World-Class Enterprise Architecture: Framework Guidance and TOGAF™ 9 Example

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Executive Summary

This is the second part of a White Paper on adoption of world-class enterprise architecture.

This document complements the TOGAF 9 specification by providing an approach to successfully develop an enterprise architecture capability. This document will help overcome common pitfalls when adopting TOGAF 9, and will ensure that an enterprise architecture function is focused on activities that provide recognized value to an organization. Consequently, this document will lead to a:

• Fuller and more consistent use of the TOGAF 9 specification

• Higher success rate in the adoption and deployment of TOGAF 9

• Faster and more cost-effective adoption and deployment of TOGAF 9

Introduction

Abstract

The world is changing at a pace faster than ever experienced. Several trends in demographics, technology, the environment, globalization, public attitudes, and political institutions are driving Government[1] and Industry agendas as never before. In order to respond to the demands and needs of their stakeholders, organizations have to launch ambitious business and technology programs in order to deliver significant value in a transparent manner.

Organizations need an enterprise architecture function as an integral capability in order to support these transformational programs. However, over the years, many organizations have attempted to set up enterprise architecture practices only to see them fail after a few years. These failures are due to several reasons, such as an inability to merge enterprise architecture processes with the other management processes – such as demand management – within the organization, or the lack of authority for enterprise architects; for example, when making strategic decisions or quality assuring programs and projects.

In spite of these previous failures, organizations are again trying to set up enterprise architecture functions as they have found that no other pragmatic alternatives exist.

Enterprise architecture is thus here to stay.

From a number of proprietary frameworks that have been developed by specific individuals or organizations over the last few decades, enterprise architecture has now become main-stream, with the development and adoption of open frameworks such as The Open Group Architecture Framework (TOGAF 9).

Organizations are deploying enterprise architecture functions at the heart of their operations in order to maximize the impact, effectiveness, and therefore benefits of enterprise architecture. This central position means that the consequences of enterprise architecture failure are also high. For this reason, organizations must strive to develop world-class enterprise architecture from the outset.

World-class enterprise architecture is the result of a mature and operational enterprise architecture function, within an organization, that leverages the entire suite of enterprise architecture capabilities. World-class enterprise architecture also provides a next-generation maturity model and roadmap that allows organizations to plan and monitor their progress on their particular enterprise architecture journey.

Why is this Document Important?

TOGAF 9 supports a modular, iterative, and incremental approach to enterprise architecture, both in terms of how architectures are developed and also in the way that architecture capability is developed. However, the adoption of a comprehensive set of enterprise architecture capabilities (as described in TOGAF 9) is a large and complex undertaking.

Adopting TOGAF 9 is not an exercise that should typically be completed in a single step as organizations are likely to prefer an incremental and evolutionary approach.

This document complements the TOGAF 9 specification by providing an approach to successfully develop an enterprise architecture capability. This document will help overcome common pitfalls when adopting TOGAF

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[1] The Future and How to Think About It, Report by the Performance and Innovation Unit (PIU), UK Government, 1999

9, and will ensure that an enterprise architecture function is focused on activities that provide recognized value to an organization. Consequently, this document will lead to a:

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How is this Document Structured?

This document is the second of two parts:

- Part 1 looks at the adoption of world-class enterprise architecture. It identifies the capabilities that are needed in order to successfully practice enterprise architecture, and explains how to prioritize them based on a number of factors such as business trends and drivers.

- Part 2 (this document) takes the world-class enterprise architecture approach forward and describes how TOGAF 9 should be used for the practical deployment of architecture capabilities. For each of the enterprise architecture capabilities identified in Part 1, this document describes in detail how TOGAF 9 can be used to help.

The diagram below illustrates the five major steps of the world-class enterprise architecture approach.
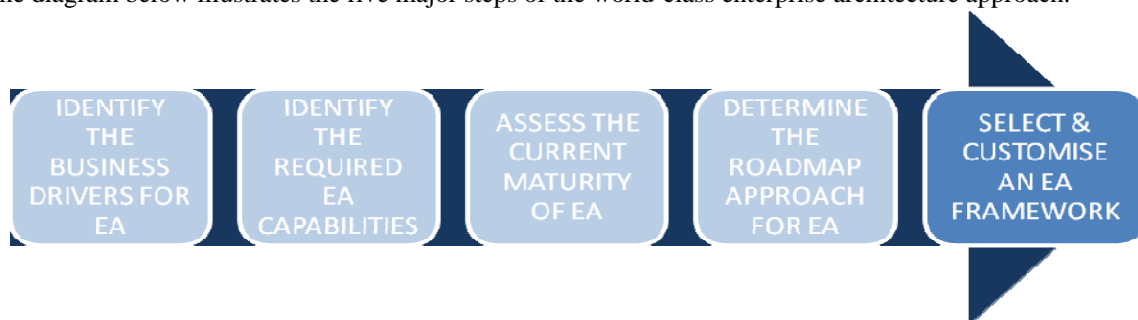
Figure 1: World-Class Enterprise Architecture Approach

This document describes the fifth step of this approach, whereas the first four steps are described in Part 1:

- The **World-Class Enterprise Architecture Capabilities** section summarizes the architecture capability model that is described in Part 1.

- The **TOGAF 9 to Implement World-Class Enterprise Architecture Capabilities** section describes our view of how organizations should adopt TOGAF 9 in order to develop world-class enterprise architecture capabilities in their journey to achieve a world-class enterprise architecture function.

- The **Worked Example** section brings this approach to life. It walks through a fictional example of an organization that is developing its enterprise architecture capability using TOGAF 9.

- Finally, **Appendices A, B, and C** provide an overview of the TOGAF 9 parts, descriptions of deliverables and artifacts together with links to the actual templates, and mappings between these deliverables/artifacts and the Architecture Development Method (ADM) phases.

Lessons Learned

Throughout this White Paper, "Lessons Learned" sections will highlight the critical success factors that have been identified within each section.

World-Class Enterprise Architecture Capabilities

An enterprise architecture capability, like any other business function, requires a number of elements such as people, process, technology, and information in order to operate effectively.

Therefore, organizations can apply some of their generic practices and controls – for example, financial control, leadership, and the provision of human resource – to these architecture capabilities.

However, other practices and controls for these architectural capabilities will be specific to the enterprise architecture function, as they will relate to the outcomes that enterprise architecture seeks to achieve.

Although some enterprise architecture capabilities may only be deployable within a specific organization, or type of organization – for example, due to a unique business model – most enterprise architecture capabilities can be deployed within any organization.

The diagram below illustrates the capability model for world-class enterprise architecture that was developed in Part 1 of this document set. The rest of this document assumes an understanding of these capabilities and, furthermore, anticipates that a prioritization exercise that is based on valid business drivers has been undertaken.

General Business Capabilities Supporting an Architecture Practice

| Architecture Team Leadership & Direction | Performance Measurement | Team Management | Risk Management | Enterprise Engagement & Enrolment |

Architecture at the Strategy and Portfolio Management Level
- Architecture-Led Enterprise Strategy Development
- Architecture Support for Business and IT Strategy definition
- Architecture Road-Mapping

Architecture at the Program Level
- Architecture Supported Program Inception
- Architectural Governance and Issue Management

Architecture at the Project Level
- Architecture Budgeting & Estimation (Effort & Cost)
- Solution Architecture
- Project Assurance

Using Architecture to Manage Third Party Contractors
- Architecture Supported Procurement
- Architecture Supported Contractor Governance
- Contractor Collaboration and Integration Management

Foundational Architecture Capabilities

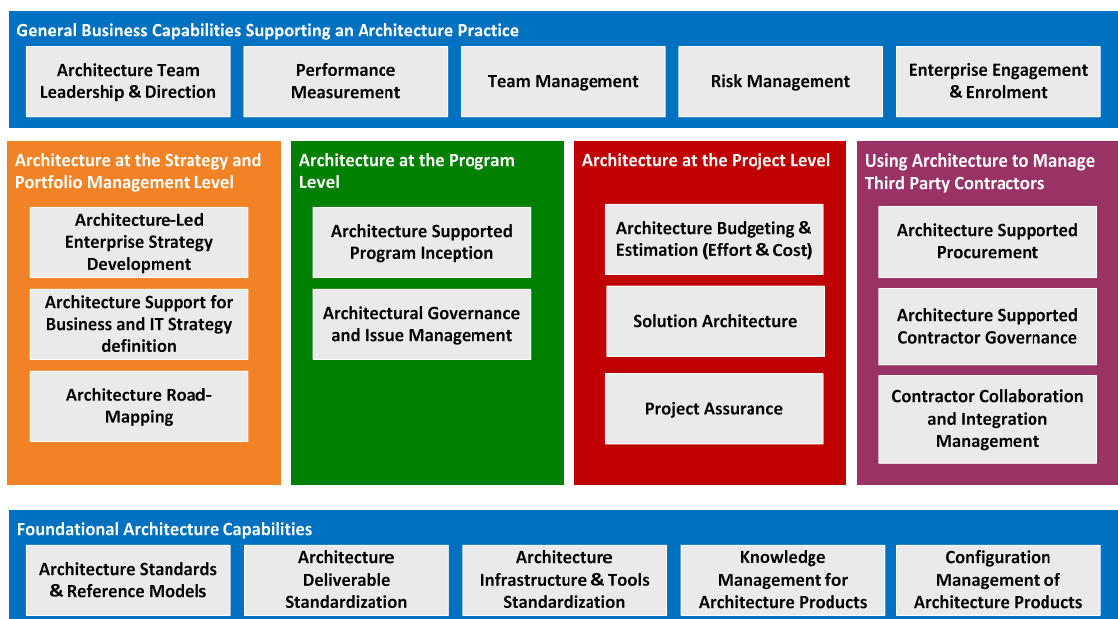| Architecture Standards & Reference Models | Architecture Deliverable Standardization | Architecture Infrastructure & Tools Standardization | Knowledge Management for Architecture Products | Configuration Management of Architecture Products |

Figure 2: World-Class Enterprise Architecture Capability Model

Lessons Learned

Knowing "why" – TOGAF 9 provides a very rich assortment of tools and techniques. However, it can be difficult to know where to begin. A prioritized set of capabilities, which are based on business drivers, will help focus on the specific aspects of TOGAF 9 that will provide the most value.

TOGAF 9 to Implement World-Class Enterprise Architecture Capabilities

TOGAF 9 contains a wealth of materials, too much to tackle at once, which need to be prioritized and tailored in order to create value.

The section describes our view of how organizations should adopt TOGAF 9 in order to develop world-class enterprise architecture capabilities in their journey to achieve a world-class enterprise architecture function.

Note: An overview and descriptions for the TOGAF 9 parts are provided in Appendix A: Overview of TOGAF 9.

The table below shows mappings between TOGAF 9 parts and enterprise architecture capabilities, based on the architectural activities that need to be undertaken, and architecture deliverables and artifacts that need to be produced, for the capability. Each of these mappings is specified as High (H), Medium (M), or Low (L), based on whether the TOGAF 9 part is critical, desirable, or of low importance for the capability.

TOGAF Part	Enterprise Strategy & Portfolio Management			Program Level		Project Level		Using Architecture to Manage Third-Party Contractors			Foundational Architecture Capability				
	Architecture-Led Enterprise Strategy Development	Architecture Support for Business/IT Strategy Def.	Architecture Roadmapping	Architecture-Supported Program Inception	Architectural Governance & Issue Management	Solution Architecture	Reference Models	Architecture-Supported Procurement	Architecture-Supported Subcontractor Governance	Subcontractor Collaboration & Integration Mgmt.	Architecture Standards	Standardized Architecture Deliverables	Standardized Infrastructure & Tools for Architecture	Knowledge Management for Architecture Products	Configuration Mgmt. of Architecture Products
Introduction (definition and value of EA)	M	M	L	L	L	L	L	L	L	M	M	L	L	L	L
ADM – Preliminary	L	M	M	M	L	M	L	H	L	M	L	M	L	M	L
ADM – A to D	H	H	H	H	L	H	H	H	L	L	L	M	L	L	L
ADM – E and F	H	H	H	H	M	H	L	H	M	L	L	M	L	M	L
ADM – G and H	L	M	M	M	H	H	L	M	H	M	M	M	L	H	H
Architecture Content Framework	M	M	M	H	H	H	H	H	H	H	H	H	H	H	L
Archtiecture Partitioning	H	M	H	L	M	L	H	H	M	H	H	M	M	M	L
Enterprise Continuum	H	M	H	L	L	L	H	L	L	H	M	M	H	H	L
Architecture Repository	L	L	L	H	M	M	M	M	M	H	M	M	H	H	L
Reference Models – TRM & III-RM	H	L	L	M	L	M	H	L	L	M	H	M	M	L	L
Architecture Capability Framework	L	L	L	L	H	L	L	M	H	H	M	L	L	M	M

Table 1: World-Class Enterprise Architecture Capability to TOGAF Part Mappings

Part 1 of this documentation set describes how business trends and themes have been used to prioritize enterprise architecture capabilities. Organizations then need to look at these prioritized capabilities in the table, and identify the complete set of TOGAF 9 architectural activities and collateral that they need to undertake or produce respectively, in order to develop a world-class enterprise architecture function.

For organizations that have already begun their TOGAF 9 implementation, the table may act as a reference guide in order to ensure that their current direction is in line with industry best practice.

Although the identification of TOGAF 9 activities and collateral that need to be undertaken or produced is an essential step in order to develop a world-class enterprise architecture function on the ground, the next step of actually creating the first artifacts and deliverables represents a significant leap.

Many enterprise architecture adoption initiatives founder at this point due to a lack of experience, and a lack of understanding of the real purpose of various artifacts. In addition, there is often a pent-up demand for architecture work which leads to excessive time pressure that compounds the difficulties.

By defining standardized content in terms of artifacts and deliverables, templates and best-practices can be leveraged in order to assist with these initial challenges.

While the precise content will almost certainly need to be tuned to the precise needs of the initiative, an initial outline of the end result is still an enormous help in bringing the TOGAF 9 specification to life, and in setting the correct direction for the initial work.

Note: Appendix A: Overview of TOGAF 9 provides templates for the standard TOGAF 9 deliverables and artifacts.

Lessons Learned

Balancing content and process – A common pitfall is to get "lost in content", producing extensive architecture documentation that is never actually used. Instead, it is important to balance content generation initiatives with work on implementing best practices in areas such as Migration Planning and Implementation Governance. A combined approach tackling both content ("thinking") and process ("doing") is very powerful.

Not doing it all at once – Trying to take on too much initially leads to unfocused efforts which rarely make much impact. It is much better to choose a very small number of initiatives initially, and concentrate on doing them really well. Additional content and techniques can then be introduced gradually, building on this proven success.

Value of accelerators – Architecture work using TOGAF 9 follows a consistent pattern. Whilst every product is different, there is no need to reinvent the wheel when creating basic artifacts and deliverables. Templates can accelerate the effort, allowing architects to concentrate on value-adding insight rather than mundane document creation.

Expectation setting – Stakeholders are often unfamiliar with architecture work, and unsure what the final outputs will look like. This may lead to a mismatch of expectations, with subsequent difficulties and disappointment if the actual deliverables are not as imagined. By making use of templates, the architect can educate stakeholders at a very early stage as to the likely format and content of the eventual outputs.

Need for tailoring – While templates are useful, architecture work is not a mechanical activity. Delivering value to stakeholders must take priority at all times. Therefore, in almost all real projects, templates have to be tailored with sections being added, removed, or customized to make the document more readable and relevant for its intended purpose and audience.

Worked Example

This section provides a complete worked example that steps through one (fictional) organization's journey to develop its enterprise architecture capability.

Background

Mike came out of the weekly meeting with his CIO, having been briefed on some strategic change that had been mandated by the Board.

He had joined Goldstore Bank six months ago as their Chief Enterprise Architect. The last 12 months at the bank, and indeed across the sector, had been the most challenging in living memory. The Bank is facing a declining economy, heightened funding requirements (Basel II constraints, limited access through securitization), and the increasing cost of client risk, which are all jeopardizing the old credit-based model that drove the Bank's growth.

Now, with all the day-to-day fire-fighting, and the general inertia of the Bank around new ways of working, any attempt to get architecture work underway seemed to be an uphill struggle.

In this climate of crisis, how will architecture add value back to the Bank?

Things had been different in Mike's previous job where they had a mature architecture team working closely with the business stakeholders and using best-practices from TOGAF 9.

One of Mike's first actions on joining Goldstore had been to get the team trained and certified in TOGAF 9, but unfortunately they had not had much chance to put it into practice yet.

However, Mike now saw the "climate of crisis" as an opportunity to add value to the business while developing a world-class enterprise architecture capability here at Goldstore. He called his team together for a meeting.

STEP 1: Identification of Business Drivers

In 2008, the subprime crisis marked a clear stop to positive trends in the mortgage market, with an explosion in funding costs having a dramatic impact on mortgage profitability for the Bank. The Bank is now at a crossroads, with the Board calling for significant changes in order to remain successful over the next five years.

As a top-performing retail bank, the Board has directed that they will have to rethink their business model and revert to their historic deposit-based approach, leaving behind the credit-based model that they have relied upon over the past few years. To be successful in the future, the Bank must focus on deposits and provide the highest capability to fund and transform those deposits into credits. A new deposit-based approach appears to be inevitable.

The CIO has relayed to Mike that a key priority is the development of their sales, particularly by improving their cross-selling capabilities, product bundling, and customer-based pricing models. They will also have to find and attract new, lower-net-worth clients in order to increase volume.

Rather than relying exclusively on cost reduction, the Bank needs to continue to develop sales.

Reducing cost, primarily through the geographic consolidation of middle and back-offices as well as IT systems, should be a target for the Bank. Nevertheless, in the context of the current financial crisis, cutting costs is not a sufficient measure by itself, due to high fixed costs and uncertain revenue streams.

So the key message from the CIO is that the Bank will need to create value in new ways, notably through differentiation on offers and services.

Mike recognized that there are significant challenges in aligning the business and IT around these drivers.

It was true that Goldstore's customer channels were far from ideal, and that they weakened its ability to effectively cross-sell. The mainframe-based branch network had been upgraded in the 1990s, but little had really changed since then. Meanwhile, multiple different websites had been created for the different divisions of the Bank, and call centers in South East Asia and Eastern Europe. None of these channels were particularly well integrated, and customers often complained when information provided through one channel appeared to be "lost" when they got in touch again via a different route. It was becoming unacceptable. Indeed feedback from staff and customer surveys had proved that this issue was losing them business.

The Bank's CEO had set strategic objectives to double the profitability of the top 10% of customers, and achieve double-digit growth in new customers over the next five years. Projects were already being discussed across the Bank, but progress was rather disjointed, and Mike knew that many of the project managers had concerns about whether everything would really come together as the Board anticipated.

Bearing all this in mind, it seemed to Mike that the time was ripe to accelerate the development of Goldstore's enterprise architecture capabilities.

STEP 2: Prioritization of Enterprise Architecture Capabilities

Mike's team were enthusiastic about his suggestions for developing the bank's enterprise architecture practice. Several of them dusted off their TOGAF 9 course notes and hung posters of the ADM and metamodel over their desks. One of the team even spent his weekend creating an intricate database for recording details of every server in the Bank. There were animated discussions in the canteen.

Mike sighed. This enthusiasm was good, but he knew that much more was needed in order to make the architecture initiative a success. He organized an away-day for the team, to help prioritize their efforts. On the away-day the team worked through a number of exercises to prioritize the enterprise architecture capabilities that Goldstore Bank should develop first.

They began with a baseline maturity assessment. Mike briefly presented the enterprise architecture capabilities model and then gave each team member a grid to fill in. They had five minutes to fill out their own grid, based on their knowledge of the Bank, and then there was a 30-minute discussion to reach a combined answer. Mike was deliberately keeping it very simple.

The results looked like this:

Characteristic	Level 1 (Initial)	Level 2 (Managed)	Level 3 (Defined)	Level 4 (Quantit- atively Managed)	Level 5 (Optimizing)
Core Business Capabilities for an Architecture Practice	X				
Architecture at the Strategy and Portfolio Management Level		X			
Architecture at the Program Level	X				
Architecture at the Project Level			X		
Using Architecture to Manage Third-Party Contractors			X		
Foundational Architecture Capabilities	X				

Table 2: Baseline Enterprise Architecture Maturity Assessment

Subsequent discussions confirmed these results. They agreed that the Bank was typical of a large bureaucratic type of organization. Projects were individually well run and managed, but typically progressed in silos that rarely joined up to build the bigger picture. Also, insightful strategic directions were defined by the Board but often got "lost" in the labyrinthine processes and procedures of the Bank. Program and portfolio management was based largely on gut-feel and office politics. And of course the team already knew that the architecture capabilities were currently weak.

After a brief coffee break, Mike set the team to work again in small groups, this time to consider the organizational stakeholders for their architecture work. When the post-it notes were collated, the summary was:

Stakeholder	Attitude and Concerns	Relevant Architecture Capabilities
CEO	Not particularly interested in architecture per-se, but does want to see a focus on the differentiation on offers and services. Would like to see an extension of the Bank's activities to non-financial products (real estate, services, insurance, etc.). Frustrated at lack of progress on strategic targets and initiatives.	Architecture at the Strategy and Portfolio Management Level
CIO	Strong supporter. Reducing the level of reactive change and duplication between projects. Processes need to be quickly designed and implemented supported by technology to guarantee well organized client service.	Architecture at the Strategy and Portfolio Management Level Architecture at the Program Level

Stakeholder	Attitude and Concerns	Relevant Architecture Capabilities
Operational Executives	Strongly opposed to any "theoretical" architecture that might challenge their freedom to act and make decisions within their own business unit. However, keen to get help with implementing their own critical projects. Also concerned about how their KPI objectives for profitability can be met.	Architecture at the Project Level
Program and Project Management Professionals	Open to help from architecture work, as long as it does not stand in the way of project delivery. Often complain that they have trouble translating general strategic directions into concrete plans.	Architecture at the Program Level Architecture at the Project Level

Table 3: Enterprise Architecture Stakeholders Matrix

Finally, the team considered the nature of the business need around sales growth, particularly with respect to differentiation and cross-selling. Key architecture-related aspects were considered to be:

- A focus on understanding the processes within the business, as they will need to be quickly designed and implemented; new sales offerings will likely be the result of bundling different financial products, and speed-to-market will become an important factor

- Coordinating the efforts of disparate projects that are working on product-related initiatives throughout the bank

- Developing reference models for sales channels, and using them to build a consistent infrastructure so that future channel developments could "slot-in" to a common framework

- Lack of money or opportunity for a major rewrite; rather, the architecture would have to progress incrementally via multiple projects

Based on all of these considerations, the team agreed that their focus for the next 6-12 months would be:

- Architecture at the strategy and portfolio management level

- Architecture at the program level

The team felt that this approach would be the easiest to gain support for initially, as well as have the biggest impact in terms of co-ordinating disparate individual projects which would improve the Bank's sales growth and value creation initiative.

The team also agreed to improve their own internal enterprise architecture practice capabilities as a by-product of this work, especially with regards to enterprise engagement, architecture standards and reference models, and architecture deliverable standardization.

To conclude the morning's activities, the team summarized these objectives on the enterprise architecture capabilities maturity grid shown below:

Characteristic	Level 1 (Initial)	Level 2 (Managed)	Level 3 (Defined)	Level 4 (Quantit-atively Managed)	Level 5 (Optimizing)
Core Business Capabilities for an Architecture Practice	X	O			
Architecture at the Strategy and Portfolio Management Level		X	O		
Architecture at the Program Level	X	O	O		
Architecture at the Project Level			X		
Using Architecture to Manage Third-Party Contractors			X		
Foundational Architecture Capabilities	X	O			

Table 4: Updated Enterprise Architecture Maturity Assessment

STEP 3: Using TOGAF 9 for the Implementation

After lunch, the challenge was to consider how TOGAF 9 could help achieve the capability maturity objectives set. The team refreshed their memory of the TOGAF 9 specification, and referred to the grid that cross-referenced the architecture capabilities to the TOGAF 9 areas.

Initial efforts were rather over-ambitious, and Mike sent the team away to think again. "It's better to pick just a few items and really make them work" he said. "Once the value of these first deliverables is proven, then it will be much easier to extend the scope later."

After some further discussion, the following tasks and deliverables were prioritized:

ADM A-D:

• An **Architecture Vision** for sales growth and value creation

• An **Architecture Definition Document** that needed to concentrate on the business, information systems, and data aspect areas of the Architecture Content Framework, and define **Reference Models** for the customer channels

ADM E&F:

• An **Architecture Roadmap,** aimed at the Bank's project and portfolio managers, which needed to show how the Architecture Vision and Reference Model could be implemented incrementally via multiple coordinated projects

As they were packing up to go home, the team also agreed that, as a background activity, they would start to develop their own foundational capabilities by collating the artifacts that they would develop into a simple **Architecture Repository**.

STEP 4: Determining TOGAF 9 Templates and Best Practices

Over the following eight weeks, the architecture team set about the development of the architecture content. A core team was assigned to develop the Architecture Roadmap, while others were tightly aligned with business projects that would help clarify the business, information systems, and data aspects of the wider architecture.

To help communicate the Architecture Vision, a conceptual reference architecture was created in order to articulate where potential change would be required, and thus focus the program effort.
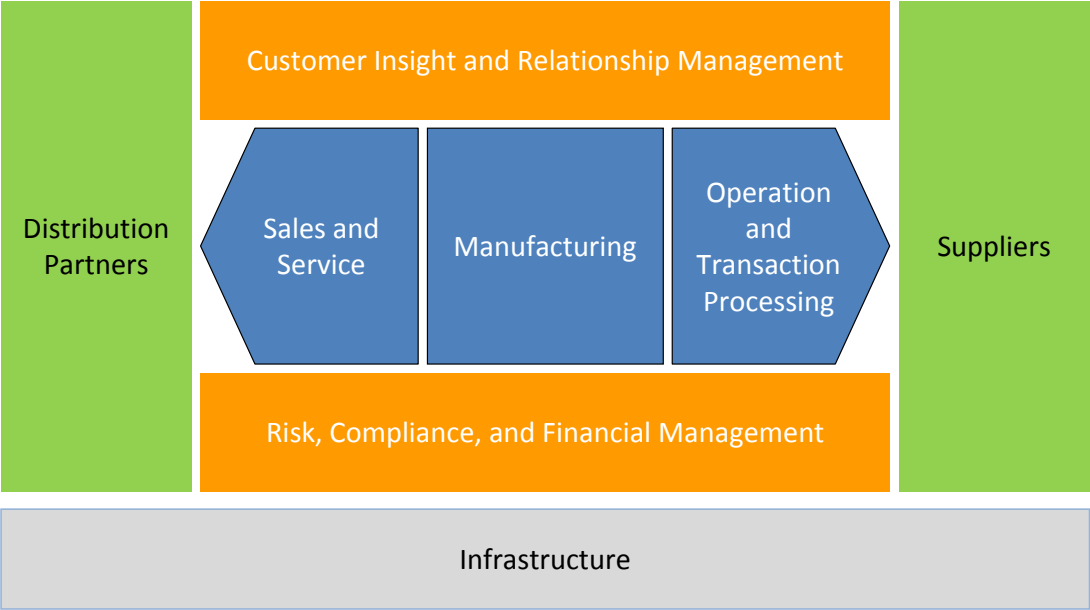

Figure 3: Conceptual Reference Architecture

Working with senior business managers, business analysts, and business architects, an initial target business architecture was established. The picture above provided the stakeholders with a high-level view of the business with the necessary context for the architecture effort, including the impact of the new sales growth and value creation initiative.

This contextual view of the business was expanded further, which elaborated the front, middle, and back-office areas, to create a more detailed understanding of the business services that comprised the business architecture.
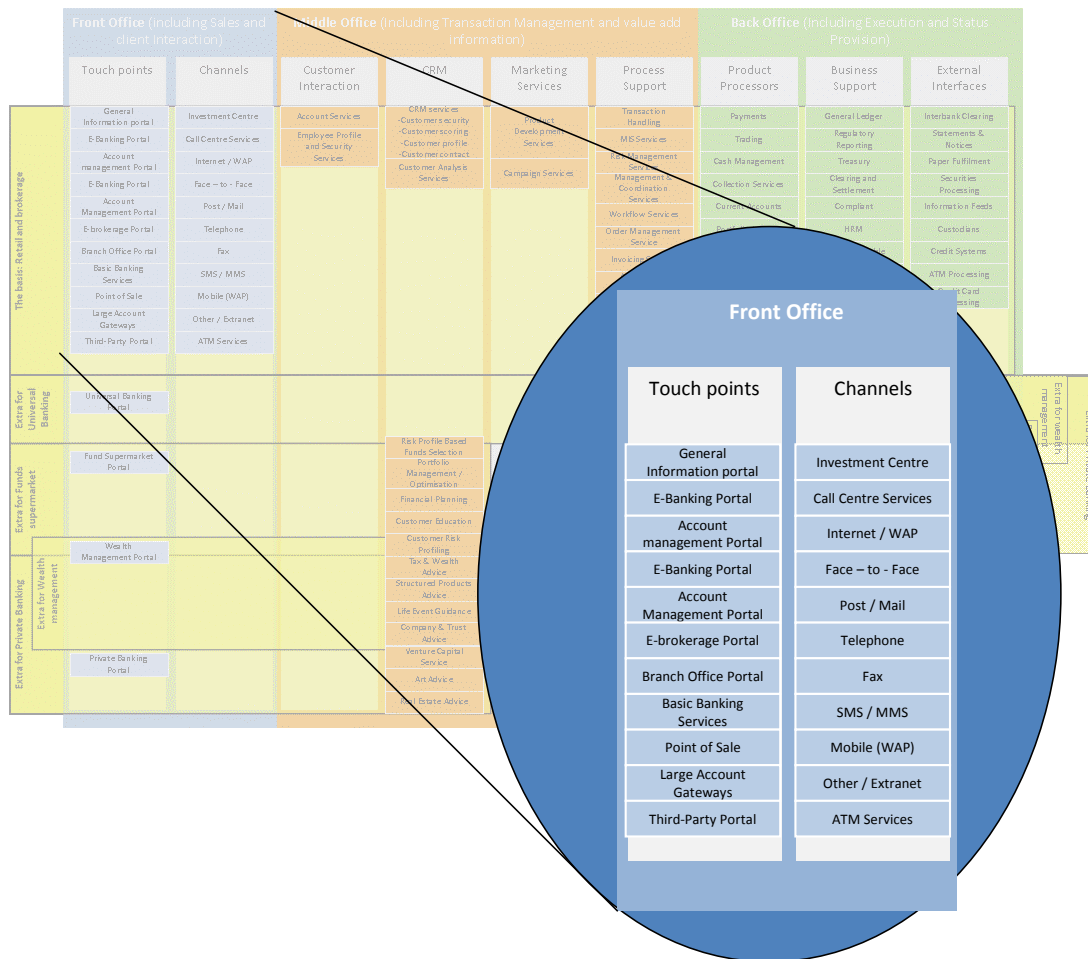
Figure 4: Business Architecture

Specific solution-level business value chains were captured to help inform this view. Within the middle and back-office areas, numerous projects were focusing on mortgage origination and servicing. High-level value chains (i.e., business processes) were developed to inform the high-level retail business view, while aligning the various projects at a program level.

The diagram below illustrates the value chain, developed jointly with the business stakeholders, which is focused on mortgage origination and servicing.
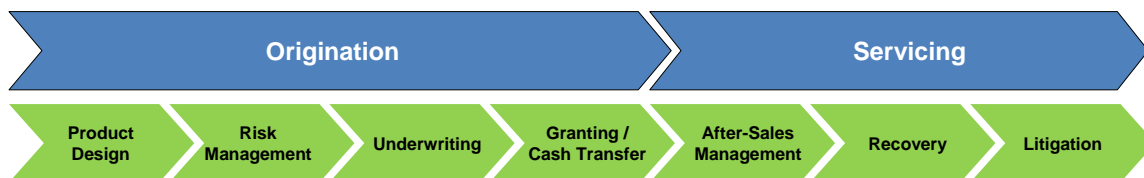

Figure 5: Mortgage Origination and Servicing Value Chain

In support of the business architecture, a first cut of the target information systems architecture was created. The combination of these two views provided clarity to the program around the cross-selling opportunity, where the Bank's services can be sold by non-Bank sales, and *vice versa* through the partner channel.

The diagram below details the target information systems architecture, which builds on the views that were created for the business architecture.
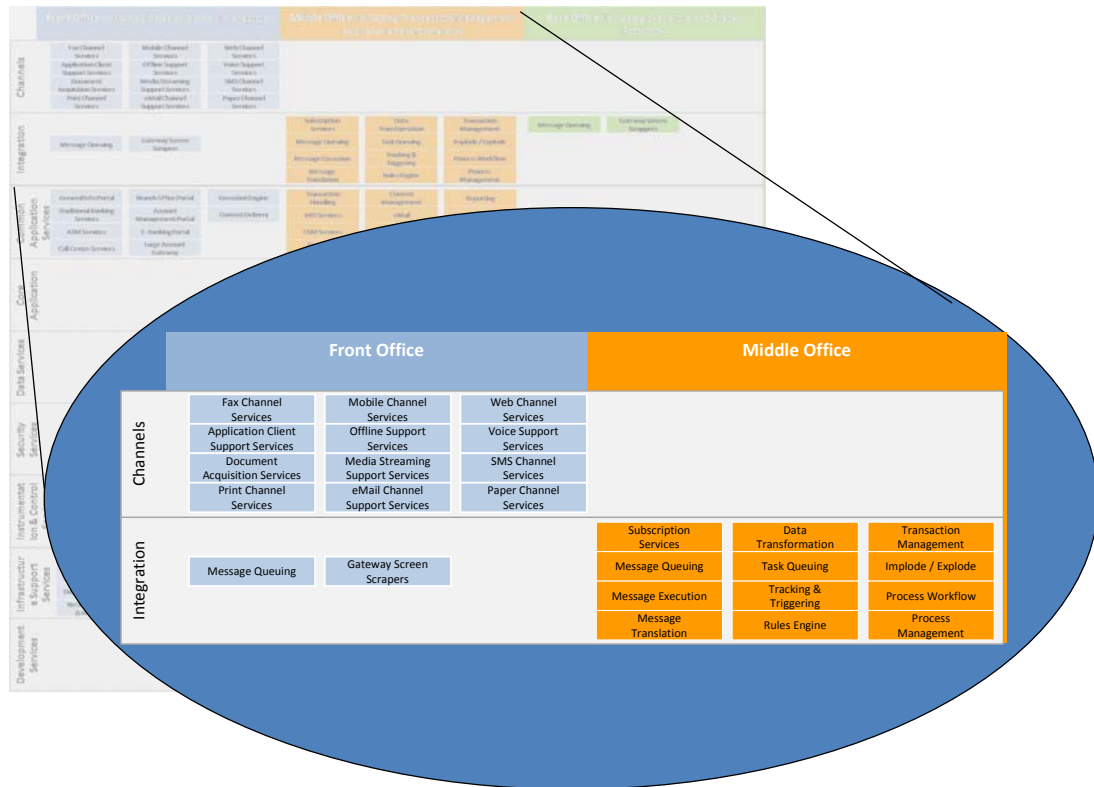

Figure 6: Information Systems Architecture

To help the program and portfolio managers understand how the vision and reference models would be implemented over the coming months, an architecture roadmap, which showed the incremental implementation via multiple coordinated projects, was developed.

In the first instance, a view was created of the business initiatives and activities, showing the alignment back to the Bank's business drivers.

Secondly, this was then mapped back to the IT and business services that would be required to realize the sales growth and value creation initiative. The outcome is captured in the diagram below. This view provides a powerful representation of differing stakeholder concerns. Business drivers, strategy and initiatives, and activities that are underway within the business are also articulated. Only a small subset of activities relevant to the sales growth and value creation initiative, such as the mortgage origination project, is shown.
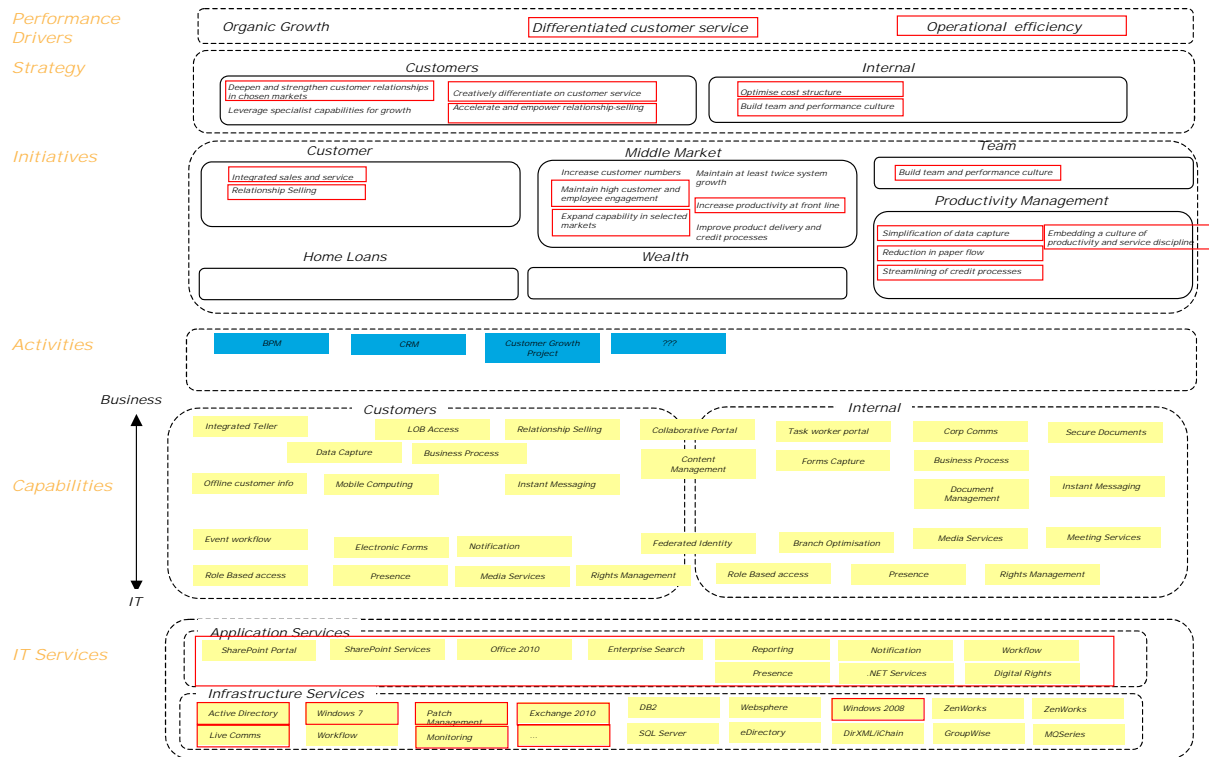
Figure 7: Business Initiatives and Activities Aligned to IT

A range of business and IT services that are aligned to the business activities, and subsequently the business drivers through the strategy and initiatives, have been identified. These services will realize the capabilities required for the identified business activities. In addition, the supporting technology services have been identified.

A supporting roadmap of architecture work was then developed, ensuring alignment with the business projects and overall objectives of the program. The roadmap, shown below, articulates what the architecture team will be doing over the coming months to assist in realizing the sales growth and value creation initiative. It is a high-level view of the specific architecture-led initiatives over an 18-month period.
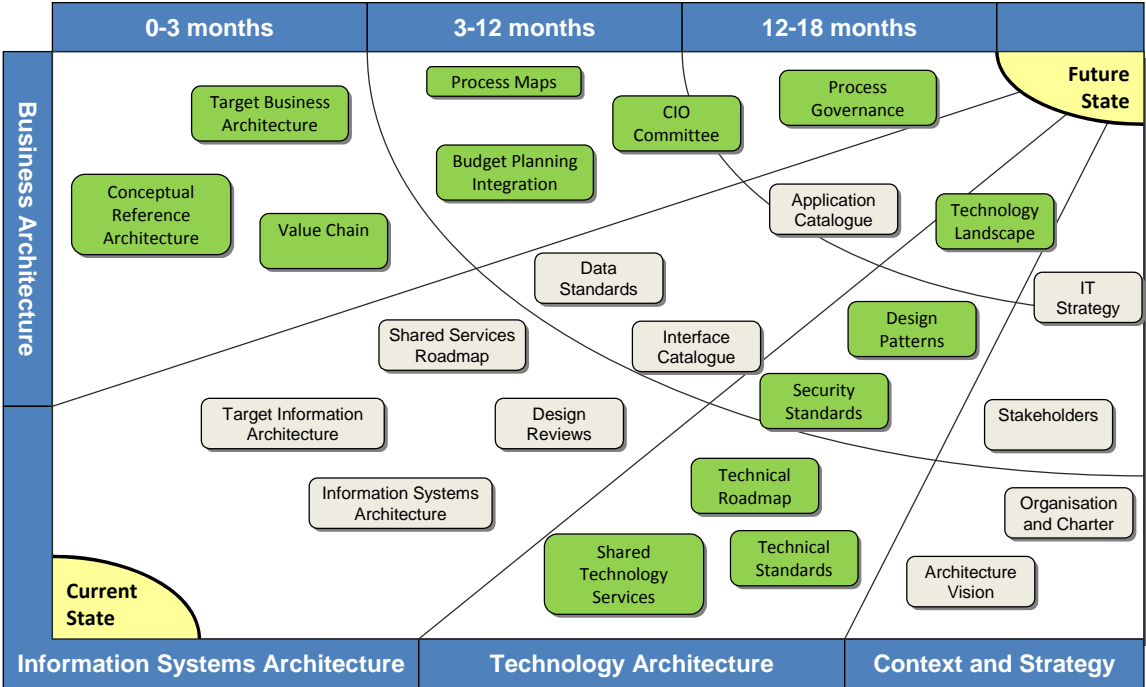
Figure 8: Roadmap

Through discussion with the program team and individual project managers, agreement was reached with the architecture team to deliver the architecture artifacts through the program and project levels.

STEP 5: Measuring Success

Six months quickly passed, and Mike's diary reminded him that it was time for a progress review.

Overall he felt pleased. The reference models and roadmap had been a great success and had won the team several influential supporters in the program management community. The CIO was delighted with progress, and even the CEO had remarked that it felt for the first time as if the Bank was really "pulling together" to align around the sales and value creation initiative.

However, Mike was not complacent. In some ways they were becoming a victim of their own success, as the team was struggling to keep up with the demands on their time. They needed to train or recruit more architects. Also, they needed to get better organized; for example, the Architecture Repository had not been built.

Also, some of the projects had a few snags. For example, a new supplier of mobile devices had completely misunderstood the reference architecture and wasted a lot of money in developing an incompatible solution. Maybe the Bank's project and supplier governance was not quite as robust as they had first thought.

To help confirm these impressions, Mike decided to repeat the maturity assessment exercise. However, this time Mike judged that it was worth spending a little more time on a thorough job, so he hired a consultant to drill down to the next level of detail, and conduct an independent review.

STEP 6: Plan Next Iteration

The report was largely as expected, although there were a few surprises. For example, the supplier governance process seemed to be worse than Mike had first thought. So this time around, they would need to put a bit more

emphasis on those capabilities, as well as continue to extend the palette of TOGAF 9 deliverables in use, and devote some time to better organize their own internal team capabilities. Mike gathered up his notes and called the team together to start planning the next six months.

Appendix A: Overview of TOGAF 9

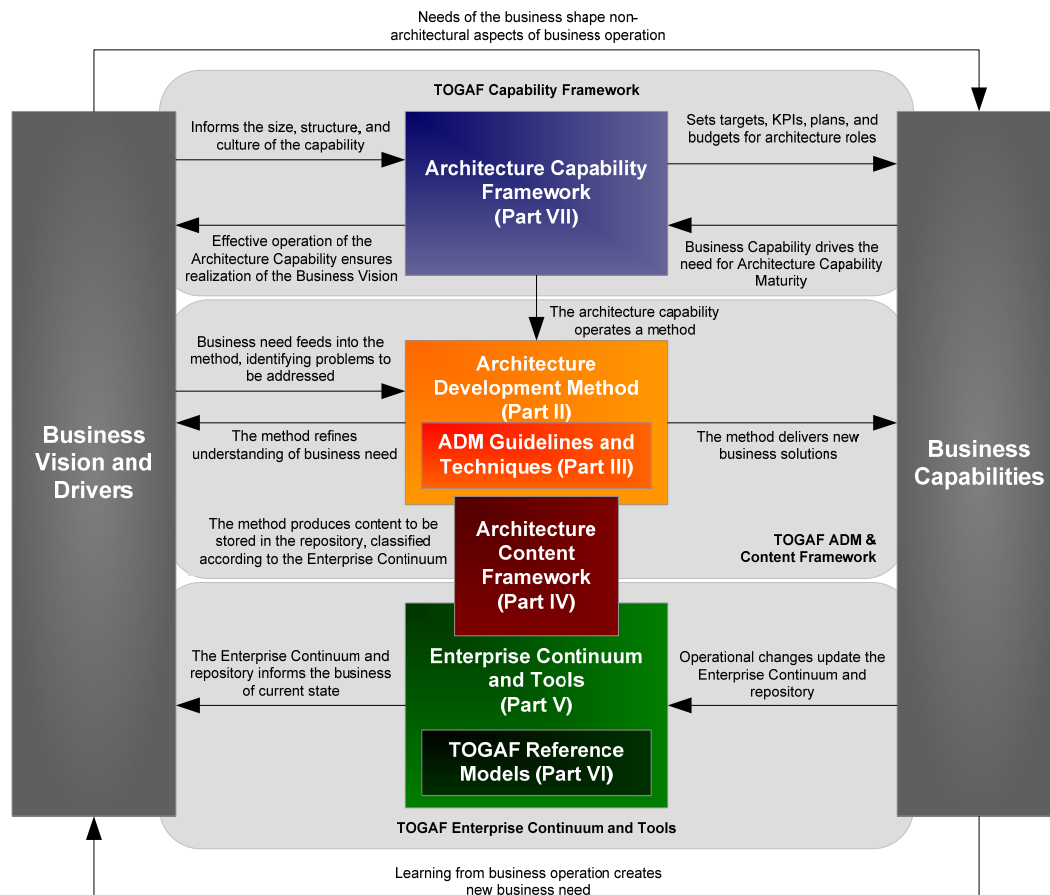The diagram below highlights the main parts of the TOGAF 9 specification.

Figure 9: TOGAF 9 Parts

Part I: Introduction

This part provides an overview of the basic concepts and value of enterprise architecture.

Part II: ADM and Part III: ADM Guidelines and Techniques

These parts describes the Architecture Development Method (ADM), which is the part of the TOGAF 9 framework that helps to define the phases (i.e., processes) via which an enterprise architecture capability can be developed and then managed. The list below outlines the primary purpose for these phases:

- **Preliminary Phase** – provides initial guidance for establishing an architecture function

- **Phases A to D** – essentially focus on content generation in order to understand the problem domain, identify the current architecture, and determine the target architecture

- **Phases E and F** – focus on the identification of solution options, and then the planning for migration

activities

- **Phases G and H** – focus on the implementation of a governance model, and change management activities

Part IV: Architecture Content Framework

This part describes the Architecture Content Framework, which is the part of the TOGAF 9 framework that provides a consistent approach for the classification of architecture content. The Architecture Content Framework is highly relevant to almost all architecture activity. However, a slightly more flexible approach to content presentation may be needed when dealing with senior or business stakeholders.

Part V: Enterprise Continuum and Tools

This part explains how to manage architecture work at multiple levels within a large enterprise over an extended period of time. These concepts are particularly valuable for enterprise-wide initiatives, or where multiple architecture teams are involved. They may be less relevant for smaller, self-contained projects. A further breakdown within this area includes:

- Enterprise Continuum

- Architecture Partitioning

- Architecture Repository

Part VI: TOGAF Reference Models

This part provides useful templates for when the focus is on developing reference models and standards.

Part VII: Architecture Capability Framework

This part provides guidance on how to develop and structure an architecture team, thus helping to address the business drivers for governance and process management.

Appendix B: Deliverable/Artifact Descriptions and Templates

This appendix describes the deliverables and artifacts that will typically be consumed and produced throughout the TOGAF 9 ADM cycle. It also provides access to templates that should be used in order to create a deliverable or artifact.

Therefore, it acts as a starting point for tailoring the Architecture Content Framework within a specific organization, and helps provide a baseline of architecture deliverables and artifacts that will be produced from the ADM phases.

Note: Not all of the deliverables or artifacts are required for a typical project, and not all of the artifacts described here need to be contained in the TOGAF 9 stated deliverable. An architecture team may decide to produce artifacts in a deliverable that is different to the TOGAF 9 stated deliverable.

Rather, we recommend that external references be used where relevant. Also, we do not suggest that these templates and descriptions should be followed to the letter. However, each deliverable should be considered carefully, as downstream implications may exist.

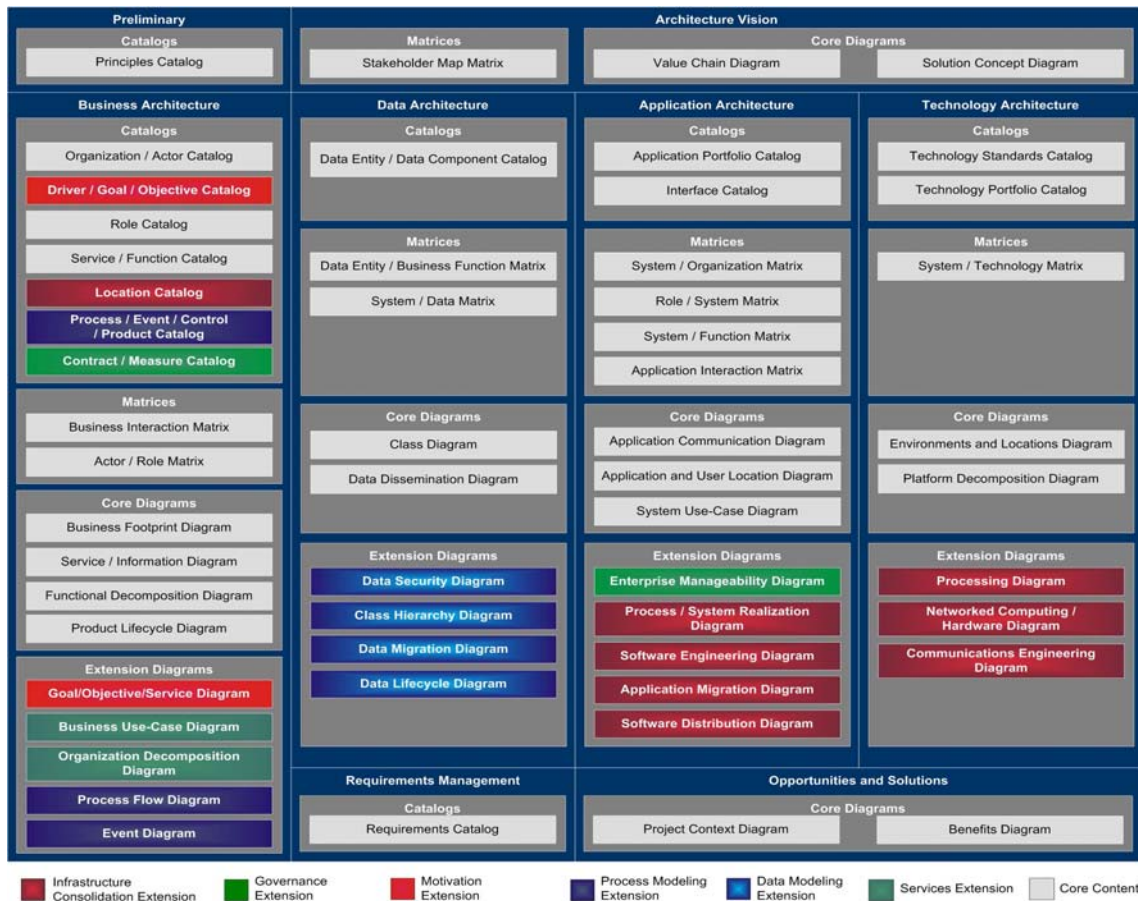The diagram below illustrates TOGAF 9 artifacts.

Figure 10: TOGAF 9 Artifacts

An archive file of templates can be obtained from The Open Group Bookstore at
www.opengroup.org/bookstore/catalog/i093.htm.

Table 5: Deliverable/Artifact Descriptions and Templates

Template	Description
Architecture Principles	Principles are general rules and guidelines, intended to be enduring and seldom amended, that inform and support the way in which an organization sets about fulfilling its mission.
Architecture Repository	The Architecture Repository acts as a holding area for all architecture-related projects within the enterprise. The repository allows projects to manage their deliverables, locate re-usable assets, and publish outputs to stakeholders and other interested parties.
Business Principles, Business Goals, and Business Drivers	Business principles, business goals, and business drivers provide context for architecture work, by describing the needs and ways of working employed by the enterprise.
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.
Request for Architecture Work	This is a document that is sent from the sponsoring organization to the architecture organization in order to trigger the start of an architecture development cycle.
Tailored Architecture Framework	Tailoring at this level will select the appropriate deliverables and artifacts to meet project and stakeholder needs.
Architecture Change Request	In the case where the original Architecture Definition and requirements are not suitable or are not sufficient to complete the implementation of a solution, a Change Request may be submitted in order to kick-start a further cycle of architecture work.
Requirements Impact Assessment	A Requirements Impact Assessment assesses the current architecture requirements and specification to identify changes that should be made, and the implications of those changes.
Compliance Assessment	Once an architecture has been defined, it should be governed through implementation in order to ensure that the original Architecture Vision is appropriately realized, and that any implementation learning is fed back into the architecture process.
Solution Building Blocks	Implementation-specific building blocks from the enterprise's Architecture Repository.
Architecture Building Blocks	Architecture documentation and models from the enterprise's Architecture Repository.
Architecture Contract	Architecture Contracts are the joint agreements between development partners and sponsors on the deliverables, quality, and fitness-for-purpose of an architecture.
Implementation Governance Model	Once an architecture has been defined, it is necessary to plan how the Transition Architecture that implements the architecture will be governed through implementation.

Template	Description
Implementation and Migration Plan	The Implementation and Migration Plan provides a schedule for the implementation of the solution described by a Transition Architecture. The Implementation and Migration Plan includes timing, cost, resources, benefits, and milestones for the implementation.
Transition Architecture	A Transition Architecture shows the enterprise at incremental states that reflect periods of transition that sit between the baseline and target architectures.
Architecture Definition Document	The Architecture Definition Document is the deliverable container for the core architectural artifacts that are created during a project. The Architecture Definition Document spans all architecture domains (business, data, application, and technology) and also examines all relevant states of the architecture (baseline, interim, and target).
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.
Architecture Roadmap	The Architecture Roadmap lists individual increments of change and lays them out on a timeline to show progression from the baseline architecture to the target architecture.
Architecture Vision	The Architecture Vision is created early on in the project lifecycle and provides a high-level, aspirational view of the end architecture product.
Capability Assessment	Before embarking upon a detailed Architecture Definition, it is valuable to understand the baseline and target capability level of the enterprise.
Communications Plan	Enterprise architectures contain large volumes of complex and inter-dependent information. The effective communication of targeted information to the right stakeholders at the right time is a critical success factor for enterprise architecture.
Statement of Architecture Work	The Statement of Architecture Work defines the scope and approach that will be used to complete an architecture project.
Principles Catalog	The Principles catalog captures the business and architecture principles that describe what a "good" solution or architecture should look like.
Organization/Actor Catalog	The purpose of the Organization/Actor catalog is to capture a definitive listing of all participants that interact with IT, including users and owners of IT systems.
Driver/Goal/Objective/ Catalog	The purpose of the Driver/Goal/Objective catalog is to provide a cross-organizational reference of how an organization meets its drivers in practical terms through goals, objectives, and (optionally) measures.
Role Catalog	The purpose of the Role catalog is to provide a list of all authorization levels or zones within an enterprise.
Business Service/Function Catalog	The purpose of the Business Service/Function catalog is to provide the functional decomposition of an organization, in a form that can be filtered, reported on, and queried. It is a supplement to graphical Functional Decomposition diagrams.

Template	Description
Location Catalog	The Location catalog provides a list of all locations where an enterprise carries out business operations or houses architecturally-relevant assets, such as data centres or end-user computing equipment.
Process/Event/Control/ Product Catalog	The Process/Event/Control/Product catalog provides a hierarchy of processes, events that trigger processes, outputs from processes, and controls applied to the execution of processes.
Contract/Measure Catalog	The Contract/Measure catalog provides a list of all agreed service contracts and (optionally) the measures attached to those contracts.
Data Entity/Data Component Catalog	The purpose of the Data Entity/Data Component catalog is to identify and maintain a list of all data use across the enterprise, including data entities and also the data components where data entities are stored.
Application Portfolio Catalog	The purpose of the Application Portfolio catalog is to identify and maintain a list of all the applications in the enterprise.
Interface Catalog	The purpose of the Interface catalog is to scope and document the interfaces between applications to enable the overall dependencies between applications to be scoped as early as possible.
Technology Standards Catalog	The Technology Standards catalog documents the agreed standards for technology across the enterprise, covering technologies, and versions, the technology lifecycles, and the refresh cycles for the technology.
Technology Portfolio Catalog	The purpose of the Technology Portfolio catalog is to identify and maintain a list of all the technology in use across the enterprise, including hardware, infrastructure software, and application software.
Requirements Catalog	The Requirements catalog captures things that the enterprise needs to do to meet its objectives.
Stakeholder Map Matrix	The purpose of the Stakeholder Map matrix is to identify the stakeholders for the architecture engagement, their influence over the engagement, and their key questions, issues, or concerns that must be addressed by the architecture framework.
Business Interaction Matrix	The purpose of the Business Interaction matrix is to depict the relationship interactions between organizations and business functions across the enterprise.
Actor/Role Matrix	The purpose of the Actor/Role matrix is to show which actors perform which roles. It supports the definition of security and skills requirements.
Data Entity/Business Function Matrix	The purpose of the Data Entity/Business Function matrix is to depict the relationship between data entities and business functions within the enterprise.
System/Data Matrix	The purpose of the System/Data matrix is to depict the relationship between systems (i.e., application components) and the data entities that are accessed and updated by them.
System/Organization Matrix	The purpose of the System/Organization matrix is to depict the relationship between systems (i.e., application components) and organizational units within the enterprise.
Role/System Matrix	The purpose of the Role/System matrix is to depict the relationship between systems (i.e., application components) and the business roles that use them within the enterprise.

Template	Description
System/Function Matrix	The purpose of the System/Function matrix is to depict the relationship between systems (i.e., application components) and business functions within the enterprise.
Application Interaction Matrix	The purpose of the Application Interaction matrix is to depict communications relationships between systems (i.e., application components).
System/Technology Matrix	The System/Technology matrix documents the mapping of business systems to the technology platform.
Value Chain Diagram	A Value Chain diagram provides a high-level orientation view of an enterprise and how it interacts with the outside world.
Solution Concept Diagram	A Solution Concept diagram provides a high-level orientation of the solution that is envisaged in order to meet the objectives of the architecture engagement.
Business Footprint Diagram	A Business Footprint diagram describes the links between business goals, organizational units, business functions, and services, and maps these functions to the technical components that deliver the required capability.
Business Service/ Information Diagram	The Business Service/Information diagram shows the information needed to support one or more business services.
Functional Decomposition Diagram	The purpose of the Functional Decomposition diagram is to show on a single page the capabilities of an organization that are relevant to the consideration of an architecture.
Product Lifecycle Diagram	The purpose of the Product Lifecycle diagram is to assist in understanding the lifecycles of key entities within the enterprise.
Class Diagram	The key purpose of the Class diagram is to depict the relationships among the critical data entities (or classes) within the enterprise.
Data Dissemination Diagram	The purpose of the Data Dissemination diagram is to show the relationship between a data entity, business services, and application components.
Application Communication Diagram	The purpose of the Application Communication diagram is to depict all models and mappings related to communication between applications in the metamodel entity.
Application and User Location Diagram	The Application and User Location diagram shows the geographical distribution of applications.
System Use-Case Diagram	A System Use-Case diagram displays the relationships between consumers and providers of application services.
Environments and Locations Diagram	The Environments and Locations diagram depicts which locations host which applications, identifies what technologies and applications are used at which locations, and finally identifies the locations from which business users typically interact with the applications.
Platform Decomposition Diagram	The Platform Decomposition diagram depicts the technology platform that supports the operations of the Information Systems Architecture.
Project Context Diagram	A Project Context diagram shows the scope of a work package to be implemented as part of a broader transformation roadmap.
Benefits Diagram	The Benefits diagram shows opportunities identified in an architecture definition, classified according to their relative size, benefit, and complexity.

Appendix C: Deliverable/Artifact to ADM Phase Mappings

The following table defines where in the ADM lifecycle a particular deliverable or artifact is to be produced or consumed.

Note: An artifact is distinct from a deliverable, which is a contracted output from a project. In general, a deliverable will contain one or more artifacts, and an artifact may exist in one or more deliverables.

Table 6: Deliverable/Artifact to ADM Phase Mappings

Deliverable/Artifact	Output From …	Input To …
Architecture Principles	Preliminary, A, B, C, D	Preliminary, A, B, C, D, E, F, G, H
Architecture Repository	Preliminary	Preliminary, A, B, C, D, E, F, G, H, Requirements Management
Business Principles, Business Goals, and Business Drivers	Preliminary, A, B	A, B
Organizational Model for Enterprise Architecture	Preliminary	Preliminary, A, B, C, D, E, F, G, H, Requirements Management
Request for Architecture Work	Preliminary, F	A, G
Tailored Architecture Framework	Preliminary, A	Preliminary, A, B, C, D, E, F, G, H, Requirements Management
Architecture Change Request	H	
Requirements Impact Assessment	H, Requirements Management	Requirements Management
Compliance Assessment	G	H
Solution Building Blocks	G	A, B, C, D
Architecture Building Blocks	F, H	A, B, C, D
Architecture Contract	F	G
Implementation Governance Model	F	G, H
Implementation and Migration Plan	E, F	F
Transition Architecture	E, F	G, H
Architecture Definition Document	B, C, D	C, D, E, F, G, H
Architecture Requirements Specification	B, C, D, E, F, Requirements Management	C, D, Requirements Management
Architecture Roadmap	B, C, D, E, F	C, D, E, F, G, H
Architecture Vision	A	B, C, D, E, F, G, H, Requirements Management
Capability Assessment	A, E	B, C, D, E, F
Communications Plan	A	B, C, D, E, F

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Deliverable/Artifact	Output From …	Input To …
Statement of Architecture Work	A, B, C, D	B, C, D, E, F, G, H, Requirements Management
Principles Catalog	Preliminary	
Organization/Actor Catalog	Business Architecture	
Driver/Goal/Objective/ Catalog	Business Architecture	
Role Catalog	Business Architecture	
Business Service/Function Catalog	Business Architecture	
Location Catalog	Business Architecture	
Process/Event/Control/ Product Catalog	Business Architecture	
Contract/Measure Catalog	Business Architecture	
Data Entity/Data Component Catalog	Data Architecture	
Application Portfolio Catalog	Application Architecture	
Interface Catalog	Application Architecture	
Technology Standards Catalog	Technology Architecture	
Technology Portfolio Catalog	Technology Architecture	
Requirements Catalog	Requirements	
Stakeholder Map Matrix	Architecture Vision	
Business Interaction Matrix	Business Architecture	
Actor/Role Matrix	Business Architecture	
Data Entity/Business Function Matrix	Data Architecture	
System/Data Matrix	Data Architecture	
System/Organization Matrix	Application Architecture	
Role/System Matrix	Application Architecture	
System/Function Matrix	Application Architecture	
Application Interaction Matrix	Application Architecture	
System/Technology Matrix	Technology Architecture	
Value Chain Diagram	Architecture Vision	
Solution Concept Diagram	Architecture Vision	
Business Footprint Diagram	Business Architecture	
Business Service/ Information Diagram	Business Architecture	
Functional Decomposition Diagram	Business Architecture	

Deliverable/Artifact	Output From …	Input To …
Product Lifecycle Diagram	Business Architecture	
Class Diagram	Data Architecture	
Data Dissemination Diagram	Data Architecture	
Application Communication Diagram	Application Architecture	
Application and User Location Diagram	Application Architecture	
System Use-Case Diagram	Application Architecture	
Environments and Locations Diagram	Technology Architecture	
Platform Decomposition Diagram	Technology Architecture	
Project Context Diagram	Opportunities and Solutions	
Benefits Diagram	Opportunities and Solutions	

Acknowledgements

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