

# TOGAF 9.1

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# Welcome!

This presentation is for you if:

- ▶ Want to know what TOGAF is and what its all about.
- ▶ Have gone through the training and are now studying to write the exams.

Lets get started:



# TOGAF 9.1 Parts

- ▶ Part I - Introduction
- ▶ Part II - The ADM
- ▶ Part III - ADM Guidelines and Techniques
- ▶ Part IV - Architecture Content Framework
- ▶ Part V - Enterprise Continuum and Tools
- ▶ Part VI - Reference Models
- ▶ Part VII - Architecture Capability Framework

# What is TOGAF?

- ▶ TOGAF is an architecture framework - The Open Group Architecture Framework.
- ▶ TOGAF is a tool for assisting in the acceptance, production, use, and maintenance of enterprise architectures.
- ▶ The first version of TOGAF, developed in 1995, was based on the US Department of Defense Technical Architecture Framework for Information Management (TAFIM).
- ▶ The key to TOGAF is the method - the TOGAF Architecture Development Method (ADM) - for developing an enterprise architecture that addresses business needs.

# What is Architecture in the Context of TOGAF?

In TOGAF, “architecture” has two meanings depending upon the context:

1. A formal description of a system, or a detailed plan of the system at a component level to guide its implementation.
2. The structure of components, their inter-relationships, and the principles and guidelines governing their design and evolution over time.

# Key Terms

- ▶ **Activity:** A task or collection of tasks that support the functions of an organization; for example, a user entering data into an IT system or traveling to visit customers.
- ▶ **Application :**A deployed and operational IT system that supports business functions and services; for example, a payroll. Applications use data and are supported by multiple technology components but are distinct from the technology components that support the application.
- ▶ **Application Architecture :** A description of the major logical grouping of capabilities that manage the data objects necessary to process the data and support the business.
- ▶ **Building Block :**Represents a (potentially re-usable) component of business, IT, or architectural capability that can be combined with other building blocks to deliver architectures and solutions.
- ▶ **Architecture Building Block (ABB) :**A constituent of the architecture model that describes a single aspect of the overall model.
- ▶ **Business Architecture :**The business strategy, governance, organization, and key business processes information, as well as the interaction between these concepts.
- ▶ **Architecture Principles :**A qualitative statement of intent that should be met by the architecture. Has at least a supporting rationale and a measure of importance.

# Key Terms

- ▶ **Architecture Continuum** :A part of the Enterprise Continuum. A repository of architectural elements with increasing detail and specialization. This Continuum begins with foundational definitions such as reference models, core strategies, and basic building blocks. From there it spans to Industry Architectures and all the way to an organization's specific architecture.
- ▶ **Architecture Development Method (ADM)** :The core of TOGAF. A step-by-step approach to develop and use an enterprise architecture.
- ▶ **Architecture Domain** :The architectural area being considered. There are four architecture domains within TOGAF: Business, Data, Application, and Technology.
- ▶ **Architecture Framework** :A foundational structure, or set of structures, which can be used for developing a broad range of different architectures. It should contain a method for designing an information system in terms of a set of building blocks, and for showing how the building blocks fit together. It should contain a set of tools and provide a common vocabulary. It should also include a list of recommended standards and compliant products that can be used to implement the building blocks.

# Key Terms

- ▶ **Architecture View** : A view is a representation of a system from the perspective of a related set of concerns. A view is what you see (or what a stakeholder sees). Views are specific.
- ▶ **Architecture Viewpoint**: where you are looking from; the vantage point or perspective. Viewpoints are generic. A model (or description) of the information contained in a view.
- ▶ **Architecture Vision** : A high-level, aspirational view of the Target Architecture. / A phase in the ADM which delivers understanding and definition of the Architecture Vision /Level of granularity of work to be done.
- ▶ **Baseline** :A specification that has been formally reviewed and agreed upon, that thereafter serves as the basis for further development or change and that can be changed only through formal change control procedures or a type of procedure such as configuration management.
- ▶ **Baseline Architecture** :The existing defined system architecture before entering a cycle of architecture review and redesign.

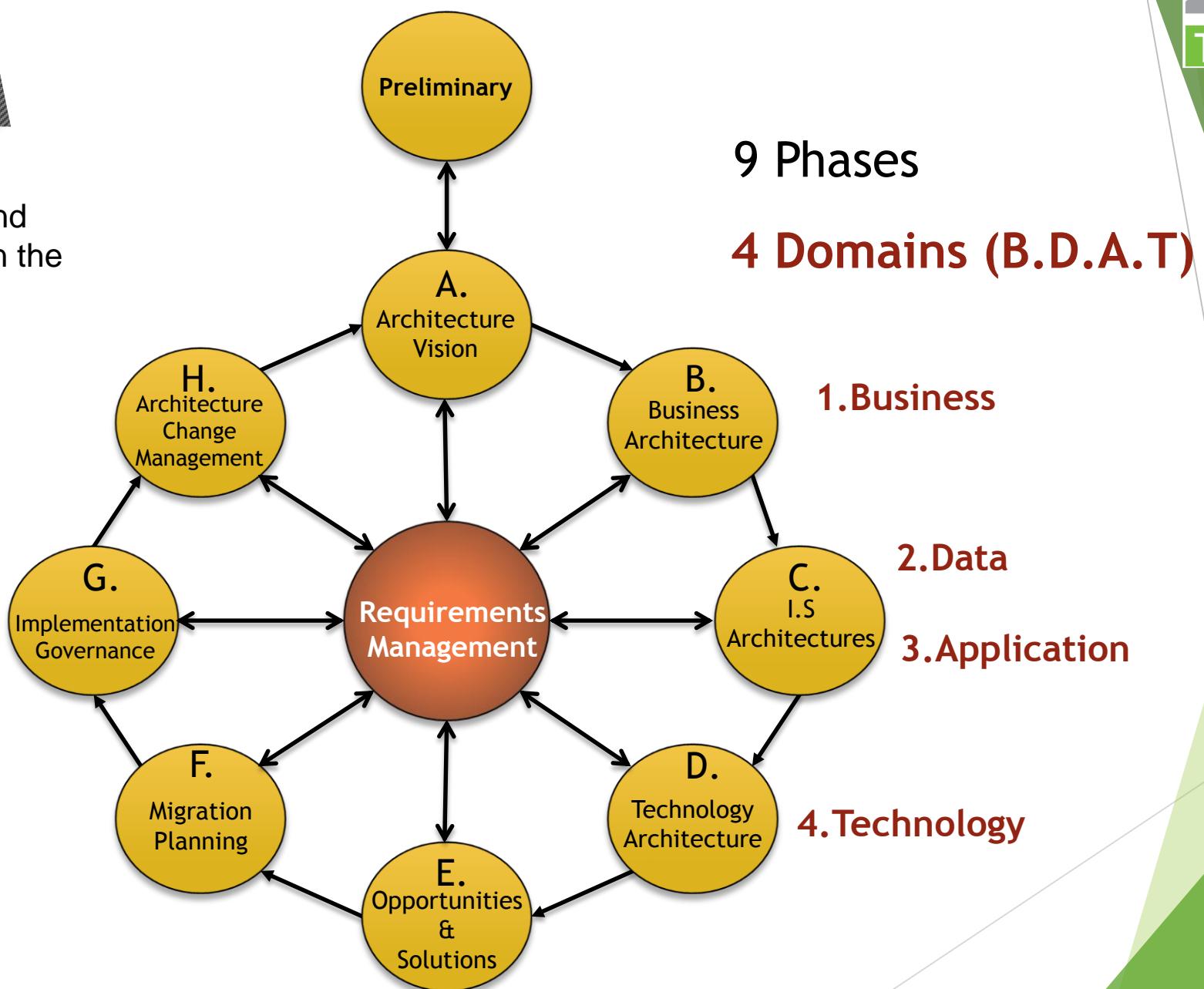
# Key Terms

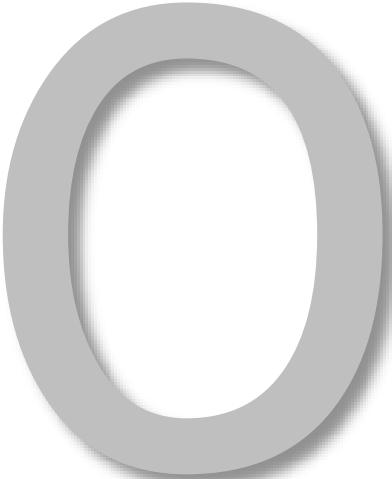
- ▶ **Business Governance** :Concerned with ensuring that the business processes and policies (and their operation) deliver the business outcomes and adhere to relevant business regulation.
- ▶ **Capability** :An ability that an organization, person, or system possesses. Capabilities are typically expressed in general and high-level terms and typically require a combination of organization, people, processes, and technology to achieve; for example, marketing, customer contact, or outbound telemarketing.
- ▶ **Concerns** :The key interests that are crucially important to the stakeholders in a system, and determine the acceptability of the system. Concerns may pertain to any aspect of the system's functioning, development, or operation, including considerations such as performance, reliability, security, distribution, and evolvability. Longer lasting than problem (eg. state of the economy), not a requirement, which is short term.
- ▶ **Enterprise** : The highest level (typically) of description of an organization and typically covers all missions and functions. An enterprise will often span multiple organizations.
- ▶ A "**pattern**" has been defined as: "an idea that has been useful in one practical context and will probably be useful in others" [*Analysis Patterns - Re-usable Object Models*].

- ▶ The ADM supports the concept of iteration at three levels:
  - ▶ **Cycling around the ADM:** The ADM is presented in a circular manner indicating that the completion of one phase of architecture work directly feeds into subsequent phases of architecture work.
  - ▶ **Iterating between phases:** TOGAF describes the concept of iterating across phases (e.g., returning to Business Architecture on completion of Technology Architecture).
  - ▶ **Cycling around a single phase:** TOGAF supports repeated execution of the activities within a single ADM phase as a technique for elaborating architectural content.

# ADM

The TOGAF ADM is framework-agnostic, and helps IT architects fill in the framework they might already have in use.





# Preliminary

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

# Objective

- ▶ Prepare the organization for successful TOGAF architecture projects.
- ▶ Undertake the preparation and initiation activities required to meet the business directive for a new enterprise architecture, including the definition of an Organization-Specific Architecture framework and tools, and the definition of principles.
- ▶ The Preliminary Phase is about defining “where, what, why, who, and how we do architecture” in the enterprise concerned.

The main aspects are as follows:

- ▶ Defining the enterprise.
- ▶ Identifying key drivers and elements in the organizational 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 relationships between management frameworks
- ▶ Evaluating the enterprise architecture's maturity

# Defining the Enterprise

*“How big is this animal?”*

- ▶ The enterprise scope will determine those stakeholders who will derive most benefit from the new or enhanced enterprise architecture.
- ▶ It is important to appoint a sponsor at this stage.
- ▶ The enterprise may include many organizations and the duty of the sponsor is to ensure that all stakeholders are included in some part of the architecture work.

# Identifying key drivers and elements in the organizational context

It is necessary to understand the context surrounding the architecture. For example, considerations include:

- ▶ The commercial models and budget for the enterprise architecture.
- ▶ The stakeholders.
- ▶ The intentions and culture of the organization.
- ▶ Current processes that support execution of change and operation of IT.
- ▶ The Baseline Architecture landscape.
- ▶ The skills and capabilities of the enterprise.

# Defining The Requirements For Architecture Work

Business imperatives drive the requirements and performance metrics. One or more of the following requirements need to be articulated so that the sponsor can identify the key decision-makers and stakeholders and generate a Request for Architecture Work:

- ▶ Business requirements
- ▶ Cultural aspirations
- ▶ Organization intents
- ▶ Strategic intent
- ▶ Forecast financial requirements

# Defining The Architecture Principles

- ▶ Architecture work is informed by business principles as well as architecture principles.
- ▶ The architecture principles themselves are also normally based in part on business principles.
- ▶ Principles are general rules and guidelines, intended to be enduring and seldom amended, that inform and support the way in which an organization sets about fulfilling its mission.
- ▶ Depending on the organization, principles may be established within different domains and at different levels. Two key domains inform the development and utilization of architecture:
  - ▶ **Enterprise** principles provide a basis for decision-making throughout an enterprise, and inform how the organization sets about fulfilling its mission.
  - ▶ **Architecture** principles are a set of principles that relate to architecture work. They reflect a level of consensus across the enterprise, and embody the spirit and thinking of existing enterprise principles.

# Example Principle

## Statement:

***Enterprise operations are maintained in spite of system interruptions.***

## Rationale:

As system operations become more pervasive, we become more dependent on them; therefore, we must consider the reliability of such systems throughout their design and use. Business premises throughout the enterprise must be provided with the capability to continue their business functions regardless of external events. Hardware failure, natural disasters, and data corruption should not be allowed to disrupt or stop enterprise activities. The enterprise business functions must be capable of operating on alternative information delivery mechanisms.

## Implications:

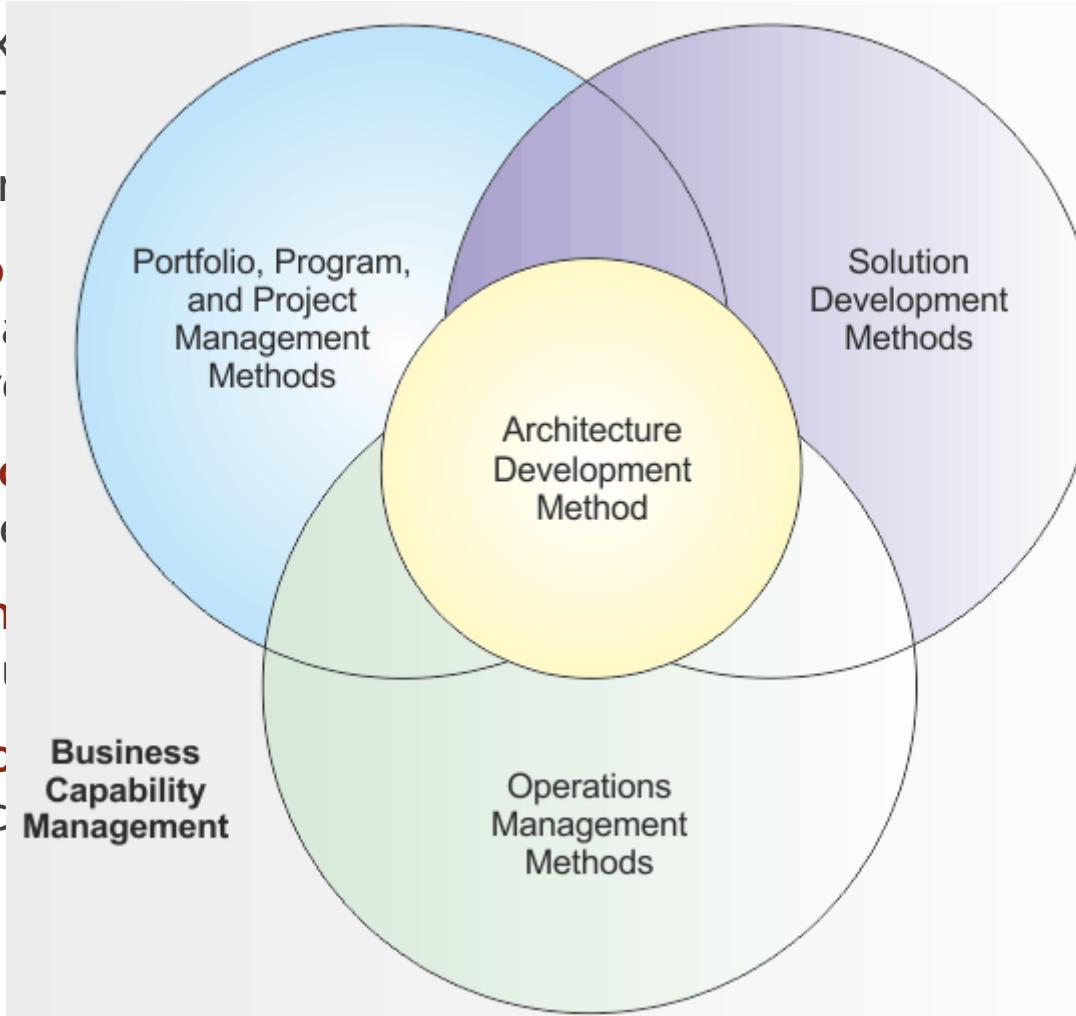
- ▶ Dependency on shared system applications mandates that the risks of business interruption must be established in advance and managed.
- ▶ Management includes but is not limited to periodic reviews, testing for vulnerability and exposure, or designing mission-critical services to ensure business function continuity through redundant or alternative capabilities.
- ▶ Recoverability, redundancy, and maintainability should be addressed at the time of design.
- ▶ Applications must be assessed for criticality and impact on the enterprise mission, in order to determine what level of continuity is required and what corresponding recovery plan is necessary.

# Management Frameworks

TOGAF has to co-exist with other management frameworks that are:

The main framework is:

- ▶ **Business Capabilities** – what business capabilities are needed to generate return on investment.
- ▶ **Portfolio/Project Management** – change initiatives.
- ▶ **Operations Management** – operations, including day-to-day management.
- ▶ **Solution Development** – solution delivered in accordance with requirements.



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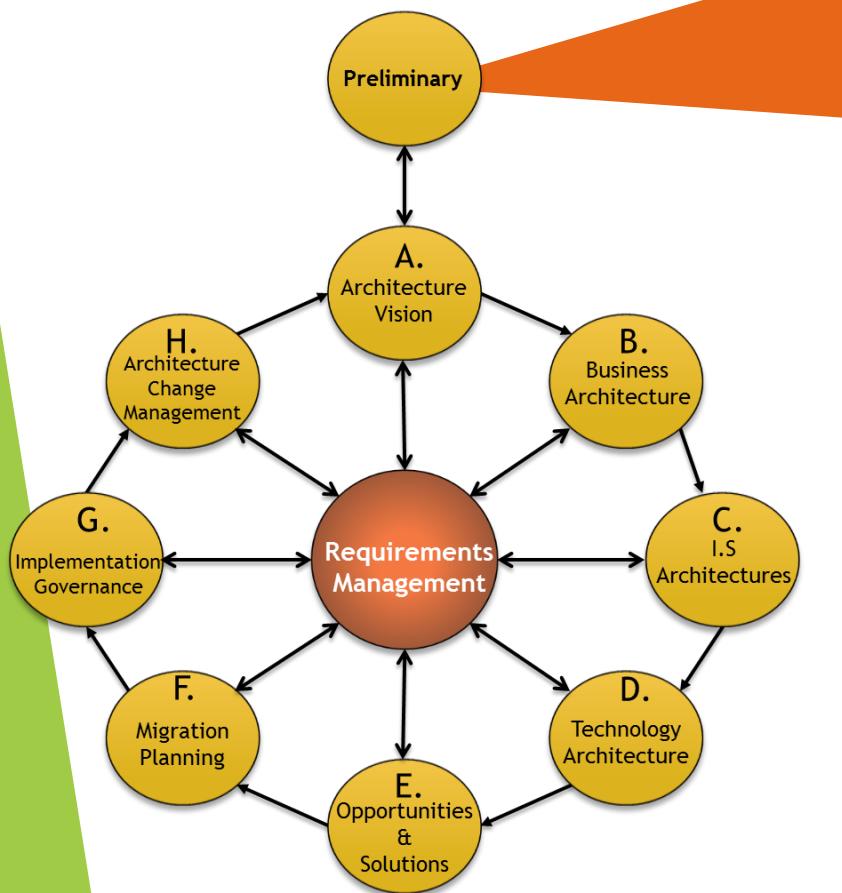
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# Preliminary Phase Steps

The order of the steps should be adapted to the situation. In particular you should determine whether it is appropriate to do the Baseline Business Architecture or Target Business Architecture development first



1. Scope the Enterprise Organizations Impacted
2. Confirm Governance and Support Frameworks
3. Define and Establish Enterprise Architecture Team and Organization
4. Identify and Establish Architecture Principles
5. Tailor TOGAF and, if any, Other Selected Architecture Framework(s)
6. Implement Architecture Tools

# A Architecture Vision

Describes the initial phase of an Architecture Development Cycle. It includes information about defining the scope, identifying the stakeholders, creating the Architecture Vision, and obtaining approvals.

# Objective

- ▶ Develop a high-level aspirational vision of the capabilities and business value to be delivered as a result of the proposed enterprise architecture.
- ▶ Set the scope, constraints, and expectations for a TOGAF project.
- ▶ Create the Architecture Vision.
- ▶ Define stakeholders.
- ▶ Validate the business context and create the Statement of Architecture Work.
- ▶ Obtain approvals for Statement of Architecture Work.

# Creating the Architecture Vision

- ▶ The Architecture Vision provides the sponsor with a key tool to sell the benefits of the proposed capability to stakeholders and decision-makers within the enterprise.
- ▶ Architecture Vision describes how the new capability will meet the business goals and strategic objectives and address the stakeholder concerns when implemented.
- ▶ The Architecture Vision provides a first-cut, high-level description of the Baseline and Target Architectures, covering the business, data, application, and technology domains.
- ▶ Business scenarios are an appropriate and useful technique to discover and document business requirements, and to articulate an Architecture Vision that responds to those requirements.

# Business Scenarios

## 1. Problem

Identifying, documenting, and ranking the problem driving the scenario.

## 2. Environment

Identifying the business and technical environment of the scenario and documenting it in scenario models.

## 3. Objectives

Identifying and documenting desired objectives (the results of handling the problems successfully); get "SMART".

## 4. Human Actors

▶ Specific  
▶ Measureable

## 5. Computer Actors

▶ Actionable  
▶ Realistic

## 6. Roles & Responsibilities

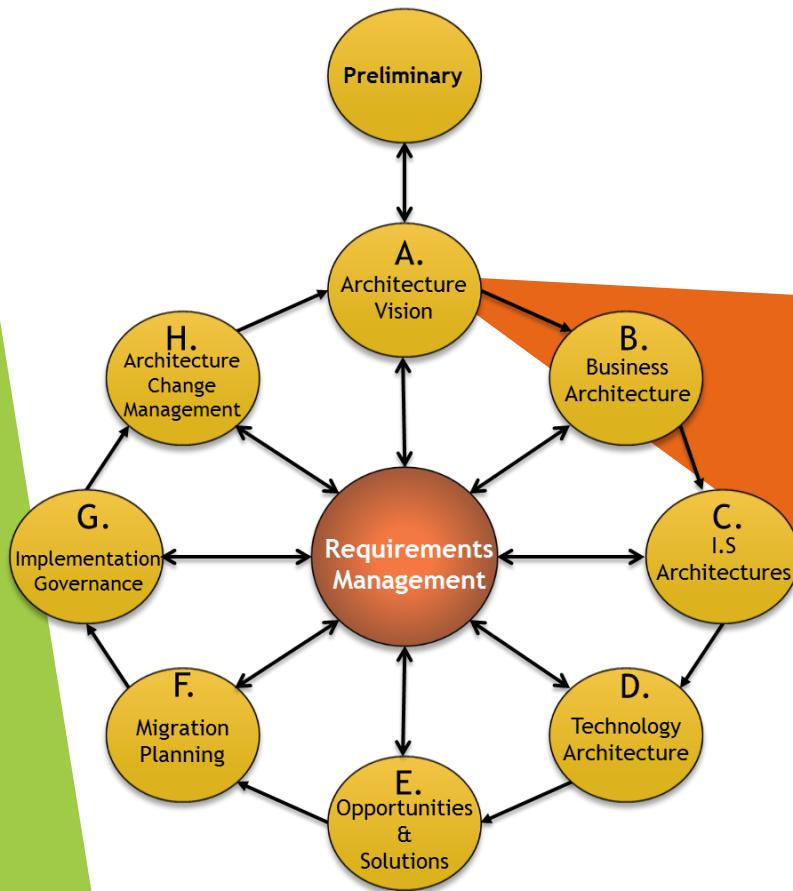
Identifying and documenting roles, responsibilities

## 7. Refine

Checking for "fitness-for-purpose" and refining only if necessary

# Phase A Steps

The order of the steps should be adapted to the situation. In particular you should determine whether it is appropriate to do the Baseline Business Architecture or Target Business Architecture development first



1. Establish the Architecture Project
2. Identify Stakeholders, Concerns, and Business Requirements
3. Confirm and Elaborate Business Goals, Business Drivers, and Constraints
4. Evaluate Business Capabilities
5. Assess Readiness for Business Transformation
6. Define Scope
7. Confirm and Elaborate Architecture Principles, including Business Principles
8. Develop Architecture Vision
9. Define the Target Architecture Value Propositions and KPIs
10. Identify the Business Transformation Risks and Mitigation Activities
11. Develop Statement of Architecture Work; Secure Approval

# B

## Business Architecture

Describes the development of a Business Architecture to support an agreed Architecture Vision.

# Objective

- ▶ Develop the Target Business Architecture that describes how the enterprise needs to operate to achieve the business goals, and respond to the strategic drivers set out in the Architecture Vision, in a way that addresses the Request for Architecture Work and stakeholder concerns
- ▶ Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Business Architectures

# Developing the Baseline Description

- ▶ If an enterprise has existing architecture descriptions, they should be used as the basis for the Baseline Description.
- ▶ The normal approach to Target Architecture development is top-down.
- ▶ In the Baseline Description, however, the analysis of the current state often has to be done bottom-up, particularly where little or no architecture assets exist.
- ▶ Whatever the approach, the goal should be to re-use existing material as much as possible, and to gather and analyze only that information that allows informed decisions to be made regarding the Target Business Architecture.

*“It is important to build a complete picture without going into unnecessary detail.”*

# Business Modelling

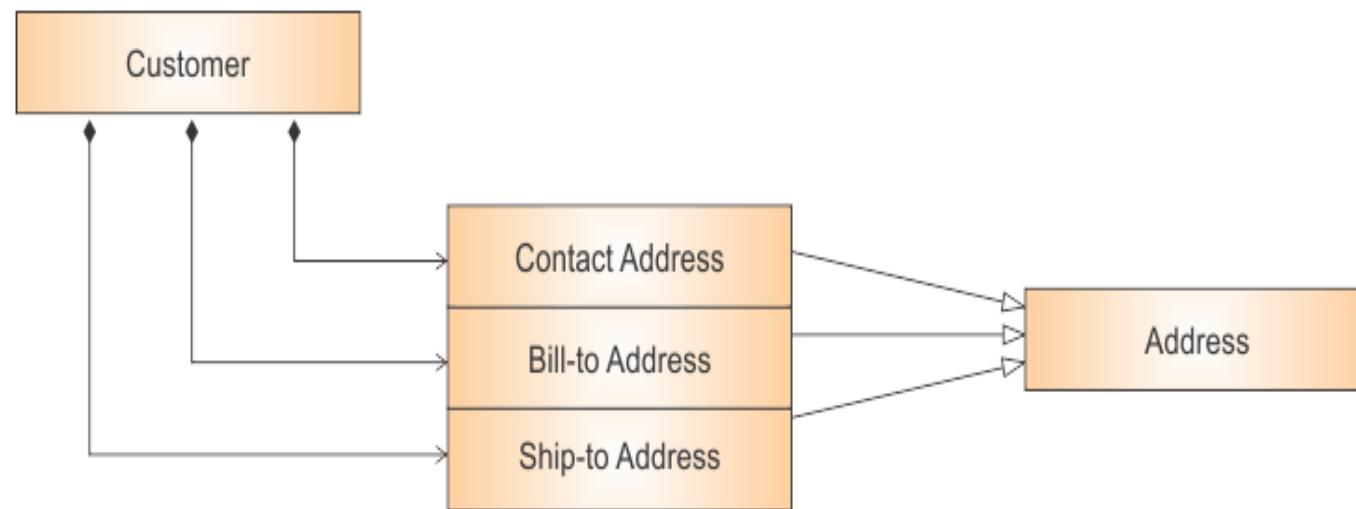
- Business models should be logical extensions of the business scenarios from the Architecture Vision, so that the architecture can be mapped from the high-level business requirements down to the more detailed ones.

A variety of modelling tools and techniques may be employed:

**Activity Models** (also called **Business Process Models**) : describe the functions associated with the enterprise's business activities, the data and/or information exchanged between activities.

**Use-Case Models**: can describe either business processes or systems functions, depending on the focus of the modelling effort.

**Class Models** : describes static information and relationships between information.



# Architecture Repository

- ▶ As part of Phase B, the architecture team will need to consider what relevant Business Architecture resources are available from the Architecture Repository. In Particular:
  - ▶ Generic business models relevant to the organization's industry sector. These are "Industry Architectures", in terms of the Enterprise Continuum.
  - ▶ Business models relevant to common high-level business domains.
  - ▶ Enterprise-specific building blocks (process components, business rules, job descriptions, etc.).

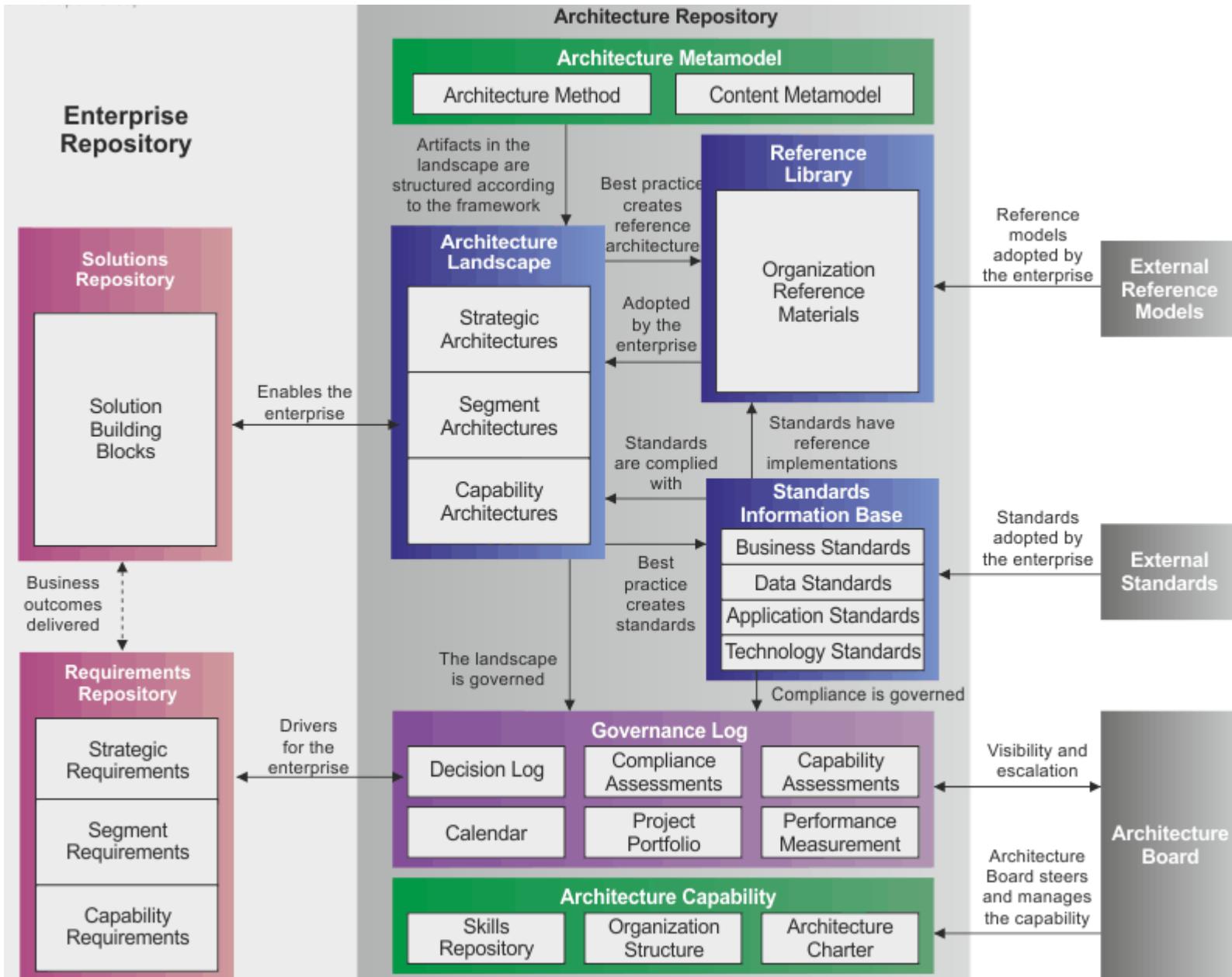
# The Architecture Repository

- ▶ Supporting the Enterprise Continuum is the concept of an Architecture Repository which can be used to store different classes of architectural output at different levels of abstraction, created by the ADM.

The major components within an Architecture Repository are as follows:

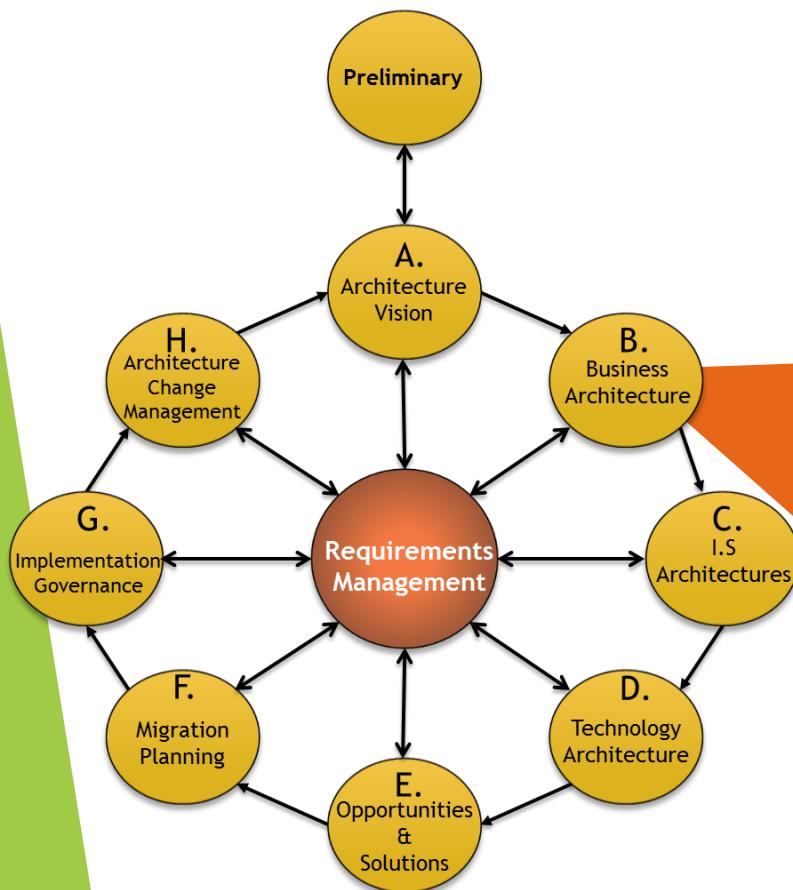
- ▶ The **Architecture Metamodel** describes the organizationally tailored application of an architecture framework, including a metamodel for architecture content.
- ▶ The **Architecture Capability** defines the parameters, structures, and processes that support governance of the Architecture Repository.
- ▶ The **Architecture Landscape** shows an architectural view of the building blocks that are in use within the organization today (e.g., a list of the live applications). The landscape is likely to exist at multiple levels of abstraction to suit different architecture objectives.
- ▶ The **Standards Information Base (SIB)** captures the standards with which new architectures must comply, which may include industry standards, selected products and services from suppliers, or shared services already deployed within the organization.
- ▶ The **Reference Library** provides guidelines, templates, patterns, and other forms of reference material that can be leveraged in order to accelerate the creation of new architectures for the enterprise.
- ▶ The **Governance Log** provides a record of governance activity across the enterprise.

# The Architecture Repository



# Phase B Steps

The order of the steps should be adapted to the situation. In particular you should determine whether it is appropriate to do the Baseline Business Architecture or Target Business Architecture development first



1. Select reference models, viewpoints, and tools
2. Develop Baseline **Business** Architecture Description
3. Develop Target **Business** Architecture Description
4. Perform gap analysis
5. Define roadmap components
6. Resolve impacts across the Architecture Landscape
7. Conduct formal stakeholder review
8. Finalize the **Business** Architecture
9. Create Architecture Definition Document

# C

## Information Systems Architectures

Describes the development of Information Systems Architectures for an architecture project, including the development of Data and Application Architectures.

# Objective

- ▶ Develop the Target Information Systems (Data and Application) Architecture, describing how the enterprise's Information Systems Architecture will enable the Business Architecture and the Architecture Vision, in a way that addresses the Request for Architecture Work and stakeholder concerns.
- ▶ Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Information Systems (Data and Application) Architectures.

# Data Architecture part of Phase C (Objectives)

- ▶ Develop the Target Data Architecture that enables the Business Architecture and the Architecture Vision, while addressing the Request for Architecture Work and stakeholder concerns
- ▶ Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Data Architectures

# Key Considerations for Data Architecture

## 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?
- ▶ Clearly understand how data entities are utilized 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?

# Key Considerations for Data Architecture

## Data Migration

Considerations include:

- ▶ 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.
- ▶ The objective being that the target application has quality data when it is populated.
- ▶ Ensure that an enterprise-wide common data definition is established to support the transformation.

# Key Considerations for Data Architecture

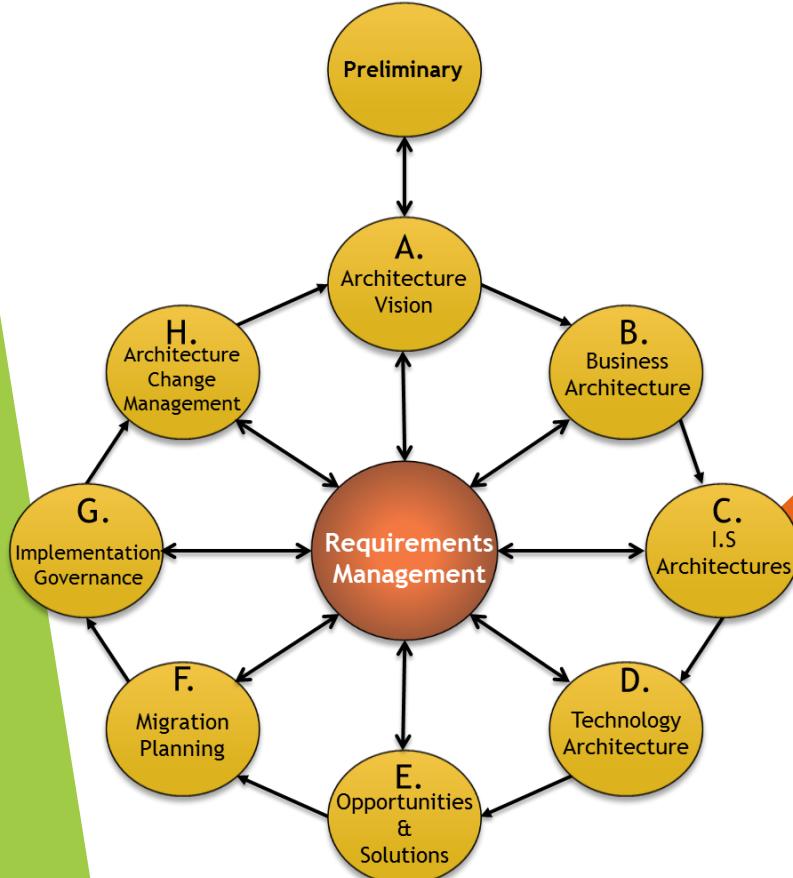
## Data Governance

Data governance considerations ensure that the enterprise has the necessary dimensions in place to enable the transformation, as follows:

- ▶ **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. If the enterprise lacks such resources and skills, the enterprise should consider either acquiring those critical skills or training existing internal resources to meet the requirements through a well-defined learning program.

# Phase C Data Architecture Steps

The order of the steps should be adapted to the situation.



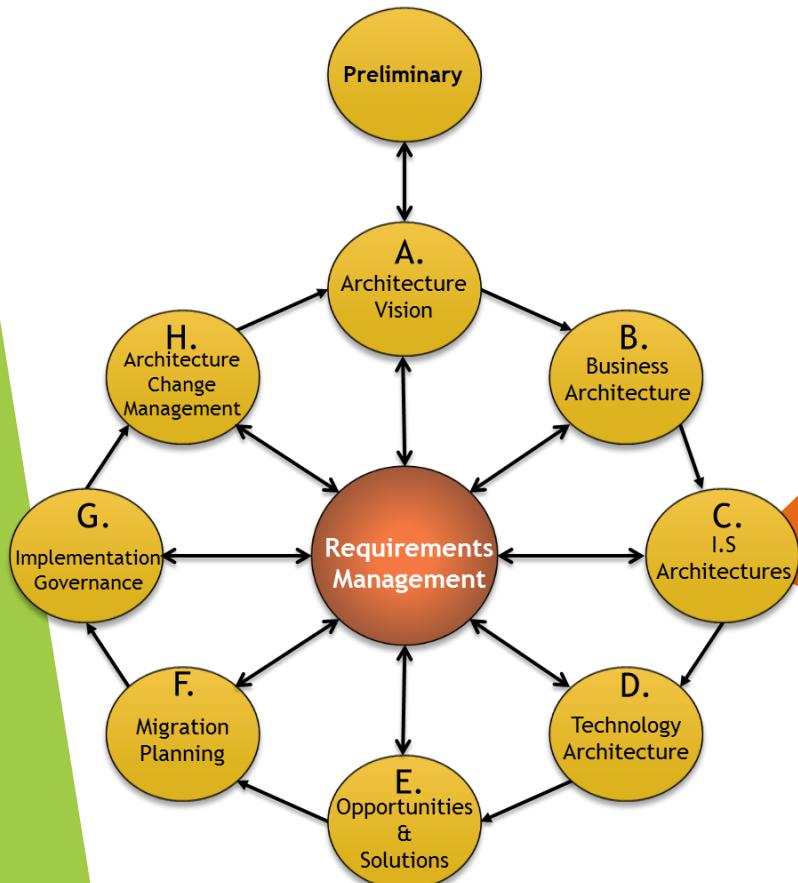
1. Select reference models, viewpoints, and tools
2. Develop Baseline **Data** Architecture Description
3. Develop Target **Data** Architecture Description
4. Perform gap analysis
5. Define roadmap components
6. Resolve impacts across the Architecture Landscape
7. Conduct formal stakeholder review
8. Finalize the **Data** Architecture
9. Create Architecture Definition Document

# Applications Architecture part of Phase C (Objectives)

- ▶ Develop the Target Application Architecture that enables the Business Architecture and the Architecture Vision, while addressing the Request for Architecture Work and stakeholder concerns
- ▶ Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Application Architectures

# Phase C Applications Architecture Steps

The order of the steps should be adapted to the situation.



1. Select reference models, viewpoints, and tools
2. Develop Baseline **Application** Architecture Description
3. Develop Target **Application** Architecture Description
4. Perform gap analysis
5. Define roadmap components
6. Resolve impacts across the Architecture Landscape
7. Conduct formal stakeholder review
8. Finalize the **Applications** Architecture
9. Create Architecture Definition Document

# D

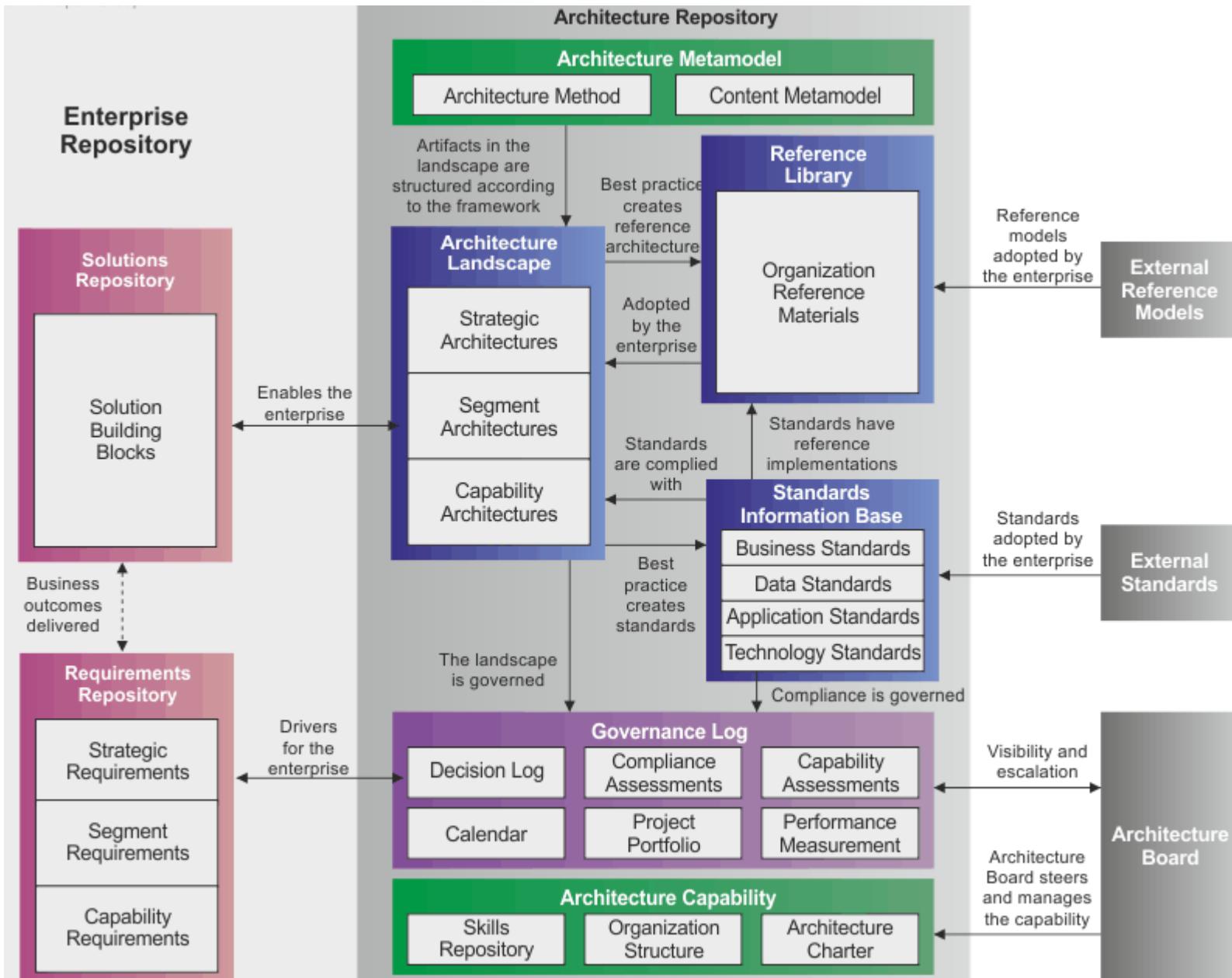
## Technology Architecture

Describes the development of the Technology Architecture for an architecture project.

# Objectives

- ▶ Develop the Target Technology Architecture that enables the logical and physical application and data components and the Architecture Vision, addressing the Request for Architecture Work and stakeholder concerns.
- ▶ Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Technology Architectures

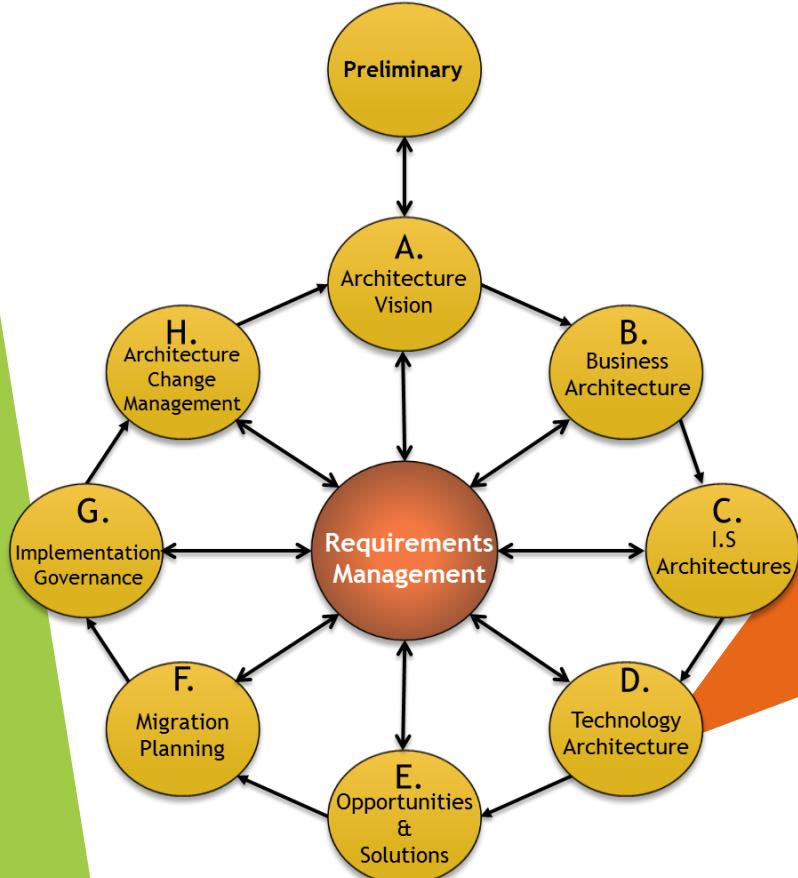
# The Architecture Repository



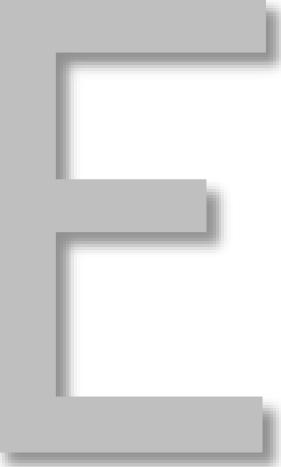
- Existing IT services as documented in the IT repository or IT service catalog
- TOGAF Technical Reference Model (TRM)
- Generic technology models relevant to the organization's industry "vertical" sector

# Phase D Steps

The order of the steps should be adapted to the situation.



1. Select reference models, viewpoints, and tools
2. Develop Baseline **Technology** Architecture Description
3. Develop Target **Technology** Architecture Description
4. Perform gap analysis
5. Define roadmap components
6. Resolve impacts across the Architecture Landscape
7. Conduct formal stakeholder review
8. Finalize the **Technology** Architecture
9. Create Architecture Definition Document



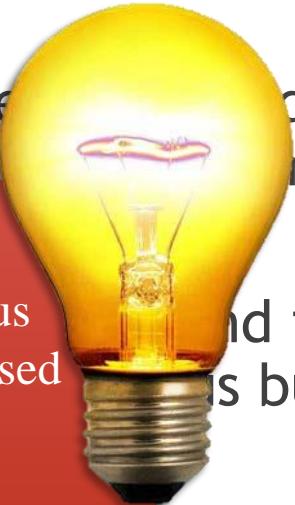
# Opportunities & Solutions

**Opportunities and Solutions** conducts initial implementation planning and the identification of delivery vehicles for the architecture defined in the previous phases.

- ▶ Generate the initial complete version of the Architecture Roadmap, based upon the gap analysis and candidate Architectures.

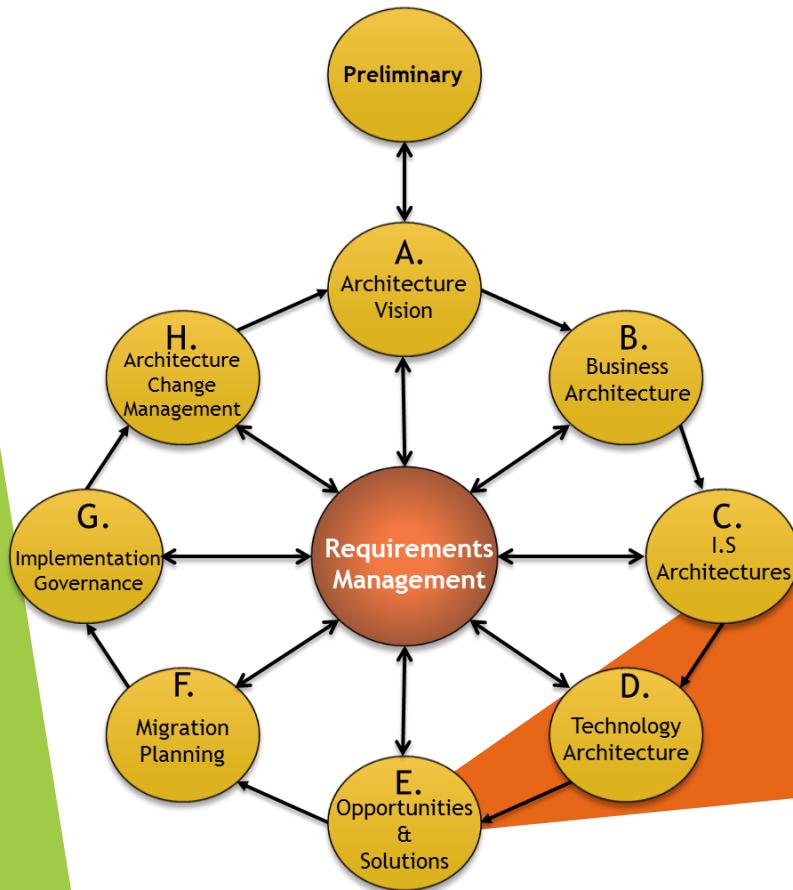
## Capability-Based Planning and the ADM

- ▶ Determine specific capabilities targeted for completion will be the focus of the Architecture Definition (Phases B, C, and D) and, based upon the identified work packages Phase E, projects will be conceived.
- ▶ To coordinate the delivery of the architecture definition and if so required, the transition architectures.
- ▶ To generate the implementation and migration plans.
- ▶ Migrating the organization to the new architecture.



# Phase E Steps

The order of the steps should be adapted to the situation.



1. Determine/Confirm Key Corporate Change Attributes

2. Determine Business Constraints for Implementation

3. Review and Consolidate Gap Analysis Results from Phases B to D

4. Review Consolidated Requirements Across Related Business Functions

5. Consolidate and Reconcile Interoperability Requirements

6. Refine and Validate Dependencies

7. Confirm Readiness and Risk for Business Transformation

8. Formulate Implementation and Migration Strategy

9. Identify and Group Major Work Packages

10. Identify Transition Architectures

11. Create the Architecture Roadmap & Implementation and Migration Plan

# F Migration Planning

Addresses the formulation of a set of detailed sequence of Transition Architectures with a supporting Implementation and Migration Plan.

# Objective

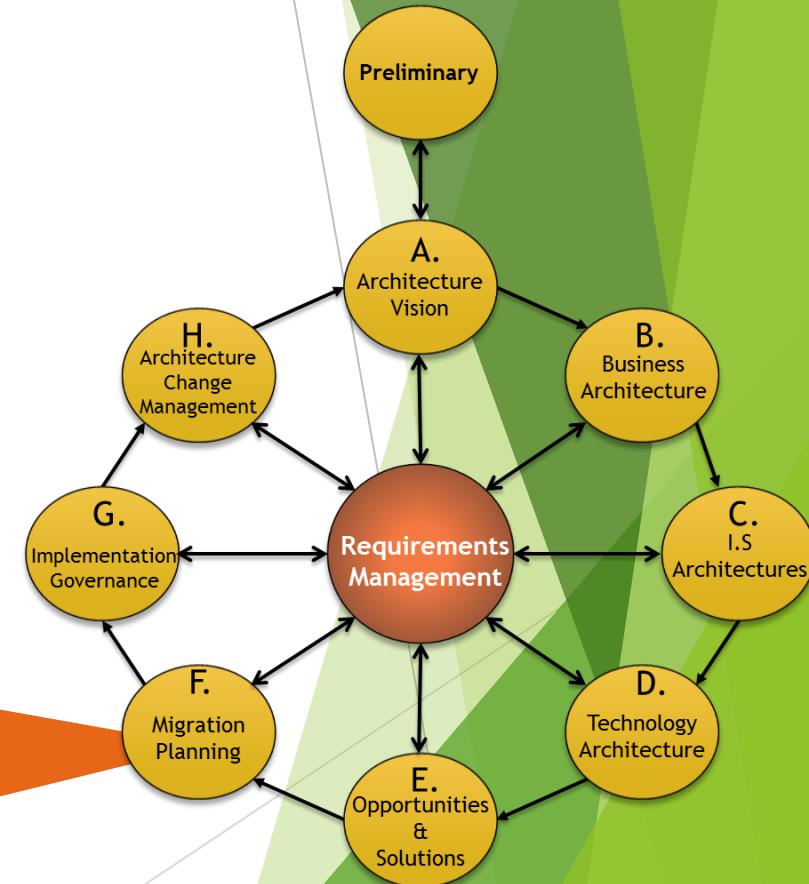
- ▶ Analyze cost benefits and risk.
- ▶ Develop detailed Implementation and Migration Plan
  - The focus of Phase F is the creation of an Implementation and Migration Plan in co-operation with the portfolio and project managers.
  - Phase E provides an incomplete Architecture Roadmap and Implementation and Migration Plan that address the Request for Architecture Work. In Phase F this Roadmap and the Implementation and Migration Plan are integrated with the enterprise's other change activity.
  - The Architecture Roadmap, Version 0.1 and Implementation and Migration Plan, Version 0.1 from Phase E will form the basis of the final Implementation and Migration Plan that will include portfolio and project-level detail.
- ▶ Finalize the implementation and migration plan.
- ▶ Coordinate the implementation and migration plan with the enterprise's other change activity.
- ▶ Implement the changes.



# Phase F Steps

The order of the steps should be adapted to the situation.

1. Confirm Management Framework Interactions for the Implementation and Migration Plan
2. Assign a Business Value to Each Work Package
3. Estimate Resource Requirements, Project Timings, and Availability/Delivery Vehicle
4. Prioritize the Migration Projects through the Conduct of a Cost/Benefit Assessment and Risk Validation
5. Confirm Architecture Roadmap and Update Architecture Definition Document
6. Generate the Implementation and Migration Plan
7. Complete the Architecture Development Cycle and Document Lessons Learned



# G

## Implementation Governance

Provides an architectural oversight of the implementation.

# Objective

- ▶ Provide architectural oversight for the implementation.
- ▶ Prepare and issue Architecture Contracts (Implementation Governance Board).
- ▶ Ensure that the implementation project conforms to the architecture.

- Note that, in parallel with Phase G, there is the execution of an organizational-specific development process, where the actual development happens.
- To enable early realization of business value and benefits, and to minimize the risk in the transformation and migration program, the favoured approach is to deploy the Target Architecture as a series of transitions.
- Each transition represents an incremental step towards the target, and each delivers business benefit in its own right



# Approach

The overall approach in Phase G is to:

- ▶ 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 organization's standard for corporate, IT, and architecture governance.
- ▶ Use the organization's established portfolio/program management approach, where this exists.
- ▶ Define an operations framework to ensure the effective long life of the deployed solution.

# Approach

Phase G establishes the connection between architecture and implementation organization, through the Architecture Contract.

Project details are developed, including:

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

Implementation governance is closely allied to overall architecture governance.

*“the practice and orientation by which enterprise architectures and other architectures are managed and controlled at an enterprise-wide level..”*

## Domains of Governance within the Enterprise

- ▶ Corporate governance
- ▶ Technology governance
- ▶ IT governance
- ▶ Architecture governance

Each of these domains of governance may exist at multiple geographic levels - global, regional, and local - within the overall enterprise.

Corporate governance is a broad topic, beyond the scope of an enterprise architecture framework such as TOGAF.

# Architecture Governance : Characteristics

Architecture governance is the practice and orientation by which enterprise architectures and other architectures are managed and controlled at an enterprise-wide level. It includes the following:

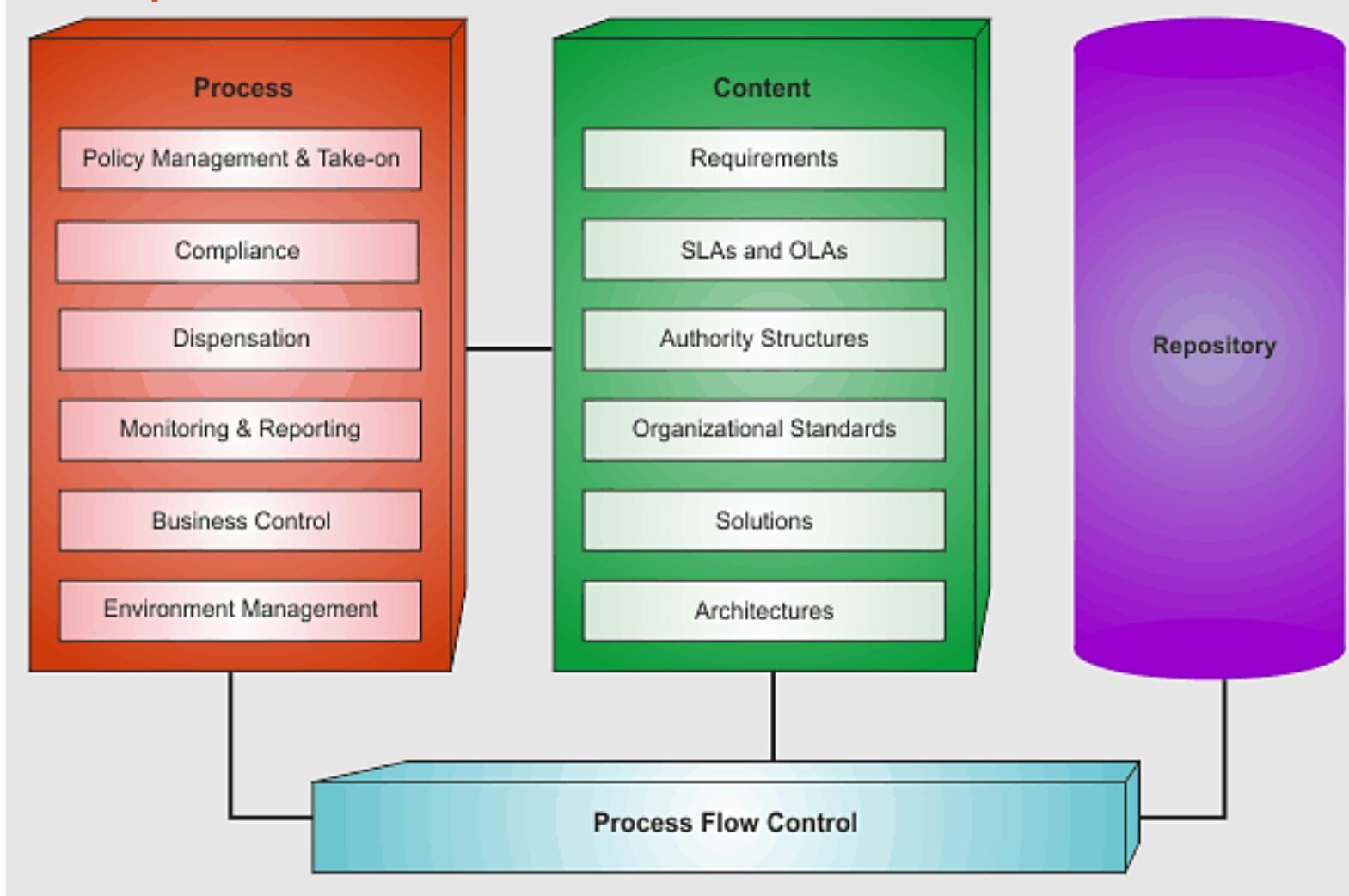
- ▶ Implementing a system of controls over the creation and monitoring of all architectural components and activities, to ensure the effective introduction, implementation, and evolution of architectures within the organization.
- ▶ Implementing a system to ensure compliance with internal and external standards and regulatory obligations.
- ▶ Establishing processes that support effective management of the above processes within agreed parameters.
- ▶ Developing practices that ensure accountability to a clearly identified stakeholder community, both inside and outside the organization.

Architecture governance needs to be supported by an **Architecture Governance Framework** which assists in identifying effective processes so that the business responsibilities associated with architecture governance can be elucidated, communicated, and managed effectively.

# Architecture Governance Framework

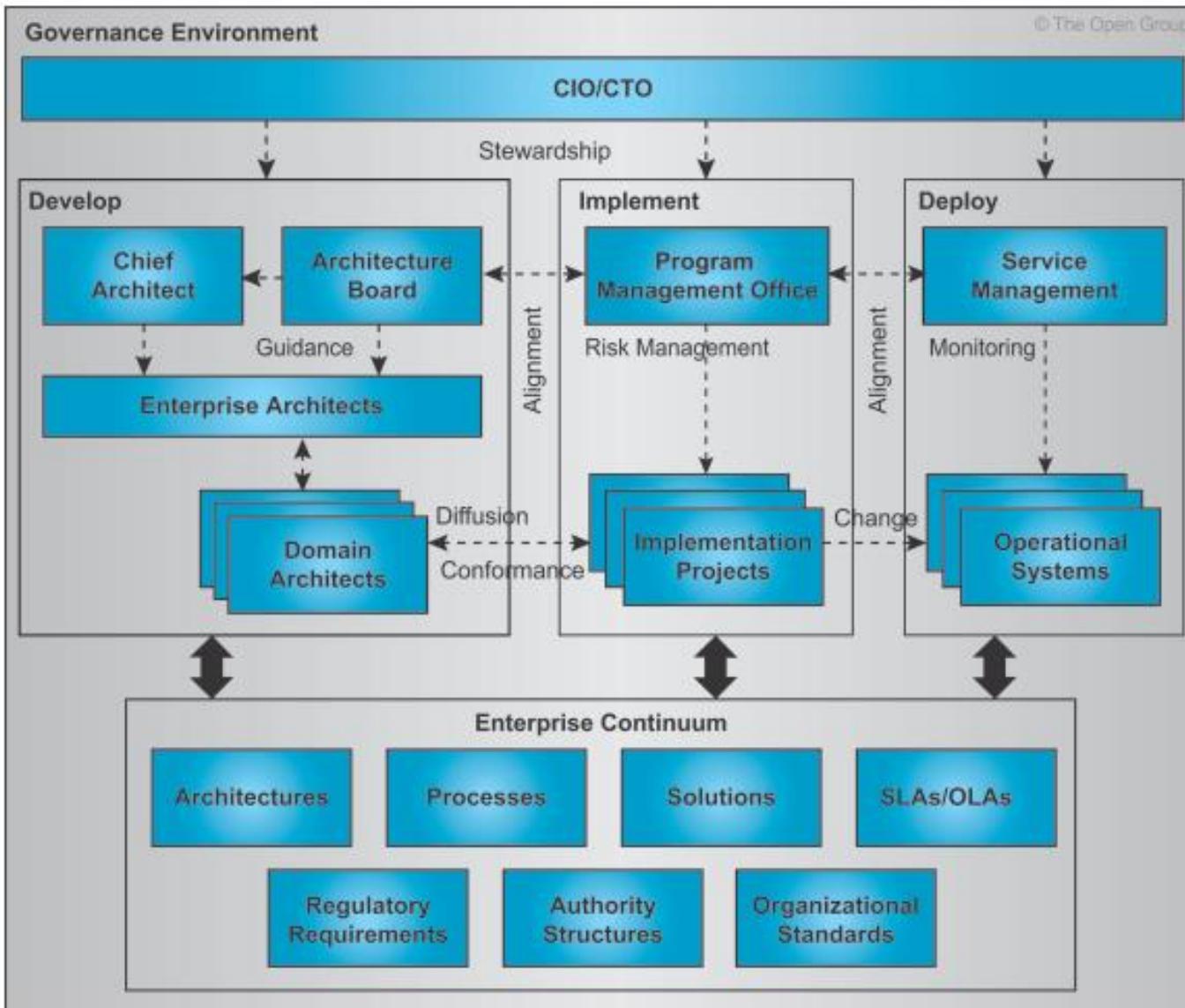
*"a conceptual and organizational framework for architecture governance."*

## Conceptual Structure



# Architecture Governance Framework

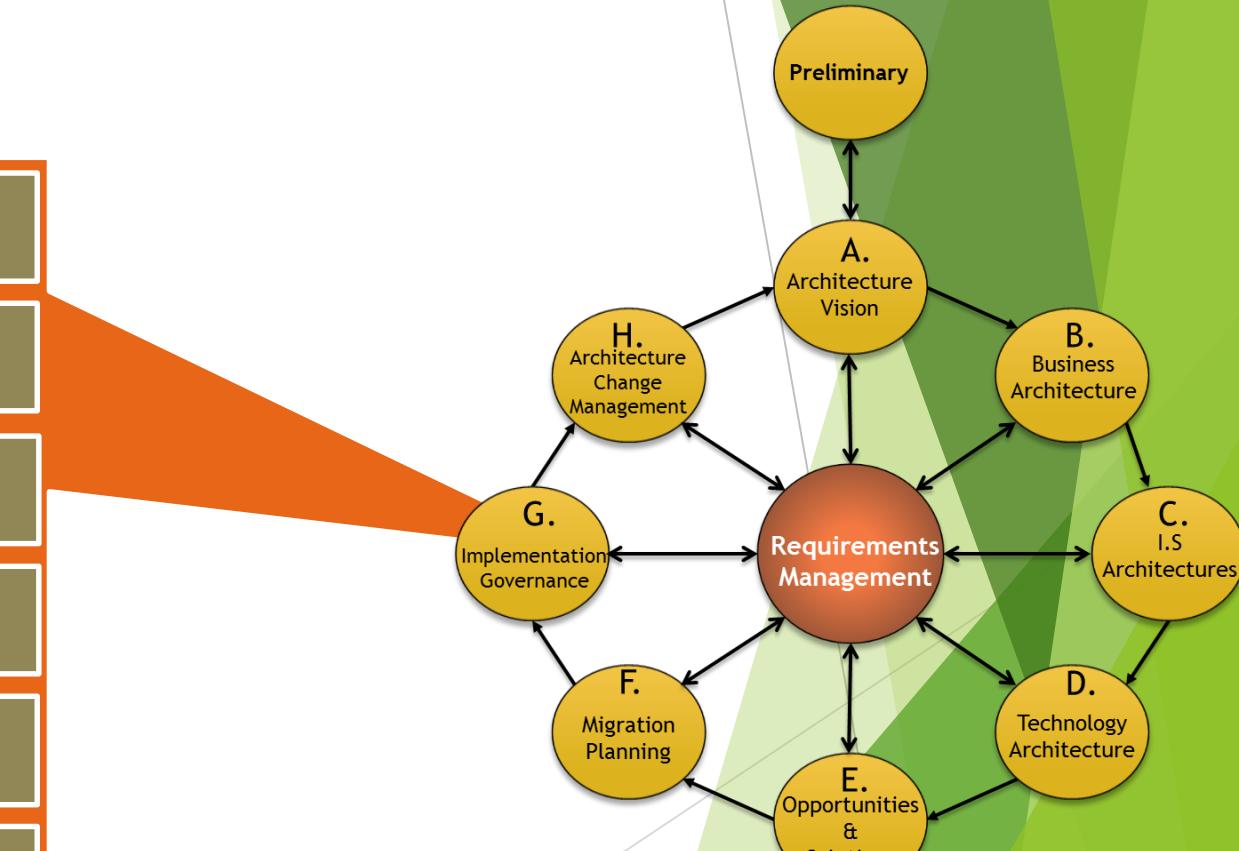
## Organizational Structure

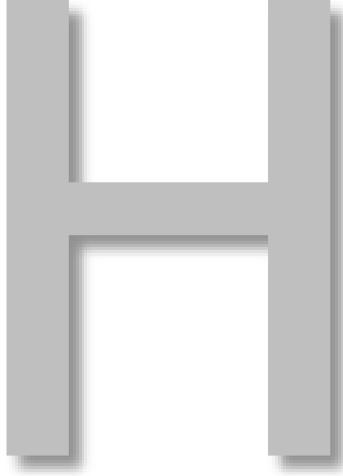


# Phase G Steps

The order of the steps should be adapted to the situation.

1. Confirm Scope and Priorities for Deployment with Development Management
2. Identify Deployment Resources and Skills
3. Guide Development of Solutions Deployment
4. Perform Enterprise Architecture Compliance Reviews
5. Implement Business and IT Operations
6. Perform Post-Implementation Review and Close the Implementation





# Architecture Change Management

Establishes procedures for managing change to the new architecture.

# Objective

- ▶ Provide continual monitoring and a change management process to ensure that the architecture responds to the needs of the enterprise and maximizes the value of the architecture to the business.



- In Phase H it is critical that the governance body establish criteria to judge whether a Change Request warrants just an architecture update or whether it warrants starting a new cycle of the Architecture Development Method (ADM). It is especially important to avoid "creeping elegance", and the governance body must continue to look for changes that relate directly to business value.
- When changes are identified, change management will determine whether to formally initiate a new architecture evolution cycle.

# Drivers for Change

There are three ways to change the existing infrastructure that have to be integrated:

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

# Enterprise Architecture Change Management Process

Architectural changes can be classified into one of three categories:

- ▶ **Simplification change:** A simplification change can normally be handled via change management techniques.
- ▶ **Incremental change:** An incremental change may be capable of being handled via change management techniques, or it may require partial re-architecting, depending on the nature of the change .
- ▶ **Re-architecting change:** A re-architecting change requires putting the whole architecture through the architecture development cycle again.

**A good rule-of-thumb is:**

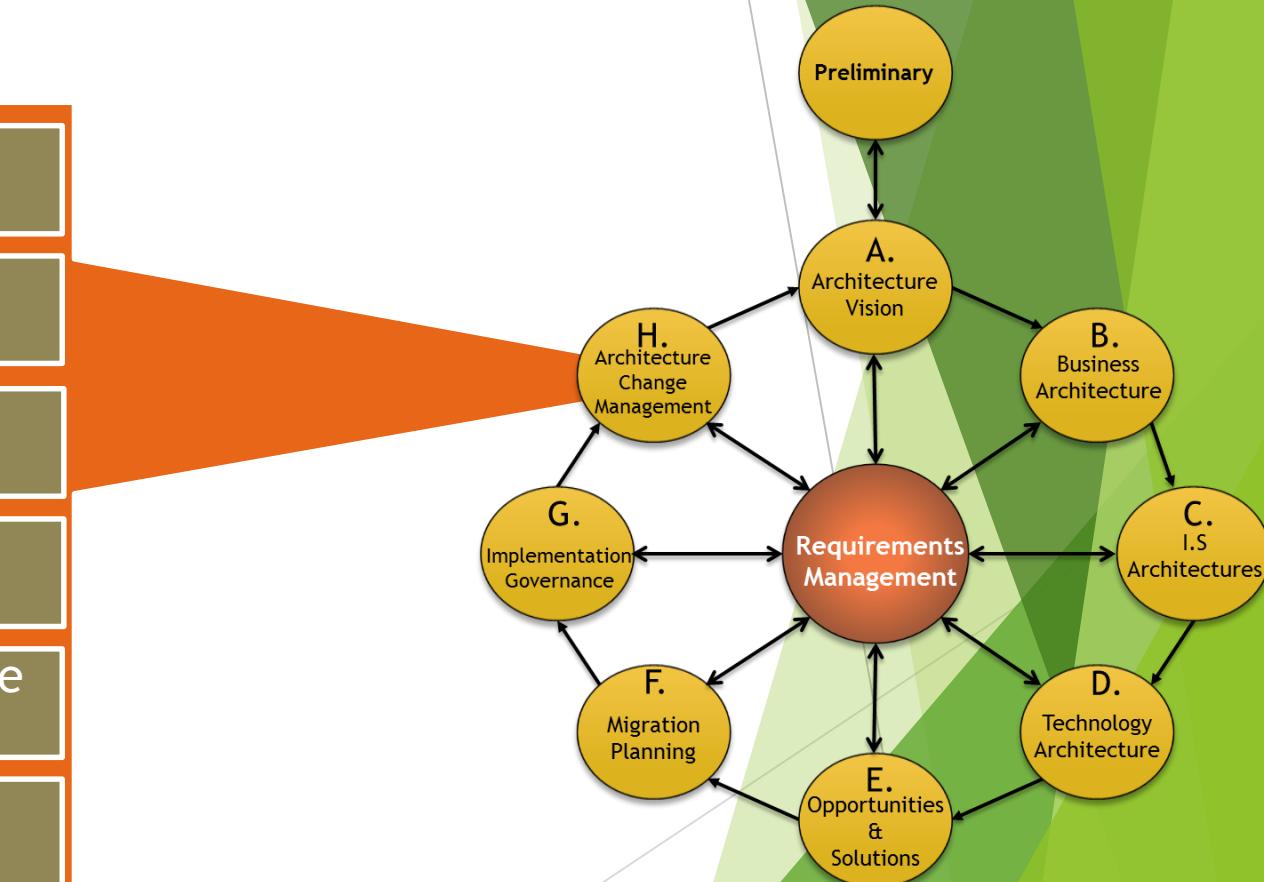
- If the change impacts two stakeholders or more, then it is likely to require an architecture redesign and re-entry to the ADM.
- If the change impacts only one stakeholder, then it is more likely to be a candidate for change management.
- If the change can be allowed under a dispensation, then it is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



# Phase H Steps

The order of the steps should be adapted to the situation.

1. Establish Value Realization Process
2. Deploy Monitoring Tools
3. Manage Risks
4. Provide Analysis for Architecture Change Management
5. Develop Change Requirements to Meet Performance Targets
6. Manage Governance Process
6. Activate the Process to Implement Change



# Requirements Management

Examines the process of managing architecture requirements throughout the ADM.

# Objective

- ▶ Ensure that the architecture lifecycle is maintained.
- ▶ Ensure that the Architecture Governance Framework is executed.
- ▶ Ensure that the enterprise Architecture Capability meets current requirements.
- ▶ Ensure that the Requirements Management process is sustained and operates for all relevant ADM phases

# Architecture Content Framework

*“provides a detailed model of architectural work products, including deliverables, artefacts within deliverables, and the Architecture Building Blocks (ABBs) that deliverables represent.”*



- ▶ It helps to improve the consistency of the TOGAF outputs by presenting outputs in a consistent and structured way, and also helps to reference and classify them.
- ▶ It provides a comprehensive checklist of architecture outputs, it promotes better integration of work products, and provides a detailed open standard for how architectures should be described.
- ▶ A structured store house for the products of the ADM cycle.

# Content Framework

- ▶ The Architecture Content Framework uses the following three categories to describe the type of architectural work product within the context of use:

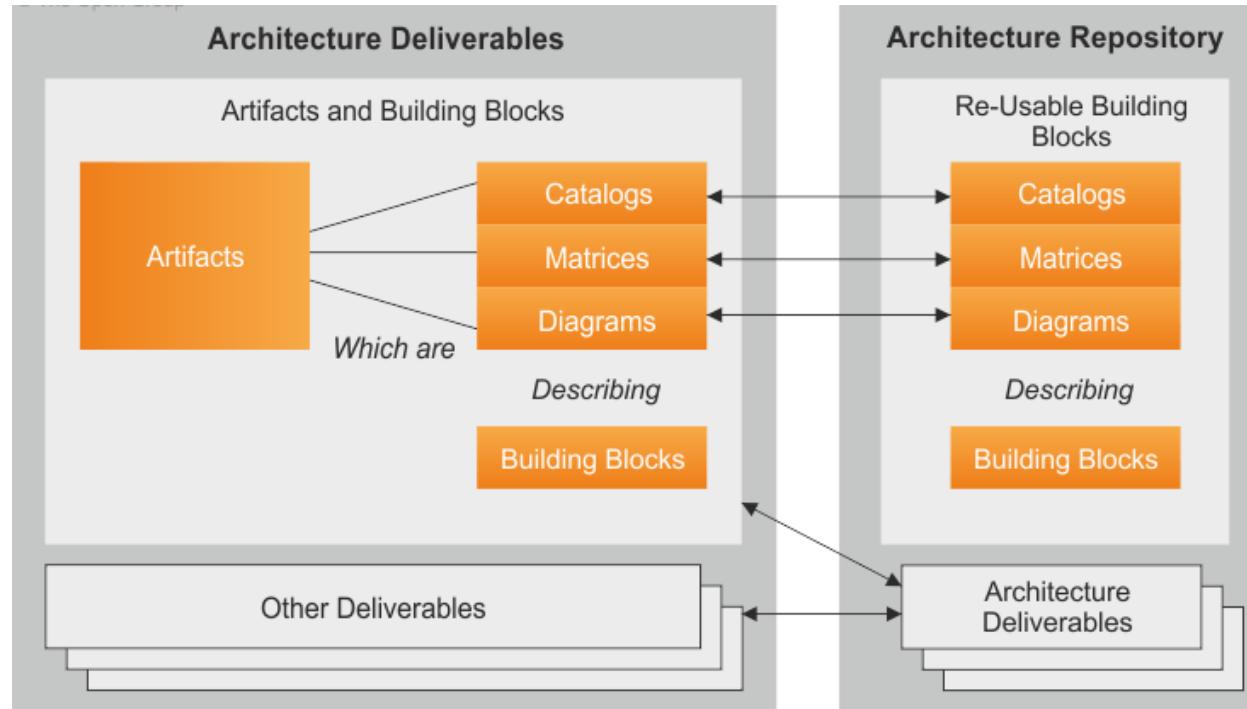
A **deliverable** is a work product that is contractually specified and in turn formally reviewed, agreed, and signed off by the stakeholders. Deliverables represent the output of projects and those deliverables that are in documentation form will typically be archived at completion of a project, or transitioned into an Architecture Repository as a reference model, standard, or snapshot of the Architecture Landscape at a point in time.

An **artifact** is a more granular architectural work product that describes an architecture from a specific viewpoint. Examples include a network diagram, a server specification, a use-case specification, a list of architectural requirements, and a business interaction matrix. Artifacts are generally classified as catalogs (lists of things), matrices (showing relationships between things), and diagrams (pictures of things). An architectural deliverable may contain many artifacts and artifacts will form the content of the Architecture Repository.

A **building block** represents a (potentially re-usable) component of business, IT, or architectural capability that can be combined with other building blocks to deliver architectures and solutions. Building blocks can be defined at various levels of detail and can relate to both architectures and solutions, with Architecture Building Blocks (ABBs) typically describing the required capability in order to shape the Solution Building Blocks (SBBs) which would represent the components to be used to implement the required capability.

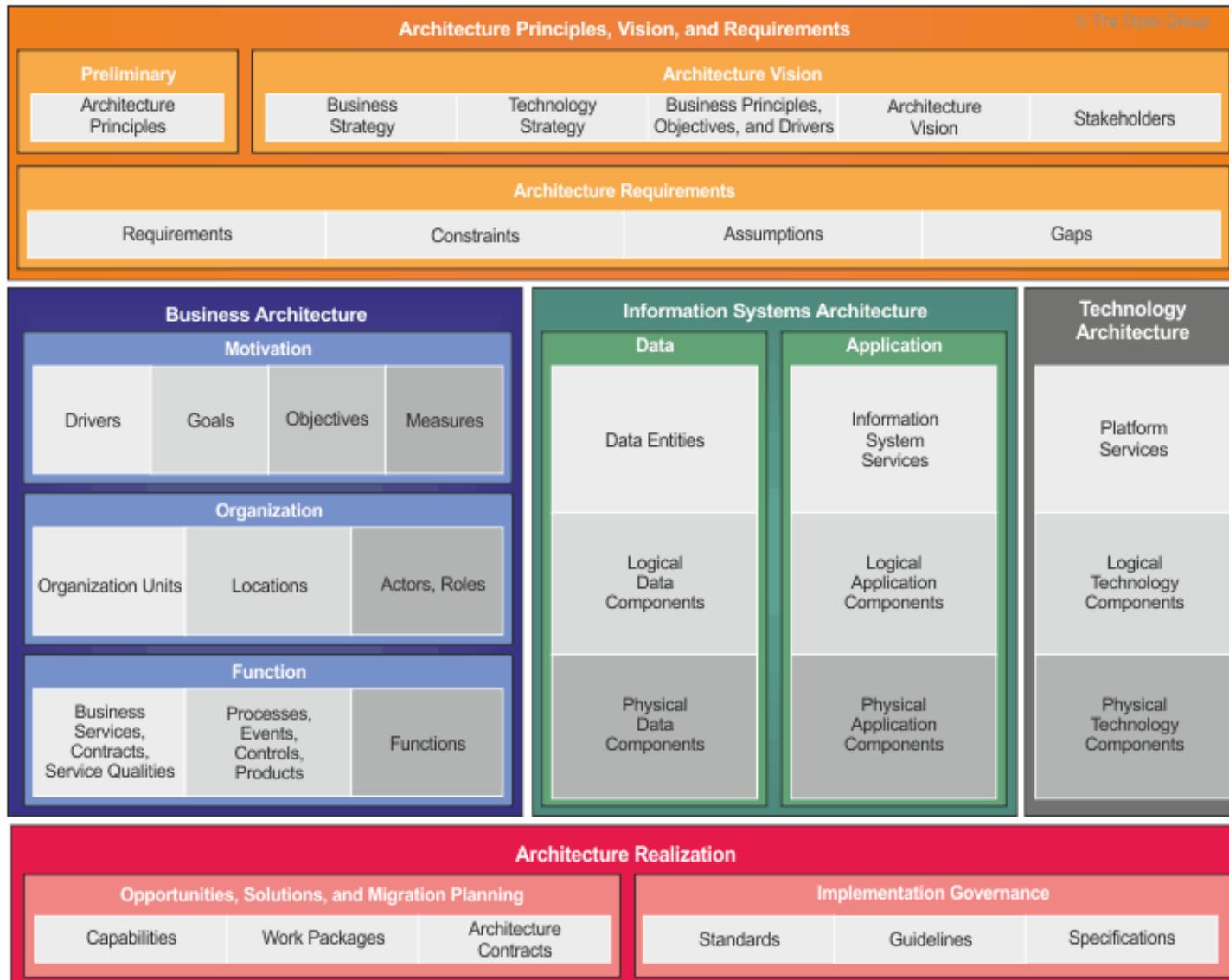
# The relationships between deliverables, artefacts, and building blocks

- ▶ Architecture Building Blocks (ABBs) typically describe required capability and shape the specification of Solution Building Blocks (SBBs). For example, a customer services capability may be required within an enterprise, supported by many SBBs, such as processes, data, and application software.
- ▶ Solution Building Blocks (SBBs) represent components that will be used to implement the required capability. For example, a network is a building block that can be described through complementary artefact's and then put to use to realize solutions for the enterprise.

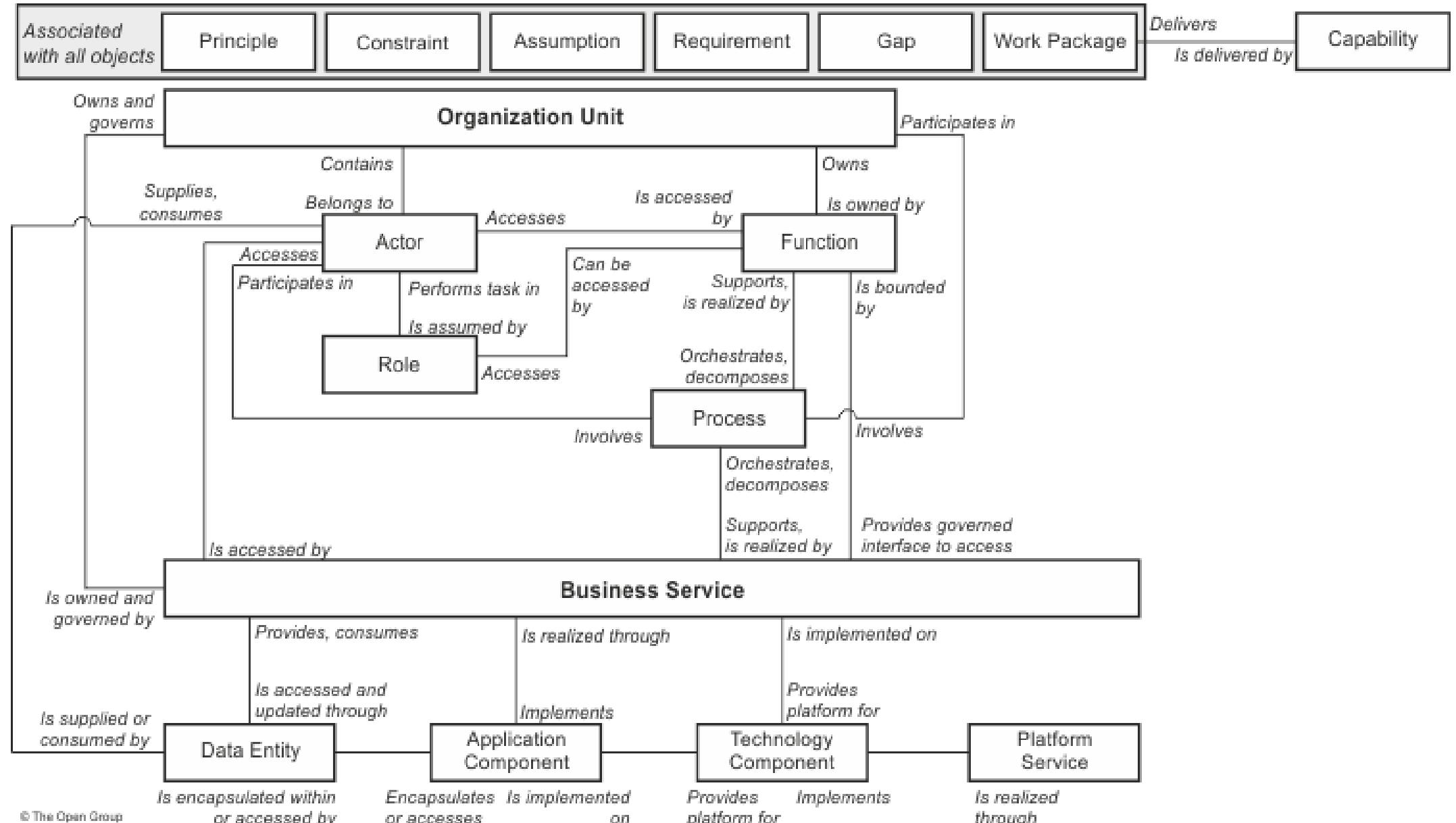


# Content Metamodel

- ▶ Provides a definition of all the types of building blocks that may exist within an architecture, showing how these building blocks can be described and related to one another.



# Metamodel entities and Their Relationships



# Building Blocks

Building blocks have generic characteristics as follows:

- ▶ A building block is a package of functionality defined to meet the business needs across an organization.
- ▶ A building block has a type that corresponds to the TOGAF content metamodel (such as actor, business service, application, or data entity)
- ▶ A building block has a defined boundary and is generally recognizable as "a thing" by domain experts.
- ▶ A building block may interoperate with other, inter-dependent, building blocks.
- ▶ A good building block has the following characteristics:
  - ▶ It considers implementation and usage, and evolves to exploit technology and standards.
  - ▶ It may be assembled from other building blocks.
  - ▶ It may be a subassembly of other building blocks.
  - ▶ Ideally a building block is re-usable and replaceable, and well specified.

# The Enterprise Continuum



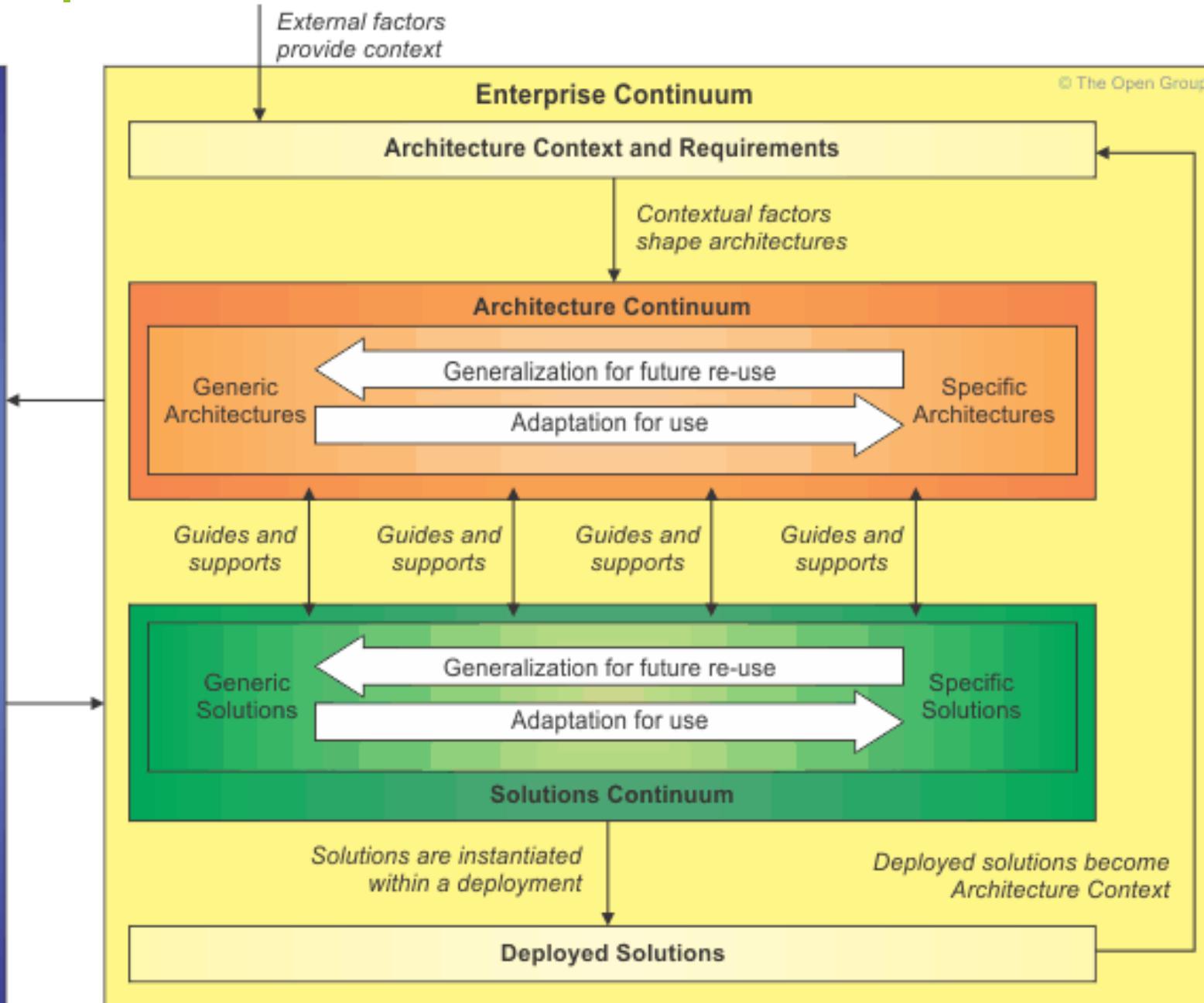
- ▶ The Enterprise Continuum is a view of the Architecture Repository that provides methods for classifying architecture and solution artefacts as they evolve from generic Foundation Architectures to Organization-Specific Architectures.
- ▶ The Enterprise Continuum comprises two complementary concepts:
  - ▶ **Architecture Continuum**- offers a consistent way to define and understand the generic rules, representations, and relationships in an architecture, including traceability and derivation relationships (e.g., to show that an Organization-Specific Architecture is based on an industry or generic standard). Represents a structuring of Architecture Building Blocks (ABBs)
  - ▶ **Solutions Continuum** -The Solutions Continuum provides a consistent way to describe and understand the implementation of the assets defined in the Architecture Continuum. The Solutions Continuum defines what is available in the organizational environment as re-usable Solution Building Blocks (SBBs).
- ▶ The Enterprise Continuum provides a view of the Architecture Repository that shows the evolution of these related architectures from generic to specific, from abstract to concrete, and from logical to physical.
- ▶ Consists of all the architecture assets; that is, models (eg. TRM), patterns, architecture descriptions, and other artifacts produced during application of the ADM.

# The Enterprise Continuum

Enterprise Repositories  
(including Requirements Repository, Architecture Repository, Design Stores, and CMDB)

The Enterprise Continuum provides structure and classification for assets in Enterprise Repositories.

Enterprise Repositories provide resources to be classified within the Enterprise Continuum.



# The Architecture Continuum

Industry Architect integration of core components with specific components to the creation of integrated solutions for problems within a specific industry.

Organizational Arch relevant to company

A Foundation Architecture is an architecture of building blocks and corresponding standards that supports all the Common Systems Architectures and, therefore, the complete enterprise operating environment. Eg the Technical Reference Model(TRM) effective across enterprises.

Systems Architectures guide the integration and integration of services from the Foundation Architecture to create an architecture for building common solutions involving a number of relevant Integrated Information Architecture Reference Model (III-RM)

Foundation Arch.

Common Systems Arch.

Industry Arch.

Organization Arch.

# The Solutions Continuum

An Industry Solution is an implementation of the Foundation Architecture, which uses reusable packages of components and standards from an industry. Fundamental building blocks are provided by Common Solutions and/or Industry Solutions, and are augmented with industry-specific components.

An Organization-Specific Solution is an implementation of the Organization-Specific Architecture that provides the required business functions. They contain the highest amount of unique content in order to accommodate the varying people and processes of specific organizations.

Common Systems Solutions represent collections of common requirements and capabilities, rather than those specific to a particular customer or industry. Common Systems Solutions provide organizations with operating environments specific to operational organizational needs, such as high transaction processing and scalable warehousing systems. Examples of Common Systems Solutions include: an enterprise management system product and a security system product.

Foundation Arch.

Common Systems Arch.

Industry Arch.

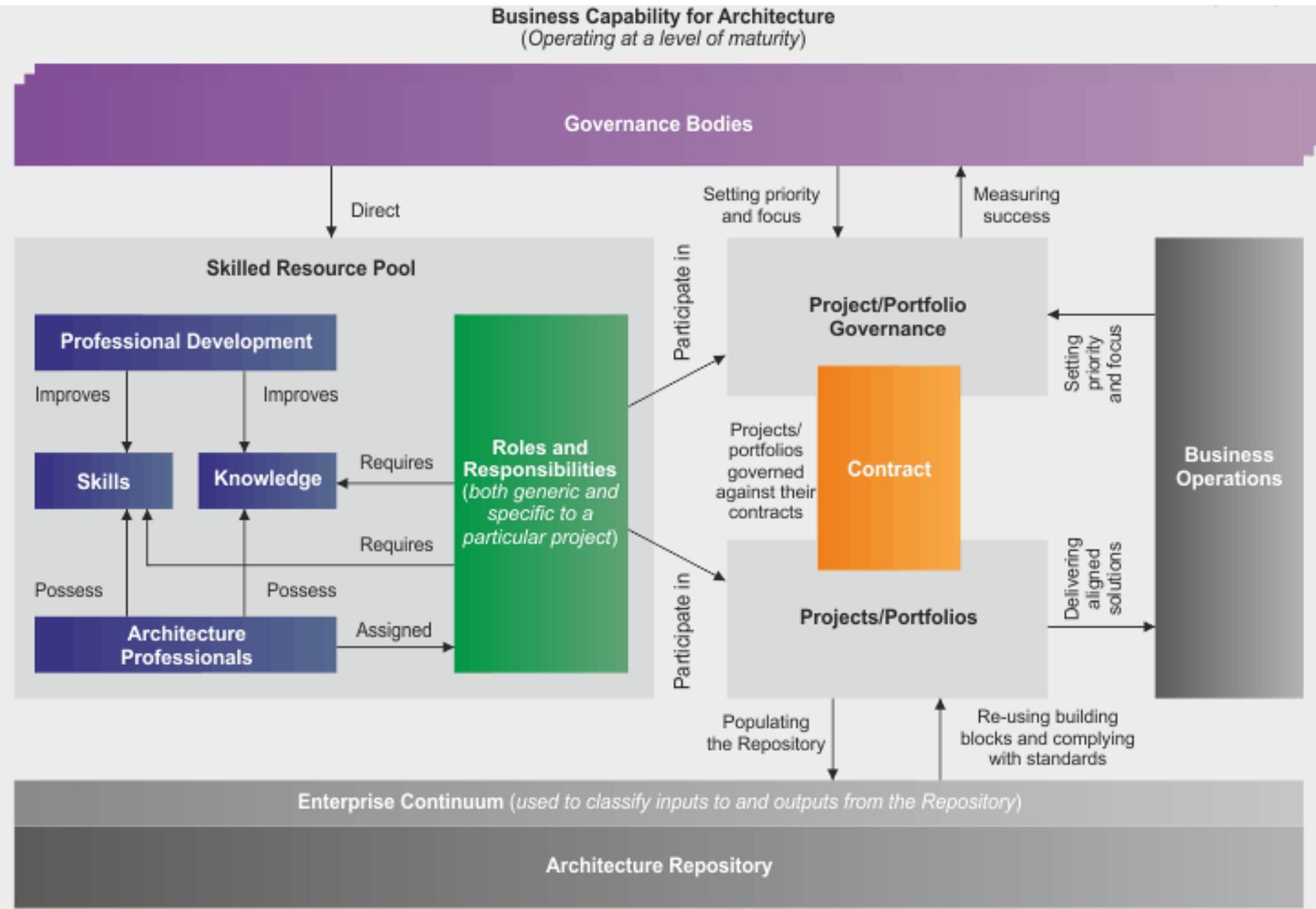
Organization Arch.

# Architecture Capability Framework

## Architecture Capability Framework Contents:

Chapter	Description
Establishing an Architecture Capability	Guidelines for establishing an Architecture Capability within an organization.
Architecture Board	Guidelines for establishing and operating an enterprise Architecture Board.
Architecture Compliance	Guidelines for ensuring project compliance to architecture.
Architecture Contracts	Guidelines for defining and using Architecture Contracts.
Architecture Governance	Framework and guidelines for Architecture Governance.
Architecture Maturity Models	Techniques for evaluating and quantifying an organization's maturity in enterprise architecture.
Architecture Skills Framework	A set of role, skill, and experience norms for staff undertaking enterprise architecture work.

# Architecture Capability Framework



# TOGAF Document Categorization Model

The categories are as follows:

Category	Description	Examples
TOGAF Core	The fundamental concepts that form the essence of TOGAF.	2. Core Concepts 5.2.2 Basic Structure
TOGAF Mandated	The normative parts of the TOGAF specification. These elements are central to its usage and without them the framework would not be recognizably TOGAF.	3. TOGAF Definitions For each ADM phase: Objectives Inputs Steps Outputs
TOGAF Recommended	A pool of resources that are specifically referenced in TOGAF as ways in which TOGAF Core and TOGAF Mandated processes can be accomplished.	Business Scenarios Gap Analysis The SEI Architecture Trade-off Analysis Method
TOGAF Supporting	Additional resources not referenced in the other TOGAF categories.	Release Notes Evaluation Criteria for Tools

# Version Management

Phase	Deliverable	Content	Version	Description
A: Architecture Vision	Architecture Vision	Business Architecture	0.1	Version 0.1 indicates that a high-level outline of the architecture is in place.
		Data Architecture	0.1	
		Application Architecture	0.1	
		Technology Architecture	0.1	
B: Business Architecture	Architecture Definition Document	Business Architecture	1.0	Version 1.0 indicates a formally reviewed, detailed architecture.
C: Information Systems Architecture	Architecture Definition Document	Data Architecture	1.0	
		Application Architecture	1.0	
D: Technology Architecture	Architecture Definition Document	Technology Architecture	1.0	

# Stakeholder Management

*"helps them ensure that their projects succeed where others fail by managing Stakeholders."*

## Classify Stakeholder Positions

Stakeholder Group	Stakeholder	Ability to Disrupt Change	Current understanding	Required understanding	Current Commitment	Required Commitment	Required Support
CIO	John Smith	H	M	H	L	M	H
CFO	Jeff Brown	M	M	M	L	M	M

## Determine Stakeholder Management Approach



# Gap Analysis

*"It is used to validate an architecture that is being developed."*

- ▶ Draw up a matrix with all the Architecture Building Blocks (ABBs) of the Baseline Architecture on the vertical axis, and all the ABBs of the Target Architecture on the horizontal axis.
- ▶ Add to the Baseline Architecture axis a final row labeled "New", and to the Target Architecture axis a final column labeled "Eliminated".
- ▶ Where an ABB is available in both the Baseline and Target Architectures, record this with "Included" at the intersecting cell.
- ▶ Where an ABB from the Baseline Architecture is missing in the Target Architecture, each must be reviewed. If it was correctly eliminated, mark it as such in the appropriate "Eliminated" cell. If it was not, an accidental omission in the Target Architecture has been uncovered that must be addressed by reinstating the ABB in the next iteration of the architecture design - mark it as such in the appropriate "Eliminated" cell.
- ▶ Where an ABB from the Target Architecture cannot be found in the Baseline Architecture, mark it at the intersection with the "New" row as a gap that needs to be filled, either by developing or procuring the building block.

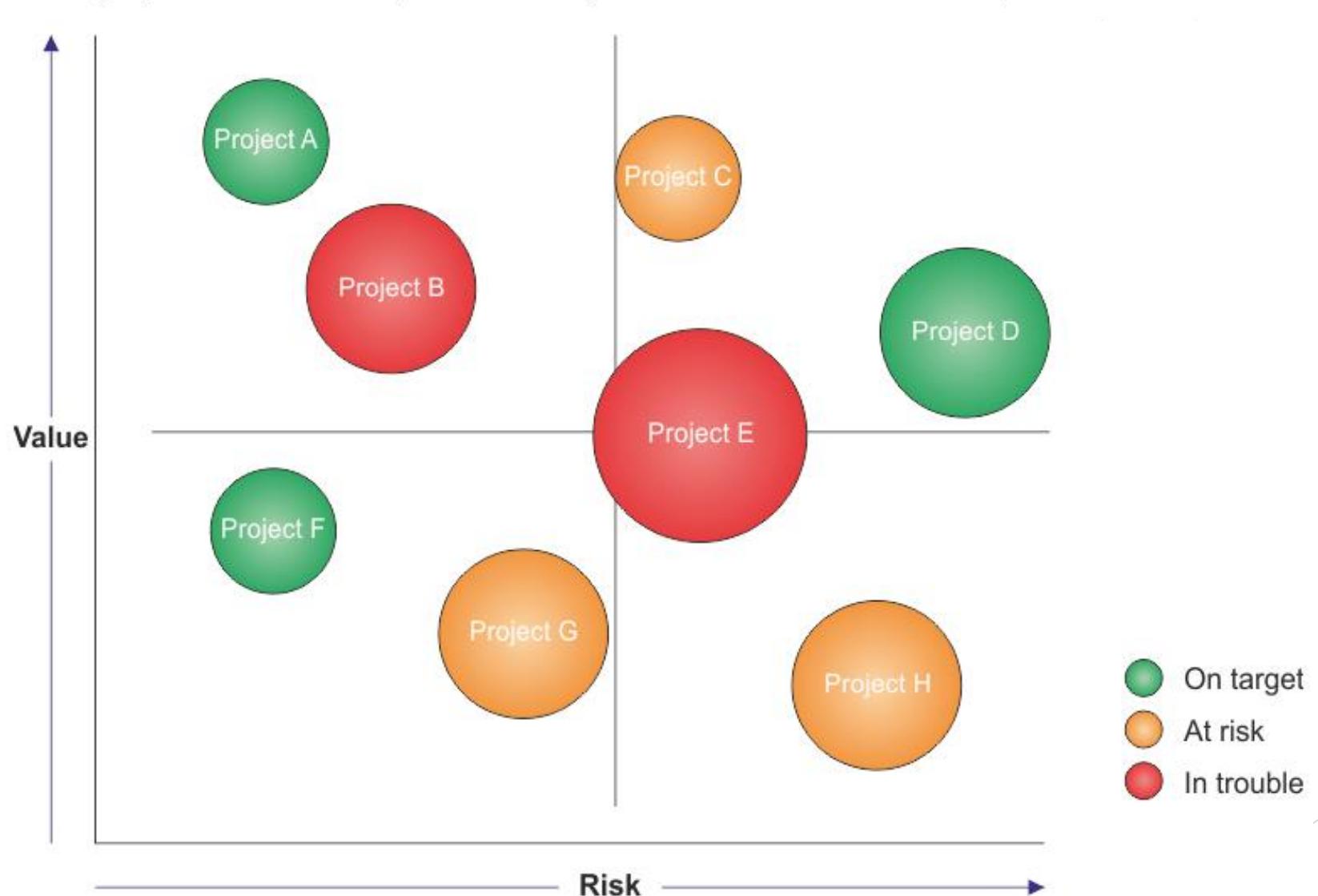
# Gap Analysis Example :

Target → Architecture Baseline Architecture ↓	Video Conferencing Services	Enhanced Telephony Services	Mailing List Services	Eliminated Services ↓
Broadcast Services				Intentionally eliminated
Video Conferencing Services	Included			
Enhanced Telephony Services		Potential match		
Shared Screen Services				Unintentionally excluded - a gap in Target Architecture
New →		Gap: Enhanced services to be developed or produced	Gap: To be developed or produced	

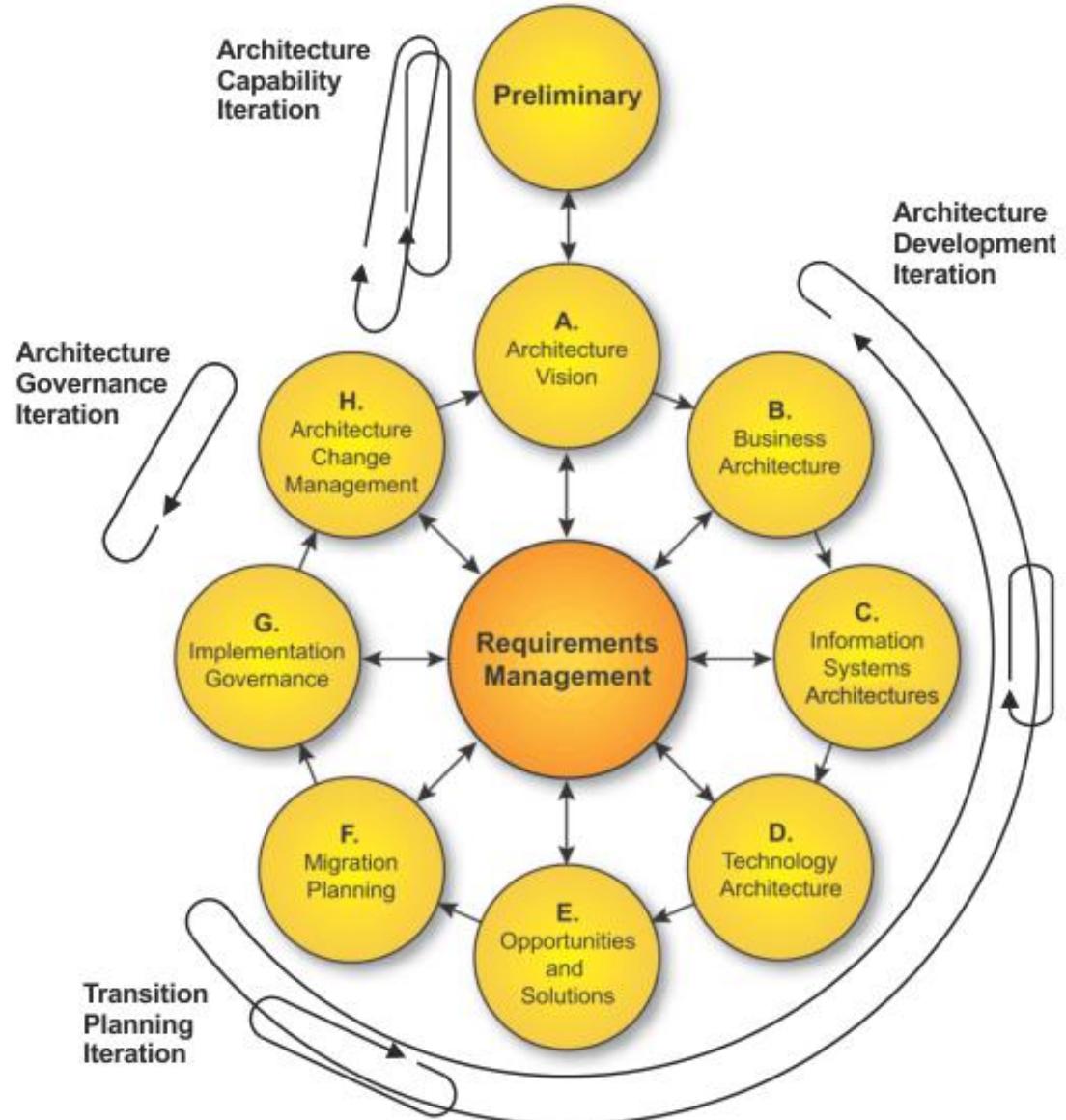
# Migration Planning Technique

## Business Value Assessment Technique

(Project size indicated by size of circle.)



# Iteration Cycles



# Views & View Points

Views → View Points →



Business Architecture						
Planer View	List of important things to enterprise	List of processes the enterprise performed	List of locations where the enterprise operates	List of organization units	List of business events/cycles	List of business objectives
Owner's View	Entity Relationship diagram	Business Process Model	Logistics Network	Organizational Chart	Business Master Schedule	Business Rules

Information Architecture						
Designer's View	Data model	Essential data flow, application architecture	Distributed system architecture	Human interface architecture	Dependency diagram, entity life history	Business Rule model

Information & comm. Technology Architecture						
Builder's View	Data Architecture	System design: structure chart, pseudo code	Systems Architecture	User interface design	Control flow diagram	Business Rule design
Detailed View	Data design, physical storage	Detailed program design	Network Architecture	Screens	Timing of definitions	Rule specification in program logic
Operational View	Converted Data	Executable programs	Communications facilities	Trained people	Business events	Enforced rule

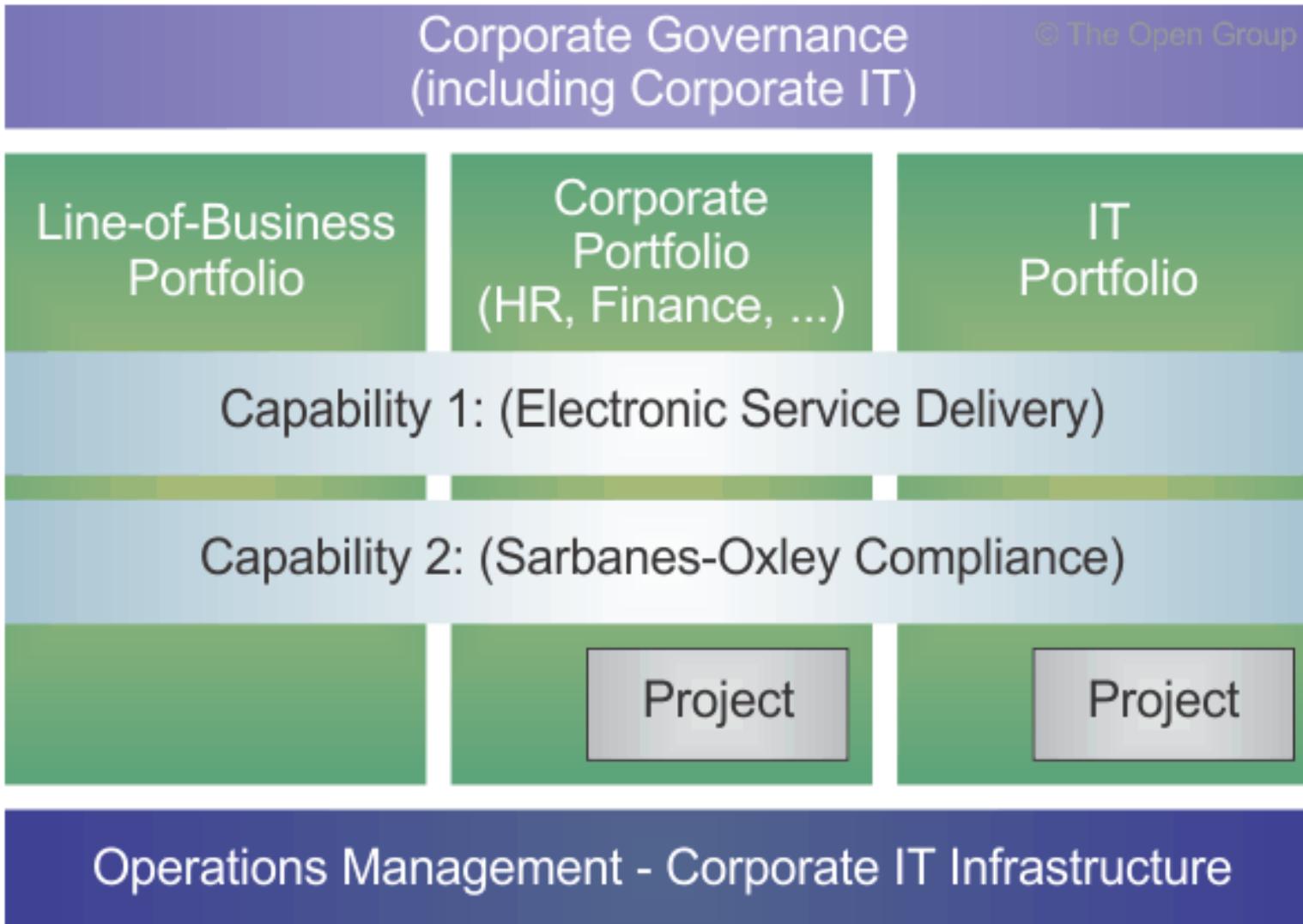
- ▶ **Architecture View** : A view is a representation of a system from the perspective of a related set of concerns. A view is what you see (or what a stakeholder sees). Views are specific.
- ▶ **Architecture Viewpoint**: where you are looking from; the vantage point or perspective. Viewpoints are generic. A model (or description) of the information contained in a view.

# Capability-Based Planning

*"focuses on the planning, engineering, and delivery of strategic business capabilities to the enterprise."*

- ▶ It is business-driven and business-led and combines the requisite efforts of all lines of business to achieve the desired capability.
- ▶ Capability-based planning accommodates most, if not all, of the corporate business models.
- ▶ Many capabilities are "horizontal" and go against the grain of normal vertical corporate governance.
  
- ▶ Three Capability Dimensions:
  1. People: Training
  2. Process: Business Processes/Information Management
  3. Material: Infrastructure/Technology/Equipment

# Capability-Based Planning



Functional Management (Vertical)

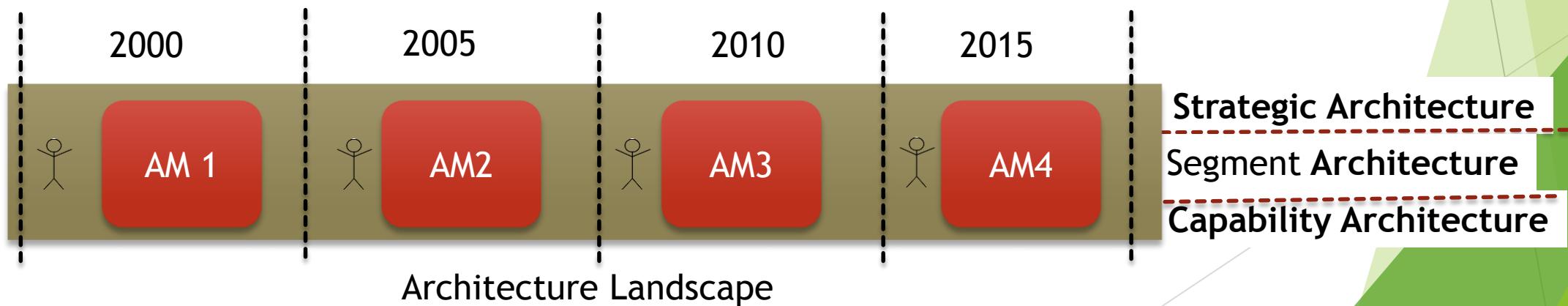
Many capabilities are "horizontal" and go against the grain of normal vertical corporate governance.

Capability Management (Horizontal)



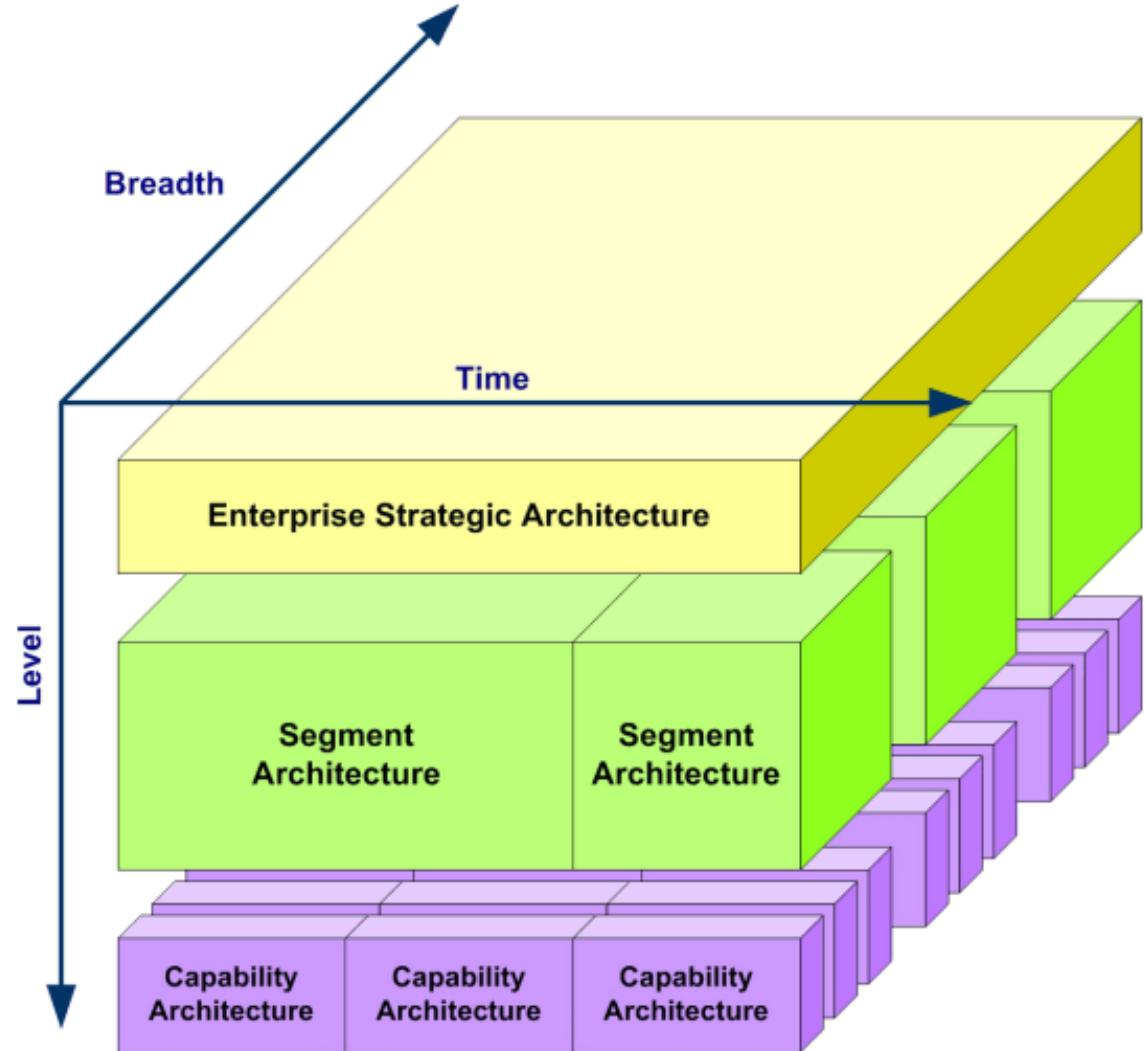
# Architecture Landscape

- ▶ Shows how the AM (Architectural Model) has changed over time.
- ▶ Strategic Architecture provides an organizing framework for operational and change activity and allows for direction setting at an executive level.
- ▶ Segment Architecture provides an organizing framework for operational and change activity and allows for direction setting and the development of effective architecture roadmaps at a program or portfolio level.
- ▶ Capability Architecture provides an organizing framework for change activity and the development of effective architecture roadmaps realizing capability increments.



# Architecture Landscape

Levels provide a framework for dividing the Architecture Landscape into three levels of granularity:

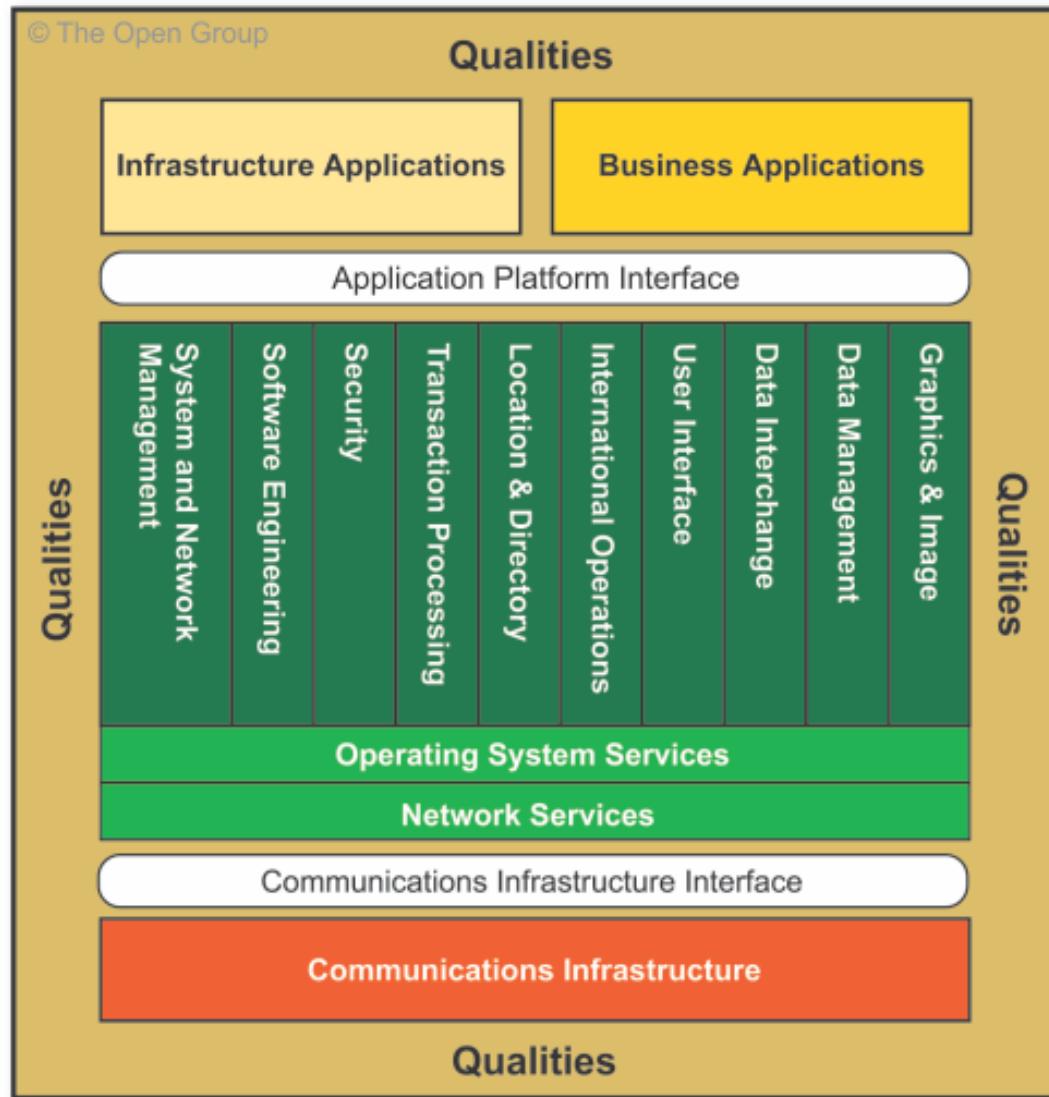


# Foundation Architecture: Technical Reference Model (TRM)

- ▶ The Foundation Architecture is embodied within the Technical Reference Model (TRM), which provides a model and taxonomy of generic platform services.
- ▶ The TRM is universally applicable and, therefore, can be used to build any system architecture.
- ▶ Any TRM has two main components: (same as III-RM)
  1. A **taxonomy**, which defines terminology, and provides a coherent description of the components and conceptual structure of an information system.
  2. An associated **TRM graphic**, which provides a visual representation of the taxonomy, as an aid to understanding.

# Foundation Architecture: Technical Reference Model (TRM)

TRM graphic



# Integrated Information Infrastructure Reference Model (III-RM)

*“The ability of information to permeate boundaries such as departments and organisations.”*

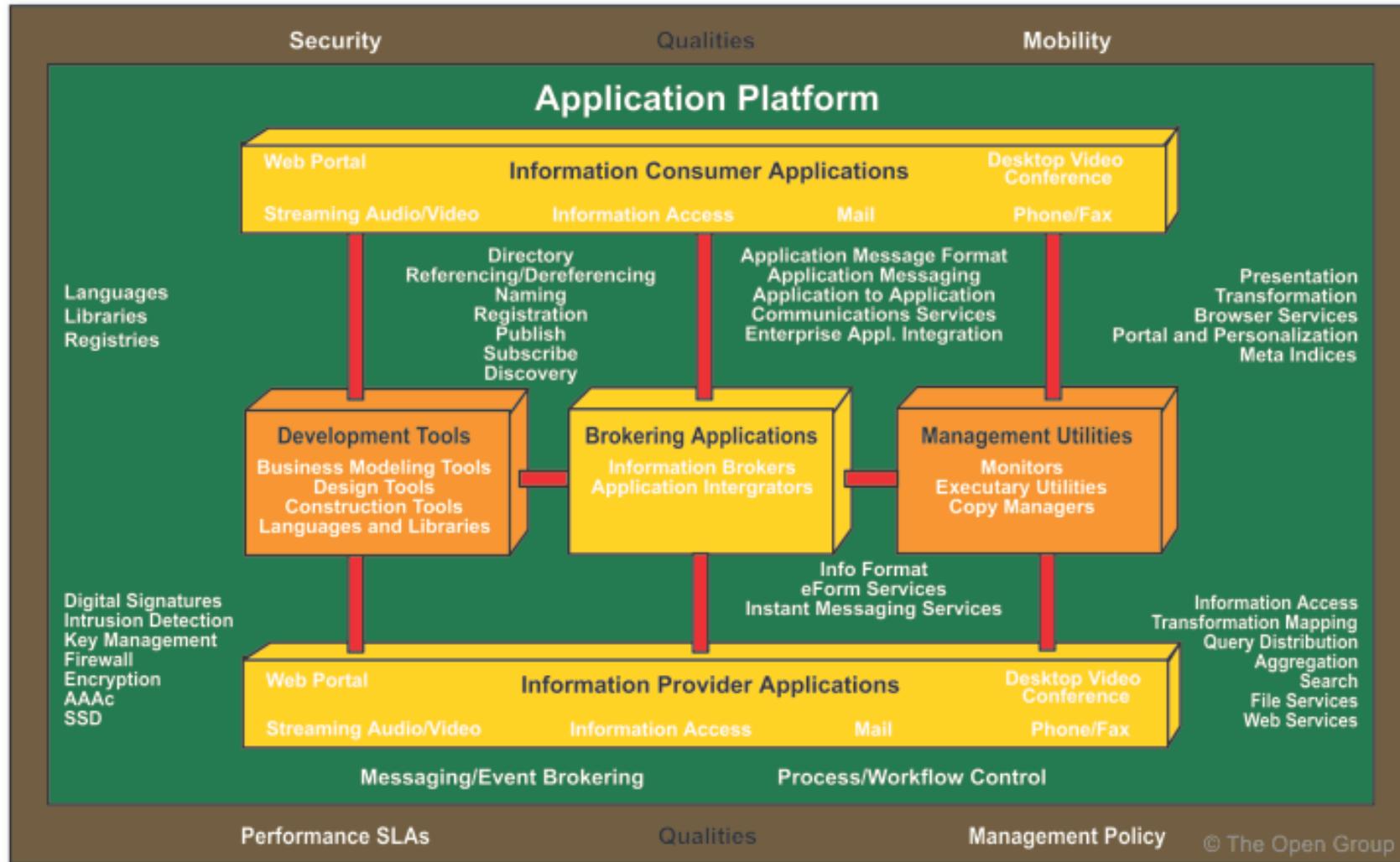
- ▶ The III-RM is a subset of the TOGAF TRM in terms of its overall scope, but it also expands certain parts of the TRM - in particular, the business applications and infrastructure applications parts - in order to provide help in addressing one of the key challenges facing the enterprise architect today: the need to design an integrated information infrastructure to enable Boundaryless Information Flow.
- ▶ The model assumes the underlying existence of a computing and network platform, as described in the TRM.

This is a **Common  
Systems Architecture.**



# Integrated Information Infrastructure Reference Model (III-RM)

## Detailed III-RM Graphic



# The End

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