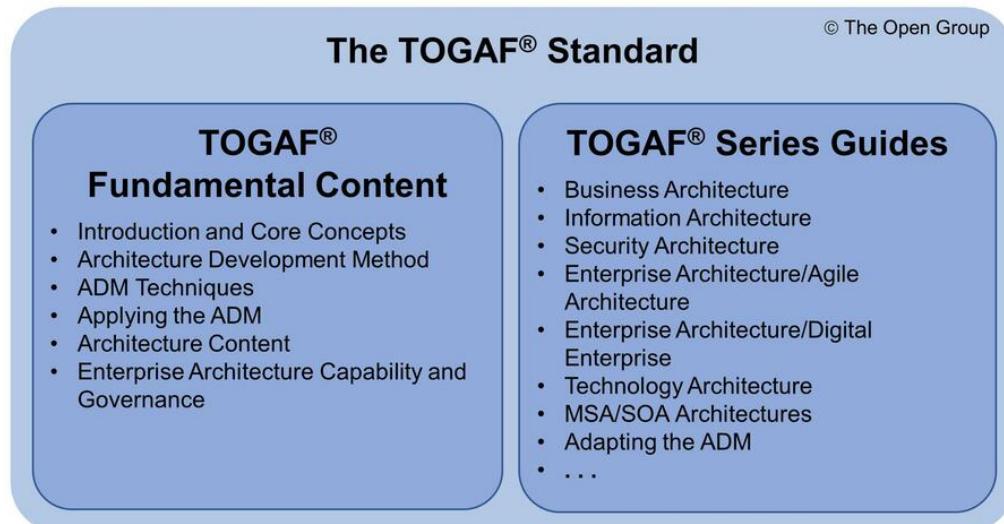


Figure 2. The TOGAF Standard

The TOGAF Standard applies to all Enterprise Architecture practices. It does not matter whether your architecture will support strategy, portfolio, project, or solution delivery, or whether it is about embarking on a Digital Transformation or legacy simplification. The TOGAF Fundamental Content and TOGAF Series Guides provide enduring, stable, universal concepts, and proven best practices.

1.3.1. The TOGAF Fundamental Content

The TOGAF Fundamental Content consists of six documents as shown in Table 1. Central to the TOGAF Fundamental Content is the TOGAF Architecture Development Method (ADM), which provides a tested and repeatable process for developing architectures.

Table 1. TOGAF Fundamental Content Documents

Document	Summary
<i>The TOGAF Standard: Introduction and Core Concepts</i> (see Section 5.1)	This document introduces the TOGAF Standard. It provides an executive overview of Enterprise Architecture and the TOGAF Standard; it describes the structure of the TOGAF documentation set, the core concepts of the framework, together with terminology and definitions that apply to the Fundamental Content.
<i>The TOGAF Standard: Architecture Development Method</i> (see Chapter 6)	This document describes the TOGAF ADM, which is an iterative approach to developing an Enterprise Architecture.
<i>The TOGAF Standard: ADM Techniques</i> (see Section 5.3)	This document contains a collection of techniques available for applying the TOGAF approach and the TOGAF ADM.
<i>The TOGAF Standard: Applying the ADM</i> (see Section 5.4)	This document contains guidelines for adapting the TOGAF ADM to address the specific style of architecture required in a practical context.
<i>The TOGAF Standard: Architecture Content</i> (see Section 5.5)	This document describes the TOGAF Content Framework, a structured metamodel for architectural artifacts, and an overview of typical architecture deliverables.
<i>The TOGAF Standard: Enterprise Architecture Capability and Governance</i> (see Section 5.6)	This document describes the organization, processes, skills, roles, and responsibilities required to establish and operate an architecture function within an enterprise and describes an Enterprise Architecture governance framework.

The role of the TOGAF Fundamental Content is to provide essential concepts and established best practices that are stable and enduring. The concepts in the TOGAF Fundamental Content are considered to be universally applicable to the TOGAF framework.

1.3.2. The TOGAF Series Guides

The TOGAF Series Guides consist of a series of best practice documents, that is expected to expand over time as the professional body of knowledge that forms the TOGAF Standard expands with more stable best practice.

The role of the TOGAF Series Guides is to build upon the content provided in the TOGAF Fundamental Content by providing extended guidance for specific topics, concerns, and use-cases. Examples of the topic areas covered by this guidance material are shown in Figure 2.

1.3.3. Documentation Set Summary

At the time of writing, the TOGAF Standard documentation set is summarized in Table 3. The general categories for document type can be considered as:

- General How-To Guidance (see Chapter 2)
- Establishing an Enterprise Architecture Team (see Chapter 3)
- Domain-Specific Guidance (see Chapter 4)
- TOGAF Fundamental Content (see Chapter 5)

This categorization is also used to organize the chapter content within this document.

A classification for Domain-Specific Guidance has been made in Table 3, and summarized in Table 2.

Table 2. Key to Columns in Table 3 for Domain-Specific Guidance

Domain-Specific Guidance	
SA = Security Architecture	BA = Business Architecture
IA = Data/Information Architecture	AM = Agile Methods
RM = Reference Models and Method	

Table 3. TOGAF Standard Document Summary

Document	General How-To	Establishing an EA Team	SA	BA	IA	AM	RM	TOGAF Fundamental Content
<i>TOGAF Series Guide: A Practitioners' Approach to Developing Enterprise Architecture Following the TOGAF ADM</i>	X							
<i>TOGAF Series Guide: Using the TOGAF Standard in the Digital Enterprise</i>	X							
<i>TOGAF Series Guide: Digital Technology Adoption: A Guide to Readiness Assessment and Roadmap Development</i>	X							
<i>TOGAF Series Guide: The TOGAF Leader's Guide to Establishing and Evolving an EA Capability</i>		X						
<i>TOGAF Series Guide: Integrating Risk and Security within a TOGAF Enterprise Architecture</i>			X					
<i>TOGAF Series Guide: Business Models</i>				X				
<i>TOGAF Series Guide: Business Capabilities, Version 2</i>				X				
<i>TOGAF Series Guide: Value Streams</i>				X				
<i>TOGAF Series Guide: Information Mapping</i>				X				

Document	General How-To	Establishing an EA Team	SA	BA	IA	AM	RM	TOGAF Fundamental Content
<i>TOGAF Series Guide: Organization Mapping</i>				X				
<i>TOGAF Series Guide: Business Scenarios</i>				X				
<i>TOGAF Series Guide: Information Architecture: Customer Master Data Management (C-MDM)</i>					X			
<i>TOGAF Series Guide: Enabling Enterprise Agility</i>						X		
<i>TOGAF Series Guide: Applying the TOGAF ADM using Agile Sprints</i>						X		
<i>TOGAF Series Guide: TOGAF Digital Business Reference Model (DBRM)</i>				X			X	
<i>TOGAF Series Guide: Government Reference Model</i>				X			X	
<i>TOGAF Series Guide: Architecture Maturity Models</i>							X	
<i>TOGAF Series Guide: Architecture Project Management</i>							X	
<i>TOGAF Series Guide: Architecture Skills Framework</i>							X	
<i>The TOGAF Standard: Introduction and Core Concepts</i>								X

Document	General How-To	Establishing an EA Team	SA	BA	IA	AM	RM	TOGAF Fundamental Content
<i>The TOGAF Standard: Architecture Development Method</i>								X
<i>The TOGAF Standard: ADM Techniques</i>								X
<i>The TOGAF Standard: Applying the ADM</i>								X
<i>The TOGAF Standard: Architecture Content</i>								X
<i>The TOGAF Standard: Enterprise Architecture Capability and Governance</i>								X

1.4. The TOGAF Library

Accompanying the standard are additional resources contained in the TOGAF Library. Whereas the TOGAF Series Guides are proven, stable, best practices, the TOGAF Library also provides emerging ideas, guidelines, templates, patterns, and other forms of reference material to accelerate the creation of new architectures for the enterprise.

The TOGAF Library follows a categorization model based on capabilities and features, as shown in Figure 3.

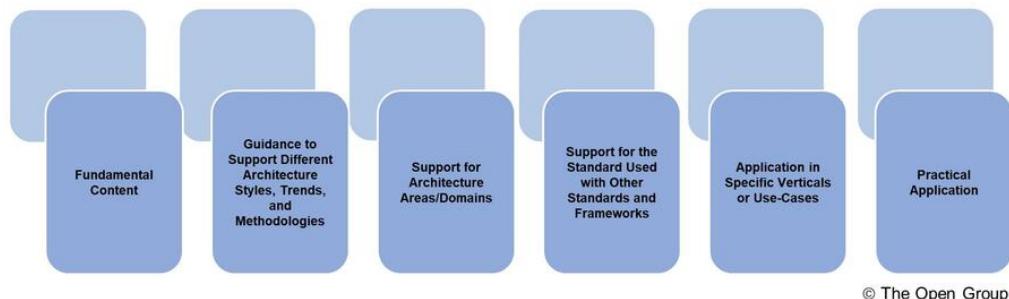


Figure 3. The TOGAF Library Categorizations

It includes material developed elsewhere in The Open Group; for example, *The Open Group IT4IT™ Reference Architecture*, *The Open Group Commercial Aviation Reference Architecture*, and the *O-PAS™ Standard*. They are reference architectures developed by experts in their industry, and can be adopted or used as examples.

Emerging ideas in the TOGAF Library are often in the form of White Papers. Material in this category either has not yet stood the test of time, or the members developed the idea to a usable point and have moved their innovative thinking to a new idea.

All documents in the TOGAF Library can be used as-is or used as a start for developing your organization's Enterprise Architecture.

1.5. An Overview of the TOGAF Framework

The TOGAF framework reflects the structure and content of an Architecture Capability within an enterprise, as shown in Figure 4.

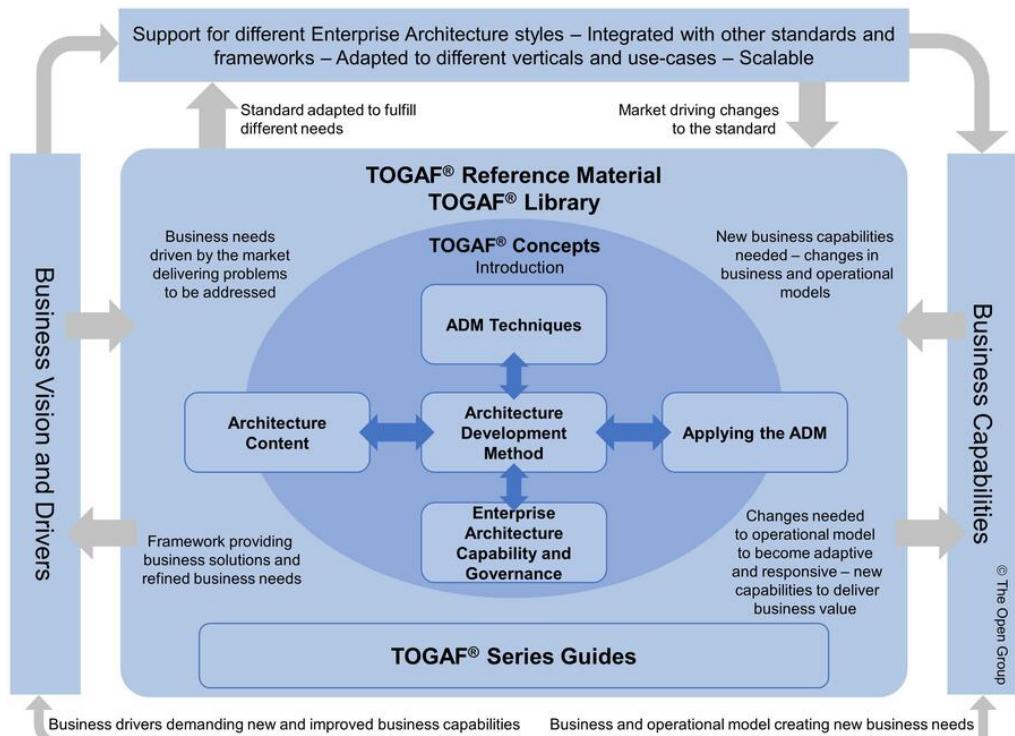


Figure 4. TOGAF Framework Overview

Central to the framework is the ADM (see Chapter 6). The Enterprise Architecture Capability and Governance (see Section 5.6) operates the method. The method is supported by ADM Techniques (see Section 5.3), Applying the ADM guidelines (see Section 5.4), the TOGAF Series Guides (see Section 1.3.2), and the TOGAF Library (see Section 1.4). This produces content to be stored as Architecture Content (see Section 5.5).

1.6. How to Read the Standard

In this section, brief guidance is provided for readers approaching this version of the TOGAF Standard.

For readers approaching the topic of Enterprise Architecture for the first time, it is recommended to read the White Paper *Why does Enterprise Architecture Matter?* available from the TOGAF Library at <https://www.opengroup.org/library/w076>.

For readers approaching the TOGAF Standard for the first time, it is recommended to read this document in conjunction with the *TOGAF Standard – Introduction and Core Concepts* (part of the Fundamental Content).

For all readers, including those familiar with earlier versions of the TOGAF Standard, it is recommended to read the White Paper *An Introduction to the TOGAF Standard, 10th Edition* available from the TOGAF Library at <https://www.opengroup.org/library/w212>.

1.6.1. Audience-Specific Guidance

In the following section, we provide guidance for Enterprise Architects, Enterprise Architecture Team Leaders, and Sponsors of Enterprise Architecture Teams:

Guidance for Enterprise Architects

This approach is aimed at Enterprise Architects most concerned with developing an Enterprise Architecture for their organization. It moves directly to how to develop, approve, and use your Enterprise Architecture.

A good first step is to obtain a copy of the *TOGAF Series Guide: A Practitioners' Approach to Developing Enterprise Architecture Following the TOGAF ADM*. Chapters 3 and 6 set the stage for applying everything in the TOGAF Standard, the TOGAF Fundamental Content, other TOGAF Series Guides, and the TOGAF Library.

A next step is to read the *TOGAF Series Guide: Integrating Risk and Security within a TOGAF Enterprise Architecture*. Risk and security are central to every Enterprise Architecture practitioner. Every practitioner has accountability to improve the performance of their organization. Practitioners are accountable for reducing the uncertainty of the organization reaching its objectives and improving its security.

Then obtain a copy of each guide that applies to your work. The guides are applicable because of the problem or domain they are designed to address. If your organization has digital initiatives, then get the digital-specific guides. If you need to enable Agile development, then get the Agile guides. If you are a Business Architect, then get the Business Architecture guides. If you are a Data Architect, then the *TOGAF Series Guide: Information Architecture: Customer Master Data Management (C-MDM)* may be helpful.

Lastly, explore the TOGAF Library. You will find documents that directly help you do your job or show you a very effective approach. Both make you a better Enterprise Architect. At every point, the TOGAF Fundamental Content is available to provide a consistent framework.

Guidance for Enterprise Architecture Team Leaders

Leaders have the challenge of optimizing their Enterprise Architecture Capability and developing their practitioners.

In this section we provide brief guidance for Enterprise Architecture team leaders on how to get started with this version of the TOGAF Standard.

Obtain a copy of the *TOGAF Series Guide: The TOGAF Leader's Guide to Establishing and Evolving an EA Capability*. Ensure that you have clarity on the purpose of your Enterprise Architecture team (Section 3.3), and the boundary of your enterprise (Sections 4.1 and 4.2).

Identify any gaps in your ability to deliver the Enterprise Architecture your organization wants to consume. Consider how to address the gaps. You will likely find the following TOGAF Series Guides useful: *Integrating Risk and Security within a TOGAF Enterprise Architecture* and *Using the TOGAF Standard in the Digital Enterprise*. High-performing Enterprise Architecture teams always reduce the uncertainty of the organization reaching its objectives and improving its security. If your organization is not on a Digital Transformation journey, then you should expect it to start soon.

The next step is to obtain a copy of each guide that applies to your team. Become familiar with them and distribute them to your team.

Guidance for Sponsors of Enterprise Architecture Teams

Sponsors know they can improve their organization's ability to make better change decisions and execute the changes with Enterprise Architecture. They will have championed their Enterprise Architecture team to help their organization. Most sponsors have the additional challenge of not being Enterprise Architecture practitioners, or Enterprise Architecture team leads. Most want the outcome without the need to understand the detail of how the work is done.

Read the *TOGAF Series Guide: The TOGAF Leader's Guide to Establishing and Evolving an EA Capability*. You should provide clarity on the purpose of your Enterprise Architecture team (Sections 3.3 and 8.2), the boundary of your enterprise (Sections 4.1 and 4.2), and how success will be measured (Section 5.4). Further, you need to assist with the improvement of your governance structure (Chapter 6).

2. General How-To Information

This chapter describes the general how-to information provided in the TOGAF Standard.

2.1. Documentation

Table 4. TOGAF General How-To Documents

Document	Summary
<i>TOGAF Series Guide: A Practitioners' Approach to Developing Enterprise Architecture Following the TOGAF ADM</i>	<p>This document is written for the Practitioner, the person who is tasked to develop, maintain, and use an Enterprise Architecture. 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.</p> <p>This document provides guidance on using the TOGAF framework to develop, maintain, and use an Enterprise Architecture. It is a companion to the TOGAF framework and is intended to bring the concepts and generic constructs in the TOGAF framework to life. It puts forward an approach to develop, maintain, and use an Enterprise Architecture that aligns to a set of requirements and expectations of the stakeholders and enables predictable value creation.</p>
<i>TOGAF Series Guide: Using the TOGAF Standard in the Digital Enterprise</i>	<p>This document is written for Enterprise Architects and Digital Practitioners.</p> <p>It describes what architecture practices would help grow a digital enterprise, and how the Enterprise Architect role can support a digital enterprise. It provides guidance on using the TOGAF Standard in alignment with the Digital Practitioner Body of Knowledge™ Standard, also known as the DPBoK™ Standard.</p>

Document	Summary
<i>TOGAF Series Guide: Digital Technology Adoption: A Guide to Readiness Assessment and Roadmap Development</i>	<p>This document provides a technique that can be used by Enterprise Architects in leading and guiding the process of assessment for a Digital Transformation.</p> <p>This document covers the critical tenets of digital technology adoption for any organization. The application of this document is technology-neutral by design. The readers of this document will get a defined roadmap that could be leveraged for adopting digital technology. The intent of the document is to facilitate readers with a readiness assessment which is to be used as a toolkit.</p>

2.2. What is Enterprise Architecture?

In its simplest terms, Enterprise Architecture is used to describe the future state of an enterprise to guide the changes needed to reach that 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 guides what must change within the enterprise.

2.3. Why Develop an Enterprise Architecture?

An Enterprise Architecture 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 Enterprise Architecture. During implementation, Enterprise

Architecture 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.

2.4. Purposes of Enterprise Architecture

The four broad purposes of Enterprise Architecture can be considered as follows:

- **Enterprise Architecture to Support Strategy:** deliver Enterprise Architecture to provide an end-to-end Target Architecture, and develop roadmaps of change over an extended period; for example, three years or more

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.

- **Enterprise Architecture to Support Portfolio:** deliver Enterprise Architecture 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, set their terms of reference, align their approaches, identify synergies, and govern their execution of projects.

- **Enterprise Architecture to Support Project:** deliver Enterprise Architecture 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.

- **Enterprise Architecture to Support Solution Delivery:** deliver Enterprise Architecture 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.

2.5. Developing an Enterprise Architecture

Developing an Enterprise Architecture is an iterative process. Different parts of the Enterprise Architecture are developed separately, in separate Architecture Projects^[1]. Each Architecture Project extends, or refreshes, the Enterprise Architecture with the objective of enabling effective change. As a result, the ADM is all about creating useful information – architecture descriptions, constraints, or guidance that can be used. Best practice limits information gathering and analysis to the minimum necessary to address the question at hand. Following an incremental approach, effort spent returns the highest value when the resulting part of a comprehensive Enterprise Architecture is used to guide change that improves the organization.

The ADM is designed to identify the information required to develop part of an Enterprise Architecture, the steps to create consistent information inputs, and information outputs. Each phase of the ADM is described in isolation to provide clarity of the inputs, steps, and outputs, not to describe a sequence of work.

2.6. Phase A: The Starting Point

All architecture development as per the ADM (see Chapter 6) needs to start with TOGAF ADM Phase A (see Section 6.2.2). 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 as follows:

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

What problem are you solving? Define this in terms of the Enterprise Architecture Landscape (breadth and planning-horizon) and also 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 Enterprise Architecture Repository for superior architecture constraints and guidance. Develop a Stakeholder Map to understand which stakeholders must be served and what their concerns are.

- **Assess the capability of the Enterprise Architecture team**

Take a hard look at the Enterprise Architecture team and confirm the ability of the team to deliver on this architecture development project. A good Enterprise Architecture 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 are:

- **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 needed to facilitate the change.

2.7. Essential ADM Outputs

A summary of the essential outcome and output is provided in Table 5. These are derived from the objectives of the ADM phase (see Section 6.2).

Table 5. Essential ADM Outputs, Outcomes, and Knowledge

Phase	Output & Outcome	Essential Knowledge
Phase A: Architecture Vision (see Section 6.2.2)	<p>Sufficient documentation to get permission to proceed.</p> <p>Permission to proceed to develop a Target Architecture to prove out a summary target.</p>	<p>The scope of the problem being addressed.</p> <p>Those who have interests that are fundamental to the problem being addressed. (Stakeholders & Concerns)</p> <p>What summary answer to the problem is acceptable to the stakeholders? (Architecture Vision)</p> <p>Stakeholder priority and preference.</p> <p>What value does the summary answer provide?</p>

Phase	Output & Outcome	Essential Knowledge
Phase B, Phase C, & Phase D (see Section 6.2.3, Section 6.2.4, Section 6.2.5)	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.	<p>How does the current enterprise fail to meet the preferences of the stakeholders?</p> <p>What must change to enable the enterprise to meet the preferences of the stakeholders? (Gaps)</p> <p>What work is necessary to realize the changes, that is consistent with the additional value being created? (Work Package)</p> <p>How stakeholder priority and preference adjust in response to value, effort, and risk of change. (Stakeholder Requirements)</p>
Phase E: Opportunities & Solutions (see Section 6.2.6)	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.	<p>Dependency between the set of changes. (Work Package & Gap dependency)</p> <p>Value, effort, and risk associated with each change and work package.</p> <p>How stakeholder priority and preference adjust in response to value, effort, and risk of change.</p>
Phase F: Implementation and Migration Plan (see Section 6.2.7)	An approved set of projects, containing the objective and any necessary constraints, resources required, and start and finish dates.	<p>Resources available to undertake the change.</p> <p>How stakeholder priority and preference adjust in response to value, effort, and risk of change. (Stakeholder Requirements)</p>

Phase	Output & Outcome	Essential Knowledge
Phase G: Implementation Governance (see Section 6.2.8)	Completion of the projects to implement the changes necessary to reach the target state.	Purpose and constraints on the implementation team. (Gap, Architecture Requirements 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 (see Section 6.2.9)	Direction to proceed with 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)

2.8. Strategies for the Digital Enterprise

Two strategies can be defined that will improve the probability of success for the digital enterprise in any organization.

The Peek-Ahead Strategy

This first strategy is 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 an appropriate understanding of potential problems and difficulties. This strategy can be followed by someone undertaking the role of an architect. Even in the Individual/Founder context of the DPBoK Standard, the individual or 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 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

2.9. Supporting the Digital Enterprise

This section provides insight on using the TOGAF Standard to support the digital enterprise. It is based on the *TOGAF Series Guide: Using the TOGAF Standard in the Digital Enterprise*, and aligns with the DPBoK Standard.

The DPBoK Standard

The DPBoK Standard identifies four contexts of organizational evolution of a digital enterprise:

- Context I: Individual/Founder
- Context II: Team
- Context III: Team of Teams
- Context IV: Enduring Enterprise

These are presented as levels, where the enterprise moves from an earlier context to the next level of success. This is described by the DPBoK Standard as an emergence model. Enterprise Architecture can support this emergence model through the peek-ahead strategy (defined in Section 2.8). The Enterprise Architect supports the specific context, and also considers the next level and informs the Digital Practitioners of ways to position themselves to best evolve. At the higher levels of the emergence model, the

Enterprise Architect plays 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.

2.9.1. Context I: Individual/Founder

The Individual/Founder context addresses the “*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.

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.

- **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.

More details about how the TOGAF Standard supports enterprise agility can be found in the *TOGAF Series Guide: Enabling Enterprise Agility* and in the *TOGAF Series Guide: Applying the TOGAF® ADM using Agile Sprints*. See also Section 4.4.

2.9.2. 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.

Key topics of interest within the Team context are:

- **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; while not the best form of work

management, this can be a good way to communicate within a small team.

- **Operations management**

Enterprise Architects have been significant contributors to those managing operations.

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 the efficacy of communication and collaboration. So, a common shared understanding of modeling and documenting becomes more important to support product management, work execution, and operations understanding.

2.9.3. 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 over-complex coordination with the need to ensure the success of a family of digital products.

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.

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.

2.9.4. 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.

Key topics areas of interest in this context are:

- **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 the compliance of business processes, information technology,

and human resources.

- **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**

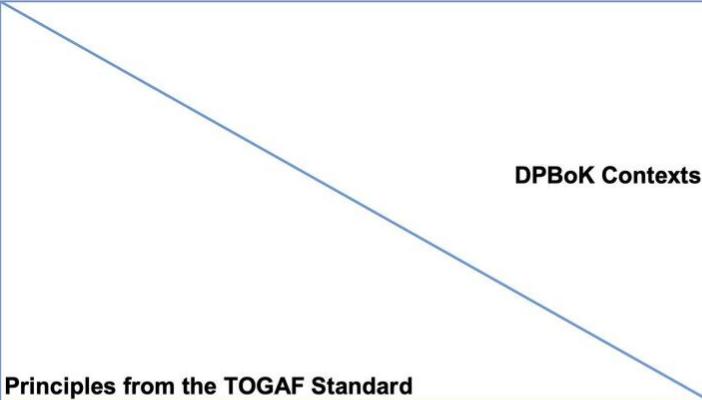
Enterprise Architectures that depict portfolios of products are critical resources in portfolio management.

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.

2.9.5. Applying TOGAF Principles per Context

Figure 5 identifies which of the TOGAF principles are most applicable to each of the contexts of the DPBoK Standard.



Principles from the TOGAF Standard	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 5. TOGAF Principles Mapped to DPBoK Standard Contexts

2.9.6. Applying Enterprise Architecture Services in a Digital Enterprise

Enterprise Architecture services are the delivery mechanism for Enterprise Architecture capabilities. In this section, we summarize the Enterprise Architecture capabilities supported by the TOGAF Standard that could be of use in each of the contexts of the DPBoK Standard.

Figure 6 summarizes Enterprise Architecture Services that should be considered per context to deliver Enterprise Architecture capabilities.

Figure 7 summarizes the Enterprise Architecture services per context, and constitutes the Enterprise Architecture Service Emergence Model.

Enterprise Architecture Development Process Improvement Service			x
Enterprise Architecture Practice Development Support Services			
Capability Planning Support Service			x
Enterprise Analysis and Assessment Services			x x
Sustainability Management Support Services	x	x	x x
Risk Management Services	x	x	x x
Portfolio Management Support Services (inc. Asset Mgmt, Acquisitions)			x x
Enterprise Support Services			
Release Support Services			x x
Change Management Services		x	x x
Compliance Assessment and Analysis Service			x
Architecture and Standards Guidance Service	x	x	x x
Development Support Services			
Architecture Compliance Dev. Services (Bus, Info, Appl, Infra, Systs, ...)			x
Architecture Integration Services		x	x
Architecture Modeling and Documentation Services (MVA)		x	x
Architecture Vision and Strategy Definition Services		x	x
Design Support Services			
Architecting Tailoring Services		x	x
Architecture Project Planning Services		x	x
Architecture Planning Services			
Business Value Assessment and Analysis Service	x	x	x x
Stakeholders Management Services	x	x	x x
Requirements Elicitation and Understanding Services			
Context I: Individual/Founder Context II: Team Context III: Team of Teams Context IV: Enduring Enterprise			

Figure 6. Enterprise Architecture Services to DPBoK Standard Emergence Model

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Service	D	P	N	D	P	D	N
Enterprise Architecture Dev Process Improvement Service	N						
Capability Planning Support Service	N						
Enterprise Analysis and Assessment Services	D	D	N				
Sustainability Management Support Services	P	P	P	D	D		N
Risk Management Services	D	D	D	D	D		N
Portfolio Management Support Services	P	P	N				
Release Support Services	P	P	N				
Compliance Assessment and Analysis Service	N						
Change Management	P	P	P	D	D	N	
Architecture and Standards Guidance Service	P	P	D	D	D	N	
Architecture Compliance Development Services	N						
Architecture Integration Services	D	D	N				
Architecture Modeling and Documentation Services (MVA)	P	P	N				
Architecture Vision and Strategy Services	P	P	N				
Architecting Tailoring Services	P	P	N				
Architecture Project Planning Services	P	P	N				
Business Value Assessment and Analysis Service	D	P	P	D	P	N	
Stakeholders Management Services	D	P	D	D		N	

Context IV: Enduring Enterprise
Context III: Team of Teams
Context II: Team
Context I: Individual/Founder

Legend:

- N** - newly introduced EA Service
- P** - previously introduced EA Service
- D** - previous EA Service, but deeper

Figure 7. The Enterprise Architecture Service Emergence Model

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2.10. Factors Impacting Digital Technology Adoption

The *TOGAF Series Guide: Digital Technology Adoption: A Guide to Readiness Assessment and Roadmap Development* provides a technique, known as Digital Transformation Readiness Assessment (DTRA), that can be used by Enterprise Architects in leading and guiding the process of assessment for a Digital Transformation. It provides a view of how ready the enterprise is for the changes related to digital technology adoption. This provides a quantifiable measurement for the preparedness of organizations to undergo a large transformation and identifies gaps to be addressed. Organizations may not want to start a big transformation initiative without knowing if they have the right resources and conditions to accomplish the evolution effectively and derive the full benefits sustainably.

The factors defined in the DTRA that can be used to assess the readiness of enterprises for digital technologies are categorized as follows:

- **Foundational factors:** factors that organizations must have to establish the minimum acceptable readiness to adopt digital technologies
- **Impact factors:** factors that enhance or amplify the effectiveness of primary factors by providing supporting conditions
- **Sustaining factors:** factors that enable the institutionalization of the adoption of digital technologies for sustained long-term benefits

Table 6. Factor Categorization

Foundational Factors	Impact Factors	Sustaining Factors
Vision	Business Model Adaptability	Value Realization
Sponsorship and Direction	Skills and Competence	Policy and Regulations
IT Capability	Technology Maturity	Funding and Resources
Culture	Ecosystem	
Scope and Scale	Governance and Compliance	
Business Rationale		
Implementation Approach		

In Table 6, factors are arranged in each category. Figure 8 highlights the relationships and inter-dependencies between these factors.

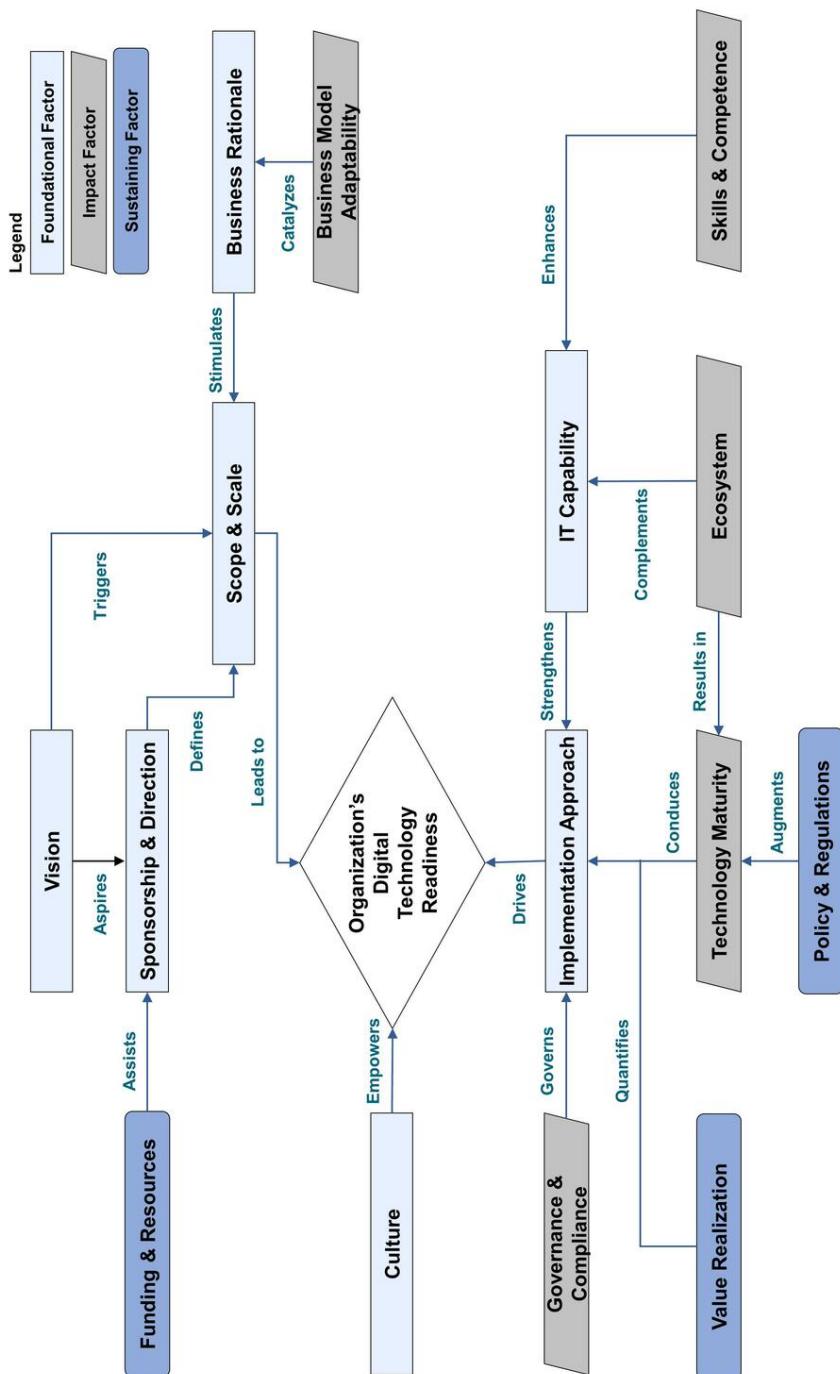


Figure 8. DTRA Factor Dependency Diagram

2.11. Roadmap for Digital Technology Adoption

Step 1: Select the Adoption Approach

The organization must select the adoption approach for the digital technology it desires to take on. The “ABCD framework” comprises the fitment of all types of organization with respect to their digital technology adoption strategy.

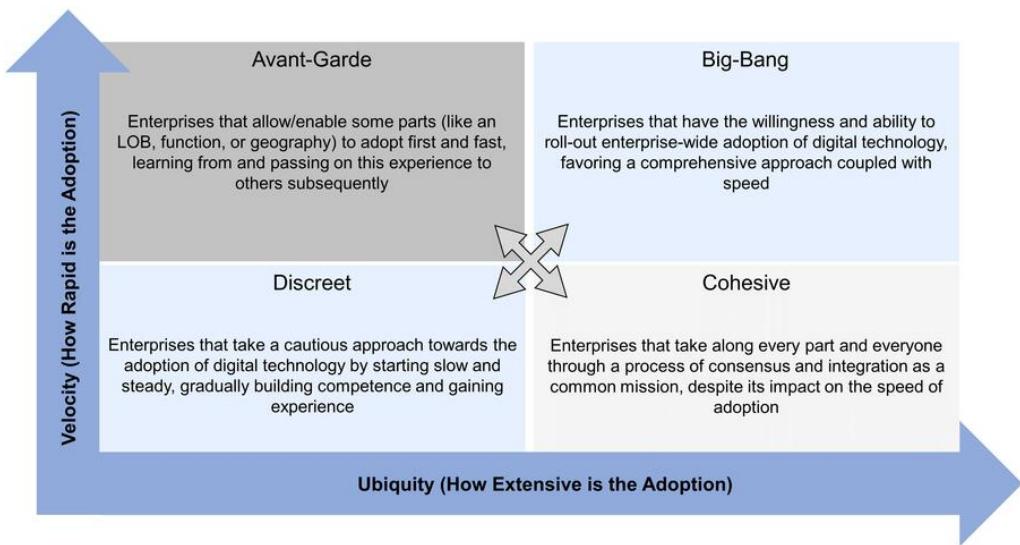


Figure 9. The ABCD Framework for Digital Technology Adoption

Step 2: Perform the DTRA

The DTRA, comprising all the identified factors, is considered a toolkit for inspecting the readiness of the organization against the various critical factors defined in the assessment. A questionnaire is provided in Appendix A of the *TOGAF Series Guide: Digital Technology Adoption: A Guide to Readiness Assessment and Roadmap Development*.

Step 3: Identify Factors Needing Management Attention

The next step in the process is to analyze the output of the readiness assessment. There might be certain factors that are not as per expectations and the organization is falling short in parameters. It is important to

understand the implications of missing factors. For instance, if the result of a readiness assessment shows that an organization is lagging in “Implementation Approach”, it means that the consequence could lead to a likelihood of missed opportunities due to a trial and error-based approach. Organizations may have more than one missing factor and, therefore, the primary consequence of all the factors needs to be understood collectively without any prejudice and bias.

Step 4: Address Shortcomings and Initiate Digital Technology Adoption

This step in the journey is to prepare and address shortcomings (plug the gaps) based on the primary consequences identified in the previous step.

There are three categories of organizations based on the assessment:

Type 1: Enterprises that fulfill foundational factors only

Type 2: Those that fulfill foundational and impact factors

Type 3: Those that fulfill foundational, impact, and sustaining factors

If the organization does not meet the requirements of the foundational factors, it is futile to evaluate for impact and sustaining factors. Hence, it is paramount that enterprises adopt a progressive (step-wise) and Agile approach to mitigate the shortcomings.

If the enterprise is evaluated to be at Type 3; i.e., there is sufficient readiness across all three levels of factors, the readiness of the enterprise is more conducive to start the digital technology adoption than an enterprise evaluated to be at Type 2 or Type 1. Organizations that are Type 1 or Type 2 are recommended to follow the progressive and Agile path; i.e., to address foundational factors, followed by impact factors, followed by sustaining factors.

Footnotes

[1] 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.

3. Establishing an Enterprise Architecture Team

This chapter describes the guidance provided in the TOGAF Standard to support the establishment of an Enterprise Architecture team.

3.1. Documentation

Table 7. TOGAF Establishing an Enterprise Architecture Team Document

Document	Summary
<i>TOGAF Series Guide: The TOGAF Leader's Guide to Establishing and Evolving an EA Capability</i>	This document is written for the EA Capability Leader, the person who is tasked to lead the effort to establish or evolve an EA Capability. It presents advice on establishing an EA Capability that aligns to a set of requirements and expectations that are specific to each enterprise. 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 ADM.

3.2. Enterprise Architecture Capability

An Enterprise Architecture Capability is the ability to develop, use, and maintain the architecture of a particular enterprise, and use the architecture to govern change.

The term “capability” is defined differently by different practitioners, most commonly when it is used as part of a formal analysis technique when the definition must be precise and constrained. The term EA Capability is used as a management concept that facilitates planning improvements in the ability to do something that leads to enhanced outcomes enabled by the capability.

While every organization can benefit from an EA Capability, each organization will require a different EA Capability.

Typically, there are four broad purposes of an EA Capability, as shown in

Figure 10 and described in Section 2.4.



Figure 10. Enterprise Architecture Capability Model

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 Enterprise Architecture-specific activities and activities that are general to any business.

Enterprise Architecture-specific activities are either foundational or purpose-specific, as shown in a decomposition of the EA Capability model in Figure 11. The nature of the 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.

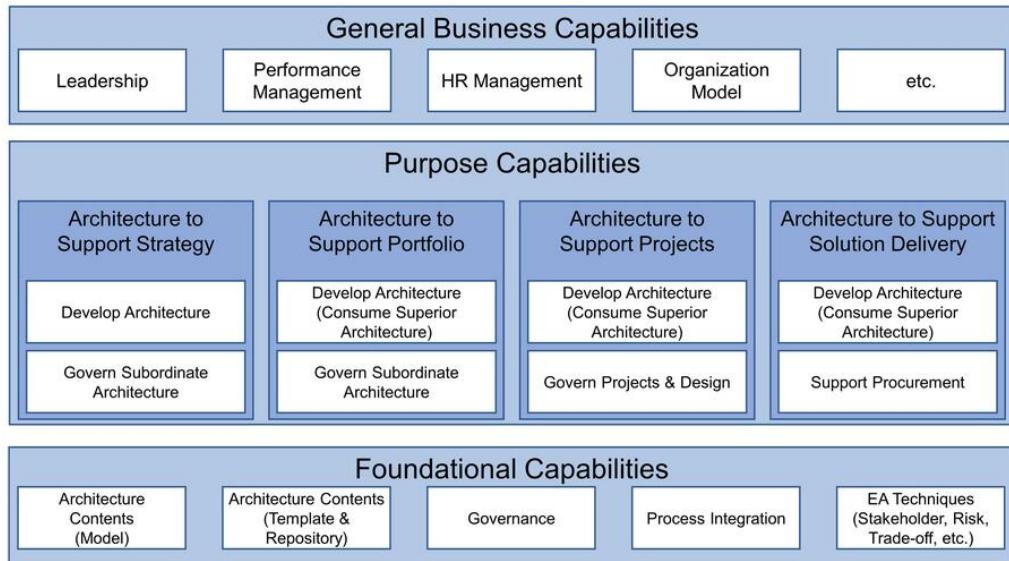


Figure 11. Decomposition of an Enterprise Architecture Capability Model

3.3. Organization Models

The following figures show some of the variants of organizational alignment of a team providing the EA Capability. They are used to convey an idea and do not account for differences that an enterprise might have, like industry, customer segment, product lines, country, and geography.

In a function-centric model (see Figure 12), it is possible that Enterprise Architecture is part of each of the functional verticals and one of the teams consolidates all Enterprise Architecture activities, as shown in the top of Figure 12. Another variant is that Enterprise Architecture could be part of the dominant or key function of the enterprise, as shown in the lower part of Figure 12. 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.

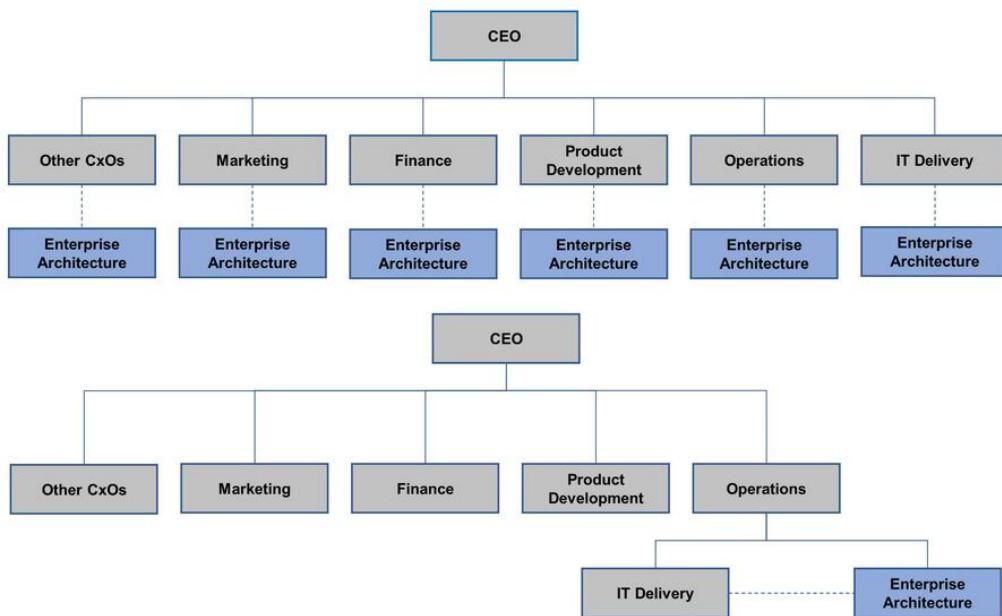


Figure 12. Function-Centric Enterprise Architecture

In an IT-centric model (see Figure 13), Enterprise Architecture 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 Enterprise Architecture 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. It is important to understand the context and draw members with process analysis and cost management expertise or a deep functional knowledge of operations.

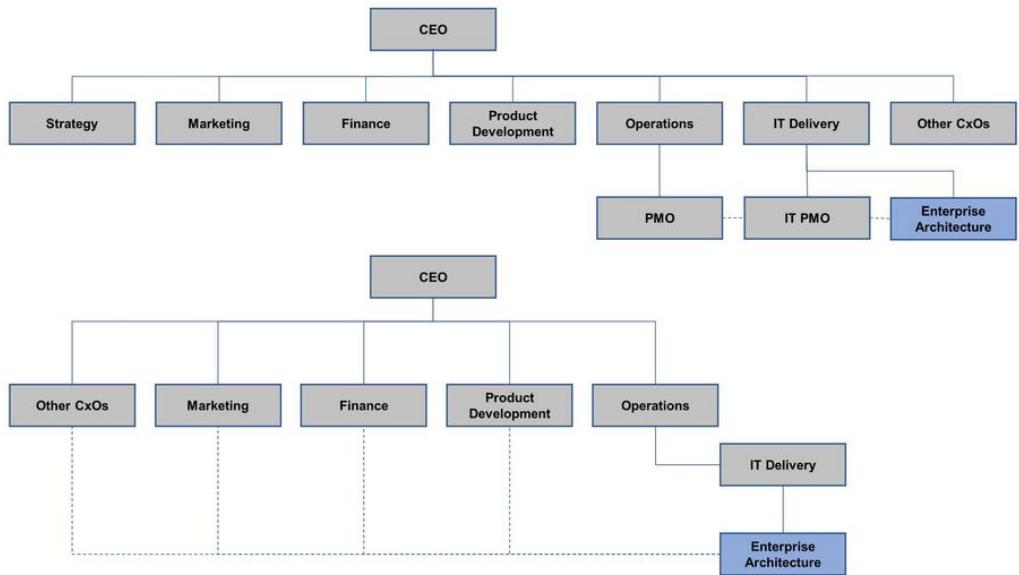


Figure 13. IT-Centric Enterprise Architecture

In a strategy-centric model (see Figure 14), Enterprise Architecture 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).

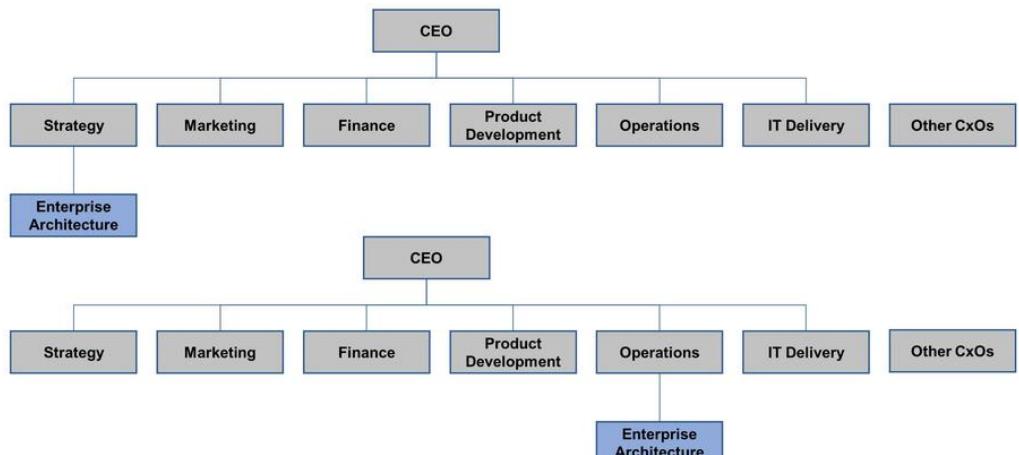


Figure 14. Strategy-Centric Enterprise Architecture

4. Domain-Specific Guidance

This chapter describes the guidance provided in the TOGAF Standard for specific topic domains.

4.1. Security Architecture

4.1.1. Documentation

Table 8. TOGAF Standard Security Architecture

Document	Summary
<i>TOGAF Series Guide: Integrating Risk and Security within a TOGAF Enterprise Architecture</i>	This document provides guidance for security practitioners and Enterprise Architects to develop an Enterprise Architecture that comprehensively addresses risk and security. It describes how to integrate risk and security into an Enterprise Architecture, and introduces a common language for Security Architects and Enterprise Architects.

4.1.2. Integrating Risk and Security

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 the *TOGAF Series Guide: Integrating Risk and Security within a TOGAF® Enterprise Architecture*.

4.1.3. Definition of Risk

Risk is the “effect of uncertainty on objectives” (ISO 31000:2009).

The effect of uncertainty is any deviation from what is expected – positive and negative. The uncertainty is concerned with predicting future outcomes, given the limited amount of information available when making a 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.

4.1.4. 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 Information Security Management (ISM) and Enterprise Risk Management (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. As a cross-cutting concern, the Security Architecture impacts and informs the Business, Data, Application, and Technology Architectures (see Figure 15). 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.

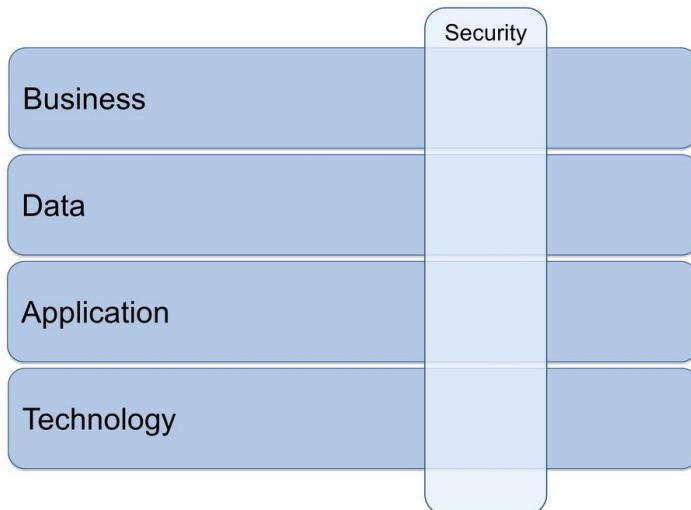


Figure 15. Security as a Cross-Cutting Concern through the Architecture

4.1.5. Enterprise Risk Management

Enterprise Risk Management (ERM) 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. Risk management should be embedded deeply and firmly in all business activities. It is a continuous lifecycle rather than an isolated activity.

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

The ISO 31000:2009 risk management process model is shown in Figure 16.

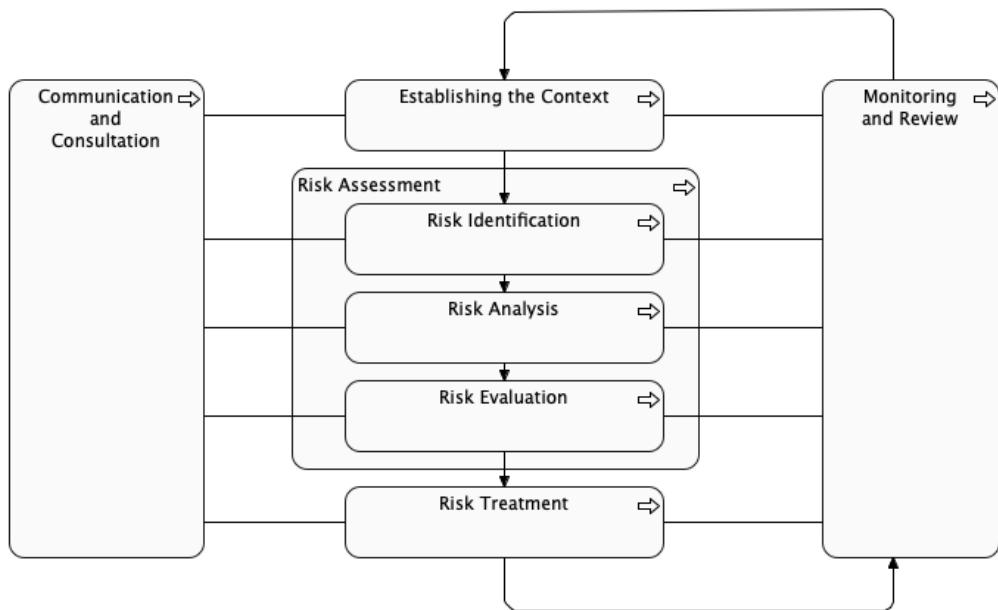


Figure 16. ISO 31000:2009 Model for Risk Management

4.1.6. 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.

4.2. Business Architecture

The TOGAF Standard provides guidance for Business Architects and Enterprise Architects to develop an Enterprise Architecture that is based upon the business model, ecosystem, value, and organizational design the organization has and needs.

4.2.1. Documentation

Table 9. TOGAF Standard Business Architecture

Document	Summary
<i>TOGAF Series Guide: Business Models</i>	This document provides a basis for Enterprise Architects to understand and utilize business models, which describe the rationale of how an organization creates, delivers, and captures value. It covers the concept and purpose of business models and highlights the Business Model Canvas™ technique.
<i>TOGAF Series Guide: Business Capabilities, Version 2</i>	This document answers key questions about what a business capability is, and how it is used to enhance business analysis and planning. It addresses how to provide the architect with a means to create a capability map and align it with other Business Architecture viewpoints in support of business planning processes.
<i>TOGAF Series Guide: Value Streams</i>	Value streams are one of the core elements of a Business Architecture. This document provides an architected approach to developing a business value model. It addresses how to identify, define, model, and map a value stream to other key components of an enterprise's Business Architecture.
<i>TOGAF Series Guide: Information Mapping</i>	This document describes how to develop an information map that articulates, characterizes, and visually represents information that is critical to the business. It provides architects with a framework to help understand what information matters most to a business before developing or proposing solutions.

Document	Summary
<i>TOGAF Series Guide: Organization Mapping</i>	This document shows how organization mapping provides the organizational context to an Enterprise Architecture. While capability mapping exposes what a business does and value stream mapping exposes how it delivers value to specific stakeholders, the organization map identifies the business units or third parties that possess or use those capabilities, and which participate in the value streams.
<i>TOGAF Series Guide: Business Scenarios</i>	This document describes the Business Scenarios technique, which provides a mechanism to fully understand the requirements of information technology and align it with business needs. It shows how business scenarios can be used to develop resonating business requirements and how they support and enable the enterprise to achieve its business objectives.

4.2.2. Business Models

A business model is a description of the rationale for how an organization creates, delivers, and captures value.

Business models provide a basis for establishing a common understanding of how to describe and manipulate the business in pursuit of new strategic alternatives. In that sense, business models are a starting point for discussions around business innovation and strategy planning for the allocation of resources. Business models can be represented in many different ways; for example, see the *TOGAF Series Guide: Business Models*.

The benefits of using business models include:

- Improved communication
- Providing a common perspective

4.2.3. What is a Business Capability?

A business capability is a particular ability or capacity that a business may possess or exchange to achieve a specific purpose or outcome.

A key point differentiating a business capability from say a business

process, is that it delineates what a business does without attempting to explain how, why, or where the business uses the capability.

A business capability can be something that exists today or something that is required to enable a new direction or strategy. When integrated into a business capability map, business capabilities represent all of the abilities that an enterprise has at its disposal to run its business. A key distinction is that business capability components (the *how*) will change regularly, but that the business capability endures over longer planning horizons.

4.2.4. Defining a Business Capability

Naming the business capability is the first step in the capability definition process. It establishes a clear need for the existence of the business capability and helps to ensure it is clearly distinguishable from other business capabilities.

A brief description helps to clarify the scope and purpose of the business capability and to differentiate it from other business capabilities. As with the business capability name, it helps to write all descriptions using language that is relevant and appropriate to the business stakeholders. Two important considerations are to:

1. Be concise: provide just enough detail over one or two sentences to enable greater understanding than can be gained from the business capability name alone.
2. Be precise: do not simply repeat the name of the business capability in the description, such as “the ability to manage projects” when describing “project management”.

The template shown in Table 10 can be used to define an individual business capability.

Table 10. Business Capability Template

Name		This should be a noun (“this is what we do”) rather than a verb (“this is how we do it”). Business capabilities are most often written as compound nouns; e.g., “Project Management” or “Strategic Planning”.
Description		A brief description clarifying the scope and purpose and differentiating it from other business capabilities. A useful syntax is to phrase the description of each business capability as “the ability [or capacity] to ...”.
Components	Roles	Roles represent the individual actors, stakeholders, business units, or partners involved in delivering the business capability. Roles should be described in a way that is not organization-specific.
	Processes	Identify just the core business processes within a business capability. Identifying and analyzing the efficiency of the core processes helps to optimize the business capability’s effectiveness.
	Information	The business information and knowledge required or consumed by the business capability (as distinct from IT-related data entities). There may also be information that the capability exchanges with other capabilities. Examples include information about customers and prospects, products and services, business policies and rules, sales reports, and performance metrics.
	Resources	The tools, resources, or assets that a business capability relies on for successful execution. Examples include IT systems and applications, physical tangible assets (buildings, machinery, vehicles, etc.), and intangible assets such as money and intellectual property.

A business capability example, “Recruitment Management”, is shown in Table 11.

Table 11. Business Capability Example – Recruitment Management

Name		Recruitment Management
Description		The ability to solicit, qualify, and provide support for hiring new employees into the organization.
Components	Roles	<p>User:</p> <ul style="list-style-type: none"> • Recruiter <p>Stakeholders:</p> <ul style="list-style-type: none"> • Manager • Candidate Employee
	Processes	<p>Evaluate New Hire Requisitions</p> <p>Recruit/Source Candidates</p> <p>Screen and Select Candidates</p> <p>Hire Candidate</p>
	Information	<p>Candidate/Applicant Details</p> <p>Position Descriptions</p> <p>Recruitment Agency Data</p> <p>Industry Standard Role Definitions</p>
	Resources	<p>Recruitment Management Application</p> <p>HR Application</p> <p>Social Media Application</p>

4.2.5. What is a Business Capability Model?

A business capability model represents the currently active, stable set of business capabilities (along with all of their defining characteristics) that cover the business, enterprise, or organizational unit in question.

The first task of business capability modeling is to capture and document all of the business capabilities that represent the full scope of what the business segment under consideration does today (irrespective of how well it does it) or what it desires to be able to do in the future. The second task is to organize that information in a logical manner.

The end product of the modeling process is typically a Business Capability Map, which provides the visual depiction (or blueprint) of all the business capabilities at an appropriate level of decomposition, logically grouped into different categories or perspectives to support more effective analysis and planning.

Table 12. Example Level 1 Business Capability Model for ABC Company

Strategic	Business Planning	Market Planning	Partner Management
	Capital Management	Policy Management	Government Relations Management
Core	Account Management	Product Management	Distribution Management
	Customer Management	Channel Management	Agent Management
Supporting	Financial Management	HR Management	Procurement Management
	Information Management	Training Management	Operations Management

4.2.6. Mapping Capabilities to Other Business Perspectives

Having identified and organized the business capabilities into a business capability model, it is then possible to apply the information to business analysis and planning.

There are two aspects to consider:

1. Adding a heat map to the business capability model itself.
2. Mapping the relationships between the business capabilities and other business and IT architecture domains, using cross-mapping techniques such as capability/organization mapping, and capability/value stream mapping (see Section 4.2.11).

These are described in detail in the *TOGAF Series Guide: Business Capabilities, Version 2*.

4.2.7. What is a Value Stream?

A value stream (a simple example of which is shown in Figure 17) is depicted as an end-to-end collection of value-adding activities that create an overall result for a customer, stakeholder, or end user. In modeling terms, those value-adding activities are known as value stream stages, each of which creates and adds incremental stakeholder value from one stage to the next.



Figure 17. Example of a Value Stream

Value streams may be externally triggered, such as a retail customer acquiring some merchandise, as shown in Figure 17. Value streams may also be internally triggered, such as a manager obtaining a new hire. Value streams may be defined at an enterprise level or at a business unit level. Either way, the complete set of value streams (as depicted in a value stream diagram or map) is simply the visual representation of all the value streams that denote an organization's primary set of business activities. It is an

aggregation of the multiple ways in which the enterprise creates value for its various stakeholders.

4.2.8. The Benefits of Value Streams

Mapping value streams as part of a broader Business Architecture initiative is a quick and easy way to obtain a snapshot of the entire business, since those value streams represent all the work that the business needs to perform – at least from a value-delivery perspective.

Doing so helps business leaders assess their organization's effectiveness at creating, capturing, and delivering value for different stakeholders.

4.2.9. Defining a Value Stream

Table 13. Value Stream Template

Name	The value stream name must be clearly understandable from the initiating stakeholder's perspective. In contrast to the way that business capabilities are named, value streams use an active rather than passive tense. That usually means a verb-noun construct. For example, "Acquire Retail Product" and "Recruit Employee".
Description	While the value stream name should be self-explanatory, a short, precise description can provide additional clarity on the scope of activities with which the value stream deals.
Stakeholder	The person or role that initiates or triggers the value stream.
Value	The value (expressed in stakeholder terms) that the stakeholder expects to receive upon successful completion of the value stream. That value is an aggregation of the incremental value items that are delivered by each value stream stage.

Continuing with the earlier example shown in Figure 17, we can define the value stream as shown in Table 14.

Table 14. Example Value Stream Definition

Name	Acquire Retail Product
Description	The activities involved in looking for, selecting, and obtaining a desired retail product.
Stakeholder	A retail shopper wishing to purchase a product.
Value	Customers are able to locate desired products and obtain them in a timely manner.

4.2.10. Decomposing a Value Stream

Value, as shown in a value stream, is achieved through a series of sequential and/or parallel actions, known as value stream stages, that incrementally create and add stakeholder value from one stage to the next.

It is possible to decompose a value stream by defining the value stream stages, as shown in Table 15.

Table 15. Value Stream Stage Template

Name	Two to three words identifying what is (or will be) achieved by this stage.
Description	A few sentences explaining the purpose and the activities performed during the value stream stage.
Stakeholders	Actors who receive measurable value from the value stream stage, or who contribute to creating or delivering that value.
Entrance Criteria	The starting condition or state change that either triggers the value stream stage or enables it to be activated.
Exit Criteria	The end state condition that denotes the completion of the value stream stage; i.e., when the required value has been created or delivered to the stakeholders. This information becomes the entry criteria for the next value stream stage.
Value Item	The incremental value that is created or delivered to the participating stakeholder(s) by the value stream stage.

Table 16 decomposes the earlier example, and lists the elements of each

value stream stage, including a description, the participating stakeholders, entry criteria, exit criteria, and the value delivered from each stage. This retail example deals with physical storefronts as well as online sites, so the terms used could apply to either channel or type of customer interaction.

Table 16. Acquire Retail Product Value Stream Stages

Value Stream Stage	Description	Participating Stakeholders	Entrance Criteria	Exit Criteria	Value Item
Advertise Channels	The act of making customers aware of the company's products.	Store or Website Owner, Marketing	Customer searches for product	Customer selects channel	Retail channel available to customer
Display Merchandise	The act of presenting products in a physical or searchable digital form.	Store Employees, Inventory Manager, Web Designer	Customer selects channel	Customer views products	Product options provided to customer
Enable Selection	The act of enabling filtering and assessments of the best product(s) matched to the customer's needs.	Store Employees, Web Designer, Retail Shopper	Customer views products	Customer selects product	Desired product located
Process Payment	The act of taking and processing payment from the customer.	Cashier, Financial Entities, Retail Shopper	Customer selects product	Charges paid	Delivery commitment
Deliver Merchandise	The act of getting the product into the customer's hands.	Warehousing, Transportation, Retail Shopper	Charges paid	Product delivered	Product in user's possession

4.2.11. Mapping Value Streams to Capabilities

Figure 18 uses the Recruit Employee value stream from the *TOGAF Series Guide: Value Streams* to illustrate both mapping a value stream to business capabilities, as well as the use of a heat map. In this example an analysis has been made as to how well each business capability supports the required value to be delivered by the value stream stage, with green indicating a good match, yellow indicating some changes needed, and red indicating significant gaps between what is needed and what is present.

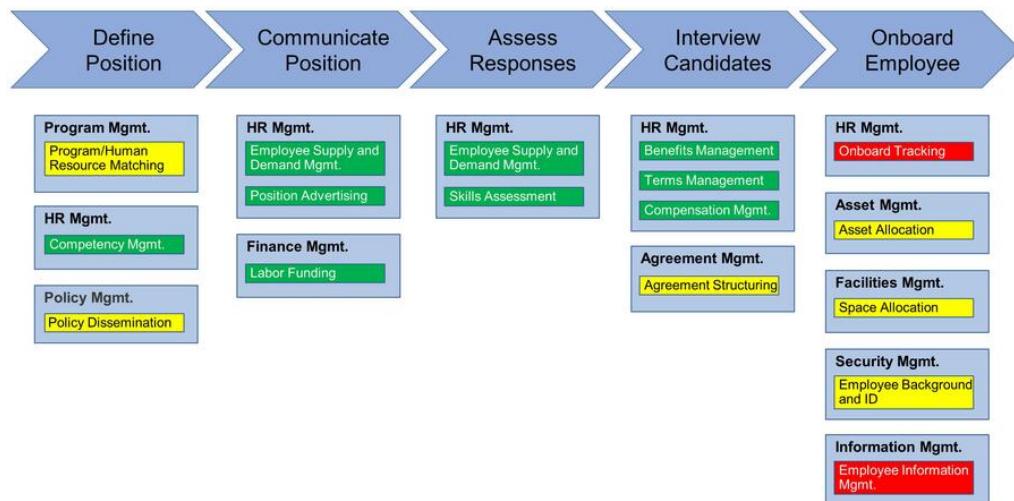


Figure 18. Value Stream/Capability Heat Map Example

4.2.12. Information Mapping

information mapping provides the architect with a means to articulate, characterize, and visually represent the information that is critical to the business, and to shape its representation in ways that enable a more detailed analysis of how the business operates today – or how it should operate at some point in the future.

An information map is a collection of information concepts and their relationships to one another.

Mapping information in Business Architecture starts with listing those elements that matter most to the business as well as how they are described in business terms. A useful way to discern an information concept is to

listen for the nouns that are used when talking about the business. Every noun is potentially an information concept. By using a noun-challenge process, it is possible to determine if the noun represents an item of information that the business cares about. In other words, does anyone in the business need to know, store, or manipulate the thing that the noun represents?

A simple, high-level example of an information map is shown in Figure 19. This shows some key information concepts and inter-relationships that might be found at a financial company.

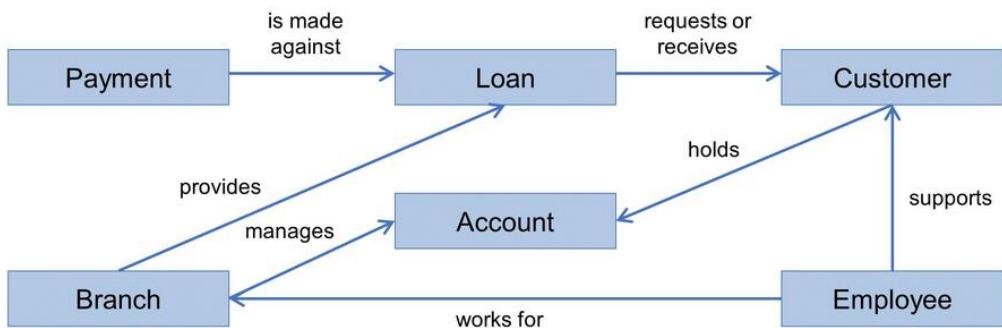


Figure 19. Simple Information Map for a Financial Institution

Information maps can also be formally modeled; for example, as ArchiMate models, Unified Modeling Language™ (UML®) class diagrams, and Entity Relationship Diagrams (ERDs).

Information maps can be mapped to business capabilities, value streams, as well as organization maps. For more details, see the *TOGAF Series Guide: Information Mapping*.

4.2.13. Organization Mapping

An organization map is a Business Architecture blueprint that shows:

1. The main organizational units, partners, and stakeholder groups that comprise the ecosystem of an enterprise.
2. The working relationships (informal as well as formal) between each of those entities.

These two primary characteristics reflect what distinguishes organization

maps from traditional organization charts, which are more likely to portray the reporting lines that exist between named individuals who are in charge of each department. Instead of describing the business in terms of a top-down hierarchy that is focused on people and titles, an organization map depicts it in more fluid terms – as a network of relationships and interactions between business entities that may extend beyond the legal boundaries of the enterprise.

The benefits of organization mapping include:

- Improves understanding of the organization
- Improves strategic planning
- Provides organizational context for deployment
- Improves communication and collaboration
- Improves the effectiveness of organizational change management

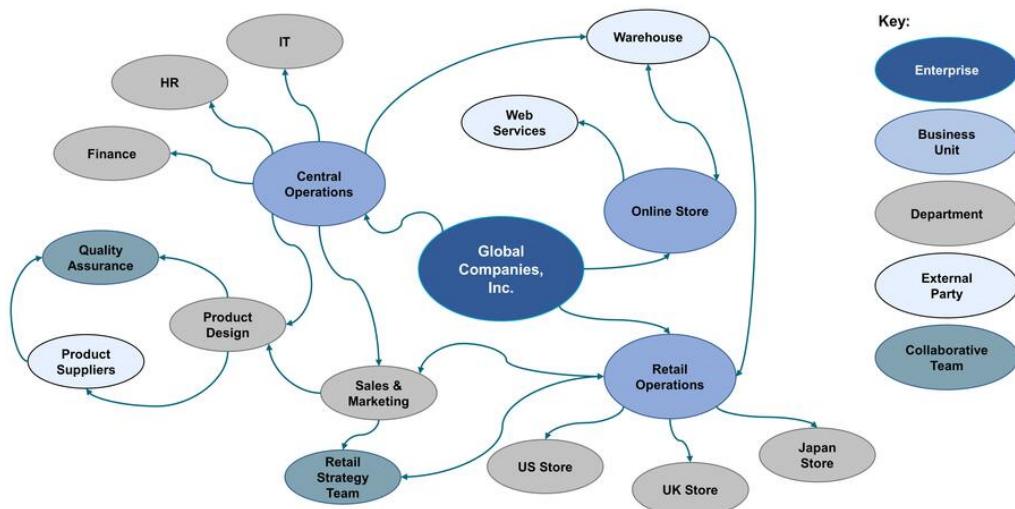


Figure 20. Generic Organization Map

Organization maps, as shown in Figure 20, depict internal and external relationships as well as the collaborations from across the enterprise and beyond to include its ecosystem of business partners and stakeholders. The central oval (the enterprise) should be interpreted as denoting the total scope to be represented in the map, not just as the name of the legal entity. Also note that all of these entities are organization units, while the term

business unit is being used to denote the next level below the enterprise (in this case representing business functions).

An organization map can be extended, as shown in Figure 21, to show the relationships between organization units and other Business Architecture domains such as business capabilities.

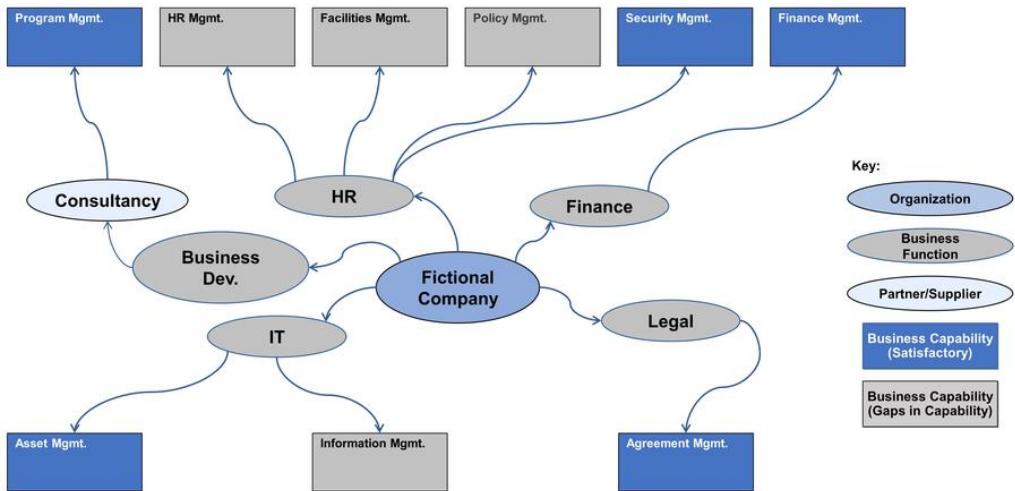


Figure 21. Organization Map for the Recruit Employee Value Stream with Business Capabilities

4.2.14. Business Scenarios

The Business Scenario method is used as a technique to help identify and understand the business requirements that an architecture must address. A good business scenario represents a significant business need or problem and enables vendors to understand the value of a solution to the customer.

A business scenario describes:

- A business process, application, or set of applications
- The business and technology environment
- The people and computing components (“actors”) who execute the scenario
- The desired outcome of proper execution

The method can be used in any ADM phase. Most notably it can be used in

the Preliminary Phase to define requirements for establishing an Enterprise Architecture Capability, the initial phase of an ADM cycle, Phase A (where it is used to define relevant business requirements and to build consensus with stakeholders), as well as in the Business Architecture phase, to derive the characteristics of the architecture directly from the high-level requirements of the business. The technique may be used iteratively, at different levels of detail in the hierarchical decomposition of the Business Architecture.

The method is as follows:

- Identify, document, and rank the problem that is driving the scenario
- Document, as high-level architecture models, the business and technical environments where the problem situation is occurring
- Identify and document desired objectives; the results of handling the problems successfully (ensure the objectives are SMART)
- Identify human actors (participants) and their place in the business model
- Identify computer actors (computing elements) and their place in the technology model
- Check for fitness-for-purpose, and refine only if necessary

4.3. Data/Information Architecture

4.3.1. Documentation

Table 17. TOGAF Standard Data/Information Architecture

Document	Summary
<i>TOGAF Series Guide: Information Architecture: Customer Master Data Management (C-MDM)</i>	This document describes an approach for implementing Customer Master Data Management (C-MDM) in an organization. It includes people, process, organizations, and systems to manage customer master data as an asset.

4.3.2. Customer Master Data Management (C-MDM)

The purpose of C-MDM in an organization is to increase the value of customer information shared across the organization. It is a data foundation for most organizations.

The *TOGAF Series Guide: Information Architecture: Customer Master Data Management (C-MDM)*, Chapter 4, describes an adaptation of the TOGAF ADM to support the execution of a C-MDM transformation program.

4.4. Agile Methods

4.4.1. Documentation

Table 18. TOGAF Standard Agile Methods

Document	Summary
<i>TOGAF Series Guide: Enabling Enterprise Agility</i>	This document describes in general terms how the TOGAF Standard 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.
<i>TOGAF Series Guide: Applying the TOGAF ADM using Agile Sprints</i>	<p>This document describes how sprints can be applied in a number of scenarios:</p> <ul style="list-style-type: none"> — Collaboratively applying Enterprise Architecture and the TOGAF ADM following an Agile approach — Creating an Enterprise Architecture tuned for use together with Agile practices — Supporting and collaborating with Agile teams for a given business need — Enabling Enterprise Architects to leverage an Agile practice to assure that the Agile delivery of a solution is in alignment with strategic objectives

4.4.2. 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 re-prioritization 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

Agility 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

4.4.3. 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 22.

Top-down, the *Enterprise Strategic Architecture* provides a high-level view of the area of the enterprise impacted by change. It enables an 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.

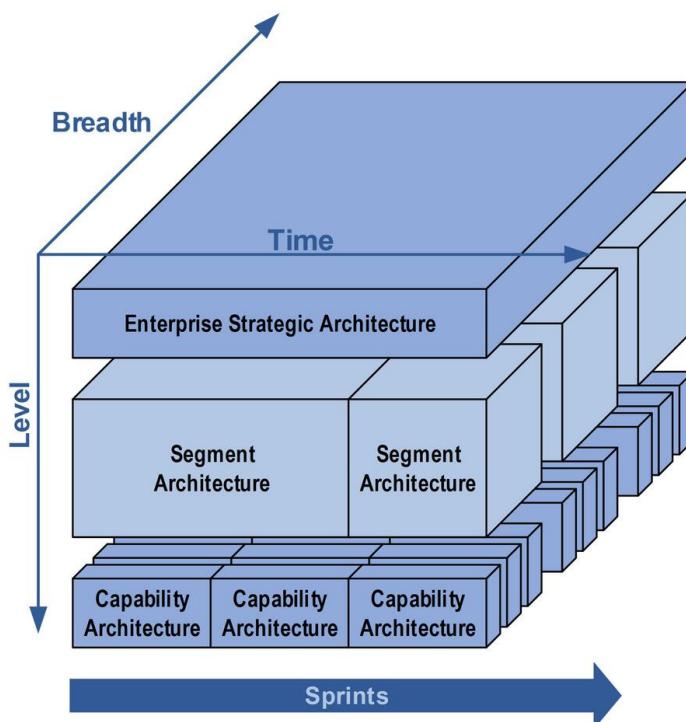


Figure 22. Summary Classification Model for Architecture Landscapes

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. 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.

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.

4.4.4. An Approach to Structuring Agile Enterprise Architecture

An approach to applying Agile Enterprise Architecture is through a hierarchy of ADM cycles, as illustrated in Figure 23.

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 already 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.

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.

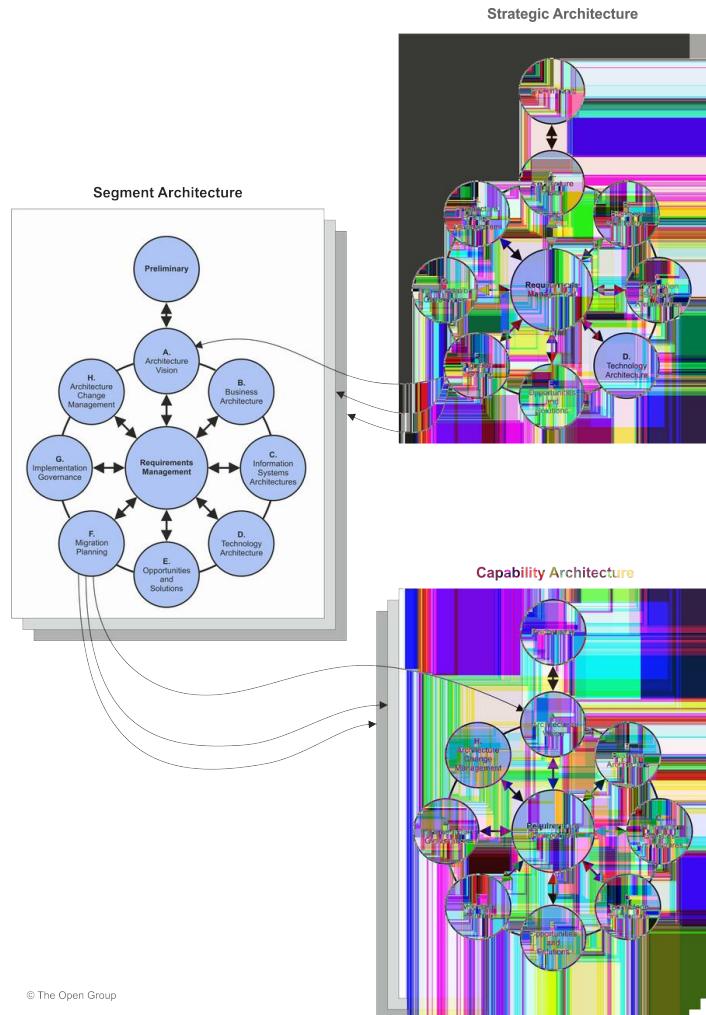


Figure 23. A Hierarchy of ADM Processes Example

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* “Big Design Up Front” (BDUF), which results in exploring too much detail too soon without the benefit of feedback from delivery sprints. This is often referred to as the Minimum Viable Architecture (MVA).

4.4.5. Mapping to Agile Concepts

The hierarchy of ADM processes approach can also be applied using techniques such as SAFe® and Scrum. 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. This is illustrated in Figure 24.

4.4.6. Agile Product Management

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^[2] and business model canvassing, help to shape the architecture direction to achieve the solution. Requirements often come on a just-in-time 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 common domains of architecture and more emphasis on collaborative views across all domains focused around the required product.

An important concept for Agile Architecture is intentional architecture, which specifies a set of purposeful, planned architectural strategies and initiatives to enhance solution design, performance, and usability as well as providing guidance for inter-team design and implementation synchronization.

In Figure 25, 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 sprint backlog is defined and also the intentional architecture that will guide implementation (deploy target). Change management will address any new requirements and will support the refinement and prioritization for the product backlog.

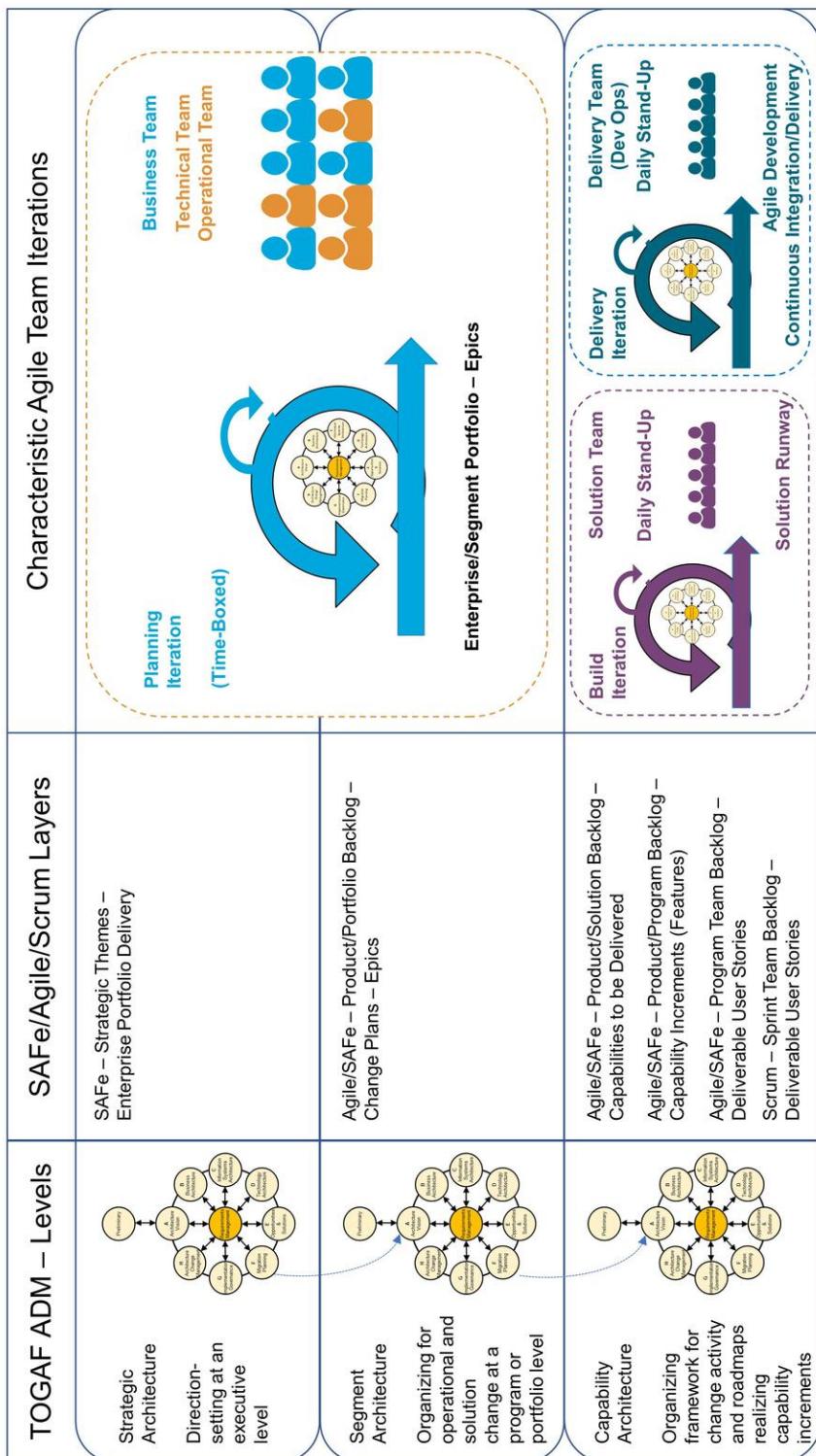


Figure 24. ADM Levels Mapped to Agile Delivery Concepts

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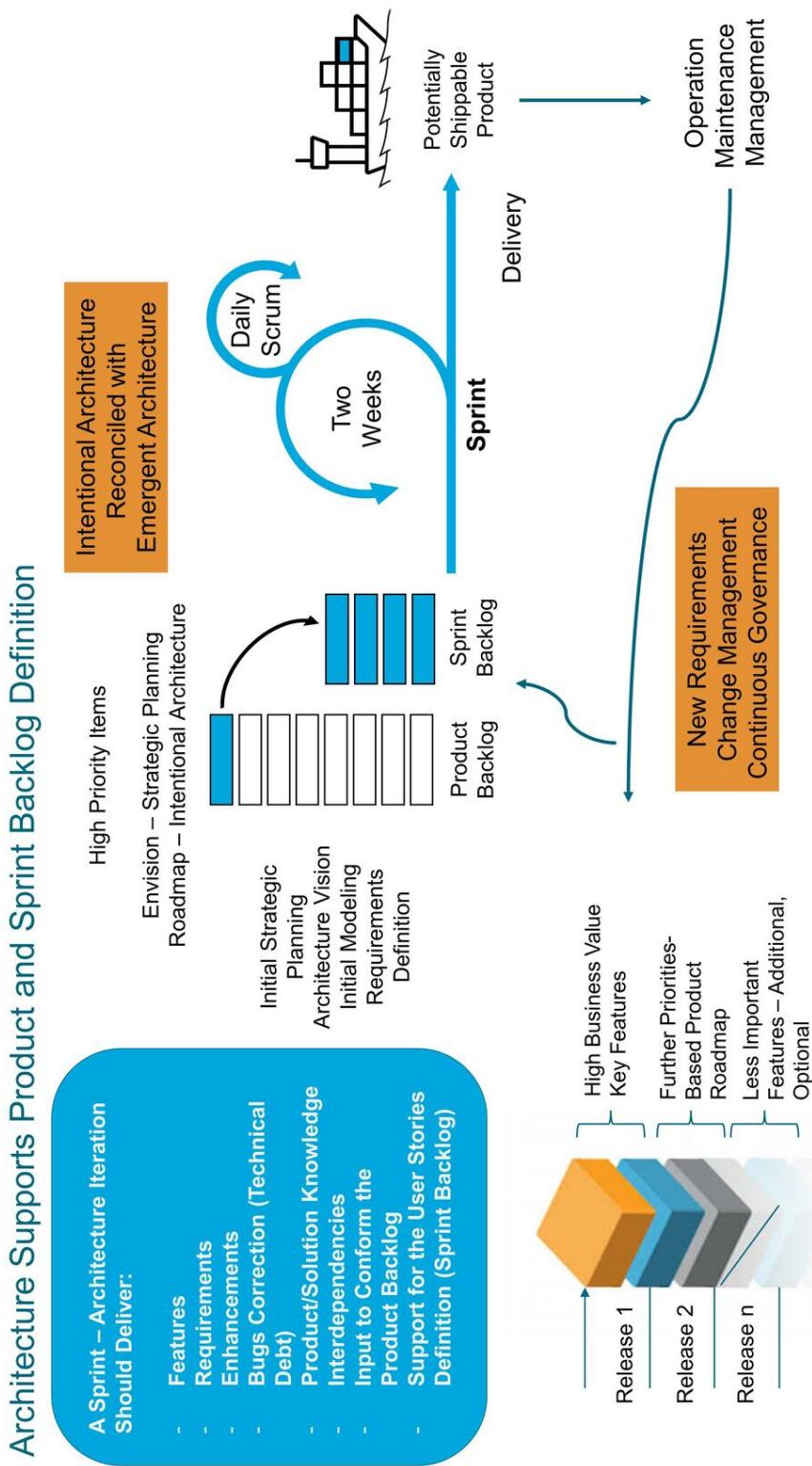


Figure 25. Agile Architecture and Product Development

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4.4.7. How to Sprint with the TOGAF ADM

There are a number of ways to use sprints in Enterprise Architecture development. This section briefly explains four different Agile Enterprise Architecture approaches, as shown in Figure 26. The choice of which to apply depends on the needs of the Agile practice in the organization.

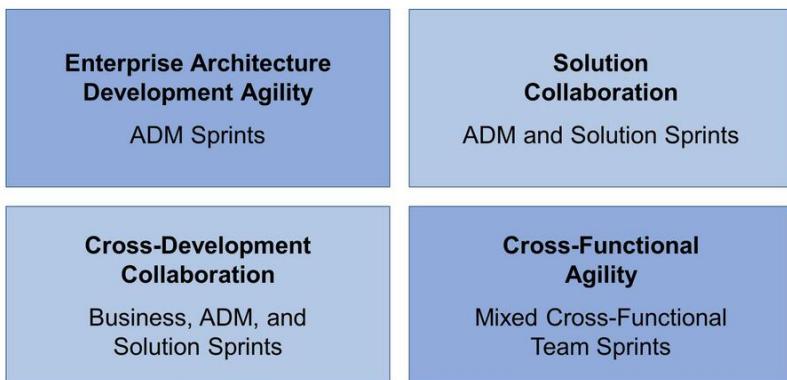


Figure 26. Agile Enterprise Architecture Collaboration Approaches

The four ways of collaboration are described in Table 19.

Table 19. Agile Enterprise Architecture Collaboration Approaches

Collaboration Approach	Summary
Enterprise Architecture Development Agility	<p>Deliver the Enterprise Architecture for the business change using sprints.</p> <p>The necessary ADM phases (A to F) to deliver the Enterprise Architecture are divided into a set of sprints, often with a slice (partition) of the ADM (A to F) in each sprint. Governance will be applied following the TOGAF governance framework that may also be adapted to be applied in an Agile way.</p>
Solution Collaboration	<p>Deliver the solution(s) with collaborating Enterprise Architecture and Agile Solution team sprints.</p> <p>Each sprint contains both Enterprise Architecture and Agile solution development. The Enterprise Architecture team will create MVAs for subsequent development sprints.</p>

Collaboration Approach	Summary
Cross-Development Collaboration	<p>Deliver the solutions with collaborating Agile business development, Agile Enterprise Architecture, and Agile solution development sprints.</p> <p>Each sprint contains Agile business development, Agile Enterprise Architecture, and Agile solution development. The Business Development team will create Minimum Viable Business Developments (MVBDS) for subsequent Enterprise Architecture sprints, and the Enterprise Architecture team will create MVAs for subsequent development sprints. Delivering Enterprise Architecture has contexts and within each context the interpretation of the sprint, outcome, and membership will vary.</p>
Cross-Functional Agility	<p>Deliver the solution with mixed, cross-functional Sprint teams all containing Agile business development, Agile Enterprise Architecture, and Agile solution development competencies.</p> <p>Each Sprint team contains business development, Enterprise Architecture, and Agile solution development competencies to break silos and ensure consistent innovation. These competencies are collaborating in the same team.</p>

For more detail see the *TOGAF Series Guide: Applying the TOGAF ADM using Agile Sprints*.

4.5. TOGAF Standard Reference Models and Method

4.5.1. Documentation

Table 20. TOGAF Standard Reference Models and Method

Document	Summary
<i>TOGAF Series Guide: TOGAF Digital Business Reference Model (DBRM)</i>	This document provides an industry-independent outline of common core components that are essential building blocks for the modern digital enterprise. It enables organizations to develop an appropriate digital architecture blueprint in response to their changing strategies, business model, operating model, and operations.
<i>TOGAF Series Guide: Government Reference Model</i>	This document provides a standard reference model template that can be used to describe any business in the public sector and allow for different architecture approaches and analysis techniques. It gives public sector organizations a common way to view themselves in order to plan and execute effective transformational change.
<i>TOGAF Series Guide: Architecture Maturity Models</i>	This document introduces the concept of Architecture Capability Maturity Models; techniques for evaluating and quantifying an organization's maturity in Enterprise Architecture, including a publicly available framework as an example, which can be used by any enterprise to develop their own organization-specific maturity model.
<i>TOGAF Series Guide: Architecture Project Management</i>	This document provides guidelines for TOGAF architects on how to manage an Architecture Project using an approach that supplements the TOGAF ADM with selected project management techniques. The goal of this approach is to enhance an Architecture Project's chances of success through better planning, monitoring, and communication.
<i>TOGAF Series Guide: Architecture Skills Framework</i>	This document provides a set of role, skill, and experience norms for staff undertaking Enterprise Architecture work. It provides a view of the competency levels for specific roles within the Enterprise Architecture team, defining specific roles, the skills required by those roles, and the depth of knowledge required to fulfill each role successfully.

4.5.2. Digital Business Reference Model (DBRM)

The Digital Business Reference Model (DBRM) presents a generic reference model that may be adapted and used by organizations to enable sustainable enterprise design, organizational agility, and interoperability in response to the evolving customer needs and the business ecosystem.

The high-level view of the DBRM is depicted in Figure 27.

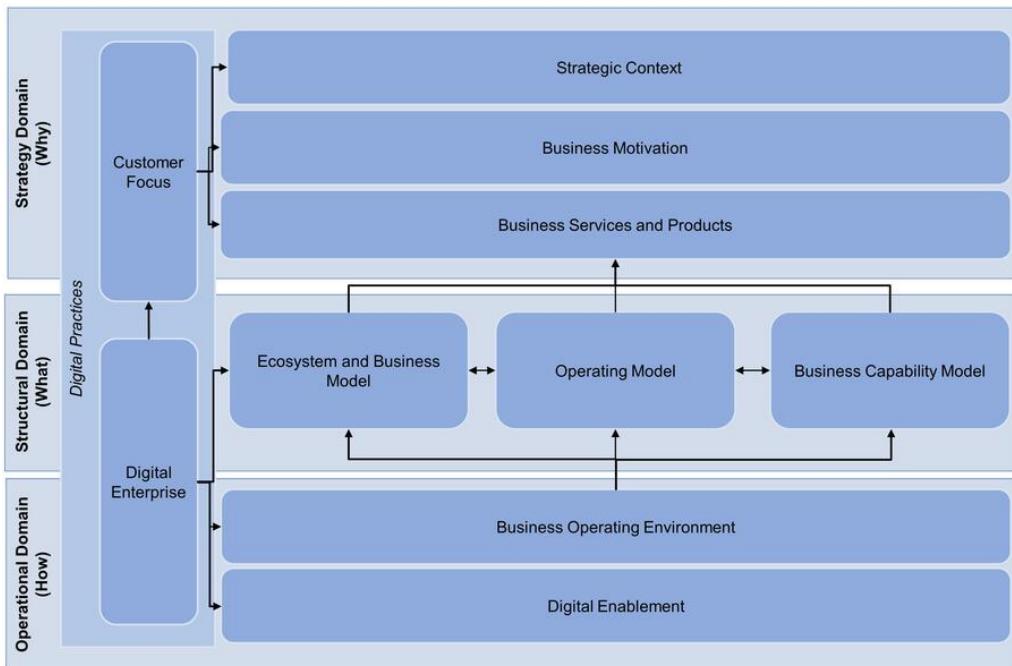


Figure 27. DBRM Elements — High-Level View

The DBRM provides guidance on the adoption of relevant aspects of The Open Group TOGAF Standard and other related standards, particularly The Open Group DPBoK and Open Agile Architecture standards.

The DBRM consists of ten core elements categorized into four domains as follows:

- Digital Domain:
 - Customer Focus
 - Digital Enterprise
- Strategy Domain:

- Strategic Context
- Business Motivation
- Business Services and Products
- Structural Domain:
 - Ecosystem and Business Model
 - Operating Model
 - Business Capability Model
- Operational Domain:
 - Business Operating Environment
 - Digital Enablement

The four domains – Digital, Strategic, Structural, and Operational – enable the DBRM to address specific stakeholder concerns and enable consistent stakeholder management.

The Digital Domain is essential to enable an outside-in approach for the creation and management of Digital Products and Services with an increasing digital component or to lead the organization through the digital journey towards a digital business.

The Strategy Domain is addressed by the Strategic Context, Business Motivation, and Business Services and Products elements, which are about determining the “why” of the business.

Underpinning the core Business Services and Products element are the elements of the DBRM that focus on the “what” of the business – the Ecosystem and Business Model, Operating Model, and Business Capability Model are inter-related. They collectively define the means with which the business will establish and deliver the identified core business services to achieve the intended business objectives as defined in the Business Motivation element. They address the Structural Domain of the DBRM.

The Operational Domain is addressed by the Business Operating Environment and Digital Enablement elements – the “how” of the business. They enable the business to deliberately determine the requirements and

implications of the Business Operating Environment in response to the intended business strategy.

4.5.3. Government Reference Model

The Government Reference Model (GRM) gives public sector organizations a common way to view themselves in order to plan and execute effective transformational change. It provides a standard reference model template that can be used to describe any business in the public sector and allow for different architecture approaches and analysis techniques. The intended audience of the GRM includes decision-makers and designers of change in the public sector.

Table 21 shows the names and description of various types of sectors that are in the GRM.

Table 21. GRM Sectors and Descriptions

Sector	Definition
International Affairs and Trade	Activities undertaken by the government to facilitate financial support and trade with international economies, and related to the conduct and implementation of policies, aid programs, treaties, and diplomatic relations.
Defense and Security	Corresponds to the research, maintenance, equipment, procurement, and development of forces, weapons, and related entities. This also comprises remuneration and benefits paid to all active and non-active civilians and personnel.
General Government (Customer Service, Customer Operations) and Local Services	The provision of general customer services and operations including registrations, licensing, applications, workforce planning, social services, management of labor rights, and local services.
Young People and Education	Educational programs that correspond to early years, primary school, secondary school, higher education, and specialist schooling; children's social services, safeguarding, and associated children and adolescent services; and skill or training activities undertaken by the government to promote education.

Sector	Definition
Health and Community Wellbeing	Encompasses medical and nursing governance, strategy and care services provided to individuals and families, research, and the provision of hospital and community services to safeguard mental and physical health.
Judiciary, Justice, and Home Affairs	Covers the total cost of judiciary, prosecution, expenses connected with funding protection, law enforcement services, and the cost of criminal justice including the incarceration, supervision, parole, and rehabilitation of prisoners.
Financial	Maintains controls over public spending, revenue, financial reporting, auditing, and providing the direction for future investment decisions and financial planning.
Growth, Housing, and Environment	Activities that ensure natural and urban environment responsibility, provision of core infrastructure, and protection of citizens' standards of living and safety through the licensing and enforcement of regulation.
Policy, Performance, Population, and Innovation	Involves the development of policy across the government, the provision of statistics for population and performance against benchmarks to ensure continuous improvement, and incorporates strategic and long-term planning to identify future risks, opportunities, and solutions.
Shared Services	Co-ordinates and manages people, communications, finance, and transformation services on behalf of the public in order to facilitate the transfer of information and oversight of people, processes, and technology to support procurement and align to corporate strategy.
Transport and Operations	Activities that enable general operations and guarantee the safe transfer and availability of people and goods over land, air, sea, and space.

The reference model provides a taxonomy for each service provisioned by the government and a common language that simplifies complex information components, enables consistency of cross-government services and common capabilities, and delivers a consistent view of commonly required operational services.

An example extract from the model is shown in Figure 28.



Figure 28. Elements of Judiciary, Justice, and Home Affairs Sector

4.5.4. Architecture Maturity Models

Organizations that can manage change effectively are generally more successful than those that cannot. Many organizations know they need to improve their processes in order to successfully manage change, but do not know how. Such organizations typically either spend very little on process improvement (because they are unsure how to proceed), or spend a lot on a number of parallel and unfocused efforts, to little or no avail.

Architecture Maturity Models, more formally known as Capability Maturity Models (CMMs), address this problem by providing an effective and proven method for an organization to gradually gain control over and improve its change processes. Such models provide the following benefits:

- They describe the practices that any organization must perform in order to improve its processes
- They provide a yardstick against which to periodically measure improvement
- They constitute a proven framework within which to manage the

improvement efforts

- They organize the various practices into levels, each level representing an increased ability to control and manage the development environment

An evaluation of the organization's practices against the model – called an “assessment” – determines the level at which the organization currently stands. It indicates the organization's ability to execute in the area concerned, and the practices on which the organization needs to focus in order to see the greatest improvement and the highest return on investment. The benefits of CMMs to effectively direct effort are well documented.

The *TOGAF Series Guide: Architecture Maturity Models* describes the US Department of Commerce Architecture Capability Maturity Model as an aid to conducting assessments.

4.5.5. Architecture Project Management

Architecture Projects are typically complex in nature. They need proper project management to stay on track and deliver on promise. The *TOGAF Series Guide: Architecture Project Management* provides Architecture Project teams with an overall view and detailed guidance on what processes, tools, and techniques of PRINCE2® or PMBOK® can be applied alongside the TOGAF ADM for project planning, monitoring, and control. It also provides a detailed mapping of the processes and deliverables of the TOGAF framework against PRINCE2 and PMBOK.

4.5.6. Architecture Skills Framework

The Architecture Skills Framework provides a set of role, skill, and experience norms for staff undertaking Enterprise Architecture work.

“Enterprise Architecture” and “Enterprise Architect” are widely used but poorly defined terms. They are used to denote a variety of practices and skills applied in a wide variety of architecture domains. There is a need for better classification to enable a more implicit understanding of what type of architect/architecture is being described.

This lack of uniformity leads to difficulties for organizations seeking to recruit or assign/promote staff to fill positions in the architecture field. Because of the different usages of terms, there is often misunderstanding and miscommunication between those seeking to recruit for, and those seeking to fill, the various roles of the architect.

The TOGAF Architecture Skills Framework attempts to address this need by providing definitions of the architecting skills and proficiency levels required of personnel, internal or external, who are to perform the various architecting roles defined within the TOGAF framework.

Skill categories include:

- Generic skills, typically comprising leadership, teamworking, interpersonal skills, etc.
- Business skills and methods, typically comprising business cases, business processes, strategic planning, etc.
- Enterprise Architecture skills, typically comprising modeling, building block design, applications and role design, systems integration, etc.
- Program or Project Management skills, typically comprising managing business change, project management methods and tools, etc.
- IT general knowledge skills, typically comprising brokering applications, asset management, migration planning, SLAs, etc.
- Technical IT skills, typically comprising software engineering, security, data interchange, data management, etc.
- Legal environment, typically comprising data protection laws, contract law, procurement law, fraud, etc.

Footnotes

[2] See the Open Agile Architecture™ Standard for a description of design thinking.

5. TOGAF Fundamental Content

This chapter describes the TOGAF Fundamental Content documents provided in the TOGAF Standard.

5.1. Introduction and Core Concepts

This document introduces the TOGAF Standard. It provides an executive overview of Enterprise Architecture and the TOGAF Standard; it describes the structure of the TOGAF documentation set, the core concepts of the framework, together with terminology and definitions that apply to the Fundamental Content. It consists of the chapters as shown in Table 22.

Table 22. Introduction and Core Concepts Summary

Chapter	Description
Introduction	A general introduction to Enterprise Architecture and the TOGAF Standard, including an executive overview.
The TOGAF Documentation Set	A description of the scope and structure of the materials that make up the TOGAF Standard, and the scope and structure of the TOGAF Library.
Core Concepts	A description of the core concepts that are used across the components of the TOGAF Standard.
Definitions	Definitions of terms that are used consistently across the components of the TOGAF Standard.
Appendices	The list of documents referenced in the TOGAF Standard, a supplementary list of definitions of terms, and commonly used abbreviations.

Core concepts in this document include high-level descriptions of the following:

- The Architecture Development Method
- Enterprise Architecture Services
- Deliverables, Artifacts, and Building Blocks
- Architecture Abstraction

- Architecture Principles
- Interoperability
- Enterprise Continuum
- Architecture Repository
- TOGAF Content Framework and Enterprise Metamodel
- Establishing and Maintaining an Enterprise Architecture Capability
- Establishing the Architecture Capability as an Operational Entity
- Using the TOGAF Standard with Other Frameworks
- Using the TOGAF Framework with Different Architecture Styles
- Architecture Views and Viewpoints
- Enterprise Agility
- Risk Management

5.2. The Architecture Development Method (ADM)

This document describes the TOGAF ADM, which is an iterative approach to developing an Enterprise Architecture. This document is described in Chapter 6.

5.3. ADM Techniques

This document provides a collection of techniques to support the application of the TOGAF approach and the TOGAF ADM.

Table 23. ADM Techniques Summary

Chapter	Description
Architecture Principles	Describes principles for the use and deployment of resources across the enterprise, and how to develop the set of general rules and guidelines for the architecture being developed. See Section 7.3.

Chapter	Description
Stakeholder Management	Describes stakeholder management, an important discipline that successful architecture practitioners can use to win support for their projects.
Architecture Patterns	Provides guidance on using architectural patterns.
Gap Analysis	Describes the technique used in the TOGAF ADM to validate an architecture that is being developed.
Migration Planning Techniques	Describes a number of techniques to support migration planning in Phases E and F. See Section 5.3.3.
Interoperability Requirements	Describes a technique for determining interoperability requirements.
Business Transformation Readiness Assessment	Describes a technique for identifying business transformation issues.
Risk Management	Describes a technique for managing risk during an architecture/business transformation project. ^[3]
Architecture Alternatives and Trade-Offs	Describes a technique to identify alternative Target Architectures and perform trade-offs between the alternatives.

5.3.1. Stakeholder Management

Stakeholder management is an important discipline that successful architects can use to win support from others. It helps them ensure that their projects succeed where others fail. The technique should be used during Phase A to identify the key players in the engagement, and also be updated throughout each phase. The output of this process forms the start of the Communications Plan (see Section 7.8).

The benefits of successful stakeholder management are that:

- The most powerful stakeholders can be identified early and their input can then be used to shape the architecture; this ensures their support and improves the quality of the models produced
- Support from the more powerful stakeholders will help the engagement win more resources, thus making the architecture engagement more likely to succeed

- By communicating with stakeholders early and frequently, the architecture team can ensure that they fully understand the architecture process, and the benefits of Enterprise Architecture; this means they can support the architecture team more actively when necessary
- The architecture team can more effectively anticipate likely reactions to the architecture models and reports, and can build into the plan the actions that will be needed to capitalize on positive reactions while avoiding or addressing any negative reactions
- The architecture team can identify conflicting or competing objectives among stakeholders early and develop a strategy to resolve the issues arising from them

5.3.2. Gap Analysis

The Gap Analysis technique is usually the final step within a phase. The basic premise is to highlight a shortfall between the Baseline Architecture and the Target Architecture; that is, items that have been deliberately omitted, accidentally left out, or not yet defined.

The steps are as follows:

- Draw up a matrix with all the Architecture Building Blocks (ABBs) of the Baseline Architecture on the vertical axis, and all the ABBs of the Target Architecture on the horizontal axis
- Add to the Baseline Architecture axis a final row labeled “New”, and to the Target Architecture axis a final column labeled “Eliminated”
- Where an ABB is available in both the Baseline and Target Architectures, record this with “Included” at the intersecting cell
- Where an ABB from the Baseline Architecture is missing in the Target Architecture, each must be reviewed

If it was correctly eliminated, mark it as such in the appropriate “Eliminated” cell. If it was not, you have uncovered an accidental omission in your Target Architecture that must be addressed by reinstating the ABB in the next iteration of the architecture design – mark it as such in the appropriate “Eliminated” cell.

- Where an ABB from the Target Architecture cannot be found in the Baseline Architecture, mark it at the intersection with the “New” row as a gap that needs to be filled, either by developing or procuring the building block

When the exercise is complete, anything under “Eliminated” or “New” is a gap, which should either be explained as correctly eliminated, or marked as to be addressed by reinstating or developing/procuring the function.

5.3.3. Migration Planning Techniques

The TOGAF Standard defines a number of techniques to support migration planning in Phases E and F. These are described in the following sections.

5.3.3.1. Implementation Factor Catalog

The Implementation Factor Catalog is used to document factors having an impact on the architecture Implementation and Migration Plan. The catalog should include a list of the factors to consider, their descriptions, and the deductions (conclusions) that indicate the actions or constraints that have to be taken into consideration when formulating the plans. Typical factors include risks, issues, assumptions, dependencies, actions, and impacts. An example catalog is shown in Table 24.

Table 24. Implementation Factor Catalog

Factor	Description	Deduction
<Name of the Factor>	<Description of the Factor>	<Impact on the Migration Plan>
Change in Technology	Reduction in staff in the call centers, saving 500 personnel, and have them replaced by AI systems.	Need for personnel training, re-assignment AI technology has major personnel savings and should be given priority.
Consolidation of Services
Introduction of New Customer Service

5.3.3.2. Consolidated Gaps, Solutions, and Dependencies Matrix

The Consolidated Gaps, Solutions, and Dependencies Matrix is used by the architect to group the gaps identified in the domain architecture gap analysis results and assess potential solutions and dependencies to one or more gaps. An example is shown in Table 25. This matrix can be used as a planning tool when creating work packages. The identified dependencies drive the creation of projects and migration planning in Phases E and F.

Table 25. Consolidated Gaps, Solutions, and Dependencies Matrix

#	Architecture	Gap	Potential Solutions	Dependencies
1	Business	New Order Processing Process	Use COTS software tool process Implement custom solution	Drives Application #2
2	Application	New Order Processing Application	COTS software tool X Develop in-house	
3	Data	Consolidated Customer Database	Use COTS customer database Develop customer data mart	

5.3.3.3. Architecture Definition Increments Table

The Architecture Definition Increments Table is used by the architect to plan a series of Transition Architectures outlining the status of the Enterprise Architecture at specified times. A table should be drawn up, as shown in Table 26, listing the projects and then assigning their incremental deliverables across the Transition Architectures.

Table 26. Example Architecture Definition Increments Table

Project	April 2020/2021	April 2021/2022	April 2022/2023	Comments
	Transitional Architecture 1: Preparation	Transitional Architecture 2: Initial Operational Capability	Transitional Architecture 3: Benefits	
Enterprise e-Services Capability	Training and Business Process	e-licensing Capability	e-employment Benefits	
IT e-Forms	Design and Build			
IT e-Information Environment	Design and Build Information Environment	Client Common Data Web Content Design and Build	Enterprise Common Data Document Management Design and Build	
...

5.3.3.4. Transition Architecture State Evolution Table

The Transition Architecture State Evolution Table is used by the architect to show the proposed state of the architectures at various levels using the defined taxonomy for the enterprise.

Table 27. Example Transition Architecture State Evolution Table

Sub-Domain	Service	Transition Architecture 1	Transition Architecture 2	Transition Architecture 3
Infrastructure Applications	Information Exchange Services	Solution System A (replace)	Solution System B-1 (transition)	Solution System B-2 (new)
	Data Management Services	Solution System D (retain)	Solution System D (retain)	Solution System D (retain)
...	...			

A table should be drawn, listing the services from the taxonomy used in the enterprise, the Transition Architectures, and proposed transformations, as shown in Table 27. All SBBs should be described with respect to their delivery and impact on these services. They should also be marked to show the progression of the Enterprise Architecture. In the example, where target capability has been reached, this is shown as “new” or “retain”; where capability is transitioned to a new solution, this is marked as “transition”; and where a capability is to be replaced, this is marked as “replace”.

5.3.3.5. Business Value Assessment Matrix

The business value assessment matrix is a matrix based on a value index dimension and a risk index dimension. It is used to assess the business value of a project.

An example is shown in Figure 29, showing Projects A through H. The value index should include criteria such as compliance to principles, financial contribution, strategic alignment, and competitive position. The risk index should include criteria such as size and complexity, technology, organizational capacity, and impact of a failure. Each criterion should be assigned an individual weight.

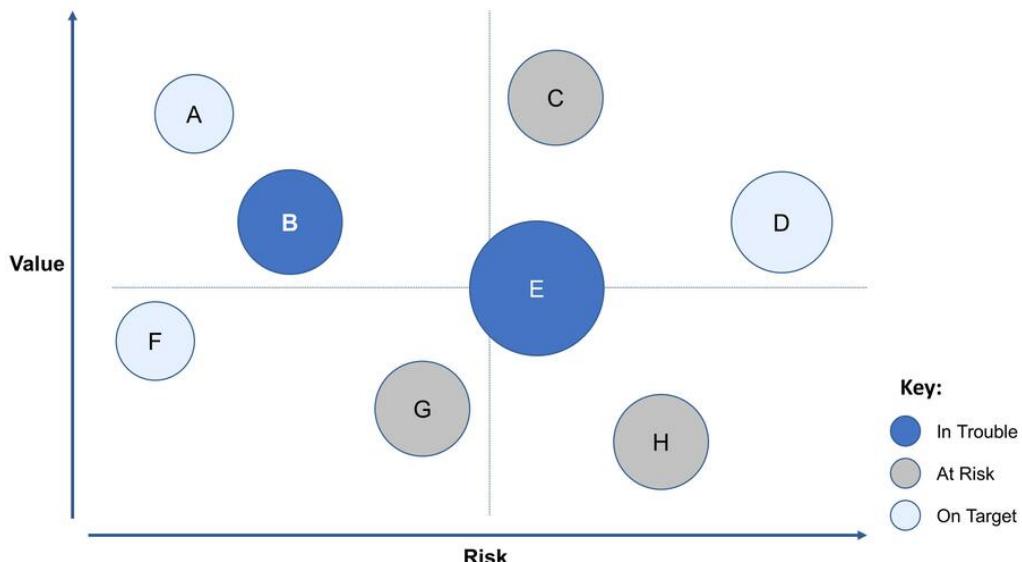


Figure 29. Example Business Value Assessment Matrix

5.3.4. Risk Management

Identification of business transformation risks and mitigation activities is first determined in Phase A. Risk management is a technique used to mitigate risk when implementing an architecture project.

It includes a process for managing risk consisting of the following activities:

- Risk classification
- Risk identification
- Initial risk assessment
- Risk mitigation and residual risk assessment
- Risk monitoring

It is recommended that risk mitigation activities be included within the Statement of Architecture Work (see Section 7.6).

5.3.5. Architecture Alternatives and Trade-Offs

There is often more than one possible Target Architecture that would conform to the Architecture Vision, Architecture Principles, and Requirements. It is important to identify alternative Target Architectures and build understanding of different possibilities and identify trade-offs between the alternatives. Creating an architecture normally requires trade-offs among competing forces. Presenting different alternatives and trade-offs to stakeholders helps architects to extract hidden agendas, principles, and requirements that could impact the final Target Architecture. Figure 30 illustrates the architecture trade-off method.

Figure 30. Architecture Trade-Off Method

5.4. Applying the ADM

This document provides guidelines for adapting the TOGAF ADM to deal with a number of usage scenarios.

Table 28. Applying the ADM Summary

Chapter	Description
Using the TOGAF Framework with Different Architecture Styles	Discusses how the framework can be adapted to different architectural styles.
Applying Iteration to the ADM	Discusses the concept of iteration and shows potential strategies for applying iterative concepts to the ADM.
Applying the ADM Across the Architecture Landscape	Discusses the different types of architecture engagement that may occur at different levels of the enterprise – this section then also discusses how the ADM process can be focused to support different types of engagement.

Chapter	Description
Architecture Partitioning	Discusses how partitions are used to simplify the development and management of the Enterprise Architecture.

5.4.1. Architecture Styles

The Architecture Development Method (ADM) process can be adapted to deal with many different usage scenarios, including different process styles (e.g., the use of iteration) and also specific specialist architectures (such as security). Architectural styles differ in terms of focus, form, techniques, materials, subject, and time period. The TOGAF Standard is a generic framework intended to be used in a wide variety of environments. It is a flexible and extensible framework that can be readily adapted to a number of architectural styles.

An organization's Architecture Landscape can be expected to contain architecture work that is developed in many architectural styles. The TOGAF Standard ensures that the needs of each stakeholder are appropriately addressed in the context of other stakeholders and the Baseline Architecture.

When using the TOGAF Standard to support a specific architectural style the practitioner must take into account the combination of distinctive features in which architecture is performed or expressed. As a first step, the distinctive features of a style must be identified.

The second step is determining how these distinctive features will be addressed. Addressing a distinctive style should not call for significant changes to the TOGAF framework; instead it should adjust the models, viewpoints, and tools used by the practitioner.

In Phase B, Phase C, and Phase D the practitioner is expected to select the relevant architecture resources, including models, viewpoints, and tools, to properly describe the architecture domain and demonstrate that stakeholder concerns are addressed. Depending upon the distinctive features, different architectural styles will add new elements that must be described, highlight existing elements, adjust the notation used to describe

the architecture, and focus the architect on some stakeholders or stakeholder concerns.

Addressing the distinctive features will usually include extensions to the Architecture Content Metamodel and the use of specific notation or modeling techniques and the identification of viewpoints. Dominance of a particular architectural style can direct the practitioner to revisit the Preliminary Phase to make changes to the Architecture Capability or to address a distinctive feature in the expected scope of a single ADM cycle. Style-specific reference models and maturity models are commonly used tools that support a practitioner.

5.4.2. Iteration and the ADM

The graphical representation of the TOGAF ADM and the description of the ADM phases discretely in order can be read to imply a deterministic waterfall methodology. This method of presentation is provided for the purpose of quickly communicating the basics of architecture development and the architecture development cycle. In practice, two key concepts are used to manage the complexity of developing an Enterprise Architecture and managing its lifecycle — iteration and levels. The two concepts are tightly linked.

The ADM supports a number of concepts that are characterized as iteration.

Iteration to develop a comprehensive Architecture Landscape:

- Projects will iterate through the entire ADM cycle, commencing with Phase A

Each cycle of the ADM will be bound by a Request for Architecture Work. The architecture output will populate the Architecture Landscape, either extending the landscape described, or changing the landscape where required.

- Separate projects may operate their own ADM cycles concurrently, with relationships between the different projects
- One project may trigger the initiation of another project

Typically, this is used when higher-level architecture initiatives identify opportunities or solutions that require more detailed architecture, or when a project identifies landscape impacts outside the scope of its Request for Architecture Work.

Iteration within an ADM cycle (Architecture Development Iteration):

- Projects may operate multiple ADM phases concurrently

Typically, this is used to manage the inter-relationship between Business Architecture, Information Systems Architecture, and Technology Architecture.

- Projects may cycle between ADM phases, in planned cycles covering multiple phases

Typically, this is used to converge on a detailed Target Architecture when higher-level architecture does not exist to provide context and constraint.

- Projects may return to previous phases in order to circle back and update work products with new information

Typically, this is used to converge on an executable Architecture Roadmap or Implementation and Migration Plan, when the implementation details and scope of change trigger a change or re-prioritization of stakeholder requirements.

Iteration to manage the Architecture Capability (Architecture Capability Iteration):

- The result of addressing a Request for Architecture Work in Phase A may require a new iteration of the Preliminary Phase to adjust the Architecture Capability for the organization
- Changes identified in Phase H may require a new iteration of the Preliminary Phase to adjust the Architecture Capability for the organization

The suggested iteration cycles for the TOGAF ADM are shown in Figure 31.

These can be used to effectively group related architectural activities to achieve a specific purpose.

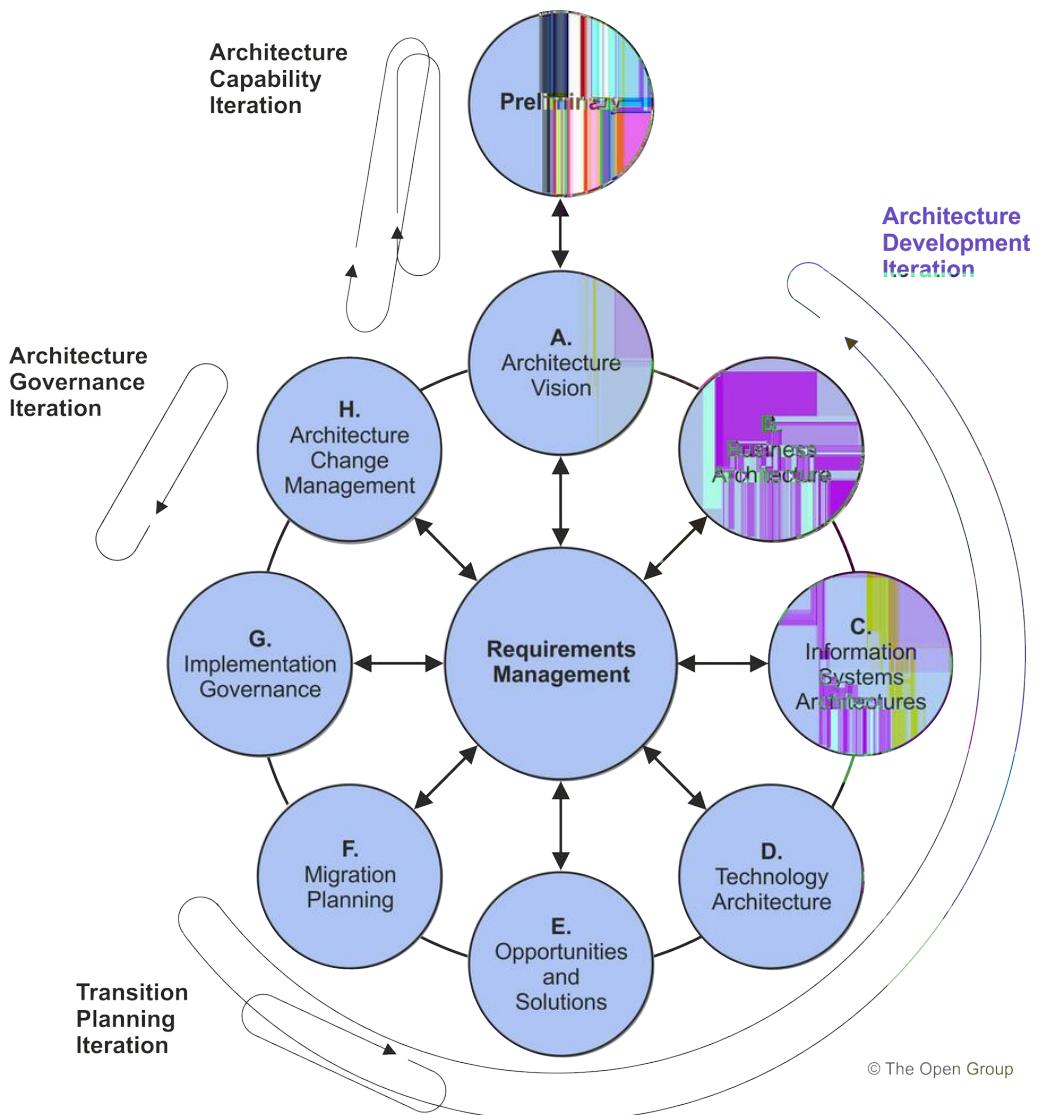


Figure 31. Iteration Cycles

The iteration cycles are as follows:

- **Architecture Capability** iterations support the creation and evolution of the required Architecture Capability

These iterations include the initial mobilization of the architecture activity for a given purpose or architecture engagement type by

establishing or adjusting the architecture approach, principles, scope, vision, and governance.

- **Architecture Development** iterations allow creation of content by cycling through, or integrating, Business, Information Systems, and Technology Architecture phases

These iterations ensure that the architecture is considered as a whole. In this type of iteration stakeholder reviews are typically broader. As the iterations converge on a target, extensions into the Opportunities and Solutions and Migration Planning phases ensure that the architecture's implementability is considered as the architecture is finalized.

- **Transition Planning** iterations support the creation of formal change roadmaps for a defined architecture
- **Architecture Governance** iterations support governance of change activity progressing towards a defined Target Architecture

A number of techniques can be employed to use the ADM as a process that supports hierarchies of architectures, referred to as levels. Essentially there are two strategies that can be applied:

- Architectures at different levels can be developed through iterations within a single cycle of the ADM process
- Architectures at different levels can be developed through a hierarchy of ADM processes, executed concurrently (see Figure 23)

5.4.3. Applying the ADM Across the Architecture Landscape

In a typical enterprise, many architectures will be described in the Architecture Landscape at any point in time. Some architectures will address very specific needs; others will be more general. Some will address detail; some will provide a big picture. To address this complexity the TOGAF Standard uses the concepts of levels.

Levels provide a framework for dividing and organizing the Architecture Landscape into three levels of granularity as summarized in Figure 32:

1. Strategic Architecture provides an organizing framework for

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- operational and change activity and allows for direction setting at an executive level.
2. Segment Architecture provides an organizing framework for operational and change activity and allows for direction setting and the development of effective architecture roadmaps at a program or portfolio level.
 3. Capability Architecture provides an organizing framework for change activity and the development of effective architecture roadmaps realizing capability increments.

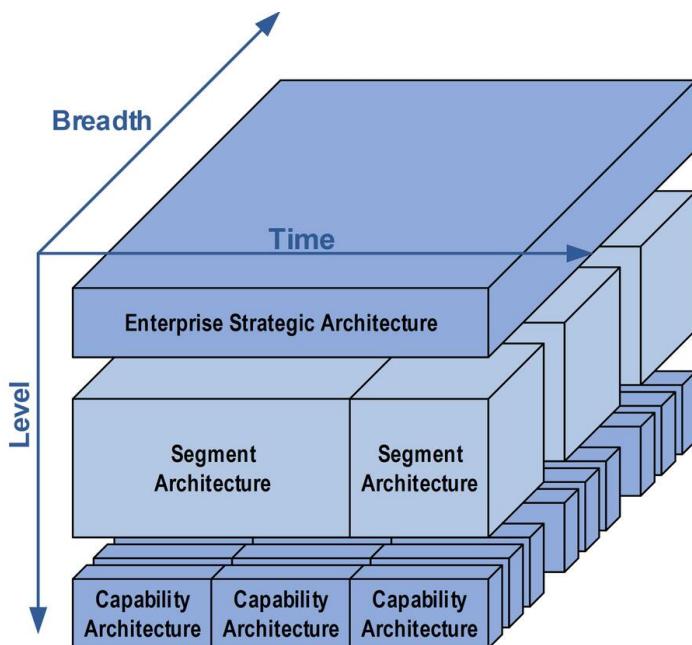


Figure 32. Summary Classification Model for Architecture Landscape

5.4.4. Architecture Partitioning

Partitions are used to simplify the development and management of the Enterprise Architecture. Architectures are partitioned because:

- Organizational unit architectures conflict with one another
- Different teams need to work on different elements of architecture at the same time and partitions allow for specific groups of architects to own and develop specific segments of the architecture

- Effective architecture re-use requires modular architecture segments that can be taken and incorporated into broader architectures and solutions

It is impractical to present a definitive partitioning model for architecture. Each enterprise needs to adopt a partitioning model that reflects its own operating model. The TOGAF Standard includes classification criteria that can be applied when partitioning architectures, and guidance for activities within the Preliminary Phase for establishing a partition.

5.5. Architecture Content

This document describes the TOGAF Content Framework, a structured metamodel for architectural artifacts, and an overview of typical architecture deliverables, artifacts within deliverables, and the ABBs that artifacts represent.

Table 29. Architecture Content Summary

Chapter	Description
Introduction	An overview of the Architecture Content document introducing the key concepts, including categories for architectural work products, the TOGAF Content Framework, the Enterprise Metamodel, the Enterprise Continuum, and the Enterprise Repository.
TOGAF Content Framework and Enterprise Metamodel	Describes the Content Framework, a categorization framework used to structure the Architecture Description and the models that describe an architecture. The Enterprise Metamodel defines the types of entities that appear in the models that describe the architecture, and the relationships between these entities.
Architectural Artifacts	Discusses the concepts surrounding architecture artifacts and then describes the artifacts that are recommended to be created for each phase within the ADM.
Architecture Deliverables	Provides descriptions of deliverables referenced in the ADM.

Chapter	Description
Building Blocks	Explains the concept of building blocks and their use in the ADM.
Enterprise Continuum	Provides methods for classifying architecture and solution artifacts, both internal and external to the Architecture Repository, as they evolve from generic Foundation Architectures to Organization-Specific Architectures.
Architecture Repository	Provides a structural framework for an Architecture Repository that allows an enterprise to distinguish between different types of architectural assets that exist at different levels of abstraction in the organization.

5.5.1. Content Framework Overview

Architects executing the ADM will produce a number of outputs as a result of their efforts, such as process flows, architectural requirements, project plans, or project compliance assessments.

The TOGAF Content Framework is intended to:

- Provide a detailed model of architectural work products
- Drive consistency in the outputs created when following the ADM
- Provide a comprehensive checklist of architecture output that could be created
- Reduce the risk of gaps within the final architecture deliverable set
- Help an enterprise mandate standard architecture concepts, terms, and deliverables

The Content Framework provided supports the use of the TOGAF framework as a stand-alone framework for architecture within an enterprise. However, other Content Frameworks exist (for example, that provided by the ArchiMate Specification) and it is expected that some enterprises will use an external framework in conjunction with the ADM instead. In such cases, the TOGAF Content Framework provides a useful reference and starting point for TOGAF content to be mapped to the metamodels of other frameworks.

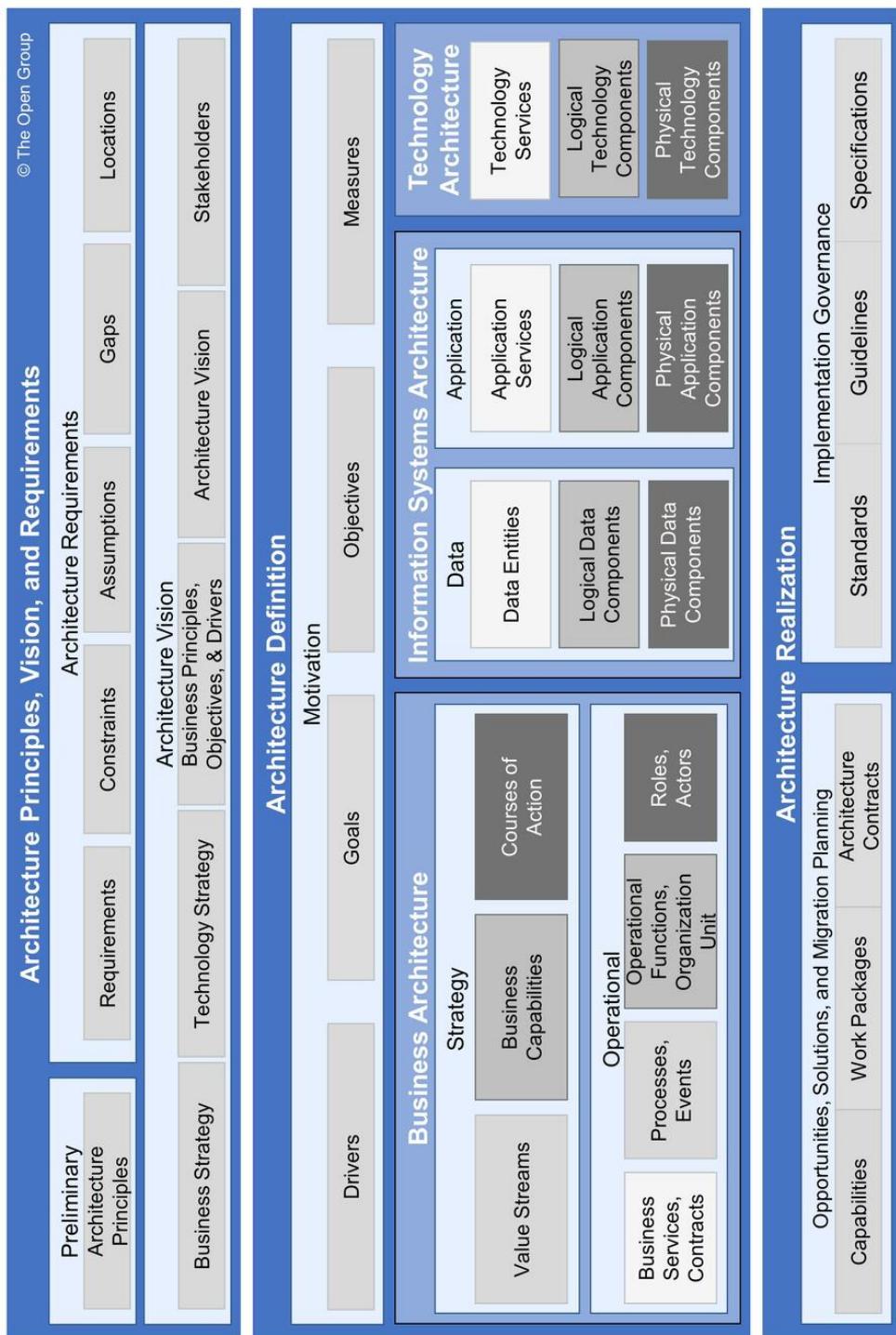


Figure 33. Content Framework Overview

5.5.2. Architectural Work Products

In order to assist with the classification of new work products and the potential need to correlate with other content frameworks (including any existing classified architecture work products), the Content Framework uses the following three categories to describe the type of architectural work product within its context of use:

- A deliverable is a work product that is contractually specified, and would normally be reviewed, agreed, and signed off by its stakeholders – deliverables often represent the output of projects
- An artifact is an architectural work product that describes an aspect of the architecture

Artifacts are generally classified as catalogs (lists of things), matrices (showing relationships between things), and diagrams (pictures of things). Examples include a requirements catalog, application interaction matrix, and a value chain diagram. An architectural deliverable may contain many artifacts and artifacts will form the content of the Architecture Repository.

- A building block represents a (potentially re-usable) component of business, IT, or architectural capability that can be combined with other building blocks to deliver architectures and solutions

5.5.3. The Enterprise Continuum

The Enterprise Continuum, shown in Figure 34, is a categorization for artifacts held in the Enterprise Repositories that provides methods for classifying architecture and solution artifacts as they evolve from generic Foundation Architectures to Organization-Specific Architectures. The Enterprise Continuum comprises two complementary concepts: the Architecture Continuum and the Solutions Continuum.

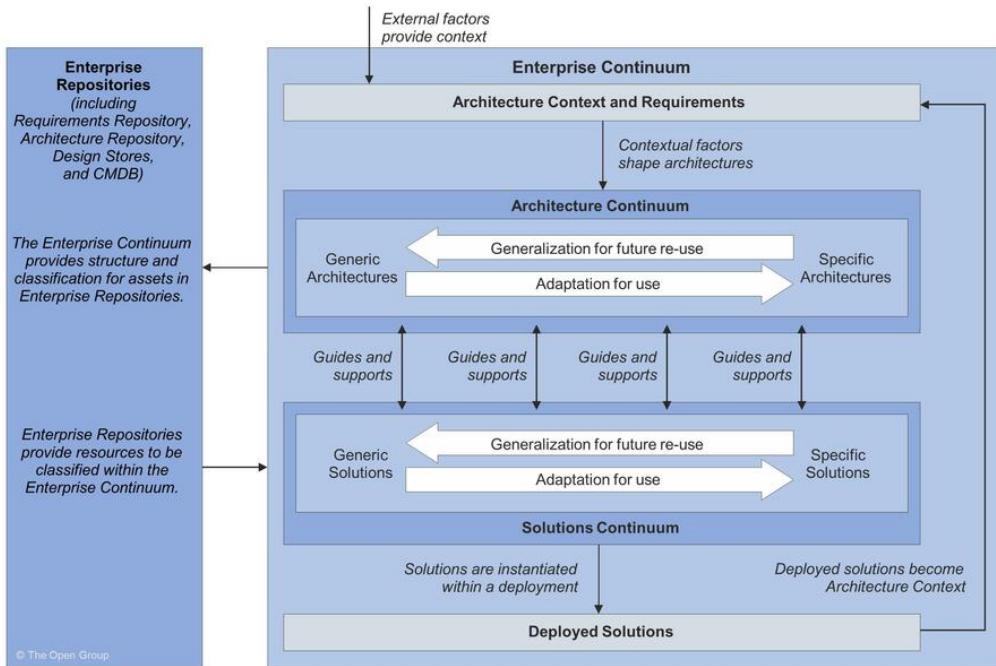


Figure 34. The Enterprise Continuum

5.5.4. Architecture Repository

Operating a mature Architecture Capability within a large enterprise creates a huge volume of architectural output. Effective management and leverage of these architectural work products require a formal taxonomy for different types of architectural asset alongside dedicated processes and tools for architectural content storage.

The TOGAF Standard provides a structural framework for an Architecture Repository that allows an enterprise to distinguish between different types of architectural assets that exist at different levels of abstraction in the organization. This Architecture Repository is one part of the wider Enterprise Repository, which provides the capability to link architectural assets to components of the Detailed Design, Deployment, and Service Management Repositories.

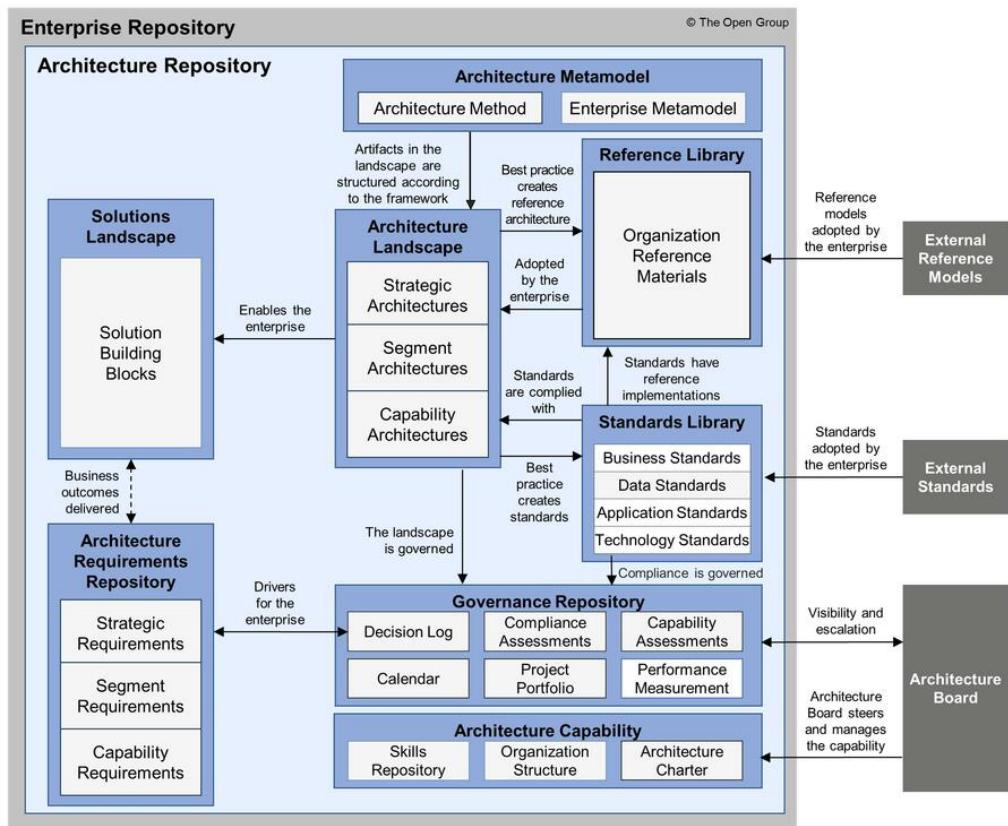


Figure 35. Overview of Architecture Repository

5.6. Enterprise Architecture Capability and Governance

This document is a set of resources, guidelines, templates, background information, etc. provided to help establish an architecture practice and governance framework within an organization. It describes the organization, processes, skills, roles, and responsibilities required to establish and operate an architecture function within an enterprise and describes an Enterprise Architecture governance framework.

Table 30. Enterprise Architecture Capability and Governance Summary

Chapter	Description
Establishing an Architecture Capability	Guidelines on how to use the ADM to establish an Architecture Capability within an organization.
Architecture Governance	Framework and guidelines for Architecture Governance.
Architecture Board	Guidelines for establishing and operating an Enterprise Architecture Board.
Architecture Contracts	Guidelines for defining and using Architecture Contracts.
Architecture Compliance	Guidelines for ensuring project compliance to the architecture.

5.6.1. Architecture Capability

An overview of the TOGAF Architecture Capability is shown in Figure 36.

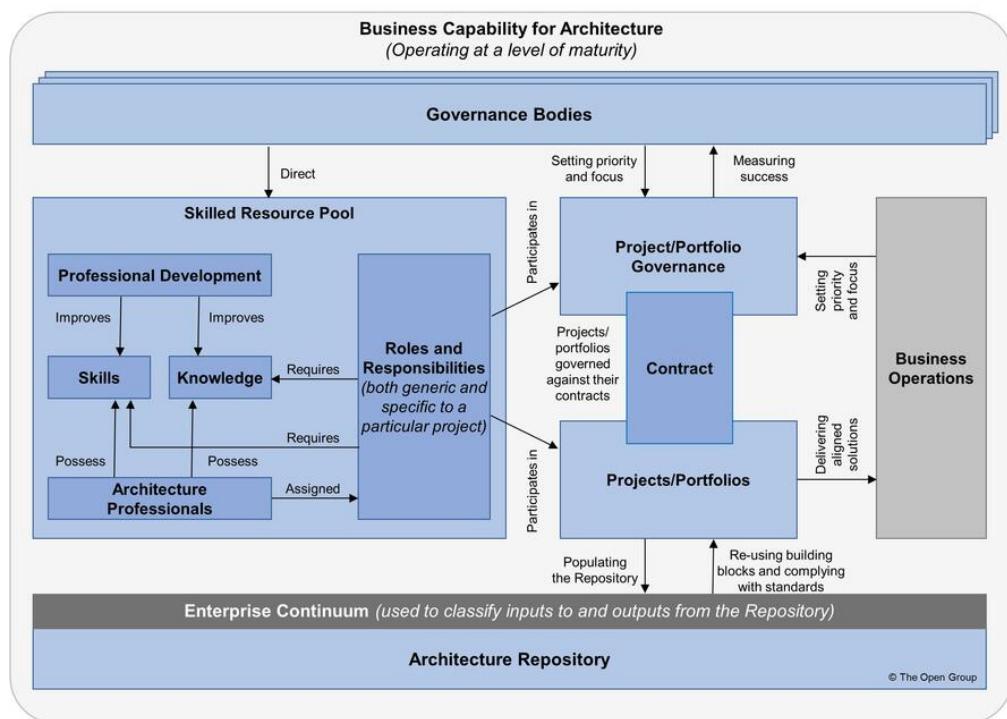


Figure 36. Architecture Capability Overview

5.6.2. Architecture Governance

The TOGAF Standard contains a framework and guidelines for Architecture Governance. Architecture Governance is the practice by which Enterprise Architectures and other architectures are managed and controlled at an enterprise-wide level. It includes the following:

- Implementing a system of controls over the creation and monitoring of all architecture components and activities, to ensure the effective introduction, implementation, and evolution of architectures within the organization
- Implementing a system to ensure compliance with internal and external standards and regulatory obligations
- Establishing processes that support effective management of the above processes within agreed parameters
- Establishing and documenting decision structures that influence the Enterprise Architecture; this includes stakeholders that provide input to decisions
- Developing practices that ensure accountability to a clearly identified stakeholder community, both inside and outside the organization

5.6.3. Architecture Board

An Enterprise Architecture is more than just the artifacts produced by the application of the ADM process. Making the organization act according to the principles laid down in the architecture requires a decision-making framework. The TOGAF Standard provides a set of guidelines for establishing and operating an Enterprise Architecture Board.

An Architecture Board is responsible for operational items and must be capable of making decisions in situations of possible conflict and be accountable for taking those decisions. It should therefore be a representation of all the key stakeholders in the architecture, and will typically comprise a group of executives responsible for the review and maintenance of the overall architecture. It is important that the members of the Architecture Board cover architecture, business, and program management areas.

Issues for which the Architecture Board can be made responsible and accountable are:

- Providing the basis for all decision-making with regard to changes to the architectures
- Consistency between sub-architectures
- Identifying re-usable components
- Flexibility of Enterprise Architecture; to meet business needs and utilize new technologies
- Enforcement of architecture compliance
- Improving the maturity level of architecture discipline within the organization
- Ensuring that the discipline of architecture-based development is adopted
- Supporting a visible escalation capability for out-of-bounds decisions

The Architecture Board is also responsible for operational items, such as the monitoring and control of Architecture Contracts (see Section 7.18), and for governance items, such as producing usable governance materials. Important tasks are:

- Assigning architectural tasks
- Formally approving architectural products
- Resolving architectural conflicts

Footnotes

[3] For expanded guidance on Risk Management see the TOGAF Series Guide: Integrating Risk and Security within a TOGAF® Enterprise Architecture.

6. The TOGAF Architecture Development Method

This chapter describes the TOGAF Architecture Development Method (ADM), including summary tables for each of the ADM phases.

6.1. What is the ADM?

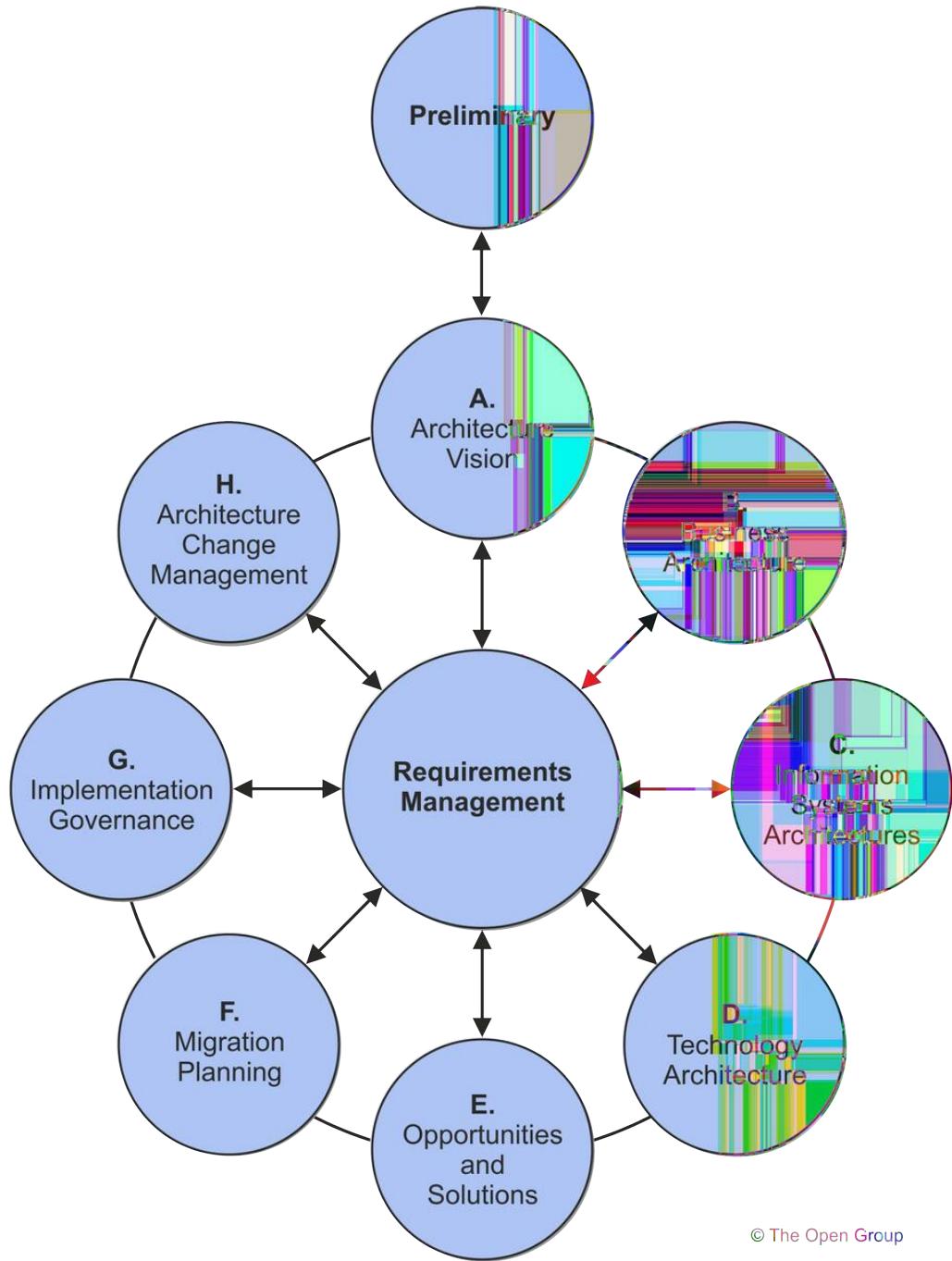
The ADM provides a tested and repeatable process for developing architectures. It is a method for deriving organization-specific Enterprise Architectures and is specifically designed to address business requirements. It includes establishing an architecture framework, developing architecture content, transitioning, and governing the realization of architectures. All of these activities are carried out within an iterative cycle of continuous architecture definition and realization that allows organizations to transform their enterprises in a controlled manner in response to business goals and opportunities. This is illustrated in Figure 37.

6.1.1. What are the Phases of the ADM?

The phases within the ADM and their purpose are summarized in Table 31.

The description of the phases of the ADM in the TOGAF Standard focuses on recommendations for defining and deploying an Enterprise Architecture. Additional guidance for how to apply the recommendations can be found in the TOGAF Series Guides.

It is recommended that the ADM be adapted to meet the needs of the enterprise and to support different architecture styles. In particular, after commencing an architecture development cycle, the ADM does not mandate that the phases be performed in any specific order, and does not mandate a “waterfall” method.



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Figure 37. The Architecture Development Cycle

Table 31. Phases within the ADM

ADM Phase	Purpose
Preliminary Phase	Describes the preparation and initiation activities required to create an Architecture Capability, including customization of the TOGAF framework and definition of Architecture Principles.
Requirements Management	Operates the process of managing architecture requirements throughout the ADM.
Phase A: Architecture Vision	<p>Describes the initial phase of an architecture development cycle.</p> <p>It includes information about defining the scope of the architecture development initiative, identifying the stakeholders, creating the Architecture Vision, and obtaining approval to proceed with the architecture development.</p>
Phase B: Business Architecture Phase C: Information Systems Architectures (Data & Application) Phase D: Technology Architecture	<p>Describes the development of four architectures, that are commonly accepted as subsets of an overall Enterprise Architecture, to support the agreed Architecture Vision:</p> <ul style="list-style-type: none"> — Business — Information Systems – Data — Information Systems – Application — Technology
Phase E: Opportunities and Solutions	Conducts initial implementation planning and the identification of delivery vehicles for the architecture defined in the previous phases.
Phase F: Migration Planning	Addresses how to move from the Baseline to the Target Architectures by finalizing a detailed Implementation and Migration Plan.
Phase G: Implementation Governance	Provides architectural oversight for the implementation.
Phase H: Architecture Change Management	Establishes procedures for managing change to the new architecture.

6.2. The ADM in Detail

The following tables summarize the objectives, steps, and the inputs and outputs of each ADM phase.

6.2.1. Preliminary Phase

The Preliminary Phase describes the preparation and initiation activities required to meet the business directive for a new Enterprise Architecture Capability, including the definition of an Organization-Specific Architecture framework and the definition of principles.

An overview of the phase is given in Table 32.

Table 32. Preliminary Phase Objectives and Steps

Objectives	Steps
<p>Determine the Architecture Capability desired by the organization:</p> <ul style="list-style-type: none"> - Review the organizational context for conducting Enterprise Architecture - Identify and scope the elements of the enterprise organizations affected by the Architecture Capability - Identify the established frameworks, methods, and processes that intersect with the Architecture Capability - Establish the Capability Maturity target <p>Establish the Architecture Capability:</p> <ul style="list-style-type: none"> - Define and establish the Organizational Model for Enterprise Architecture - Define and establish the detailed process and resources for Architecture Governance - Select and implement tools that support the Architecture Capability - Define the Architecture Principles 	<p>Scope the enterprise organizations impacted</p> <p>Confirm governance and support frameworks</p> <p>Define and establish the Enterprise Architecture team and organization</p> <p>Identify and establish Architecture Principles</p> <p>Tailor the TOGAF framework and, if any, other selected architecture frameworks</p> <p>Develop strategy and implementation plans for tools and techniques</p>

Table 33. Preliminary Phase Inputs and Outputs

Inputs	Outputs
The TOGAF Library	Organizational Model for Enterprise Architecture
Other architecture framework(s)	
Board strategies, business plans, business strategy, IT strategy, business principles, business goals, and business drivers	Tailored Architecture Framework, including Architecture Principles, configured and deployed tools
Major frameworks operating in the business	Initial Architecture Repository
Governance and legal frameworks	Restatement of, or reference to, business principles, business goals, and business drivers
Architecture Capability	Request for Architecture Work
Partnership and contract agreements	Architecture Governance Framework
Existing organizational model for Enterprise Architecture	The Architecture of the Enterprise Architecture Capability
Existing architecture framework, if any, including: - Architecture method - Architecture content - Configured and deployed tools - Architecture Principles - Architecture Repository	

6.2.2. Phase A: Architecture Vision

Phase A is the initial phase of the ADM. It includes information about defining the scope, identifying the stakeholders, creating the Architecture Vision, and obtaining approvals.

Table 34. Phase A Objectives and Steps

Objectives	Steps
Develop a high-level aspirational vision of the capabilities and business value to be delivered as a result of the proposed Enterprise Architecture	Establish the Architecture Project Identify stakeholders, concerns, and business requirements
Obtain approval for a Statement of Architecture Work that defines a program of works to develop and deploy the architecture outlined in the Architecture Vision	Confirm and elaborate business goals, business drivers, and constraints Evaluate capabilities Assess readiness for business transformation Define the scope Confirm and elaborate Architecture Principles, including business principles Develop the Architecture Vision Define the Target Architecture value propositions and Key Performance Indicators (KPIs) Identify the business transformation risks and mitigation activities Develop Statement of Architecture Work; secure approval

Table 35. Phase A Inputs and Outputs

Inputs	Outputs
Request for Architecture Work	Approved Statement of Architecture Work
Business principles, business goals, and business drivers	Refined statements of business principles, business goals, and business drivers
Organizational Model for Enterprise Architecture	Architecture Principles
Tailored Architecture Framework, including tailored architecture method, architecture content, Architecture Principles, configured and deployed tools	Capability assessment Tailored Architecture Framework
Populated Architecture Repository; that is, existing architecture documentation (framework description, architecture descriptions, existing baseline descriptions, etc.)	Architecture Vision, including: - Refined key high-level stakeholder requirements Draft Architecture Definition Document, which may include Baseline and/or Target Architectures of any architectural domain Communications Plan Additional content populating the Architecture Repository

6.2.3. Phase B: Business Architecture

Phase B describes the development of a Business Architecture to support an agreed Architecture Vision.

Table 36. Phase B Objectives and Steps

Objectives	Steps
<p>Develop the Target Business Architecture that describes how the enterprise needs to operate to achieve the business goals, and respond to the strategic drivers set out in the Architecture Vision in a way that addresses the Statement of Architecture Work and stakeholder concerns</p>	<p>Select reference models, viewpoints, and tools</p> <p>Develop the Baseline Business Architecture Description</p>
<p>Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Business Architectures</p>	<p>Develop the Target Business Architecture Description</p> <p>Perform a gap analysis</p> <p>Define candidate roadmap components</p> <p>Resolve impacts across the Architecture Landscape</p> <p>Conduct a formal stakeholder review</p> <p>Finalize the Business Architecture</p> <p>Create/update Architecture Definition Document</p>

Note that the same steps are common to Phases B, C, and D.

Table 37. Phase B Inputs and Outputs

Inputs	Outputs
Architecture reference materials Request for Architecture Work	Refined and updated versions of the Architecture Vision phase deliverables, where applicable, including:
Business principles, business goals, and business drivers	<ul style="list-style-type: none"> - Statement of Architecture Work - Validated business principles, business goals, and business drivers - Architecture Principles
Capability Assessment	
Communications Plan	Draft Architecture Definition
Organizational Model for Enterprise Architecture	Document containing content updates: <ul style="list-style-type: none"> - Baseline Business Architecture, approved, if appropriate
Tailored Architecture Framework	<ul style="list-style-type: none"> - Target Business Architecture (approved with business capabilities, business data model, business processes, etc.)
Approved Statement of Architecture Work	<ul style="list-style-type: none"> - Views corresponding to selected viewpoints addressing key stakeholder concerns
Architecture Principles, including business principles, when pre-existing	
Enterprise Continuum	Draft Architecture Requirements Specification including content updates:
Architecture Repository	<ul style="list-style-type: none"> - Gap analysis results - Technical requirements - Updated business requirements
Architecture Vision, including: <ul style="list-style-type: none"> - Refined key high-level stakeholder requirements 	
Draft Architecture Definition Document, which may include Baseline and/or Target Architectures of any architectural domain	Business Architecture components of an Architecture Roadmap

6.2.4. Phase C: Information Systems Architectures

Phase C describes the Information Systems Architectures for an Architecture Project, including the development of Data and Application Architectures. It involves some combination of Data and Application Architecture, which may be developed either sequentially or concurrently.

6.2.4.1. Data Architecture

Table 38. Phase C – Data Architecture Objectives and Steps

Objectives	Steps
Develop the Target Data Architecture that enables the Business Architecture and the Architecture Vision, in a way that addresses the Statement of Architecture Work and stakeholder concerns	As per Phase B Steps, see Table 36.
Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Data Architectures	

Table 39. Phase C – Data Architecture Inputs and Outputs

Inputs	Outputs
Architecture reference materials	Refined and updated versions of the Architecture Vision phase deliverables, where applicable, including:
Request for Architecture Work	
Capability Assessment	
Communications Plan	
Organizational Model for Enterprise Architecture	Draft Architecture Definition Document, including:
Tailored Architecture Framework	
Data principles	
Statement of Architecture Work	
Architecture Vision	Draft Architecture Requirements Specification, including:
Architecture Repository	
Draft Architecture Definition Document, which may include Baseline and/or Target Architectures of any architectural domain	
Draft Architecture Requirements Specification, including:	
<ul style="list-style-type: none"> - Gap analysis results - Relevant technical requirements 	<ul style="list-style-type: none"> - Gap analysis results - Data interoperability requirements - Relevant technical requirements that will apply to this evolution of the architecture development cycle - Constraints on the Technology Architecture
Business Architecture components of an Architecture Roadmap	<ul style="list-style-type: none"> - Updated business requirements - Updated application requirements
	Data Architecture components of an Architecture Roadmap

6.2.4.2. Application Architecture

Table 40. Phase C – Application Architecture Objectives and Steps

Objectives	Steps
Develop the Target Application Architecture that enables the Business Architecture and the Architecture Vision, in a way that addresses the Statement of Architecture Work and stakeholder concerns	<i>As per Phase B Steps, see Table 36.</i>
Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Application Architectures	

Table 41. Phase C – Application Architecture Inputs and Outputs

Inputs	Outputs
Architecture reference materials	Refined and updated versions of the Architecture Vision phase deliverables, where applicable, including:
Request for Architecture Work	<ul style="list-style-type: none"> - Statement of Architecture Work - Validated application principles, or new application principles
Capability Assessment	
Communications Plan	
Organizational Model for Enterprise Architecture	Draft Architecture Definition Document, including:
Tailored Architecture Framework	<ul style="list-style-type: none"> - Baseline Application Architecture - Target Application Architecture - Views corresponding to the selected viewpoints, addressing key stakeholder concerns
Application principles	
Statement of Architecture Work	
Architecture Vision	Draft Architecture Requirements Specification, including content updates:
Architecture Repository	<ul style="list-style-type: none"> - Gap analysis results - Application interoperability requirements
Draft Architecture Definition Document, which may include Baseline and/or Target Architectures of any architectural domain	<ul style="list-style-type: none"> - Relevant technical requirements that will apply to this evolution of the architecture development cycle - Constraints on the Technology Architecture
Draft Architecture Requirements Specification, including:	<ul style="list-style-type: none"> - Updated business requirements - Updated data requirements
<ul style="list-style-type: none"> - Gap analysis results - Relevant technical requirements 	
Business and Data Architecture components of an Architecture Roadmap	Application Architecture components of an Architecture Roadmap

6.2.5. Phase D: Technology Architecture

Phase D is about the development of a Technology Architecture for an Architecture Project.

Table 42. Phase D Objectives and Steps

Objectives	Steps
Develop the Target Technology Architecture that enables the Architecture Vision, target business, data, and application building blocks to be delivered through technology components and technology services, in a way that addresses the Statement of Architecture Work and stakeholder concerns	<i>As per Phase B Steps, see Table 36.</i>
Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Technology Architectures	

Table 43. Phase D Inputs and Outputs

Inputs	Outputs
Architecture reference materials	Refined and updated versions of the Architecture Vision phase deliverables, where applicable, including:
Product information on candidate products	
Request for Architecture Work	
Capability Assessment	
Communications Plan	
Organizational Model for Enterprise Architecture	Draft Architecture Definition Document, including:
Tailored Architecture Framework	
Technology principles	
Statement of Architecture Work	
Architecture Vision	Draft Architecture Requirements Specification, including content updates:
Architecture Repository	
Draft Architecture Definition Document, which may include Baseline and/or Target Architectures of any architectural domain	
Draft Architecture Requirements Specification, including:	
<ul style="list-style-type: none"> - Gap analysis results - Relevant technical requirements 	
Business, Data, and Application Architecture components of an Architecture Roadmap	Technology Architecture components of an Architecture Roadmap

6.2.6. Phase E: Opportunities and Solutions

Phase E describes the process of identifying delivery vehicles (projects, programs, or portfolios) that effectively deliver the Target Architecture identified in previous phases. It is the first phase which is directly concerned with implementation.

Table 44. Phase E Objectives and Steps

Objectives	Steps
Generate the initial complete version of the Architecture Roadmap, based upon the gap analysis and candidate Architecture Roadmap components from Phases B, C, and D	Determine/confirm key corporate change attributes Determine business constraints for implementation
Determine whether an incremental approach is required, and if so identify Transition Architectures that will deliver continuous business value	Review and consolidate gap analysis results from Phases B to D
Define the overall Solution Building Blocks (SBBs) to finalize the Target Architecture based on the ABBs	Review consolidated requirements across related business functions Consolidate and reconcile interoperability requirements
	Refine and validate dependencies
	Confirm readiness and risk for business transformation
	Formulate Implementation and Migration Strategy
	Identify and group major work packages
	Identify Transition Architectures
	Create Architecture Roadmap & Implementation and Migration Plan

Table 45. Phase E Inputs and Outputs

Inputs	Outputs
Architecture reference materials Product Information	Refined and updated versions of the Architecture Vision phase deliverables, where applicable, including:
Request for Architecture Work	<ul style="list-style-type: none"> - Architecture Vision - Statement of Architecture Work
Capability Assessment	
Communications Plan	Architecture Vision, updated if necessary
Planning methodologies	
Organizational Model for Enterprise Architecture	Draft Architecture Definition Document, including:
Governance models and frameworks	<ul style="list-style-type: none"> - Baseline and/or Target Architectures of any architectural domain - Transition Architectures, number and scope, if any
Tailored Architecture Framework	
Statement of Architecture Work	
Architecture Vision	Draft Architecture Requirements Specification, including Consolidated Gaps, Solutions, and Dependencies Assessment
Architecture Repository	
Draft Architecture Definition Document, which may include Baseline and/or Target Architectures of any architectural domain	Capability Assessments, including:
Draft Architecture Requirements Specification	<ul style="list-style-type: none"> - Business Capability - IT Capability
Change Requests for existing business programs and projects	Architecture Roadmap, including:
Candidate Architecture Roadmap components from Phases B, C, and D	<ul style="list-style-type: none"> - Work package portfolio - Identification of Transition Architectures, if any - Implementation recommendations
Implementation and Migration Plan Draft, including:	
Candidate Architecture Roadmap components from Phases B, C, and D	<ul style="list-style-type: none"> - Implementation and Migration Strategy

6.2.7. Phase F: Migration Planning

Phase F addresses migration planning, which is how to move from the Baseline to the Target Architectures by finalizing a detailed Implementation and Migration Plan.

Table 46. Phase F Objectives and Steps

Objectives	Steps
Finalize the Architecture Roadmap and the supporting Implementation and Migration Plan	Confirm management framework interactions for the Implementation and Migration Plan
Ensure that the Implementation and Migration Plan is coordinated with the enterprise's approach to managing and implementing change in the enterprise's overall change portfolio	Assign a business value to each work package
Ensure that the business value and cost of work packages and Transition Architectures is understood by key stakeholders	Estimate resource requirements, project timings, and availability/delivery vehicle
	Prioritize the migration projects through the conduct of a cost/benefit assessment and risk validation
	Confirm Architecture Roadmap and update Architecture Definition Document
	Complete the Implementation and Migration Plan
	Complete the architecture development cycle and document lessons learned

Table 47. Phase F Inputs and Outputs

Inputs	Outputs
Architecture reference materials	Implementation and Migration Plan (detailed), including:
Request for Architecture Work	- Implementation and Migration Strategy
Capability Assessment	- Project and portfolio breakdown of the implementation
Communications Plan	- Project charters (optional)
Organizational Model for Enterprise Architecture	Finalized Architecture Definition Document, including:
Governance models and frameworks	- Finalized Transition Architectures, if any
Tailored Architecture Framework	Finalized Architecture Requirements Specification
Statement of Architecture Work	Finalized Architecture Roadmap
Architecture Vision	Re-usable ABBs
Architecture Repository	Requests for Architecture Work for a new iteration of the ADM cycle (if any)
Draft Architecture Definition Document, which may include Baseline and/or Target Architectures of any architectural domain	Implementation Governance Model
Draft Architecture Requirements Specification	Change Requests for the Architecture Capability arising from lessons learned
Change Requests for existing business programs and projects	
Architecture Roadmap	
Capability Assessment, including:	
- Business Capability	
- IT Capability	
Implementation and Migration Plan Draft, including:	
- High-level Implementation and Migration Strategy	

6.2.8. Phase G: Implementation Governance

Phase G provides architectural oversight of the implementation.

Table 48. Phase G Objectives and Steps

Objectives	Steps
<p>Ensure conformance with the Target Architecture by implementation projects</p> <p>Perform appropriate Architecture Governance functions for the solution and any implementation-driven architecture Change Requests</p>	<p>Confirm scope and priorities for deployment with development management</p> <p>Identify deployment resources and skills</p> <p>Guide development of solutions deployment</p> <p>Perform Enterprise Architecture compliance reviews</p> <p>Implement business and IT operations</p> <p>Perform post-implementation review and close the implementation</p>

Table 49. Phase G Inputs and Outputs

Inputs	Outputs
Architecture reference materials	Architecture Contract (signed)
Request for Architecture Work	Compliance Assessments
Capability Assessment	Change Requests
Organizational Model for Enterprise Architecture	Architecture-compliant solutions deployed, including: - The architecture-compliant implemented system
Tailored Architecture Framework	- Populated Architecture Repository - Architecture compliance recommendations and dispensations - Recommendations on service delivery requirements - Recommendations on performance metrics - SLAs
Statement of Architecture Work	- Architecture Vision, updated post-implementation
Architecture Vision	- Architecture Definition Document, updated post-implementation
Architecture Repository	- Business and IT operating models for the implemented solution - ABBs
Architecture Definition Document	
Architecture Requirements Specification	
Architecture Roadmap	
Implementation Governance Model	
Architecture Contract (standard)	
Request for Architecture Work identified in Phases E and F	
Implementation and Migration Plan	

6.2.9. Phase H: Architecture Change Management

Phase H establishes procedures for managing change to the new architecture.

Table 50. Phase H Objectives and Steps

Objectives	Steps
Ensure that the architecture development lifecycle is maintained	Establish value realization process Deploy monitoring tools
Ensure that the Architecture Governance Framework is executed	Manage risks
Ensure that the Enterprise Architecture Capability meets current requirements	Provide analysis for architecture change management Develop change requirements to meet performance targets Manage governance process Activate the process to implement change

Table 51. Phase H Inputs and Outputs

Inputs	Outputs
Architecture reference materials Request for Architecture Work	Architecture updates (for maintenance changes)
Organizational Model for Enterprise Architecture	Changes to architecture framework and principles (for maintenance changes)
Tailored Architecture Framework	
Statement of Architecture Work	New Request for Architecture Work, to initiate another cycle of the ADM (for major changes)
Architecture Vision	
Architecture Repository	Statement of Architecture Work, updated if necessary
Architecture Definition Document	Architecture Contract, updated if necessary
Architecture Requirements Specification	
Architecture Roadmap	Compliance Assessments, updated if necessary
Change Requests due to technology changes	
Change Requests due to business changes	
Change Requests from lessons learned	
Implementation Governance Model	
Architecture Contract (signed)	
Compliance Assessments	
Implementation and Migration Plan	

6.2.10. Requirements Management

This phase is the process of managing architecture requirements throughout the ADM, and applies to all phases of the ADM cycle. The Requirements Management process is a dynamic process, which addresses the identification of requirements for the enterprise, storing them, and then feeding them in and out of the relevant ADM phases. As shown in Figure 37, this process is central to driving the ADM process.

Table 52. Requirements Management Objectives and Steps

Objectives	Steps
Ensure that the Requirements Management process is sustained and operates for all relevant ADM phases	Identify/document requirements Baseline requirements
Manage architecture requirements identified during any execution of the ADM cycle or a phase	Monitor baseline requirements Identify new and changed requirements; remove, add, modify, and re-assess priorities
Ensure that relevant architecture requirements are available for use by each phase as the phase is executed	Identify changed requirements and record priorities; identify and resolve conflicts; generate Requirements Impact Statement
	Assess impact of changed requirements on current and previous ADM phases
	Implement requirements arising from Phase H
	Update the Architecture Requirements Repository
	Implement change in the current phase
	Assess and revise gap analysis for past phases

Table 53. Requirements Management Inputs and Outputs

Inputs	Outputs
A populated Architecture Repository	Changed requirements
Organizational model for Enterprise Architecture	Updated Requirements Specification
Tailored Architecture Framework	
Statement of Architecture Work	
Architecture Vision	
Architecture requirements populating an Architecture Requirements Specification	
Requirements Impact Statement	

7. ADM Deliverables

This chapter describes a typical baseline of architecture deliverables, in order to better define the activities required in the ADM and act as a starting point for tailoring within a specific organization.

Table 54 shows the ADM phase in which the deliverables are typically created, used, or enriched providing a roadmap for this chapter.

Table 54. Roadmap to ADM Deliverables

ADM Phase	Reference(s)
Preliminary Phase	Section 7.1 – Tailored Architecture Framework Section 7.2 – Organizational Model for Enterprise Architecture Section 7.3 – Architecture Principles Section 7.4 – Business Principles, Business Goals, and Business Drivers Section 7.5 – Request for Architecture Work
Phase A: Architecture Vision	Section 7.6 – Statement of Architecture Work Section 7.7 – Architecture Vision Section 7.8 – Communications Plan Section 7.9 – Capability Assessment Section 7.10 – Architecture Definition Document
Phase B: Business Architecture	Section 7.10 – Architecture Definition Document Section 7.11 – Architecture Requirements Specification Section 7.12 – Architecture Roadmap Section 7.13 – Architecture Building Blocks

ADM Phase	Reference(s)
Phase C: Information Systems Architectures	<p>Section 7.10 – Architecture Definition Document</p> <p>Section 7.11 – Architecture Requirements Specification</p> <p>Section 7.12 – Architecture Roadmap</p> <p>Section 7.13 – Architecture Building Blocks</p>
Phase D: Technology Architecture	<p>Section 7.10 – Architecture Definition Document</p> <p>Section 7.11 – Architecture Requirements Specification</p> <p>Section 7.12 – Architecture Roadmap</p> <p>Section 7.13 – Architecture Building Blocks</p>
Phase E: Opportunities and Solutions	<p>Section 7.10 – Architecture Definition Document</p> <p>Section 7.13 – Architecture Building Blocks</p> <p>Section 7.12 – Architecture Roadmap</p> <p>Section 7.14 – Solution Building Blocks</p> <p>Section 7.15 – Implementation and Migration Plan</p> <p>Section 7.16 – Transition Architecture</p> <p>Section 7.17 – Implementation Governance Model</p>
Phase F: Migration Planning	<p>Section 7.12 – Architecture Roadmap</p> <p>Section 7.15 – Implementation and Migration Plan</p> <p>Section 7.16 – Transition Architecture</p> <p>Section 7.17 – Implementation Governance Model</p>

ADM Phase	Reference(s)
Phase G: Implementation Governance	Section 7.17 – Implementation Governance Model Section 7.18 – Architecture Contracts Section 7.19 – Change Request Section 7.20 – Compliance Assessment
Phase H: Architecture Change Management	Section 7.17 – Implementation Governance Model Section 7.18 – Architecture Contracts Section 7.19 – Change Request Section 7.20 – Compliance Assessment Section 7.5 – Request for Architecture Work Section 7.21 – Requirements Impact Assessment
ADM Architecture Requirements Management	Section 7.11 – Architecture Requirements Specification Section 7.21 – Requirements Impact Assessment

7.1. Tailored Architecture Framework

Before the TOGAF framework can be effectively used within an Architecture Project, tailoring at a number of levels is necessary and should occur in the Preliminary Phase. Firstly, it is necessary to tailor the framework for integration into the enterprise. This tailoring will include integration with management frameworks, customization of terminology, development of presentational styles, selection, configuration, and deployment of architecture tools, etc. The formality and detail of any frameworks adopted should also align with other contextual factors for the enterprise, such as culture, stakeholders, commercial models for Enterprise Architecture, and the existing level of Architecture Capability. Once the framework has been tailored to the enterprise, further tailoring is necessary in order to tailor the framework for the specific Architecture Project. Tailoring at this level will select appropriate deliverables and artifacts to meet project and stakeholder needs.

The following contents are typical within a Tailored Architecture Framework:

- Tailored architecture method
- Tailored architecture content (deliverables and artifacts)
- Configured and deployed tools
- Interfaces with governance models and other frameworks:
 - Corporate Business Planning
 - Enterprise Architecture
 - Portfolio, Program, Project Management
 - System Development/Engineering
 - Operations (Services)

7.2. Organizational Model for Enterprise Architecture

An important deliverable produced in the Preliminary Phase is the Organizational Model for Enterprise Architecture.

In order for an architecture framework to be used successfully, it must be supported by the correct organization, roles, and responsibilities within the enterprise. Of particular importance is the definition of boundaries between different Enterprise Architecture practitioners and the governance relationships that span across these boundaries.

Typical contents of an Organizational Model for Enterprise Architecture are:

- Scope of organizations impacted
- Maturity assessment, gaps, and resolution approach
- Roles and responsibilities for architecture team(s)
- Constraints on architecture work
- Budget requirements
- Governance and support strategy

7.3. Architecture Principles

Architecture Principles are general rules and guidelines that relate to architecture work. They are an output of the Preliminary Phase. See the *TOGAF Standard – ADM Techniques* document (Architecture Principles) for guidelines and a detailed set of generic Architecture Principles, including business, data, application, and technology principles.

Architecture Principles are typically developed by the Enterprise Architects, in conjunction with the key stakeholders, and are approved by the Architecture Board. Architecture Principles will be informed by principles at the enterprise level, if they exist.

The following factors typically influence the development of Architecture Principles:

- Enterprise mission and plans: the mission, plans, and organizational infrastructure of the enterprise
- Enterprise strategic initiatives: the characteristics of the enterprise; its strengths, weaknesses, opportunities, and threats; and its current enterprise-wide initiatives (such as process improvement and quality management)
- External constraints: market factors (time-to-market imperatives, customer expectations, etc.), existing and potential legislation
- Current systems and technology: the set of information resources deployed within the enterprise, including systems documentation, equipment inventories, network configuration diagrams, policies, and procedures
- Emerging industry trends: predictions about economic, political, technical, and market factors that influence the enterprise environment

7.3.1. Defining Architecture Principles

The TOGAF Standard includes a recommended template for describing principles, as shown in Table 55. In addition to a definition statement, each principle should have associated rationale and implications statements, both to promote understanding and acceptance of the principles

themselves, and to support the use of the principles in explaining and justifying why specific decisions are made.

Table 55. TOGAF Template for Defining Principles

Name	Should both represent the essence of the rule as well as be easy to remember. Specific technology platforms should not be mentioned in the name or statement of a principle. Avoid ambiguous words in the name and in the statement, such as: “support”, “open”, “consider”, and, for lack of good measure, the word “avoid” itself. Be careful with “manage(ment)”, and look for unnecessary adjectives and adverbs (fluff).
Statement	Should succinctly and unambiguously communicate the fundamental rule. For the most part, the principles statements for managing information are similar among organizations. It is vital that the principles statement be unambiguous.
Rationale	Should highlight the business benefits of adhering to the principle, using business terminology. Point to the similarity of information and technology principles to the principles governing business operations. Also describe the relationship to other principles, and the intentions regarding a balanced interpretation. Describe situations where one principle would be given precedence or carry more weight than another for making a decision.
Implications	Should highlight the requirements, both for the business and IT, for carrying out the principle – in terms of resources, costs, and activities/tasks. It will often be apparent that current systems, standards, or practices would be incongruent with the principle upon adoption. The impact on the business and the consequences of adopting a principle should be clearly stated. The reader should readily discern the answer to: “How does this affect me?”. It is important not to oversimplify, trivialize, or judge the merit of the impact. Some of the implications will be identified as potential impacts only, and may be speculative rather than fully analyzed.

There are five criteria that distinguish a good set of principles, as shown in Table 56.

Table 56. Recommended Criteria for Quality Principles

Criteria	Description
Completeness	Every potentially important principle governing the management of information and technology for the organization is defined. The principles cover every situation perceived.
Robustness	Principles should enable good quality decisions about architectures and plans to be made, and enforceable policies and standards to be created. Each principle should be sufficiently definitive and precise to support consistent decision-making in complex, potentially controversial situations.
Understandability	The underlying tenets of a principle can be quickly grasped and understood by individuals throughout the organization. The intention of the principle is clear and unambiguous, so that violations, whether intentional or not, are minimized.
Consistency	Strict adherence to one principle may require a loose interpretation of another principle. The set of principles must be expressed in a way that allows a balance of interpretations. Principles should not be contradictory to the point where adhering to one principle would violate the spirit of another. Every word in a principle statement should be carefully chosen to allow consistent yet flexible interpretation.
Stability	Principles should be enduring, yet able to accommodate changes. An amendment process should be established for adding, removing, or altering principles after they are ratified initially.

7.4. Business Principles, Goals, and Drivers

A statement of the business principles, goals, and drivers has usually been defined elsewhere in the enterprise prior to the architecture activity. They are restated as an output of the Preliminary Phase and reviewed again as part of Phase A: Architecture Vision. The activity in Phase A is to ensure that the current definitions are correct and clear. The *TOGAF Standard – ADM Techniques* document (Architecture Principles) contains an example set of nine business principles that are a useful starting point.

7.5. Request for Architecture Work

The Request for Architecture Work document is sent from the sponsoring organization to the architecture organization to trigger the start of an architecture development cycle. It is produced with the assistance of the architecture organization as an output of the Preliminary Phase. Requests for Architecture Work can also be created as a result of approved architecture Change Requests, or terms of reference for architecture work originating from migration planning.

In general, all the information in this document should be at a high level. The typical contents of this document are as follows:

- Organization sponsors
- Organization's mission statement
- Business goals (and changes)
- Strategic plans of the business
- Time limits
- Changes in the business environment
- Organizational constraints
- Budget information, financial constraints
- External constraints, business constraints
- Current business system description
- Current architecture/IT system description
- Description of developing organization
- Description of resources available to developing organization

7.6. Statement of Architecture Work

The Statement of Architecture Work is created as a deliverable of Phase A, and is effectively a contract between the architecting organization and the sponsor of the Architecture Project. This document is a response to the Request for Architecture Work input document (see Section 7.5). It should

describe an overall plan to address the request for work and propose how solutions to the problems that have been identified will be addressed through the architecture process.

The typical contents of this document are as follows:

- Title
- Architecture Project request and background
- Architecture Project description and scope
- Overview of Architecture Vision
- Specific change of scope procedures
- Roles, responsibilities, and deliverables
- Acceptance criteria and procedures
- Architecture Project plan and schedule
- Approvals

7.7. Architecture Vision

The Architecture Vision is created in Phase A and provides a high-level summary of the changes to the enterprise that will follow from the successful deployment of the Target Architecture. The purpose of the vision is to agree at the outset what the desired outcome should be for the architecture, so that architects can then focus on the detail necessary to validate feasibility. Providing an Architecture Vision also supports stakeholder communication by providing a summary version of the full Architecture Definition. Business scenarios are an appropriate and important technique that can be used as part of the process in developing an Architecture Vision document.

The typical contents are as follows:

- Problem description:
 - Stakeholders and their concerns
 - List of issues/scenarios to be addressed

- Objective of the Statement of Architecture Work
- Summary views necessary for the Request for Architecture Work and the draft Business, Data, Application, and Technology Architectures
- Mapped requirements
- Reference to the Draft Architecture Definition Document

7.8. Communications Plan

Enterprise Architectures contain large volumes of complex and inter-dependent information. Effective communication of targeted information to the right stakeholders at the right time is a Critical Success Factor (CSF) for Enterprise Architecture. Development of a Communications Plan for architecture in Phase A allows for this communication to be carried out within a planned and managed process.

Typical contents of a Communications Plan are:

- Identification of stakeholders and grouping by communication requirements
- Identification of communication needs, key messages in relation to the Architecture Vision, communication risks, and CSFs
- Identification of mechanisms that will be used to communicate with stakeholders and allow access to architecture information, such as meetings, newsletters, repositories, etc.
- Identification of a communications timetable, showing which communications will occur with which stakeholder groups at what time and in what location

7.9. Capability Assessment

Before embarking upon a detailed architecture definition, it is valuable to understand the baseline and target capability level of the enterprise. This Capability Assessment is first carried out in Phase A, and updated in Phase E.

The following contents are typical within a Capability Assessment

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deliverable:

- Business Capability Assessment, including:
 - Capabilities of the business
 - Baseline state assessment of the performance level of each capability
 - Future state aspiration for the performance level of each capability
 - Baseline state assessment of how each capability is realized
 - Future state aspiration for how each capability should be realized
 - Assessment of likely impacts to the business organization resulting from the successful deployment of the Target Architecture
- IT Capability Assessment, including:
 - Baseline and target maturity level of change process
 - Baseline and target maturity level of operational processes
 - Baseline capability and capacity assessment
 - Assessment of likely impacts to the IT organization resulting from the successful deployment of the Target Architecture
- Architecture Maturity Assessment, including:
 - Architecture Governance processes, organization, roles, and responsibilities
 - Architecture skills assessment
 - Breadth, depth, and quality of landscape definition within the Architecture Repository
 - Breadth, depth, and quality of standards definition within the Architecture Repository
 - Breadth, depth, and quality of reference model definition within the Architecture Repository
 - Assessment of re-use potential
- Business Transformation Readiness Assessment, including:
 - Readiness factors
 - Vision for each readiness factor

- Current and target readiness ratings
- Readiness risks

7.10. Architecture Definition Document

The Architecture Definition Document is the deliverable container for the core architectural artifacts created during a project and for important related information. The Architecture Definition Document spans all architecture domains (Business, Data, Application, and Technology) and also examines all relevant states of the architecture (Baseline, Transition, and Target).

It is first created in Phase A, where it is populated with artifacts created to support the Architecture Vision. It is updated in Phase B, with Business Architecture-related material, and subsequently updated with Information Systems Architecture material in Phase C, and then with Technology Architecture material in Phase D. Where the scope of change to implement the Target Architecture requires an incremental approach, the Architecture Definition Document will be updated to include one or more Transition Architectures in Phase E.

The Architecture Definition Document is a companion to the Architecture Requirements Specification, with a complementary objective:

- The Architecture Definition Document provides a qualitative view of the solution and aims to communicate the intent of the architects
- The Architecture Requirements Specification provides a quantitative view of the solution, stating measurable criteria that must be met during the implementation of solutions supporting the architecture

Typical contents of an Architecture Definition Document include:

- Scope
- Goals, objectives, and constraints
- Architecture Principles
- Baseline Architecture

- Architecture models (for each state to be modeled):
 - Business Architecture models
 - Data Architecture models
 - Application Architecture models
 - Technology Architecture models
- Rationale and justification for architectural approach
- Mapping to Architecture Repository:
 - Mapping to Architecture Landscape
 - Mapping to reference models
 - Mapping to standards
 - Re-use assessment
- Gap analysis
- Impact assessment
- Transition Architecture (see Section 7.16)

The following sections look at each of the architectures in more detail.

7.10.1. Business Architecture

The Business Architecture is developed in Phase B. The topics that should be addressed in the Architecture Definition Document related to Business Architecture are as follows:

- Baseline Business Architecture, if appropriate – this is a description of the existing Business Architecture
- Target Business Architecture, including:
 - Organization structure – identifying business locations and relating them to organizational units
 - Business goals and objectives – for the enterprise and each organizational unit
 - Business functions – a detailed, recursive step involving successive decomposition of major functional areas into sub-functions

- Business capabilities – the abilities that a business needs to possess or exchange to achieve its goals and objectives
 - Business services – the services that support the business by encapsulating a unique “elements of business behavior”; a service offered external to the enterprise may be supported by business services
 - Products – output generated by the business to be offered to customers; products include materials and/or services
 - Business processes, including measures and deliverables
 - Business roles, including development and modification of skills requirements
 - Business data model
 - Correlation of organization and functions – relate business functions to organizational units in the form of a matrix report
- Views corresponding to the selected viewpoints addressing key stakeholder concerns

7.10.2. Information Systems Architectures

The Information Systems Architectures are developed in Phase C. The topics that should be addressed in the Architecture Definition Document related to the Information Systems Architectures are as follows:

- Baseline Data Architecture, if appropriate
- Target Data Architecture, including:
 - Business data model
 - Logical data model
 - Data management process models
 - Data Entity/Business Function matrix
- Data Architecture views corresponding to the selected viewpoints addressing key stakeholder concerns
- Baseline Application Architecture, if appropriate

- Target Application Architecture
- Application Architecture views corresponding to the selected viewpoints addressing key stakeholder concerns

7.10.3. Technology Architecture

The Technology Architecture is developed as part of Phase D. The topics that should be addressed in the Architecture Definition Document related to Technology Architecture are as follows:

- Baseline Technology Architecture, if appropriate
- Target Technology Architecture, including:
 - Technology components and their relationships to information systems
 - Technology platforms and their decomposition, showing the combinations of technology required to realize a particular technology “stack”
 - Environments and locations – a grouping of the required technology into computing environments (e.g., development, production)
 - Expected processing load and distribution of load across technology components
 - Physical (network) communications
 - Hardware and network specifications
- Views corresponding to the selected viewpoints addressing key stakeholder concerns

7.11. Architecture Requirements Specification

The Architecture Requirements Specification provides a set of quantitative statements that outline what an implementation project must do in order to comply with the architecture. An Architecture Requirements Specification will typically form a major component of an implementation contract or contract for more detailed architecture definition. As mentioned earlier in this chapter, the Architecture Requirements Specification is a companion to the Architecture Definition Document, with a complementary objective to provide the quantitative view.

Typical contents of an Architecture Requirements Specification include:

- Success measures
- Architecture requirements
- Business service contracts
- Application service contracts
- Implementation guidelines
- Implementation specifications
- Implementation standards
- Interoperability requirements
- IT service management requirements
- Constraints
- Assumptions

7.11.1. Business Architecture Requirements

Business Architecture requirements populating the Architecture Requirements Specification in Phase B include:

- Gap analysis results
- Technical requirements

An initial set of technical requirements should be generated as the output of Phase B (Business Architecture). These are the drivers for the architecture work that follows, and should identify, categorize, and prioritize the implications for work in the remaining architecture domains.

- Updated business requirements

The Business Scenarios technique can be used to discover and document business requirements.

7.11.2. Information Systems Architecture Requirements

Information Systems Architecture requirements populating the Architecture Requirements Specification in Phase C include:

- Gap analysis results
- Data interoperability requirements
- Application interoperability requirements
- Areas where the Business Architecture may need to change in order to comply with changes in the Data and/or Application Architecture
- Constraints on the Technology Architecture about to be designed
- Updated business requirements, if appropriate
- Updated data requirements, if appropriate
- Updated application requirements, if appropriate

7.11.3. Technology Architecture Requirements

Technology Architecture requirements populating the Architecture Requirements Specification in Phase D include:

- Gap analysis results
- Updated technology requirements

7.11.4. Interoperability Requirements

The determination of interoperability is present throughout the ADM cycle. A set of guidelines is provided in the ADM Techniques document for defining and establishing interoperability requirements.

7.12. Architecture Roadmap

The Architecture Roadmap lists individual work packages that will realize the Target Architecture and lays them out on a timeline to show progression from the Baseline Architecture to the Target Architecture. The Architecture Roadmap highlights individual work packages' business value at each stage. Transition Architectures necessary to effectively realize the Target Architecture are identified as intermediate steps. The Architecture Roadmap is incrementally developed throughout Phases E and F, and informed by the roadmap components developed in Phases B, C, and D.

Typical contents of an Architecture Roadmap are as follows:

- Work package portfolio:
 - Work package description (name, description, objectives, deliverables)
 - Functional requirements
 - Dependencies
 - Relationship to opportunity
 - Relationship to Architecture Definition Document and Architecture Requirements Specification
 - Business value
- Implementation Factor catalog, including:
 - Risks
 - Issues
 - Assumptions
 - Dependencies

- Actions
- Impact
- Consolidated Gaps, Solutions, and Dependencies matrix, including:
 - Architecture domain
 - Gaps
 - Potential solutions
 - Dependencies
- Transition Architectures, if any
- Implementation recommendations:
 - Criteria/measures of effectiveness of projects
 - Risks and issues
 - SBBs

7.13. Architecture Building Blocks

Architecture Building Blocks (ABBs) are architecture documentation and models from the enterprise's Architecture Repository classified according to the Architecture Continuum. They are defined or selected as a result of application of the ADM (mainly in Phases A, B, C, and D). The characteristics of ABBs are as follows:

- They capture architecture requirements; e.g., business, data, application, and technology requirements
- They direct and guide the development and procurement of SBBs

The content of ABB specifications include the following as a minimum:

- Fundamental functionality and attributes: semantics, unambiguous, including security capability and manageability
- Interfaces: chosen set, supplied (Application Programming Interfaces (APIs), data formats, protocols, hardware interfaces, standards)
- Interoperability and relationship with other building blocks

- Dependent building blocks with required functionality and named user interfaces

Each ABB should include a statement of any architecture documentation and models from the enterprise's Architecture Repository that can be re-used in the architecture development. The specification of building blocks using the ADM is an evolutionary and iterative process.

7.14. Solution Building Blocks

Solution Building Blocks (SBBs) relate to the Solutions Continuum. They are implementation choices of the architectures identified in the enterprise's Architecture Continuum and may be either procured or developed. SBBs appear in Phase E of the ADM where product-specific building blocks are considered for the first time. SBBs define what products and components will implement the functionality, thereby defining the implementation. They fulfill business requirements and are product or vendor-aware. The content of an SBB specification includes the following as a minimum:

- Specific functionality and attributes
- Interfaces; the implemented set
- Required SBBs used with required functionality and names of the interfaces used
- Mapping from the SBBs to the IT topology and operational policies
- Specifications of attributes shared such as security, manageability, localizability, scalability
- Performance, configurability
- Design drivers and constraints, including the physical architecture
- Relationships between the SBBs and ABBs

7.15. Implementation and Migration Plan

The Implementation and Migration Plan is developed in Phases E and F, and provides a schedule of the projects for implementation of the Target Architecture. The Implementation and Migration Plan includes executable

projects grouped into managed portfolios and programs. The Implementation and Migration Strategy identifying the approach to change is a key element of the Implementation and Migration Plan.

Typical contents are as follows:

- Implementation and Migration Strategy:
 - Strategic implementation direction
 - Implementation sequencing approach
- Project and portfolio breakdown of implementation:
 - Allocation of work packages to project and portfolio
 - Capabilities delivered by projects
 - Milestones and timing
 - Work breakdown structure
 - May include impact on existing portfolio, program, and projects

It may contain:

- Project charters:
 - Included work packages
 - Business value
 - Risk, issues, assumptions, dependencies
 - Resource requirements and costs
 - Benefits of migration, determined (including mapping to business requirements)
 - Estimated costs of migration options

7.16. Transition Architecture

Where the scope of change to implement the Target Architecture requires an incremental approach, one or more Transition Architectures are defined within the Architecture Definition Document output from Phase E. A Transition Architecture shows the enterprise at an architecturally

significant state between the Baseline and Target Architectures. Transition Architectures are used to describe interim architectures necessary for the effective realization of the Target Architecture. These provide an ability to identify clear interim points of reference along the roadmap to realizing the Target Architecture.

The following contents are typical within a Transition Architecture:

- Transition Architecture:
 - Definition of transition states
 - Business Architecture for each transition state
 - Data Architecture for each transition state
 - Application Architecture for each transition state
 - Technology Architecture for each transition state

7.17. Implementation Governance Model

Once an architecture has been defined, it is necessary to plan how the architecture will be governed through implementation. Within organizations that have established architecture functions, there is likely to be a governance framework already in place, but specific processes, organizations, roles, responsibilities, and measures may need to be defined on a project-by-project basis.

The Implementation Governance Model produced as an output of Phase F ensures that a project transitioning into implementation also smoothly transitions into appropriate Architecture Governance (for Phase G).

Typical contents of an Implementation Governance Model are:

- Governance processes
- Governance organization structure
- Governance roles and responsibilities
- Governance checkpoints and success/failure criteria

7.18. Architecture Contracts

Architecture Contracts may occur at various stages of the ADM; for example, in Phase G: Implementation Governance. Architecture Contracts are the joint agreements between development partners and sponsors on the deliverables, quality, and fitness-for-purpose of an architecture. Successful implementation of these agreements will be delivered through effective architecture. By implementing a governed approach to the management of contracts, the following will be ensured:

- A system of continuous monitoring to check the integrity, changes, decision-making, and audits of all architecture-related activities within the organization
- Adherence to the principles, standards, and requirements of the existing or developing architectures
- Identification of risks in all aspects of the development and implementation of the architecture(s) covering the internal development against accepted standards, policies, technologies, and products as well as the operational aspects of the architectures such that the organization can continue its business within a resilient environment
- A set of processes and practices that ensure accountability, responsibility, and discipline with regard to the development and usage of all architectural artifacts
- A formal understanding of the governance organization responsible for the contract, their level of authority, and scope of the architecture under the governance of this body

Typical contents of an Architecture Design and Development Contract are:

- Introduction and background
- The nature of the agreement
- Scope of the architecture
- Architecture and strategic principles and requirements
- Conformance requirements
- Architecture development and management process and roles

- Target Architecture measures
- Defined phases of deliverables
- Prioritized joint work plan
- Time window(s)
- Architecture delivery and business metrics

Typical contents of a Business Users' Architecture Contract are:

- Introduction and background
- The nature of the agreement
- Scope
- Strategic requirements
- Conformance requirements
- Architecture adopters
- Time window
- Architecture business metrics
- Service architecture (includes SLA)

7.19. Change Request

Requests for Architecture Change are considered in Phase H: Architecture Change Management. During the implementation of an architecture, as more facts become known, it is possible that the original architecture definition and requirements are not suitable or are not sufficient to complete the implementation of a solution. In these circumstances, it is necessary for implementation projects to either deviate from the suggested architectural approach or to request scope extensions. Additionally, external factors – such as market factors, changes in business strategy, and new technology opportunities – may open up opportunities to extend and refine the architecture.

In these circumstances, a Change Request may be submitted in order to kick-start a further cycle of architecture work.

Typical contents of a Change Request are:

- Description of the proposed change
- Rationale for the proposed change
- Impact assessment of the proposed change, including:
 - Reference to specific requirements
 - Stakeholder priority of the requirements to date
 - Phases to be revisited
 - Phase to lead on requirements prioritization
 - Results of phase investigations and revised priorities
 - Recommendations on management of requirements
- Repository reference number

7.20. Compliance Assessment

Once an architecture has been defined, it is necessary to govern that architecture through implementation to ensure that the original Architecture Vision is appropriately realized and that any implementation lessons are fed back into the architecture process. Periodic compliance reviews of implementation projects in Phase G provide a mechanism to review project progress and ensure that the design and implementation is proceeding in line with the strategic and architectural objectives.

Typical contents of a Compliance Assessment are:

- Overview of project progress and status
- Overview of project architecture/design
- Completed architecture checklists:
 - Hardware and operating system checklists
 - Software services and middleware checklists
 - Applications checklists
 - Information management checklists

- Security checklists
- System management checklists
- System engineering checklists
- Methods and tools checklists

7.21. Requirements Impact Assessment

Throughout the ADM, new information is collected relating to an architecture. As this information is gathered, new facts may come to light that invalidate existing aspects of the architecture. A Requirements Impact Assessment assesses the current architecture requirements and specification to identify changes that should be made and the implications of those changes.

It documents an assessment of the changes and the recommendations for change to the architecture. The typical contents are as follows:

- Reference to specific requirements
- Stakeholder priority of the requirements to date
- Phases to be revisited
- Phase to lead on requirements prioritization
- Results of phase investigations and revised priorities
- Recommendations on management of requirements
- Repository reference number

These are often produced as a response to a Change Request.

A: Glossary and Acronyms

ABB

Architecture Building Block

ADM

Architecture Development Method

Agile

To move/change quickly and easily, often to provide value-generating outcomes.

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.

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.

API

Application Programming Interface

Application Architecture

A description of the structure and interaction of the applications as groups of capabilities that provide key business functions and manage the data assets.

Architecture

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.

2. The structure of components, their inter-relationships, and the principles and guidelines governing their design and evolution over time.

Architecture Building Block (ABB)

A constituent of the architecture model that describes a single aspect of the overall model.

Architecture Continuum

A part of the Enterprise Continuum. A repository of architectural elements with increasing detail and specialization.

Architecture Development Method (ADM)

The core of the TOGAF framework. A multi-phase, iterative approach to develop and use an Enterprise Architecture to shape and govern business transformation and implementation projects.

Architecture Framework

A conceptual structure used to plan, develop, implement, govern, and sustain an architecture.

Architecture Landscape

The architectural representation of assets in use, or planned, by the enterprise at particular points in time.

Architecture Principle

A qualitative statement of intent that should be met by the architecture.

Architecture Project

An endeavor undertaken to define and describe the Enterprise Architecture to be implemented. In TOGAF terms, it encompasses all activities undertaken within the ADM Phases A to F, and Requirements Management for these phases. Practically, it can be a stand-alone project or part of a larger effort (e.g., a program).

Architecture View

A representation of a system from the perspective of a related set of concerns.

Architecture Viewpoint

A specification of the conventions for a particular kind of architecture view.

Artifact

An architectural work product that describes an aspect of the architecture.

Backlog

An ever-evolving list of requirements, prioritized by the stakeholders, that conveys to an Agile team which requirements to handle first. Business change design and development typically employ a top-level backlog, known as a business change backlog, and each Agile team working on a sprint typically creates a backlog for each sprint, known as a sprint backlog.

Baseline

A specification that has been formally reviewed and agreed upon, that thereafter serves as the basis for further development or change and that can be changed only through formal change control procedures or a type of procedure such as configuration management.

BDUF

Big Design Up Front

Business Architecture

A representation of holistic, multi-dimensional business views of: capabilities, end-to-end value delivery, information, and organizational structure; and the relationships among these business views and strategies, products, policies, initiatives, and stakeholders.

Capability

An ability that an organization, person, or system possesses.

Capability Architecture

A highly detailed description of the architectural approach to realize a particular solution or solution aspect.

Capability Increment

A discrete portion of a capability architecture that delivers specific value. When all increments have been completed, the capability has been realized.

C-MDM

Customer Master Data Management

CMM

Capability Maturity Model

CSF

Critical Success Factor

Data Architecture

A description of the structure and interaction of the enterprise's major types and sources of data, logical data assets, physical data assets, and data management resources.

DBRM

Digital Business Reference Model

DoDAF

Department of Defense Architecture Framework

DTRA

Digital Transformation Readiness Assessment

Enterprise

The highest level (typically) of description of an organization and typically covers all missions and functions. An enterprise will often span multiple organizations.

Enterprise Architecture

1. 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 (Source: Gartner).
2. A set of abstractions and models that simplify and communicate complex structures, processes, rules, and constraints to improve understanding, implementation, forecasting, and resourcing” (Source: DoDAF).

Enterprise Continuum

A categorization mechanism for classifying architecture and solution artifacts as they evolve from generic to specific applicability.

ERD

Entity Relationship Diagram

ERM

Enterprise Risk Management

Foundation Architecture

Generic building blocks, their inter-relationships with other building blocks, combined with the principles and guidelines that provide a foundation on which more specific architectures can be built.

Framework

A structure for content or process that can be used as a tool to structure thinking, ensuring consistency and completeness.

Gap

A statement of difference between two states. Used in the context of gap analysis, where the difference between the Baseline and Target Architecture is identified.

Governance

The discipline of monitoring, managing, and steering a business (or Information Systems/Information Technology (IS/IT) landscape) to

deliver the business outcome required.

GRM

Government Reference Model

IS/IT

Information Systems/Information Technology

ISM

Information Security Management

KPI

Key Performance Indicator

Metamodel

A model that describes how and with what the architecture will be described in a structured way.

Minimum Viable Architecture (MVA)

The minimum (Enterprise) Architecture that is realizable and adds business value. 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.

Minimum Viable Business Development (MVBD)

The minimum set of business change that delivers significant value to the stakeholders.

Minimum Viable Product (MVP)

An output that satisfies a minimum set of functional and non-functional requirements and can be realized when implemented in a live operational environment. The smallest possible outcome that generates acceptable learning, delivery of value to the customer (internal or external), and is a basis for future extension.

Practitioner

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

Architecture.

Product

An outcome generated by the business to be offered to customers. Products include materials and/or services.

Project Management

The planning, delegating, monitoring, and control of all aspects of the project, and the motivation of those involved to achieve the project objectives within the expected performance targets for time, cost, quality, scope, benefits, and risks. Market-leading methods include PRINCE2 and PMBOK.

Repository

A system that manages all of the data of an enterprise, including data and process models and other enterprise information.

Requirement

A statement of need that must be met by a particular architecture or work package.

Retrospective

A time-boxed meeting held at the end of a sprint, in which the Sprint team examines its processes to determine what succeeded and what could be improved; key to an Agile team's ability to "inspect and adapt" in the pursuit of "continuous improvement".

Risk Management

The management of risks and issues that may threaten the success of the Enterprise Architecture practice and its ability to meet its vision, goals, and objectives, and, importantly, its service provision.

Segment Architecture

A detailed, formal description of areas within an enterprise, used at the program or portfolio level to organize and align change activity.

Service

A repeatable activity; a discrete behavior that a building block may be

requested or otherwise triggered to perform.

Service-Orientation

Viewing an enterprise, system, or building block in terms of services provided and consumed.

Service-Oriented Architecture (SOA)

An architectural style that supports service-orientation.

SLA

Service-Level Agreement

Solution Architecture

A description of a discrete and focused business operation or activity and how IS/IT supports that operation.

Solution Building Block (SBB)

A candidate solution which conforms to the specification of an Architecture Building Block (ABB).

Solutions Continuum

A part of the Enterprise Continuum. A repository of solution implementation elements with increasing detail and specialization.

Sprint

A short, time-boxed period, at the very heart of Agile methodologies, when an Agile team works to complete a set amount of work supporting the delivery of a working solution.

Stakeholder

An individual, team, organization, or class thereof, having an interest in a system.

TAFIM

Technical Architecture Framework for Information Management

Target Architecture

The description of a future state of the architecture being developed for

an organization.

Technical Reference Model (TRM)

A structure which allows the components of an information system to be described in a consistent manner.

Technology Architecture

A description of the structure and interaction of the technology services, and logical and physical technology components.

Transition Architecture

A formal description of one state of the architecture at an architecturally significant point in time.

Value Stream

A representation of an end-to-end collection of value-adding activities that create an overall result for a customer, stakeholder, or end user.

View

See Architecture View.

Viewpoint

See Architecture Viewpoint.

Work Package

A set of actions identified to achieve one or more objectives for the business. A work package can be a part of a project, a complete project, or a program.

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