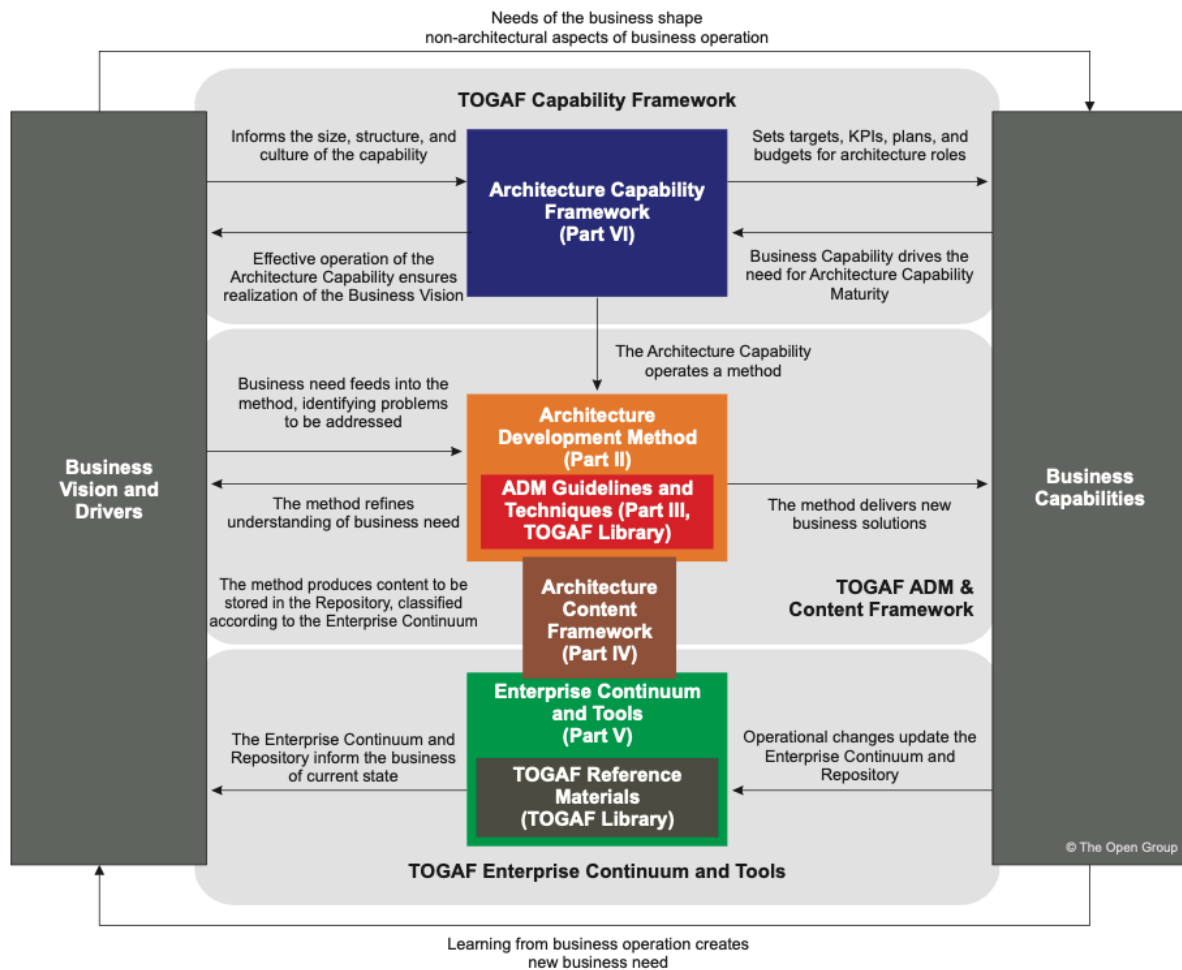


## Introduction :



**Figure 1-1** Structure of the TOGAF Standard

**TOGAF Library :** TOGAF Library is a reference library containing guidelines, templates, pattern and other form of reference material to accelerate creation of new architecture of Enterprise.

Library resource is organised into four sections :

- Section 1 : Foundation document
- Section 2 : Generic guidance and techniques
- Section 3 : Industry specific Guidance and techniques.
- Section 4 : Organisation specific guidance and techniques.

**Enterprise :** Enterprise is a collection of organisations that have common goals.

**Ex :** Whole corporation or a division of a corporation. A government agency of a single government department, Group of countries or governments working together to create common or shareable deliverables or infrastructure. Partnership and alliance of business working together a a consortium or supply chain.

The term “Enterprise” in the context of Enterprise Architecture can be applied to either an entire enterprise encompassing all of its business activities and capabilities, information and technology that make up the

entire infrastructure and governance of the enterprise or to one or more specific areas of interest within the enterprise.

Benefits of Enterprise architecture :

- More Effective and efficient business operations :
  - Lower business operation cost
  - More agile organisation
  - Business capabilities shared across the organisation
  - Lower change management cost.
  - More flexible workforce
  - Improved business productivity
- More effective and efficient Data Integration and IT operation :
  - Extending effective reach of the enterprise through digital capability
  - Bringing all component of enterprise into horizontal environment
  - Lower software development, support and maintenance costs
  - Increase portability of applications
  - Improved interoperability and easier system and network management
  - Improved ability to address critical enterprise wide issues like security
  - Easier upgrade and exchange of system component.
- Better return on existing investment, reduces risk for future investments;
  - Reduced complexity in the business and IT
  - Maximum return on investment in existing business and IT infrastructure.
  - The flexibility to make, buy or out source business and IT solutions.
  - Reduced risk in new investment and their cost of ownership
- Faster simpler and cheaper procurements
  - Buying decision are simpler because the information governing procurement is readily available in coherent plan
  - The procurement process is faster - maximising procurement speed and flexibility without sacrificing architectural coherence.
  - The ability to procure heterogeneous multi vendor open systems.
  - The ability to secure more economic capabilities.

What specifically prompt the development of Enterprise architecture : Typically preparation for business transformation needs or for radical infrastructure changes initiative and Enterprise architecture review or development. Often key people identifies areas of change required in order for new business goals to be met. Such people are commonly referred as the “Stakeholders” in the change. The role of architecture is to address their concerns by:

- Identifying and refining the requirement that stakeholders have
- Developing views of the architecture that show how the concerns and requirement are going to be addressed.
- Showing the tradeoff that are going to be made in reconciling the potentially conflicting concerns of different stakeholders.

What is an Architecture framework : is a foundational structure or set of structures which can be used for developing a broad range of different architecture. It should describe a method for designing a target state of enterprise in terms of a set of building blocks and for showing how the building blocks fit together. It should contain set of tools and provide a common vocabulary. It should also include list of standards and compliant products that can be used to implement the building blocks.

**Core concepts :**

TOGAF standard : is an architecture framework. It provide the methods and tools for assisting in acceptance, production, use and maintenance of Enterprise architecture. It is based on Iterative process model supporting best practices and re-usable set of existing architecture assets.

Kind of architecture TOGAF Deals with :

- Business architecture : Defines business strategy, governance, organisation and key business process.
- Data architecture : Describes the structure of an organisation's logical and physical data assets and data management resources.
- Application architecture : Provides blueprint of individual application to be deployed their interactions and their relationship to the core business process of the organisation.
- Technology architecture : Describes logical software and hardware capabilities that are required to support the deployment of business data and application services, this includes IT infrastructure, middleware, network communications, processing, standards etc.

Architecture Development method (ADM) : Provides a tested and repeatable process for developing architecture.

Phases of ADM :

- Preliminary Phase : Describes the preparation and initiation required to create architecture capability including customisation of TOGAF framework and definition of architecture principles.
- Phase A: Architecture vision - describes the initial phase of ADM cycle.

It includes information about defining the scope of architecture development initiative, identifying the stakeholders, creating architecture vision and obtaining approval to proceed with architecture development.

- Phase B : Business architecture - describes development of Business architecture to support the agreed architecture vision.
- Phase C : Information system architecture - describes the development of information system architecture to support the agreed architecture vision.
- Phase D: Technology architecture - describes the development of the technology architecture to support the agreed architecture vision.
- Phase E: Opportunities and solutions : Conducts initial implementation planning and identification of delivery vehicle for architecture defined in previous phase
- Phase F : Migration planning : Addresses how to move from the baseline to target architecture by finalising a detailed implementation and migration planning
- Phase G : Implementation governance : Provides an architecture oversight of the implementation.
- Phase H : Architecture change management : Establishes procedures for managing change to the new architecture.
- Requirement management : Examines the process of managing architecture requirements through ADM

Deliverables, Artefacts and building blocks : - Architects executing ADM will produce a number of outputs as a result of their efforts such as process flow, architecture requirement, project plans, project compliance assessment etc. Architecture Content framework provides a structural model of architectural content that allows major work products to be consistently defined structured and presented.

Architecture content framework uses following three categories to describe the type of architecture work products within the context of use:

- Deliverable : is a work product that is contractually specified and in turn formally reviewed, agreed and signed off by the stakeholders.

Deliverable represents the output of project and those deliverables that are in documentation form will typically be archived at completion of project or transitioned into architecture repository as a reference model or snapshot of the Architecture landscape a a point in time.

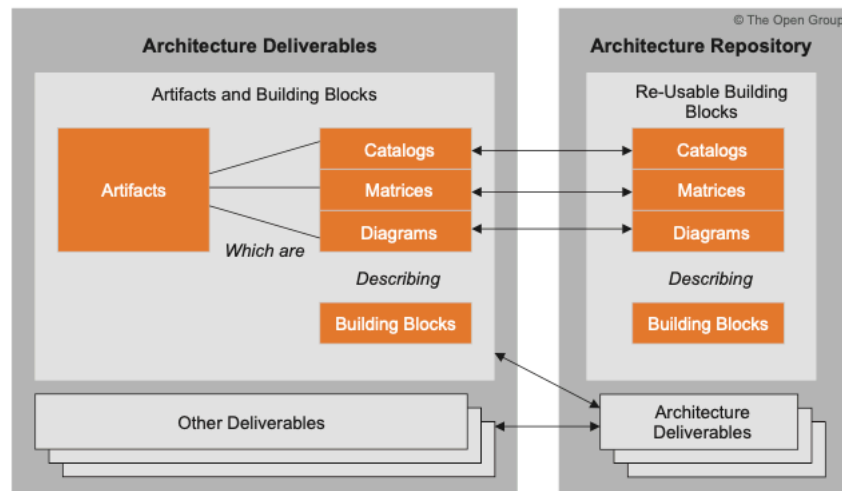
- Artefacts : Is an architectural work product that describes an aspect of the architecture.

Artefacts are generally classified as catalog (list of things), matrices (Showing relationship between things) and diagram (Pictures of things). Example include a requirement catalog, business interaction matrix, and a use-case diagram. An architectural deliverable may contain many artefacts and artefacts will form the content of architecture repository.

- Building blocks: represent a (Potentially re-usable) component of Enterprise capability that can be combined with other building blocks to deliver architecture and solutions.

Building blocks can be defined at various level of detail, depending of what stage of architecture development has been reached. For instance early stage a building block can simply consist of a name or an outline description. Later on a building block may be decomposed into multiple supporting building blocks and may be accompanied by full specification.

- Architecture building block (ABB) - typically describe requirement capability and shape the specification of Solution building block. For example customer services capability may required within an enterprise, supported by SBBs such as processes, data and application software.
- Solution building block (SBB) - represents component that will be used to implement required capability for example network is a building block that can be described through complementary artefacts and then put to use to realise the solution for the enterprise.



**Figure 2-1** Relationships between Deliverables, Artifacts, and Building Blocks

Example Architecture definition document is a deliverable

that documents an Architecture description. This document will contain a number of complementary artefacts that views of the building blocks relevant to the architecture. For example a process flow diagram (an artefact) may be created to describe target call handling process (a building block) . This artefact may also describe other building block such as actors involved in the process (e.g. Customer service representative).

**Enterprise Continuum** : Sets broader context for an architecture and explains how generic solution can be leveraged and specialised in order to support the requirements of an individual organisation. The Enterprise continuum is a view of Architecture repository that provides method for classifying architecture and solution artefacts as they evolve from generic foundation architecture to organisation specific architecture.

Enterprise continuum has two main concepts :

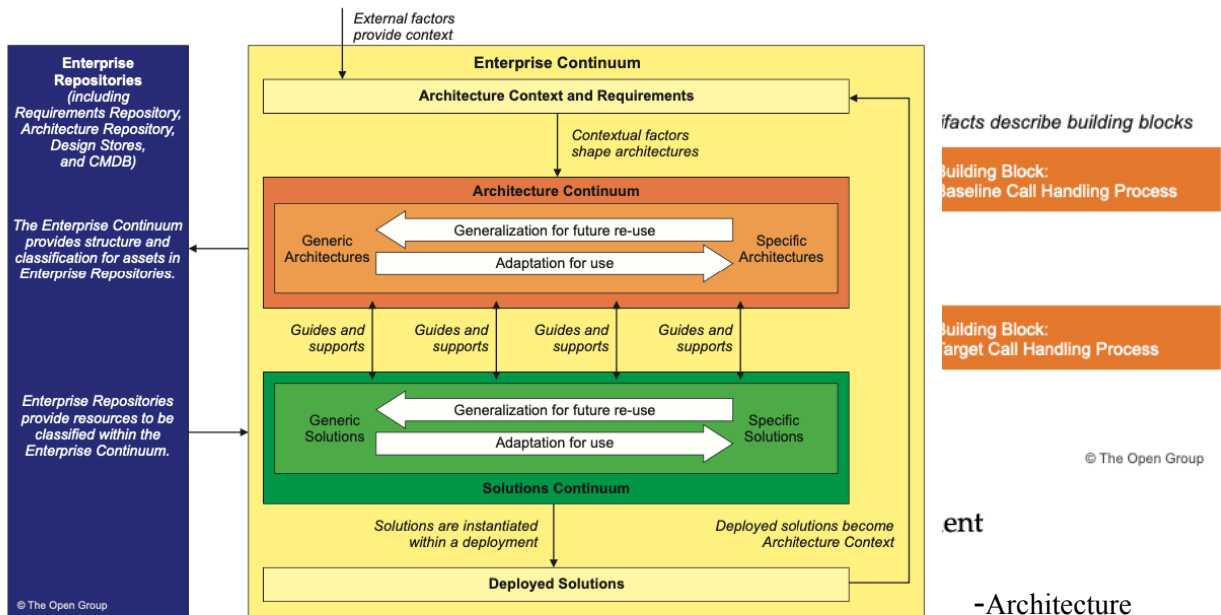


Figure 2-3 Enterprise Continuum

ent

-Architecture continuum

-Solution Continuum

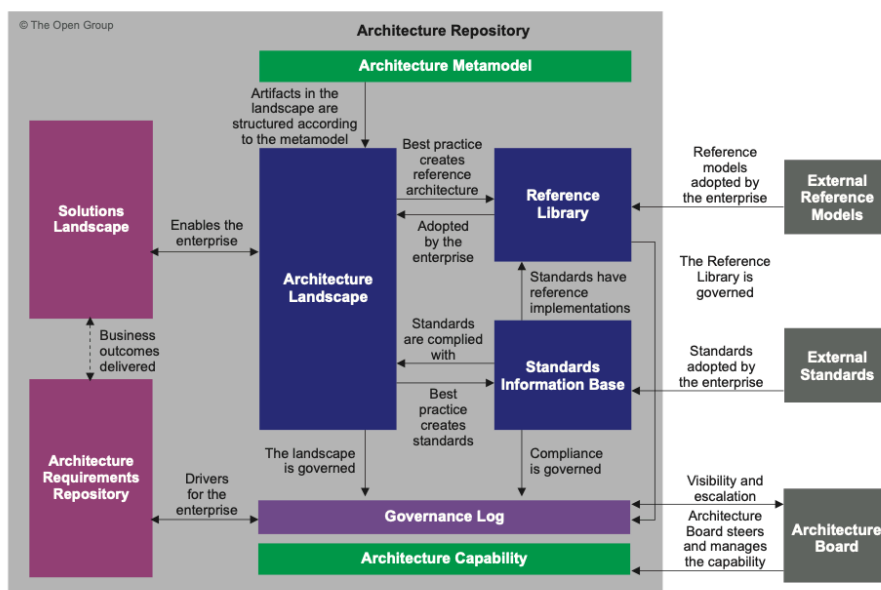


Figure 2-4 TOGAF Architecture Repository Structure

Architecture Repository : Supporting Enterprise continuum is the concept of Architecture repository which can be

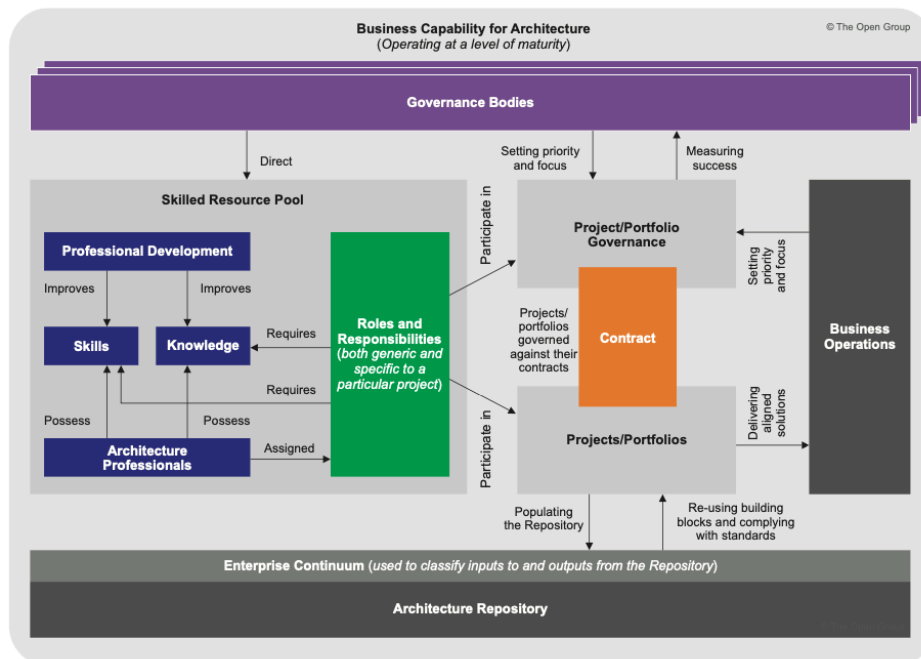
used to store different classes of architectural output at different level of abstractions, created by the ADM.

In this way TOGAF standard facilitates understanding and co-operation between stakeholders and practitioners at different levels.

The major components within Architecture repository are as follows :

- Architecture meta-model : Describes the organisationally tailored application of an architecture framework including a meta-model for architecture content.
- Architecture capability : Defines parameters, structures and processes that support governance of architecture repository
- Architecture landscape : is architectural representation of assets to be deployed within the operating enterprise at a particular point in time - the landscape is likely to exist at multiple level of abstraction to suit different architecture objectives.
- Standard information base : Captures the standards with which new architectures must comply which may include industry standards, selected products and services from supplier or shared services already deployed within the organisation.
- Reference library : Provides guidelines, template, patterns and other forms of reference material that can be leveraged in order to accelerate the creation of new architecture for enterprise.
- Governance logs : Provides record of governance activity across enterprise.
- Architecture requirements repository : Provides a view of all authorised architecture requirements which have been agreed with Architecture board.
- Solution landscape : Presents an architectural representation of the SBBs supporting the architecture landscape which have been planned or deployed by enterprise.

**Establishing and maintaining an Enterprise capability :** In order to carry out architectural activity effectively within an enterprise, it is necessary to put in place an appropriate business capability for architecture through organisation structures, roles responsibilities, skills and process



**Figure 2-5 TOGAF Architecture Capability Overview**

Establishing the architecture capability as an operational entity : Barring architecture capability set up to purely support change delivery program, it is increasingly recognised that a successful Enterprise Architecture practice must sit on a firm operational footing. In effect Architecture practice must be run like any other operational unit within a business ie. It should be treated like a business. EA Practice should establish capabilities in the following areas:

- Financial management
- Performance management

- Service management
- Risk management
- Resource management
- Communication and stakeholder management
- Quality management
- Supplier management
- Configuration management
- Environment management

**The benefits of Architecture Governance include :**

- Increased transparency of accountability, and informed delegation of authority
- Controlled risk management
- Protection of the existing asset base through maximising re-use of existing architectural components
- Proactive control, monitoring and management mechanism
- Process, concept, and component re-use across all organisational business units.
- Value creation through monitoring, measuring, evaluation and feedback.
- Increased visibility supporting internal process and external parties requirements, in particular, increased visibility of decision making at lower levels ensures oversight at an appropriate level within the enterprise of decision that may have far-reaching strategic consequences for the organisation.
- Greater stakeholder value, in particular, EA increasingly represents the core intellectual property of enterprise - studies have demonstrated a correlation between increased shareholder value and well governed enterprise.
- Integrates with existing process and methodologies and complements functionality by adding control capabilities.

Using the TOGAF standard with other frameworks :

Two of the key elements of any Enterprise architecture framework are :

- A definition of the deliverables that the architecting activity should produce.
  - A description of the method by which this should be done.
- This architecture tailoring may include adopting elements from other architecture frameworks, or integrating TOGAF methods with other standard frameworks or



best practices, such as ITIL<sup>®</sup>, CMMI<sup>®</sup>, COBIT<sup>®</sup>, PRINCE2<sup>®</sup>, PMBOK<sup>®</sup>, and MSP<sup>®</sup>.

#### Definitions:

**Abstraction :** The technique of providing summarised or generalised description of detailed and complex content.

Level of abstraction can also mean providing a focus for analysis that is concerned with a consistent and common level of detail or abstraction. Abstraction in this sense is typically used in architecture to allow a consistent level of definition and understanding to be achieved in each area of architecture in order to support effective communication and decision making. It is especially useful when dealing with large and complex architectures as it allows relevant issues to be identified before further detail is attempted.

**Actor :** A person, organisation or system that has one or more role that initiates or interacts with activities for example sales representative. Actor can be internal or external.

**Application architecture :** A description of the structure and interaction of application as group of capabilities that provide key business function and manage the data assets.

**Application component :** An encapsulation of application functionality aligned to implement structure which is modular and replaceable. It encapsulates its behaviour and data, provides service and makes them available through interface.

For example : a business application such as an accounting, payroll or CRM system. An application component usually maintains a data component. It is enabled by technology service provided by technology components.

**Application platform :** Collection of technology component of hardware and software that provide the services used to support application.

**Architecture style :** Combination of distinctive feature related to the specific context within which architecture is performed or expressed. A collection of principles and characteristics that steer or constraints how an architecture is formed.

**Architecture :** The fundamental concepts or properties of a system in its environment embodied in its elements, relationship and in the principles of design and evolution.

The structure of component, their relationship and the principles and guidelines governing their design and evolution over time.

**Architecture Building block :** A constituent of the architecture model that describes a single aspect of overall model.

**Architecture Continuum :** A repository of architectural elements with increasing detail and specification. This continuum begins with fundamental definition like reference models, core strategies and basic building blocks. From there it spans to industry Architectures and all the way to an Organisation specific architecture.

Architecture development method (ADM) : The core of TOGAF. A multi phase, iterative approach to develop and use an Enterprise architecture to shape and govern business transformation and implementation project.

Architecture Domain : The architectural area being considered. The TOGAF Framework has four primary architecture domains : Business, data, application and technology. Other domain can also be considered (eg. Security)

Architecture Framework : A Conceptual structure used to plan, develop, implement, govern and sustain an architecture.

Architecture Governance : A Practice of monitoring and directing architecture related work. The goal is to deliver desired outcome and adhere to relevant principles, standard and roadmaps.

Architecture landscape : A architectural representation of assets in use, or planned by enterprise at particular point in time.

Architecture model : A representation of a subject of interest. A architecture model provides a smaller scale, simplified and/or abstract representation of the subject matter.

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

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

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

Architecture vision : A succinct description of target architecture that describe its business values and the change to the enterprise that will result from its successful deployment. It serves as aspirational vision and a boundary for detailed architecture development.

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

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

Building block : A (potentially re-usable) component of enterprise capability that can be combined with other building block to deliver architectures and solutions.

Business architecture : A representation of holistic, multi dimensional business view of capability, end to end delivery, information and organisation structure and relationship among these business view and strategies, products, policies, initiatives and stakeholders.

Business capability : A particular ability that a business may process or exchange to achieve specific purpose.

Business function : Delivers business capability closely aligned to an organisation, but not necessarily explicitly governed by the organisation.

Business governance : Concerned with ensuring that business processes and policies deliver the business outcomes and adhere to relevant business regulation.

Business model : A model describing the rationale for how an enterprise creates, delivers and captures value.

Business service : Support business capabilities through an explicitly defined interface and is explicitly governed by an organisation.

Capability : An ability that an organisation, person or system possesses.

Capability architecture : A highly detailed description of architecture approach to realise a particular solution or solution aspect.

Data architecture : A description of the structure and interaction of enterprises' major type and sources of data, logical assets, physical data assets and data management resources.

Deliverable : An architectural work product that is contractually specified and in turn formally reviewed, agreed and signed off by the stakeholders.

Enterprise : The highest level (typically) of description of an organisation and typically covers all mission and functions. An enterprise often spans multiple organisation.

Enterprise Continuum : A categorisation mechanism useful for classifying architecture and solution artefacts, both internal and external to Architecture repository as they evolve from generic foundation architecture to Organisation specific architectures.

Foundation architecture : Generic building block, their inter relationship with other building blocks, combined with principles and guidelines that provides 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.

Governance : The discipline of monitoring, managing and steering a business to deliver the business outcome required.

Information system service : The automated element of business services.

Interoperability : The ability to share information and services.

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

Reference model : An abstract framework for understanding significant relationship among the entities of frameworks and for development of consistent standard or specification supporting that environment.

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

Segment architecture : A detailed, formal description of areas within an enterprise used as the program or portfolio level to organisation and align change activity.

Service : An element of behaviour that provides specific functionality in response to request from actors or other services.

Service orientation : Viewing enterprise, system or building block in terms of services provided and consumed.

Solution architecture : A description of a discrete and focused business operation or activity and how IS/IT support that operation.

Solution building block (SBB) : A candidate solution which conforms to the specification of an ABB

**Solution continuum** : A part of Enterprise Continuum. A repository of re-usable solution for future implementation effort. It contains implementations of corresponding definition in Architecture continuum.

**Stakeholder** : An individual, team, organisation or class thereof, having an interest in system.

**Standard Information Base (SIB)** : A database of standards that can be used to define the particular service and other components of an Organisation specific architecture.

**Strategic architecture** : A summary of formal description of enterprise, providing an organising framework for operational and change activity and an executive level, Long term view for direction setting.

**Target architecture** : The description of future state of architecture being developed for an organisation.

**Technology architecture** : A description of structure and interaction of technology service and technology component.

**Technology component** : An encapsulation of technology infrastructure that represents a class of technology product or specific technology product.

**Technology service** : A technical capability required to provide enabling infrastructure that support the delivery of application.

**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.

## **Introduction to ADM :**

It describes a method for developing and managing the lifecycle of Enterprise Architecture and forms the core of TOGAF Standard.

Enterprise continuum provides a framework and context to support the leverage of relevant architecture assets in executing ADM. These assets may include Architecture description, models, and pattern taken from a variety of sources.

Enterprise continuum categories architecture source material - both the content of the Organisation's own enterprise repository and set off relevant, available reference model and standard in the industry.

The practical implementation of Enterprise Continuum will typically take the form of an Architecture Repository that includes reference architectures, models, and patterns that have been accepted for use within the enterprise and actual architectural work done previously within the enterprise.

While using ADM, the architect is developing a snapshot of enterprise's decisions and their implications at particular point in time. Each iteration will populate an organisation's specific landscape with all the architecture assets and leveraged through the process, including the final organisation specific architecture delivered.

The ADM is also useful to populate the Foundation architecture of an Enterprise. Business requirements of enterprise may be used to identify the necessary definitions and selections in the Foundation architecture. This could be set of re-usable common models, policy and governance definitions or even as specific as overriding technology selections.

## **Architecture Development Cycle:**

Key points :

- The ADM is iterative over the whole process, between phases and within phases
  - For each iteration a fresh decision must be taken as to;
    - The breadth of coverage of enterprise to be defined
    - The level of detail to be defined
    - The extent of time period aimed at, including the number of event of any intermediate time periods.
    - The architectural assets to be leveraged, including:
      - Assets created in previous iteration of ADM cycle within the enterprise
      - Assets available elsewhere in the industry (other framework, system models, vertical industry model etc)
- These decision should be based on a practical assessment of resource and competence availability and the value that can be realistically be expected to accrue to the enterprise from the chosen scope of architecture work.
- As a generic method, the ADM is intended to be used by enterprise in a wide variety of different geographies and applied in different vertical sectors/industry types.

The phase of ADM cycle are further divided into steps for example within the architecture development phases (B, C, D) are as follows:

- Select reference models, viewpoints and tools
- Develop baseline architecture description
- Develop target architecture description
- Perform gap analysis
- Define candidate roadmap components
- Resolve impact across the architecture landscape.
- Conduct formal stakeholder review.
- Finalise the architecture

- Create the architecture definition document.

The requirement management phase is a continuous phase which ensures that any changes to requirement are handled through appropriate governance processes and reflected in all other phases

Possible reasons for wanting to adapt the ADM includes:

- The ADM is one of the many corporate process that make the corporate governance model.
- ADM is being mandated for use by prime or lead contractor in an outsourcing situation and needs to be tailored to achieve a suitable compromise between the contractor's existing practice and contractor's enterprise requirement
- The enterprise is small to medium enterprise and wishes to use "cut-down" method more attuned to be the reduced level of resources and system complexity typical of such an environment.
- The enterprise is very large and complex, comprising many separate but interlinked "enterprise" within an overall collaborative business framework and the architecture method needs to be adapted to recognise this.

### **Adapting ADM : Examples**

If the business case for doing architecture at all is not well recognised then creating an architecture vision is almost essential and a detailed business architecture is often needs to come next in order to underpin the Architecture vision, detail the business case for remaining architecture work and secure the active participation of Stakeholder in that work.

A detailed inventory of baseline environment may be done before undertaking the business architecture.

The order of phases may also be defined by Architecture principles and business principles. Ex. The business principles may dictate that the enterprise be prepared to adjust its business process to meet the needs of a packaged solution, so that it can be implemented quickly to enable fast response to market changes. In such case the Business architecture may well follow completion of Information system architecture or technology architecture.

Another reason for wanting to adapt the ADM is if TOGAF is to be integrated with other enterprise framework. Ex. Use ADM in conjunction with Bachman framework.

Other possible reason for wanting to adapt ADM include :

- ADM is one of the many corporate process that make up the corporate governance model.
- ADM is being mandated for use by prime or lead contractor in an outsourcing situation and needs to be tailored to achieve a suitable compromise between the contractors' existing practice and contracting enterprise.
- The enterprise is a small to medium and wishes to us a 'cut-down' method more attended to the reduced level of resource and system complexity typical of such an environment.
- The enterprise is very large and complex comprising may separate but interlinked "enterprise" within an overall collaborative business framework and architecture method needs to be adapted to recognise this.

Different approach to planning and integration may be used in such case including the following (possibly in combination).

1. Top down planning and development : designing the whole interconnected meta enterprise as a single entity
2. Development of 'generic' or 'reference' architecture, typical of enterprise within the organisation but not representing any specific enterprise, which individual enterprises are then expected to adapt in order to produce an architecture 'instance' suited to the particular enterprise concerned.
3. Replication - developing a specific architecture for one enterprise, implementing it as a proof of concept and then taking that as a 'reference architecture' to be cloned in other enterprise.

**Architecture Governance :**

The architecture board should be satisfied that the method is being applied correctly across all phases of ADM iteration. Compliance with the ADM fundamental to the governance of the architecture, to ensure that all consideration are made and all required deliverables are produced.

The major information are managed by a governance repository should contain the following types of information :

1. Reference data (Collateral from the organisation's own repository/Enterprise Continuum, including external data e.g COBIT, the IT4IT Reference architecture) used for guidance and instruction during project implementation.
2. Process status : All information regarding the state of any governance process will be managed. Ex. Of this include outstanding compliance request, dispensation requests and compliance assessments investigation.
3. Audit information : All record all completed governance process actions and will be used to support:
  - I. Key decision and responsible personal for any architecture project that has been sanctioned by governance process.
  - II. A reference for future architectural and supporting process developments, guidance and precedence.

**Scoping the architecture :**

There are many reasons to constraint the scope of architectural activity to be undertaken, most of which relate to limit in :

1. The organisational authority of team producing the architecture.
2. The objective of stakeholder concerns to be addressed within the architecture.
3. The availability of people, finance and other resource.

Four dimensions are typically used in order to define and limit the scope of an architecture :

1. Breadth : What is the full extent of the enterprise and what part of that extent will this architecting effort will deal with
  - (i) Many enterprises are very large effectively comprising a federation of organisational units that could be validly be considered enterprise in their own right
  - (ii) The modern enterprise increasingly extends beyond its traditional boundaries, to embrace a fuzzy combination of traditional business enterprise combined with suppliers, customers and partner.

It is often necessary to have a number of different architectures existing across an enterprise, focused on particular time frames, business functions or business requirement.

The feasibility of a single enterprise wide architecture for every business function of purpose may be rejected as too complex and unwieldy.

2. Depth : to what level of detail should the architecting effort go. Care should be taken to judge the appropriate level of detail to be captured, based on the intended use of the Enterprise Architecture and the decision to be made based on it.

It is also important to predict the future uses of architecture so that within resource limitations, the architecture can be structured to accommodate future tailoring, extensions or re-use.

3. Time period : what is the time period that needs to be articulated for architecture vision and does it makes sense for the same period to be covered in the detailed architecture description.
4. Architecture domain : A complete Enterprise Architecture description should contain all four domain (business, data, application and technology) but the realities of resource and time constraint often mean there is not enough time, funding or resource to build top down all inclusive architecture description encompassing all four architecture domains, even if the enterprise scope is chosen to be less than the full extent of overall enterprise.

Typically the scope of an architecture is first expressed in terms of breadth, depth and time. Once the dimensions are understood a suitable combination of architecture domains can be selected that are appropriate to the problem being addressed.

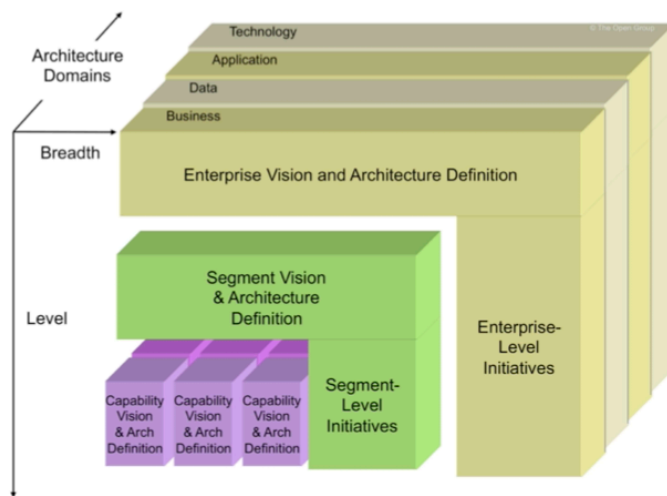


Figure 4-2 Integration of Architecture Artifacts

### Preliminary Phase :

Objectives : -

1. Determine the architecture capability required by the organisation
  1. Review the organisation context for conducting Enterprise architecture.
  2. Identify and scope the elements of Enterprise organisations affected by the architecture capability.
  3. Identify and establish frameworks, methods and processes that intersects with the Architecture capability.
  4. Establish capability maturity target.
2. Establish the architecture capability :
  1. Define and establish the organisational model of Enterprise Architecture.
  2. Define and establish the detailed process and resources for architecture governance.
  3. Select and implement tools that support the Architecture capability
  4. Define the Architecture principles.

Input :

1. Reference material to enterprise
2. Non architectural inputs :
  1. Board strategies and board business plans business strategy, IT strategy, business principles, business goals and business drivers when pre-existing.
  2. Major framework operating in business e.g. project/ portfolio management
  3. Governance and legal framework, including architecture governance strategy, when pre-existing
  4. Architecture capability
  5. Partnership and contract agreement.
3. Architectural Input : Pre existing models for operating an EA capability can be used as a baseline for Preliminary phase



- (I) Organisational model for Enterprise Architecture
  - a. Scope or Organisation impacted
  - b. Maturity assessments , gaps, and resolution approach
  - c. Roles and responsibilities for architecture team(s)
  - d. Budget requirement
  - e. Governance and strategy requirement
- (II) Existing Architectural framework, if any including.
  - a. Architecture method
  - b. Architecture content
  - c. Configured and deployment tools
  - d. Architecture principles
  - e. Architecture Repository.

Steps : Preliminary phase involves doing any necessary work to initiate and adapt the ADM to define an organisation specific framework.

The level of details addressed in preliminary phase depends on the scope and goals of the overall architecture effort.

The steps within the Preliminary phase are as follows:

- Scope the enterprise organisation impacted
- Confirm governance and support framework
- Define and establish enterprise architecture term and organisation
- Tailor TOGAF framework and if any other selected architecture framework
- Develop a strategy and implementation plan for tools and techniques.

#### **Scope the Enterprise Organisation impacted :**

- Identify core enterprise (units) : Those who are most affected and achieve most value from the work.
- Identify soft enterprise (units) : Those who will see change to their capability and work with core units but are otherwise not directly affected.
- Identify extended enterprise (units) : Those units outside the scoped enterprise who will be affected in their own Enterprise Architecture
- Identify communities involved (enterprise) : Those stakeholders who will be affected and who are in groups of communities.
- Identify governance involved, including legal framework and geographies

#### **Confirm Governance and support framework :**

##### **Define and establish enterprise architecture team and organisation:**

- Determine existing enterprise and business capability
- Conduct an Enterprise architecture/ Business change maturity assessment if required
- Identify gaps in existing work areas
- Allocate key roles and responsibilities for Enterprise Architecture capability management and governance
- Define request for change in existing business programs and projects:
  - Inform existing Enterprise architecture and IT architecture work of stakeholder requirements
  - Request assessment of impact on their plan and work
  - Identify common area of interest.
  - Identify any critical differences and conflicts of interest
  - Produce request for change to stakeholder activities.
- Determine constraint on Enterprise architecture work
- Review and agree with sponsors and board
- Assess budget requirement.

#### **Identify and establish Architecture Principles:**

Tailor the TOGAF framework and if any other selected architecture framework(s)

- Terminology tailoring : Architecture practitioner should use terminology that are generally understood across the enterprise. Tailoring should produce an agreed terminology set for description of architectural

content. Consideration should be given to the creation of Enterprise Glossary to be updated throughout the architecture process.

- Process tailoring : ADM provides a generic process for carrying out architecture. Process tailoring provides the opportunity to remove tasks that are already carried out elsewhere in the organisation, add organisation specific task and to align the ADM Processes to external process framework and touch points. Key touch points to be addressed would include
  - Links to (Projects and service) portfolio management processes
  - Links to project lifecycle
  - Links to operations handover processes
  - Links to operational management processes (including configuration management, change management and service management)
  - Links to procurement processes.
- Content tailoring ; Using TOGAF Architecture Content Framework and Enterprise Continuum as a basis, tailoring of content structure and classification approach allows adoption of third party content frameworks and allows for customisation of the framework to support organisation specific requirements.

Develop strategy and Implementation plan for tools and techniques : There are many tools and techniques which may be used to develop Enterprise Architecture across many domain. The development of tools and strategy is recommended that reflects the understanding and level of formality required by Stakeholder. The strategy should encompass management techniques, decision management, workshop techniques, business modelling, detailed infrastructure modelling, office products, language and repository management as well as more formal architecture tools. For example the Balanced scorecard technique is best performance measurement tool used by business schools and many organisation that can be used successful architecture projects.

Outputs :

- Organisation model for Enterprise architecture
  - Scope of organisation impacted
  - Maturity assessment, gaps and resolution approach
  - Roles and responsibilities for architecture team(s)
  - Constraint on architecture work
  - Budget requirement
  - Governance and support strategy
- Tailored Architecture Framework
  - Tailored architecture method
  - Tailored architecture content
  - Architecture principles
  - Configured and deployed tools
- Initial architecture repository populated with framework content
- Restatement of , or reference to business principles, business goals and business drives
- Request for architecture work (Optional)
- Architecture governance framework

Approach : The Preliminary phase is all about definite “Where”, “What”, “why” and “how “ dow we do architecture in enterprise concerned. The main steps are as follows:

- Define enterprise
- Identify key driver and elements in the organisational context
- Defining the requirements for architecture work
- Defining the architecture principles that will inform any architecture work
- Defining the framework to be used.
- Defining the relationship between management frameworks
- Evaluating the Enterprise Architecture maturity.

The Enterprise architecture provide a strategic, top down view of an organisation to enable executives, planner, architects and engineers to coherently co-ordinate, integrate and conduct their activities.

The preliminary phase may be revisited from Architecture vision phase in order to ensure that organisation's architecture capability is suitable to address a specific architecture problem.

Organisation context : in order to make effective and informed decision about the framework for architecture to be used within a particular enterprise, it is necessary to understand the context surrounding the architecture framework. Specific area to consider would include :

1. The commercial models for Enterprise Architecture and budgetary plans for Enterprise architecture activity, where no such plans exist the Preliminary phase should be used to develop a budget plan
2. The stakeholders for architecture in the enterprise : their key issues and concerns.
3. The intentions and culture of the organisation, as captured within board business directives, business imperatives, business strategies, business principles, business goals, and business drivers.
4. Current processes that support execution of change and operation of enterprise, including the structure of process and also the level of rigour and formality applied within the organisation.
5. Area of focus should include :
  1. Current method of architecture description
  2. Current project management framework and methods
  3. Current system management process and methods
  4. Current project portfolio management process and methods
  5. Current application portfolio management process and methods
  6. Current technology portfolio management process and methods
  7. Current information portfolio management process and methods
  8. Current system design and development frameworks and methods
6. The baseline architecture landscape, including state of enterprise and also how the landscape is currently represented in documentation form.
7. The skill and capabilities of the enterprise and specific organisations that will be adopting the framework.

Review of the organisational context should provide valuable requirements on how to tailor the architecture framework in terms of :

1. Level of formality and rigor to be applied.
2. Level of sophistication and expenditure required.
3. Touch point with other organisation, processes, roles and responsibilities.
4. Focus on content coverage.

Requirement for Architecture work : The business imperative behind the EA work drive the requirements and performance metrics for the architecture work. This may include for example :

- Business requirements
- Cultural aspirations
- Organisation intent
- Strategic intent
- Forecast financial requirements.

Principles : The preliminary phase defines the architecture principles that will form part of constraint on any architecture work undertaken in the enterprise.

Management frameworks : The TOGAF framework has to co-exist with and enhance the operational capabilities of other management framework that are present within any organisation either formally or informally.

The main framework suggested to be co-ordinated with the TOGAF frameworks are :

- Business capability framework : That determines business capability required to deliver business value including the definition of return on investment and requisite control/performance measures.
- Project/Portfolio management method : that determines how a company manages its change initiative.

- Operation management method : that describes how a company runs its day-to-day operations, including IT.
- Solution development method : that formalise the way that business systems are delivered in accordance with the structure development in IT architecture

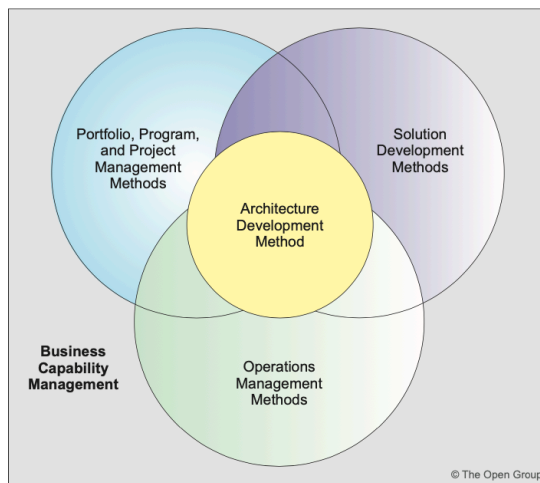


Figure 5-2 Management Frameworks to Co-ordinate with the TOGAF Framework

**Relating the management framework :** The enterprise architecture can be used to provide a structure of all the current initiatives, the portfolio management framework can be used to deliver the component of architecture, and operation management framework supports incorporation of these new components within the corporation infrastructure.

The business planners are present throughout the process and are in position to support and enforce the architecture by retaining approval for resources at various stages of planning and development.

The solution development methodology is used within the portfolio management framework to plan, create and deliver the architectural component specified in the project and portfolio charter. These deliverables include but are not exclusively IT, for example a new building, a new set of skills, production equipment, hiring, marketing and so on. Enterprise architecture potentially provides the context for all enterprise activities.

The management frameworks are required to complement each other and work in close harmony for the good of enterprise.

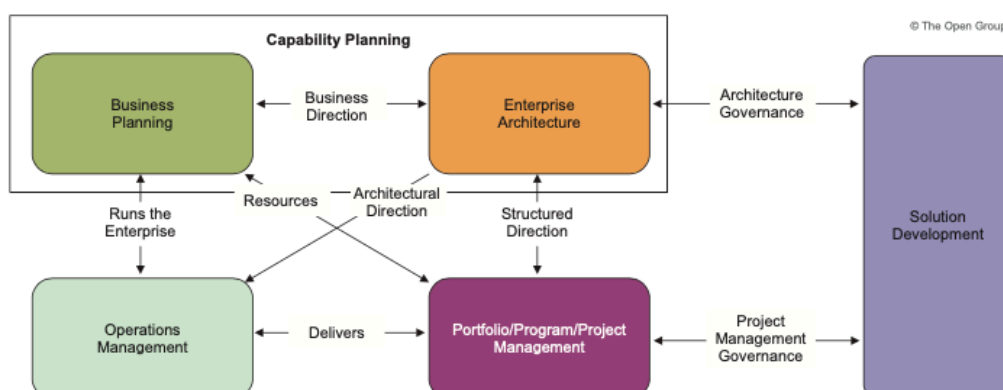


Figure 5-3 Interoperability and Relationships between Management Frameworks

Business planning at the strategy level provides the initial direction to Enterprise architecture.

Enterprise architecture structures the business planning into an integrated framework that regards the enterprise as a system or system of system.

Project/Portfolio management is the delivery framework that receives the structured, detailed direction that enables them to plan and build what is required knowing that each assigned deliverable will be in context.

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#### Architecture Vision :

##### Objectives :

- Develop high level aspirational vision of capabilities and business value to be delivered as a result of proposed enterprise architecture.
- Obtain approval for statement of architecture work that defines a program of works to develop and deploy the architecture outlined in architecture vision.

##### Input :

- Reference material external to enterprise
- Non architectural inputs
  - Request for architecture work
  - Business principles, business goals, business drivers
- Architectural inputs;
  - Organisation model for Enterprise architecture
    - Scope of organisation impacted
    - Maturity assessment, gap and resolution approach
    - Roles and responsibilities for architecture team(s)
    - Re-use requirements
    - Budget requirements
    - Request for change
    - Governance and support strategy
- Tailored architecture framework
  - Tailored architecture method
  - Tailored architecture content
  - Architecture principles , including business principles, when pre-existing
  - Configured and deployed tools

- Populated architecture repository - Existing architectural documentation (framework description, architecture descriptions, baseline description, ABBs etc.)

Steps :

- Establish architecture project
- Identify Stakeholders and business requirement
- Confirm and elaborate business goals, business drivers and constraints
- Evaluate capabilities
- Assess readiness of business transformation
- Define scope
- Confirm and elaborate architecture principles, including business principles
- Develop architecture vision
- Define the target architecture value proposition and KPIs
- Identify the business transformation risk and mitigation activities
- Develop statement of architecture work, secure approval

An understanding of required artefacts will enable stakeholders to start to scope out their decision making which will guide subsequent phase. These decision need to be reflected in the stakeholder map.

Policy development and strategic decision need to be captured in this phase to enable the subsequent work to be quantified for example rationalisation decision and metrics, revenue generation and target which meet the business strategy.

In architecture vision phase, architect should consider the capability of enterprise to develop the enterprise architecture itself as required in the specific initiative or project underway.

Business transformation readiness assessment can be used to evaluate and quantify the organisations' readiness to undergo a change. This assessment is based upon the determination and analysis/rating of a series of readiness factors.

Architecture principles are normally based on the principles developed as part of Preliminary phase.

An understanding of the required artefacts will enable stakeholders to start to scope out their decision making which will guide subsequent phase. These decision need to be reflected in the Stakeholder map

Policy decision and strategic decision need to be captured in this phase to enable the subsequent work to be quantified. For example : rationalisation decision and metrics, revenue generation and target which meet the business strategy. There are also other areas which need to be addressed : for example : Digital transformation and IT Strategy where decision on the Architecture vision will provide leadership and direction for organisation in subsequent phases.

Output :

1. Approved Statement of architecture work including
  1. Architecture project description and scope
  2. Overview of architecture vision
  3. Architecture project plan and schedule
2. Refined statement of business principle, business goals and business driver.
3. Architecture principles
4. Capability assessment
5. Tailored architecture framework
  1. Tailored architecture method
  2. Tailored architecture content
  3. Configure and deployed tools
6. Architecture vision

1. Problem description
2. Objective of statement of architecture work
3. Summary views
4. Business scenario
5. Refined key high level stakeholder requirement.
7. Draft architecture definition document
  1. Baseline business architecture
  2. Baseline technology architecture
  3. Baseline data architecture
  4. Baseline application architecture
  5. Target business architecture
  6. Target technology architecture
  7. Target data architecture
  8. Target application architecture.

Creating architecture vision : the architecture vision provides the sponsors with a key tools to sell benefit of proposed capability to stakeholder and decision makers within the enterprise. Architecture vision describes how the new capability will meet business goals and strategic objectives and address the stakeholder concerns when implemented.

Integral to architecture vision is an understanding of emerging technologies and their potential impact on industries and enterprise without which many business opportunities may be missed.

Normally key elements of architecture vision - such as enterprise mission, vision, strategy and goals

This excursive should examine and search for existing material on fundamental business architecture concepts such as :

- Business capability : Which represents a particular ability or capability that business may posses or exchange to achieve a specific purpose or outcome.
- Value streams : Which represents an end-to-end collection of value adding activities that create an overall result for customer, stakeholder and end-user.
- Organisation map : Which depicts the relationship between the primary entities that make up the enterprise, its partner and stakeholder.s

In additions architecture mission explore other domain which are appropriate for Enterprise architecture in hand. These domain may include elements of basic domain yet server and additional purpose for stakeholder. Example may include :

- Information
- Security
- Digital
- Network management
- Knowledge
- Industry specific
- Services
- Partnership
- Cybersecurity

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Business architecture :

Objective of Phase B are :

1. Develop target business architecture that describe how the enterprise need to operate to achieve the business goals and respond to strategic driver set out in the architecture vision, in a way to address the statement of architecture work and stakeholders concerns.
2. Identify candidate architecture roadmap components based upon gaps between te baseline and target business architecture.

Input :

1. Reference material external to enterprise
2. Non architecture input
  1. Request for architecture work
  2. Business principles, goals and drivers
  3. Capability assessments
  4. Communication plan
3. Architecture input :
  1. Organisation model for Enterprise architecture
    1. Scope of organisation impacted
    2. Maturity assessment gaps and resolution approach
    3. Roles and responsibilities for architecture team
    4. Budget requirement
    5. Governance and support strategy
  2. Tailored Architecture framework
    1. Tailored architecture method
    2. Tailored architecture content
    3. Configured and deployed tools
  3. Approved statement of architecture work
  4. Architecture principles
  5. Enterprise continuum
  6. Architecture repository
    1. Re-usable building blocks
    2. Publicly available reference models
    3. Organisation specific reference model
    4. Organisation standards
  7. Architecture vision
    1. Problem description
    2. Objective of statement of architecture work
    3. Summary views
    4. Business scenario (Optional)
    5. Refined key high level stakeholder requirements.
8. Draft architecture definition document
  1. Baseline business architecture
  2. Baseline technology architecture
  3. Baseline data architecture
  4. Baseline application architecture
  5. Target business architecture
  6. Target technology architecture
  7. Target data architecture
  8. Target application architecture.

Steps : the order of steps in Phase B as well as time at which they are formally started and completed should be adapted to the situation at hand in accordance with the established architecture governance.

The steps in Phase B are as follows;



- Select reference model, viewpoint and tools
- Develop baseline business architecture description
- Develop target business architecture description
- Perform gap analysis
- Define candidate roadmap component
- Resolve impact across the architecture landscape
- Conduct formal stakeholder review
- Finalise the business architecture.
- Create the architecture definition document.

Select relevant Business architecture from the architecture repository on the basis of business driver and stakeholders and concerns.

Select relevant business architecture view point (e.g. operations, management, financial) i.e. those that will enable the architecture to demonstrate how the stakeholder concerns are being addressed in Business architecture.

Business modelling and strategy assessment are effective technique for framing the target state of organisation's business architecture. Output from that activity is then. Used to articulate the business capabilities, organisational structure and value stream required to close gap between current and target state.

Ensure that all stakeholders concern is addressed if not create a new model to address the concern not covered or augment existing model.

Business scenario is useful technique to discover and document business requirement and may be used iteratively at different level of detail in hierarchical at different level of detail in hierarchical decomposition of business architecture.

Technique to decompose a business :

- Business capability mapping : identify, categorise and decompose the business capability required for the business to have ability to deliver value to one or more stakeholders.
- Organisation mapping : A representation of organisational structure of business depicting business unit, the decomposition of those unit lower level functions and organisational relationship.
- Value stream mapping : The breakdown of activities that an organisation performs to create the value being exchanged with stakeholder.
- Structured analysis : Identifies the key business function within the scope of the architecture and maps those function onto organisation unit within the process.
- Use case analysis : the breakdown of business level functions across actors and organisations allows the actor in a function to be identified and permits a breakdown into service supporting / delivering that functional capability.
- Process modelling. : A breakdown of a function or business service through process modelling allows the actor in a function to be identified and permits a breakdown into service supporting/ delivering that functional capability.

Business architecture phase need to identify which component of the architecture are function and which component are service. Service are distinguished from function through the explicit definition of a service contract.

Business service are specific function that have explicit, define boundaries that are explicitly governed.

Catalog captures inventory of the core assets of business. Catalog are hierarchical in nature and capture the decomposition of a building block and also decomposition across related building blocks

Following catalog can be considered for development within business architecture;

1. Value stream catalog
2. Business capability catalog
3. Value stream states catalog
4. Organisation /actor catalog
5. Driver/goals/Objective catalog
6. Role catalog
7. Business service / Function catalog
8. Location catalog
9. Process / Event/ Control/ Product catalog
10. Contract/ Measure catalog

Matrices shows core relationship between related entities. The following matrices should be considered for development within Business architecture :

- Value stream/ Capability matrix : Displays capability required to support each stage of a value stream
- Strategy/ Capability matrix : displays the capability required to support specific strategy statement
- Capability/Organisation matrix : Displays organisation element that implement each capability.
- Business interaction matrix : Showing dependency and communication between organisation and actors.
- Actor /Role matrix ; Showing the roles undertaken by each actor.

Identify required diagram :

- Business model diagram
- Business Capability Map
- Value stream Map
- Organisation Map
- Business Footprint diagram
- Business service / Information diagram
- Function decomposition diagram
- Goal/ Objective/ Service diagram
- Business user case diagram
- Organisation decomposition diagram
- Process flow diagram
- Event diagram

Once the business architecture catalog, matrices, and diagram have been developed architecture modelling is completed by formalising business focused requirement for implementing the target architecture.

The requirement may :

- Related to business domain
- Provide requirements input into data, application and technology architectures
- Provide detailed guidance to be reflected during design and implementation to ensure that the solution addresses the original architecture requirement.

Output :

- Refined and updated version of architecture vision phase deliverable where application including:
  - Statement of architecture work
  - Validate business principles, business goals, and business drivers
  - Architecture principles
- Draft architecture definition document
  - Baseline business architecture
  - Target business architecture
- Draft architecture requirement specification
  - Gap analysis

- Technical requirements
- Updated business requirement
- Business architecture components of architecture roadmap

Note : Business architecture is a representation of holistic, multi dimensional business views of : Capability, end to end value delivery, information and organisational structure and the relationship among these business view and strategies, product, policies , initiatives and stakeholders.

Approach : In practical term Business architecture is also often necessary as a mean to demonstrating the business value of subsequent architecture work to key stakeholders and the return on investment to those stakeholders for supporting and participating in subsequent work.

The business strategy defines the goals and drivers and metrics for success but not necessarily how to get there.

This will depend to a large extent on the enterprise environment. In some cases, key elements of the business architecture may be done in other activities. For example : Enterprise mission, vision, strategy and goals may be documented as part of some wider business strategy or enterprise planning activity that has its own lifecycle within the enterprise.

### **Applying business capability:**

The business capability map found or developed in architecture vision phase provide self contained view of business that is independent of current organisational structure, business process, information system and application and rest of the product or service portfolio. Those business capabilities should be mapped back to the organisational unit value, store, information system and strategic plan within the scope of Enterprise architecture project.

Another common analysis technique involves heat mapping, which can be used to show a range of different perspective on the same set of core business capabilities . These include maturity, effectiveness, performance and value or cost of each capability to the business.

### **Applying Value stream :**

Value stream provide stakeholder context into why the organisation needs business capabilities while business capabilities provide what the organisation needs for a particular value stage to be successful.

### **Applying the Organisational map :**

An organisational map shows the key organisation units, partners and stakeholder group that make up the enterprise ecosystem. The map should also depict the working relationship between these entities as distinct from organisation chart that only shows hierarchical reporting relationship.

This map is the main element of business architecture because it provides the organisational context for whole enterprise architecture effort.

While capability mapping exposes what a business does and values stream mapping exposes how it delivers values to specific stakeholder , the organisation map identified the busiest unit or third parties that posses or use these capabilities and which participate in the value stream.

In addition to capability map, values streams, and organisation map a variety of modelling technique a variety of other modelling technique may be employed if deemed important for example :

- Activity model (also called business process models) : describe the functions associated with the enterprise's business activities and data and/or information exchanged between activities (internal change) and the data and/or information exchanged with other activities that are outside the scope of model .
- Use case models : Can describe either business process or system function depending on focus of modelling effort.
- Class models : are similar to logical data model. A class model describes static information and relationship between information. A class model also describe informational behaviours. Like many of the other models ti can also use use to model various level of granularity. Depending of the intent of model, a class model can represent business domain entities or system implementation classes. A business domain model represents key business information (domain classes), their characteristics (attribute) their behaviour (methods or operations) and relationship and cardinality (describes required or optimal participation in the relationship).

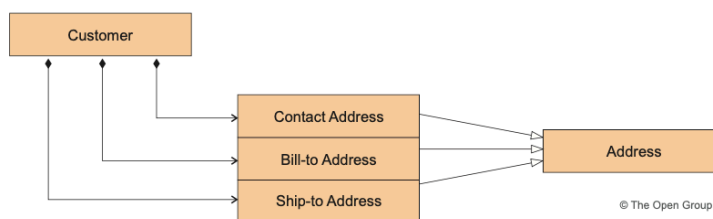


Figure 7-2 UML Business Class Diagram

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## Phase C : Information system architecture - Data architecture

### Objectives :

- Develop target data architecture that enables the business architecture and architecture vision, in a way that addresses the statement of architecture work and stakeholder concerns.
- Identify candidate architecture roadmap components based upon gaps between the baseline and target data architecture.

### Input :

- Reference material external to enterprise :
- Non architecture input
  - Request for architecture work
  - Capability assessment
  - Communication plan
- Architecture input
  - Organisational model for Enterprise architecture.
    - Scope of organisation impacted
    - Maturity assessment gaps and resolution approach.
    - Roles and responsibilities for architecture team(s)
    - Constraint on architecture work
    - Budget requirement
    - Governance and support strategy.
  - Tailored architecture framework
    - Tailored architecture method.
    - Tailored architecture content (deliverables and artefacts)
    - Configured and deployed tools
  - Data principles if existing

- Statement of architecture work
- Architecture vision
- Architecture repository
  - Re-usable building block
  - Publicly available reference model.
  - Organisation specific reference model.
  - Organisational standard.
- Architecture definition document including
  - Baseline business architecture
  - Target business architecture
  - Baseline data architecture
  - Target data architecture
  - Baseline application architecture
  - Target application architecture
  - Baseline technology architecture
  - Target technology architecture.
- Draft architecture requirement specification including
  - Gap analysis result
  - Relevant technical requirement that will apply to this phase.
- Baseline architecture components of an architecture roadmap

#### **Steps In phase C:**

- Select reference model, viewpoints and tools
- Develop baseline data architecture
- Develop target data architecture
- Perform gap analysis
- Define candidate roadmap component
- Resolve impact across the architecture landscape
- Conduct formal stakeholder review
- Finalise the data architecture
- Create the architecture definition document.

Select Reference models, view points and tools : Select relevant data architecture resource (reference models, patterns etc.) on the basis of business drivers, stakeholders, concerns and business architecture.

Select relevant data architecture viewpoints (for example stakeholders of data - regulatory body, users, generators, subjects, auditors, etc. Various time dimensions - real time, reporting period, event-driven etc. location, business process ) ie. Those will enable the architect to demonstrate how the stakeholder concerns are addressed in Data architecture.

Identify appropriate tools and techniques (including forms) to be used for data capture, modelling and analysis in association with the selected viewpoints. Depending on degree of sophistication warranted, these may comprise simple document or spreadsheets or more sophisticated modelling and techniques such as data management models, data models, etc.

Example of data modelling technique :

- Entity relationship diagram
- Class diagram.

**Determine overall modelling process :** For each view point select the model to support specific view required using selected tools or methods.

If all stakeholders' concerns are not covered create new model to address concerns or augment existing model.

Process of developing data architecture as follows :

- Collect data related models from existing business architecture and application architecture.
- Rationalise data requirement and align with any existing enterprise data catalogs and models this allows the development of a data inventory and entity relationship.
- Update and develop matrices across the architecture by relating data to business service, business function, access rights and applications
- Elaborate data architecture views by examining how data is created, distributed, migrated, secured and archived.

The organisations's data inventory is captured as a catalog within the architecture repository. Catalog are hierarchical in nature and capture a decomposition of a metamodel entity and also decomposition across related models entities (e.g. logical data component -> Physical data component -> data entity)

During business architecture phase, a business service/ information diagram is created showing the key data entities required by main business service. This is pre-requisite to successful data architecture activities.

Using traceability from application to business function to data entity inherent in content framework. It is possible to create an inventory of data needed to be in place to support architecture vision.

The following catalog should be considered for development within data architecture

- ***Data entity/ Data component catalog.***

### **Identify required matrices :**

Matrices show the core relationship between related model entities.

At this stage entity to application matrix could be produced to validate this mapping. How data is created, maintained, transformed and passed to other application or used by other applications will now start to be understood.

***The following matrices should be considered for development within a data architecture :***

- Data entity/Business function (showing which data supports which functions and which business function owns which data)
- Business service / information (developed during the business architecture phase)
- Application /data (developed across the application architecture and data architecture phase)

The following diagram should be considered for development within data architecture :

- Conceptual data diagram
- Logical data diagram
- Data dissemination diagram
- Data lifecycle diagram
- Data security diagram
- Data migration diagram

Develop baseline data architecture description

Develop target data architecture description

Perform gap analysis:

- Perform trade off analysis to resolve conflicts (if any) among different views.
- Validate that the models support the principles, objectives and constraints.
- Note changes to the viewpoint represented in the selected model from the architecture repository
- Test architecture models for completeness against requirements.

Define candidate roadmap components :

Resolve impact across the architecture landscape

At this stage, other architecture artifacts in the Architecture Landscape should be examined to identify:

- Does this Data Architecture create an impact on any pre-existing architectures?
- Have recent changes been made that impact the Data Architecture?
- Are there any opportunities to leverage work from this Data Architecture in other areas of the organisation?
- Does this Data Architecture impact other projects (including those planned as well as those currently in progress)?
- Will this Data Architecture be impacted by other projects (including those planned as well as those currently in progress)?

Finalise the data architecture :

- \* Select standard for each of the building blocks, re-using as much as possible from the reference models selected from architecture repository.
- \* Fully document each building block
- \* Conduct a final cross-check of overall architecture against business requirement , document the rationale for building block decisions in the architecture document.
- \* Document final requirements report.
- \* Document the final mapping of the architecture within the architecture repository from the selected building blocks, identify those that might re-used and publish via the architecture repository.
- \* Finalise all the work products, such as gap analysis.

Create architecture definition document : Document the rationale for building block decisions in architecture definition documents.

- Business data model.
- Logical data model
- Data management process model
- Data Entity / Business function matrix
- Data interoperability requirement (e.g. XML Schema, security, policies)
- If appropriate use reports / or graphics generated by modelling tools to demonstrate key view of architecture, route the document for review by relevant stakeholders and incorporate feedback.

Output :

- Refined and updated version of architecture vision phase deliverables :
  - Statement of architecture work update if necessary
  - Validate data principles or new data principles
- Draft architecture definition document
  - Baseline data architecture
  - Target data architecture
    - Business data model
    - Logical data model
    - Data management process models
    - Data entity / Business function matrix.
  - Views corresponding to selected viewpoints addressing key stakeholder concern
- Draft architecture requirement specification
  - Gap analysis result.
  - Data interoperability requirement.
  - Relevant technical requirement that will apply to this evolution of the architecture development cycle.
  - Constraints of technology architecture about to be designed
  - Updated business requirement if appropriate
  - Updated application requirement if appropriate.
- Data architecture component of an architecture roadmap.

- Output may include some or all of the following:
  - Catalog
    - Data entity / Data component catalog
  - Matrices
    - Data Entity / Business function matrix
    - Application / Data matrix
  - Diagram
    - Conceptual data diagram
    - Logical data diagram
    - Data dissemination diagram
    - Data security diagram
    - Data migration diagram
    - Data lifecycle diagram

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## Approach

### **Data management :**

Considerations include:

A clear definition of which application components in the landscape will serve as the system of record or reference for enterprise master data

- Will there be an enterprise-wide standard that all application components, including software packages, need to adopt?  
(In the main, packages can be prescriptive about the data models and may not be flexible.)
- Clearly understand how data entities are utilised by business functions, processes, and services
- Clearly understand how and where enterprise data entities are created, stored, transported, and reported
- What is the level and complexity of data transformations required to support the information exchange needs between applications?
- What will be the requirement for software in supporting data integration with the enterprise's customers and suppliers (e.g., use of ETL tools during the data migration, data profiling tools to evaluate data quality, etc.)?

**Data migraine :** When an existing application is replaced, there will be a critical need to migrate data (master, transactional, and reference) to the new application. The Data Architecture should identify data migration requirements and also provide indicators as to the level of transformation, weeding, and cleansing that will be required to present data in a format that meets the requirements and constraints of the target application.

### **Data governance :**

- **Structure :** this dimension pertains to whether the enterprise has the necessary organizational structure and the standards bodies to manage data entity aspects of the transformation
- **Management system :** here enterprises should have the necessary management system and data-related programs to manage the governance aspects of data entities throughout its lifecycle
- **People :** this dimension addresses what data-related skills and roles the enterprise requires for the transformation



**Objective :**

Develop target application architecture that enables the Business architecture and Architecture vision, in way to address statement of architecture work and stakeholders concerns.

Identity candidate architecture roadmap component based upon gaps between baseline and target application architecture.

**Input :**

Reference material external to enterprise :

Architecture reference material

Non architecture input :

- Request for architecture work
- Capability assessment
- Communication plan

Architectural Inputs:

- Organisational model for Enterprise architecture
  - Scope of organisations impacted
  - Maturity assessment, gaps and resolution approach
  - Roles and responsibility for architecture team(s)
  - Constraint on architecture work
  - Budget requirement
  - Governance and support strategy
- Tailored architecture framework
  - Tailored architecture method
  - Tailored architecture content (deliverables and artefacts)
  - Configured and deployed tools
- Application principles
- Statement of architecture work
- Architecture vision
- Architecture repository
  - Re-usable building blocks
  - Publicly available reference models
  - Organisation specific reference models
  - Organisation standards
- Draft architecture definition document
  - Baseline business architecture
  - Target business architecture
  - Baseline data architecture
  - Target data architecture
  - Baseline application architecture
  - Target application architecture
  - Baseline technology architecture
  - Target technology architecture.
- Draft architecture requirements specification
  - Gap analysis result (from Business architecture and data architecture, if available)
  - Relevant technical requirements that will apply to this phase.
- Business and data architecture components of architecture roadmap, if available

**Steps :** New application building blocks being introduced as part of this effort will need to be defined in detail during phase C. Existing application building blocks to be carried over and supported in the target architecture environment may already been adequately defined in previous architecture work, if not they will need to be defined in Phase C.

- Select reference model, viewpoints and tools
- Develop baseline application architecture
- Develop target application architecture description
- Perform gap analysis
- Define candidate roadmap component
- Resolve impact across the architecture landscape
- Conduct formal stakeholder review
- Finalise the application architecture
- Create the architecture definition document.

Select relevant architecture resource (reference model, patterns etc) from architecture repository on basis of business drivers the stakeholders and their concerns

Select relevant application architecture viewpoint (for example stakeholders of the application -viewpoints relevant to functional and individual users of application etc) i.e. those that will enable the architect to demonstrate how the stakeholder concerns are being addressed in application architecture.

Recommend process for developing an application architecture is as follows:

- Understand the list of application or application components that are required, based on the baseline application portfolio what the requirements are and the Business architecture scope.
- Simplify complicated application by decomposing them into two or more application.
- Ensure that the set of a application definitions is internally consistent, by removing duplicate functionality as far as possible and combining similar apposition into one.
- Identify logical application and the most appropriate physical applications.
- Develop matrices across the architecture by relating applications to business service, business function, data process etc.
- Elaborate a set of application architecture views by relating application to business service, business function, capturing integration, migration, development and operational concerns.

The organisations' application portfolio is captured as a catalog within the architecture repository. Catalogs are hierarchical in nature and captures a decomposition of a meta model entity and also decompositions across related model entities (e.g. logical application component -> Physical application component -> Information system service)

Following catalog should be considered for development within an application architecture :

- Application portfolio catalog
- Interface catalog.

Matrices show the core relationship between related model entities.

Matrices form the raw material for development of diagrams and also acts as a key resource for impact assessment.

Once the baseline application portfolio has been assembled, it is necessary to map the application to their purpose in supporting the business. The initial mapping should focus on business-service diagram developed during Business architecture.

Following matrices should be considered for development within an Application architecture;

- Application/ Organisation matrix

- Role / Application matrix
- Application interaction matrix
- Application Function matrix

### **Identify required diagram**

Diagram present the application architecture information form a set of different perspective (viewpoints) according to requirement of stakeholders.

Following diagram should be considered for development within application architecture :

- Application communication diagram
- Application and user location diagram
- Enterprise manageability diagram.
- Process / Application realisation diagram
- Application migration diagram
- Software distribution diagram
- Software Engineering diagram
- Application use case diagram

Identify types of requirements to be collected : These requirement may :

- Relate to application domain
- Provide requirements input into data and technology architecture
- Provide detailed guidance to be reflected during design and implementation to ensure that the solution addressed the original architecture requirement.

Resolve impact across architecture landscape : At this stage other architecture artefacts in Architecture landscape should be examined to identify :

- Does this application architecture create an impact on my pre-existing architecture
- Have recent changes been made that impact the application architecture.
- Are there any opportunities to leverage work from this application architecture in other area of the organisation.
- Does this application architecture impact other project (including those planned as well as those currently in progress.
- Will application architecture be impacted by other project (including those planned are well as those currently in progress)

### **Conduct formal stakeholder review.**

#### **Finalise the application architecture :**

- Select standards for each of the building blocks, re-using as much as possible from the reference models selected from the architecture repository.
- Fully document each building block.
- Conduct a final cross-check of overall architecture against business requirements, document the rational for building block decisions in the architecture document.
- Document the final requirement traceability report
- Document the final mapping of architecture within the architecture repository from the selected building block identify those that might be re-used and publish via the architecture repository.
- Finalise all work products, such as gap analysis.

#### **Create the architecture definition document :**

- Document rationale for building block decisions in architecture definition document.
- Prepare the application architecture sections of architecture definition document if appropriate use reports and/ or graphics generated by modelling tools to demonstrate key views of the architecture, route the document for review by repeated stakeholders and incorporate feedback.

**Output :**

- Refined and updated version of architecture vision deliverables, where applicable:
  - Statement of architecture work updated if necessary
  - Validation application principles or new application principles (if generated here)
- Draft architecture definition document
  - Baseline application architecture
  - Target application architecture
  - View corresponding to the selected viewpoints, addressing key stakeholders concern
- Draft architecture requirement specification
  - Gap analysis result
  - Application interoperability requirements
  - Relevant technical requirements that will apply to this evolution of architecture development cycle
  - Constraints on technology architecture about to be designed.
  - Updated business requirements, if appropriate.
  - Updated data requirements if appropriate.
- Application architecture components of an architecture roadmap.

The output may include some or all of the following:

- \* Catalog
  - \* Application portfolio catalog
  - \* Interface catalog
- \* Matrices
  - \* Application / Organisation matrix
  - \* Role/ Application matrix
  - \* Application / Function matrix
  - \* Application interaction matrix.
- \* Diagram:
  - \* Application communication diagram
  - \* Application and user location diagram
  - \* Application use case diagram
  - \* Enterprise manageability diagram
  - \* Process/ Application realisation diagram
  - \* Software engineering diagram
  - \* Application migration diagram
  - \* Software distribution diagram.

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**Technology architecture :**

**Objective :**

- Develop the target technology architecture that enables the architecture vision, target business, data and application building blocks to delivered through technology component and technology service in a way that addresses the statement of architecture work and stakeholders concerns.
- Identify candidate architecture roadmap components based upon gaps between baseline and target technology architecture.

**Input :**

- Reference materials external to Enterprise
  - Architecture reference materials
  - Product information on candidate products.
- Non architecture Inputs
  - Request of architecture work
  - Capability assessment
  - Communication plan

- Architectural inputs:
  - Organisational model for enterprise architecture including:
    - Scope of organisation impacted
    - Maturity assessment, gaps and resolution approach
    - Roles and responsibility of architecture team(s)
    - Budget requirements
    - Governance and support strategy
- Tailored architecture framework
  - Tailored architecture method
  - Tailored architecture content (Deliverables and artefacts)
  - Configured and deployed tools
- Technology principles if existing
- Statement of architecture works
- Architecture vision
- Architecture repository including
  - Re-usable building blocks
  - Publicly available reference model
  - Organisation specific reference models
  - Organisation standard
- Draft architecture definition document
  - Baseline business architecture
  - Target business architecture
  - Baseline data architecture
  - Target data architecture
  - Baseline application architecture
  - Target application architecture
  - Baseline technology architecture
  - Target technology architecture.
- Draft architecture requirements specification
  - Gap analysis (from business, data and application architectures)
  - Relevant technical requirements from previous phase
- Business, data and application architecture component of architecture roadmaps

#### **Steps :**

New technology building blocks being introduced as part of this effort will need to be defined in detail during Phase D. Existing technology building blocks to be supported in target environment may need to be redefined in Phase D to ensure interoperability and fit-for-purpose within this specific technology architecture.

The steps in Phase D are as follows:

- Select reference models, viewpoints and tools
- Develop baseline technology architecture description
- Develop target technology architecture description
- Perform gap analysis
- Define candidate roadmap components
- Resolve impact across the architecture landscape
- Conduct formal stakeholder review.
- Finalise the technology architecture.
- Create the architecture definition document.

**Select reference model, viewpoints and tools :** Review and validate the set of technology principles. These will normally form part of an overarching set of architecture principles Guidelines for developing and applying principles and a sample set of technology principles.

Selecting relevant technology architecture viewpoints that enable the architect to demonstrate how the stakeholder concerns are being addressed in technology architecture.

Identify appropriate tools and techniques to be used for capturing, modelling and analysis in association with selected viewpoints.

**Determine overall modelling process :** for each viewpoint, select the models needed to support the specific view required, using the selected tools or method.

The process to develop a technology architecture incorporate the following steps:

- Define taxonomy of technology services and logical technology components (including standard)
- Identify relevant locations where technology is deployed.
- Carry out a physical inventory of deployed technology and abstract up to fit into the taxonomy.
- Is the technology is place fit-for-purpose to meet the new requirement (ie. Does it meet the functional and non functional requirement)
  - Refine taxonomy
  - Product selection (including dependent products)
- Determine configuration of the selected technology
- Determine impact
  - Sizing and costing
  - Capacity planning
  - Installation / governance / migration impacts.

The area where technology architecture may be impacted will include following :

- Performance : Platform performance should be considered
- Maintainability : If service granularity is too coarse , then introducing changes to that service comes difficult and impacts the maintenance of the service and the platform on which it is delivered.
- Location and latency : Service might interact with each other over remote and inter service communication will have in-built latency. Drawing service boundaries and setting the service granularity should consider platform/location impact of those inter-service communication.
- Availability : Service invocation is subject to network and / or service failure. So high communication availability is an important consideration during service decomposition.

**Identify required catalog of technology building blocks:** Catalog are inventory of core assets of the business. Catalog are hierarchical in nature and capture a decomposition of a meta model entity and also decomposition across related model entities (e.g. technology service -> logical technology component -> physical technology component)

The following catalog should be considered for development within a technology architecture :

- Technology standard
- Technology portfolio.

**Identify required matrix :** Matrix show the core relationship between related model entities. Matrices form the raw material for development of diagrams and also act as a key resource for impact assessment

The following matrix should be considered for development within a technology architecture

- Application / Technology matrix.

Identify required diagram : Diagram presents the technology architecture information from a set of different perspective (viewpoints) according to the requirement of stakeholders.

This activity provides a link between platform requirements and hosting requirements, as a single application may need to be physically located in several environments to support local access, development lifecycles, and hosting requirements.

The following diagrams should be considered for development within a Technology Architecture:

## Environments and Locations diagram

- Platform Decomposition diagram
- Processing diagram
- Networked Computing/Hardware diagram
- Network and Communications diagram

Select Service : The services portfolios are combinations of basic services from the service categories in the defined taxonomy that do not conflict.

**Develop baseline technology Baseline architecture :** Begin by converting the description of the existing environment into the terms of the organisation's taxonomy of technology services and technology components (e.g., the TOGAF TRM). This will allow the team developing the architecture to gain experience and understanding of the taxonomy.

**Develop target technology architecture :** A key process in the creation of a broad architectural model of the target system is the conceptualisation of building blocks. Architecture Building Blocks (ABBs) describe the functionality and how they may be implemented without the detail introduced by configuration or detailed design.

**Perform gap analysis :** Verify the architecture models for internal consistency and accuracy:

- Perform trade-off analysis to resolve conflicts (if any) among the different views
- Validate that the models support the principles, objectives, and constraints
- Note changes to the viewpoint represented in the selected models from the Architecture Repository, and document

Resolve impact across the architecture landscape :

- Does this technology architecture create an impact on pre-existing architecture ?
- Have recent changes been made that impact the technology architecture.
- Are there any technology opportunities to leverage work with this technology architecture in other area of the organisation.
- Does this technology architecture impact other project (including those planned as well those currently in progress)
- Will this Technology architecture be impacted by other project (including those planned as well as those currently in progress).

Create the architecture definition document : Document rationale for building block decision in architecture definition document.

Prepare the technology architecture sections of the architecture definition document, comprising some or all of:

- Fundamental functionality and attributes - semantics, unambiguous including security capability and manageability.
- Dependent building blocks with required functionality and named interface.
- Interface - chosen set, supplied (APIs data formats, protocols, hardware interfaces, standard)
- Map to business / Organisational entities and policies.

## Output

- Refined and updated version of the architecture vision phase deliverables, where they are applicable.
  - Statement of architecture work, updated if necessary.
  - Validated technology principles, or new technology principles (if generated here)
- Data architecture definition document including
  - Target technology architecture
    - Technology component and their relationship to information system.
    - Technology platform and their decomposition, showing the combination of technology required to realise a particular technology "stack"

- Environment and locations - a grouping of the required technology into computing environment (e.g. development, production)
- Expected processing load and distribution of load across technology components
- Physical (network) communication
- Hardware and network communication
- Baseline technology architecture
- View corresponding to selected viewpoint addressing stakeholders concerns
- Draft architecture requirement specification, including such technology architecture requirement as :
  - Gap analysis
  - Requirements output from Phase B and Phase C
  - Updated technology requirement.
- Technology architecture components of architecture roadmap.

The outputs may include some or all of the following :

- Catalog
  - Technology standard catalog
  - Technology portfolio catalog
- Matrices :
  - Application/ technology catalog
- Diagram:
  - Environment and location diagram
  - Platform development diagram
  - Processing diagram
  - Networked computing / Hardware diagram
  - Network and communication diagram

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Phase E : Opportunity and solution.

Objective :

- Generate the initial complete version of architecture roadmap, based upon the gap analysis and candidate architecture roadmap component from Phase B, C and D.
- Determine whether an incremental approach is required and if so identify Transition architecture that will deliver continuous business value.
- Define the overall solution building blocks to finalise the target architecture based on architecture building block (ABB)

Input :

- Reference material external to the Enterprise
  - Architecture reference material
  - Product information
- Non architectural inputs:
  - Request for architecture work
  - Capability assessment
  - Communication plan
  - Planning methodology
- Architectural inputs
  - Organisational model for Enterprise architecture including:
    - Scope of organisations impacted
    - Maturity assessment, gaps and resolution approach
    - Roles and responsibilities for architecture team(s)
    - Constraints of architecture work.
    - Budget requirements
    - Governance and support strategy.
- Governance models and frameworks for:



- Corporate business planning
- Enterprise architecture
- Portfolio, program and project management
- System development / Engineering
- Operations (service)
- Tailored architecture framework, including :
  - Tailored architecture method
  - Tailored architecture content (deliverables and artefacts)
  - Configured and deployed tools
- Statement of architecture work
- Architecture vision
- Architecture repository including :
  - Re-usable building blocks
  - Publicly available reference models
  - Organisation specific reference models
  - Organisation standard.
- Draft architecture definition document, including :
  - Baseline business architecture
  - Target business architecture
  - Baseline data architecture
  - Target data architecture
  - Baseline application architecture
  - Target application architecture
  - Baseline technology architecture
  - Target technology architecture.
- Draft architecture requirement specification, including :
  - Architectural requirements
  - Gap analysis result (From business, data, application and technology architecture )
  - IT service management requirements
- Change request for existing business programs and project
- Candidate architecture roadmap component.

Steps : All activities that have been initiated in these steps must be closed during the create the Architecture roadmap and implementation and Migration plan step.

- Determine / Confirm key corporate change attribute
- Determine business constraints for implementation
- Review and consolidate gap analysis result from Phase B and D.
- Review consolidated requirements across related business functions.
- Consolidate and reconcile interoperability requirement
- Refine and validate dependencies
- Confirm readiness and risk for business transformation.
- Formulate implementation and migration strategy.
- Identify and group major work packages
- Identify transition architecture.
- Create the architecture roadmap and implementation and migration plan

**Determine / Confirm key corporate change attributes** : this step determines how the Enterprise architecture can be best implemented to take advantage of organisation's business culture. This should include the creation of an **Implementation Factor assessment and Deduction matrix** to serve as a repository for architecture implementation and migration discussion. This step also includes assessment of the transition capabilities of the organisation unit involved (including culture and abilities) and assessments of the enterprise (including culture and skill sets)

**Determine business constraints for implementation** : Identify any business drivers that would constraint the sequence of implementation. This should include a review of business and strategic plans at both a corporate and line-of- business level and review of Enterprise architecture maturity assessment.

**Review and consolidate gap analysis results from Phase B to D** : Consolidate and integrate the gap analysis result from the Business, Information Systems and Technology architecture and assess their implications with respect to potential solutions and inter-dependencies. **This should be done by creating consolidated Gap, Solutions and Dependencies matrix.**

Business Interaction matrix, the Data Entity/ Business function matrix and application / function matrix to completely relate elements from different architectural domains.

Rationalise the consolidated Gaps, Solutions and dependencies matrix. Once all of the gaps have been documented, re-organise the gap list and place similar items together. When grouping the gaps, refers to the implementation Factor assessment and Deduction matrix and review the implementation factors. Any additional factors should be added to the Implementation Factor Assessment and Deduction matrix.

**Review Consolidated Requirements across related Business Function** : Assess the requirements, gaps, solutions and factors to identify a minimal set of requirements whose integration into work package would lead to a more efficient implementation of target architecture across the business functions that are participating in architecture. This functional perspective leads to the satisfaction of multiple requirements through the provision of shared solution and services.

**Consolidate and Reconcile interoperability requirements** : The architecture vision and target architectures, as well as the Implementation factor assessment and deduction matrix and consolidated gaps, solution and dependencies matrix should be consolidated and reviewed to identify any constraints on interoperability required by the potential set of solutions.

There are two basic approaches to interoperability conflicts, either create a building block that transforms or translates between conflicting building blocks or make a change to the specification of the conflicting building blocks.

**Refine and validated dependences** : Ensuring that any constraints on the Implementation and Migration plans are identified. There are several key dependencies that should be taken into account, such as dependencies on existing implementation of Business services and Information System service or changes to them.

**Confirm Readiness and risk for Business transformation** : Review the finding of the business transformation readiness assessment previously conducted in Phase A and determine their impact on the architecture roadmap and the implementation and migration strategy.

**Formulate implementation and Migration strategy** : Create an overall implementation and Migration strategy that will guide the implementation of the Target Architecture and structure any Transition architectures. The first activity is to determine an overall strategic approach to implementing the solution and / or exploiting opportunities. There are three basic approach as follows:

- Green field : A completely new implementation
- Revolutionary : A radical change (ie. Switch on , switch off)
- Evolutionary : A strategy of convergence, such as parallel running or a phased approach to introduce new capabilities.

Next, determine an approach for the overall strategic direction that will address and mitigate the risk identified in the consolidated gaps, Solutions, and dependencies matrix. The most common implementation methodologies are :

- Quick Win (Snapshot)
- Achievable targets
- Value chain method.

Identify and Group major work packages : Key stakeholders, planners and Enterprise architecture should assess the missing business capabilities identified in the Architecture vision and Target architecture. Using the consolidated Gaps, Solutions and Dependencies matrix together with the implementation factor assessment and deduction matrix, logically group the various activities into work packages.

Identify transition architecture : Where the scope of change to implement the Target Architecture requires an incremental approach, then one or more Transition architectures may be necessary. These provide an ability to identify clear targets along the roadmap to realising the Target architecture. Transition architecture should provide measurable business value.

Development of Transition architecture must be based upon the preferred Implementation approach, the consolidated Gaps, Solutions, and Dependencies matrix, the listing of projects and portfolios as well as the enterprise's capacity for creating and absorbing change.

Create the architecture roadmap and implementation and migration plan : Consolidate the work packages and transition architecture into the Architecture roadmap, which describes a timeline of the progression from the baseline architecture to the target architecture. The timeline informs the Implementation and Migration plan. The architecture roadmap frames migration planning in Phase F.

The Implementation and Migration plan must demonstrate the activity necessary to realise the Architecture Roadmap.

Outputs :

- Refined and updated version of architecture vision phase deliverables, where applicable, including:
  - Architecture vision, including definition of types of degree of interoperability
  - Statement of architecture work, updated if necessary
- Draft architecture definition document
  - Baseline Business architecture
  - Target Business architecture
  - Baseline data architecture
  - Target data architecture
  - Baseline application architecture
  - Target application architecture
  - Baseline technology architecture
  - Target technology architecture
  - Transition architecture
  - View corresponding to the selected viewpoints addressing key stakeholder concerns.
- Draft architecture requirement specification including:
  - Consolidated gaps, solutions and dependencies assessment
- Capability assessments, including:
  - Business capability assessment
  - IT capability assessment.
- Architecture Roadmap, including :
  - Work package portfolio:
    - Work package description (name, description , objectives)
    - Functional requirement
    - Dependencies
    - Relationship to opportunity
    - Relationship to architecture definition document and architecture requirement specification
    - Relationship to any capability increments
    - Business value
    - Implementation factor assessment and Deduction matrix.
    - Impact
      - Identification of Transition architecture, if any including:
        - Relationship to architecture definition document
  - Implementation and recommendation
    - Criteria measures of effectiveness

- Risk and Issues
- Solution building blocks (SBBs)
- Implementation and migration plan, including:
  - Implementation and migration strategy.

Diagram:

- Project context diagram
- Benefit diagram.

Approach : Phase E concentrates on how to deliver architecture. It takes into account the complete set of gaps between Target and Baseline architecture in all architecture domains, and logically groups changes into work packages within the enterprise's portfolios. This is an effort to build a best-fit roadmap that is used upon the Stakeholders' requirement, the enterprises business transformation readiness, identified opportunities and solutions and identified implementation constraints.

Following four concepts are key to transitioning from developing to delivering a Target architecture :

- Architecture roadmap
- Work package
- Transition architectures
- Implementation and Migration plan

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## Phase F : Migration planning

Objectives :

- Finalise the architecture roadmap and supporting implementation and migration plan
- Ensure that the implementation and Migration plan is co-ordinated with the enterprise's approach to managing and implementing change in enterprise's overall change portfolio.
- Ensure that the business value and cost of work packages and transition architecture is understood by key stakeholders.

Inputs :

- Reference material external to enterprise : Architecture reference material
- Non architectural input :
  - Request for architecture work
  - Capability assessment
  - Communication plan
- Architectural inputs :
  - Organisational model for enterprise architecture including:
    - Scope of organisations impacted
    - Maturity assessment gaps, and resolution approach
    - Roles and responsibilities for architecture team (s)
    - Constraints on architecture work
    - Budget requirements
    - Governance and support strategy.
- Governance model and frameworks for:
  - Corporate business planning
  - Enterprise architecture
  - Portfolio, Programs, Project management

- System Development / Engineering
- Operations (Service)
- Tailored architecture framework, including :
  - Tailored architecture method
  - Tailored architecture content (deliverables and artefacts)
  - Configured and deployed tools
- Statement of architecture work
- Architecture vision
- Architecture repository, including :
  - Re-usable building blocks
  - Publicly available reference models
  - Organisation - specific reference models
  - Organisation standards
- Draft architecture definition document including :
  - Baseline business architecture
  - Target business architecture
  - Baseline data architecture
  - Target data architecture
  - Baseline application architecture
  - Target application architecture.
  - Baseline technology architecture
  - Target technology architecture
  - Transition architecture, if any.
- Draft architecture requirement specification, including :
  - Architecture requirements
  - Gap analysis result ( from business, data, application and technology architecture)
  - IT Service management requirement.
- Change requirement for existing business program and projects
- Architecture roadmap, including:
  - Identification of work package
  - Identification of transition architectures
  - Implementation Factor assessment and Deduction matrix.
- Capability assessment, including :
  - Business capability assessment
  - IT capability assessment
- Implementation and Migration plan, including high level Implementation and Migration Strategy.

Steps : The steps in Phase F are as follows:

- Confirm management framework interaction for Implementation and Migration plan
- Assign a business value to each work package
- Estimate resource requirement, project timing and availability / delivery vehicle
- Prioritise the migration projects through the conduct of 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 lesson learned.

**Confirm Management Framework Interactions for the Implementation and Migration plan :** This step is about co-ordinating the Implementation and Migration plan with Management framework with the organisation. There are typically four management frameworks that have to work closely together for the Implementation and Management plan to succeed

- Business Planning : that conceives, directs and provides the resources for all of the activities required to achieve concrete business objectives/ outcomes.
- Enterprise architecture : that structures and gives context to all enterprise activities delivering concrete business outcomes preliminary but not exclusively in IT domain.

- Project / Portfolio management : that co-ordinates, design and build the business systems that delivers the concrete business outcomes.
- Operations Management : that integrates, operates, and maintains the deliverables that deliver the concrete business outcomes.

Assign a Business value to each work package : The intent of this step is to first establish what constitutes business value within the organisation, how value can be measure, and then apply this to each one of the projects and project increments.

There are several issues to address in this activity :

- Performance evaluation criterial : Are used by portfolio and capability managers to approve and monitor the progress of architecture transformation..
- Return on investment Criteria : Have to be detailed and signed off by the various executive stakeholders.
- Business value : has to be defined as techniques, such as the value chain, which are to be used to illustrates the role in achieving tangible business outcomes. Business value will be used by Portfolio and Capability managers to allocate resource and in case where there is cutbacks, business value in conjunction with return on investment can be used to determine whether an endeavour proceeds is delayed or is cancelled.
- Critical Success Factors (CSF) : Should de established to define success for a project and / or project increment . This will provide managers and implementors with a gauge as to what constitutes a successful implementation.
- Measure of Effectiveness (MOE) : are often performance criteria and may corporations include them in the CSFs. Where they are treated discreetly, it should be clear as to how these criteria to be grouped.
- Strategic fit : Based on overall Enterprise architecture (all tier) will be the critical factor for allowing the approval of any new project or initiative and for determining the value of any delivery.

Estimate Resource requirements, Project timing and Availability/ Delivery vehicle :

Prioritise the Migration projects through the conduct of 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 lesson learned.

Outputs :

- Implementation and Migration plan, including
  - Implementation and migration strategy
  - Project and portfolio breakdown of implementation
    - Allocation of work package to project and portfolio
    - Capabilities delivered by projects
    - Relationship to Target architecture and any Transition architectures.
    - Milestone and Timing
    - Work breakdown structure.
- Project charters (Optional)
  - Related work packages
  - Business value.
  - Risk, issues, assumptions, dependencies
  - Resource requirement and costs
  - Benefit of Migration
  - Estimated cost of migration options
- Finalise architecture definition document including : finalise transition architecture
- Finalise architecture requirement specification
- Re-usable architecture building blocks
- Request for architecture work for a new iteration of the ADM cycle
- Implementation governance model (if any)
- Change request for architecture capability arising from lesson learned.

Phase E provides an incomplete Architecture Roadmap and Implementation and Migration Plan that address the Statement of Architecture Work. In Phase F this Roadmap and the Implementation and Migration Plan

are integrated with the enterprise's other change activity.

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## Phase G: Implementation Governance

### Objective :

- Ensure conformance with Target architecture by implementation projects
- Perform appropriate Architecture governance function for the solution any implementation driven architecture change requests.

### Inputs :

- Reference material external to enterprise
- Non architectural inputs :
  - Request for architecture work
  - Capability assessment
- Architectural input
  - Organisational model for Enterprise architecture
  - Tailored architecture framework
  - Statement of architecture work
  - Architecture vision
  - Architecture repository
    - Re-usable building blocks
    - Publicly available reference models
    - Organisation specific reference model
    - Organisation standards
  - Architecture definition document
  - Architecture requirement specification including
    - Architectural requirements
    - Gap analysis result
  - Architecture roadmap
  - Implementation governance model
  - Architecture contract
  - Request for architecture work identified during phase E and F.
  - Implementation and Migration plan

### Steps :

- Confirm scope and priorities for deployment with development management
- Identify deployment resource and skill
- Guide development of solution deployment
- Perform Enterprise architecture compliance reviews.
- Implement Business and IT operations
- Perform post implementation review and close implementation.

### Confirm scope and prioritise for deployment with Development Management :

- Review migration planning outputs and produce recommendations on deployment.
- Identify Enterprise architecture priorities for development teams.
- Identify deployment issues and make recommendation.
- Identify building blocks for replacement, update etc.
- Perform gap analysis on Enterprise architecture and Solution framework.
- Produce gap analysis report

Identify deployment resources and skills : The project resources will include the development resource which will need to be educated in the overall Enterprise Architecture deliverable and expectations from the specific development and implementation project.

The following considerations should be addressed in this step:

- Identify system development method required for solutions development
- Ensure that the systems development method enables feedback to the architecture team on design.

Guide development of Solution Deployment :

- Formulate project recommendation
- Document architecture contract
- Update Enterprise continuum directory and repository for solutions
- Guide development of business and IT operating model for services
- Provide service requirements derived from Enterprise Architecture
- Guide definition of business and IT operation requirements
- Carry out gap analysis between the Solution Architecture and Operations.
- Produce Implementation plan.

Perform Enterprise architecture compliance reviews:

- Review ongoing implementation governance and architecture compliance for each building block.
- Conduct post-development review
- Close development part of deployment projects.

Implement Business and IT operations:

- Carry out the deployment projects including : IT service delivery implementation, business service delivery implementation, skill development and training implementation, communication documentation publication.
- Publish new baseline architectures to the Architecture repository and update other impacted repositories, such as operational configuration management stores.

Perform post implementation review and close implementation :

- Conduct post implementation reviews
- Publish review and close projects

Outputs:

- Architecture contract (signed)
- Compliance assessment
- Change request
- Architecture compliant solution deployed including:
  - The architecture compliant implemented system
  - Populated architecture repository
  - Architecture compliance recommendation and dispensation.
  - Recommendation on performance metrics.
  - Service level agreement (SLAs)
  - Architecture vision, update post implementation.
  - Architecture definition document, updated post implementation
  - Business and IT operating models for the implemented solutions.

Approach :

- Establish an Implementation program that will enable the delivery of the Transition architectures agreed for implementation during the Migration planning phase.
- Adopt a phased deployment schedule that reflects the business priorities embodied in the Architecture roadmap.
- Follow the Organisation's standard for corporate, IT and Architecture governance.



- Use the organisation's established portfolio/ program management approach, where this exists.
- Define an operations framework to ensure the effective long life of the deployed solutions.

Project details are developed, including:

- Name, description and objectives
- Scope, deliverables and constraints
- Measures of effectiveness
- Acceptance criteria
- Risks and issues.

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#### Phase H : Architecture Change management :

Objectives :

- Ensure that the architecture lifecycle is maintained
- Ensure that the architecture governance framework is executed
- Ensure that the Enterprise architecture capability meets current requirements.

Inputs :

- Reference material external to the Enterprise
- Non architectural inputs: Request for architecture work
- Architectural inputs :
  - Organisational model for Enterprise architecture, including:
    - Scope of organisations impacted
    - Maturity assessment, gaps and resolution approach
    - Roles and responsibilities for architecture team(s)
    - Budget requirements
    - Governance and Support strategy
    -
  - Tailored architecture framework including
    - Tailored architecture method
    - Tailored architecture content (deliverables and artefacts)
    - Configured and deployed tools
  - Statement of architecture work
  - Architecture vision
  - Architecture repository, including:
    - Re-usable building blocks
    - Publicly available reference models
    - Organisation specific reference models
    - Organisation standard.
- Architecture definition document
- Architecture requirement specification, including:
  - Gap analysis result (from business, Data , application and technology architecture)
- Architecture roadmap
- Change request - business changes
- Change request - from lesson learned
- Implementation governance
- Architecture contract (signed)
- Compliance assessment
- Implementation and Migration plan.

Steps:

- Establish value realisation process
- Deploy monitoring tools

- Manage risks
- Provide analysis for architecture change management
- Develop change requirements to meet performance targets
- Manage governance process
- Activate the process to implement change

Establish value realisation process : Influence business project to exploit the Enterprise Architecture for value realisation (outcomes)

Deploy monitoring tools :

- Monitor technology changes which could impact the Baseline architecture
- Monitor business change which could impact baseline architecture.
- Business value tracking e.g. investment appraisal method to determine value metrics for the business objectives.
- Monitor Enterprise architecture capability maturity.
- Track and assess asset management programs
- Track the QoS performance and usage.
- Determine and track business continuity requirements.
- 

Manage risk : Manage Enterprise architecture risk and provide recommendations for IT strategy.

Provide analysis for Architecture change management :

- Analyse performance
- Conduct Enterprise architecture performance reviews with service management.
- Assess change requests and reporting to secure that the expected value realisation and SLA expectation of the customers are met.
- Undertake a gap analysis of the performance of Enterprise architecture.
- Ensure change management requests adhere to Enterprise architecture governance and framework.

Develop change requirements to meet Performance target. : make recommendation on change requirements to meet performance targets and development of position to act.

Manage governance process :

- Arrange meeting of Architecture board (or other governing council)
- Hold meeting of architecture board with the aim of meeting to decide on handling change (technology and business and dispensations)

Activate the process to implement change:

- Produce new request for architecture work and request for investment
- Ensure any changes implemented in this phase are captured and documented in the Architecture repository.

Outputs :

- Architecture updates (for maintenance changes)
- Changes to architecture framework and principles (for maintenance changes)
- New request for architecture work, to move to another cycle (for major changes)
- Statement of architecture work, updated if necessary.
- Architecture contract, updated if necessary.
- Compliance assessment, updated if necessary.

Approach : The goal of architecture change management process is to ensure that the architecture achieves its original target business value. This includes managing changes to the architecture in a cohesive and architected way.

This process will typically provide for the continual monitoring of such things as governance request, new development in technology, and changes in the business environment. When changes are identified change management will determine whether to formally initiate a new architecture evolution cycle.

Capacity measurement and recommendation for planning are a key aspect of this phase. While the architecture has been built to deliver a steady state business architecture with agreed capacity during the lifecycle of this enterprise architecture, the growth or decline in usage needs to be continually assessed to ensure that maximum business value is achieved.

The value and change management process, once established will determine :

- The circumstance under which the Enterprise architecture or part of it, will be permitted to change after deployment and process by which that will happen
- The circumstance under which the architecture development cycle will be initiated again to develop a new architecture.

Driver for change : The main purpose for the development of Enterprise architecture so far has been strategic direction and top-down architecture and project generation to achieve corporate capabilities.

There is also probably forever for change which often bottom-up, based upon modifying the existing infrastructure to enhance functionality. Enterprise architecture changes this paradigm by strategic top-down approach to a degree although the delivery of increments make the equation more complex.

There are three ways to change existing infrastructure that have been integrated;

- Strategic top-down directed change to enhance or create new capability
- Bottom up changes to correct or enhance capability (operations and maintenance ) for infrastructure under operation management.
- Experience with previously delivered project increments in the care of operation management but still being delivered by ongoing projects.

Architecture board assesses and approves Request for Change (RFC) is typically in response to known problem but can also include improvements.

In addition, there are many technology related drivers for architecture change request. For example:

- new technology report
- Asset management cost reductions
- Technology withdrawals
- Standard initiatives.

In addition, there are business driver for architecture change including :

- Business as usual development
- Business exceptions
- Business innovations
- Business technology innovations
- Strategic change.

Enterprise architecture change management process needs to determine how changes are to be managed, what technologies are to be applied and what methodologies used. The process also needs a filtering function that determines which phases of architecture development process are impacted by requirements. For example changes that affect only migration may be of no interest in architecture development phase.

There are many valid approaches to change management and various management techniques and methodologies that can be used to manage change. For example project management method such as PRINCE2, Service management framework such as ITIL, management consultancy method such as catalyst and many others.

The approach is based classifying required architectural change into one of three categories. :

- Simplification change : A simplification change can be normally be handled via change management techniques.

- Incremental change : An incremental change may be capable of being handled via change management technique or it may require partial re-architecting depending on the nature of change.
- Re-architecting change : A re-architecting change require putting the whole architecture through the architecture development cycle again.

Another way of looking at these three choices is to say that simplification change to an architecture is often driven by a requirement to reduce investment,  
Incremental change is driven by a requirement to derive additional value from existing investment.  
Re-architecting change is driven by requirement to increase investment in order to create a new value of exploitation.

Guidelines for maintenance versus architecture design;

- If the change impact two stakeholder or ore then it is like to require an architecture redesign and re-entry to the ADM
- If the change impacts only one stakeholder, then it is more likely to be a candidate for change management.
- If the change can be allowed under a dispensation, then it is more likely to be a candidate for change management.

For example ;

- If the impact is significant for the business strategy the there may be a need to redo the whole EA thus re-architecting approach.
- If a new technology or standard emerge then there may be need to refresh the Technology architecture but not whole EA thus incremental change.
- If the change is at infrastructure level - for example ten systems reduced or changed to one system thus this may not change the architecture above the physical layer but it will change the Baseline description of technology architecture this would be a simplification change via change management.

## **ADM Architecture Requirement management**

Objective :

- Ensure that the requirements management process is sustained and operates for all relevant ADM Phase.
- Manage architecture requirements identified during any execution of the ADM cycle for a phase.
- Ensure that relevant architecture requirements are available for use by each phase as the phase is executed.

Inputs :

- A populated architecture repository
- Organisational model for EA
  - Scope of organisation impacted
  - Maturity assessment, gaps and resolution approach
  - Roles and responsibilities for architecture team(s)
  - Constraint on architecture work
  - Budget requirement
  - Governance and support strategy.
- Tailored architecture framework
  - Tailored architecture method
  - Tailored architecture content (deliverables and artefacts)
  - Configured and deployed tools.
- Statement for architecture work
- Architecture vision
- Architecture requirements, populating an architecture requirements specification
- Requirements impact assessment.

Steps :

	Requirement management step	ADM Phase step
Step1		Identify/ Document requirements use business scenario or an analogous technique
Step 2	Baseline requirement a. Determine priorities arising from current phase of ADM b. Confirm stakeholder by-in to resultant priorities c. Recorded requirement priorities and place in architecture requirement repository	
Step3	Monitor baseline requirements	
Step 4		Identify change requirements: a. Remove or re-asses priorities b. Add requirement and re-assess priorities. c. Modify existing requiriement.
Step 5	Identify changed requirements and record priorities: a. Identify changed requirements and ensure the requirements are prioritised by the architects responsible for current phase and by relevant stakeholders. b. Record new priorities c. Ensure that any conflict are identified and managed through the phase to a successful conclusion and prioritisation. d. Generate requirement impact statement for steering the architecture team.	
Step6		a. Assess impact of changed requirements on current (active) phase b. Assess impact of changed requirement in previous phases. c. Determine whether to implement change or defer to later ADM cycle if decision is to impediment, assess timescale for change management implementation d. Issue requirement impact statement, Version n + 1
Step 7		Implement requirements arising from Phase H The architecture can be changed throughout its lifecycle by architecture change management (Phase H) The requirement management process ensures that a new or changing requirements that are derived from Phase H are managed accordingly
Step 8	Update the architecture requirement repository with information relating to the changes requested, including stakeholder view affected	
Step 9		Implement change in the current phase

	Requirement management step	ADM Phase step
Step 10		<p>Assess and revise gap analysis for phase phases</p> <p>The gap analysis in the ADM Phase B through D identifies the gap between baseline and target architecture. Certain type of gap can give rise to gap requirements</p> <p>The ADM describes two kind of gaps:</p> <ul style="list-style-type: none"> <li>- Some thing that is present in the baseline and not in the target (i.e. eliminated - by accident or design)</li> <li>- Something not in the baseline, but present in target (i.e. new)</li> <li>-</li> </ul>

Output :

- Requirements impact assessment
- Updated architecture requirement specification, if necessary.

When new requirement arises, or existing ones are changed, a Requirement Impact Statement is generated which identifies the phases of the ADM that need to be revisited to address the changes.

Approach : Requirements management process itself does not dispose of , address or prioritise any requirements, this done within the relevant phase of the ADM. It is merely the process of managing requirements throughout the overall ADM.

Requirement Development : The first high level requirements are articulated as part of the Architecture vision, generated by means of the Business Scenario or analogous technique.

Each phase in ADM, from Preliminary to Phase H must select the approved requirements for that phase as held in the Architecture requirement repository and Architecture requirement specification.

During phase execution new requirements generated for future architecture work within the scope of current architecture work needs to be documented within the architecture requirement specification and new requirements which is outside of scope of current statement of architecture work must be input to the Architecture requirement repository for management through the Requirement management process.

Relevant phase of ADM architect should identify types of requirements that must be met by architecture, including applicable;

- Functional requirements
- Non Functional requirements.

When identifying requirements the architect should take into account:

- Assumptions for requirements
- Constraints for requirements
- Domain specific principles that derive requirement
- Policies affecting requirements
- Standards that requirements must meet
- Organisation guidelines for requirements.
- Specification for requirements.

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## **ADM Guidelines and techniques:**

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- Guidelines included within this part are as follows:
  - 1 Applying iteration to the ADM, discusses the concepts of iteration and shows potential strategies for applying iterative concepts to ADM.
  - 1 Applying ADM across the Architecture landscape discuss different types of architecture type of architecture engagement that may occur at different level of enterprise

Technique for Architecture development :

- 1 **Architecture principles** : Principles for the use and deployment of IT resource across enterprise - describe how to develop the set of general rules and guidelines for architecture being developed.
- 1 **Stakeholder management** : Describe stakeholder management and important discipline that successful architecture practitioner can use to win support for their project
- 1 **Architecture pattern** :
- 1 **Gap analysis** : Describe technique known as gap analysis, it is widely used in TOGAF ADM to validate architecture that is being developed.
- 1 **Migration planning technique** : Describes a number of techniques to support migration planning in Phase E And Phase F
- 1 **Interoperability requirement**:
- 1 **Business transformation readiness assessment** : describes a technique for identifying business transformation issues.
- 1 **Risk management** : Describe technique for managing risk during architecture/business transformation project
- 1 **Capability based planning** : describe the technique of capability based planning.

Architectural style differs in terms of focus, form, technique, material, subject and time period.

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

For example, the open group definition of SOA identifies the following distinctive feature :

- 1 It is based on the design of the service - which mirror real world business activities - comprising the enterprise (or inter enterprise ) business process.
- 1 Service representation utilizes business description to provide context (i.e. business process, goal, rule, policy, service interface, and service component) and implements service using service orchestration.
- 1 It places unique requirement on the infrastructure : it is recommended that implementation use open standard to realise interoperability and location transparency
- 1 **Implementation are environment specific : they are constrained or enabled by context and must be described within that context.**

Second step is determining how these distinctive feature will be addressed.

In Phase B, C, and D the practitioner is supposed to select relevant architecture resource, including model, viewpoint and tools to properly describe the architecture domain and demonstrate that stakeholder concern are addressed.

Depending upon distinctive features different architectural style will add new element that must be described, highlight existing elements, adjust the notation used to describe the architecture and focus the architecture on some stakeholder or stakeholder concern

Addressing the distinctive features will usually include extensions to the Architecture Content Metamodel and the use of specific notation or modelling techniques and the identification of viewpoints.

- Note : View point is nothing but a template, diagram we create architecture view out of that when we fill those template.

Chapter 18:

In practice, two key concepts are used to manage the complexity of developing an Enterprise Architecture and managing its lifecycle — iteration and levels

The ADM supports a number of concepts that are characterized as iteration. First iteration describe the process of both describing

## Chapter 18 : Applying Iteration to the ADM

In practice two key concepts are used to manage the complexity of developing EA and manage its lifecycle - iteration and levels.

ADM Supports a number of concepts that are characterized as iteration.

First iteration describes the process of both describing a comprehensive architecture landscape though multiple ADM Cycle based upon individual initiatives bound to scope of Request for architecture of work.

Second iteration describes the integration process of developing an architecture where the activities described in different ADM phases to interact to produce an integrated architecture.

Third iteration describes the process of managing change to the organization's architecture capability.

Iteration to develop a comprehensive Architecture landscape:

- Project will exercise through the entire ADM Cycle, commencing with Phase A - Each cycle of ADM will be bounded by "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 cycle concurrently, with relationship between different project.
- One project may trigger initiation of another project.

Iteration within an ADM Cycle (Architectural development Iteration):

- Project may operate multiple ADM phases concurrently. : Typically this is used to manage the inter relationship between Business architecture, information system architecture and Technology architecture.
- Project may cycle between ADM Phases, in planned cycle 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.
- Project may return to previous phase in order to circle back and update work products with new information. : Typically this is used to converge on an executable architecture road map or



implementation and governance plan, when implementation detail and scope of change trigger a change or re-prioritisation of stakeholder's requirement.

Iteration to manage the architecture capability (**Architectural Capability Iteration**) :

- Projects may require a new iteration of Preliminary phase to (re) - establish aspects of the architecture capability identified in Phase A to address a request for Architecture work.
- Project may require new iteration of Preliminary phase to adjust the organization's architecture capability as a result of identifying new or changed requirement for architecture capability as a result of a "Change request" in phase H

Iteration cycles:

- Architecture capability : Iteration support the creation and evolution of the required architecture capability.

This include the initial mobilization of architecture activity for a given purpose or architecture engagement type by establishing or adjusting the architecture approach, principle, scope, vision and governance.

- Architecture development : Iteration allow the creation of architecture content by cycling through or integrating **Business, Information system, and Technology architecture** phase.

These iteration ensure that architecture is considered as a whole. In this type of iteration stakeholder reviews are typically broader. As the iteration converge on a target, extension into the Opportunity and Solution and Migration planning phases ensures that the architecture's implement ability is considered as the architecture finalised.

- Transition planning : Iteration support the creation of formal change roadmap for defined architecture.
- Architecture Governance : Iteration support governance of change activity progressing towards a defined Target Architecture.

Classes of Architecture Engagement : An architecture function or service organization may be called upon to assist an enterprise in a number of different context as the architectures developed can range from summary to detail, broad to narrow coverage and current state to future state.

Typically there are three areas of engagement for architects:

- **Identification of Required change** : Outside the context of any change initiative, architecture can be used as a technique to provide visibility of IT capability in order to support strategic decision making and alignment of execution.
- **Definition of change** : Where definition of change has been identified, architecture can be used as technique to define the nature and extent of change in structured fashion

Within largescale change initiatives, architecture can be developed to provide detailed architecture definition for change initiatives that are bounded by the scope of program or portfolio.

- **Implementation of Change** : Architecture at all levels of enterprise can be used as a technique to provide design governance to change initiatives by providing big-picture visibility, supplying structural constraints and defining criteria on which to evaluate technical decision.

Approaches for Architecture development:

- **Baseline first** : in this style, an assessment of the baseline landscape is used to identify problem area and improvement opportunities.

This process is most suitable when the baseline is complex, not clearly understood or agreed upon. This approach is common where organisational unit have had high degree of autonomy.

- **Target first** : In this style, the target solution is elaborated in detail and then mapped back to the baseline in order to identify change activity.

This process is suitable when target state is agreed at high level and where enterprise wishes to effectively transition to target model.

Iteration consideration : Some iteration cycle can be executed once, whereas other have a natural minimum number of cycles. For some iteration cycles, each iteration follows the same process where there is more than one iteration within a cycle, the process differs slightly for each of iteration.

Iteration between ADM Cycle : Each iteration completes an ADM cycle at a single level of Architecture description. This approach of ADM uses Phase F (Migration planning) to initiate new more detailed architecture development project.