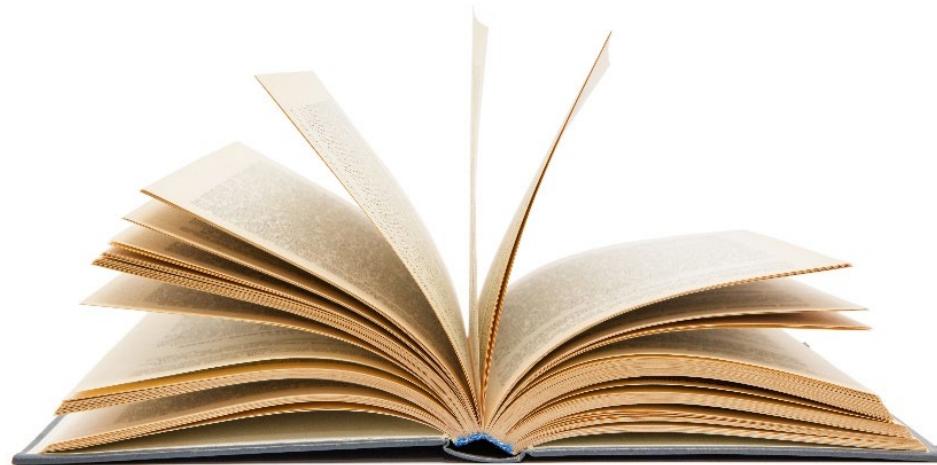




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TOGAF® 9 Training Course



THE
Open
GROUP

About The Knowledge Academy

- World Class Training Solutions
- Subject and Topic Experts
- High Quality Training Materials
- Accelerated Learning Techniques
- Leading Provider of PRINCE2®, MSP®, Project Management, Change Management, & ITIL® Certifications
- Bespoke Training Solutions



Project Management & Leadership

Business Architecture & Systems Design

Technical & Programming

Computer Software

theknowledgeacademy

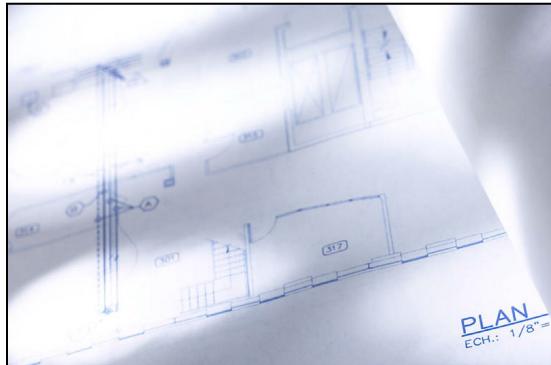
Business & Corporate

Web, Marketing, PR & Social

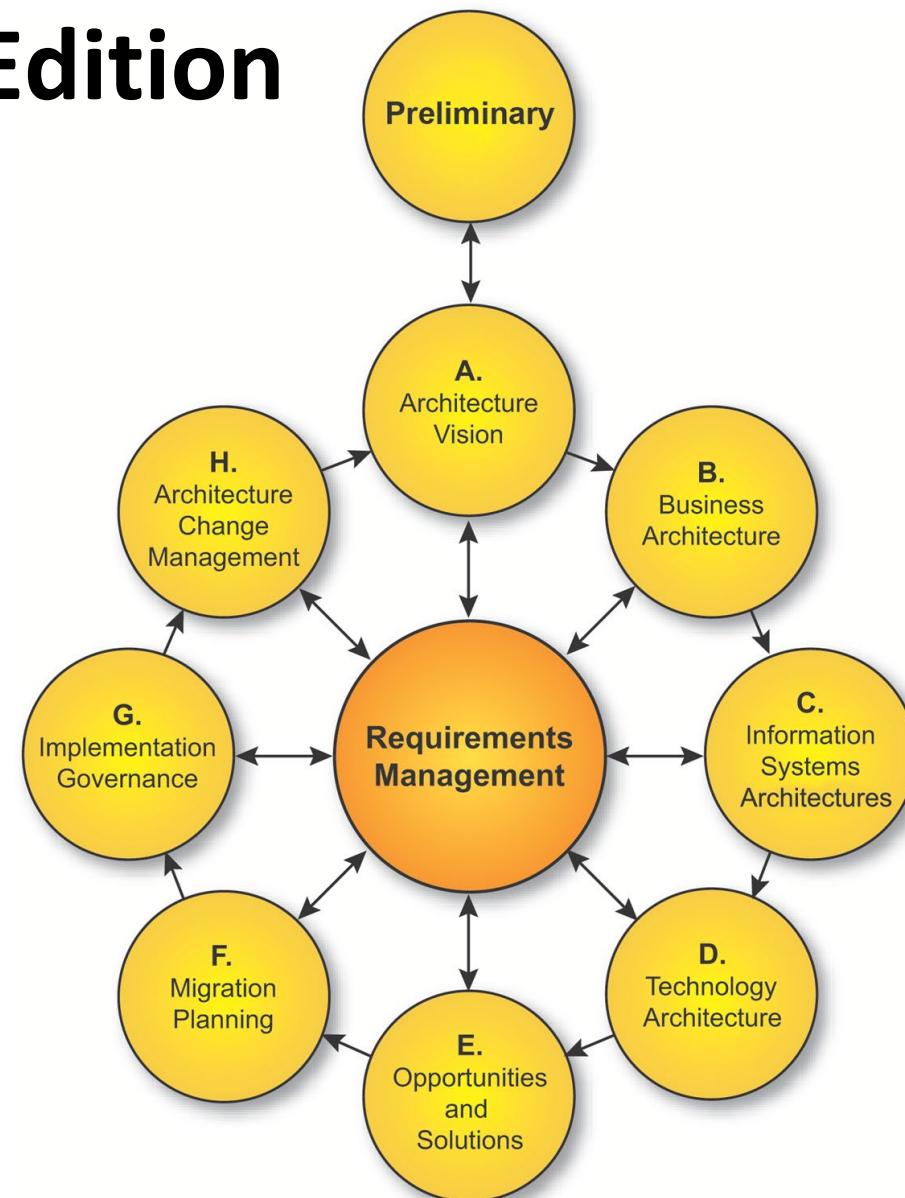
Legal, Finance & Accounting

Workplace Requirements

TOGAF® Standard Courseware Version 9.2 Edition

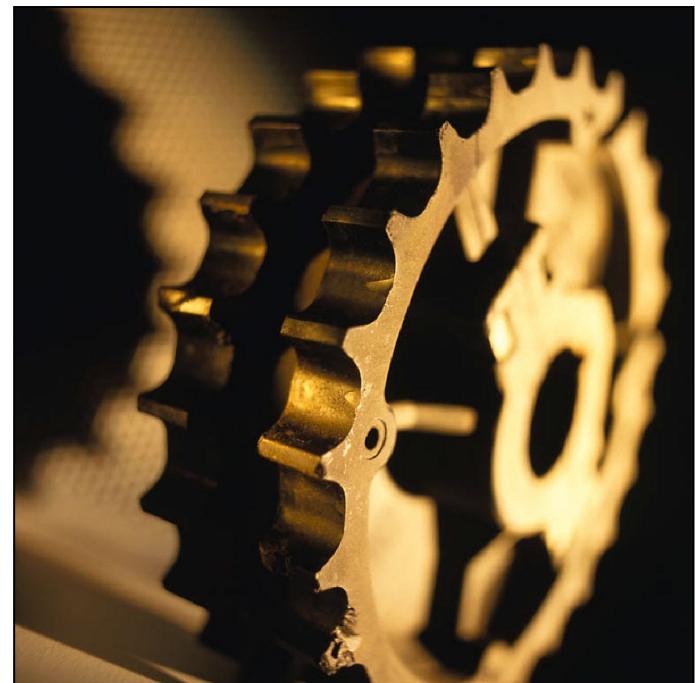


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About this Course

- This is a modular course
- It can be assembled into many configurations
- It can be further customised
- It is expected to be tailored to the audience
- This modular course can be given in a number of configurations:
 - TOGAF 9 Foundation training
 - TOGAF 9 Certified training
 - TOGAF 9 Foundation to Certified Upgrade training

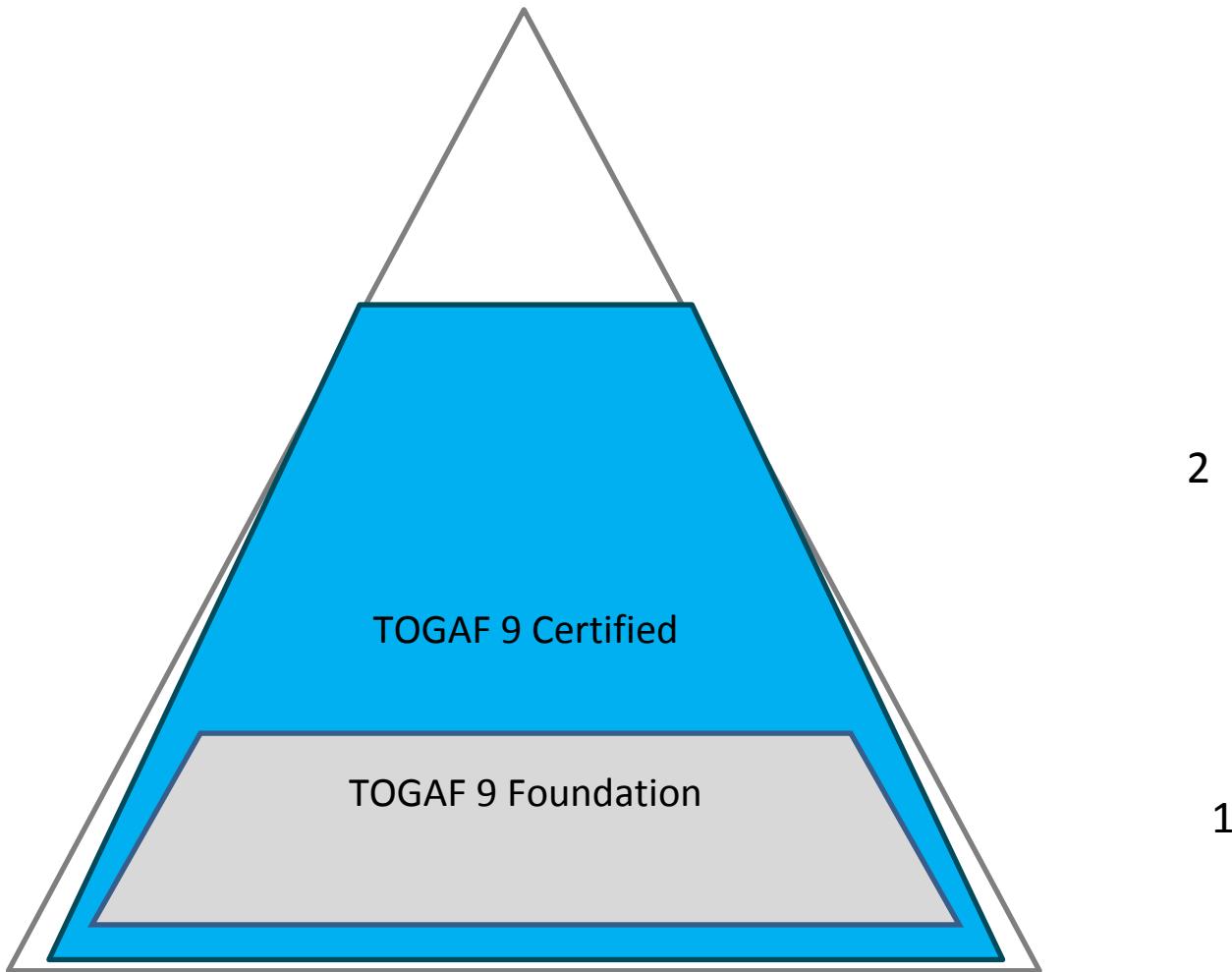




TOGAF 9 Certification Levels

| Level | Tag | Purpose | Audience |
|-------|-------------------------------------|--|---|
| 1 | <i>TOGAF 9 Foundation (Level 1)</i> | To provide validation that the candidate has gained knowledge of the TOGAF terminology, structure, and basic concepts, and understands the core principles of Enterprise Architecture and the TOGAF standard | <ul style="list-style-type: none">Individuals who require a basic understanding of the TOGAF 9 standardProfessionals who are working in roles associated with an architecture project such as those responsible for planning, execution, development, delivery and operationArchitects who are looking for a first introduction to the TOGAF standardArchitects who want to achieve Level 2 certification in a stepwise approach |
| 2 | <i>TOGAF 9 Certified (Level 2)</i> | To provide validation that in addition to knowledge and comprehension, the candidate is able to analyse and apply knowledge of the TOGAF standard | <ul style="list-style-type: none">Individuals who require a deeper understanding of the TOGAF 9 standardProfessionals who are working in an organisation where the TOGAF 9 standard has been adopted and who need to participate in architecture projects and initiativesArchitects who will be responsible for developing architecture artifactsArchitects who wish to introduce the TOGAF 9 standard into an architecture practiceArchitects who want to achieve a recognized qualification to demonstrate their detailed knowledge of the TOGAF 9 standard |

Level 2 is a Superset of Level 1



Exam Details

- Email exambookings@theknowledgeacademy.com to obtain an electronic voucher for the Direct (combined) exam
 - Voucher valid for approximately **one year**
- Use this voucher to book an exam slot via
 - <http://pearsonvue.com/theopengroup>
- Do not forget the **two** forms of ID needed to take the exam
 - See pearsonvue.com website
- Remember all exams are subject to change
- You cannot resit an exam within the month
- You cannot attempt Level 2 without passing Level 1 (unless attempting Direct exam)



Module F13:

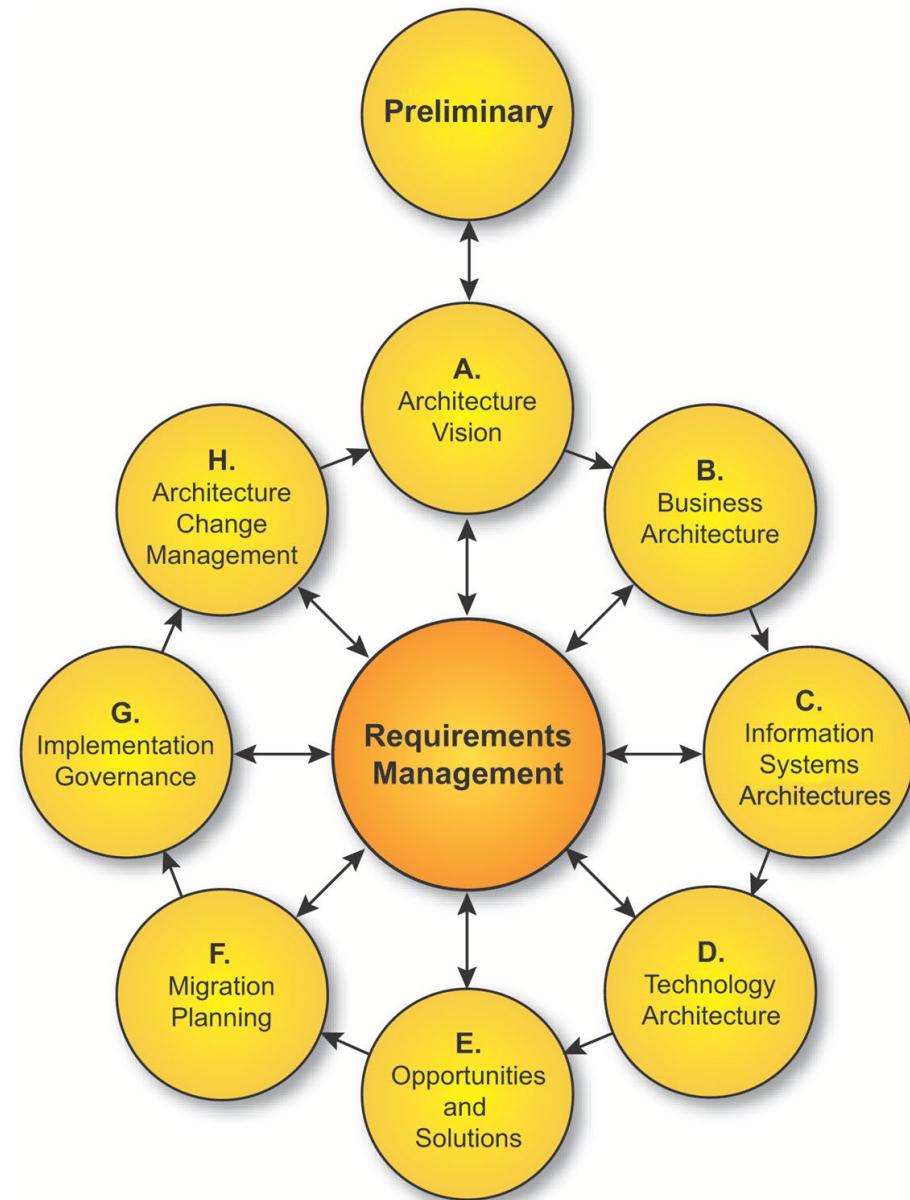
The TOGAF® Certification

for People Program



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The TOGAF® Certification for People Program



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Module Objectives

The objectives are to:

- Describe The Open Group Certification for People program for the TOGAF Standard
- Understand the levels for certification
- Understand the paths for certification
- Understand the requirements for certification

TOGAF Certification for People

- Ensures that individuals are knowledgeable about the TOGAF standard
- Is a common baseline of knowledge
- Provides a visible trust mark
- Is a foundation for the emerging profession



Level 1 Learning Units

- Basic Concepts
- Core Concepts
- General Definitions
- Introduction to the ADM
- Enterprise Continuum and Tools
- ADM Phases (Level 1)
- ADM Guidelines and Techniques
- Architecture Governance (Level 1)
- Architecture Views, Viewpoints and Stakeholders
- Building Blocks
- ADM Deliverables (Level 1)
- TOGAF Reference Models (Level 1)
- TOGAF Certification Program



Level 2 Learning Units

- **Level 1 Units +**
- Preliminary Phase
- Architecture Governance (Level 2)
- Business Scenarios Technique
- Phase A: Architecture Vision
- Architecture Content Framework
- Stakeholder Management
- TOGAF Content Metamodel
- Architecture Implementation Support Techniques
- Phase B: Business Architecture
- Phase C: Information Systems Architectures – Data Architecture
- Phase C: Information Systems Architectures – Application Architecture
- TOGAF Foundation Architecture: The TRM (Level 2)
- The Integrated Information Infrastructure Reference Model (Level 2)
- Phase D: Technology Architecture
- Migration Planning Techniques
- Phase E: Opportunities & Solutions
- Phase F: Migration Planning
- Phase G: Implementation Governance
- Phase H: Architecture Change Management
- ADM Architecture Requirements Management
- Architecture Partitioning
- The Architecture Repository
- Guidelines for Adapting the ADM: Iteration and Levels
- Guidelines for Adapting the ADM: Security
- Architecture Maturity Models
- Architecture Skills Framework

Level 1 Exam Requirements

| Level | Tag | Requirements |
|-------|---------------------------|---|
| 1 | <i>TOGAF 9 Foundation</i> | <p>Exam Type: Multiple Choice 40 Questions / 60 minutes Supervised: Yes Open Book: No</p> |
| 2 | <i>TOGAF 9 Certified</i> | <p><u><i>Either Stepwise Development:</i></u> Level 2 requires passing two examinations. Exam 1 is identical to the Level 1 examination (leads to TOGAF 9 Foundation as an intermediate step)</p> <p><u><i>Or Direct to Level 2:</i></u> Passing the single exam: TOGAF 9 Combined Part 1 and 2 (leads only to TOGAF 9 Certified)</p> |

Level 2 Stepwise Development

| Level | Tag | Requirements |
|-------|--------------------------|---|
| 2 | <i>TOGAF 9 Certified</i> | <p><u>Exam 1:</u></p> <p>Exam Type: Multiple Choice</p> <p>40 Questions / 60 minutes</p> <p>Supervised: Yes</p> <p>Open Book: No</p> <p><u>Exam 2:</u></p> <p>Exam Type: Complex Multiple Choice</p> <p>Scenario-based</p> <p>8 Questions / 90 minutes</p> <p>Supervised: Yes</p> <p>Open Book: Yes</p> |

Level 2 Direct

| Level | Tag | Requirements |
|-------|--------------------------|---|
| 2 | <i>TOGAF 9 Certified</i> | <p><u>TOGAF 9 Combined Part 1 and 2</u></p> <p>Exam Type: Two sections in a single exam corresponding to the TOGAF 9 Part 1 and 2 exams:</p> <p>Section 1: Multiple Choice</p> <p>40 Questions / 60 minutes</p> <p>Section2: Complex Multiple Choice Scenario-based</p> <p>8 Questions / 90 minutes</p> <p>Total 150 minutes</p> <p>Supervised: Yes</p> <p>Open Book: Dependent on section. Section 1 No, Section 2: Yes.</p> |

Certification

Combined Part 1 and 2 Examination

- Each section must be passed in order to obtain an overall pass mark
- If you fail a section then no certification is awarded, however you only need retake the Examination(s) corresponding to the failed section(s)
- You must wait one month before a retake
- Within 6 working days of receipt of the exam results you will receive an email from The Open Group and be invited to login to complete your certification
- You may download and print your certificate
- You can adjust your register entry to make it public (the default is to be confidential)
- You will be invited to opt-in to The Open Group Badging program to receive a digital credential (in addition to the certificate)



TOGAF 9 Foundation

Training

Applicable Modules *

* See Checklist for requirements for Accreditation



TOGAF 9 Foundation

Course Content

- Course Introduction
- Management Overview
- The TOGAF Framework Components
- An Introduction to the Architecture Development Method
- The Enterprise Continuum
- The Architecture Repository
- Architecture Governance
- Architecture Views and Viewpoints
- Building Blocks and the ADM
- The ADM Phases
- ADM Guidelines and Techniques
- Key ADM Deliverables
- TOGAF Reference Models
- TOGAF Certification Program



Prerequisite Knowledge

- A prior knowledge of Enterprise Architecture is advantageous but not required
- During the course students will become familiar with the current *TOGAF* body of knowledge
- **Note: Certification is separate to training and achieved by passing an examination**



Course Objectives

- To instruct students in the basic concepts of enterprise architecture and the TOGAF 9 standard
- To familiarize students with the features of the TOGAF standard and its methodology
- To enable students to take best advantage of how to use the TOGAF approach in their work
- To gain an understanding of the necessary body of knowledge to achieve certification by examination at Level 1 (TOGAF 9 Foundation) or Level 2 (TOGAF 9 Certified)



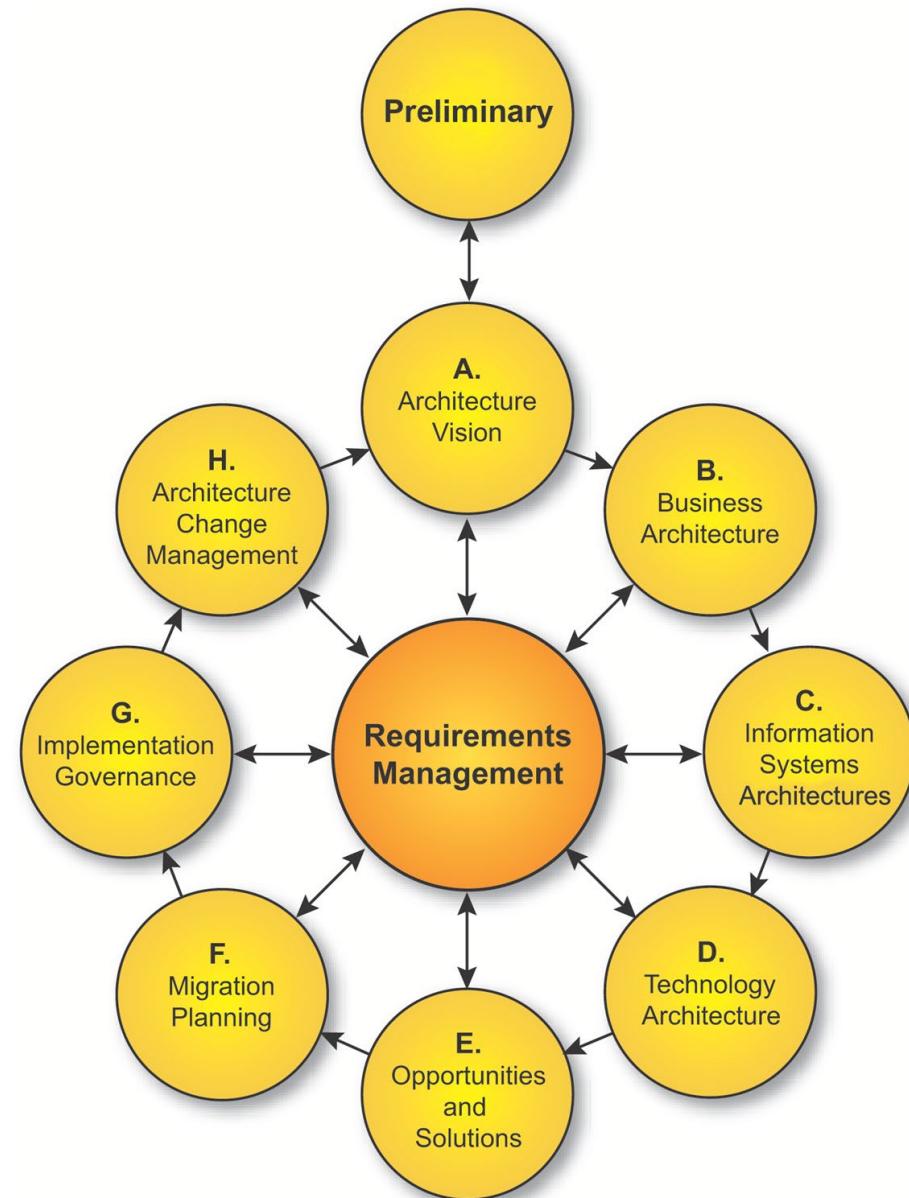
Module 1:

Management Overview



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Management Overview



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Module Objectives

- To provide a management overview of the TOGAF Standard and its ecosystem
 - The Open Group
 - The Architecture Forum
 - Why Enterprise Architecture?
 - Why a framework?
 - The TOGAF Standard, Version 9.2
 - The TOGAF Library
 - TOGAF 9 Certification
 - Summary



The Open Group

About The Open Group

- The Open Group is a global consortium that enables the achievement of business objectives through technology standards
- Its diverse membership of more than 500 organisations includes customers, systems and solutions suppliers, tool vendors, integrators, academics, and consultants across multiple industries

The Open Group Vision

Boundaryless Information Flow™

Achieved through global interoperability
In a secure, reliable, and timely manner

“Boundaryless does not mean there are no boundaries – it means that boundaries are permeable to enable business.”



Architecture Forum – Mission

- The mission of The Open Group Architecture Forum is to advance The Open Group vision of *Boundaryless Information Flow*, for and between enterprises,
- Through a set of programs that focus on all architectural aspects, including:
 - Providing broad and deep leadership to the EA community
 - Validating, publishing, fostering, and maintaining best practices for EA
 - Developing, organizing, researching, and publishing thought leaders in EA
 - Initiating and managing programs and projects to support these activities



What is an Enterprise?

- A collection of organisations that share a common set of goals
 - Government agency
 - Part of a corporation
 - Corporation
- Large corporations may comprise multiple enterprises
- May be an “extended enterprise” including partners, suppliers and customers

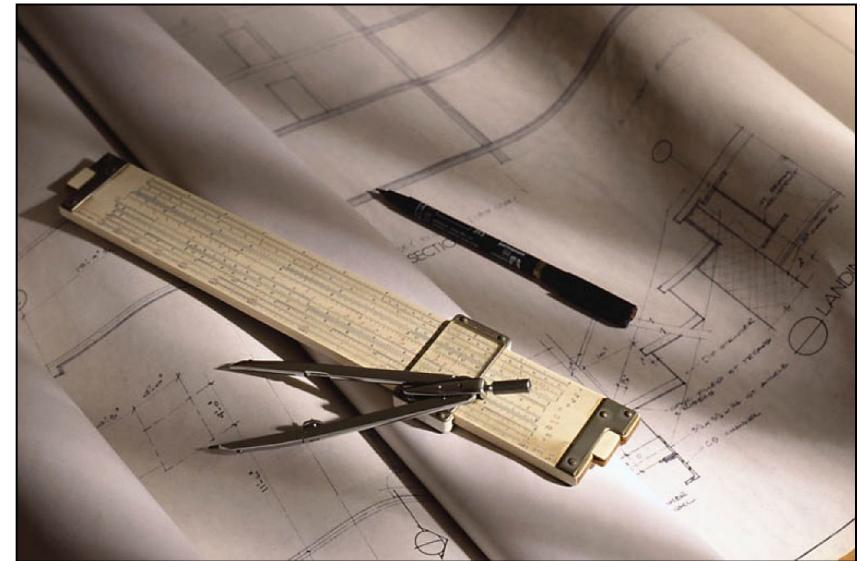
What is an Architecture?

- An Architecture is the fundamental concepts or properties of a system in its environment embodied in:
 - its elements
 - their relationships to each other and the environment
 - and the principles governing its design and evolution

What is Enterprise Architecture?

Enterprise Architecture is:

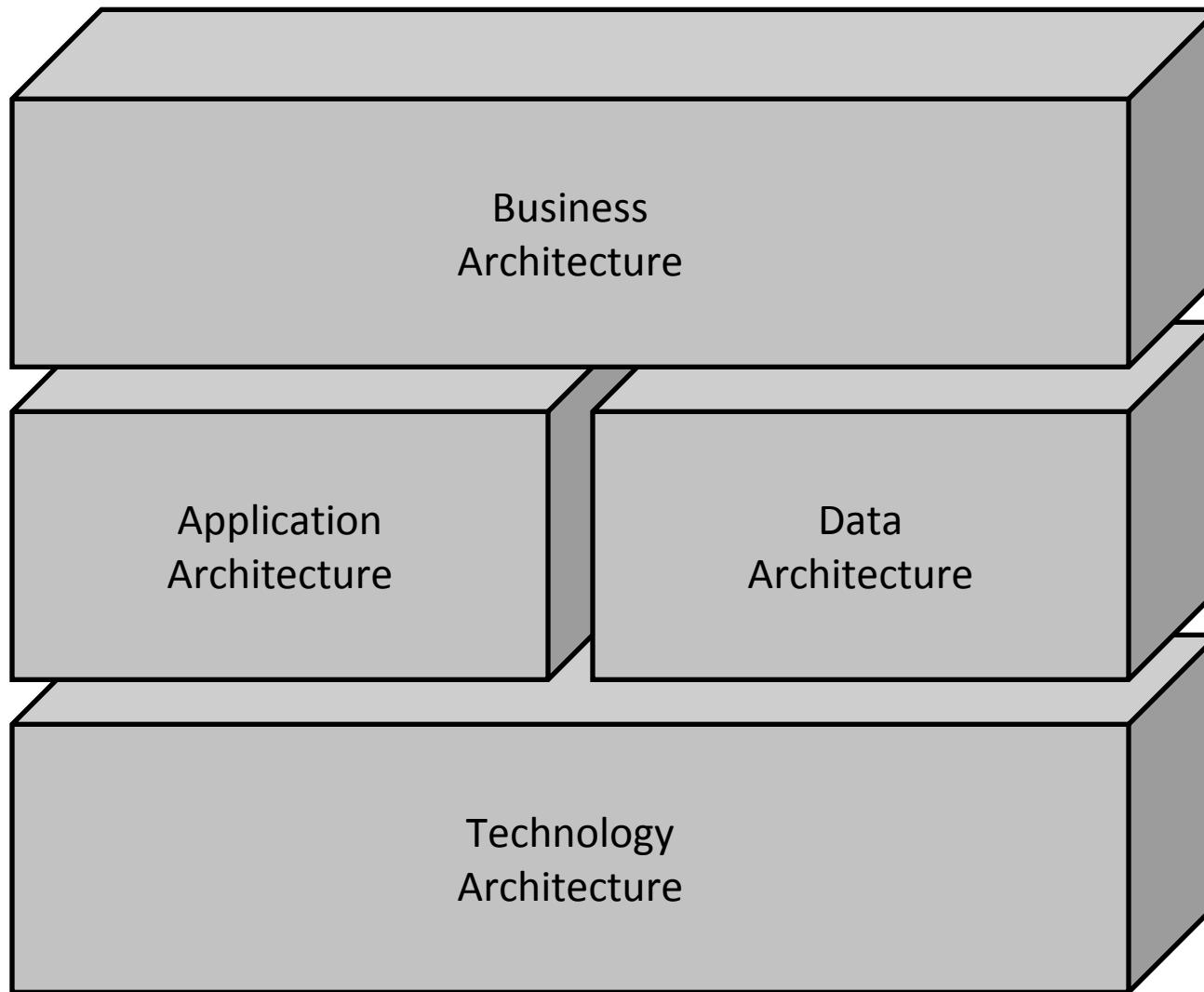
- The organising logic for business processes and IT infrastructure reflecting the integration and standardization requirements of the firm's operating model.[1]
- A conceptual blueprint that defines the structure and operation of an organisation. The intent of an Enterprise Architecture is to determine how an organisation can most effectively achieve its current and future objectives. [2]



[1] MIT Center for Information Systems Research

[2] SearchCIO.com

Architecture Types





Why Enterprise Architecture?

- Effective management and exploitation of information and Digital Transformation are key to business success
- Good information management = competitive advantage
- Current IT systems do not really meet the needs of business
 - Fragmented, duplicated
 - Poorly understood
 - Not responsive to change
- Investment in Information Technology
 - Focussed on system maintenance
 - Tactical developments rather than a strategic plan
- Two key reasons why you need an Enterprise Architecture:
 - A means to achieve competitive advantage
 - Enables managed innovation within the enterprise



Pressure to Develop Enterprise Architecture

- Laws and regulations
 - Clinger-Cohen Act (US Information Technology Management Reform Act 1996)
 - EU Directives on the Award of Public Contracts
 - Sarbanes-Oxley
- More extended enterprises
- More co-operative IT operations
- Greater publicity to failures
- Increase in litigation
- Audit requirements



Business Benefits of Enterprise Architecture

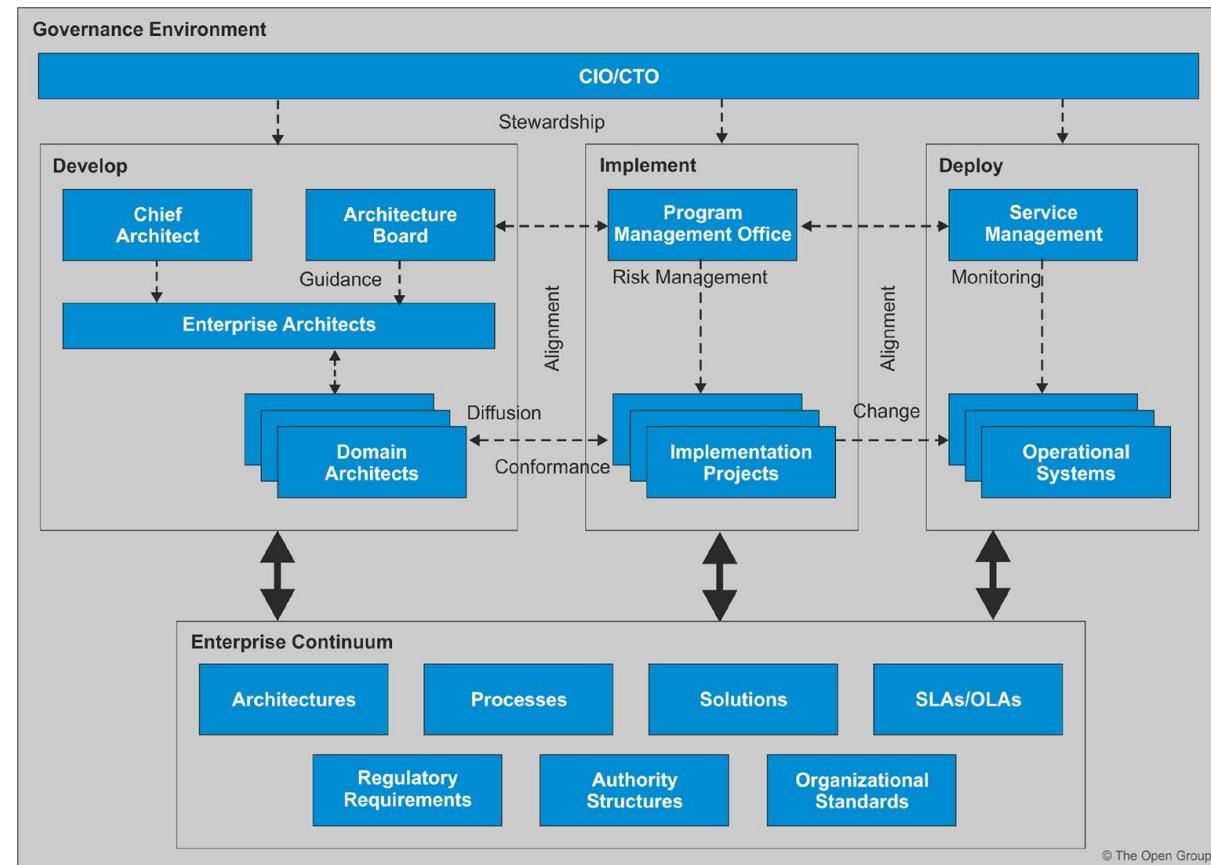
- It helps an organisation achieve its business strategy
- Faster time to market for new innovations and capabilities
- More consistent business processes and information across business units
- More reliability and security, less risk
- A more efficient business operation
- A more efficient IT operation
- Better return on existing investment,
- Reduced risk for future investment
- Faster, simpler, and cheaper procurement

The Importance of Governance

Governance = The way in which decisions are made

Who is responsible? Who is involved? Who is accountable?

- An Enterprise Architecture is only as good as the decision making framework that is established around it → “governance” framework
- The Governance Framework depends on
 - Clear authority structure
 - The right participants





What is an Architecture Framework?

- TOGAF Standard Definition: Architecture Framework
 - *A conceptual structure used to develop, implement, govern, and sustain an architecture*
- It should describe a method for designing target state of the enterprise 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

The Value of a Framework

- Provides a practical starting point for an Architecture Project
 - Avoids the initial panic when the scale of the task becomes apparent
 - Systematic – “Codified common sense”
 - Captures what others have found to work in real life
 - Contains a Baseline set of resources for reuse

Architecture Development Method

A comprehensive general method

Complementary to, not competing with, other frameworks

Widely adopted in the market

Tailorable to meet an organisation and industry needs

Available under a free perpetual license

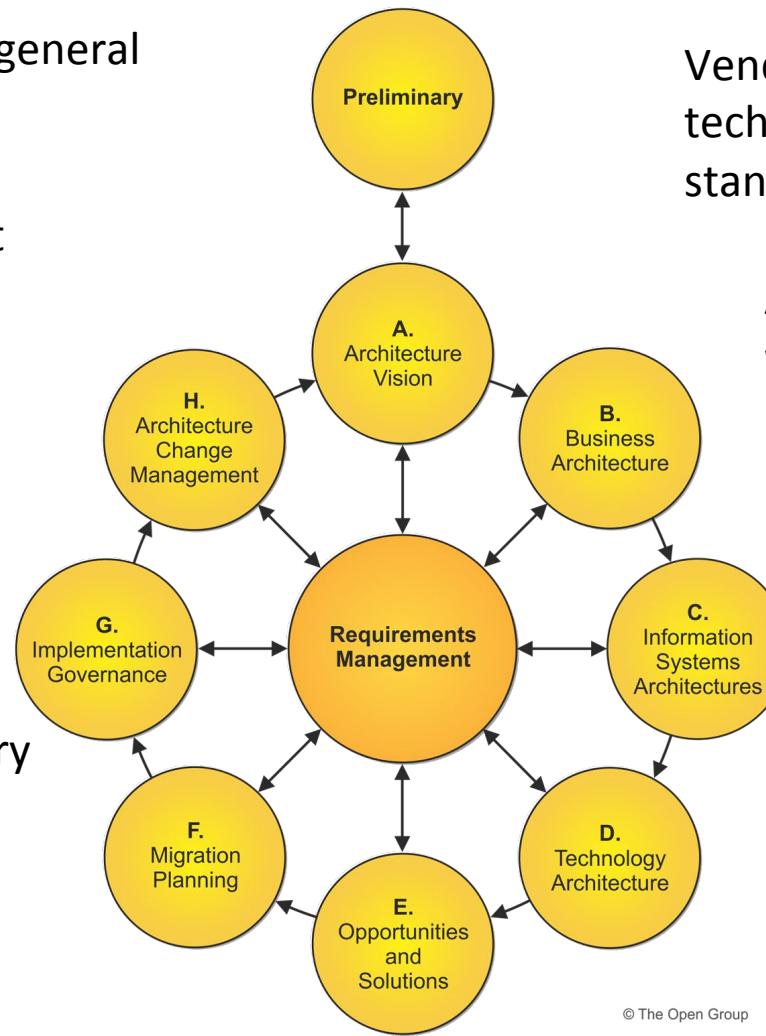
Vendor, tool and technology neutral open standard

Avoids re-inventing the wheel

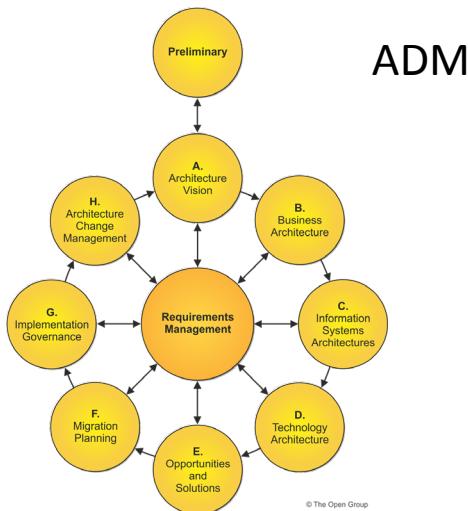
Business IT alignment

Based in best practices

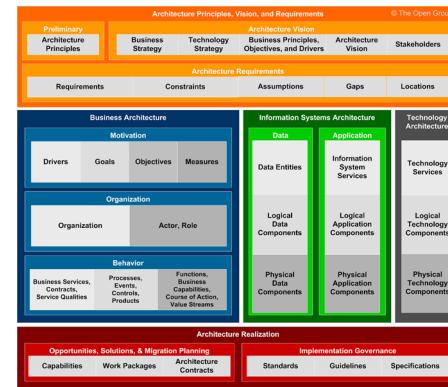
Possible to participate in the evolution of the framework



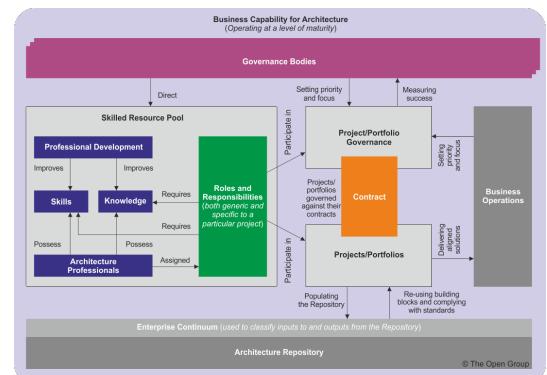
Structure of the Standard



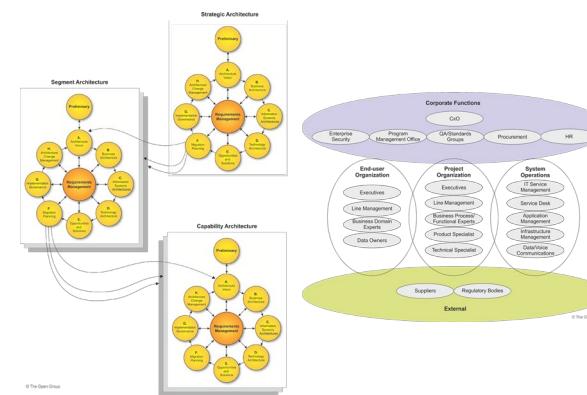
Architecture Content Framework



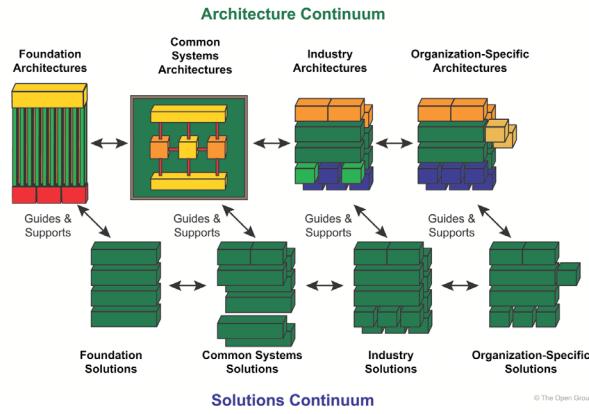
Architecture Capability Framework



ADM Guidelines & Techniques



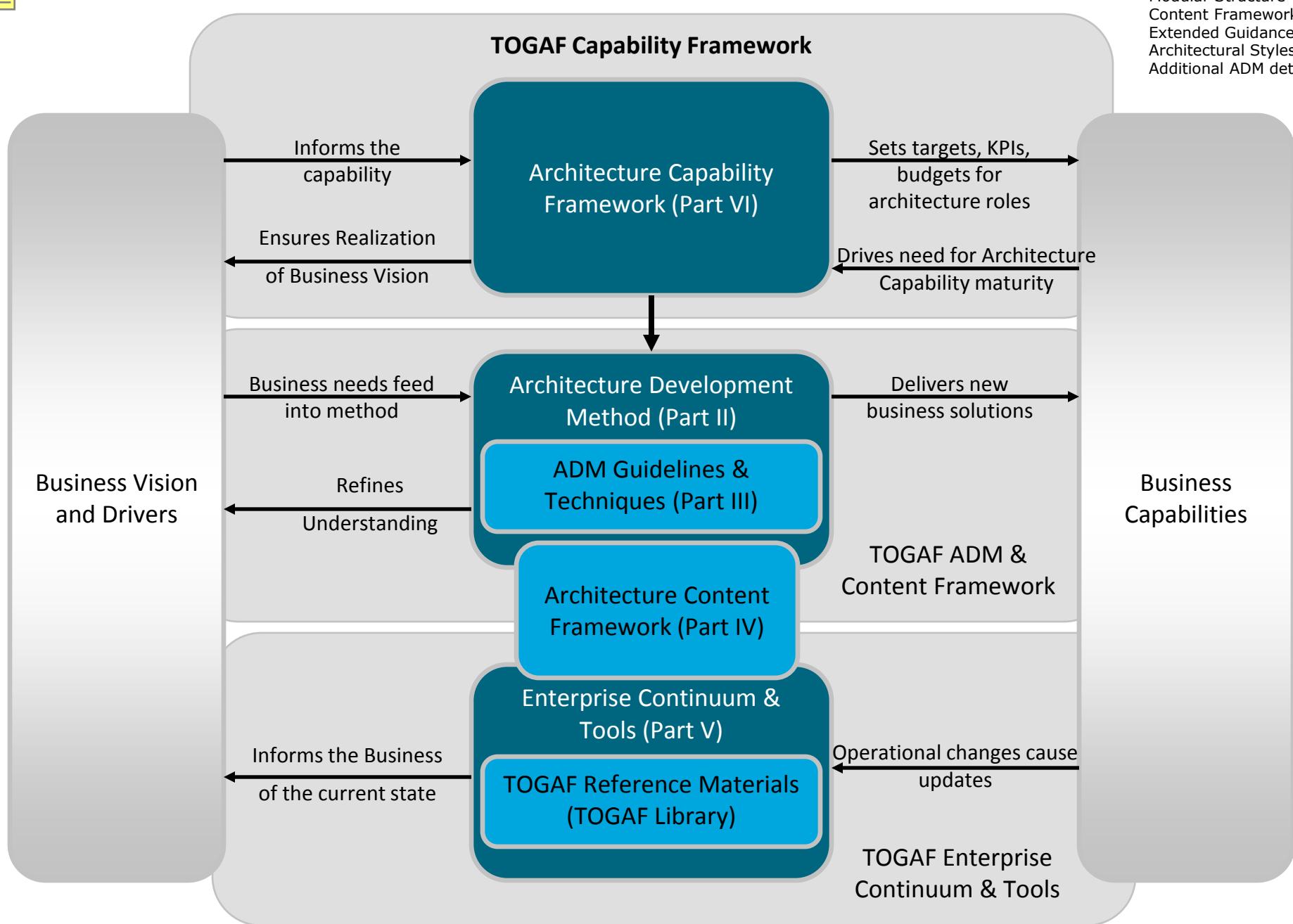
Enterprise Continuum



The TOGAF Standard, Version 9.2

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| Tools for Architecture Development |
| Part VI – Architecture Capability Framework |
| Architecture Board |
| Architecture Compliance |
| Architecture Contracts |
| Architecture Governance |
| Architecture Maturity Models |
| Architecture Skills Framework |



ADM – Basic Principles

An iterative method, over the whole process, between phases and within phases

Each iteration = new decisions:

Enterprise coverage

Level of detail

Time horizon

Architecture asset re-use:

previous ADM iterations

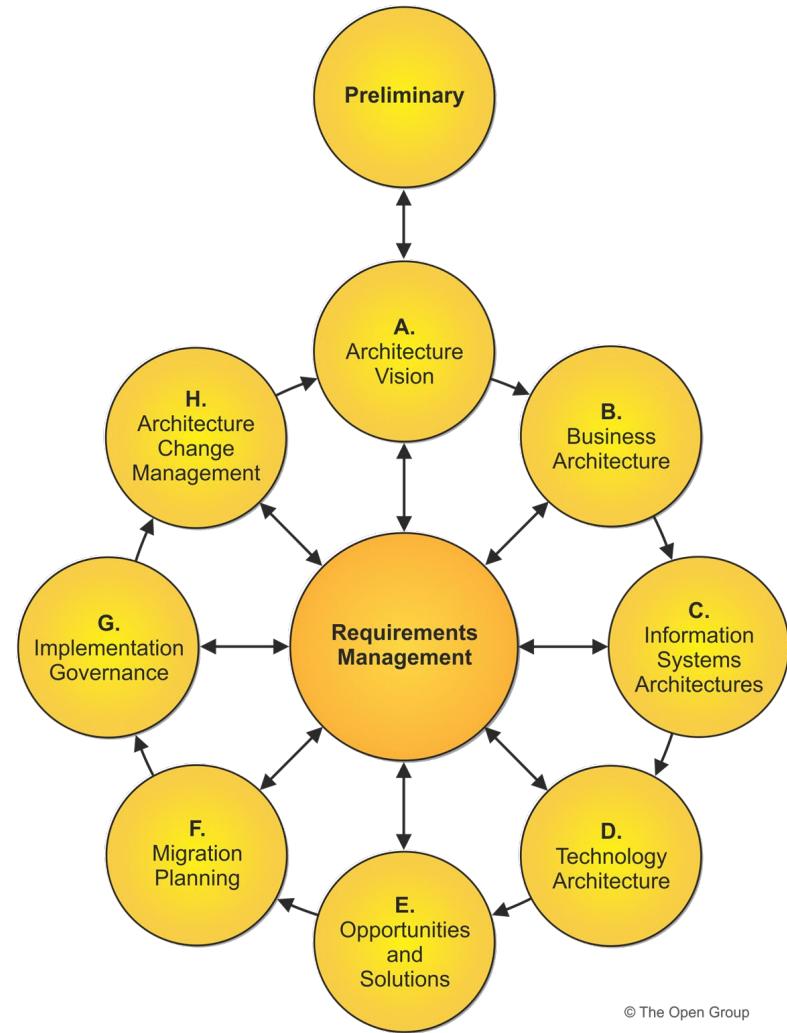
other frameworks, system models,
industry models,...

Decisions based on:

Competence / resource availability

Value accruing to the enterprise.

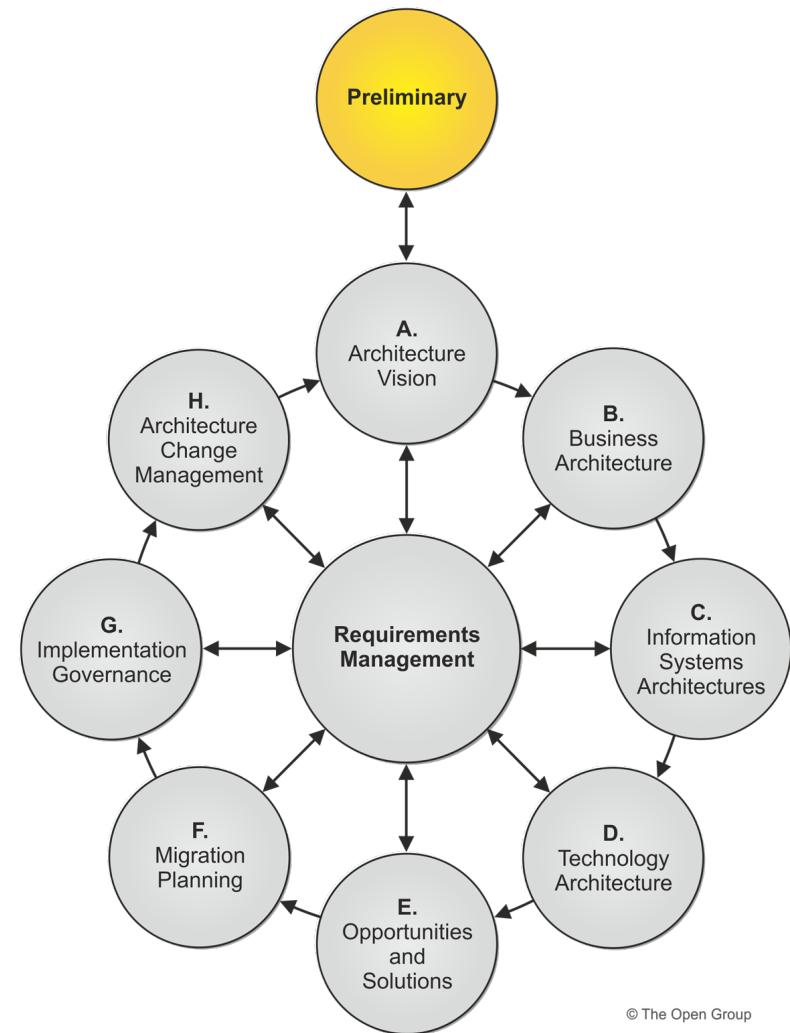
Every phase is validated against and validates the current requirements of the business.



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Preliminary Phase

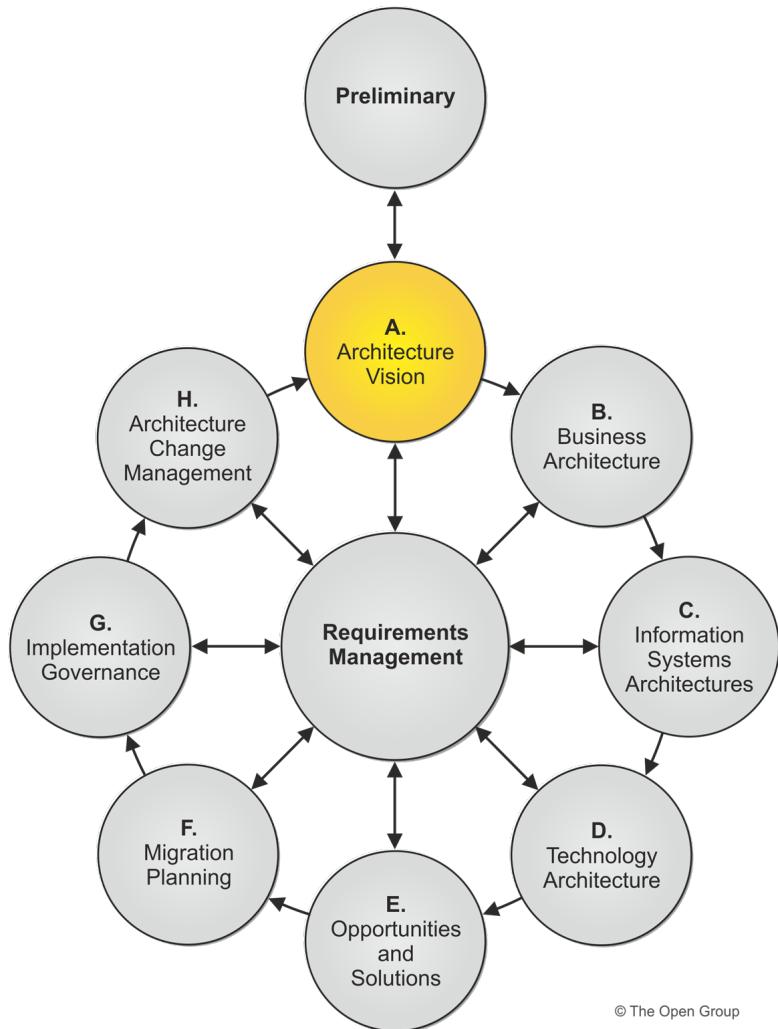
- This phase includes the preparation and initiation activities to create an Architecture Capability
 - Understand business environment
 - High level management commitment
 - Agreement on scope
 - Establish principles
 - Establish governance structure
 - Customization of the TOGAF framework
 - Architecture Team
 - RAW



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Phase A: Architecture Vision

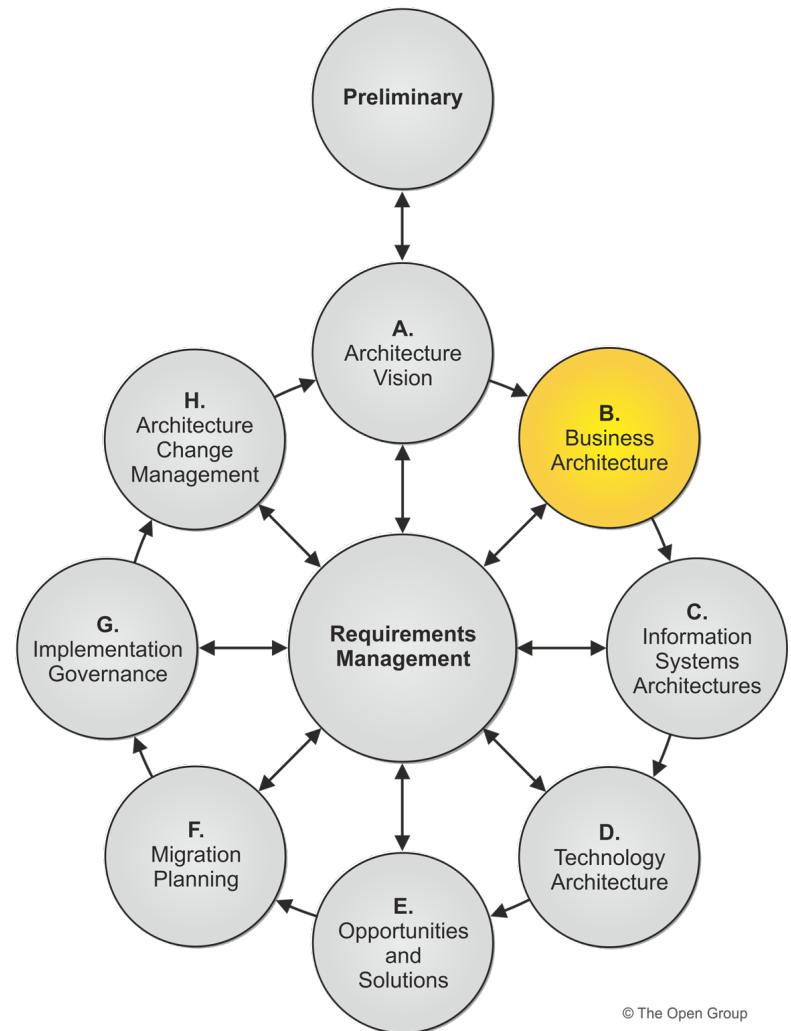
- Initiates one iteration of the architecture process
 - Sets scope, constraints, expectations
 - Required at the start of every architecture cycle
- Creates the Architecture Vision
- Validates business context
- Creates the Statement of Architecture work



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Phase B: Business Architecture

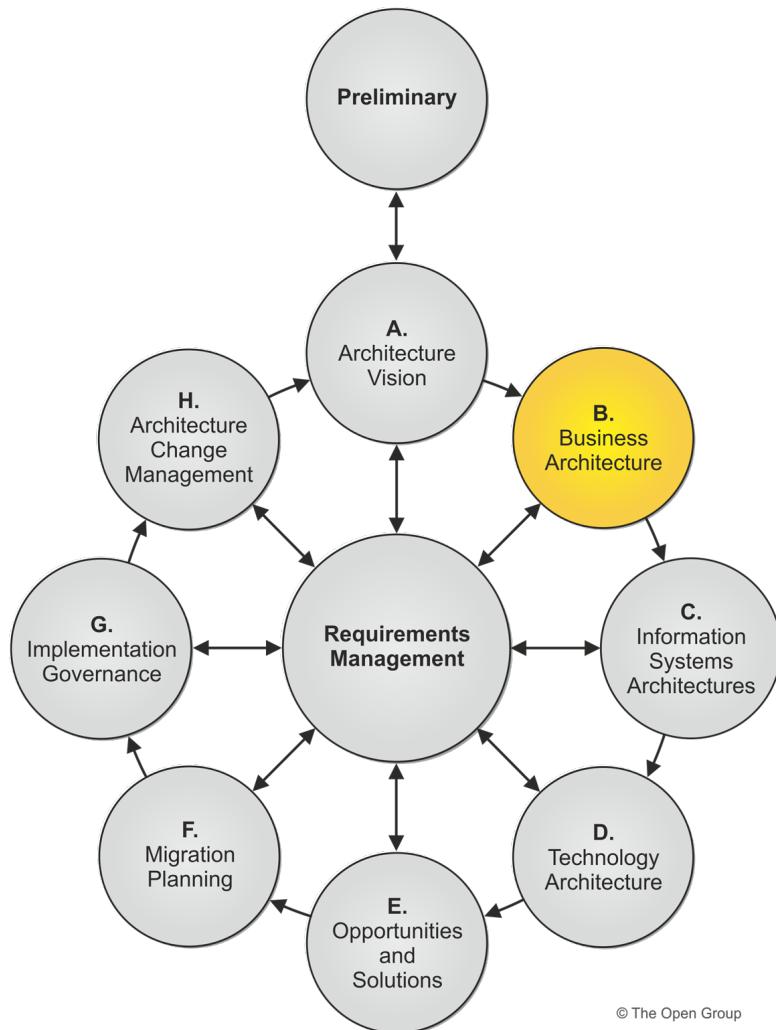
- The fundamental organisation of a business, embodied in
 - its business processes and people,
 - their relationships
 - to each other and the environment,
 - and the principles governing its design and evolution
- Shows how the organisation meets its business goals



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Business Architecture - Contents

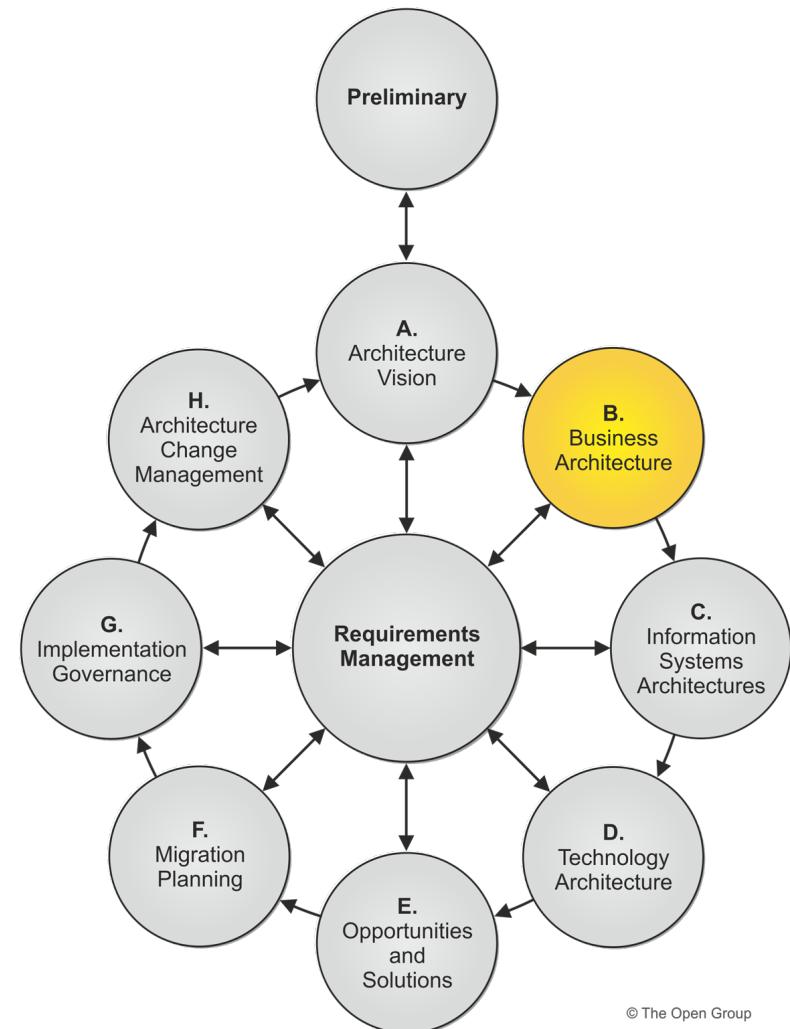
- Organisation structure
- Business goals and objectives
- Business functions
- Business services
- Business processes
- Business roles
- Business data model
- Correlation of organisation and functions



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Business Architecture - Steps

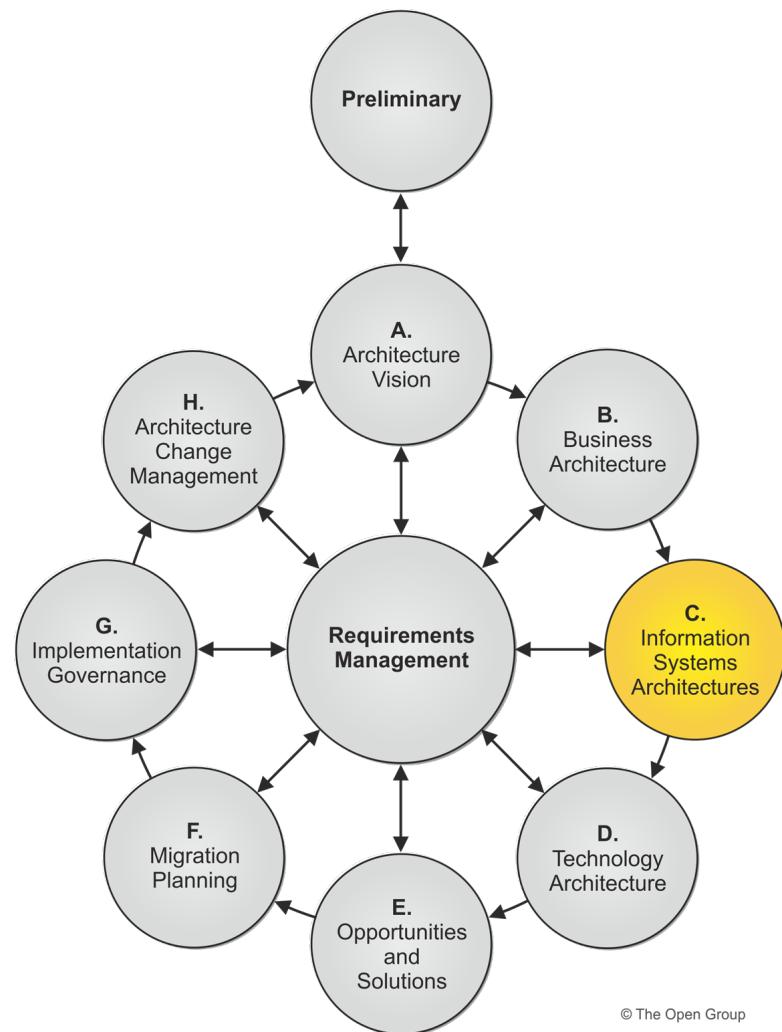
1. Select reference models, viewpoints and tools
2. Define Baseline Architecture Description
3. Define Target Architecture Description
4. Perform gap analysis
5. Define candidate roadmap components
6. Conduct formal stakeholder review
7. finalise the Architecture
8. Create Architecture Definition Document



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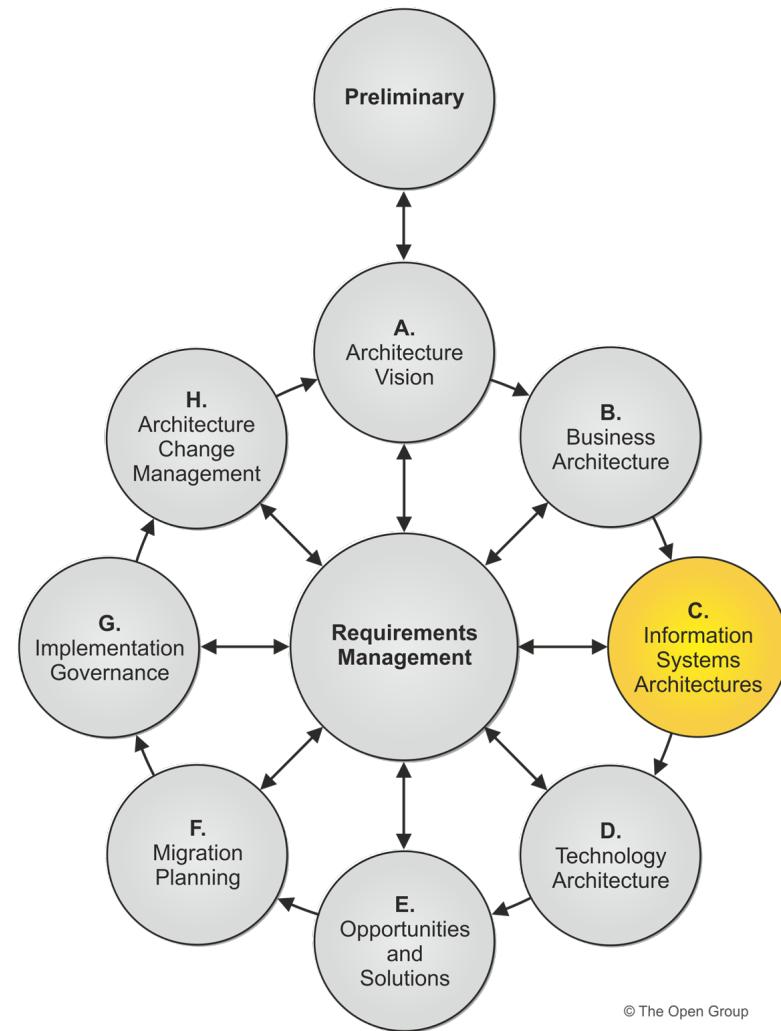
Phase C: Information Systems Architectures

- Documenting the Information Systems Architecture for a project including development of Data and Application Architectures addressing:
 - The major types of information and applications that process them
 - relationships to each other and the environment, and the principles governing its design and evolution



Data or Applications first?

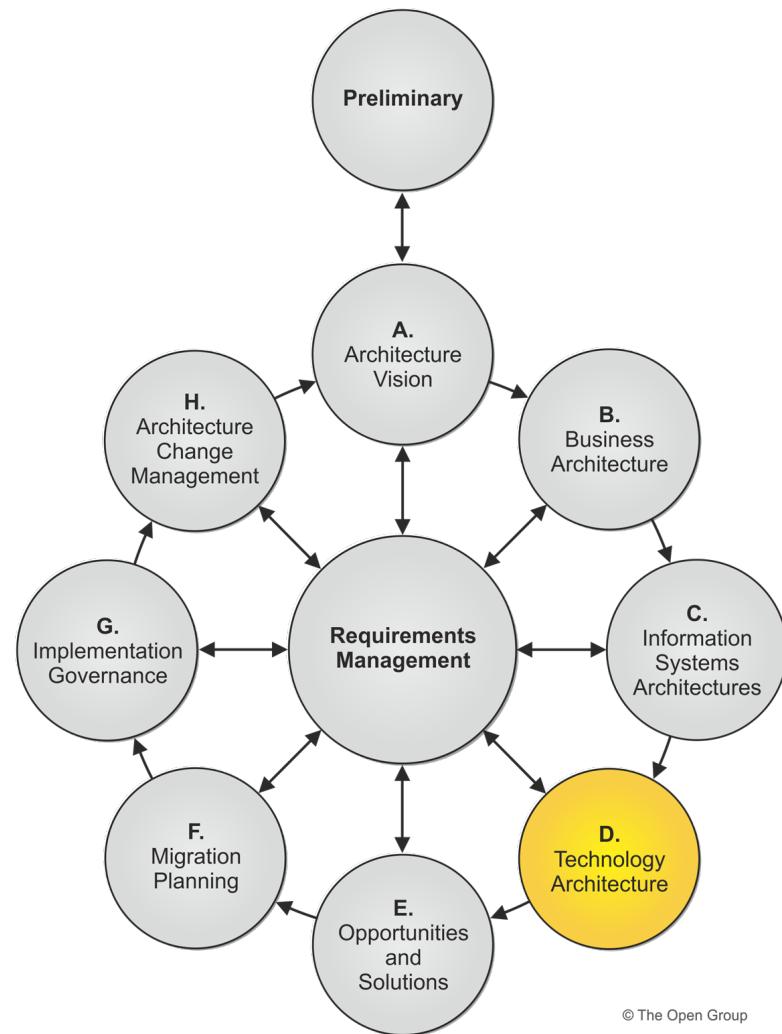
- It is usually necessary to address both
 - Not always the case, depending on project scope and constraints
- May be developed in either order, or in parallel
 - Theory suggests Data Architecture comes first
 - Practical considerations may mean that starting with Application Architecture may be more efficient
- There will need to be some iteration to ensure consistency



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Phase D: Technology Architecture

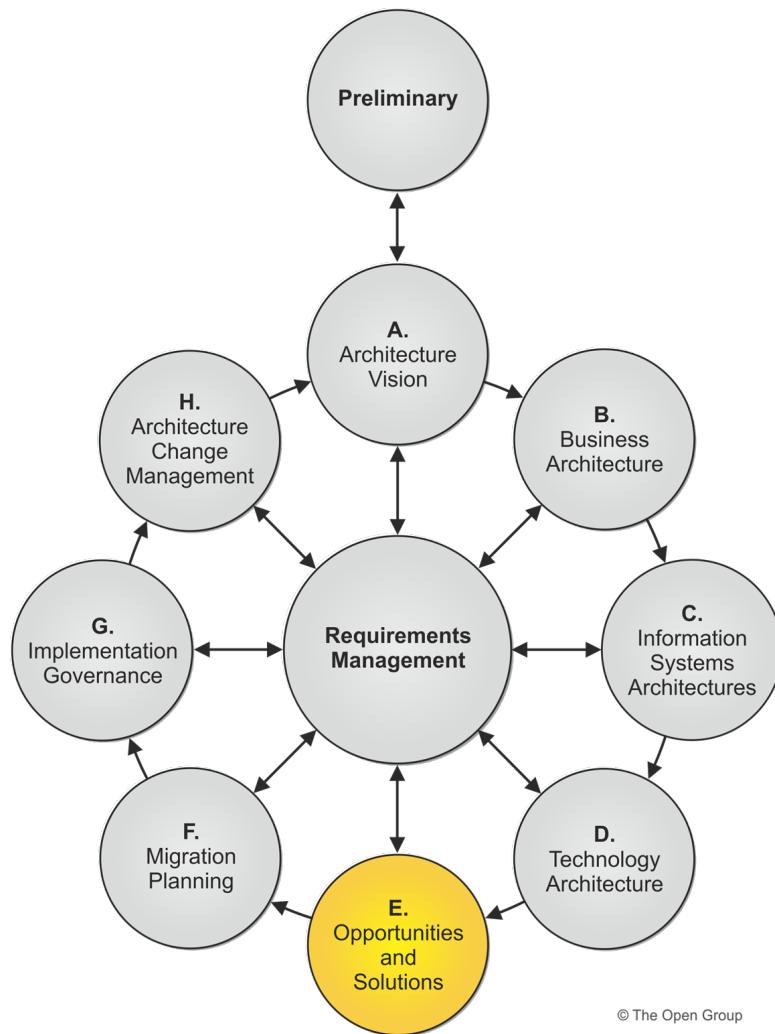
- The fundamental organisation of an IT system, embodied in
 - its hardware, software and communications technology
 - their relationships to each other and the environment,
 - and the principles governing its design and evolution



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Phase E: Opportunities and Solutions

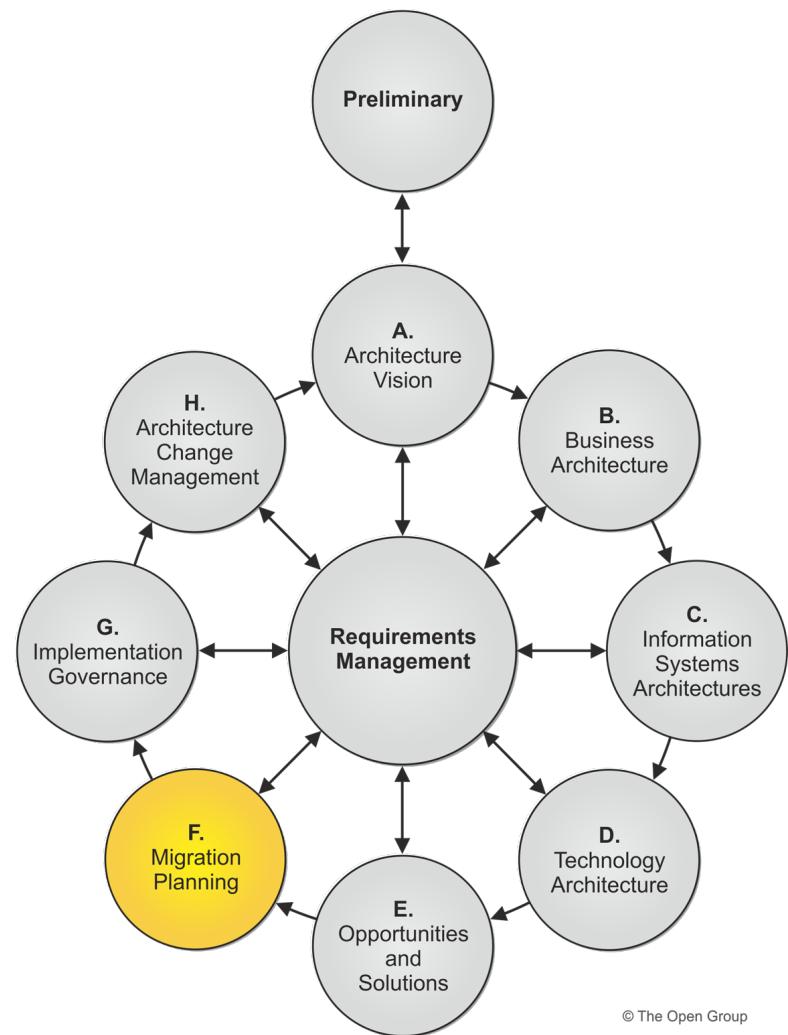
- Perform initial implementation planning
- Identify the major implementation projects
- Determine if an incremental approach is required, if so define Transition Architectures
- Decide on approach
 - Make v Buy v Re-Use
 - Outsource
 - COTS
 - Open Source
- Assess priorities
- Identify dependencies



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Phase F: Migration Planning

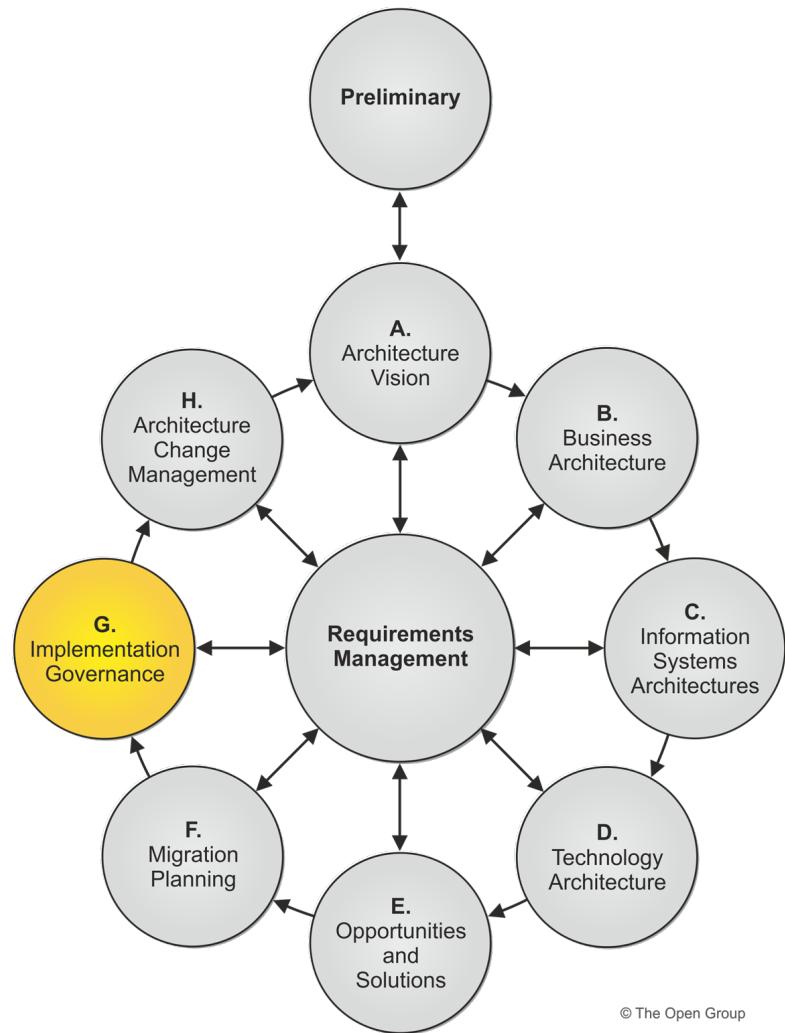
- For work packages and projects identified in Phase E perform
 - Cost/benefit analysis
 - Risk assessment
- finalise a detailed Implementation and Migration Plan



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Phase G: Implementation Governance

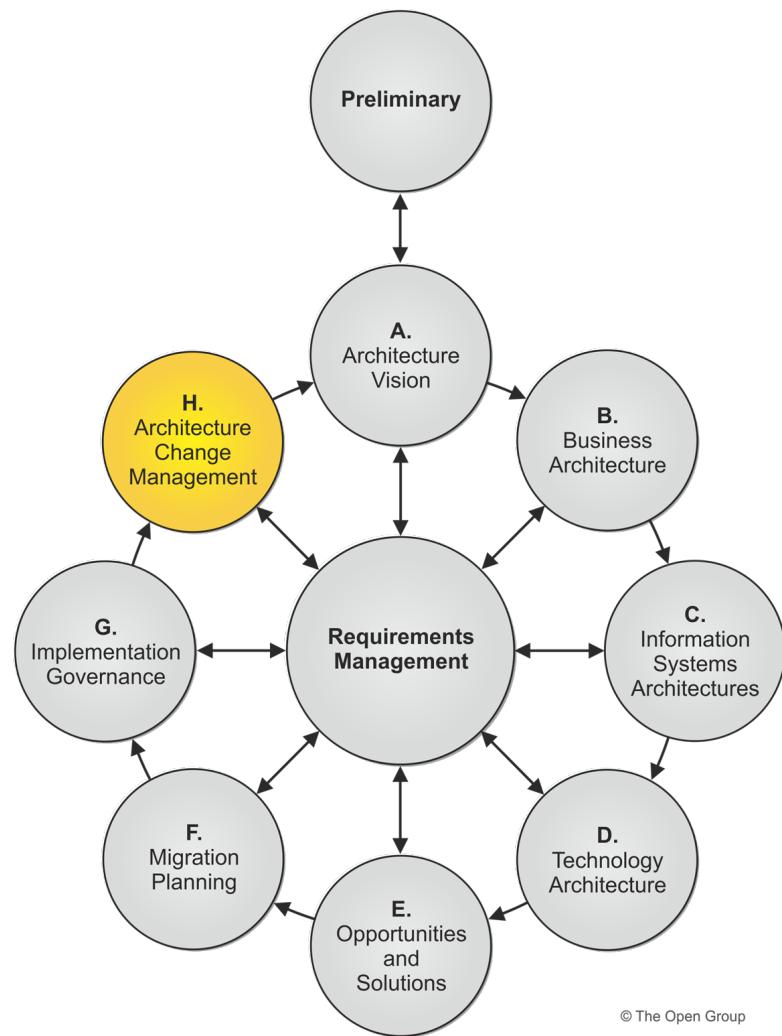
- Provide architectural oversight for the implementation
- Defines architecture constraints on implementation projects
- Govern and manage an Architecture contract
- Monitors implementation work for conformance
- Produce a *Business Value Realization*



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Phase H: Architecture Change Management

- Provide continual monitoring and a change management process
- Ensures that changes to the architecture are managed in a cohesive and architected way
- Establishes and supports the Enterprise Architecture to provide flexibility to evolve rapidly in response to changes in the technology or business environment
- Monitors the business and capacity management.



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TOGAF Library – Structure

- A portfolio of guidance material to support practical application of the TOGAF standard
- It contains guidelines, templates, patterns and other forms of reference material
- Over 80 documents (as of April 2018)
- **Section 1: Foundation Documents**
 - Broadly applicable information relating to the subject of the TOGAF framework or Enterprise Architecture
- **Section 2: Generic Guidance and Techniques**
 - Information describing architecture styles and how the TOGAF framework and Enterprise Architecture can be adapted to exploit the characteristics of a more specific context
- **Section 3: Industry-Specific Guidance and Techniques**
 - Information describing how the TOGAF framework and Enterprise Architecture can be applied to meet the specific needs of a vertical industry segment
- **Section 4: organisation-Specific Guidance and Techniques**
 - Information describing how the TOGAF framework and Enterprise Architecture have been applied to meet the needs of specific enterprises



Summary

The TOGAF® Standard is...

- An effective, industry standard framework and method for Enterprise Architecture.
- Complementary to, not competing with, other enterprise frameworks
- A repository of best practice
 - It “demystifies” architecture development
- Vendor, tool, and technology neutral
- A framework and method for achieving the “Boundaryless Information Flow” vision



ADM Phases

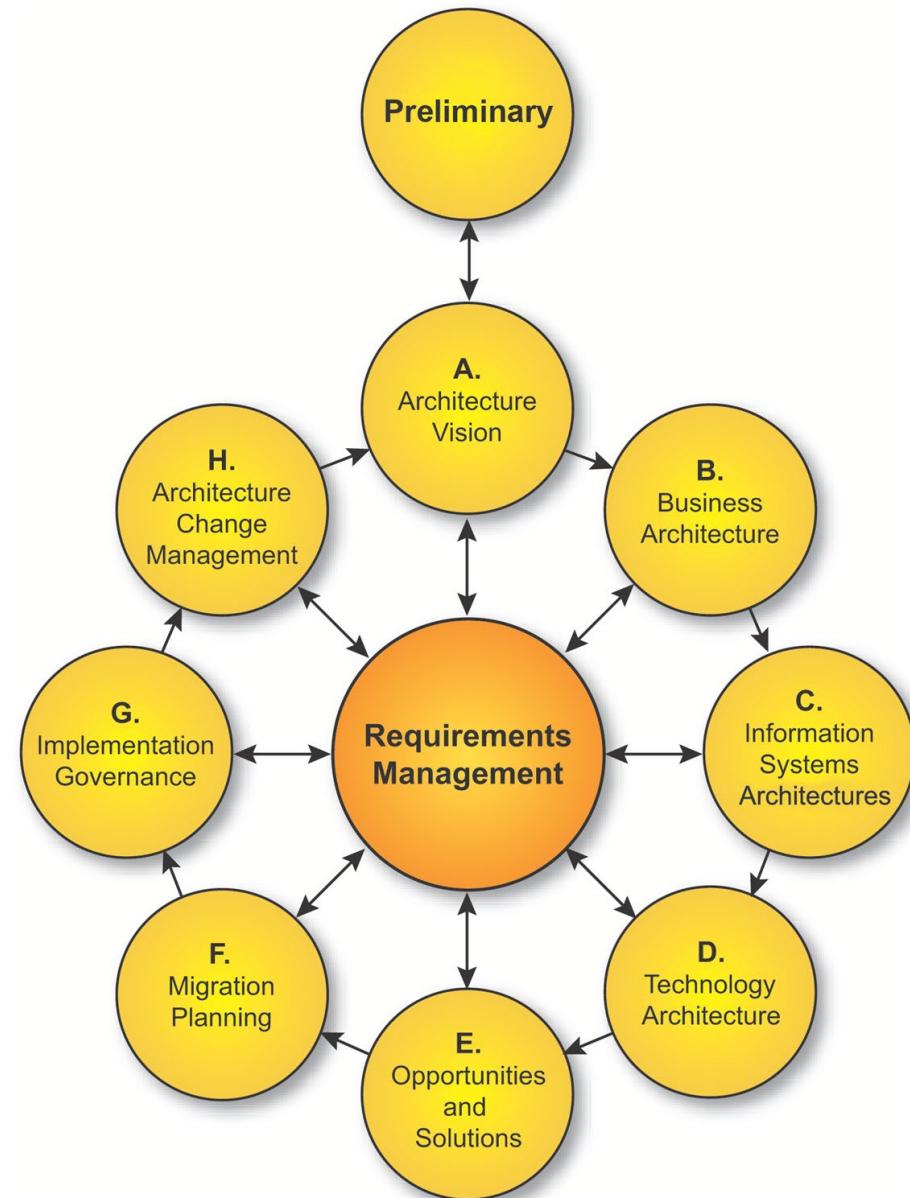
Level 1



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ADM Phases

Level 1



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Roadmap

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| Part I - Introduction |
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| Architecture Contracts |
| Architecture Governance |
| Architecture Maturity Models |
| Architecture Skills Framework |

- **Part II, Architecture Development Method, Chapters 5-16**



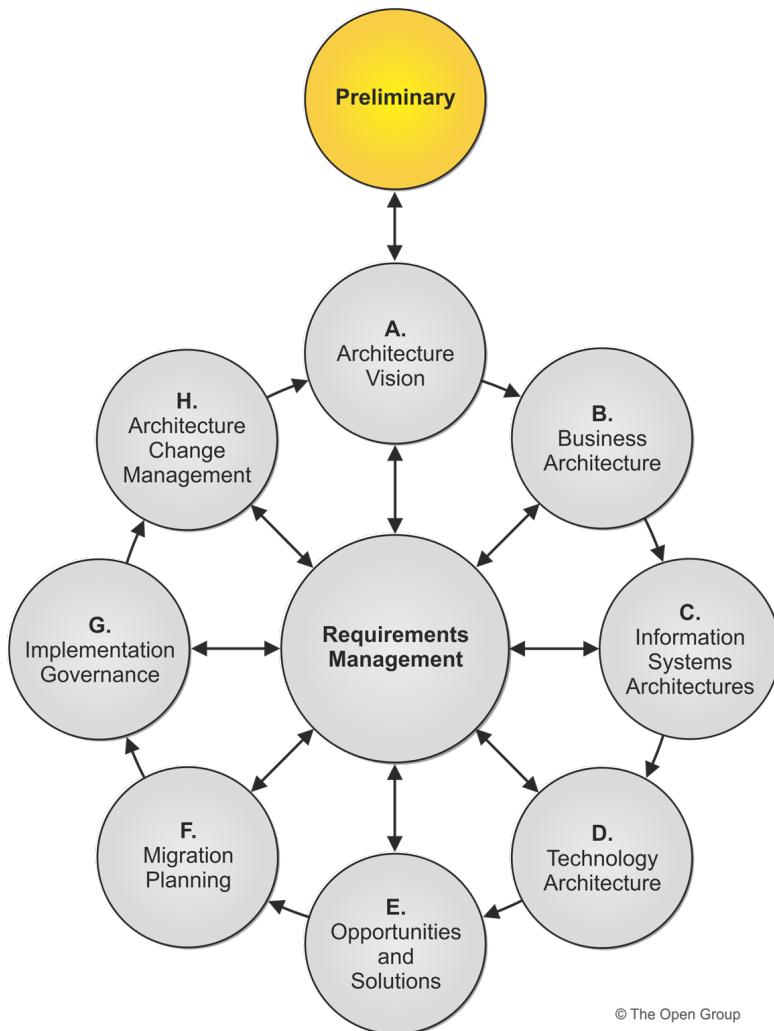


Module Objectives

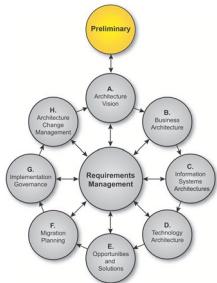
The aim of this module is to introduce the ADM Phases:

- How each ADM Phase contributes to the success of Enterprise Architecture:
 - An understanding of the *objectives*
 - An understanding of the *approach*

Preliminary Phase



- This phase includes the preparation and initiation activities to create an Architecture Capability
 - Understand business environment
 - High level management commitment
 - Agreement on scope
 - Establish Architecture Principles
 - Establish governance structure
 - Customization of the TOGAF framework

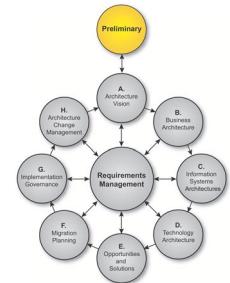


Objectives in Detail

- Determine the Architecture Capability desired by the organisation:
 - Review the organisational context for conducting Enterprise Architecture
 - Identify and scope the elements of the enterprise organisations affected by the Architecture Capability
 - Identify the established frameworks, methods, and processes that intersect with the Architecture Capability
 - Establish a Capability Maturity target
- Establish the Architecture Capability:
 - Define and establish the organisational Model for Enterprise Architecture
 - Define and establish the detailed process and resources for architecture governance
 - Select and implement tools that support the Architecture Capability
 - Define the Architecture Principles

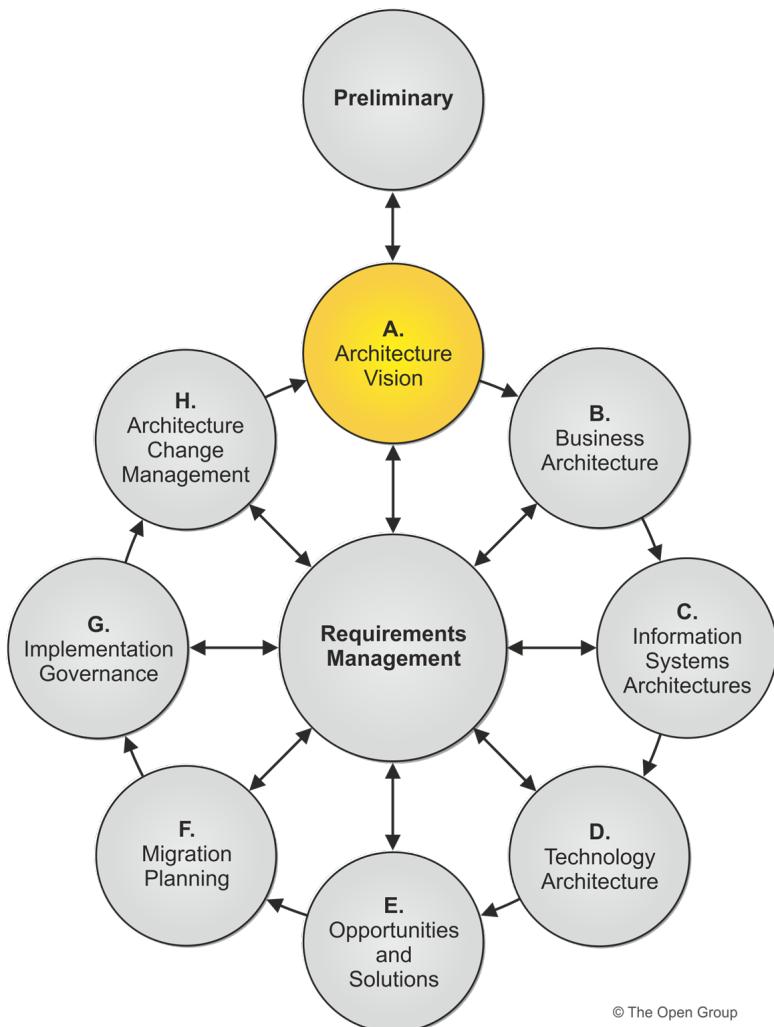


Approach



- Define the Enterprise
- Identify key drivers and elements in the organisational context
- Define the requirements for architecture work
- Define the Architecture Principles that will inform any architecture work
- Define the framework to be used
- Define the relationships between management frameworks
- Evaluate the Enterprise Architecture maturity

Phase A: Architecture Vision

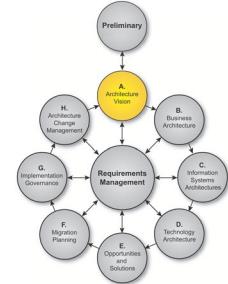


- Initiates one iteration of the architecture process
 - Sets scope, constraints, expectations
 - Required at the start of every architecture cycle
- Creates the Architecture Vision
- Validates business context
- Creates Statement of Architecture work

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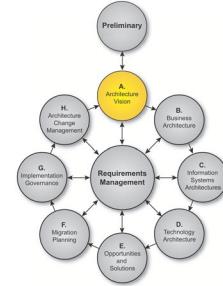
Objectives



- Develop a high-level aspirational vision of the capabilities and business value to be delivered as a result of the proposed Enterprise Architecture
- Obtain approval for a Statement of Architecture Work that defines a program of works to develop and deploy the architecture outlined in the Architecture Vision



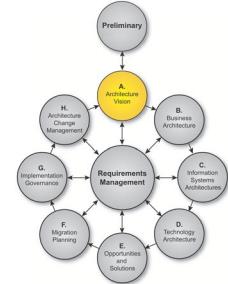
Approach



- Phase A defines what is in and what is outside of the architecture effort, and the constraints
- Constraints are informed by principles, business goals and strategic drivers
- Creates the Architecture Vision document
 - Clarifying and agreeing the purpose of the architecture
 - Demonstrating how it will be achieved
 - A first-cut high-level description of the Baseline and Target architectures
 - The business scenarios technique can be used to develop the Architecture Vision



Business Scenarios



Key factors in the success of any Enterprise Architecture are:

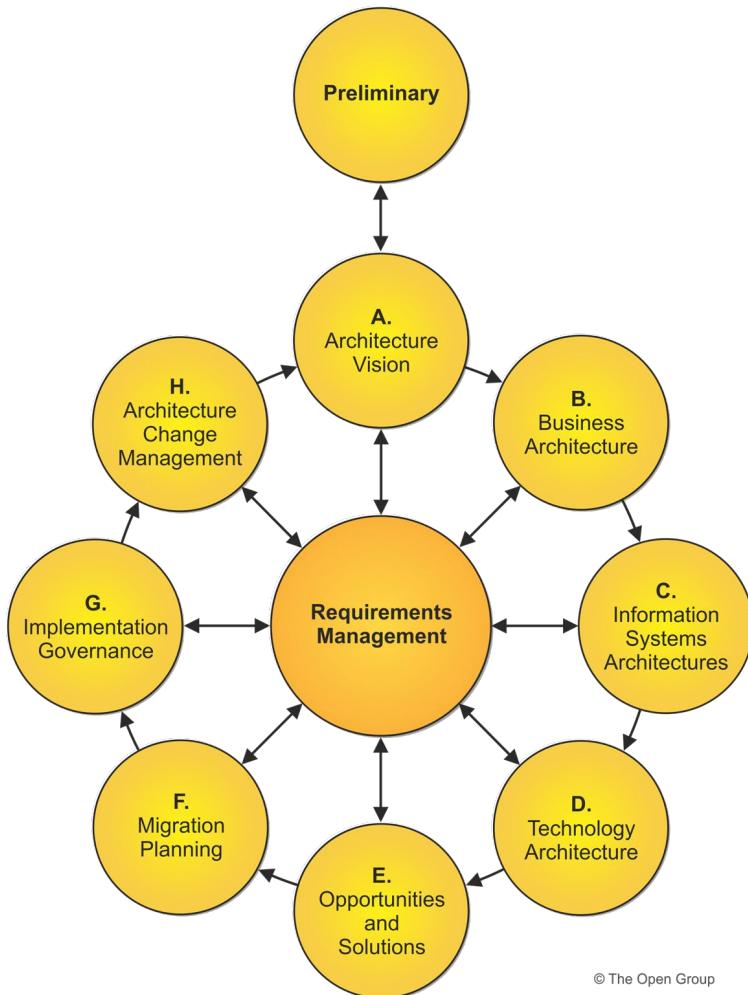
- the extent to which it is linked to business requirements, and
- its support for business objectives.

Business scenarios help us to identify and understand the business requirements that the architecture development must address.

A business scenario describes:

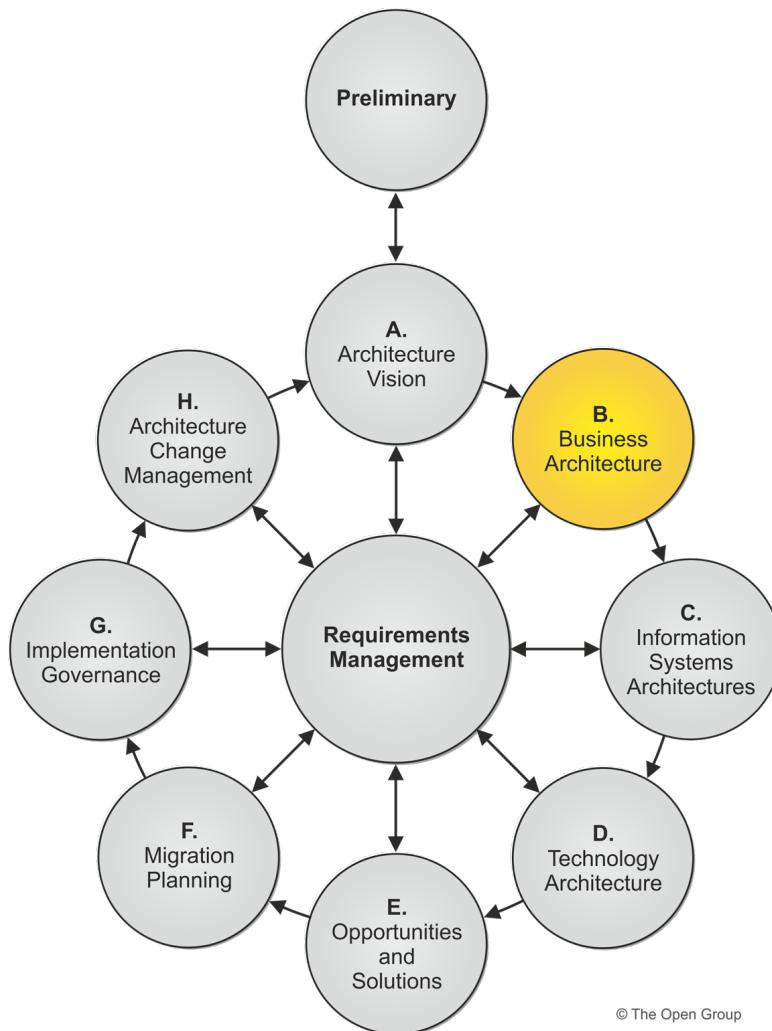
- a business process, application or set of applications that can be enabled by the architecture
- the business and technology environment;
- the people and computing components (the “actors”) who execute it;
- the desired outcome of proper execution.

Business Scenarios and the ADM



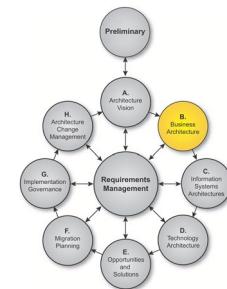
- Used prominently in Phase A (Architecture Vision) and iteratively in Phase B (Business Architecture)
- Business Requirements are referred to throughout all phases of the ADM

Phase B: Business Architecture



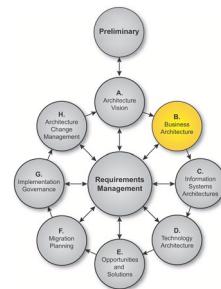
- The fundamental organisation of a business, embodied in
 - its business processes and people,
 - their relationships
 - to each other and the environment,
 - and the principles governing its design and evolution
- Shows how the organisation meets its business goals

Objectives



The objectives of Phase B are to:

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



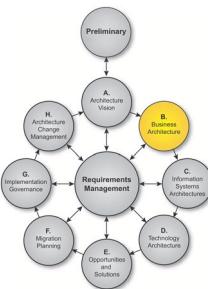
Approach – General

- Knowledge of the Business Architecture is a prerequisite for architecture work in the other domains (Data, Applications, Technology)
 - and so is the first activity that needs to be undertaken.
- Business Strategy defines *what* to achieve
- Business Architecture describes *how* to achieve it
- This Phase is often required to demonstrate business value of subsequent work to key stakeholders.

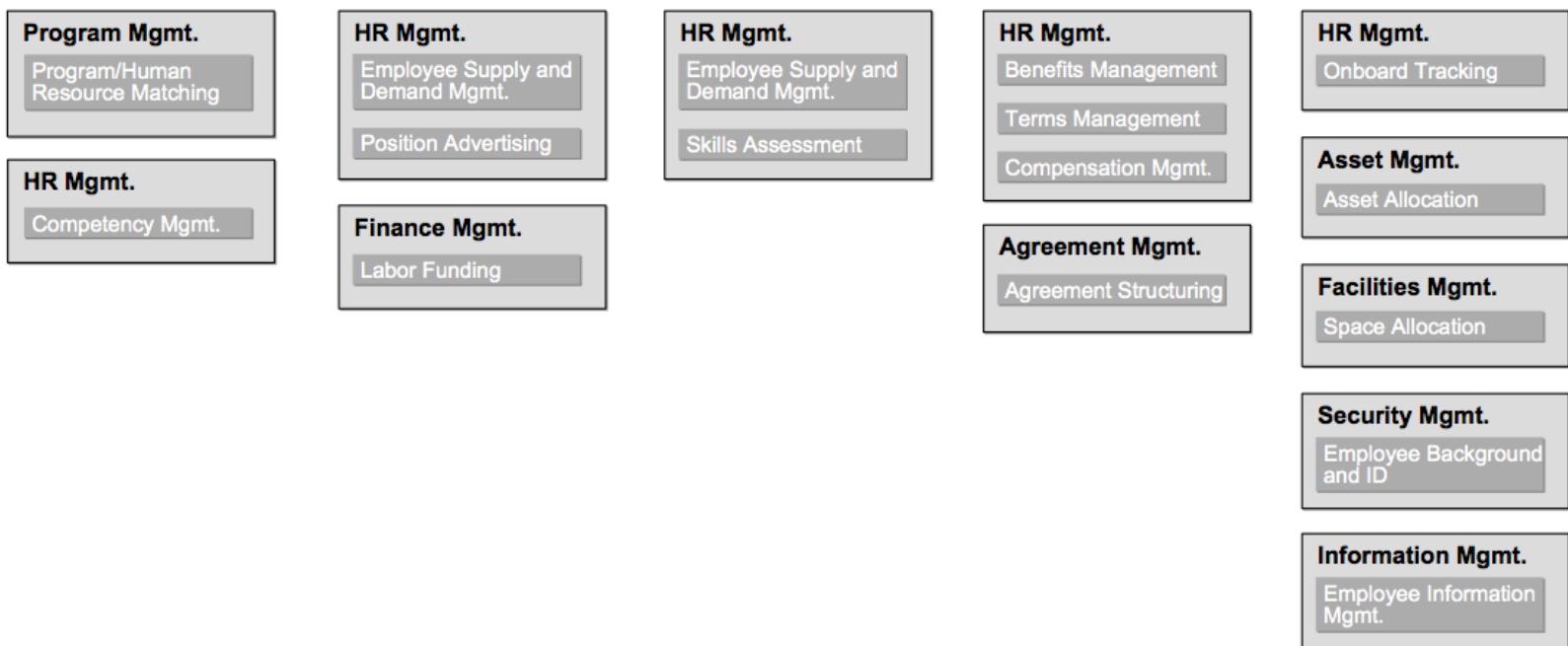
Developing the Baseline Description

- If an enterprise has existing architecture descriptions, they should be reused as the basis for the Baseline Description
- Where no such descriptions exist, information will have to be gathered and architecture descriptions developed.
- Techniques for developing architecture descriptions include:
 - Business Capability maps
 - Value Streams
 - organisation Maps

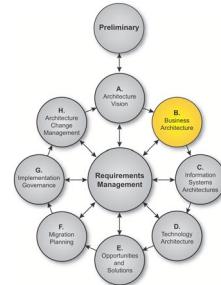
Applying Business Capabilities



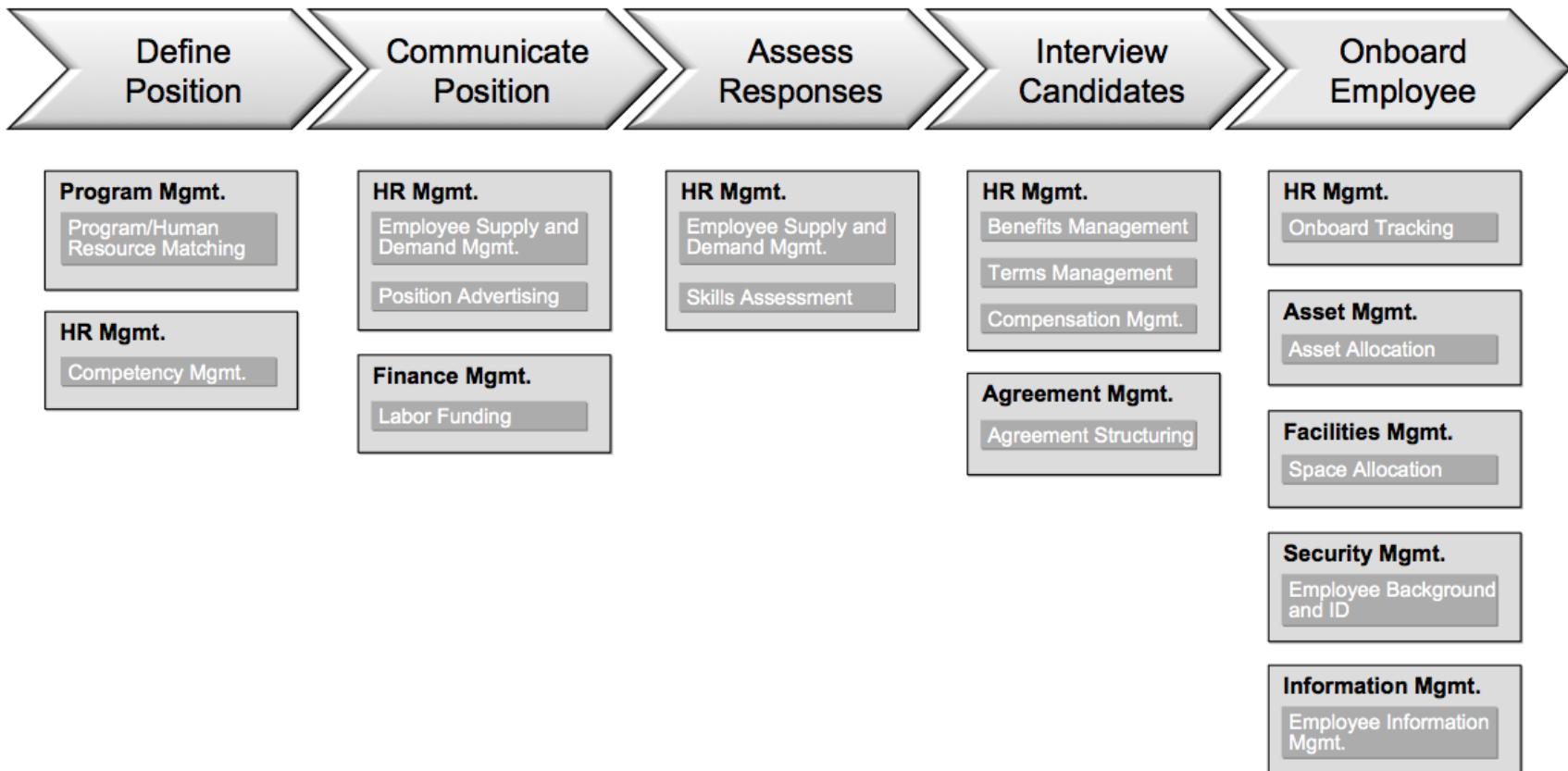
- The business capability map from Phase A provides a self-contained view of the business that is independent of the current organisational structure, business processes, information systems and applications



Mapping Value Streams



- These provide context into why the organisation needs business capabilities



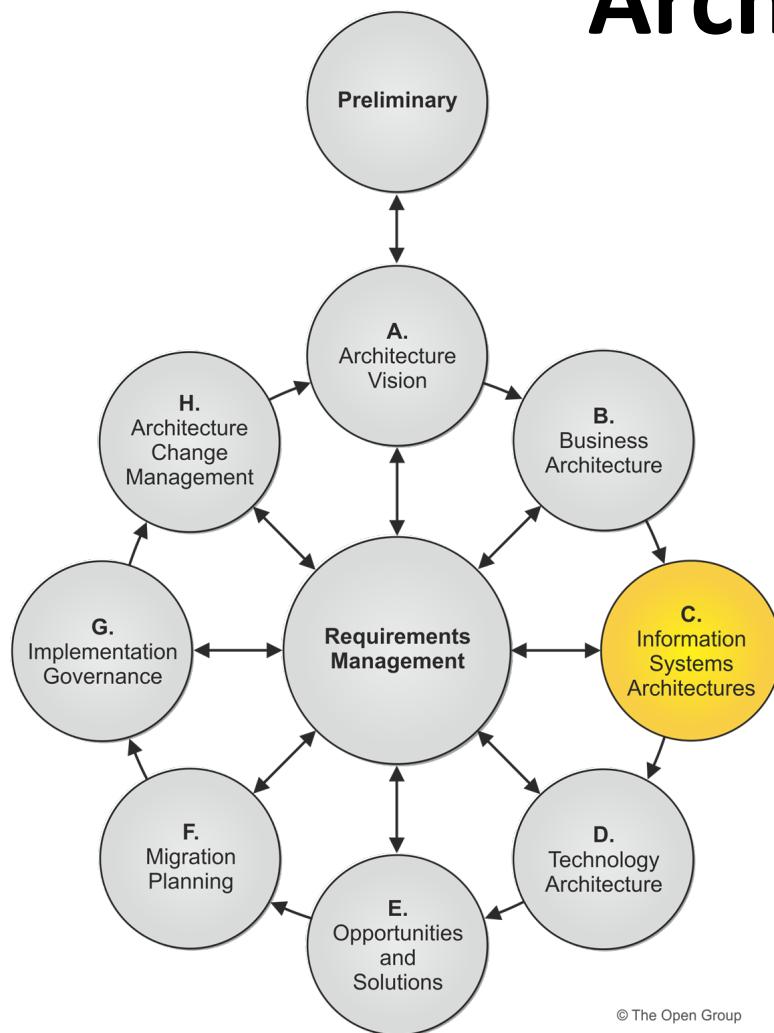


Using the Architecture Repository

- As part of Phase B the architecture team need to consider what relevant resources are available from the Architecture Repository
 - Industry reference models (in terms of the Enterprise Continuum) relevant to the organisation's industry sector
 - Enterprise-specific Business Architecture views (capability maps, value stream maps, organisation maps, etc.)
 - Enterprise-specific building blocks (process components, business rules, job descriptions etc)
 - Applicable standards

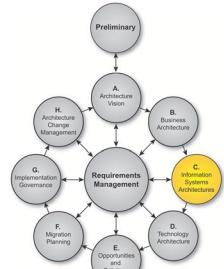
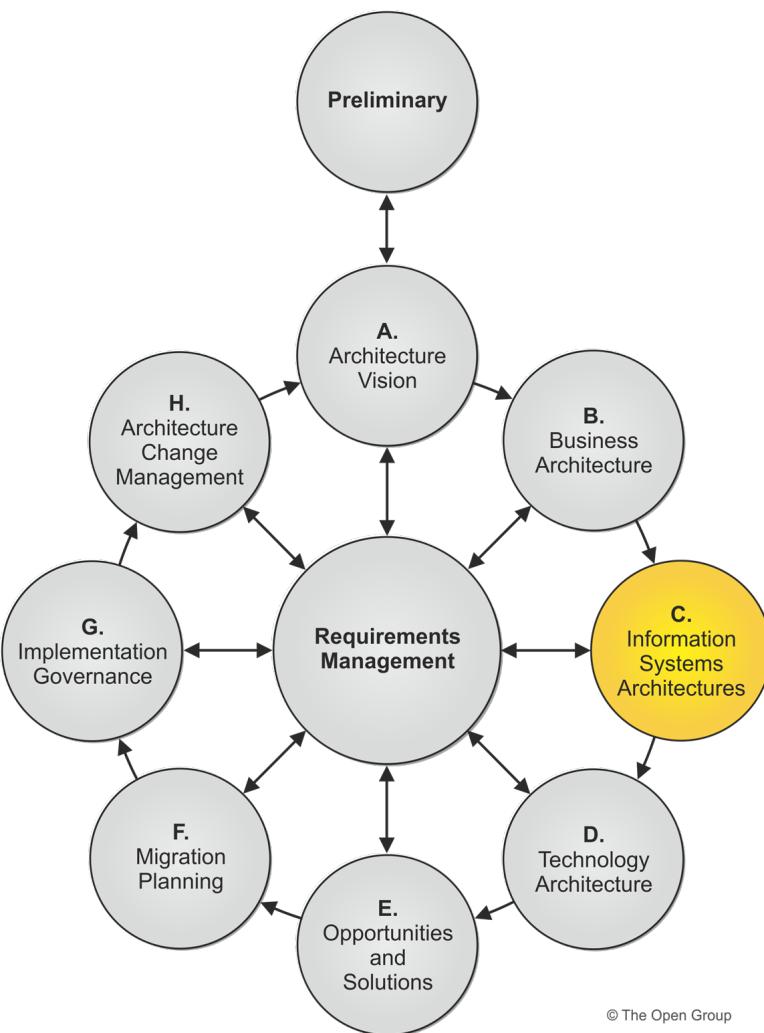
Phase C: Information Systems

Architectures



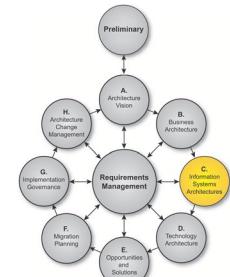
- Documenting the Information Systems Architecture for a project including development of Data and Application Architectures addressing:
 - The major types of information and applications that process them
 - relationships to each other and the environment, and the principles governing its design and evolution

Data or Applications first?



- It is usually necessary to address both
 - Not always the case, depending on project scope and constraints
- May be developed in either order, or in parallel
 - Theory suggests Data Architecture comes first
 - Practical considerations may mean that starting with Application Architecture may be more efficient
- There will need to be some iteration to ensure consistency

Information Systems Architectures – Objectives



- 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 Statement 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

Approach

Phase C involves Data and Applications Architecture, in either order.

Advocates exist for both sequences:

- Spewak's *Enterprise Architecture Planning* recommends a data-driven sequence.
- Major applications systems (ERP, CRM, ...) often combine technology infrastructure and application logic.
An application-driven approach takes core applications (underpinning mission-critical business processes) as the primary focus of the architecture effort.
- Integration issues often constitute a major challenge.

Top-Down Design vs Bottom-Up Implementation



Design:

1. Business Architecture
2. Data (or Applications) Architecture
3. Applications (or Data) Architecture
4. Technology Architecture

Implementation:

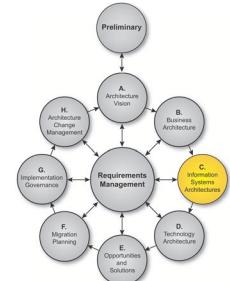
1. Technology Architecture
2. Applications (or Data) Architecture
3. Data (or Applications) Architecture
4. Business Architecture

Data-Driven Sequence Implementation

- First implement application systems that create data
- Then applications that process the data
- Finally, applications that archive data



Architecture Repository

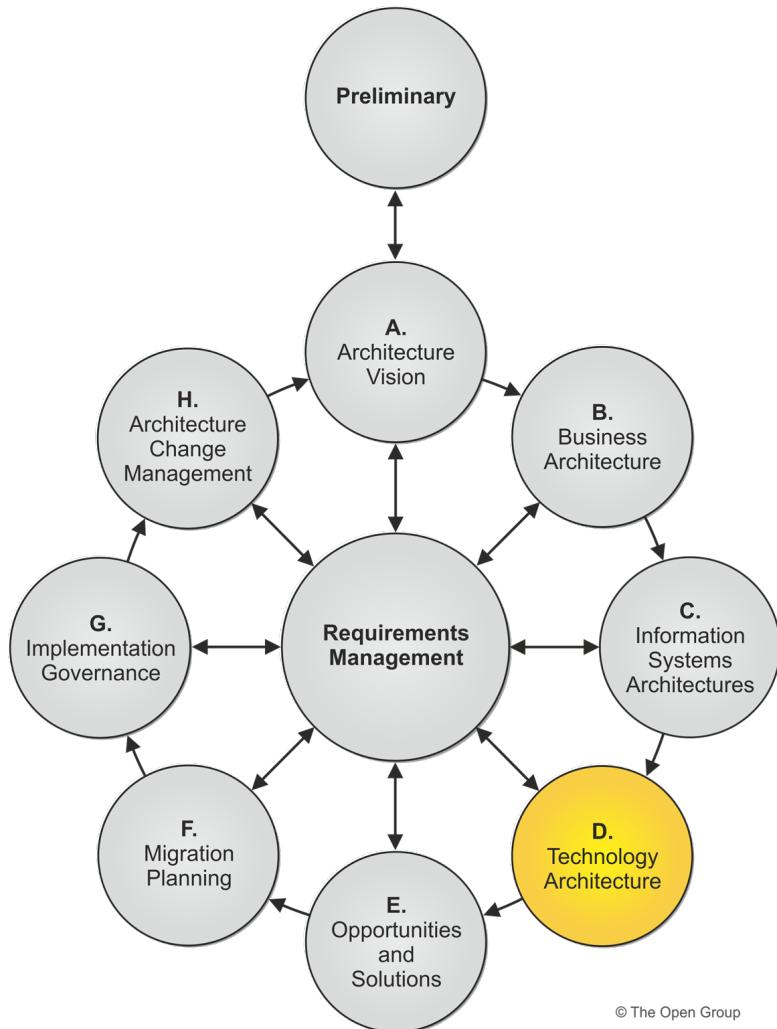


- Consider generic models relevant to an organisation's industry vertical
 - Data Architecture Resources
 - Generic data models, for example the ARTS data model (Retail industry), Energistics data model (Petrotechnical industry)
 - Application Architecture Resources
 - Generic application models, for example the TeleManagement Forum (telecommunications industry), the OMG has a number of software models for specific verticals (Healthcare, Transportation, Finance etc.)

Considerations for the Data Architecture

- Data Management
- Data Migration
- Data Governance

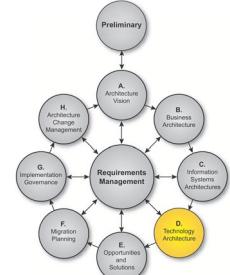
Phase D: Technology Architecture



- The fundamental organisation of an IT system, embodied in
 - its hardware, software and communications technology
 - their relationships to each other and the environment,
 - and the principles governing its design and evolution



Objectives

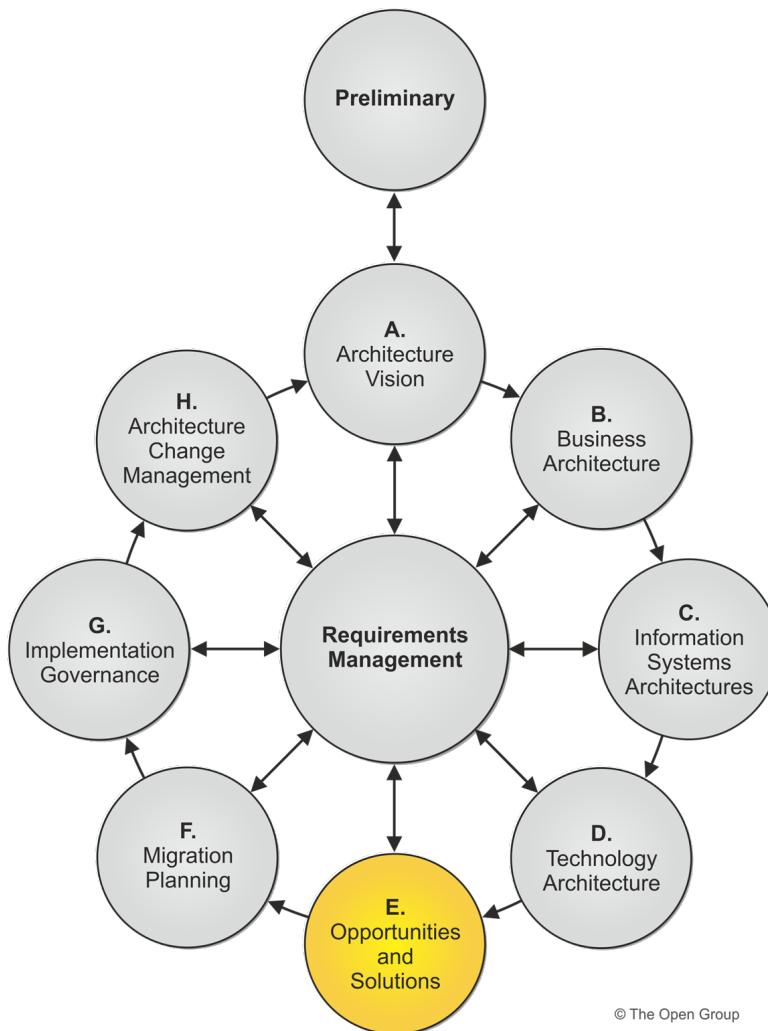


- Develop the Target Technology Architecture that enables the Architecture Vision, target business, data, and application building blocks to be delivered through technology components and technology services, in a way that addresses the Statement of Architecture Work stakeholder concerns
- Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Technology Architectures

Approach

- New Technologies are a major driver for change
 - The Technology Architecture needs to capture the transformation opportunities available to the enterprise through the adoption of new technology.
- Review the Technology Architecture Resources available in the Architecture Repository
 - Existing IT Services in the IT Repository or IT Service Catalog
 - The TOGAF TRM
 - Technology models relevant to the organisation

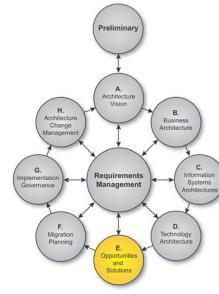
Phase E: Opportunities and Solutions



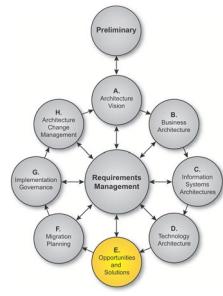
- Perform initial implementation planning
- Identify the major implementation projects
- Determine if an incremental approach is required, if so define Transition Architectures
- Decide on approach
 - Make v Buy v Re-Use
 - Outsource
 - COTS
 - Open Source
- Assess priorities
- Identify dependencies



Objectives



- Generate the initial complete version of the Architecture Roadmap, based upon the gap analysis and candidate Architecture Roadmap components from Phases B, C, and D
- Determine whether an incremental approach is required, and if so identify Transition Architectures that will deliver continuous business value
- Define the overall Solution Building Blocks (SBBs) to finalise the Target Architecture based on the Architecture Building Blocks (ABBs)



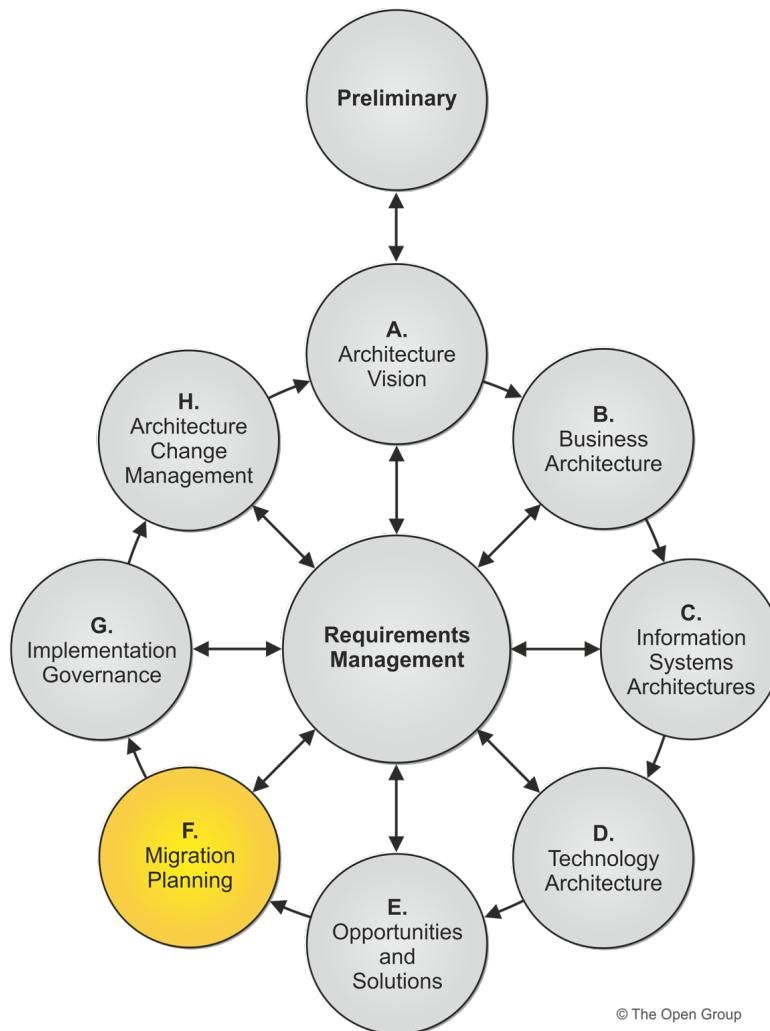
Approach

- This is the first phase concerning implementation
- It takes into account the complete set of gaps between the Target and Baseline Architectures in all architecture domains
- It logically groups changes into work packages
- It builds a best-fit roadmap based upon:
 - Stakeholder requirements
 - The enterprise's business transformation readiness
 - Identified opportunities and solutions
 - Identified implementation constraints

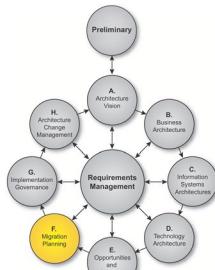
Four concepts are key to transitioning from developing to delivering a Target Architecture:

- Architecture Roadmap
- Work Packages
- Transition Architectures
- Implementation and Migration Plan

Phase F: Migration Planning



- For work packages and projects identified in Phase E perform
 - Cost/benefit analysis
 - Risk assessment
- finalise a detailed Implementation and Migration Plan



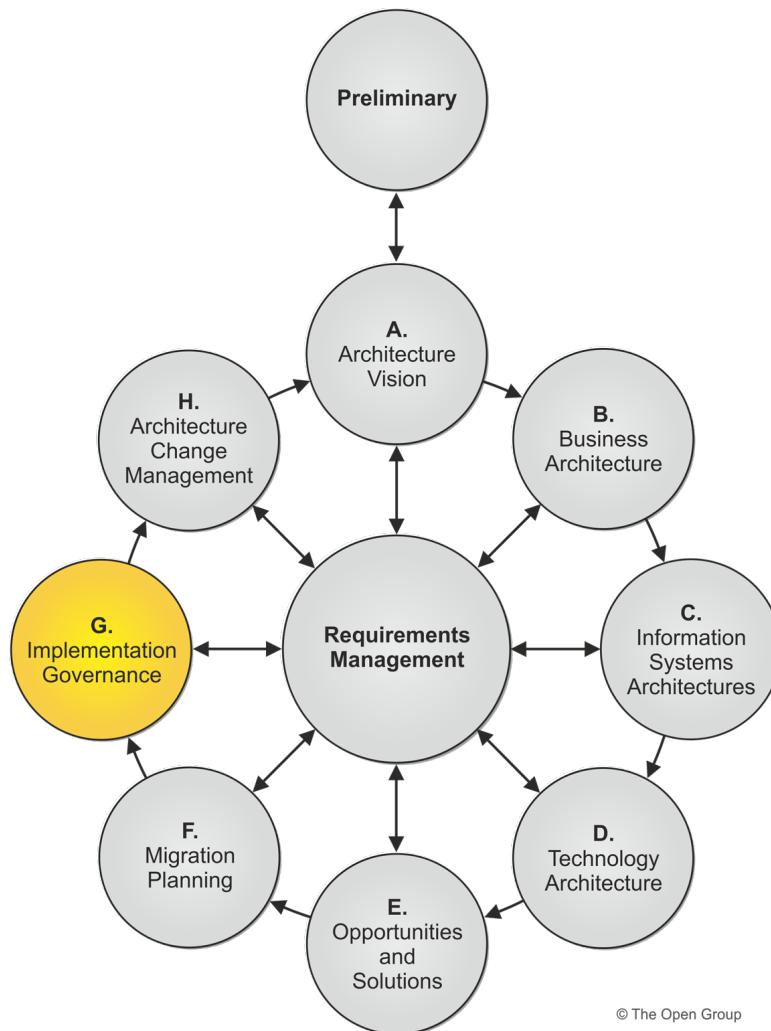
Objectives

- Finalise the Architecture Roadmap and the supporting Implementation and Migration Plan
- Ensure that the Implementation and Migration Plan is coordinated with the enterprise's approach to managing and implementing change in the enterprise's overall change portfolio
- Ensure that the business value and cost of work packages and Transition Architectures is understood by key stakeholders

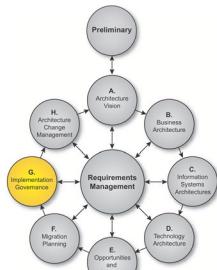
Approach

- The focus is creation of the Implementation and Migration plan in co-operation with project and portfolio managers
- Activities include the dependencies, costs, and benefits of the various migration projects within the context of the enterprise's other activity

Phase G: Implementation Governance



- Provide architectural oversight for the implementation
- Defines architecture constraints on implementation projects
- Govern and manage an Architecture contract
- Monitors implementation work for conformance
- Produce a *Business Value Realization*

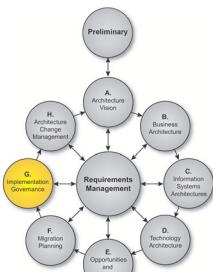


Phase G Objectives

- Ensure conformance with the Target Architecture by implementation projects
- Perform appropriate Architecture Governance functions for the solution and any implementation-driven architecture Change Requests

Approach

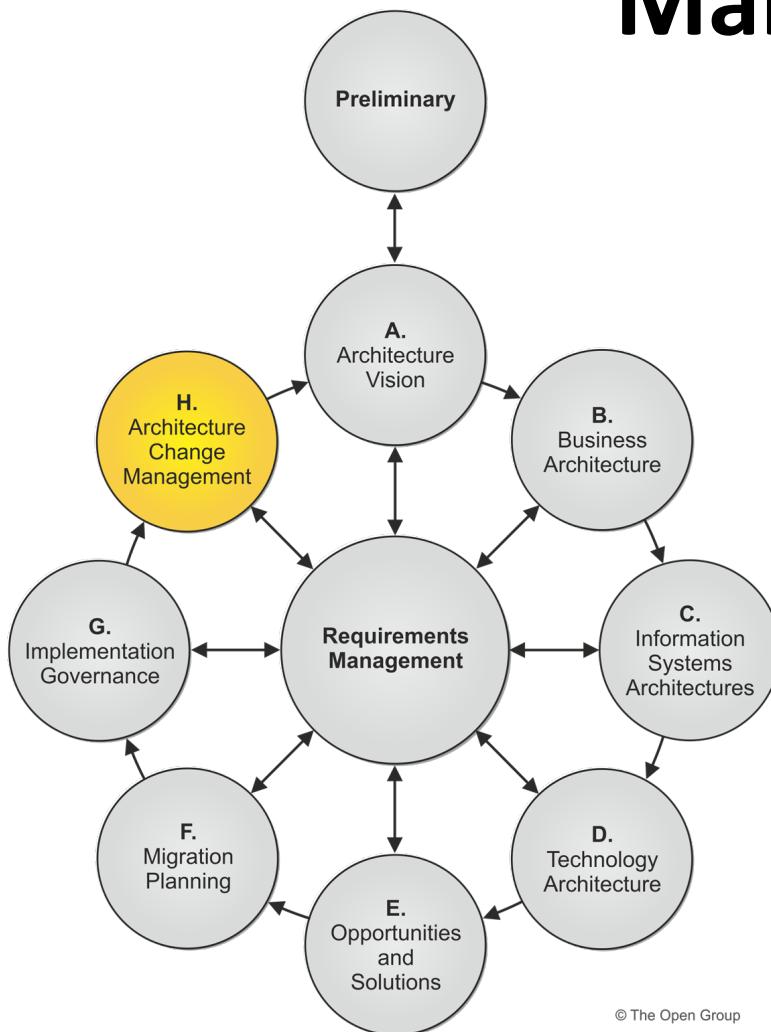
- Phase G relates the architecture to the implementation through the Architecture Contract
- The information for successful management of the projects must be brought together
- The development happens in parallel with Phase G
- Establish an implementation program that will enable the delivery of the 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 solution



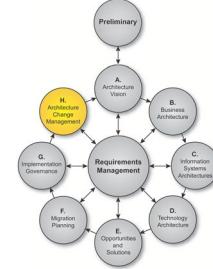
Approach

- Establish the connection between the architecture and implementation organisation 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

Phase H: Architecture Change Management



- Provide continual monitoring and a change management process
- Ensures that changes to the architecture are managed in a cohesive and architected way
- Establishes and supports the Enterprise Architecture to provide flexibility to evolve rapidly in response to changes in the technology or business environment
- Monitors the business and capacity 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

Approach

- The goal of an architecture change management process is to ensure that the architecture achieves its original target business value.
- This can be done by:
 - ensuring that changes to the architecture are managed properly
 - supporting a dynamic architecture
- The process will determine the circumstances under which:
 - The architecture will be permitted to change after deployment, and the process for this
 - The ADM will be used again



Exercise: Drivers for Architecture Change

1. Brainstorm as many examples of technology-related drivers for change as you can.
1. Brainstorm as many examples of business-related drivers for change as you can.

Change Management Process



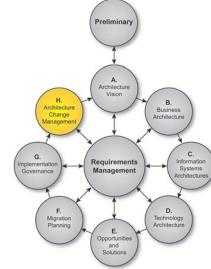
There are three main categories of architecture change:

1. **Simplification**: this can be handled via change management techniques.
2. **Incremental**: this may be handled via change management techniques, or it may require partial re-architecting.
3. **Re-architecting**: this requires putting the whole architecture through the architecture development cycle again.

Exercise: why might each of these changes occur?

To determine whether a change is simplification, incremental, or re-architecting:

1. Register all events that may impact the architecture
2. Allocate resources and management for the architecture tasks
3. The process (or role) responsible for resources has to make an assessment of what should be done
4. Evaluate the impact



Maintenance versus Redesign

If the change:

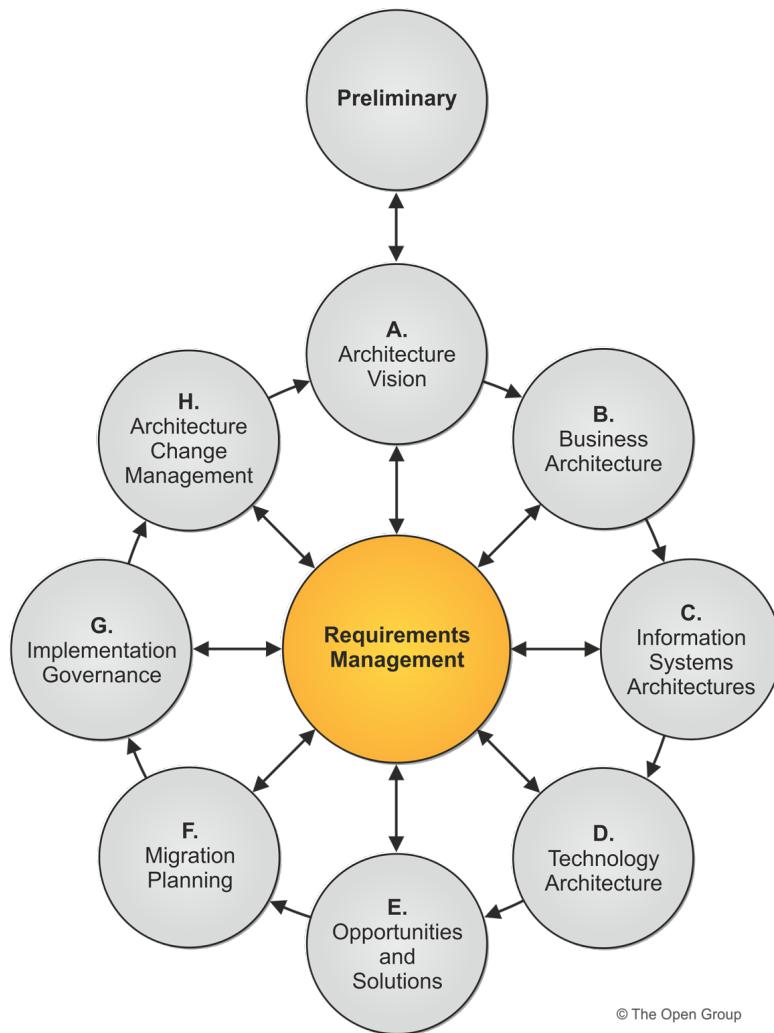
- Impacts 2 stakeholders or more, then it is likely to require an architecture redesign and re-entry to the ADM
- Impacts only 1 stakeholder, then it is likely to be a candidate for change management
- Can be allowed under a dispensation, then it is likely to be a candidate for change management

Change Impact Exercise

Determine the change impact of the following scenarios:

1. The impact of the change is significant for the business strategy
2. A new technology or standard emerges
3. The change is at an infrastructure level; for example, 10 systems are reduced to 1 system
4. The Foundation Architecture needs to be re-aligned with the business strategy
5. Substantial change is required to components and guidelines for use in deployment of the architecture

ADM Requirements Management

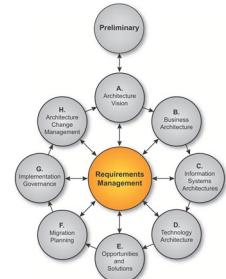


The process of managing architecture requirements:

- Applies to all phases of the ADM cycle
- Is central to the ADM process
- Is a dynamic process addressing the identification of requirements, their storage and delivery to the phases



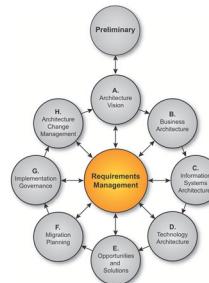
Objectives



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

Resources

- The TOGAF standard specifies generic needs for requirements, not specific tools or processes
- It recommends use of:
 - Business Scenarios
 - Commercial off the shelf tools (see next slide for an example)



Approach

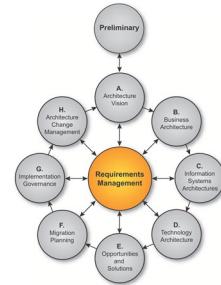
- The ability to deal with changes in the requirements is crucial to the ADM process since architecture deals with uncertainty and change
- Architecture bridges the divide between the aspirations of the stakeholders and a practical solution
- The Requirements Management process does not dispose of, address or prioritize requirements; this is done within the phases of the ADM
- It is recommended that an Architecture Requirements Repository is used to record and manage all architecture requirements



Versioning convention

- Version 0.1
 - Indicates a high-level outline of the architecture is in place
- Version1.0
 - Indicates a formally reviewed detailed architecture

Volère Requirements Specification Template



- This is an example of a suitable requirements template
- **The “Waiting Room”**
 - This is a repository for requirements that are beyond the planned scope, or the time available, for the current iteration. Having the ability to store future requirements helps avoid the perception that they are simply being discarded, while at the same time helping to manage expectations about what will be delivered.

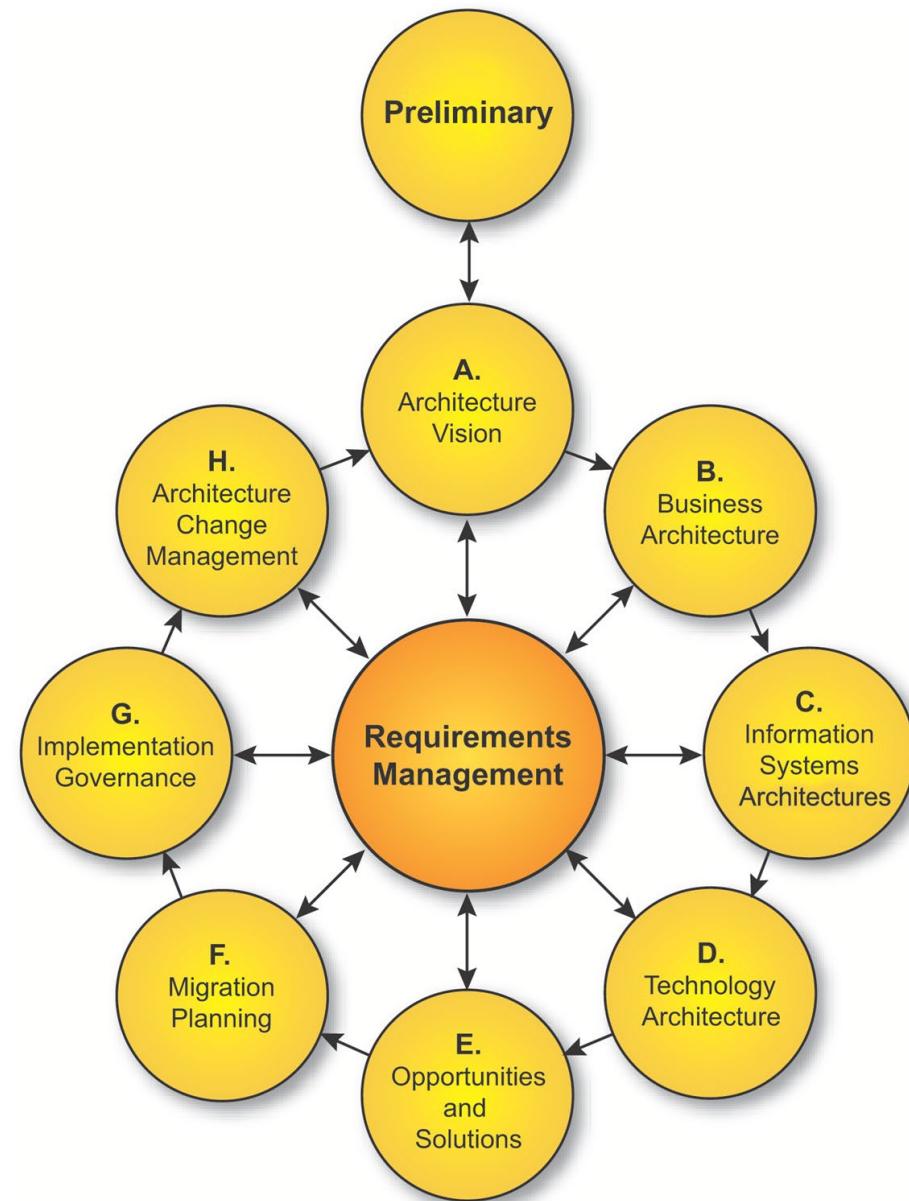


ADM Guidelines and Techniques



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ADM Guidelines and Techniques



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Roadmap

| |
|---|
| Part I - Introduction |
| Preface, Executive Overview, Core Concepts, Definitions |
| Part II – Architecture Development Method |
| Introduction to ADM |
| ADM Phase Narratives |
| Part III – ADM Guidelines & Techniques |
| Guidelines for Adapting the ADM Process |
| Techniques for Architecture Development |
| Part IV – Architecture Content Framework |
| Content Metamodel |
| Architectural Artifacts |
| Architecture Deliverables |
| Building Blocks |
| Part V – Enterprise Continuum & Tools |
| Enterprise Continuum |
| Architecture Partitioning |
| Architecture Repository |
| Tools for Architecture Development |
| Part VI – Architecture Capability Framework |
| Architecture Board |
| Architecture Compliance |
| Architecture Contracts |
| Architecture Governance |
| Architecture Maturity Models |
| Architecture Skills Framework |

- Part III, ADM Guidelines and Techniques
- A collection of guidelines and techniques for use in applying TOGAF and the ADM





Module Objectives

The objectives of this module are to describe:

- How to use the TOGAF Framework with different architectural styles
- The contents of Part III: ADM Guidelines and Techniques
 - The difference between *guidelines* and *techniques*
- The use of Architecture Principles
- The use of Business scenarios in the ADM
- The gap analysis technique
- The use of interoperability requirements in the ADM
- The Business Transformation Readiness Assessment
- Risk Management in the ADM
- Capability based planning



Using the TOGAF ADM in the Context of a Specific Architectural Style

- The TOGAF framework is designed to be flexible and readily adapted to a number of architectural styles.
- The TOGAF Standard defines *Architectural Style* as:
 - *“The combination of distinctive features related to the specific context within which architecture is performed or expressed; a collection of principles and characteristics that steer or constrain how an architecture is formed.”*
- Example guidance for adaptations included in the TOGAF Library are:
 - Risk and Security
 - Service-Oriented Architectures



Using the TOGAF ADM in the Context of a Specific Architectural Style

(Cont'd)

- The practitioner must take into account the combination of distinctive features in which architecture is performed or expressed.
- As a first step, the distinctive features of a style must be identified
 - For example, for SOA it is based on the design of the service which mirror business activities
- The second step is determining how these distinctive features will be addressed
 - It should not call for significant changes, but instead should adjust models, viewpoints and tools



ADM Guidelines and Techniques

- A set of guidelines and techniques to support the application of the ADM
- The **guidelines help to adapt the ADM** to deal with different scenarios, including different process styles (e.g. the use of iteration) and also specific requirements (e.g. security).
- The **techniques support specific tasks within the ADM** (e.g. defining principles, business scenarios, gap analysis, migration planning, risk management, etc).



Guidelines and Techniques

- Guidelines for Adapting the ADM Process
 - Ways to apply iteration to the ADM,
 - Applying the ADM at different levels of the enterprise,
 - Security considerations for the different phases
- Techniques for Architecture Development,
 - Architecture Principles
 - Stakeholder Management
 - Architecture Patterns
 - Business Scenarios
 - Gap Analysis
 - Migration Planning Techniques
 - Interoperability Requirements
 - Business Transformation Readiness Assessment
 - Risk Management
 - Capability-Based Planning

Question: What the difference is between a Guideline and a Technique?



Architecture Principles

- An initial output of the Preliminary Phase
- A set of general rules and guidelines for the architecture being developed
- The TOGAF standard contains guidelines for developing principles and a detailed set of generic principles
- Principles are generally established in two key domains:
 - **Enterprise** principles provide a basis for decision-making throughout an enterprise and dictate how the organisation fulfills its mission
 - **Architecture** principles are a set of principles that relate to architecture work.

The need for Architecture Principles

- They inform and support the way in which an organisation sets about fulfilling its mission
- Often they are one element in a structured set of ideas that collectively define and guide the organisation, from values through to actions and results



Template

| | |
|---------------------|---|
| Name | Should represent the essence of the rule and be easy to remember |
| Statement | Should be succinct and unambiguously communicate the rule |
| Rationale | Should highlight the business benefits of adhering to the principle using business terminology. |
| Implications | Should highlight the requirements, both for the business and IT for carrying out the principle, in terms of resources, costs, and activities/tasks. |



Example: Primacy of Principles

| | |
|---------------------|---|
| Statement | Principles apply throughout the enterprise and override all other considerations when decisions are made |
| Rationale | The only way we can provide a recognized, consistent and measurable level of operations is if all parts of the enterprise abide by the principles when making decisions |
| Implications | <p>Without this principle, short-term consideration, supposedly convenient exceptions, and inconsistencies would rapidly undermine the management of information.</p> <p>Information management initiatives will not be permitted to begin until they are examined for compliance with the principles.</p> <p>A conflict with a principle will be resolved by changing the conflicting initiative, which could delay or prevent the initiative.</p> |

Example: Self-Serve

| | |
|---------------------|---|
| Statement | Customers should be able to serve themselves |
| Rationale | Applying this principle will improve customer satisfaction, reduce administrative overhead, and potentially improve revenue. |
| Implications | There is an implication to improve ease-of-use and minimize training needs; for example, members should be able to update their contact details, etc. and be able to buy additional membership products online. |

What makes a good set of Architecture Principles?

A good set of principles will be founded in the beliefs and values of the organisation.

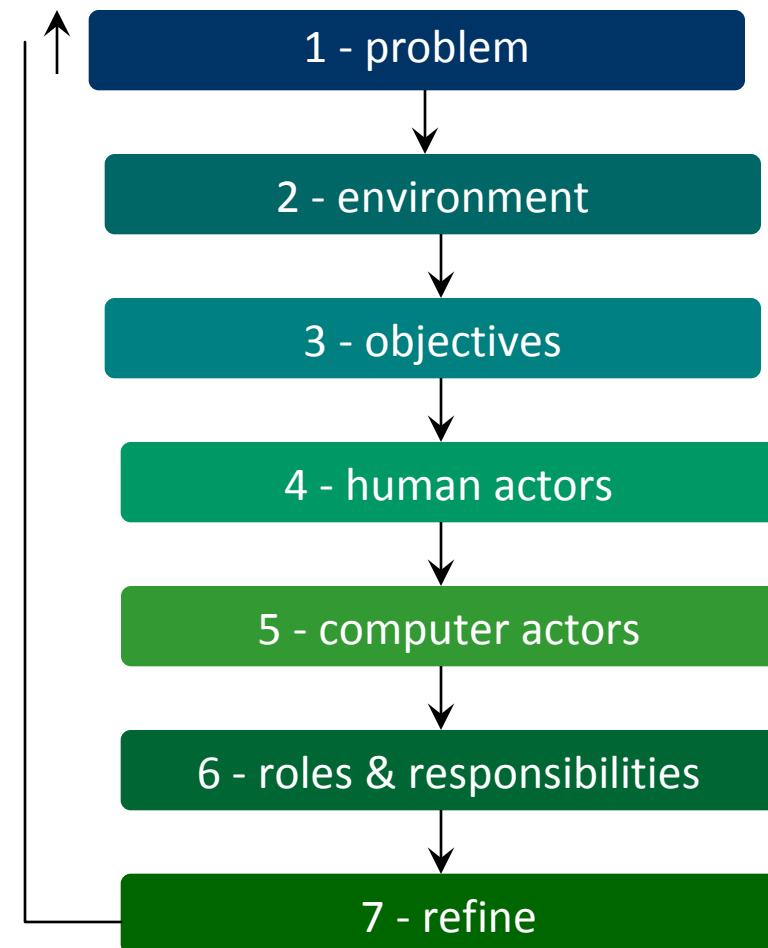
It must be:

- **Understandable**: the underlying tenets can be quickly grasped
- **Robust**: principles must be definitive and precise to support consistent decision-making
- **Complete**: principles must cover every situation perceived
- **Consistent**: principles should not be contradictory
- **Stable**: principles should be enduring, yet able to accommodate change

What is a Business Scenario?

Business scenarios are a method used to help identify and understand the business requirements that the architecture must address. A business scenario describes:

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



What is a good Business Scenario?

A good business scenario represents a significant business need or problem, and enables vendors to understand the value of a solution to the customer.

A good business scenario is also “SMART”:

- Specific, by defining what needs to be done
- Measurable, through clear metrics for success
- Actionable, by clearly segmenting the problem and providing the basis for a solution
- Realistic, in that the problem can be solved within the bounds of physical reality, time, and cost constraints
- Time-bound, in that there is a clear statement of when the opportunity expires

The use of Business Scenarios in the ADM

- Business scenarios figure most prominently in the initial phase of the ADM, Architecture Vision,
 - when they are used to define relevant business requirements
 - and to build consensus with business management and other stakeholders
- They may also be used in other phases, particularly during Business Architecture
 - to derive the characteristics of the architecture directly from the high-level requirements of the business

Gap Analysis

Gap analysis is widely used in the ADM to validate an architecture that is being developed. The basic idea is to spot gaps between the Baseline Architecture and the Target Architecture; that is, items that have been deliberately omitted, accidentally left out, or not yet defined. Gap Analysis is used in Phases B, C, D, and E.

| 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 | © The Open Group |



Interoperability

- Interoperability is “the ability to share information and services”.
- Defining the degree to which information and services are to be shared is very important, especially in a complex organisation and/or extended enterprise.

The determination of interoperability occurs throughout the ADM:

- Architecture Vision: the nature and security considerations of information and service exchanges are found using business scenarios.
- Business Architecture: information and service exchanges are defined in business terms.
- Data Architecture: the content of information exchanges is detailed using the corporate data and/or information exchange model.
- Application Architecture: the way applications are to share information and services is specified.
- Technology Architecture: appropriate technical mechanisms to permit information and service exchanges are specified.
- Opportunities & Solutions: actual solutions are selected.
- Migration Planning: interoperability is implemented logically.



Examples

Phase B: Inter-stakeholder Information Interoperability Requirements
(Using degrees of information interoperability)

| Stakeholders | A | B | C | D | E | F | G |
|--------------|---|---|---|---|---|---|---|
| A | | 2 | 3 | 2 | 3 | 3 | 3 |
| B | 2 | | 3 | 2 | 3 | 2 | 2 |
| C | 3 | 3 | | 2 | 2 | 2 | 3 |
| D | 2 | 2 | 2 | | 3 | 3 | 3 |
| E | 4 | 4 | 2 | 3 | | 3 | 3 |
| F | 4 | 4 | 2 | 3 | 3 | | 2 |
| G | 2 | 2 | 3 | 3 | 3 | 3 | |

Phase C: Inter-system Interoperability Requirements

| | System A | System B | System C | System D | System E | System F | System G |
|----------|----------|----------|----------|----------|----------|----------|----------|
| System A | | 2A | 3D | 2B | 3A | 3A | 3B |
| System B | 2E | | 3F | 2C | 3A | 2B | 2C |
| System C | 3E | 3F | | 2B | 2A | 2A | 3B |
| System D | 2B | 2B | 2B | | 3A | 3A | 3B |
| System E | 4A | 4B | 2B | 3A | | 3B | 3B |
| System F | 4A | 4A | 2B | 3B | 3A | | 2D |
| System G | 2B | 2B | 3A | 3A | 3B | 3B | |

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The Business Transformation Readiness Assessment

- Enterprise architecture often involves considerable change.
- Understanding the readiness of an organisation to accept change, identifying the issues, and dealing with them in the Implementation and Migration Plans is key to successful architecture transformation in Phases E and F. An initial assessment is carried out in Phase A.
- This is a joint effort between corporate (especially human resources) staff, lines of business and IT planners.

Business Transformation Readiness and the ADM

Recommended activities when assessing readiness for business transformation are:

- Determine the readiness factors
- Present the readiness factors using maturity models
- Assess the readiness factors, and determine the readiness factor ratings
- Assess the risks for each readiness factor and identify mitigating actions
- Work these actions into Phase E and F Implementation and Migration Plan

Example

| Business Transformation Readiness Assessment - Maturity Model | | | | | | | | |
|--|---|--|--|--|--|--|--|--|
| Factor 2: Need for Enterprise Information Architecture | | Class | Organizational Context | | | | | |
| | | BTEP Readiness Factor | YES | | | | | |
| Definition | There is recognition by the organization that information is a strategic corporate asset requiring stewardship. There is also recognition that the data is not universally understandable, of requisite quality, and accessible. | | | | | | | |
| Maturity Model Levels | | | | | | | | |
| 0 Not defined | 1 <i>Ad Hoc</i> | 2 Repeatable | 3 Defined | 4 Managed | 5 Optimized | | | |
| Information is not recognized as an asset. There is no clear stewardship of data. | Data Management (DM) concepts are intuitively understood and practiced on an <i>ad hoc</i> basis. Stewardship of the data is informal. Data is recognized by certain internal experts and senior management as being of strategic importance to the organization. Focus is primarily on technically managing redundant data at the applications level. | Many parts of the organization value information/data as a strategic asset. Internal DM experts maintain clear lines of responsibility and stewardship of the data, organized along lines of business and at all senior levels. Staff put into practice DM principles and standards in their daily activities. | Data is recognized as a strategic asset in most parts of the organization, and throughout most levels from operations to senior management. Resources are committed to ensuring strong stewardship of data at the lower management and information expert levels. | Data is recognized as a strategic asset in all parts of the organization, and throughout most levels from operations to senior management. Resources are committed to ensuring strong stewardship of data at the senior management and information expert levels. | Data is treated in all levels throughout the organization as a strategic asset to be exploited and re-used. Data products and services are strongly integrated with the management practice of the organization. All staff are empowered and equipped to take stewardship of information, and are seen as "knowledge workers". | | | |
| | | | | Recommended Target State | | | | |

Risk Management in the ADM

There are two levels of risk that should be considered:

1. **Initial Level of Risk:** Risk categorisation prior to determining and implementing mitigating actions.
2. **Residual Level of Risk:** Risk categorisation after implementation of mitigating actions

The process for risk management:

1. Risk classification
2. Risk identification
3. Initial risk assessment
4. Risk mitigation and residual risk assessment
5. Risk monitoring

- Risks are identified in Phase A as part of the initial Business Transformation Readiness Assessment
- The risk identification and mitigation assessment worksheets are maintained as governance artifacts and are kept up-to-date in Phase G (Implementation Governance) where risk monitoring is conducted
- Implementation governance can identify critical risks that are not being mitigated and might require another full or partial ADM cycle



Example

| Corporate Risk Impact Assessment | | | | | |
|----------------------------------|-----------|--------|------------|--------|----------|
| Effect | Frequency | | | | |
| | Frequent | Likely | Occasional | Seldom | Unlikely |
| Catastrophic | E | E | H | H | M |
| Critical | E | H | H | M | L |
| Marginal | H | M | M | L | L |
| Negligible | M | L | L | L | L |

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| Risk ID | Risk | Preliminary Risk | | | Mitigation | Residual Risk | | |
|---------|------|------------------|-----------|--------|------------|---------------|-----------|--------|
| | | Effect | Frequency | Impact | | Effect | Frequency | Impact |
| | | | | | | | | |
| | | | | | | | | |

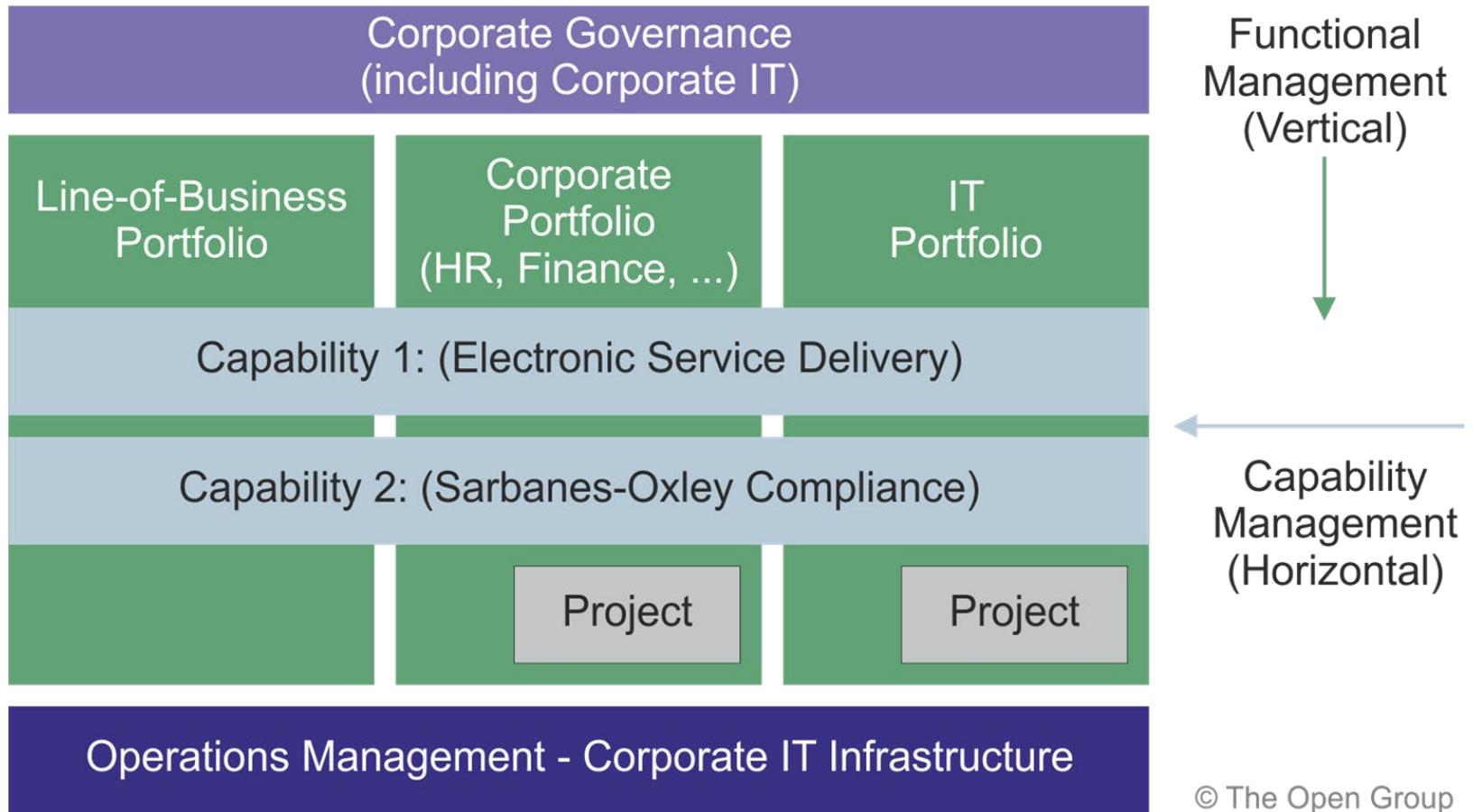
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Capability Based Planning

- Capability-based planning is a technique that focuses on the planning, engineering and delivery of strategic business capabilities
- It frames all phases of the architecture development in the context of business outcomes, clearly linking the IT vision, architectures (ABBs and SBBs), and the Implementation and Migration Plans with the corporate strategic, business, and line of business plans

Capabilities



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Summary

- This module has introduced how to adapt the ADM for different Architectural Styles
- It has described the two different types of content in Part III: Guidelines and Techniques
- It has briefly described:
 - Architecture Principles
 - Business Scenarios
 - Gap Analysis
 - Interoperability
 - Business Transformation Readiness
 - Risk Management
 - Capability-Based Planning

Exercise:

- Select 7 principles at random from the Example Set of Architecture Principles in the TOGAF standard, Chapter 20
- For each selected principle state whether it applies to your organisation or not, and give your reasons



ADM Deliverables Level 1

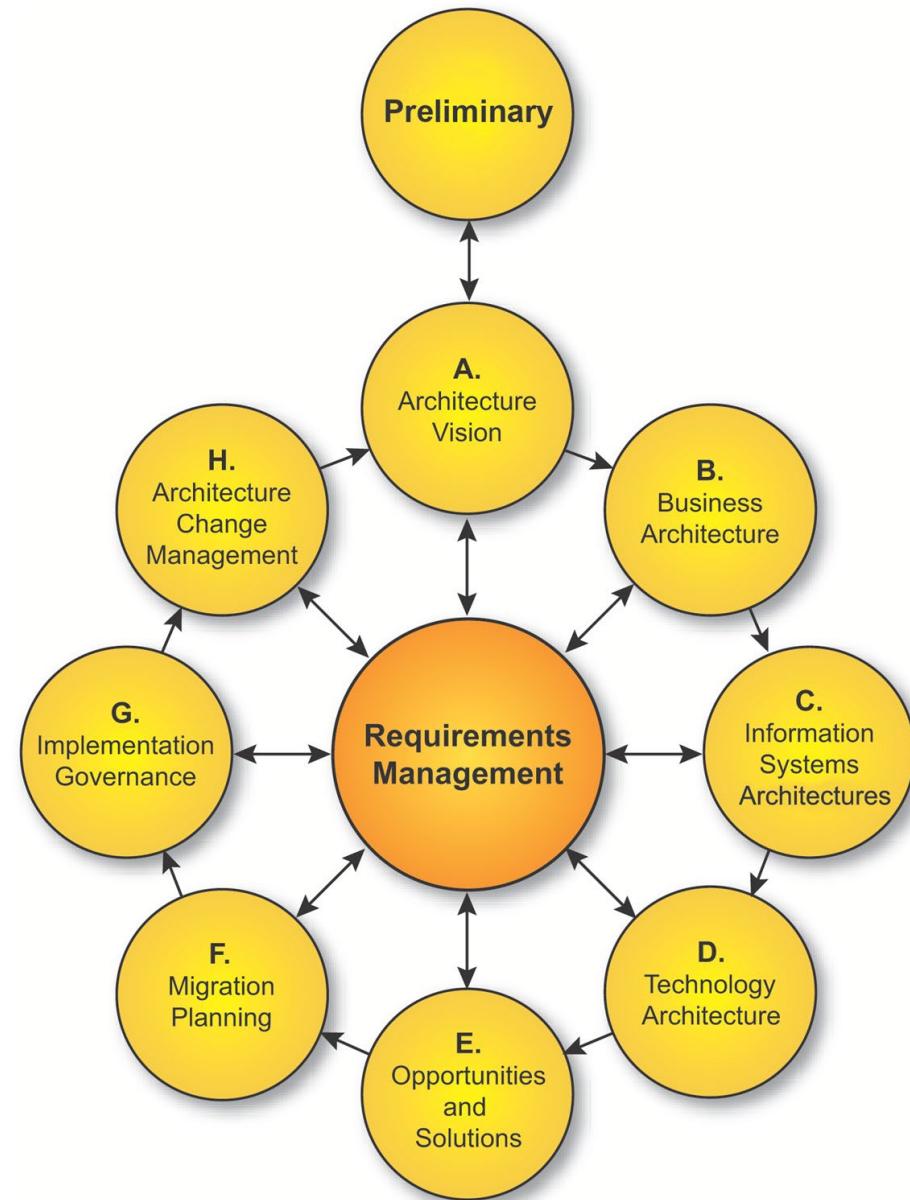


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ADM

Deliverables

Level 1



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Roadmap

| |
|---|
| Part I - Introduction |
| Preface, Executive Overview, Core Concepts, Definitions |
| Part II – Architecture Development Method |
| Introduction to ADM |
| ADM Phase Narratives |
| Part III – ADM Guidelines and Techniques |
| Guidelines for Adapting the ADM Process |
| Techniques for Architecture Development |
| Part IV – Architecture Content Framework |
| Content Metamodel |
| Architectural Artifacts |
| Architecture Deliverables |
| Building Blocks |
| Part V – Enterprise Continuum and Tools |
| Enterprise Continuum |
| Architecture Partitioning |
| Architecture Repository |
| Tools for Architecture Development |
| Part VI – Architecture Capability Framework |
| Architecture Board |
| Architecture Compliance |
| Architecture Contracts |
| Architecture Governance |
| Architecture Maturity Models |
| Architecture Skills Framework |

- **Part IV, Architecture Content Framework, Chapter 32**





Module Objectives

The aim of this module is to introduce the key deliverables of the ADM cycle:

- The role of Architecture Deliverables
- The purpose of key deliverables

Architecture Deliverables

- The contractual or formal work products of an architecture project
- The definition of deliverable provided by the TOGAF standard is a baseline
- It is thus a starting point for tailoring



Architecture Deliverables

- Architecture Building Blocks
- Architecture Contract
- Architecture Definition Document
- Architecture Principles
- Architecture Repository
- Architecture Requirements
- Architecture Roadmap
- Architecture Vision
- Business Principles, Business Goals and Business Drivers
- Capability Assessment
- Change Request
- Communications Plan
- Implementation and Migration Plan
- Implementation Governance Model
- organisational model for Enterprise Architecture
- Request for Architecture Work
- Requirements Impact Assessment
- Solution Building Blocks
- Statement of Architecture Work
- Tailored Architecture Framework



Request for Architecture Work

- Sent from the Sponsor to the Architecture organisation
- This initiates a cycle of the ADM
- Created as an output from the Preliminary Phase or an approved architecture Change Request

Statement of Architecture Work

- A deliverable output from Phase A
- A response to the Request for Architecture Work
- A plan for the architecture work

Architecture Vision

- Produced in Phase A
- An aspirational view of the end architecture product
- Its purpose is to agree the desired outcome for the architecture



Communications Plan

- Produced in Phase A
- Allows for a planned and managed process for communication about a new architecture

Architecture Definition Document

- The deliverable container for the core artifacts
 - Business, Data, Application, and Technology architectures
 - Includes baseline, transition and target architectures
 - Developed through phases A, B, C, and D
 - It provides a *qualitative* view of the solution

Architecture Requirements Document

- The deliverable container for the requirements for an architecture
- A companion to the Architecture Definition Document
- It contains measurable criteria – a *quantitative* view
- Often used as a component of the Architecture Contract

Architecture Roadmap

- Incrementally developed throughout phases E and F
 - Informed by the Candidate Roadmap Components identified in phases B, C, and D
- This lists individual increments of change
- Shows progression from Baseline to Target

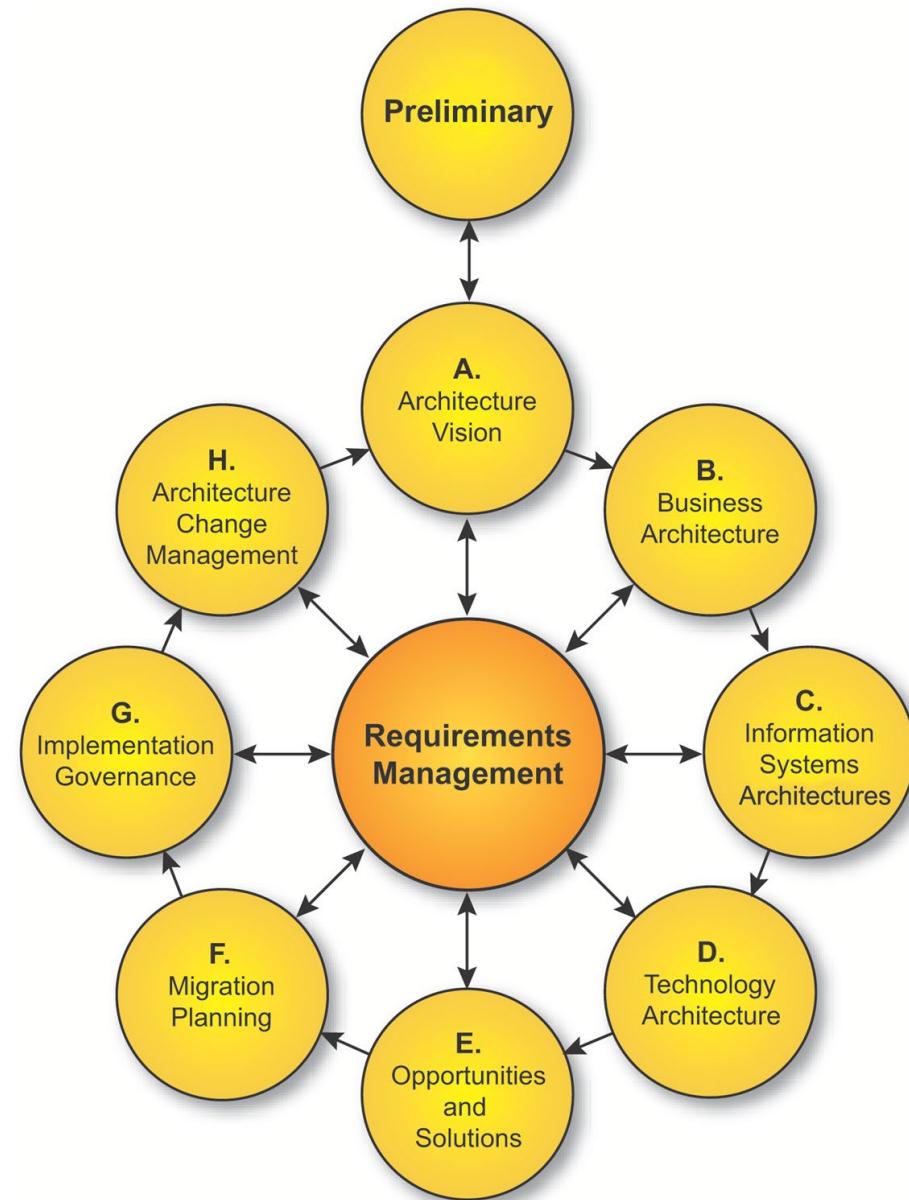


TOGAF® Reference Models



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TOGAF® Reference Models



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Module Objectives

The aim of this module is to introduce two TOGAF Reference models from the TOGAF Library:

- The TOGAF Technical Reference Model (TRM)
- The Integrated Information Infrastructure Reference Model (III-RM).

And the relationship of the III-RM to the concept of *Boundaryless Information Flow™*



TOGAF Foundation Architecture

- 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
- The TOGAF Library provides the TOGAF TRM as an example Foundation Architecture
- This TRM is “Platform-centric”
- It is an example of an architecture of generic services and functions on which other, more specific architectures can be based

The Architecture Continuum

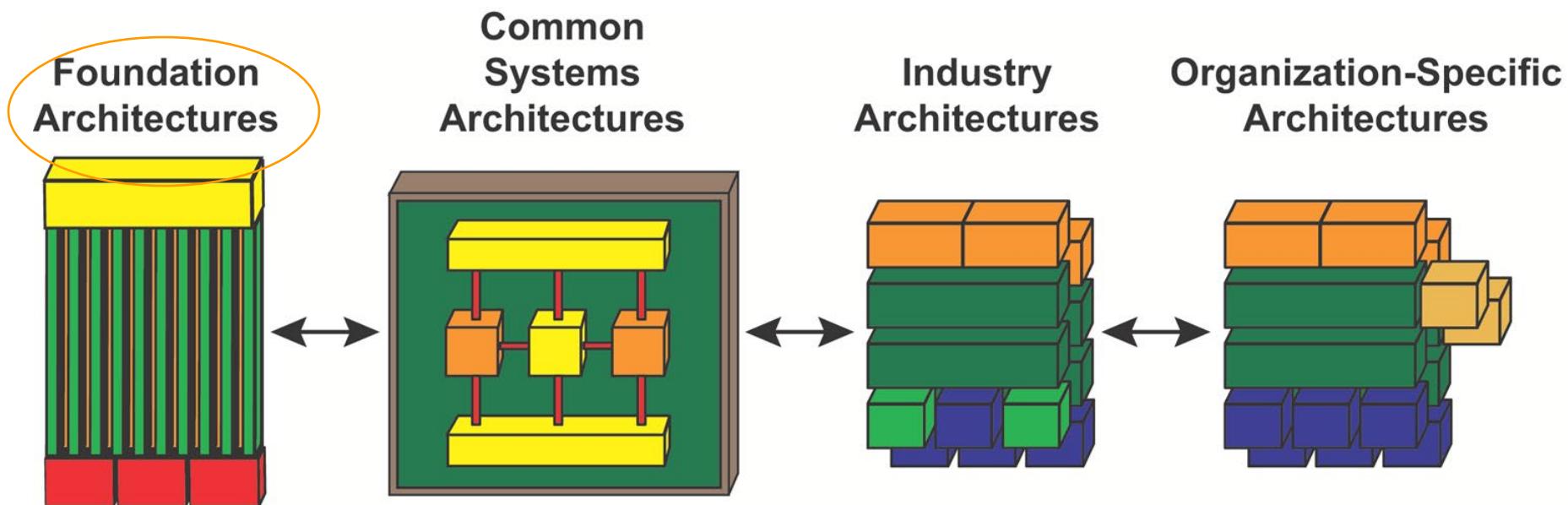
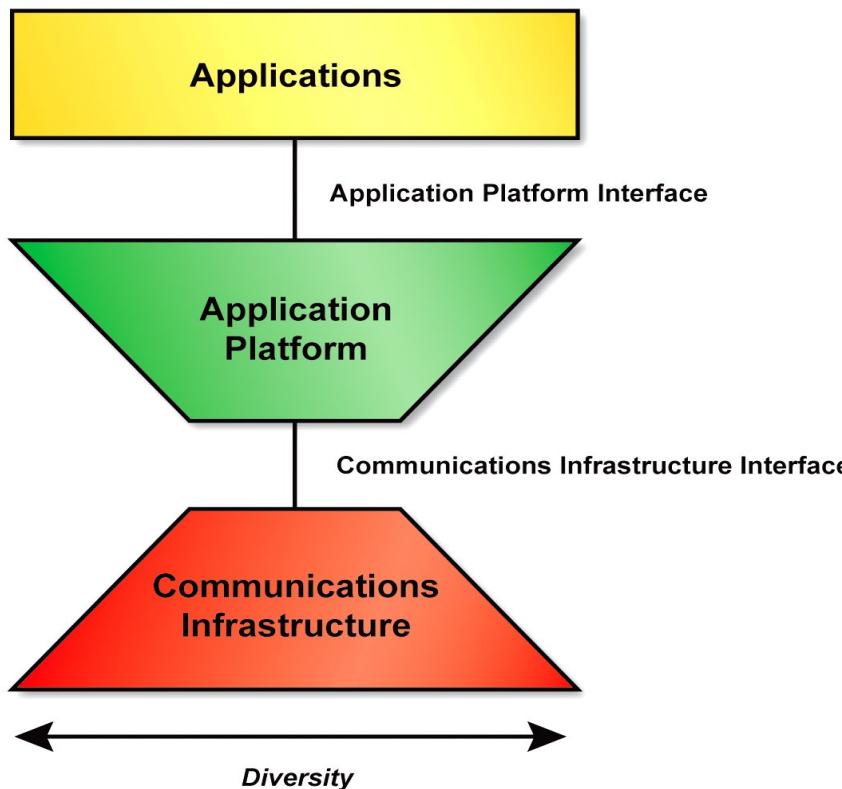


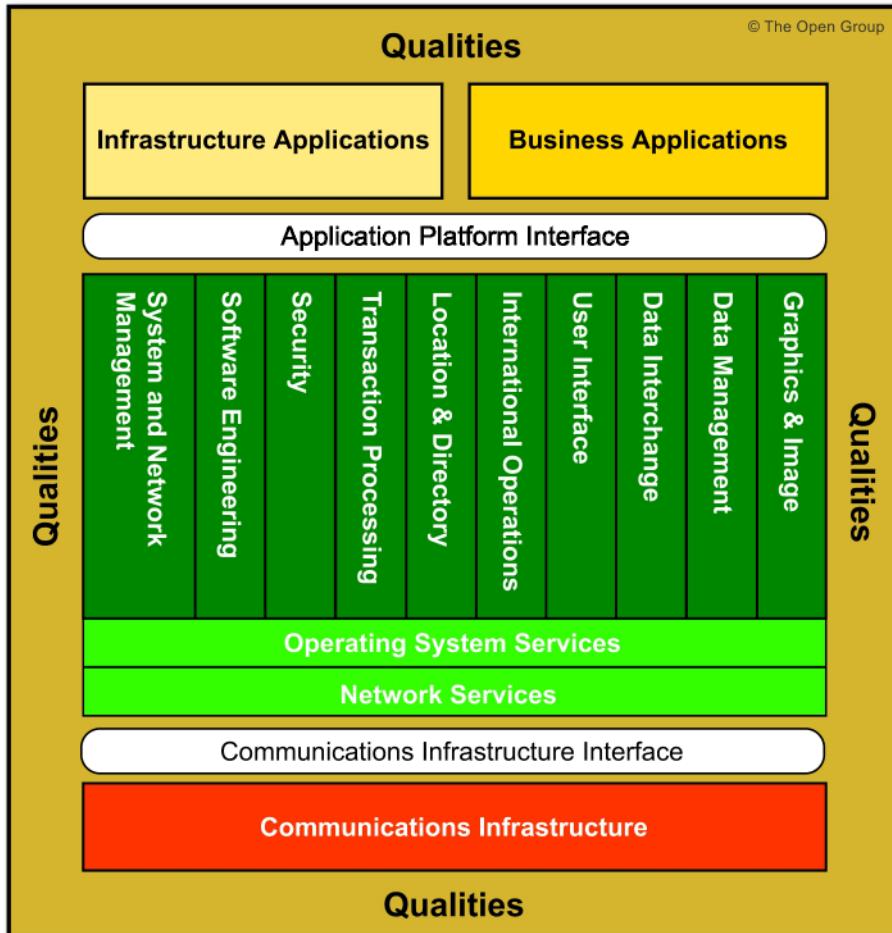
Figure 1

TRM Components



- The TRM has two main components:
 - A taxonomy that defines terminology and provides a coherent description of the components and conceptual structure of an information system
 - An associated TRM graphic that provide a visual representation as an aid to understanding

Summary of the TRM



The TOGAF Technical Reference Model provides a model and core taxonomy of generic platform services

- It is a Foundation Architecture
- It can be used to build any system architecture
- A taxonomy defines consistent terminology



How Important...

- Not having Boundary less Information Flow where systems interoperate, i.e. easily exchange information and use that information to improve operations, is causing organisations real pain *
 - 100s of millions in lost opportunities
 - Billions spent to make systems interoperate or to recover from mistakes
 - *The risks are not only financial but deal with lost lives*
 - *Hospitals, 911/999 systems, Critical infrastructure, Air Traffic Control...*

* respondents to survey taken at conference



Integrated Information Infrastructure Reference Model

- A model of the key components for developing, managing, and operating an integrated information infrastructure.
 - Supporting “*Boundaryless Information Flow™*”
- A model of a set of applications that sit on top of an application platform.
- An expanded subset of the TOGAF Technical Reference Model, using different orientation.

The Architecture Continuum

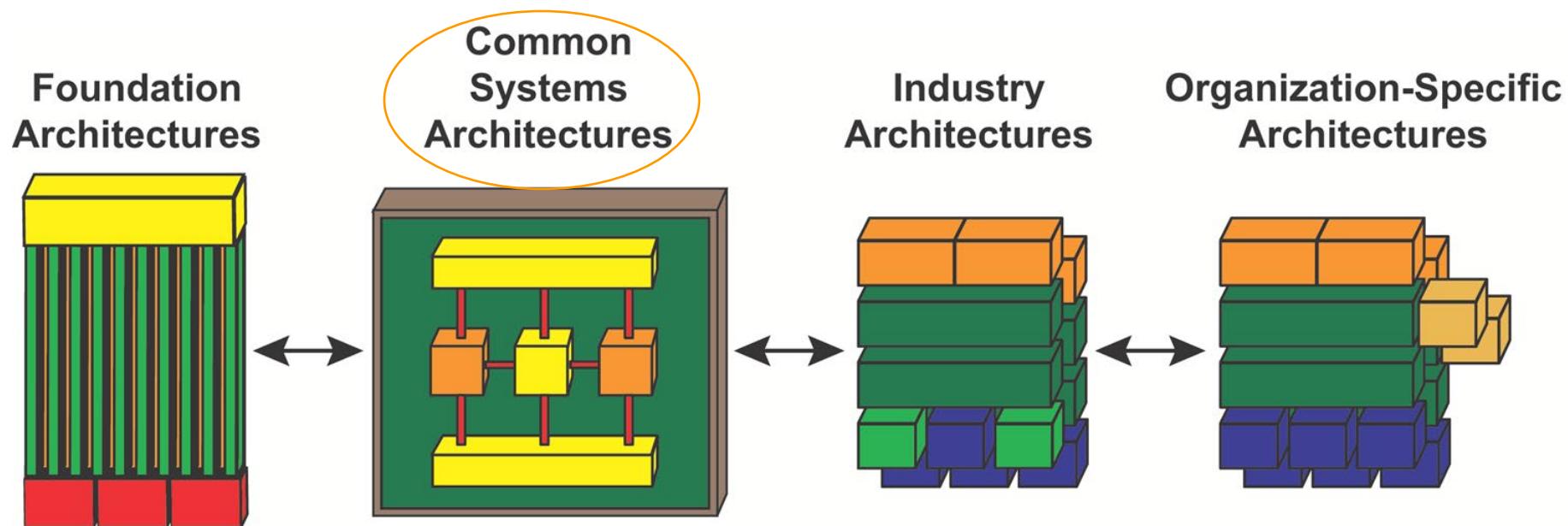
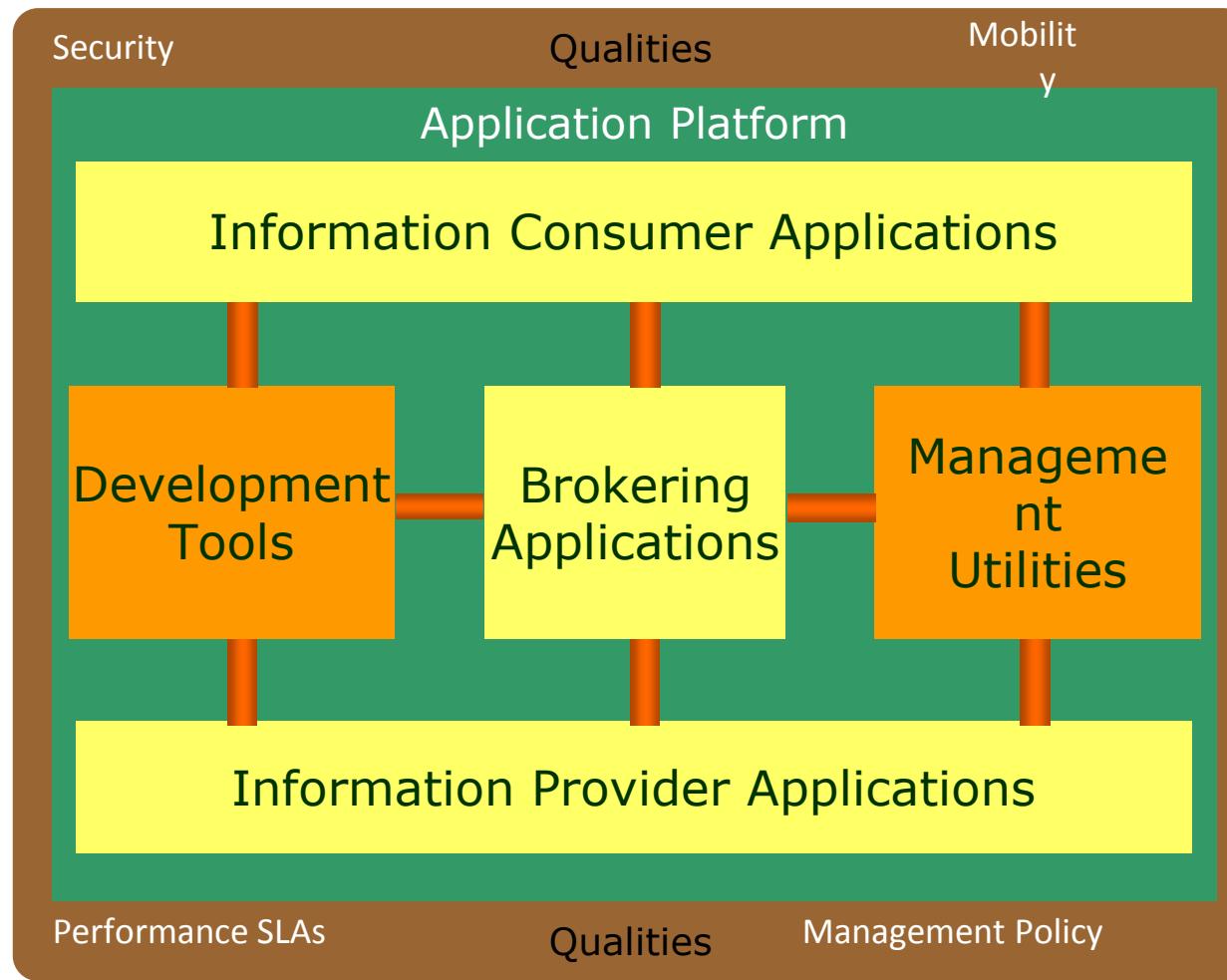


Figure 1

Integrated Information Infrastructure Reference Model – High-Level Model



Components of the III-RM

The III-RM has 2 main components:

- A taxonomy, which defines terminology, and provides a coherent description of the components and conceptual structure of an integrated information infrastructure
- An associated III-RM graphic, which provides a visual representation of the taxonomy, and the inter-relationship of the components, as an aid to understanding

Summary

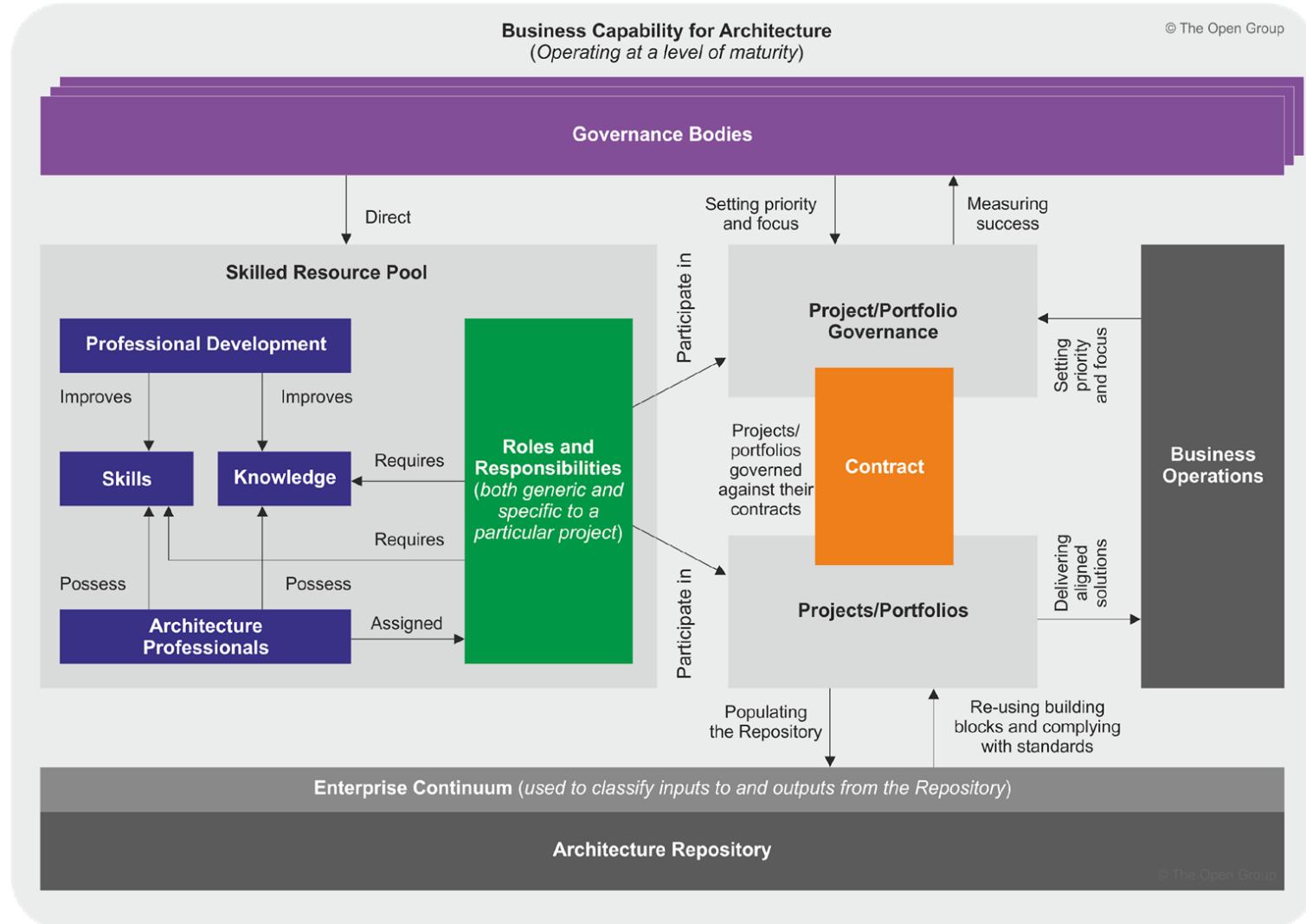
- The III-RM is an example of a Common Systems Architecture
- The focus is on applications
- The III-RM has 2 main components: a taxonomy, and an associated graphic.
- A key driver for the III-RM is the Need for Boundaryless Information Flow: getting information to the right people at the right time in a secure, reliable manner
- The infrastructure that enables this vision is called the “integrated information infrastructure”



Test Yourself Question

- Which of the following best describes the purpose of the TRM?
 - A. To provide a framework for IT governance
 - B. To provide a visual model and taxonomy for an information system
 - C. To provide a list of standards
 - D. To provide a software development method
 - E. To provide a system engineering viewpoint in a possible solution

Capability Framework





Establishing the Architecture Capability as an Operational Entity

- The Architecture Capability Framework provides guidance on establishing an operational enterprise architecture practice
- It recommends they include capabilities such as:
 - Financial Management
 - Performance Management
 - Service Management
 - Risk Management
 - Resource Management
 - Communications and Stakeholder Management
 - Quality Management
 - Supplier Management
 - Configuration Management
 - Environment Management



Boundaryless Information Flow™

- A trademark of The Open Group
- Access to integrated information to support business process improvements
- An infrastructure that provides Boundaryless Information Flow has open standard components that provide services in a customer's extended enterprise that:
 - Combine multiple sources of information
 - Securely deliver the information whenever and wherever it is needed, in the right context for the people or systems using that information



Test Yourself Question

Q: Which of the following is *not* considered one of the main parts of the TOGAF standard?

- A. Architecture Development Method
- B. Enterprise Continuum
- C. TOGAF Reference Models
- D. TOGAF Resource Base



Module 3:

Introduction to the

Architecture Development

Method



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Module Objectives

The objectives of this module are to describe:

- The TOGAF ADM
- Its relationship to other parts of the TOGAF standard
- The phases of the ADM
- How and why to adapt the ADM
- How to scope an architecture activity
- The need for an integration framework

What is the TOGAF ADM?

- The ADM forms the core of the TOGAF framework
- The result of contributions from many architecture practitioners
- A process for developing an enterprise architecture
- Integrates all the elements within the TOGAF standard
- Designed to address enterprise's business and IT needs by providing:
 - A set of architecture views (business, data, application, technology)
 - A set of recommended deliverables
 - A method for managing requirements
 - Guidelines on tools for architecture development



Prepare the organisation for a successful architecture projects

Set the scope, constraints and expectations for a TOGAF project; create the Architecture Vision; validate the business context; create the Statement of Architecture Work

Provide continual monitoring and a change management process to ensure that the architecture responds to the needs of the enterprise

Develop Business Architecture
Develop baseline and target architectures and analyse the gaps

Provide architectural oversight to the implementation; ensure that the implementation project conforms to the architecture

Develop Information Systems Architectures
Develop baseline and target architectures and analyse the gaps

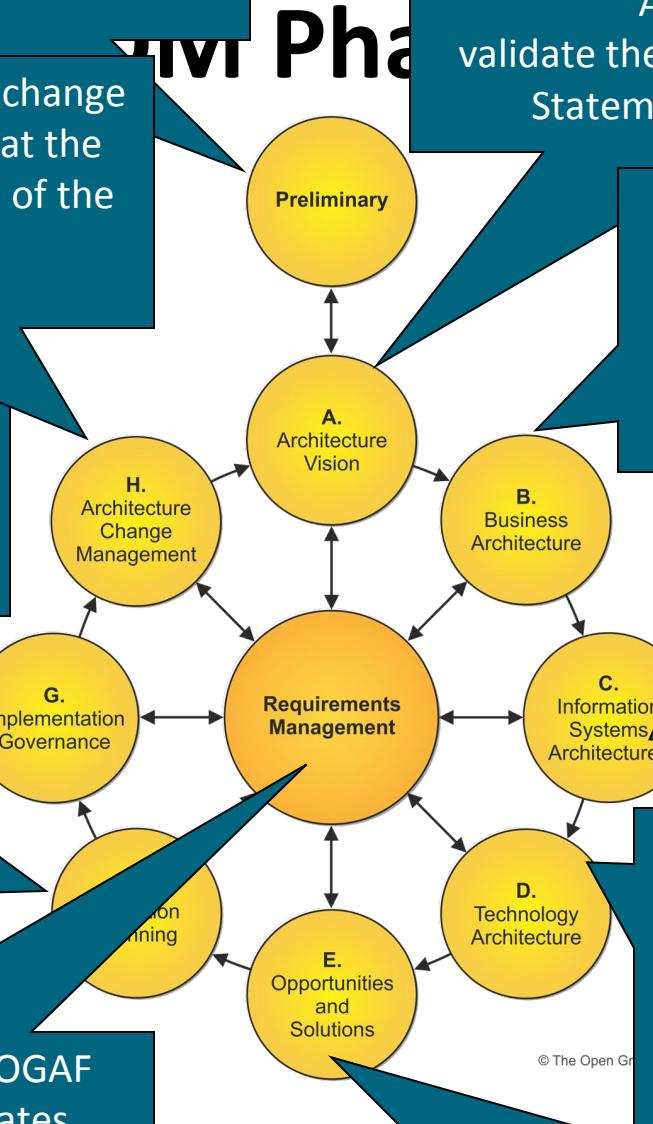
analyse costs, benefits and risks; develop detailed Implementation and Migration Plan

Develop Technology Architecture

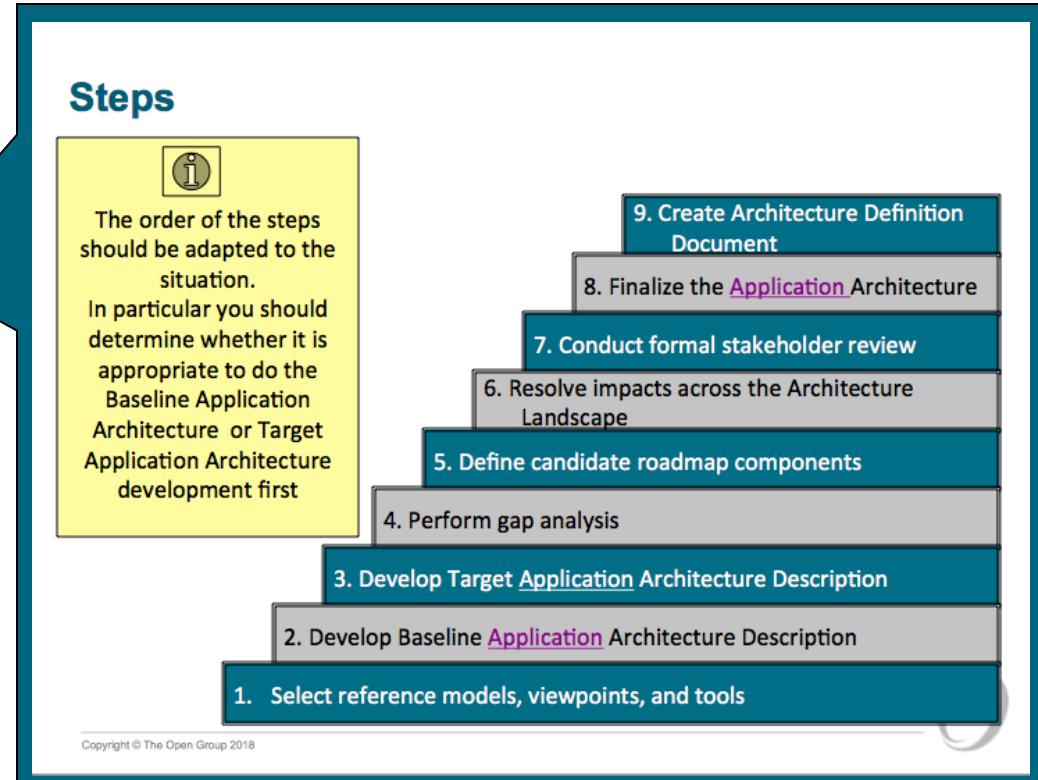
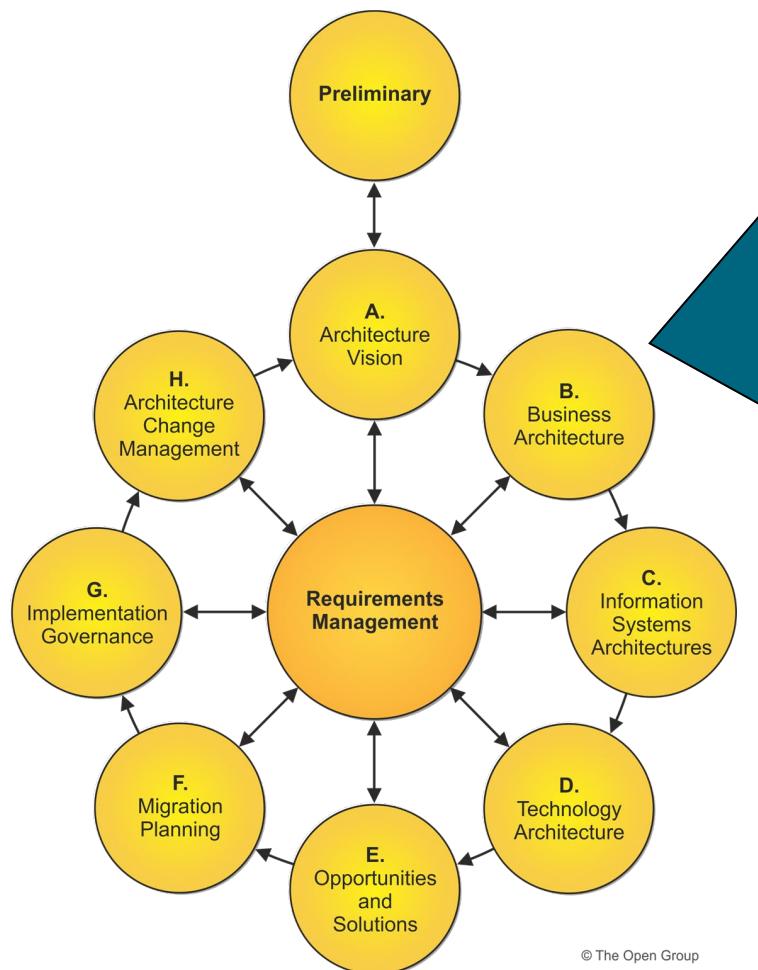
Ensure that every stage of a TOGAF project is based on and validates business requirements

Develop baseline and target architectures and analyse the gaps

Perform initial implementation planning; identify major implementation projects



ADM Phase Steps Example





ADM Inputs and Outputs

- The TOGAF standard defines a number of input and output deliverables for each ADM phase
 - These are suggestions and need not be followed exactly
 - Output of an early phase may be modified in a later phase
 - Version numbers are used to manage the output
 - A convention is used to illustrate the evolution of deliverables
 - 0.1 – a high level outline deliverable
 - 1.0 – a formally reviewed detailed deliverable



Adapting the ADM

- Generic methodology intended for variable:
 - Geographies
 - Vertical sectors
 - Industry types
- Usable with deliverables of other frameworks such as Zachman, DODAF, ...
- It is usual to modify or extend the ADM to suit specific needs



Governing the ADM

- The ADM, whether adapted or used as is, is a key process to be managed and governed
- The Architecture Board should be satisfied that the method is being applied correctly
- The management of all architectural artifacts, governance and related process should be supported by a controlled environment such as a repository

Governance Repository

- Reference Data
- Process Status
- Audit Information



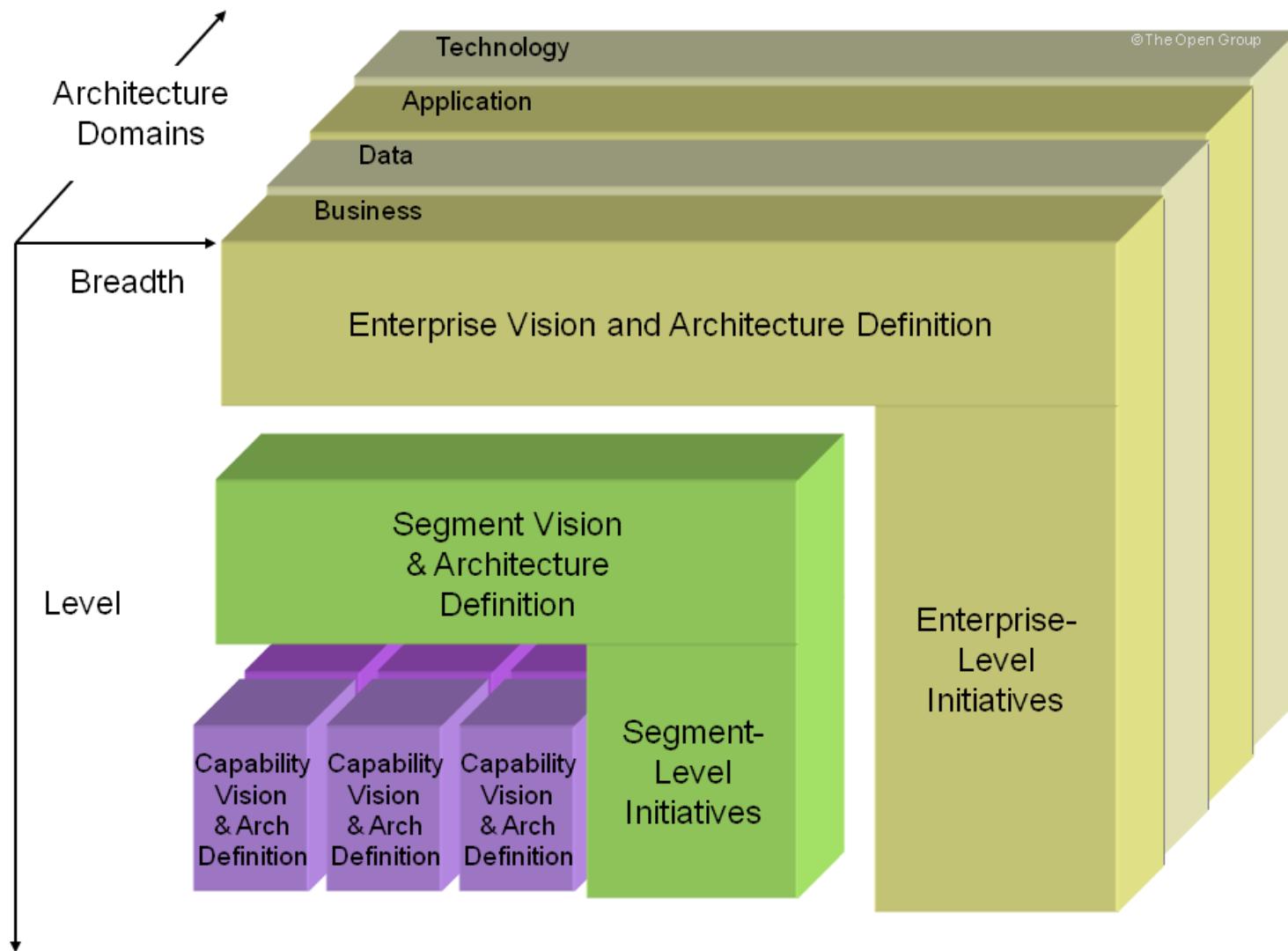
Reasons to Constrain the Scope of Architectural Activity

- The organisational authority of the team producing the architecture
- The objectives and stakeholder concerns to be addressed within the architecture
- The availability of people, finance, and other resources

Scoping the Architecture Activity

- There are four dimensions in which scope may be limited:
 - Breadth
 - Depth
 - Time Period
 - Architecture Domains

Architecture Integration





Summary

- The ADM is a comprehensive, general method
- It recommends a sequence for various phases and steps involved in developing an architecture
- It is an iterative method
- It draws on the other parts of the TOGAF framework for assets and processes
- It can be used with other deliverables from other frameworks

Test Yourself Question

The following statements describe the phases of the ADM, except ?

1. They are cyclical
2. They are iterative
3. Each phase refines the scope
4. Each phase is mandatory
5. The phases cycle through a range of architecture views

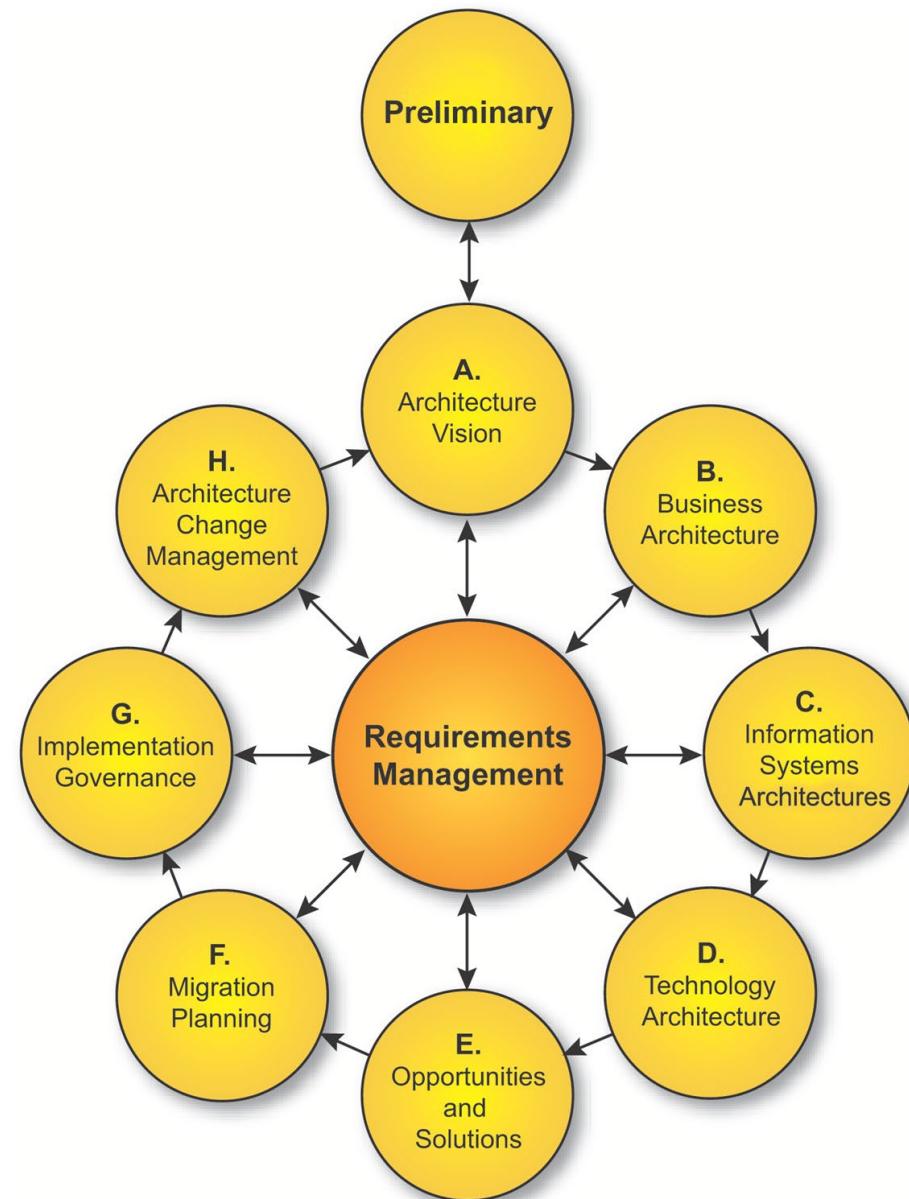


The Enterprise Continuum and Tools



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The Enterprise Continuum and Tools



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Roadmap

Part I - Introduction

Preface, Executive Overview, Core Concepts, Definitions

Part II – Architecture Development Method

Introduction to ADM

ADM Phase Narratives

Part III – ADM Guidelines and Techniques

Guidelines for Adapting the ADM Process

Techniques for Architecture Development

Part IV – Architecture Content Framework

Content Metamodel

Architectural Artifacts

Architecture Deliverables

Building Blocks

Part V – Enterprise Continuum and Tools

Enterprise Continuum

Architecture Partitioning

Architecture Repository

Tools for Architecture Development

Part VI – Architecture Capability Framework

Architecture Board

Architecture Compliance

Architecture Contracts

Architecture Governance

Architecture Maturity Models

Architecture Skills Framework

- Part V, Enterprise Continuum and Tools





Module Objectives

- To provide an introduction to the Enterprise Continuum.
- The purpose of the Enterprise Continuum
- The constituent pieces of the Enterprise Continuum
- To explain high-level issues with Tool Standardization

Definition of 'Continuum'

- Noun: a continuous extent of something, no part of which is different from any other

Source: Wiktionary.org



Overview

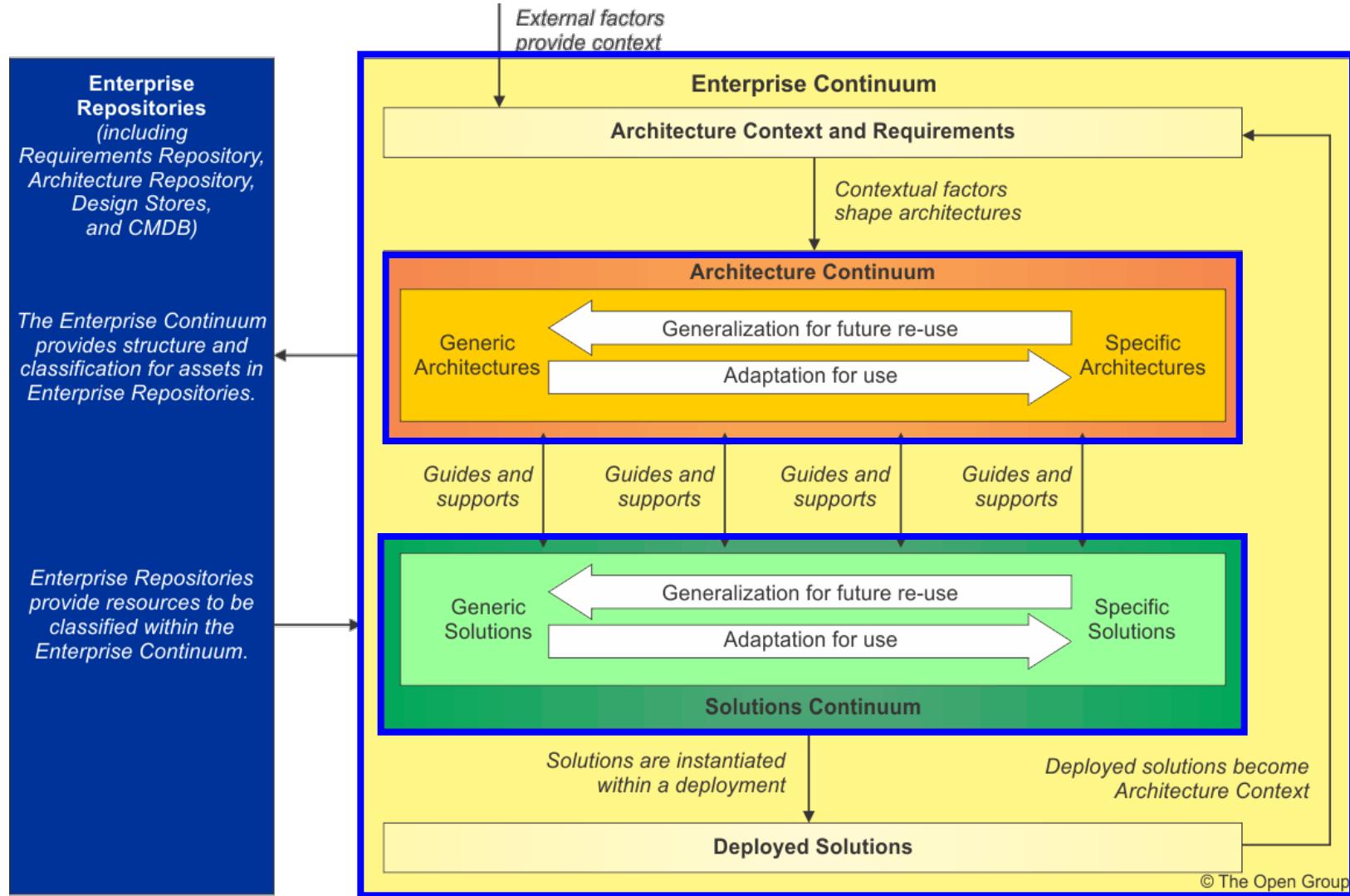
- A model for structuring a virtual repository and methods for classifying architecture and solution artifacts
- Based on architectures and solutions:
 - Models, patterns, architecture descriptions
 - Deliverables produced in this iteration of the ADM
 - Deliverables produced in other iterations of the ADM
 - Assets from the industry at large
 - Showing how artifacts evolve
- The practical implementation of the Enterprise Continuum takes the form of an Architecture Repository
- The Enterprise Continuum is a combination of two complementary concepts: the Architecture Continuum and the Solutions Continuum
- It enables effective use of COTS products.
- It improves engineering efficiency
- It aids organisation of reusable architecture and solution assets
- It provides a common language:
 - Within enterprises
 - Between customer enterprises and vendors



Architecture Reuse

- The Enterprise Continuum consists of all architecture assets: models, patterns, architecture descriptions, etc.
- External assets include:
 - Generic reference models (eg TOGAF's TRM, Zachmann...)
 - IT-specific models (eg a web services architecture)
 - Information Processing-specific models (eg e-Commerce, supply chain management ...)
 - Vertical-Industry-specific models (eg TMF, ARTS, POSC...)
- The architecture governance function decides which assets an enterprise considers part of its own Enterprise Continuum

Enterprise Continuum: Constituents



The Architecture Continuum

- Architectures range from Foundation Architectures through Common Systems Architectures, and Industry Architectures to an enterprise's own organisation-Specific architecture
- Arrows represent bi-directional relationship between the different architectures
 - Left to right: meeting enterprise needs and business requirements
 - Enterprise needs and business requirements increase in detail from left to right
 - Right to left: leveraging architectural components and building blocks

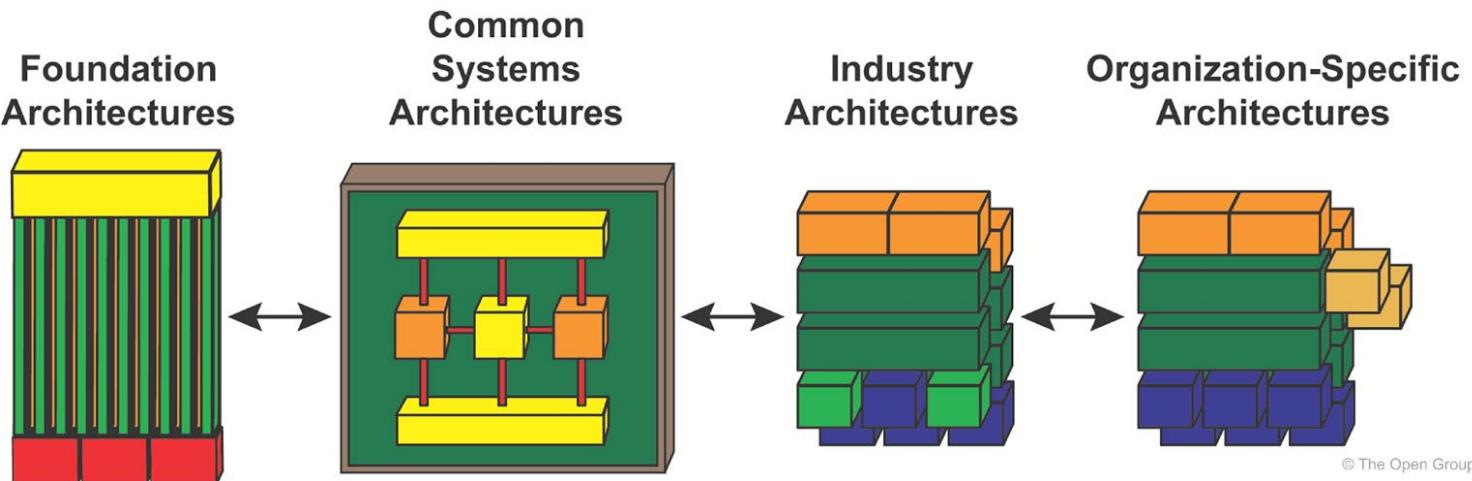


Figure 1

The Architecture Continuum

- The architectural elements furthest left are the most reusable
- Requirements for missing elements are passed to the left of the continuum for inclusion
- Enterprises can use the same continuum models, specialized for specific businesses
- Figure 1 shows the different architectures that may be developed:
 - these are not fixed stages in a process
 - different architectures may exist as well

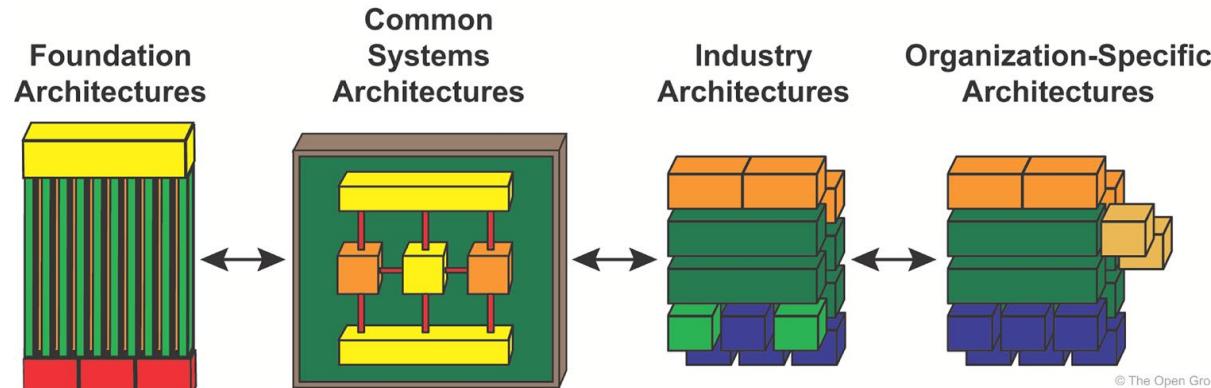


Figure 1

The Architecture Continuum

- Figure 1 does not represent a formal process but represents a progression occurring at several levels:
 - Logical → Physical
 - Horizontal (IT technology-focused) → Vertical (business-focused)
 - Generalization → Specialization
 - Taxonomy → Architecture Specification
- At each point, an architecture is designed in terms of the design concepts and building blocks available

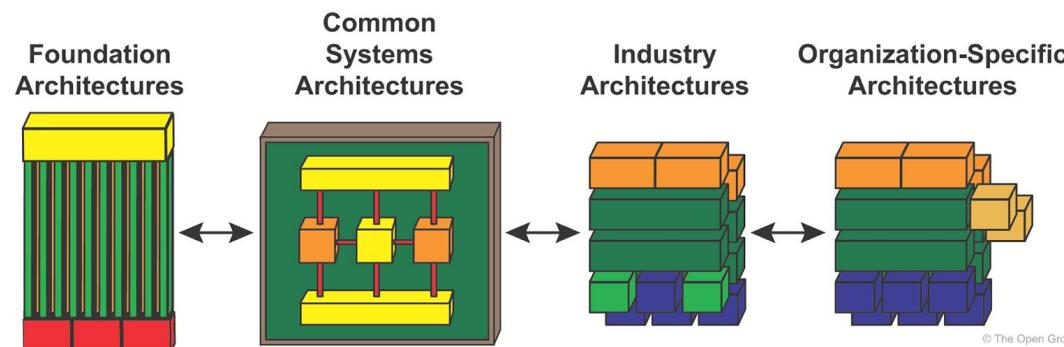


Figure 1

The Solutions Continuum

- The most specific architectures are on the right:
 - Foundation solutions help to create common systems solutions
 - Common systems solutions are used to create industry solutions
 - Industry Solutions are used to create organisation-specific solutions
- The most generic concepts are on the left
- The entire spectrum is important when balancing cost and value

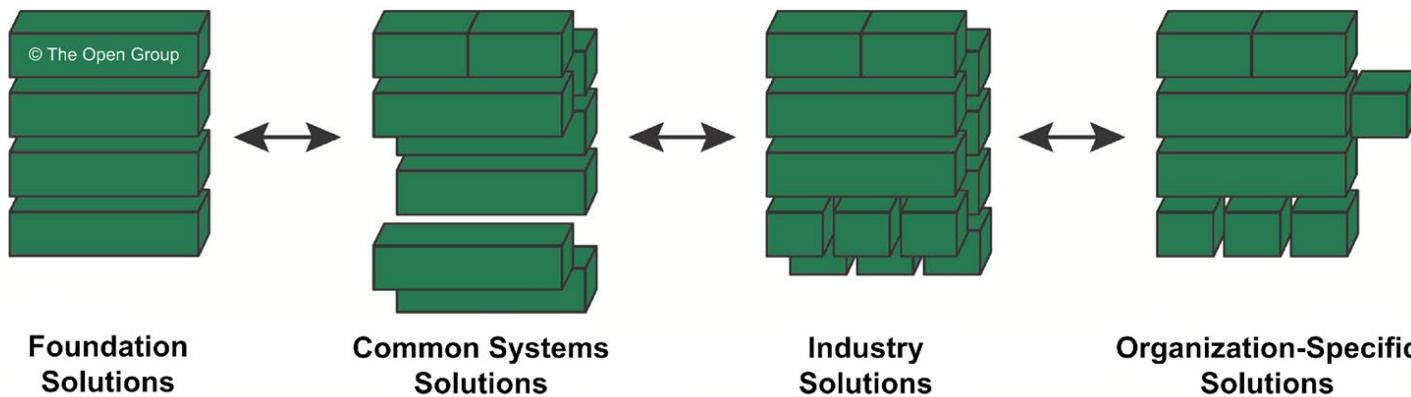


Figure 2



The Solutions Continuum

- Represents the implementations of the architectures at the corresponding levels of the *Architecture Continuum*
- Is a population of the architecture with Solution Building Blocks, either purchased products or built components, that represent a solution to the enterprise's business need
- Forms a *Solutions Inventory* or *Reuse Library*, which adds significant value to the task of managing and implementing improvements to the IT environment



Relationships

- The Architecture and Solutions Continuum are related by guidance, direction, and support
- E.g. the Foundation Architecture:
 - is an architecture of building blocks and corresponding standards
 - supports all the Common Systems Architectures and, therefore, the complete enterprise operating environment
- The Open Group Technical Reference model (TRM) is a Foundation Architecture
- The Open Group III-RM is a Common Systems Architecture

The Enterprise Continuum

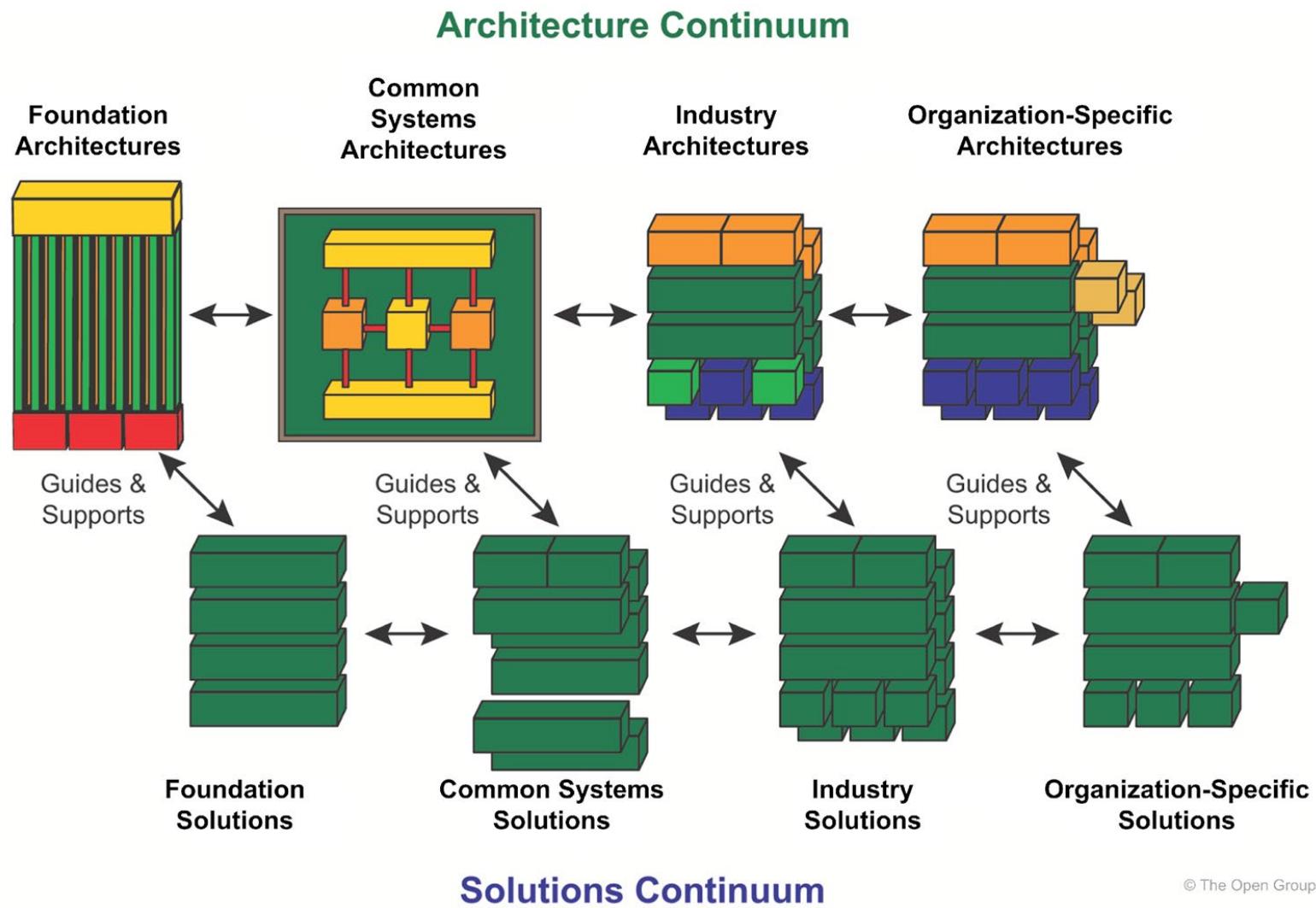


Figure 3: Best case for leveraging of architecture and solution components

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Using the Continuum

- The TOGAF ADM describes the process of developing an enterprise-specific architecture by adopting and adapting generic architectures and solutions
- The Continuum:
 - contains complete and work-in-progress solutions
 - is a "framework-within-a-framework"
 - has few internal assets, at first
 - grows by adding reusable building blocks



Relationships

- The Solutions Continuum assists understanding of products, systems, services, and solutions
- The Enterprise Continuum improves productivity through leverage
- The Enterprise Continuum does not represent strictly chained relationships:
 - enterprise architectures may have components from a Common Systems Architecture
 - enterprise solutions may contain a product or service



The Need for Tools

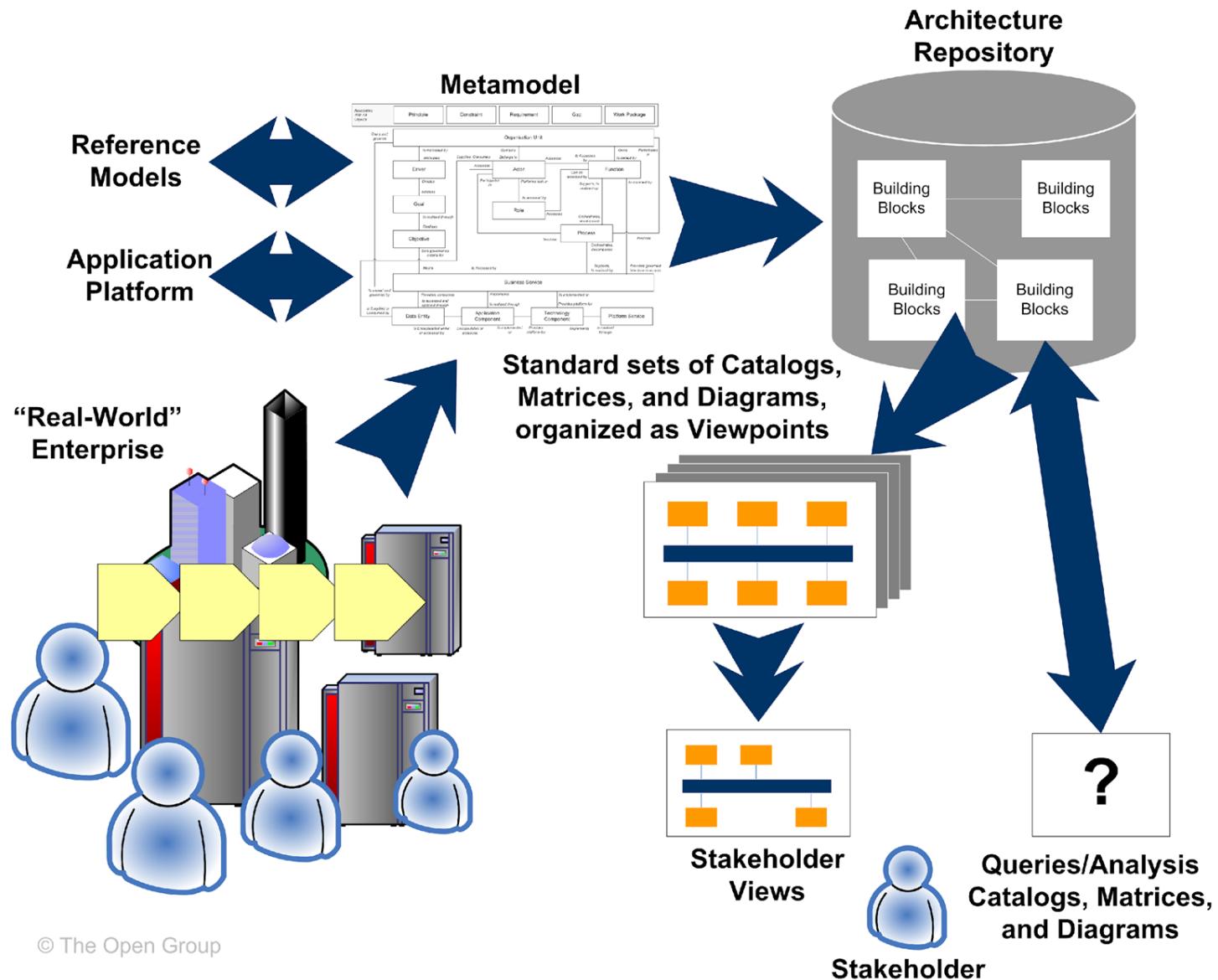
- Tools are needed to manage and control the artifacts within the Enterprise Continuum
 - To promote re-use
 - To enable sharing of architecture information within an organisation
 - To facilitate easier maintenance of the architecture
 - To ensure common terminology is used
 - To provide stakeholders with relevant models

Issues in Tools Standardization

- A single “one size fits all” tool versus multiple tools
- Can a single tool address all needs, all maturity levels?
- The Open Group recognizes the complexity in this area and is developing a TOGAF 9 Tools Certification program to assist with the evaluation



Tools can model the Enterprise Architecture





Summary

- The Enterprise Continuum is
 - a model for structuring a virtual repository and methods for classifying architecture and solution artifacts
 - It enables the organisation of reusable architecture and solution assets.
 - It is also an aid to communication between all architects involved in building and procuring an architecture by providing a common language and terminology.
 - This in turn enables efficiency in engineering and effective use of COTS products.

Summary

- The Enterprise Continuum
 - provides an overall context for architectures and solutions and classifies assets that apply across the entire scope of the enterprise.
- The Architecture Continuum
 - provides a classification mechanism for assets that collectively define the architecture at different levels of evolution from generic to specific.
- The Solutions Continuum
 - provides the classification for assets to describe specific solutions for the organisation that can be implemented to achieve the intent of the architecture.
- Tools are needed to manage artifacts within the Enterprise Continuum
- The TOGAF standard provides an introduction to Issues in Tools Standardization



Test Yourself Question

- Q. According to TOGAF, all the following statements apply to the Enterprise Continuum, *except* _____ :
- A It is a virtual repository of all known architecture assets and artifacts in the IT industry
 - B It is a virtual repository of all architecture assets and artifacts which the enterprise is considering in its own architecture project
 - C It provides a taxonomy for classifying architecture assets
 - D Its is an important aid to communication for architects on both the buy and supply side
 - E It helps to organize reusable and solution assets



Test Yourself Question

- Q. According to TOGAF, all of the following are examples of ‘assets within the IT Industry at large’ from the Architecture Continuum, *except* _____
- A The TOGAF TRM
 - B The Zachman Framework
 - C IT-specific models, such as web services
 - D The ARTS data model
 - E Deliverables from previous architecture work



Module 5: Architecture Repository



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Roadmap

| |
|---|
| Part I - Introduction |
| Preface, Executive Overview, Core Concepts, Definitions |
| Part II – Architecture Development Method |
| Introduction to ADM |
| ADM Phase Narratives |
| Part III – ADM Guidelines and Techniques |
| Guidelines for Adapting the ADM Process |
| Techniques for Architecture Development |
| Part IV – Architecture Content Framework |
| Content Metamodel |
| Architectural Artifacts |
| Architecture Deliverables |
| Building Blocks |
| Part V – Enterprise Continuum and Tools |
| Enterprise Continuum |
| Architecture Partitioning |
| Architecture Repository |
| Tools for Architecture Development |
| Part VI – Architecture Capability Framework |
| Architecture Board |
| Architecture Compliance |
| Architecture Contracts |
| Architecture Governance |
| Architecture Maturity Models |
| Architecture Skills Framework |

- **Part V, Enterprise Continuum and Tools**





Module Objectives

The objectives of this module are to describe:

- The purpose of the Architecture Repository
- Its constituent parts
- Its relationship to other parts of the TOGAF standard

Purpose

- Effective management and leverage of architectural output requires a formal taxonomy for different types of architectural asset
- TOGAF provides a structural framework for an Architecture Repository
- This is one part of a wider Enterprise Repository

Architecture Repository

Enterprise Repository

Architecture Repository

Architecture Metamodel

Architecture Method

Content Metamodel

Artifacts in the landscape are structured according to the framework

Best practice creates reference architecture

Reference Architecture

Organization Reference Materials

Solutions Landscape

Solution Building Blocks

Business outcomes delivered

Architecture Requirements Repository

Strategic Requirements

Segment Requirements

Capability Requirements

Architecture Landscape

Strategic Architectures

Segment Architectures

Capability Architectures

Enables the enterprise

Standards are complied with

Standards have reference implementations

Standards Information Base

Business Standards

Data Standards

Application Standards

Technology Standards

Best practice creates standards

The landscape is governed

Governance Log

Decision Log

Compliance Assessments

Capability Assessments

Drivers for the enterprise

Describes the architecture framework in use within the Enterprise

Shows the state of the operating enterprise at particular points in time

Contains re-usable architecture work products

An architectural representation of the SBBs supporting the Architecture Landscape

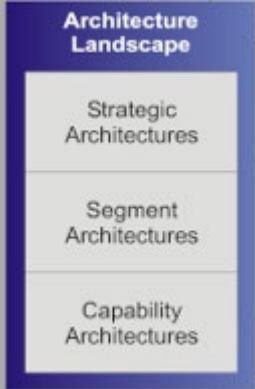
Defines the compliance criteria for work governed by architecture

Captures results of the governance activity

A view of all authorized architecture requirements

Describes the organisation, roles, skills and responsibilities of the EA practice





Architecture Landscape

1. Strategic Architectures:

- show a long-term summary view of the entire enterprise.
- provide an organizing framework for operational and change activity and allow for direction setting at an executive level.

2. Segment Architectures:

- provide more detailed operating models for areas within an enterprise
- can be used at the program or portfolio level to organize and operationally align more detailed change activity.

3. Capability Architectures:

- show in a more detail how the enterprise can support a particular capability.
- used to provide an overview of current capability, target capability, and capability increments and allow for individual work packages and projects to be grouped within managed portfolios and programs.



Reference Library

- A repository area to hold best practice or template materials that can be used to construct architectures within an enterprise.
- Reference materials held in the Reference Library are typically obtained from a variety of sources, including:
 - Standards bodies
 - Product and service vendors
 - Industry communities or forums
 - Corporately defined templates
 - Best practice resulting from project implementation



Standards Information Base

- A repository area to hold a set of specifications, to which architectures must conform.
- Establishment of a Standards Information Base provides an unambiguous basis for architectural governance since:
 - The standards are easily accessible to projects and therefore the obligations of the project can be understood and planned for
 - Standards are stated in a clear and unambiguous manner, so that compliance can be objectively assessed

Types of Standard

Legal and Regulatory
Industry
organisational

Standards Lifecycle

Trial
Active
Deprecated
Obsolete



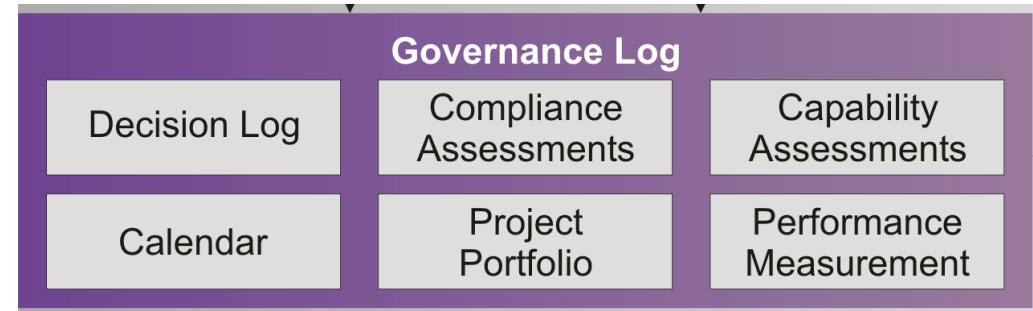
Standards Classification

- **Business Standards:**
 - Standard shared business functions
 - Standard role and actor definitions
 - Security and governance standards for business activity
- **Data Standards:**
 - Standard coding and values for data
 - Standard structures and formats for data
 - Standards for origin and ownership of data
 - Restrictions on replication and access
- **Applications Standards:**
 - Standard/shared applications supporting specific business functions
 - Standards for application communication and interoperation
 - Standards for access, presentation, and style
- **Technology Standards;**
 - Standard hardware products
 - Standard software products
 - Standards for software development

Governance Log

- A repository area to hold shared information relating to the ongoing governance of projects.
- Maintaining a shared repository of governance information is important, since:
 - Decisions made during projects (such as standards deviations or the rationale for a particular architectural approach) are important to retain and access on an ongoing basis.
 - Many stakeholders are interested in the outcome of project governance (e.g., other projects, customers of the project, the Architecture Board, etc.).

Governance log contents

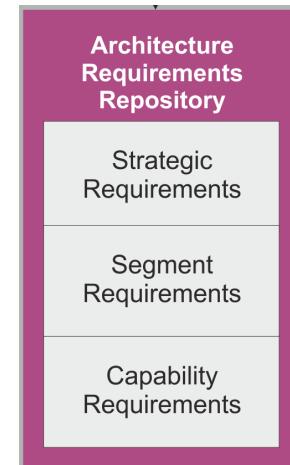




Architecture Requirements Repository

- A repository area used by all phases of the ADM to record and manage all information relevant to Architecture Requirements
- The Architecture Requirements Phase is responsible for managing the contents of this repository

Solutions Landscape



- A repository area used to hold architectural representations of all Solution Building Blocks (SBBs) supporting Architecture Building Blocks (ABBs) specified, developed, or deployed

Relationship to Other Parts of the TOGAF Standard

- The TOGAF ADM has reminders when to use assets from the Architecture Repository
- The Architecture Repository is a model for a physical instance of the Enterprise Continuum

Summary

- The TOGAF standard provides a structural framework for a repository
- It is a logical information store for ADM outputs with the following repository areas defined:
 - **Architecture Metamodel:** describes the architecture framework in use within the Enterprise
 - **Architecture Landscape:** shows the state of the operating Enterprise at particular points in time
 - **Reference Library:** contains re-usable architecture work products
 - **Standards Information Base:** defines the compliance criteria for work governed by architecture
 - **Governance Log:** captures results of governance activity
 - **Architecture Capability:** describes the organisation, roles, skills and responsibilities of the Enterprise Architecture practice
 - **Architecture Requirements Repository:** provides a view of all authorized architecture requirements which have been agreed with the Architecture Board
 - **Solutions Landscape:** presents an architectural representation of the SBBs supporting the Architecture Landscape which have been planned or deployed by the enterprise



Exercise

1. What are the advantages and disadvantages of using Reference Models that are derived from:
 - a) within the enterprise
 - b) outside the enterprise?



Module 6: Architecture Content Framework



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Part IV: Architecture Content Framework

| |
|---|
| Part I - Introduction |
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| Architecture Compliance |
| Architecture Contracts |
| Architecture Governance |
| Architecture Maturity Models |
| Architecture Skills Framework |

- This part describes
 - a structured metamodel for architectural artifacts,
 - use of architecture building blocks
 - an overview of typical architecture deliverables





Module Objectives

The objectives are to:

- Explain the purpose of the Architecture Content Framework
- Describe the main components of the Content Metamodel
- Describe the relationship between the Architecture Content Framework and the TOGAF ADM

- The Framework has 3 categories for describing work products:
 - **Deliverables**
 - **Artifacts**
 - **Building blocks**



Introduction

- The Architecture Content Framework is a significant part of the overall TOGAF framework
- It provides a detailed model of architectural work products
- It helps to improve the consistency of the TOGAF outputs
 - Presents outputs in a consistent and structured way
 - Helps to reference and classify them

Benefits of the Architecture Content Framework

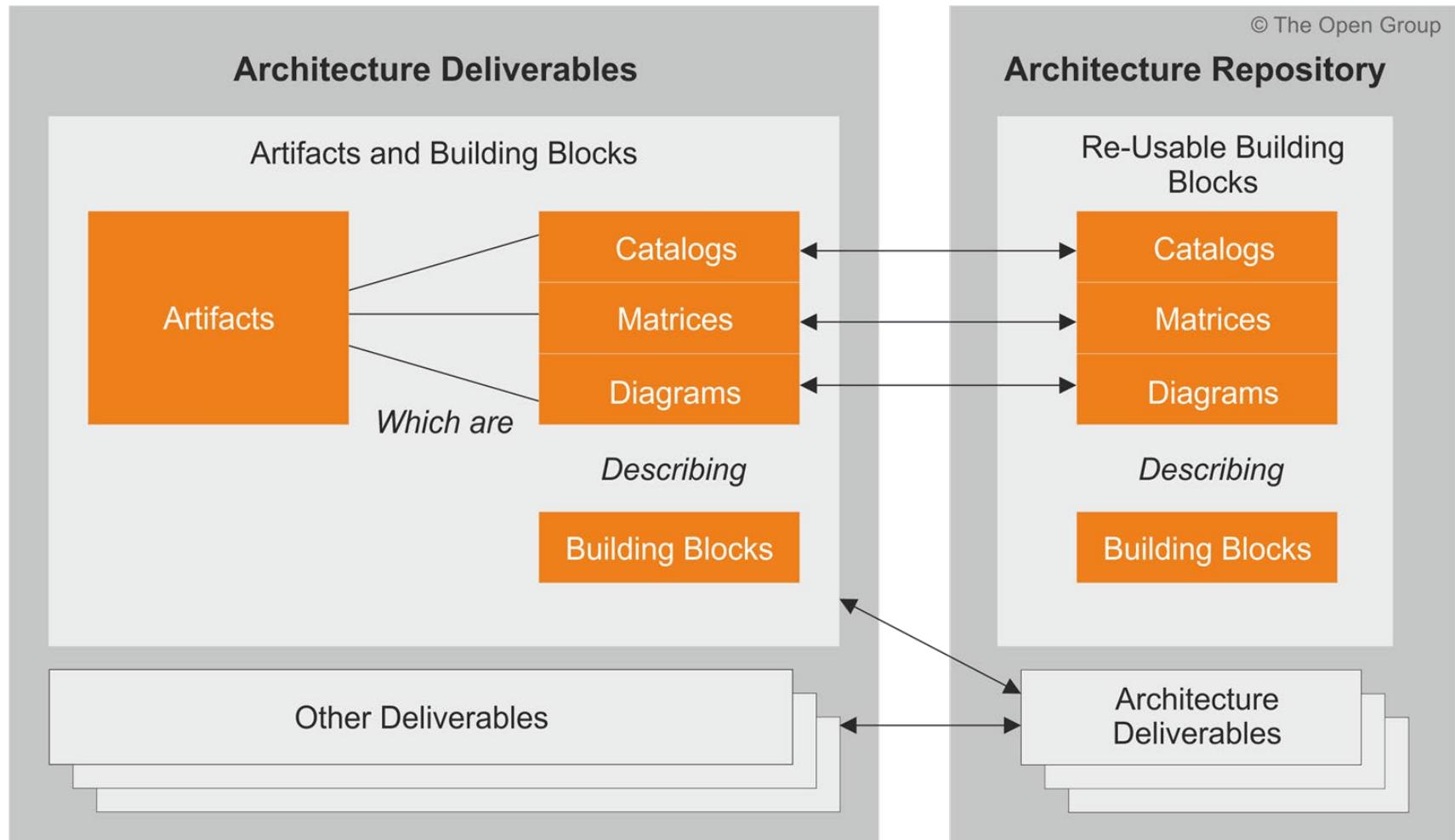
- It provides a comprehensive checklist of architecture outputs
- It promotes better integration of work products if adopted across an enterprise
- It provides a detailed open standard for how architectures should be described



Deliverables, Artifacts, and Building Blocks

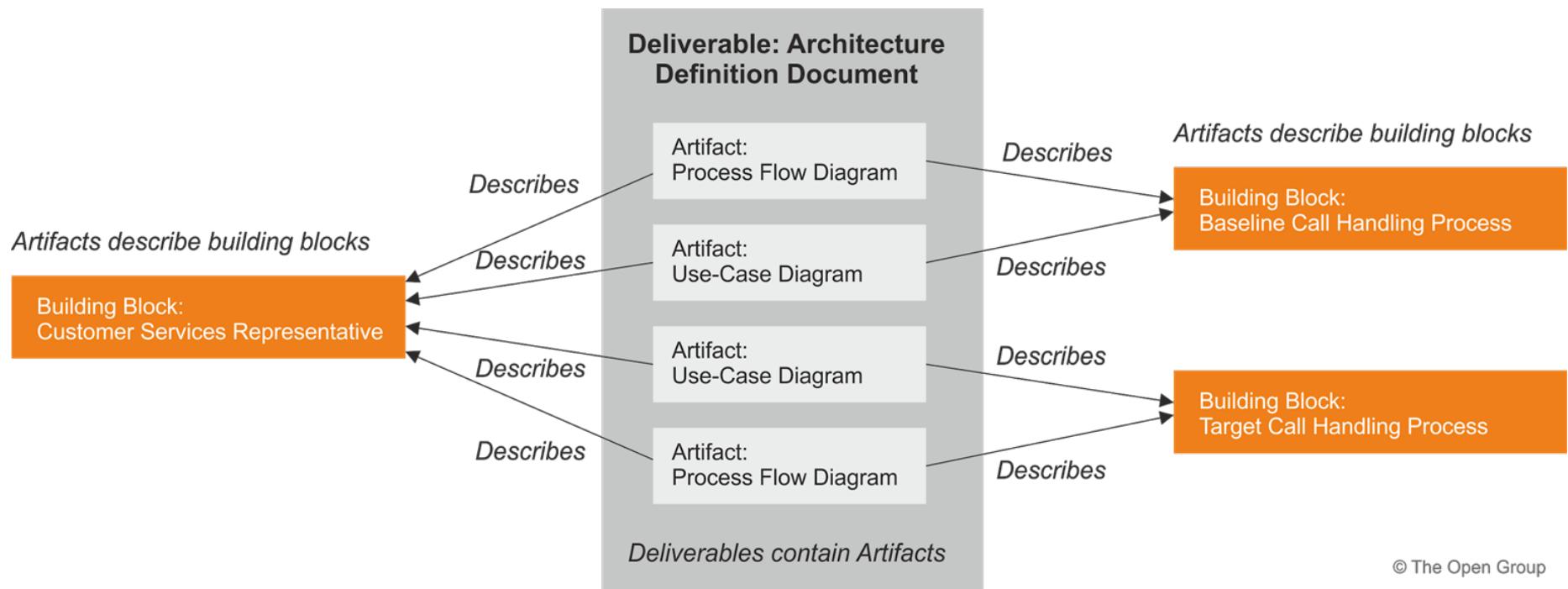
- **Deliverables**
 - Formal products
 - Contractually specified
 - Outputs from a project
 - A deliverable can contain many artifacts
- **Building blocks**
 - components that can be combined with other building blocks to deliver architectures and solutions
- **Artifacts**
 - fine grained products that describe an architecture from a specific viewpoint
 - For example: use-case specifications, architectural requirements, network diagrams, etc.
 - Classified as:
 - Catalogs (lists of things),
 - matrices (showing relationships between things) or
 - diagrams (pictures of things).
 - Artifacts make up the content of the Architecture Repository

Relationship between Deliverables, Artifacts, and Building Blocks



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Example – Architecture Definition Document





Architectural Artifacts

- Artifacts are products that are created when developing an architecture
- An artifact is distinct from a deliverable, which is a contracted output from a project
- Usually deliverables contain many artifacts and each artifact may exist in many deliverables

Content Metamodel

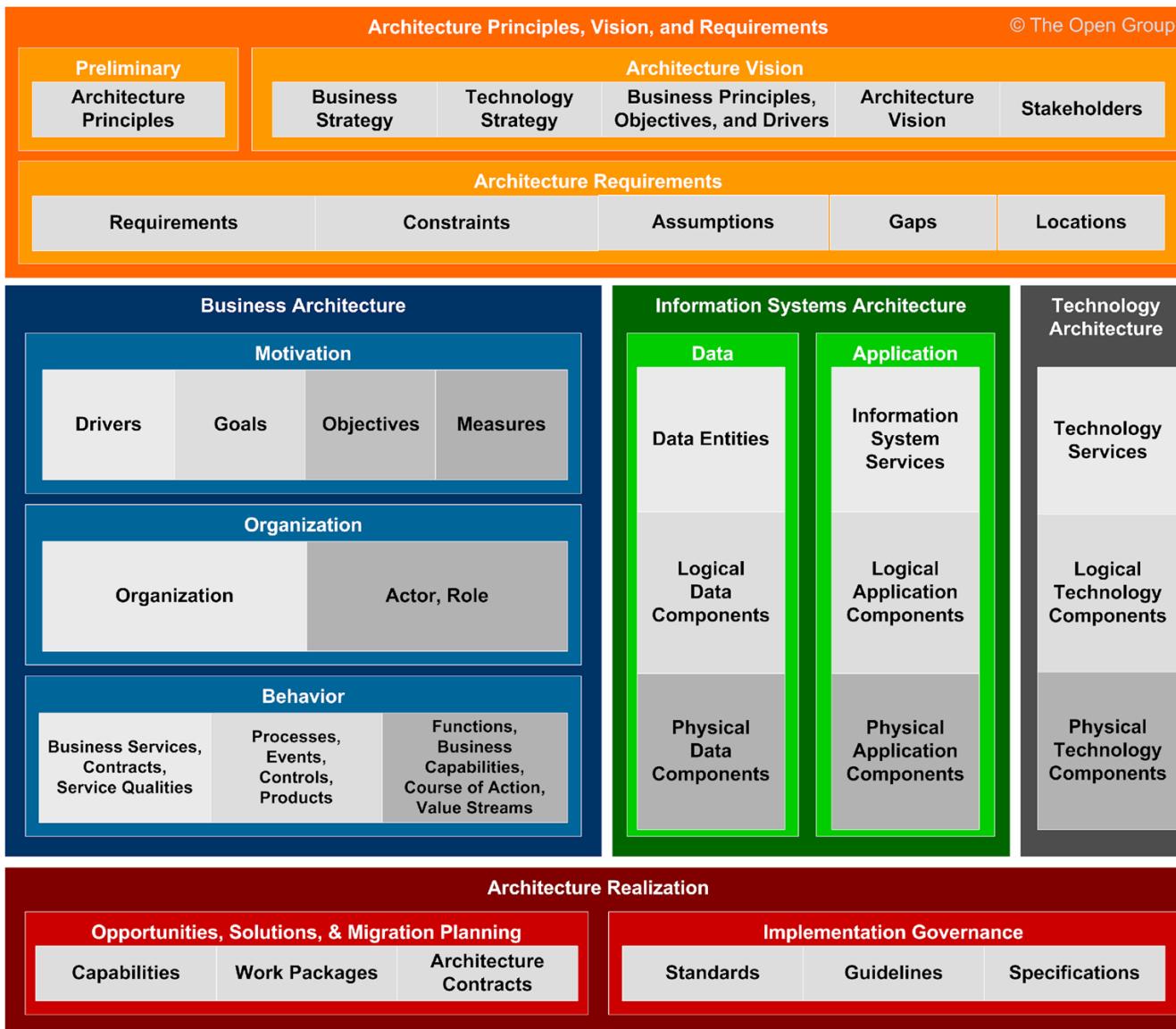
- The framework is based on a standard content metamodel that defines all the types of building blocks in an architecture
 - Showing how these building blocks can be described
 - How they relate to one another
- The content model consists of a core and extensions
- Catalogs, matrices and diagrams are used to present the architectural information

Mapping the Framework and the ADM

There is a mapping from the Architecture content framework to the TOGAF ADM phases:

- **Architecture Principles, Vision, and Requirements** entities should capture the context of the architecture models, including general architecture principles, strategic context and requirements.
- **Business Architecture** entities capture architectural models of business operations, specifically factors that motivate the enterprise, how the enterprise is structured and its functional capabilities.
- **IS Architecture** entities capture architecture models of IT systems, specifically applications and data.
- **Technology Architecture** entities capture procured technology assets used to implement and realize IS solutions.
- **Architecture Realization** entities capture the transitions between architecture states and are used to steer and govern the implementation.

Mapping the Framework and the ADM





Content Framework and the TOGAF ADM

- The ADM addresses a business need through a process of vision, definition, planning and governance. At each stage the ADM takes information as inputs and creates outputs
- The content framework provides a structure for the ADM that defines inputs and outputs in detail and puts each deliverable into the context of the architecture
- So the content framework is a companion to the ADM
- The ADM describes what needs to be done to create an architecture and the content framework describes what it should look like in the end



Summary

- The Architecture Content Framework presents outputs in a consistent and structured way
 - It has 3 categories of work products: deliverables, artifacts and building blocks
- The content metamodel consists of a core and some extensions
- Catalogs, matrices and diagrams are used to present the architectural information
- There is a mapping from the Architecture content framework to the TOGAF ADM phases

Exercise

- What other content frameworks do you know of?
- What are the advantages and disadvantages of opting to use an external framework in conjunction with the ADM instead of the TOGAF Architecture Content Framework?



TOGAF Content Metamodel



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| Architecture Governance |
| Architecture Maturity Models |
| Architecture Skills Framework |

- Part IV, Architecture Content Framework, Chapter 30





Module Objectives

The objectives of this module are to describe:

- What a *metamodel* is and why it is needed
- Key concepts of the Core Metamodel
- The division of the metamodel into Core and Extensions
- Key concepts of the Core Metamodel Entities
- The components of the TOGAF Content Metamodel



What is a Metamodel?

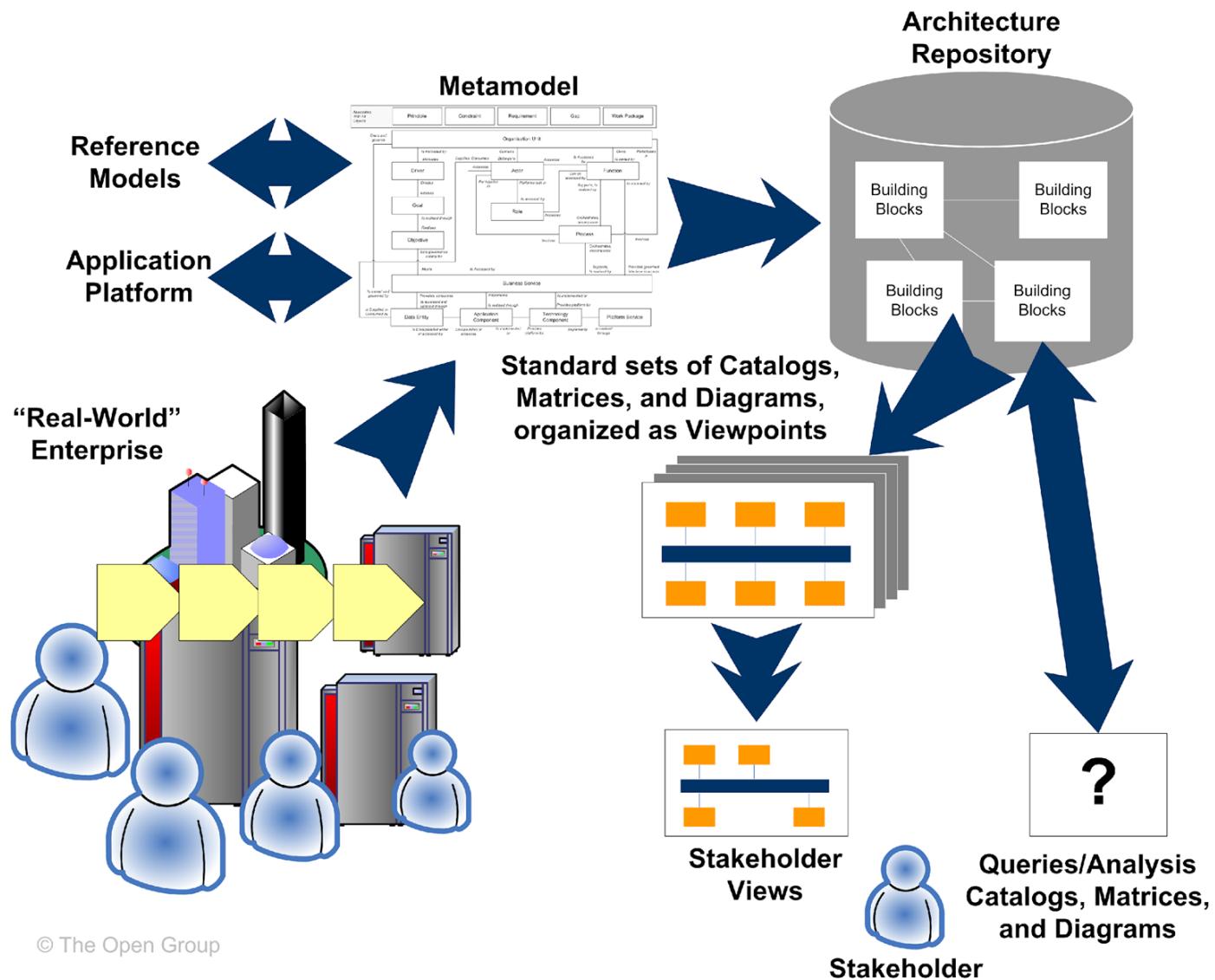
- A metamodel is a precise definition of the constructs and rules needed for creating models
 - Source www.metamodel.com
- A model that describes how and with what the architecture will be described in a structured way.
 - TOGAF Standard, Version 9.2, Chapter 3 *Definitions*

Benefits of the Metamodel

The content metamodel provides a number of benefits:

- It formalises the definition of an Enterprise Architecture
- It formalises the relationship between objects
- It enables an EA tool mapping

Why a Metamodel?





Formal and Informal Modeling

- When defining architecture content there are choices to be made on the level of structure and formality
- In some cases very formal specific language is needed in order to articulate and govern in a precise or detailed way
- In other cases the use of formal engineering discipline will result in architecture content that is:
 - inappropriate for the audience
 - difficult to communicate



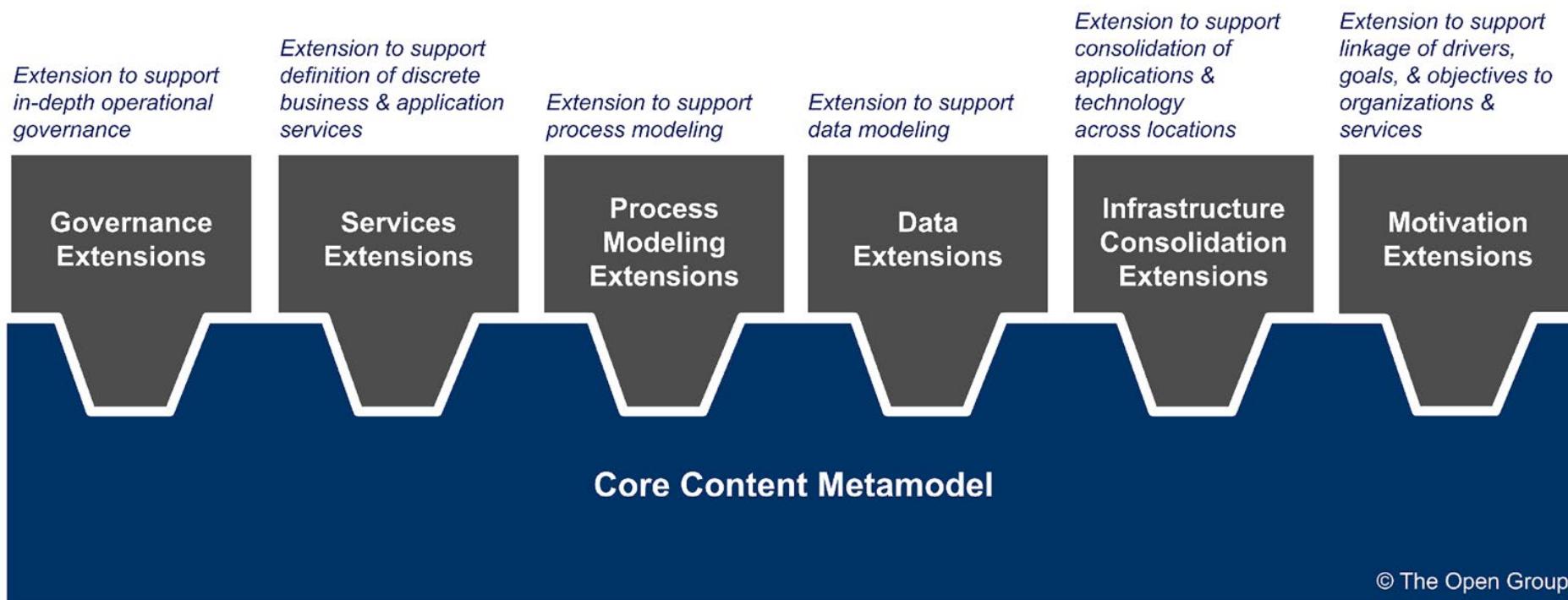
Core Content Metamodel Concepts

- A TOGAF architecture is based on
 - Defining architectural building blocks within architecture **catalogs**
 - Specifying the relationships between those building blocks in architecture **matrices**
 - And presenting communication **diagrams** that show in a precise way what the architecture is
- The metamodel is structured into **Core** and **Extension** content
 - Core content is designed not to be altered

Core and Extension Content

- In order to support many scenarios the metamodel has been partitioned into **core** and **extension** content
- The **core** provides a minimum set of architectural content to support traceability across artifacts
- The **extension** content allows for more specific or more in-depth modeling

TOGAF Content Metamodel and its Extensions





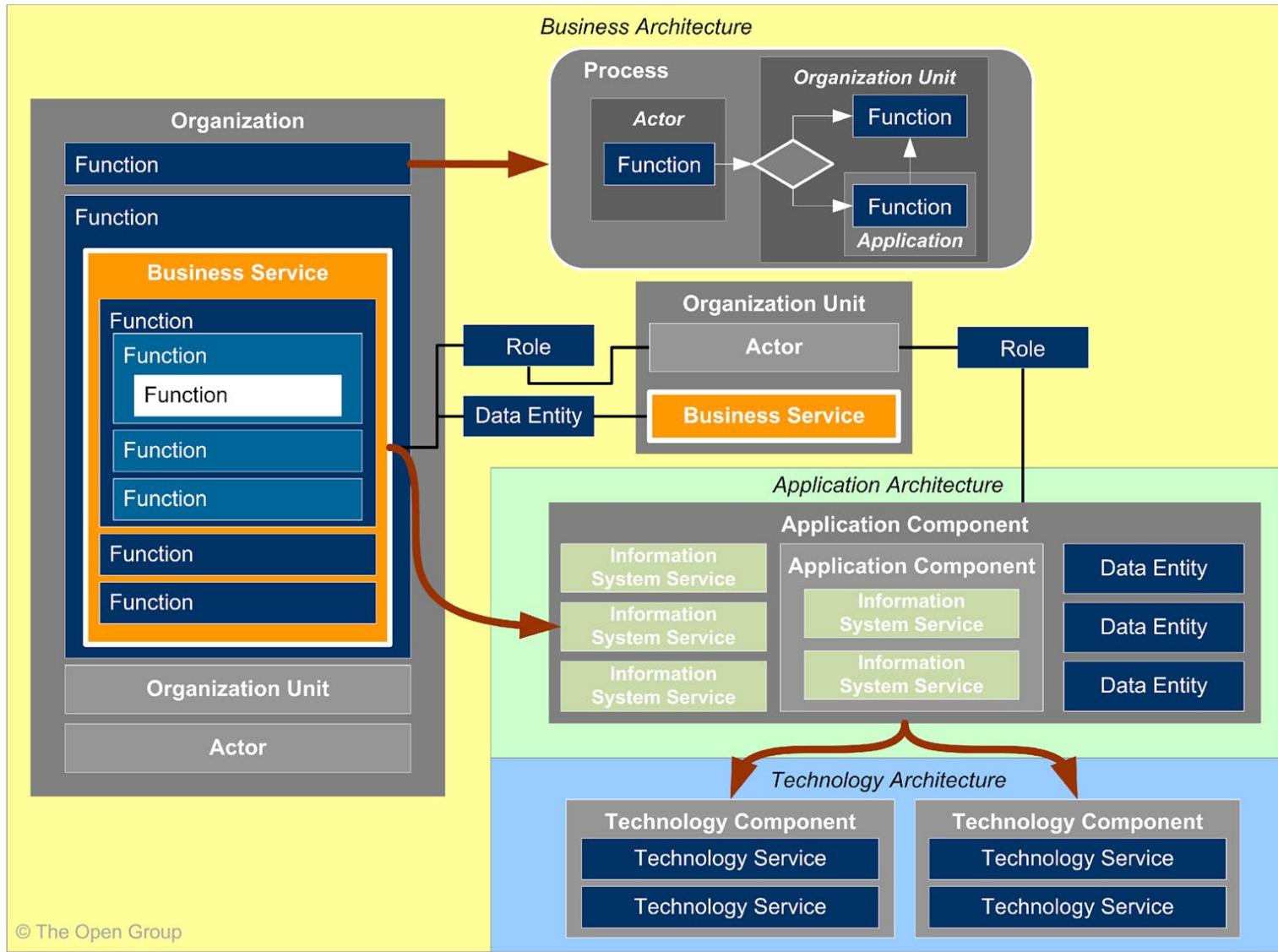
Core Metamodel Entities

- **Actor:** A person, organisation, or system that is outside the consideration of the architecture model, but interacts with it.
- **Application Component:** An encapsulation of application functionality that is aligned to implementation structuring.
- **Business Capability:** A particular ability that a business may possess or exchange to achieve a specific purpose
- **Business Service:** Supports business capabilities through an explicitly defined interface and is explicitly governed by an organisation.
- **Course of Action:** Direction and focus provided by strategic goals and objectives, often to deliver the value proposition characterized in the business model
- **Data Entity:** An encapsulation of data that is recognized by a business domain expert as a discrete concept. Data entities can be tied to applications, repositories, and services and may be structured according to implementation considerations.
- **Function:** Delivers business capabilities closely aligned to an organisation, but not explicitly governed by the organisation.

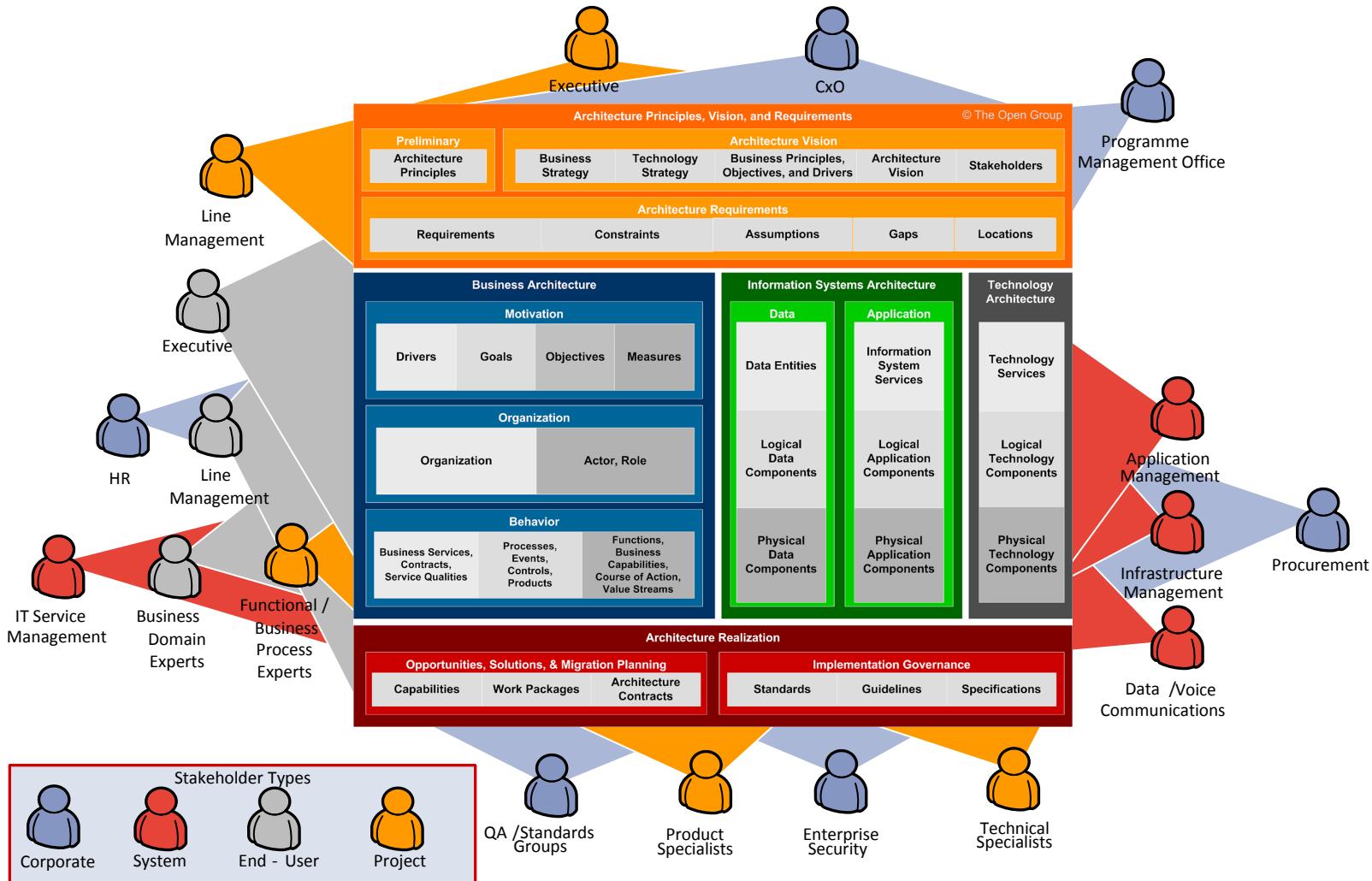
Core Metamodel Entities

- **Information System Service:** The automated elements of a business service. An information system service may deliver or support all of one or more business services.
- **organisation Unit:** A self-contained unit of resources with line management responsibility, goals, objectives, and measures. organisation units may include external parties and business partner organisations.
- **Role:** An actor assumes a role to perform a task.
- **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 supports the delivery of applications.
- **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

Core Entities and their Relationships



Stakeholder Needs



The Content Metamodel

The content metamodel provides definitions of all the types of building blocks that may exist, showing how they can be described and related to one another.

- When creating and managing architectures, it is necessary to consider concerns such as business services, actors, applications, data entities, and technology.
- The metamodel highlights these concerns, shows their relationships and identifies artifacts that can be used to represent them in a consistent way.
- The metamodel can also be used to provide guidance to organisations that wish to implement their architecture using an architecture tool.

Content Metamodel (Simplified)

Architecture Principles, Vision, and Requirements

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Preliminary

Architecture Vision

Architecture Requirements

Business Architecture

Motivation

Organization

Behavior

Information Systems Architectures

Data

Application

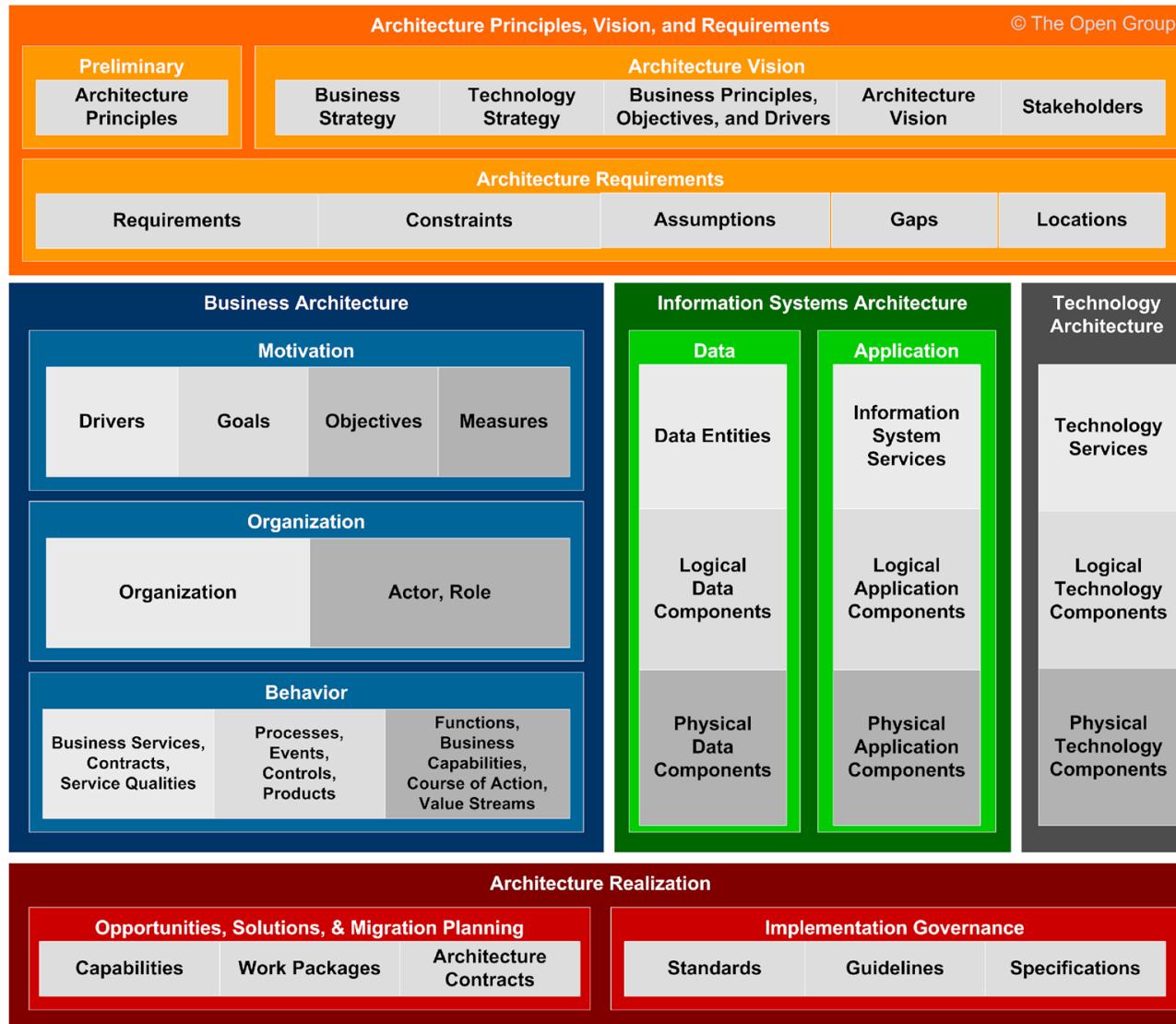
Technology
Architecture

Architecture Realization

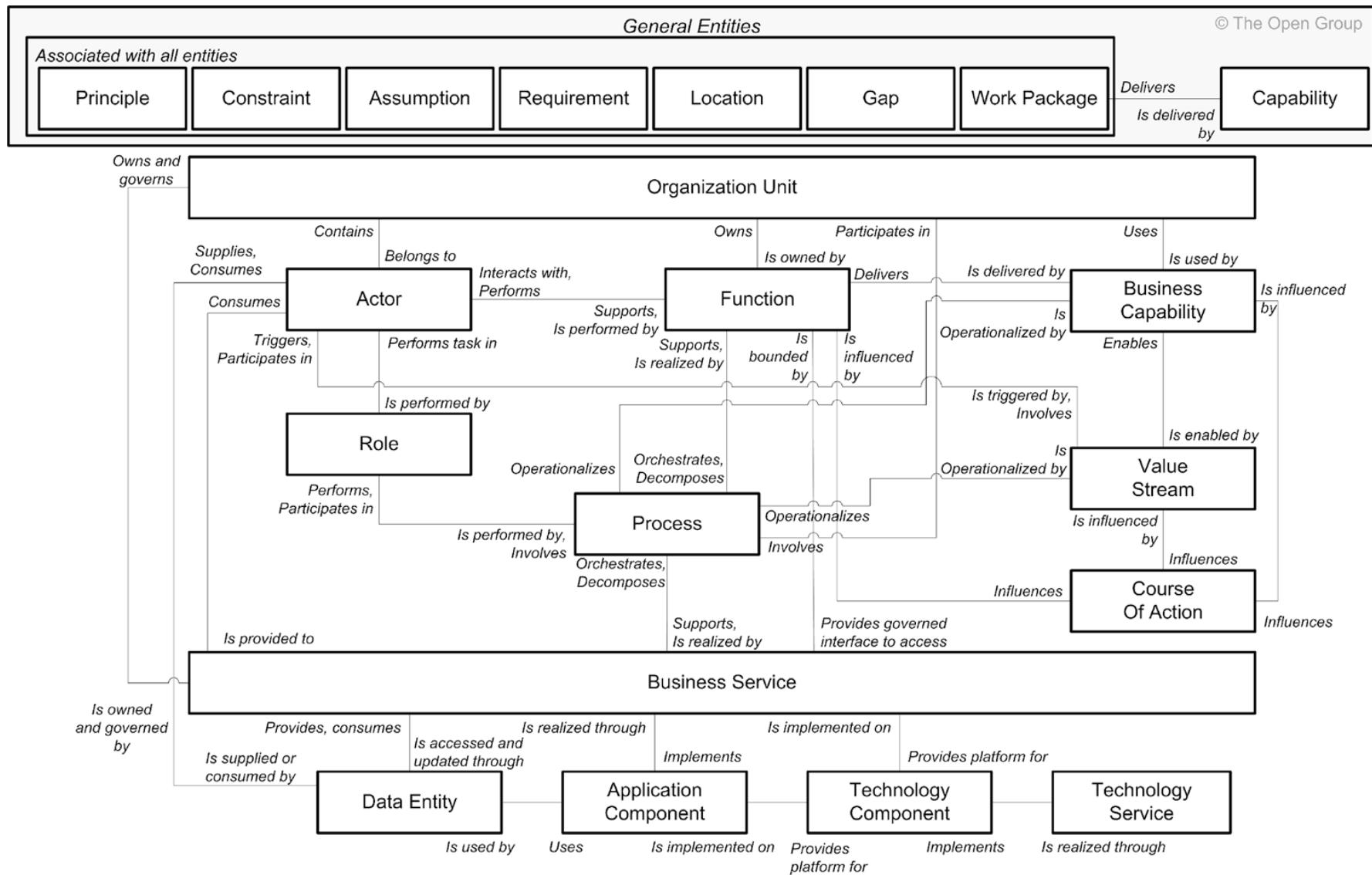
Opportunities, Solutions, & Migration Planning

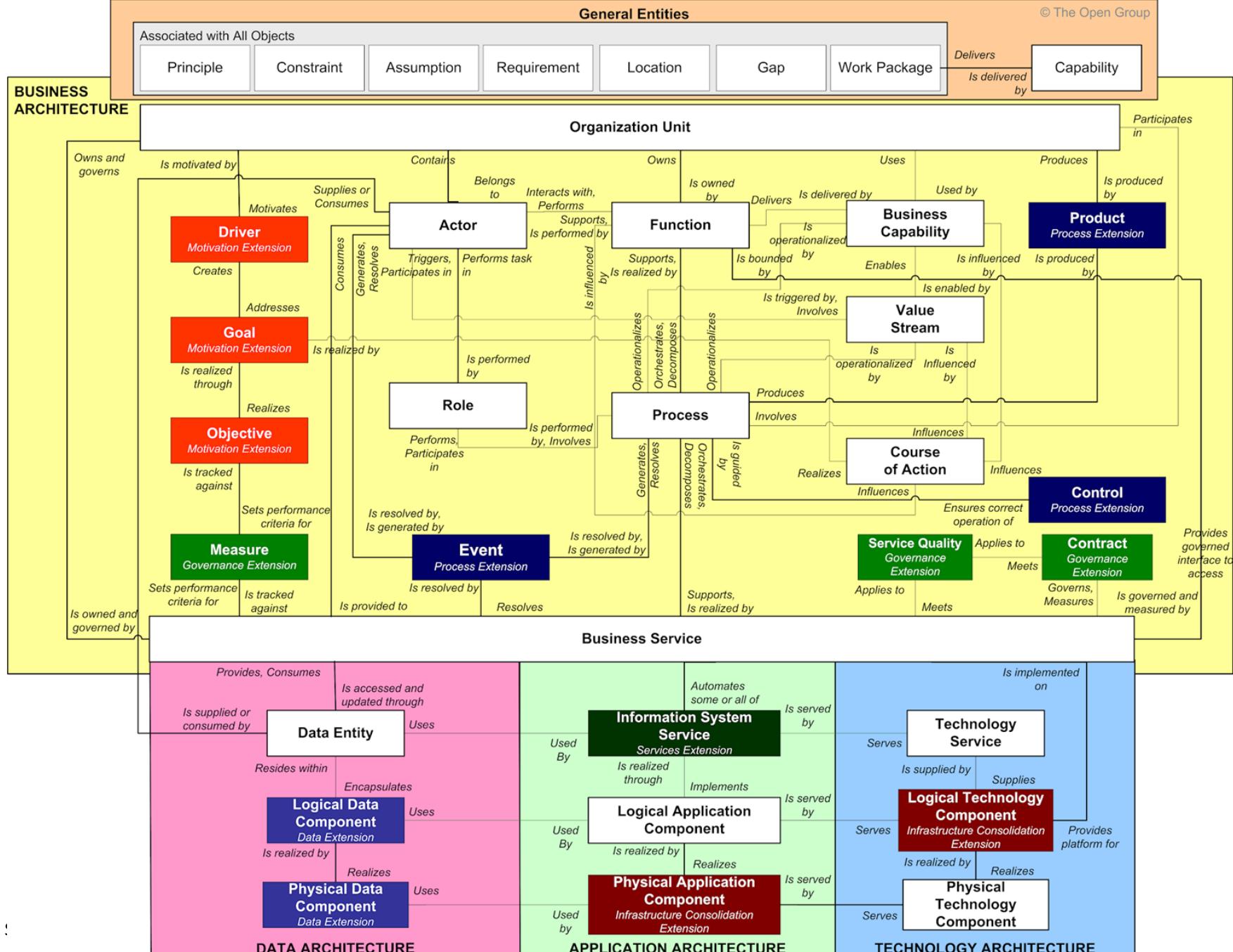
Implementation Governance

Content Metamodel (Detailed)



Core Content Metamodel

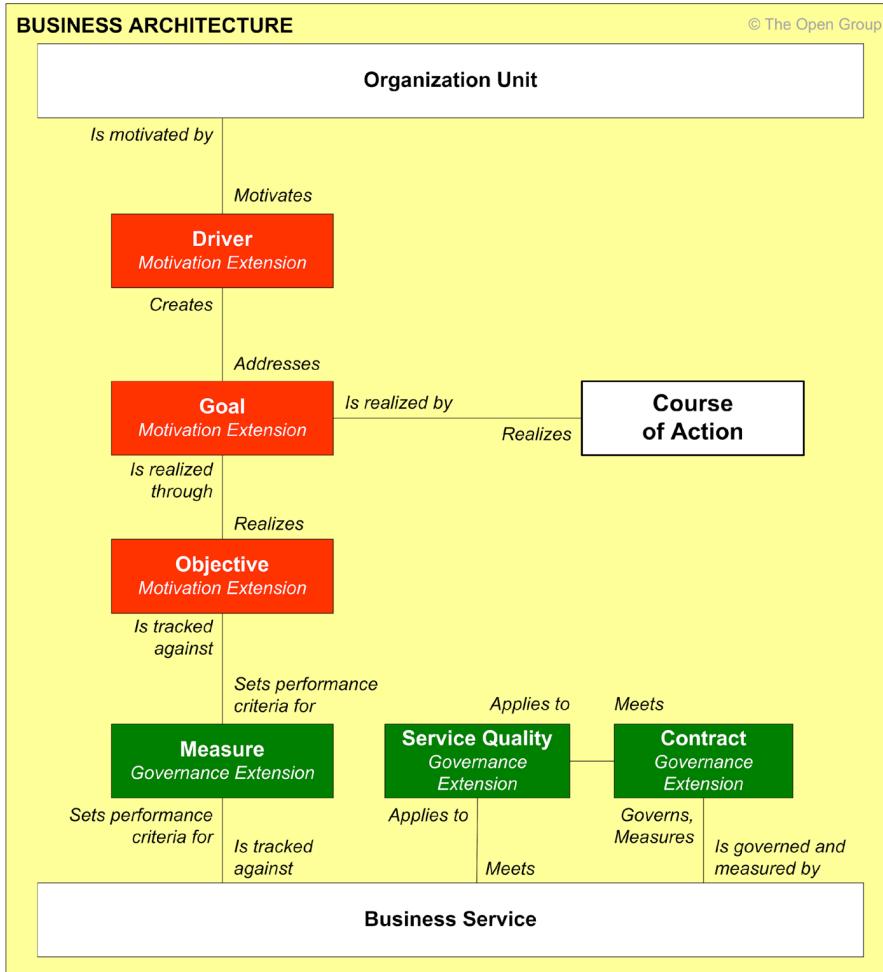




Full Content Metamodel Artifacts

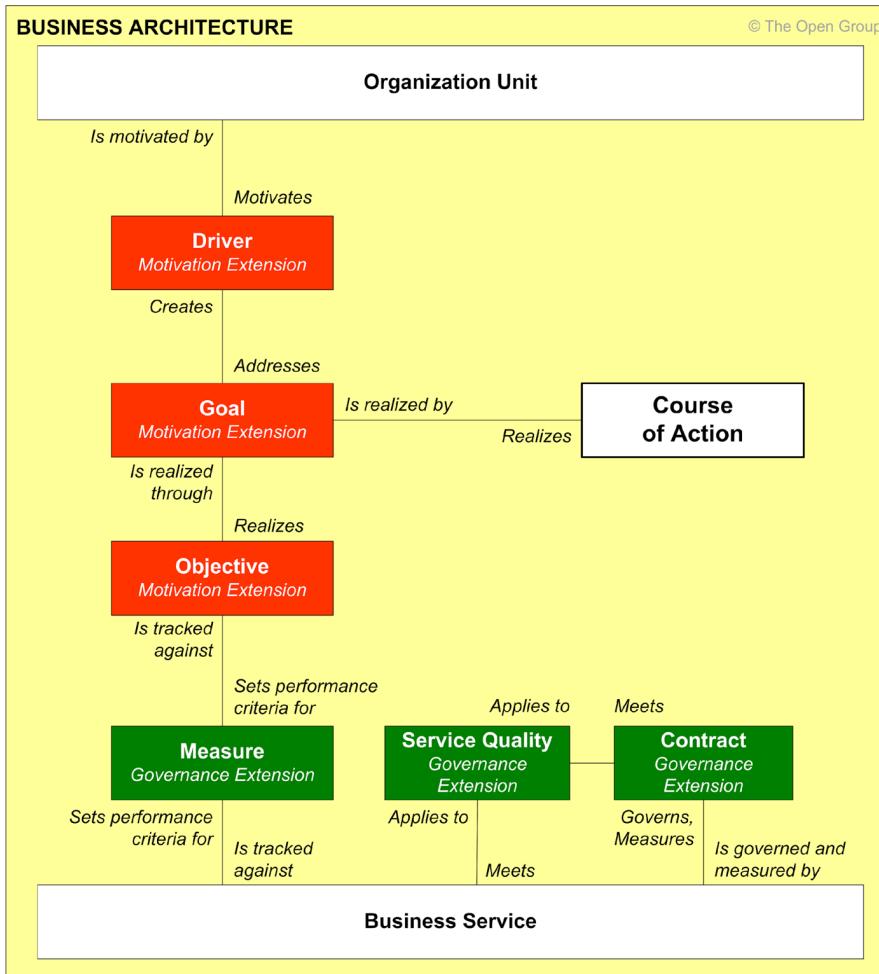
| Preliminary | Business Architecture | Data Architecture | Application Architecture | Technology Architecture |
|---|---|---|--|---|
| <p>Catalogs</p> <ul style="list-style-type: none"> Principles Catalog <p>Architecture Vision</p> <p>Matrices</p> <ul style="list-style-type: none"> Stakeholder Map Matrix <p>Core Diagrams</p> <ul style="list-style-type: none"> Value Chain Diagram Solution Concept Diagram | <p>Catalogs</p> <ul style="list-style-type: none"> Organization/Actor Catalog Role Catalog Business Service/Function Catalog Location Catalog Process/Event/Control/Product Catalog <p>Matrices</p> <ul style="list-style-type: none"> Business Interaction Matrix Actor/Role Matrix Value Stream/Capability Matrix <p>Core Diagrams</p> <ul style="list-style-type: none"> Business Footprint Diagram Business Service/Information Diagram Functional Decomposition Diagram Product Lifecycle Diagram <p>Extension Diagrams</p> <ul style="list-style-type: none"> Goal/Objective/Service Diagram Business Use-Case Diagram Organization Decomposition Diagram Process Flow Diagram Event Diagram | <p>Catalogs</p> <ul style="list-style-type: none"> Data Entity/Data Component Catalog <p>Matrices</p> <ul style="list-style-type: none"> Data Entity/Business Function Matrix Application/Data Matrix <p>Core Diagrams</p> <ul style="list-style-type: none"> Conceptual Data Diagram Logical Data Diagram Data Dissemination Diagram <p>Extension Diagrams</p> <ul style="list-style-type: none"> Data Security Diagram Data Migration Diagram Data Lifecycle Diagram | <p>Catalogs</p> <ul style="list-style-type: none"> Application Portfolio Catalog Interface Catalog <p>Matrices</p> <ul style="list-style-type: none"> Application/Organization Matrix Role/Application Matrix Application/Function Matrix Application Interaction Matrix <p>Core Diagrams</p> <ul style="list-style-type: none"> Application Communication Diagram Application and User Location Diagram Application Use-Case Diagram <p>Extension Diagrams</p> <ul style="list-style-type: none"> Enterprise Manageability Diagram Process/Application Realization Diagram Software Engineering Diagram Application Migration Diagram Software Distribution Diagram | <p>Catalogs</p> <ul style="list-style-type: none"> Technology Standards Catalog Technology Portfolio Catalog <p>Matrices</p> <ul style="list-style-type: none"> Application/Technology Matrix <p>Core Diagrams</p> <ul style="list-style-type: none"> Environments and Locations Diagram Platform Decomposition Diagram <p>Extension Diagrams</p> <ul style="list-style-type: none"> Processing Diagram Networked Computing/Hardware Diagram Network and Communications Diagram |
| <p>Infrastructure Consolidation Extension</p> | <p>Governance Extension</p> | <p>Motivation Extension</p> | <p>Data Modeling Extension</p> | <p>Services Extension</p> |
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Governance Extension



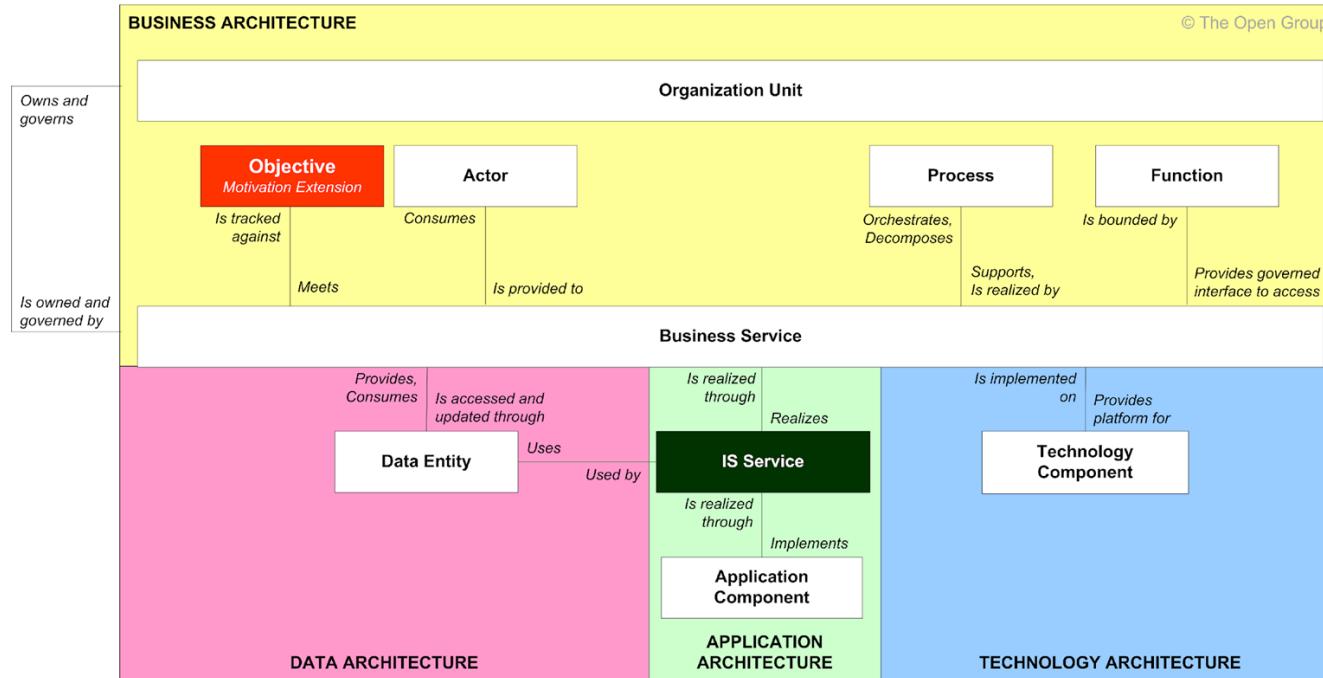
- Scope:
 - The ability to apply measures to objectives and then link those measures to services
 - The ability to apply contracts to service communication or service interactions with external users and systems
 - The ability to define re-usable service qualities defining a service-level profile that can be used in contracts
 - Creation of additional diagrams to show ownership and management of systems
- Additional diagrams to be created:
 - Enterprise Manageability diagram

Governance Extension



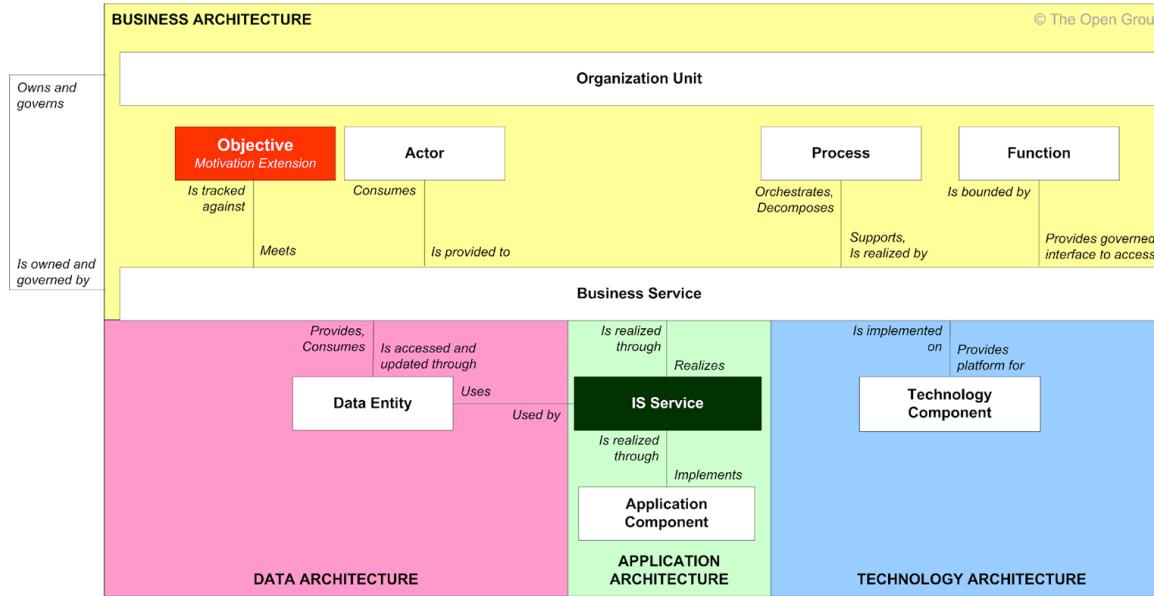
- This extension should be used in the following situations:
 - When an organisation is considering IT change that will result in a significant impact to existing operational governance models
 - When an organisation has granular requirements for service levels that differ from service to service
 - When an organisation is looking to transform its operational governance practice

Services Extension



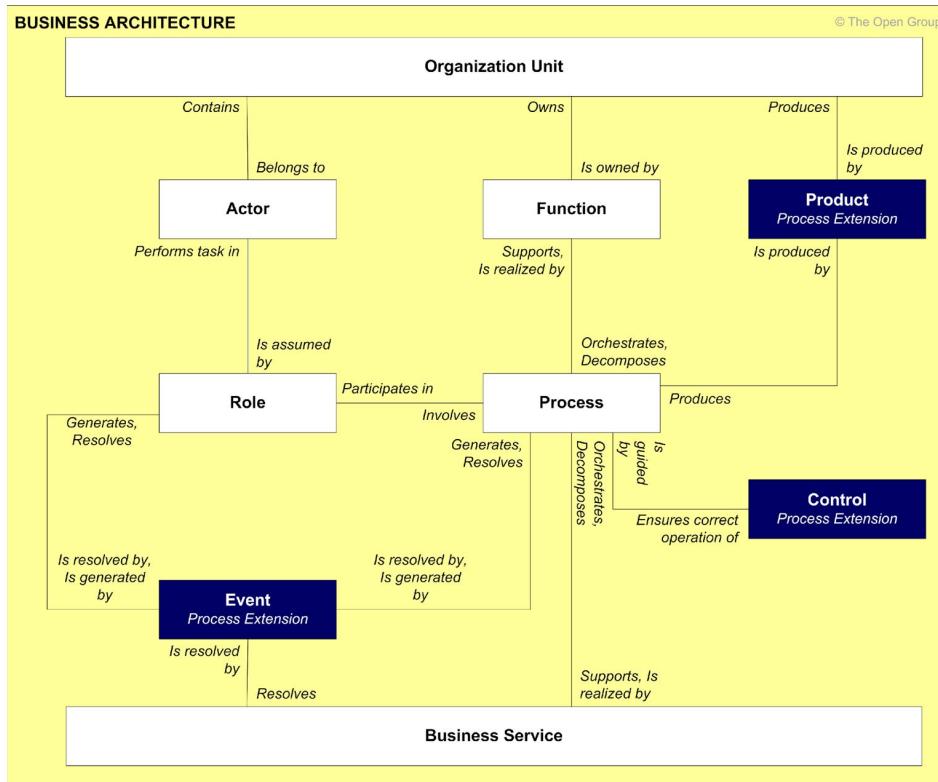
- Scope:
 - Creation of IS services as an extension of business service
- Additional diagrams to be created:
 - Business Use-Case Diagram
 - organisation Decomposition Diagram

Services Extension



- This extension should be used in the following situations:
 - When the business has a preset definition of its services that does not align well to technical and architectural needs
 - When business and IT use different language to describe similar capabilities
 - Where IT service is misaligned with business need, particularly around the areas of quality of service, visibility of performance, and management granularity
 - Where IT is taking initial steps to engage business in discussions about IT architecture

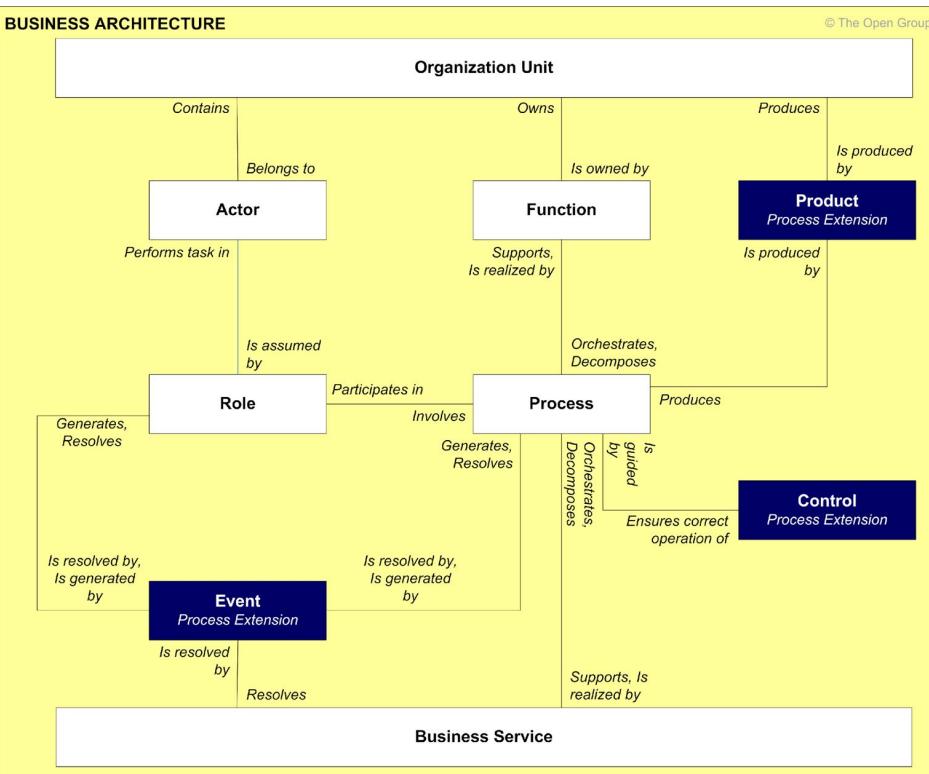
Process Modeling Extension



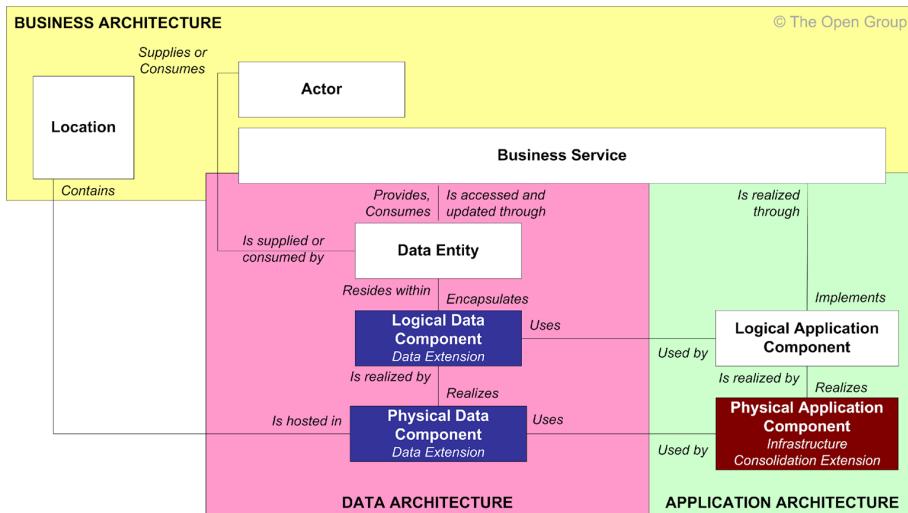
- Scope:
 - Creation of events as triggers for processes
 - Creation of controls that govern business logic and governance gates for process execution
 - Creation of products to represent the output of a process
 - Creation of event diagrams to track triggers and state changes across the organisation
- Additional diagrams to be created:
 - Process Flow diagrams
 - Event diagrams

Process Modeling Extension

- This extension should be used in the following situations:
 - Where the architecture must pay specific attention to state and events
 - Where the architecture is required to explicitly identify and store process control steps; for example, to support regulatory compliance
 - Where the architecture features critical or elaborate process flows

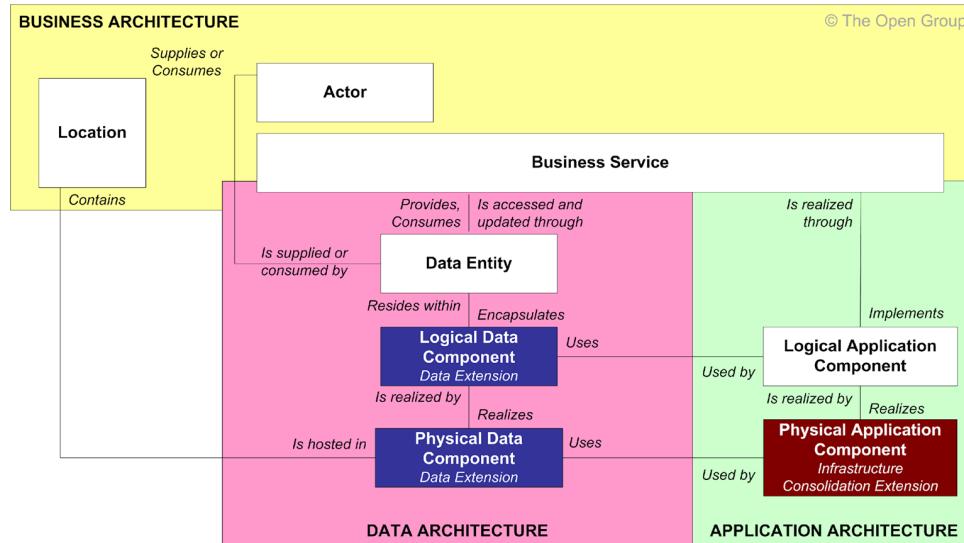


Data Extension



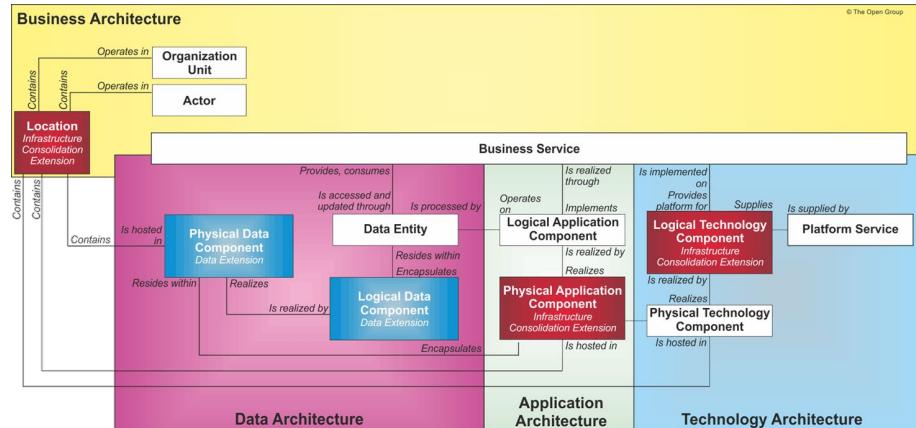
- Scope:
 - Creation of logical data components that group data entities into encapsulated modules for governance, security, and deployment purposes
 - Creation of physical data components that implement logical data components; analogous to databases, registries, repositories, schemas, and other techniques of segmenting data
 - Creation of data lifecycle, data security, and data migration diagrams to show data concerns in more detail
- Additional diagrams to be created:
 - Data Security diagram
 - Data Migration diagram
 - Data Lifecycle diagram

Data Extension



- This extension should be used in the following situations:
 - Where the architecture features significant complexity and risk around the location, encapsulation, and management of or access to data

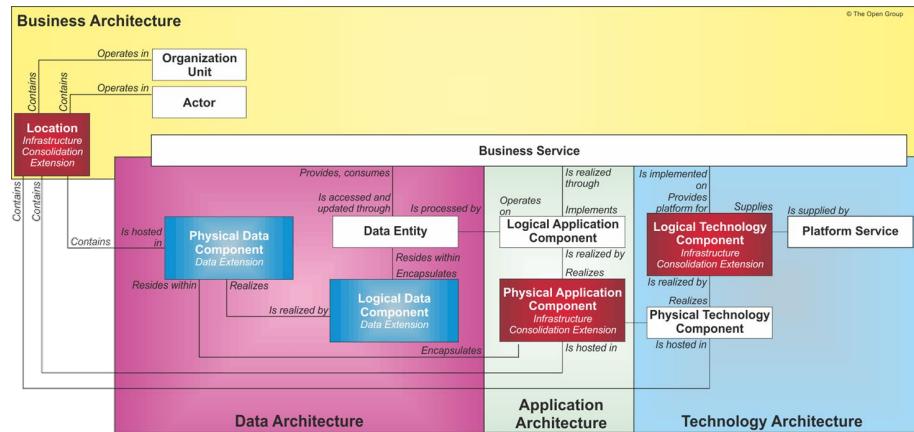
Infrastructure Consolidation Extension



- Additional diagrams to be created:
 - Process/System Realization diagram
 - Software Engineering diagram
 - Application Migration diagram
 - Software Distribution diagram
 - Processing diagram
 - Networked Computing/Hardware diagram
 - Network and Communications diagram

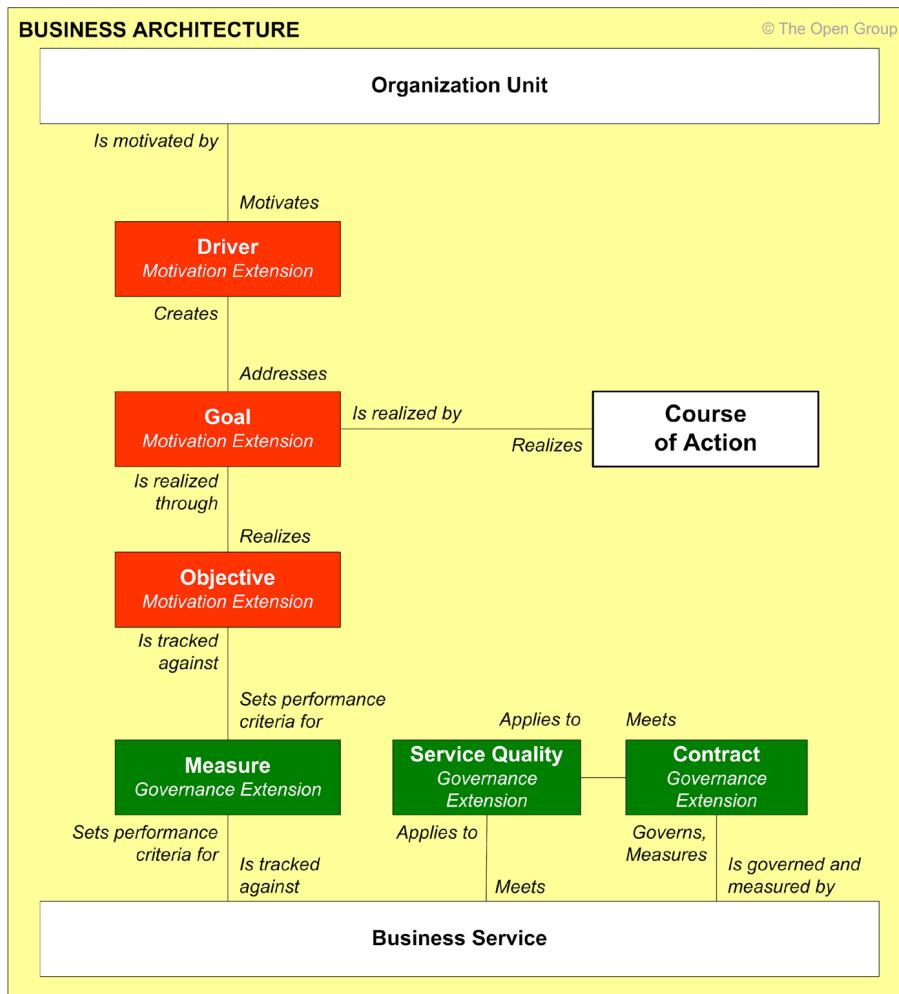
- Scope:
 - Creation of logical and physical application components to abstract the capability of an application away from the actual applications in existence
 - Creation of logical and physical technology components to abstract product type from the actual technology products in existence
 - Creation of additional diagrams focusing on the location of assets, compliance with standards, structure of applications, application migration, and infrastructure configuration

Infrastructure Consolidation Extension



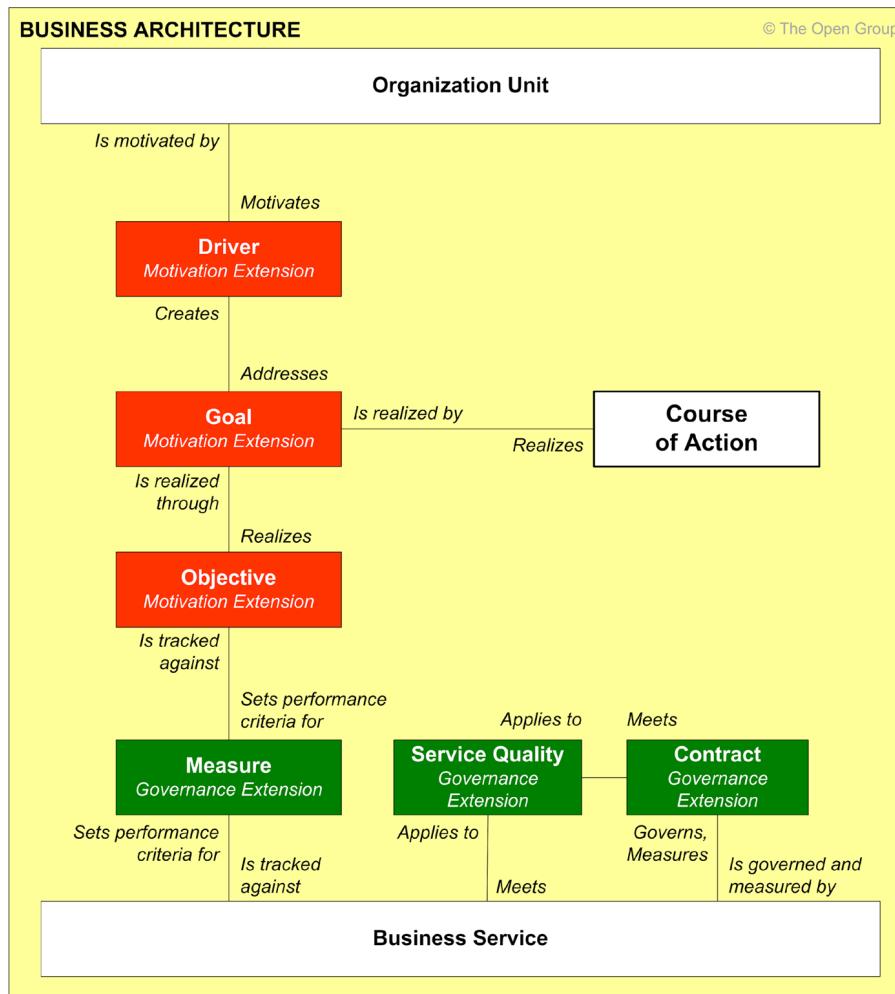
- This extension should be used in the following situations:
 - Where many technology products are in place with duplicate or overlapping capability
 - Where many applications are in place with duplicate or overlapping functionality
 - Where applications are geographically dispersed and the decision logic for determining the location of an application is not well understood
 - When applications are going to be migrated into a consolidated platform
 - When application features are going to be migrated into a consolidated application

Motivation Extension



- The scope of this extension is as follows:
 - Creation of a new metamodel entity for Driver that shows factors generally motivating or constraining an organisation
 - Creation of a new metamodel entity for Goal that shows the strategic purpose and mission of an organisation
 - Creation of a new metamodel entity for Objective that shows near to mid-term achievements that an organisation would like to attain
 - Creation of a Goal/Objective/Service diagram showing the traceability from drivers, goals, and objectives through to services
- Additional diagrams to be created:
 - Goal/Objective/Service diagram

Motivation Extension



- This extension should be used in the following situations:
 - When the architecture needs to understand the motivation of organisations in more detail than the standard business or engagement principles and objectives that are informally modeled within the core content metamodel
 - When organisations have conflicting drivers and objectives and that conflict needs to be understood and addressed in a structured form
 - When service levels are unknown or unclear



Summary

- The TOGAF standard provides a rich metamodel
- This provides a number of benefits:
 - It supports both formal and informal modeling
 - It formalises the definition of an Enterprise Architecture
 - It formalises the relationship between objects
 - It enables an EA tool mapping

Exercise

Determine which of the Metamodel extensions is most appropriate for the following situations:

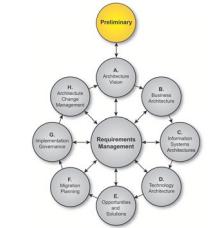
1. Where organisations have conflicting objectives
2. Where service levels are unknown
3. Where many applications are in use with overlapping functionality
4. Where management of information is complex
5. Where business process has to support regulatory compliance



Preliminary Phase



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Module Objectives

The objectives of this module are to understand the Preliminary Phase:

- Objectives
- Approach
- Steps
- Inputs
- Outputs



Preliminary Phase: Objectives in Detail

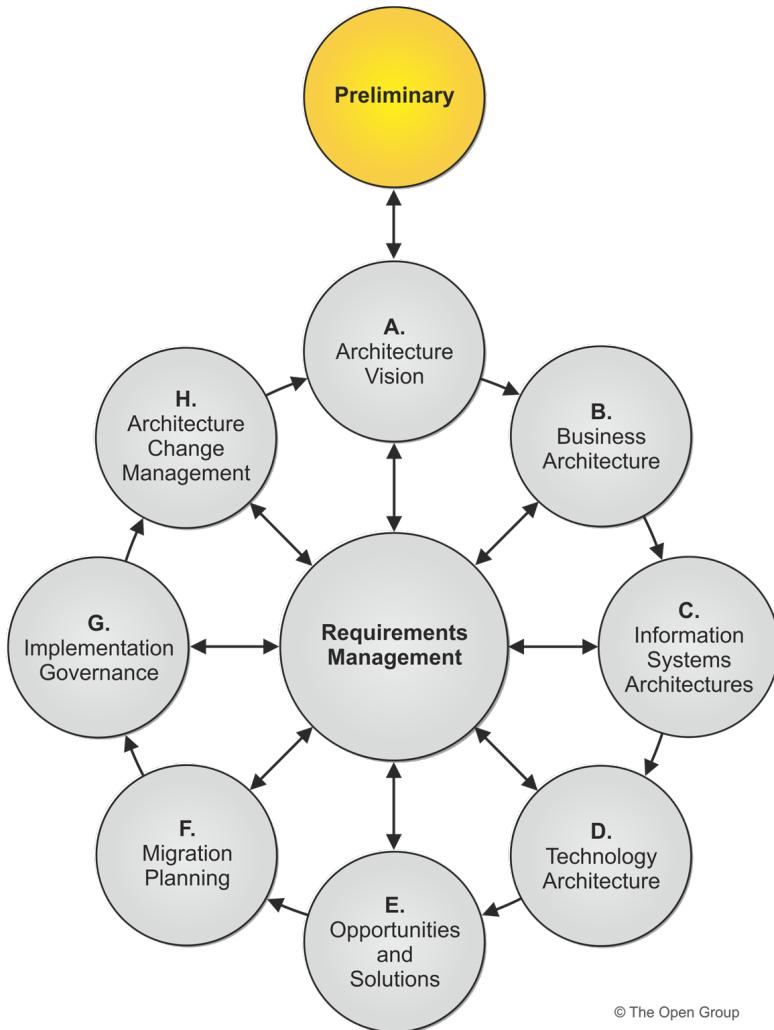
- Determine the Architecture Capability desired by the organisation:
 - Review the organisational context for conducting Enterprise Architecture
 - Identify and scope the elements of the enterprise organisations affected by the Architecture Capability
 - Identify the established frameworks, methods, and processes that intersect with the Architecture Capability
 - Establish a Capability Maturity target
- Establish the Architecture Capability:
 - Define and establish the organisational Model for Enterprise Architecture
 - Define and establish the detailed process and resources for architecture governance
 - Select and implement tools that support the Architecture Capability
 - Define the Architecture Principles



Approach

- Define the Enterprise
- Identify key drivers and elements in the organisational context
- Define the requirements for architecture work
- Define the Architecture Principles that will inform any architecture work
- Define the framework to be used
- Define the relationships between management frameworks
- Evaluate the Enterprise Architecture maturity

Preliminary Phase: Main Inputs

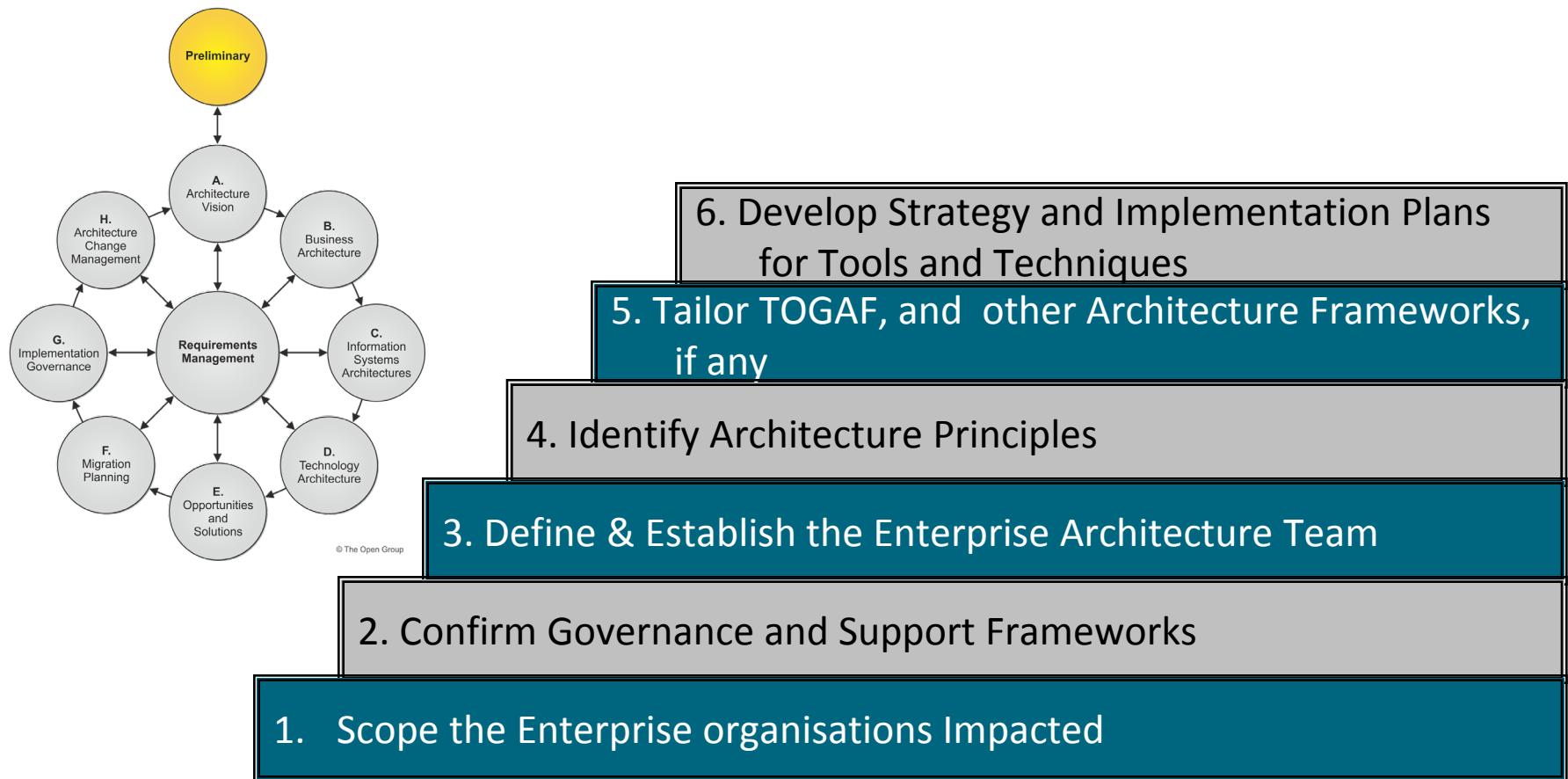


- The TOGAF Library
- Other architecture frameworks
- Business strategies and board business plans, IT strategy
- Business principles, business goals, and business drivers
- Major frameworks operating in the business
- Governance and legal frameworks

Any existing:

- organisational model
- Architecture framework
- Architecture Principles
- Architecture Repository

Steps



1. Scope the Enterprise organisations Impacted

- Identify core enterprise
- Identify soft enterprise
- Identify extended enterprise
- Identify communities
- Identify governance involved

2. Confirm Governance and Support Frameworks

- The major output of this phase is a framework for architecture governance
- The existing governance and support models of an organisation will probably need to change
- The current governance and support models need to be assessed to understand their content
- Sponsors and stakeholders will need to be consulted concerning the potential impact

As a result of Step 2 the architecture touch-points and likely impacts should be understood and agreed by relevant stakeholders.

3. Define the Team and organisation

- Determine existing enterprise and business capability
- Conduct an architecture/business change maturity assessment
- Identify gaps in existing work areas
- Allocate key roles and responsibilities for Enterprise Architecture capability management and governance
- Write requests for change for existing projects
- Scope new Enterprise Architecture work
- Determine constraints on Enterprise Architecture work
- Review and agree with sponsors and board
- Assess budget requirements

4. Identify and Establish Architecture Principles

- Principles are rules and guidelines that say how an organisation fulfils its mission.
- Enterprise principles enable decision-making
- Architecture principles relate to architecture work, and include:
 - Architecture process principles
 - Architecture implementation principles



Defining Architecture Principles

- Why
 - Architecture principles provide a framework for decision making
- Who
 - Developed by the Enterprise Architects
 - In conjunction with key stakeholders
 - The Enterprise CIO
 - Architecture Board
 - Other key business stakeholders



TOGAF Template for Principles

Name

- Should represent the essence of the rule, and be memorable
- Should not mention specific technology platforms
- Should avoid ambiguous words

Statement

- Should succinctly and unambiguously communicate the fundamental rule

Rationale

- Should highlight the business benefits of adhering to the principle, using business terminology
- Should describe the relationship to other principles

Implications

- Should highlight the requirements for the business and for IT for carrying out the principle.
- Should state the business impact and consequences of adopting the principle

An Example Statement of Principles

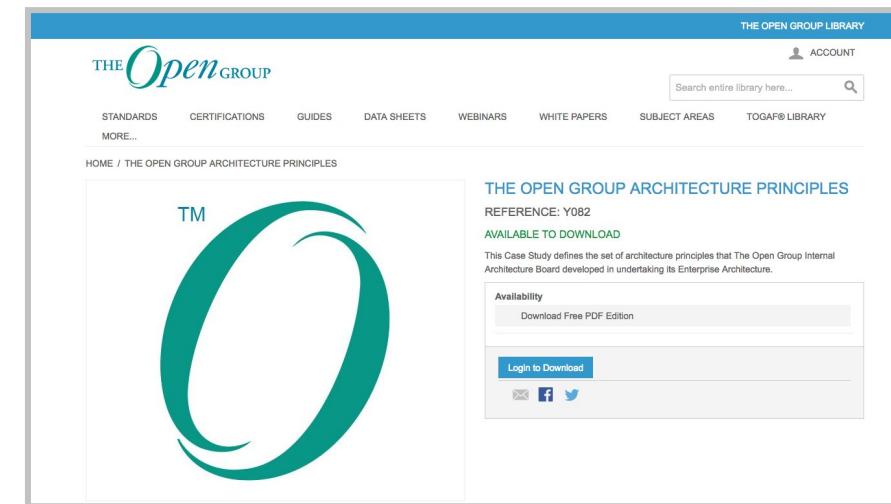
The following set of principles have been approved by the Internal Architecture Board.

Business Principles:

1. Primacy of Principles
2. Maximize Benefit to the Enterprise
3. Compliance with the Law
4. Availability at Anytime from Anywhere
5. Business Continuity
6. Citizenship
7. Custodianship
8. De-Customization
9. Painless User Experience
10. Self-Serve
11. Sharing of Information

Architecture Principles:

1. De-Skill
2. One Source
3. Content Management



The Open Group Case Study: Y082

<https://publications.opengroup.org/y082>

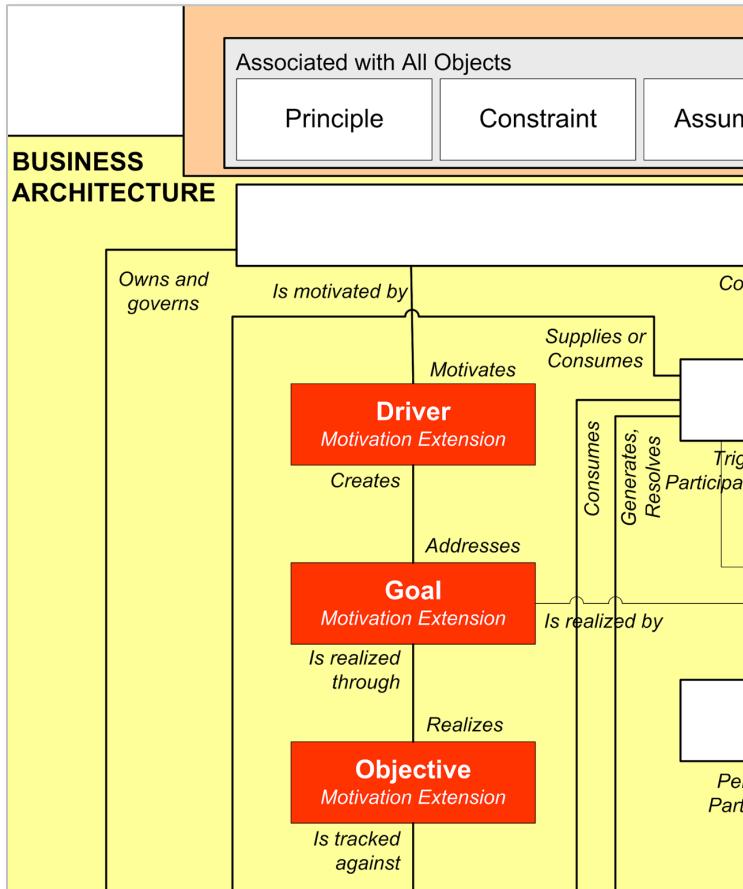


Five Qualities of Principles

1. Understandable: they can be quickly grasped. Intent is clear and unambiguous.
2. Robust: they enable good decisions about architectures and plans, and enable enforceable policies and standards to be created. A principle must be precise to support consistent decision making in complex situations.
3. Complete: every potentially important principle governing the management of IT is defined. Principles cover every situation perceived.
4. Consistent: strict adherence to one principle may require loose interpretation of another. Principles must be expressed in a way that allows a balance of interpretations and should not be contradictory.
5. Stable: Principles must be enduring, yet able to accommodate change.

An amendment process should be established for adding, removing, or altering principles after they are ratified.

Principles and the Metamodel



- Information related to Principles can be modeled, if the right information is captured
- The metamodel relates Principles back to specific drivers, goals and objectives

5. Tailor the TOGAF Framework and, if any, other Selected Architecture Frameworks

- **Terminology Tailoring:** it is best to use terminology that is understood across the enterprise.
- **Process Tailoring:** the ADM is a generic process. Process tailoring allows us to remove tasks that are done elsewhere, add organisation-specific tasks and align the ADM processes with external process frameworks.
- **Content Tailoring:** using the TOGAF Architecture Content Framework, this allows adoption of third-party content frameworks and customization of the framework to support organisation-specific requirements



Terminology & Process Tailoring

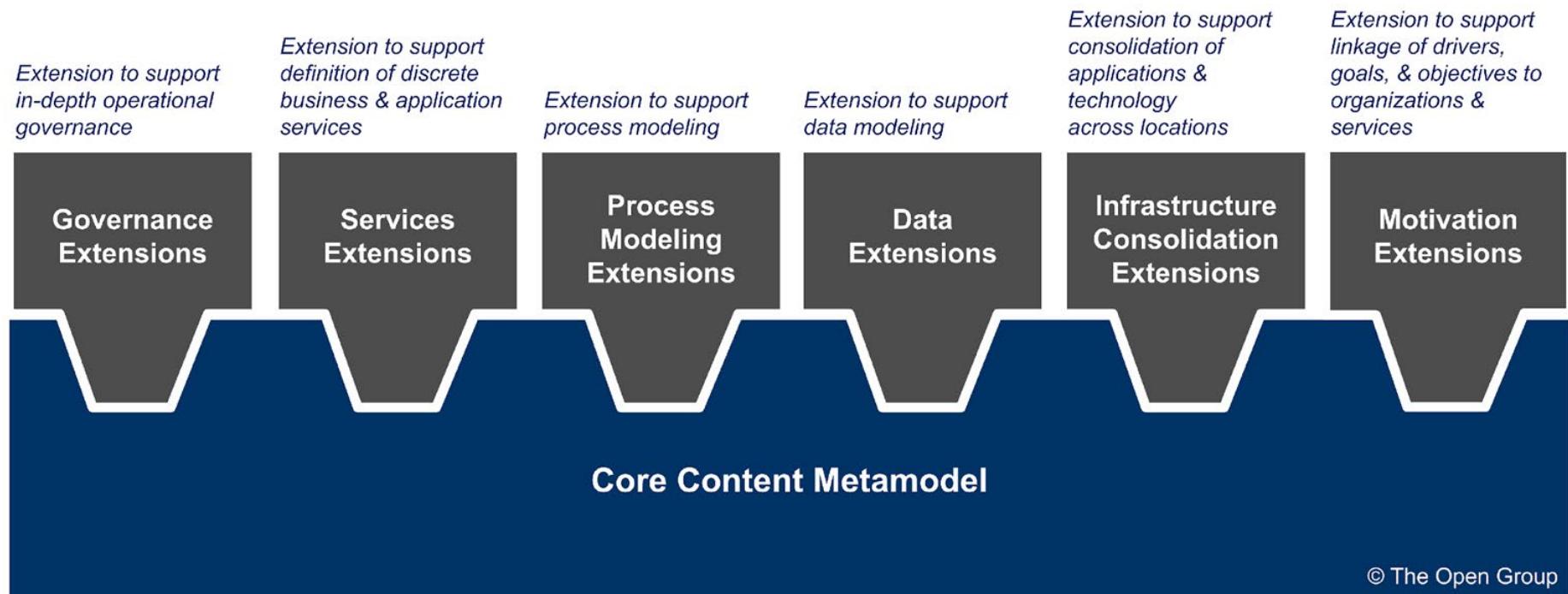
Terminology Tailoring

- Lack of agreement on the precise meanings of terms can cause problems of communication during the Architecture Engagement.
- Define and agree standard terminology
- Provide a Glossary, if appropriate

Process Tailoring

- Re-order the phases of the ADM
- Only use a subset of the phases
- Complete the Information Systems or Technology Architecture first

Content Tailoring



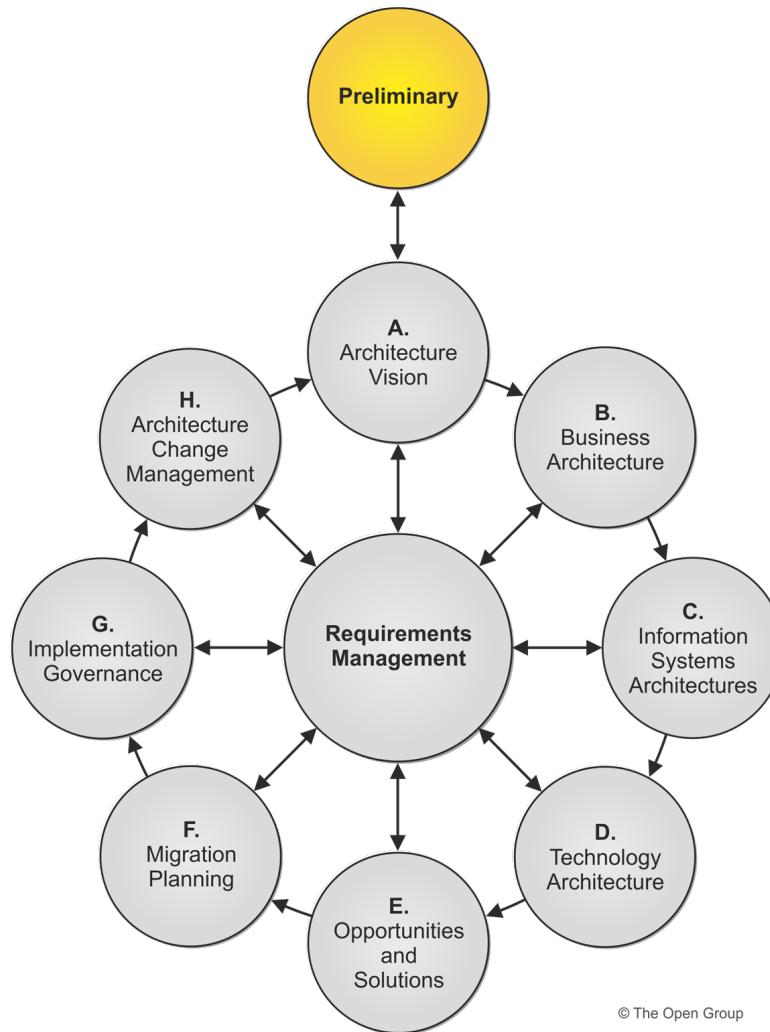
© The Open Group

6. Develop Strategy and Implementation Plans for Tools and Techniques

Develop a tools strategy to support the architecture activity.

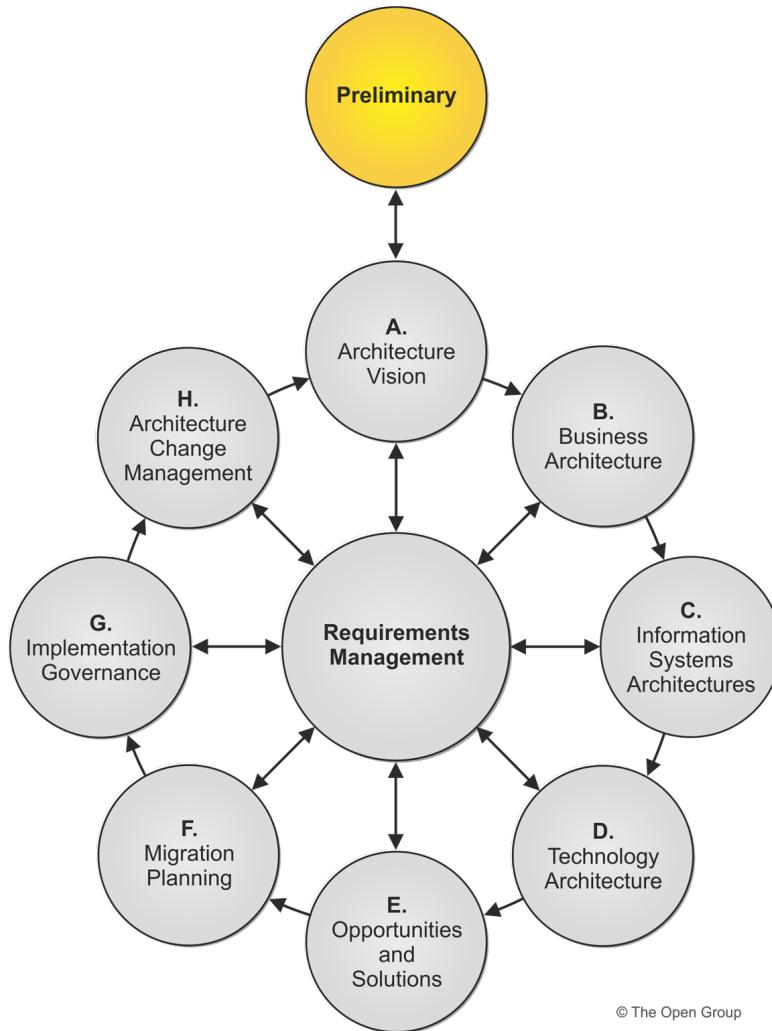
- This should reflect the understanding and level of formality required by the enterprise's stakeholders.
- The implementation of the tools may range from a trivial task to a more involved system implementation activity utilizing the TOGAF Content Metamodel

Preliminary Phase: Outputs



- organisational model for Enterprise Architecture
- Tailored Architecture Framework, including Architecture Principles
- Initial Architecture Repository
- Restatement of business principles, goals and drivers
- Request for Architecture Work
- Architecture Governance Framework

Summary



- The main objective of the preliminary phase is to prepare an organisation for a successful Enterprise Architecture project by defining “how we do architecture”

Continued...

Summary

| Preliminary Phase | | | |
|--|---|--|--|
| Objectives | Steps | Inputs | Outputs |
| <p>Determine the Architecture Capability desired by the organisation:</p> <ul style="list-style-type: none"> · Review the organisational context for conducting Enterprise Architecture · Identify and scope the elements of the enterprise organisations affected by the Architecture Capability · Identify the established frameworks, methods, and processes that intersect with the Architecture Capability · Establish Capability Maturity target <p>Establish the Architecture Capability:</p> <ul style="list-style-type: none"> · Define and establish the organisational Model for Enterprise Architecture · Define and establish the detailed process and resources for architecture governance · Select and implement tools that support the Architecture Capability · Define the Architecture Principles | <p>Scope the enterprise organisations impacted</p> <p>Confirm governance and support frameworks</p> <p>Define and establish the Enterprise Architecture team and organisation</p> <p>Identify and establish Architecture Principles</p> <p>Tailor the TOGAF framework and, if any, other selected Architecture Frameworks</p> <p>Develop strategy and implementation plans for tools and techniques</p> | <p>The TOGAF Library</p> <p>Other architecture framework(s)</p> <p>Board strategies, business plans, business strategy, IT Strategy, business principles, business goals, and business drivers</p> <p>Major frameworks operating in the business</p> <p>Governance and legal frameworks</p> <p>Architecture capability</p> <p>Partnership and contract agreements</p> <p>Existing organisational model for Enterprise Architecture</p> <p>Existing architecture framework, if any, including:</p> <ul style="list-style-type: none"> · Architecture method · Architecture content · Configured and deployed tools · Architecture Principles · Architecture Repository | <p>organisational Model for Enterprise Architecture</p> <p>Tailored Architecture Framework, including Architecture Principles</p> <p>Initial Architecture Repository</p> <p>Restatement of, or reference to, business principles, business goals, and business drivers</p> <p>Request for Architecture Work</p> <p>Architecture Governance Framework</p> |

Catalogs

| Catalog | Purpose |
|--------------------|--|
| Principles Catalog | <p>The Principles catalog captures principles of the business and Architecture Principles that describe what a "good" solution or architecture should look like. Principles are used to evaluate and agree an outcome for architecture decision points. Principles are also used as a tool to assist in architectural governance of change initiatives.</p> <p>The Principles catalog contains the following metamodel entities:</p> <ul style="list-style-type: none">* Principle |



Exercises

- Select 7 principles at random from the *Example Set of Architecture Principles* in the TOGAF Standard, Version 9.2 Chapter 20
- For each selected principle state whether it applies to your organisation or not, and give your reasons

1) Which one of the following is completed during the Preliminary Phase of the TOGAF ADM?

- A. Architecture Principles
- B. Gap Analysis
- C. Impact Analysis
- D. Statement of Architecture Work
- E. Requirements Gathering

2) Which one of the following is a reason to adapt the ADM?

- A. The use of TOGAF is being integrated with another framework
- B. The ADM is being used for a purpose other than Enterprise Architecture
- C. The enterprise is a large federated organisation
- D. The IT Governance model needs to be tailored.
- E. All the above



Module 9: Architecture Governance



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Module Objectives

This module will help you to understand:

- Architecture Governance
- The main components that make up an Architecture Governance Framework
- The TOGAF Architecture Governance Framework
- Architecture Governance in Practice
- Why Architecture Governance is beneficial
- Guidelines for establishing an EA Capability

Introduction to Governance

Governance is the practice by which Enterprise Architectures are managed and controlled.

This includes:

- controls on the creation and monitoring of components and activities – ensuring introduction, implementation, and evolution of architectures
- ensuring compliance with internal and external standards and regulatory obligations
- supporting management of the above
- ensuring accountability to external and internal stakeholders



Governance and the ADM

- Governance should be established in the Preliminary Phase
 - Usually an adaptation of existing governance and support models
- The Architecture Board should ensure that the ADM is being applied correctly
 - Compliance to the ADM is fundamental to the governance of the Architecture
- Governance plays a key role in Phases G and H
 - The implementation and then change management activities



Nature of Governance

- Governance ensures business is conducted properly.
- It is about effective and equitable usage of resources to ensure sustainability of strategic objectives.
- Basic principles of corporate governance:
 - Focus on the rights, roles and equitable treatment of shareholders
 - Disclosure and transparency
 - Accountability of the Board to the shareholders
- Responsibilities of the board:
 - Reviewing and guiding corporate strategy
 - Setting and monitoring management's performance objectives

Governance – Basic Principles

[Governance is] "... the system by which business corporations are **directed** and **controlled**.

The corporate governance structure specifies the distribution of rights and responsibilities among different participants [...] and spells out the rules and procedures for making decisions on corporate affairs. [...] it also provides the structure through which company objectives are set, and the means of attaining those objectives and monitoring performance" [OECD (1999)].



Levels of Governance

The hierarchy of governance domains includes:

- Technology Governance
- IT Governance
- Architecture Governance

Each domain may exist at multiple geographic levels:

- Global
- Regional
- Locals

An IT Governance Framework - COBIT

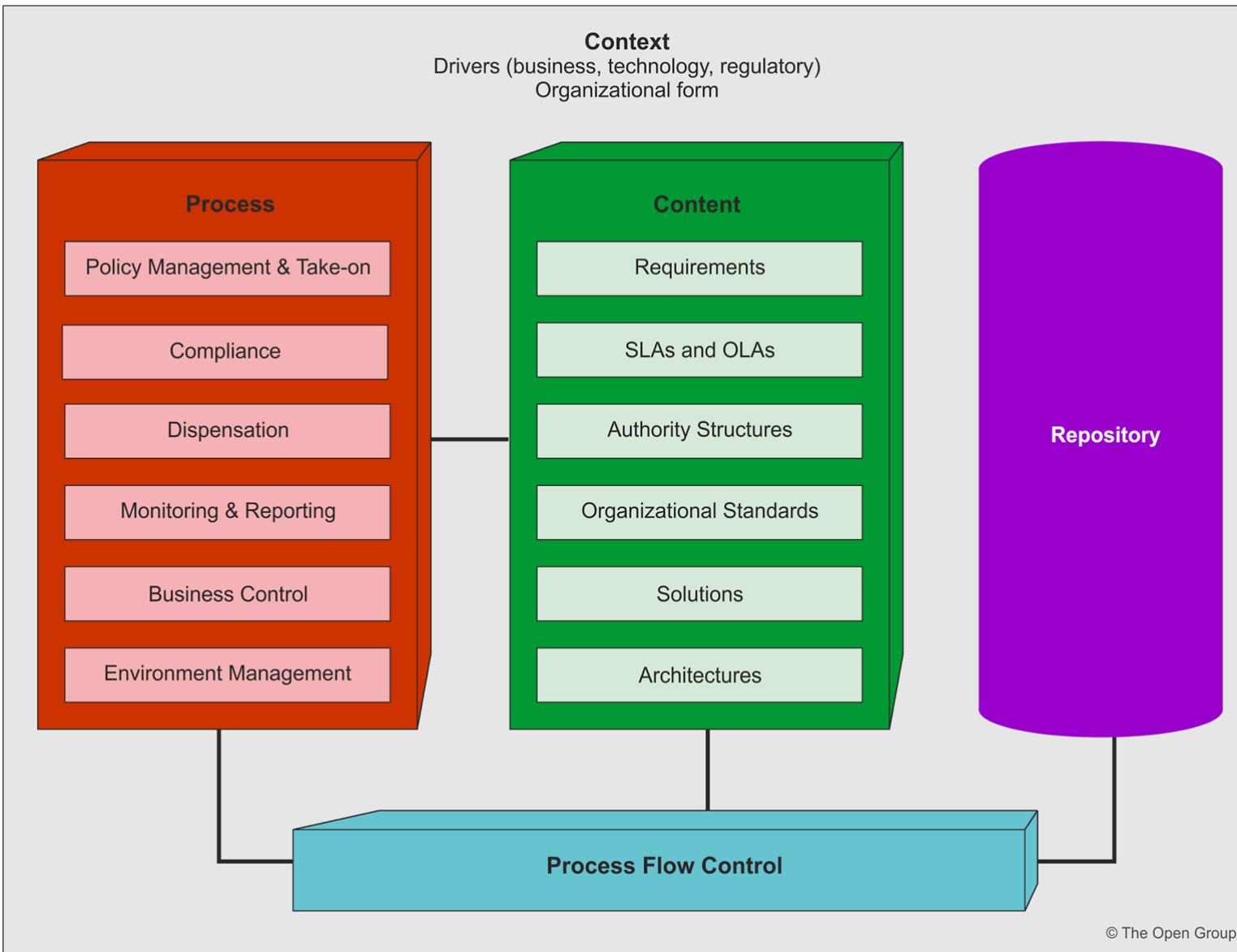
- COBIT is an open standard for control of IT.
- It was developed and promoted by the IT Governance Institute.
- COBIT provides a generally accepted standard for good IT security and control practices
- There is also a set of Management Guidelines for COBIT, including Maturity Models, Critical Success Factors, Key Goal Indicators, and Key Performance Indicators.
- The framework can help managers to control and measure IT resources.



TOGAF Architecture Governance Framework

- Phase G of the *TOGAF ADM* is about *Implementation Governance* - the realization of architecture through change projects.
- Architecture Governance covers management and control of *all* aspects of the development and evolution of Enterprise Architectures
- The Architecture Governance Framework is generic and can be adapted to an existing governance environment. It helps to identify effective processes and organisational structures, so that the business responsibilities can be elucidated, communicated, and managed.

Conceptual Structure



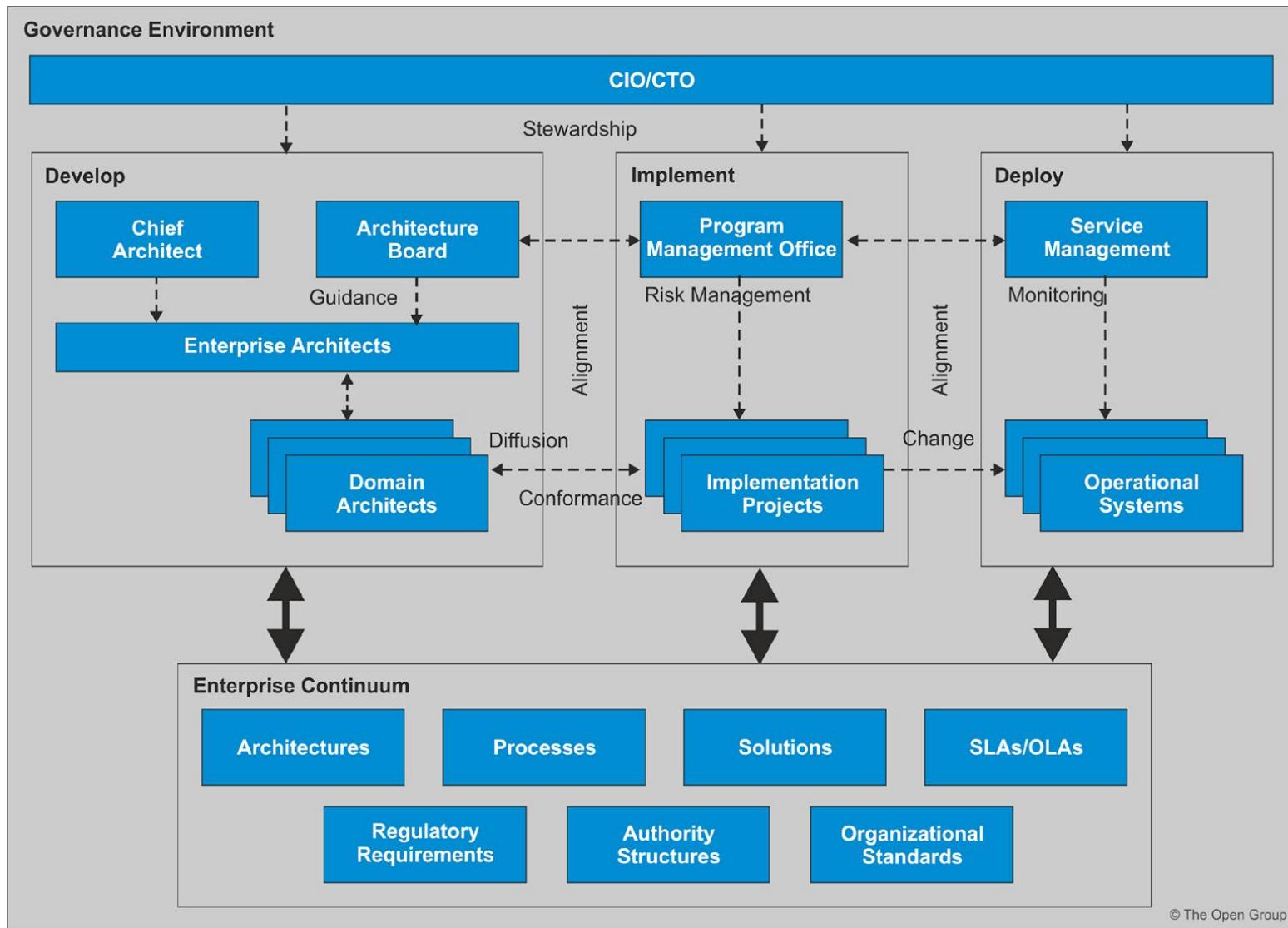


Architecture Governance Framework

- Conceptual Structure

- Architecture Governance is an approach, a series of processes, a cultural orientation and a set of responsibilities that ensure the integrity and effectiveness of architectures.
- The split of **process**, **content** and **context** is key to supporting an architecture governance initiative. It allows introduction of new governance material without impacting the processes and ensures framework flexibility.
- The Architecture Governance Framework is integral to the Enterprise Continuum, and manages all content for both the architecture and the architecture governance processes.

Organisational Structure





Organisational Structure

- Governance is the management and control of architectures.
- To ensure effective control, it is necessary to have the correct organisational structures to support all governance activities.
- Effective implementation requires IT governance processes, organisational structures, and capabilities including (e.g.):
 - Global governance board
 - Local governance board
 - Design authorities
 - Working parties



Benefits of Architecture Governance

- Links processes, resources, and information to organisational strategies and objectives
- Integrates and institutionalizes best practices
- Aligns with industry frameworks
- Enables the organisation to take full advantage of its assets
- Protects the underlying digital assets of the organisation
- Supports regulatory and best practice requirements
- Promotes visible risk management



Architecture Governance in Practice

Key success factors include:

- Best practices for submission, adoption, reuse, reporting, and retirement of architecture policies, procedures, roles, skills, organisational structures, and support services
- organisational responsibilities and structures to support the architecture governance processes and reporting requirements
- Tools and processes to procedurally and culturally promote take-up
- Management of criteria to control architecture governance processes, dispensations, compliance assessments, SLAs, and OLAs
- Meet internal and external requirements for effectiveness, efficiency, confidentiality, integrity, availability, compliance, and reliability of architecture governance-related information, services, and processes



Architecture Board

- The Board oversees implementation of the governance strategy
 - Board comprises of representative stakeholders responsible for review and maintenance of architecture typically at 2 levels:
 - Local (domain experts, line responsibility)
 - Global (organisation-wide responsibility)
- Board has identifiable and articulated:
- Responsibilities and decision-making capabilities
 - Remit and authority limits



Architecture Board Value

- Cost is offset by preventing one-off solutions and unconstrained developments which lead to:
 - High costs of development, operation and support, due to numerous run-time environments, languages, interfaces, protocols ...
 - Lower quality
 - Higher risk
 - Difficulty in replicating and re-using solutions



Architecture Board Responsibilities

- Providing the basis for all decision-making with regard to changes to the architectures
- Ensuring consistency between sub-architectures
- Establishing targets for re-use of components
- Ensuring flexibility of Enterprise Architecture:
 - To meet changing business needs
 - To leverage new technologies
- Enforcement of Architecture Compliance
- Improving the architecture maturity level within the organisation
- Ensuring that the discipline of architecture-based development is adopted
- Supporting a visible escalation capability for out-of-bounds decisions



Architecture Board Operations

- TOGAF provides guidance on operations of the Board
- These are primarily focused on best practice for meeting management
- For example:
 - Meetings should be conducted with clearly defined agendas
 - Each participant attending a meeting should be fully prepared
- TOGAF provides a sample outline agenda



Architecture Contracts

Joint agreements between development partners and sponsors on the deliverables, qualify and fitness-for-purpose of an architecture

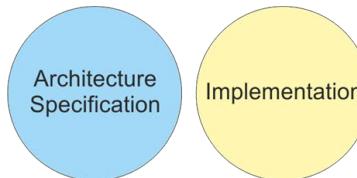
- Use of Architecture Contracts ensures
 - Continuous monitoring to check integrity, changes, decision-making, and audit of all architecture-related activities
 - Adherence to the principles, standards, and requirements of the existing or developing architectures
 - Identification of risks
 - A set of processes and practices that ensure accountability, responsibility, and discipline with regard to the development and usage of all architectural artifacts
 - A formal understanding of the governance organisation

Architecture Contracts and the ADM

- The Statement of Architecture Work created in Phase A
- Architectures Domains (Business, Data, Application, Technology)
- Phase G
- Implementation projects

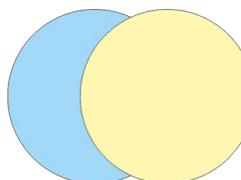
Architecture Compliance: Terminology

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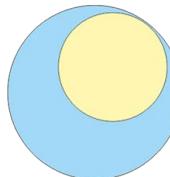
Irrelevant:

The implementation has no features in common with the architecture specification (so the question of conformance does not arise).



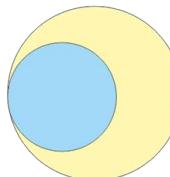
Consistent:

The implementation has some features in common with the architecture specification, and those common features are implemented in accordance with the specification. However, some features in the architecture specification are not implemented, and the implementation has other features that are not covered by the specification.



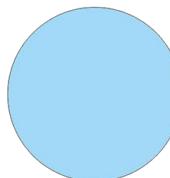
Compliant:

Some features in the architecture specification are not implemented, but all features implemented are covered by the specification, and in accordance with it.



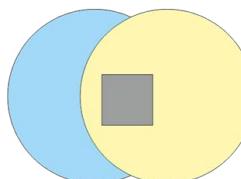
Conformant:

All the features in the architecture specification are implemented in accordance with the specification, but some more features are implemented that are not in accordance with it.



Fully Conformant:

There is full correspondence between architecture specification and implementation. All specified features are implemented in accordance with the specification, and there are no features implemented that are not covered by the specification.



Non-conformant:

Any of the above in which some features in the architecture specification are implemented not in accordance with the specification.



Architecture Compliance

Two processes are defined to ensure compliance of projects with the Enterprise Architecture:

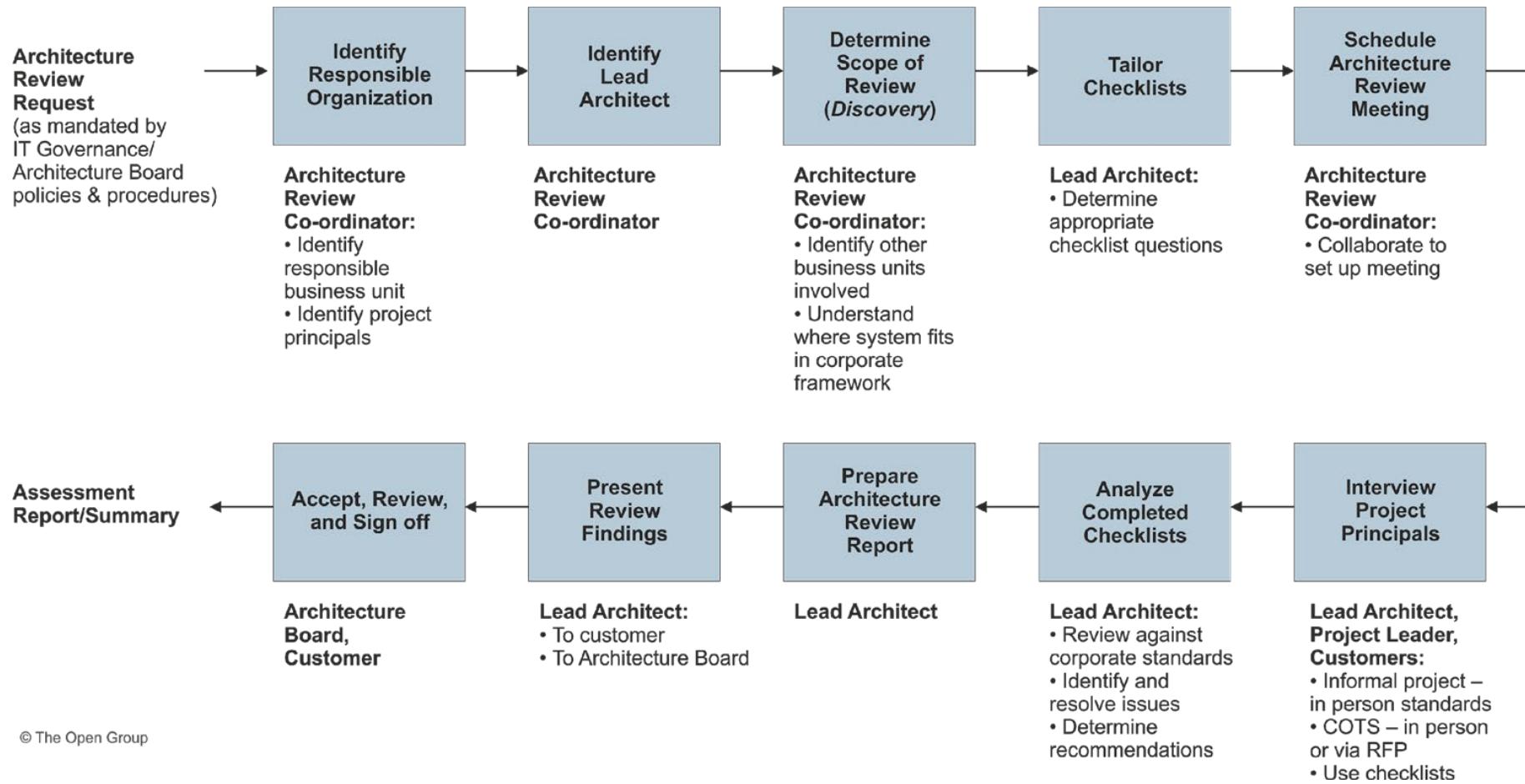
1. Prepare *Project Impact Assessments* - project-specific views that illustrate how the *Enterprise Architecture* impact a project
2. Perform an *Architecture Compliance Review*

Architecture Compliance Reviews

- Catch errors in the project architecture early,
- Ensure the application of best practices to architecture work.
- Provide an overview of the compliance to mandated standards.
- Identify where the standards themselves may require modification.
- Identify services that are currently application-specific but might be provided as part of the enterprise infrastructure.
- Document strategies for collaboration, resource sharing, and other synergies across multiple architecture teams.
- Take advantage of advances in technology.
- Communicate to management the status of technical readiness of the project.
- Identify key criteria for procurement activities
- Identify and communicate significant architectural gaps to product and service providers.

Architecture Compliance

Review Process





Establishing an Architecture Capability

- TOGAF provides guidelines to establish an EA capability
 - Use of the ADM
 - Treat is as an ongoing practice
 - Address the four domain architectures
 - **Business Architecture** : the architecture governance, architecture processes, architecture organisational structure, architecture information requirements, architecture products, etc.
 - **Data Architecture** : the structure of the organisation's Enterprise Continuum and Architecture Repository
 - **Application Architecture**: the functionality and/or applications services required to enable the architecture practice
 - **Technology Architecture**: infrastructure requirements and deployment in support of the architecture applications and Enterprise Continuum

Summary

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:

- Implementing a system of controls over the creation and monitoring of all architecture components and activities, to ensure the effective introduction, implementation, and evolution of architectures within the organisation.
- Implementing a system to ensure compliance with internal and external standards and regulatory obligations.
- Establishing processes that support effective management of these processes.
- Developing practices that ensure accountability to identified stakeholders, inside and outside the organisation.



Test Yourself Question

Which of the following are NOT included in Architecture Governance?

- A. Implementing a system of controls over expenditure within the enterprise
- B. Implementing a system of controls over the creation and monitoring of all architecture components and activities
- C. Implementing a system to ensure compliance with internal and external standards and regulatory obligations
- D. Establishing processes that support effective management of the architecture governance process
- E. Developing practices that ensure accountability to stakeholders



Test Yourself Question

- Q. Which of the following is an example of an IT governance framework?
- A. ITIL
 - B. Prince 2
 - C. COBIT
 - D. TOGAF
 - E. ATAM



Module 10: Business Scenarios



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Introduction

Module Objectives

- To understand how to apply the Business Scenarios technique
- To understand where it is used in the TOGAF standard
- Key factors in the success of any enterprise architecture are:
 - the extent to which it is linked to business requirements,
- and
 - its support for business objectives.

Business scenarios help us to identify and understand the business requirements that the architecture development must address.

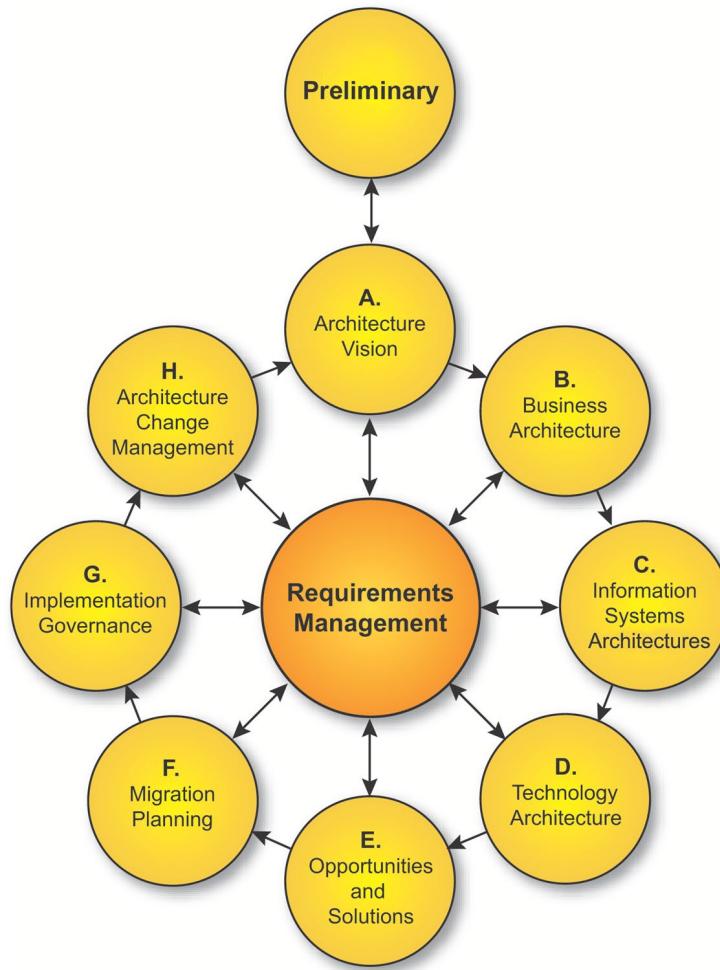


What is a Business Scenario?

A business scenario describes:

- a business process, application or set of applications that can be enabled by the architecture
 - the business and technology environment;
 - the people and computing components (the “actors”) who execute it;
 - the desired outcome of proper execution.
-
- The *TOGAF Series Guide: Business Scenarios (G176)* defines a method for developing Business Scenarios
 - It is positioned as a “*method within a method*”

Business Scenarios and the ADM



Used prominently in Phase A (Architecture Vision) and iteratively in Phase B (Business Architecture)

Business Requirements are referred to throughout all phases of the ADM



What is a Good Business Scenario?

A good business scenario:

- Is representative of a significant business need or problem
- Enables vendors to understand the value of a developed solution to a customer.
- Is “*SMART*”

Specific

defines what needs to be done to done in the business;

Measurable

has clear metrics for success;

Actionable

clearly segments the problem, and provides the basis for finding a solution;

Realistic

defines the bounds of technology capability and cost constraints;

Time-bound

gives a clear understanding of when a solution expires



The Benefits of Business Scenarios

A business scenario should be a *complete* description of a business problem

Without this:

- There is danger that the requirements will not be complete
- The business value to solving the problem will be unclear
- The relevance of potential solutions will be unclear

A scenario:

- can play an important role in engaging the stakeholders
- can help to establish good communication with vendors early on.

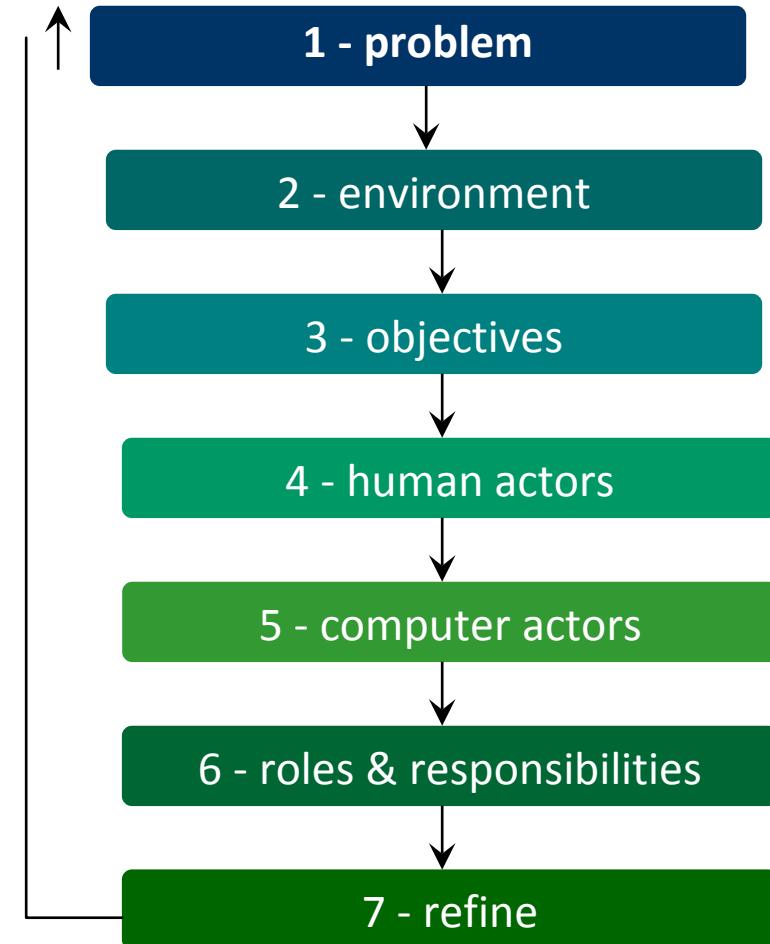


Who Contributes to a Business Scenario?

- The creation of a business scenario is not solely the province of the architect.
- Business line management and other stakeholders for the enterprise must be involved
- It may also involve an organisation's IT vendors
- Typically involvement of management is greatest in the early stages whereas the involvement of the architect is greatest in later stages

Developing a Business Scenario

- 1 - Identify, document and rank the problem driving the scenario
- 2 - Identify the business and technical environment of the scenario and document it in models
- 3 - Identify and document desired objectives - the results of handling the problems successfully - using SMART
- 4 - Identify the human actors and their place in the business model
- 5 - Identify computer actors (computing elements), and their place in the technology model
- 6 - Identify and document roles, responsibilities and measures of success per actor
- 7 - Check for “fitness for purpose” and refine if necessary



Getting Business Scenarios Right

- Customers almost always know what they want
 - But it is often not written down, especially the link to business
 - So we help write it down
- Customers sometimes do not know what they really need
 - So we observe and probe to help discover what's needed
 - We help bring out critical business rules
 - We also focus on the “what” not the “how”
- Business Scenarios are part of a larger process. They are a technique, not an end in themselves.

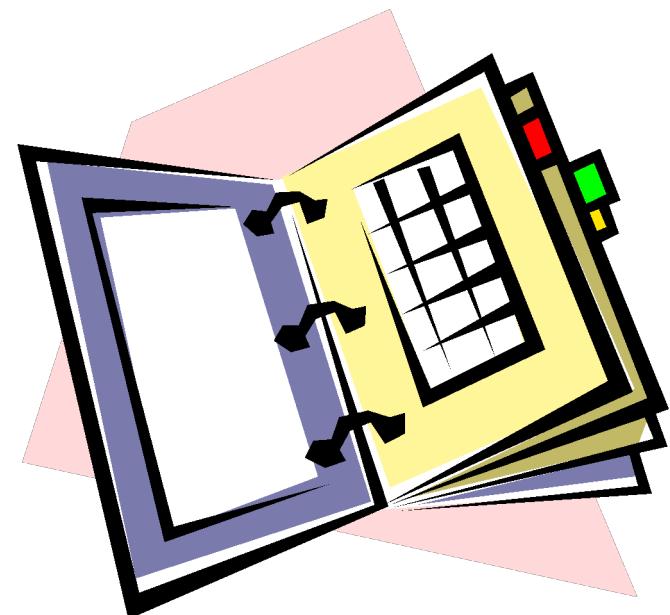
Contents of a Business Scenario

- Business Scenario *models* should:
 - Capture business and technology views graphically to help comprehension
 - Provide a starting point for requirements,
 - Relate actors and interactions
- Business Scenario *descriptions* should:
 - Capture the critical steps between actors in the right sequence
 - Partition the responsibility of the actors
 - List pre-conditions that have to be met prior to proper system functionality, and
 - Provide technical requirements to ensure the service is of acceptable quality



Template for a Business Scenario

- Business scenario problem description
- Detailed objectives
- Views of environments and processes
- Actors, their roles and responsibilities
- Principles and constraints
- Requirements
- Next steps
- Glossary of terms and abbreviations
- References





Exercise

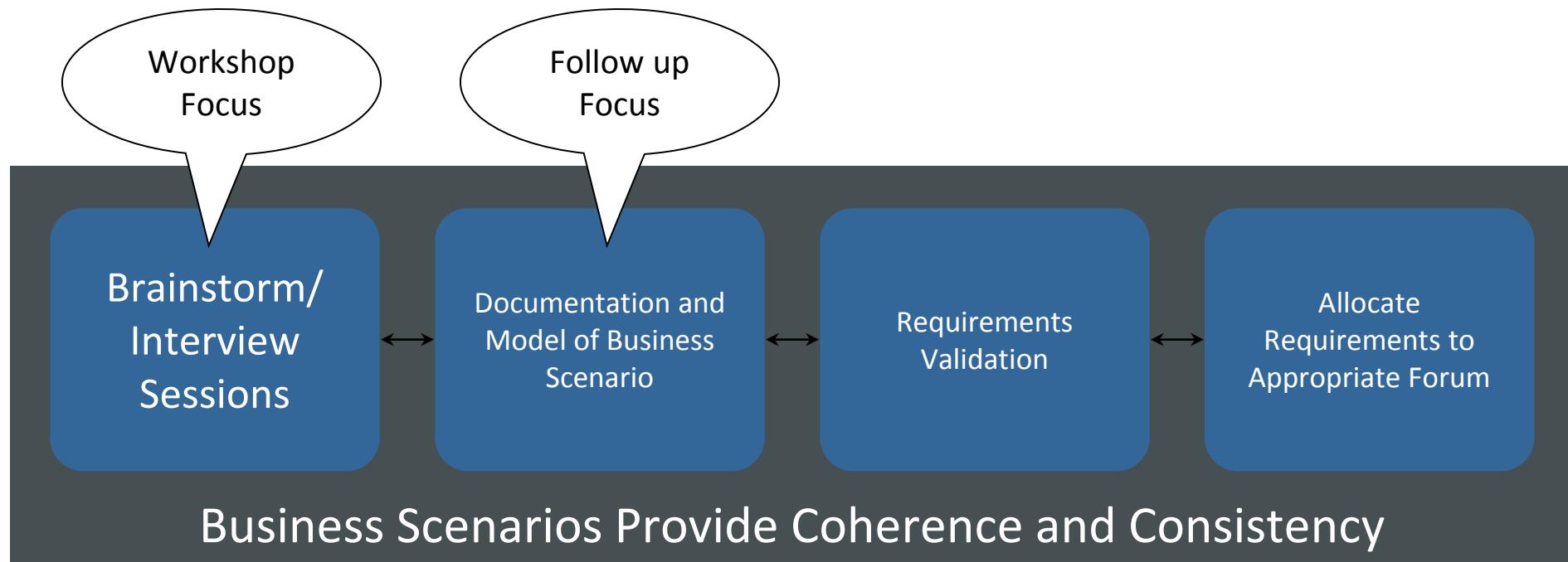
Write a scenario describing how you would choose a new car.
Include the following in your answer:

- Problem description
- Detailed objectives
- Views of environments and processes
- Actors, their roles and responsibilities
- Principles and constraints
- Requirements
- Next steps

Make the objectives SMART.

Some Reminders

- Business Scenarios are a part of (and enable) a larger process
- Business Scenarios are just a technique, not an objective
- Use them, don't get lost in them





Summary

- Business scenarios help address one of the most common issues facing businesses
 - Aligning the IT with the business
- Business scenarios help to identify and understand business needs
 - And thereby derive business requirements
- They are just a technique, not the goal
 - They are part of the larger process of architecture development

Resources

- The Open Group Library (<http://publications.opengroup.org>)
 - The TOGAF Series Guide: Business Scenarios
 - Examples of completed Business Scenarios



Exercises

- Consider the following objective: “The system’s security should be improved. This will reduce the loss of revenue which results when our system is accessed by unauthorized users”.
- How could this be re-phrased to make it into a SMART objective?

- Select a scenario (a business problem) from your own organisation
- Identify the stakeholders (human actors) and their place in the business model, the human participants and their roles
- Identify computer actors, and their place in the technology model, the computing elements and their roles
- For the stakeholders, identify the stakeholder concerns



Exercise

- Consider the Vehicle Licensing Bureau (or equivalent in your country), that handles car registrations, driving licenses, car taxes and insurance records.
- Identify the stakeholders (human actors) and their place in the business model, the human participants and their roles
- Identify computer actors, and their place in the technology model, the computing elements and their roles
- For the stakeholders, identify the stakeholder concerns



Module 11: Stakeholder Management



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Roadmap

| |
|---|
| Part I - Introduction |
| Preface, Executive Overview, Core Concepts, Definitions |
| Part II – Architecture Development Method |
| Introduction to ADM |
| ADM Phase Narratives |
| Part III – ADM Guidelines & Techniques |
| Guidelines for Adapting the ADM Process |
| Techniques for Architecture Development |
| Part IV – Architecture Content Framework |
| Content Metamode |
| Architectural Artifacts |
| Architecture Deliverables |
| Building Blocks |
| Part V – Enterprise Continuum & Tools |
| Enterprise Continuum |
| Architecture Partitioning |
| Architecture Repository |
| Tools for Architecture Development |
| Part VI – Architecture Capability Framework |
| Architecture Board |
| Architecture Compliance |
| Architecture Contracts |
| Architecture Governance |
| Architecture Maturity Models |
| Architecture Skills Framework |

- **Part III, ADM Guidelines and Techniques, Chapter 21**





Module Objectives

The objectives are to:

- Explain how to apply the stakeholder management technique
- Understand the steps in developing a stakeholder map and how to use the map
- Understand the benefits for creating views and relating those to stakeholder and their concerns

Overview

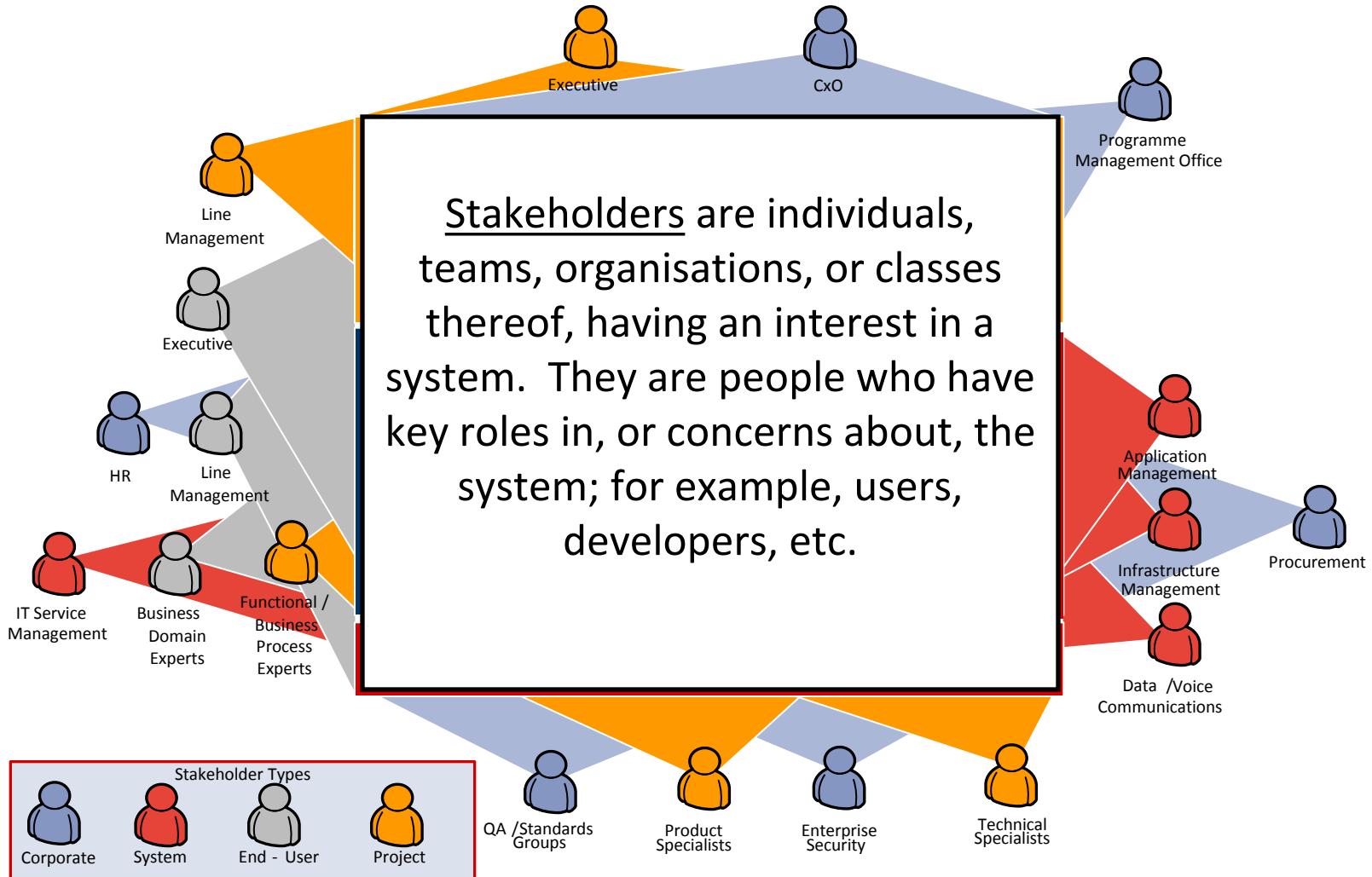
- Stakeholder Management is an important discipline that successful architecture practitioners can use to win support from others
- This technique should be used in Phase A to identify key players and updated throughout each phase
- The output of this process forms part of the Communications Plan



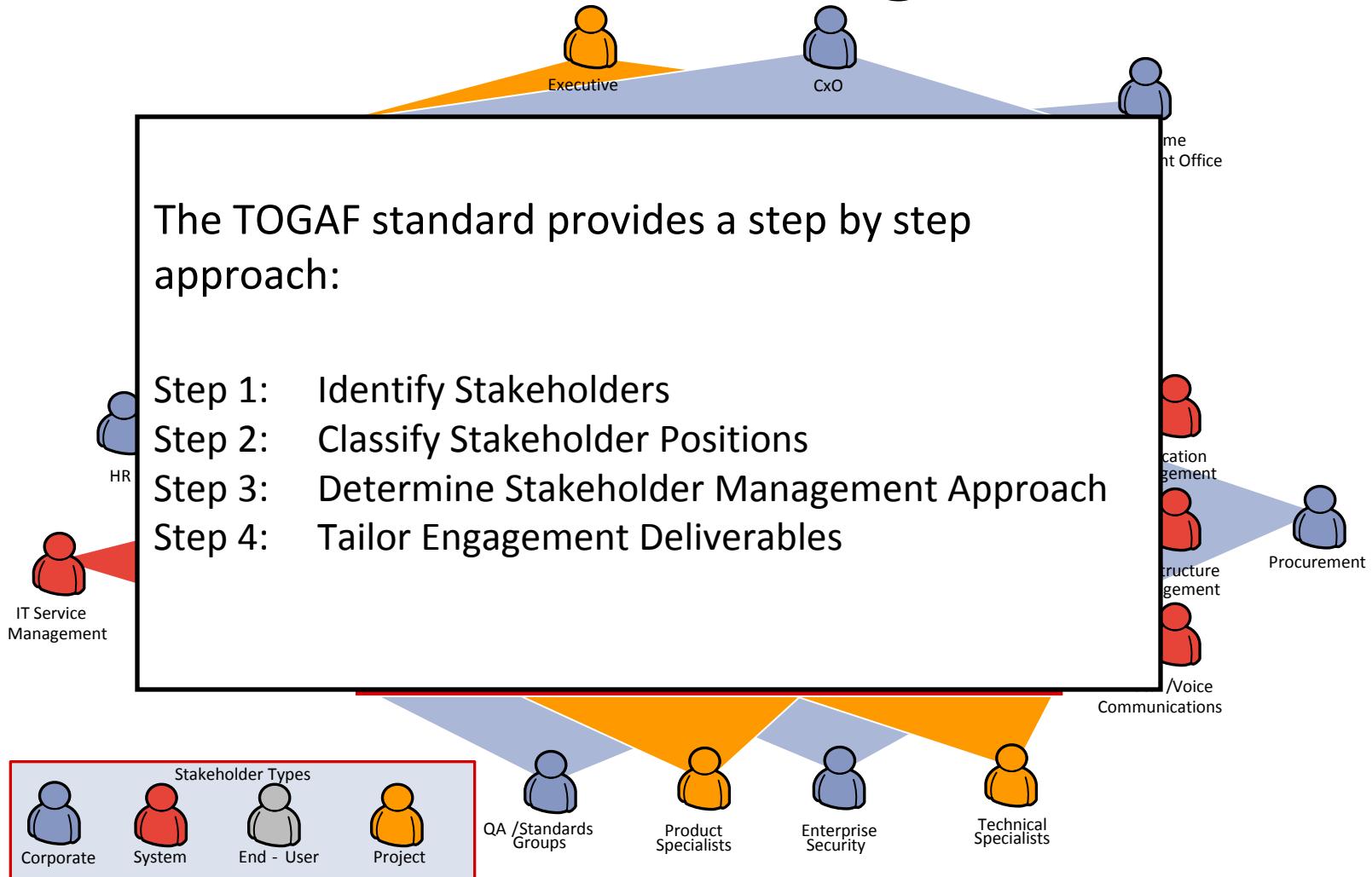
Benefits

- Identifies the most powerful stakeholders early and ensures their input is used to shape the architecture
- Achieving support from the most powerful stakeholders can help achieve necessary resources
- Early communication with stakeholders helps with ensuring all understand the architecture process and are engaged in it
- Can be used to anticipate likely reactions and develop a strategy to address them
- Can be used to identify conflicting or competing objectives amongst stakeholders and develop strategies to manage

Stakeholders



Stakeholder Management

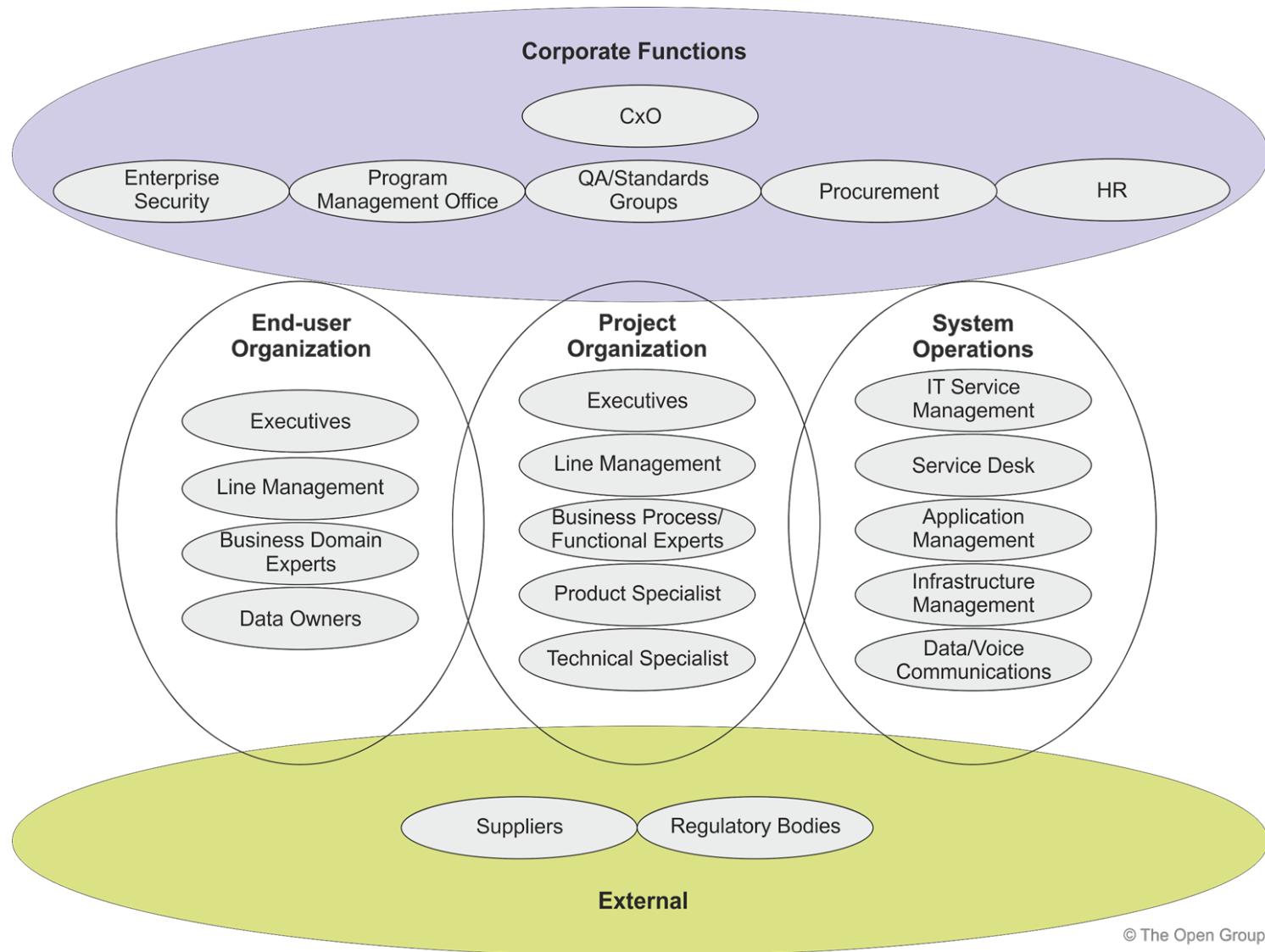




Step 1: Identify Stakeholders

- Identify the key stakeholders of the enterprise architecture.
- Look at who is impacted by the enterprise architecture project:
 - Who gains and who loses from this change?
 - Who controls change management of processes?
 - Who designs new systems?
 - Who will make the decisions?
 - Who procures IT systems and who decides what to buy?
 - Who controls resources?
 - Who has specialist skills the project needs?
 - Who has influence?

Categories of Stakeholder



© The Open Group

Step 2: Classify Stakeholder Positions

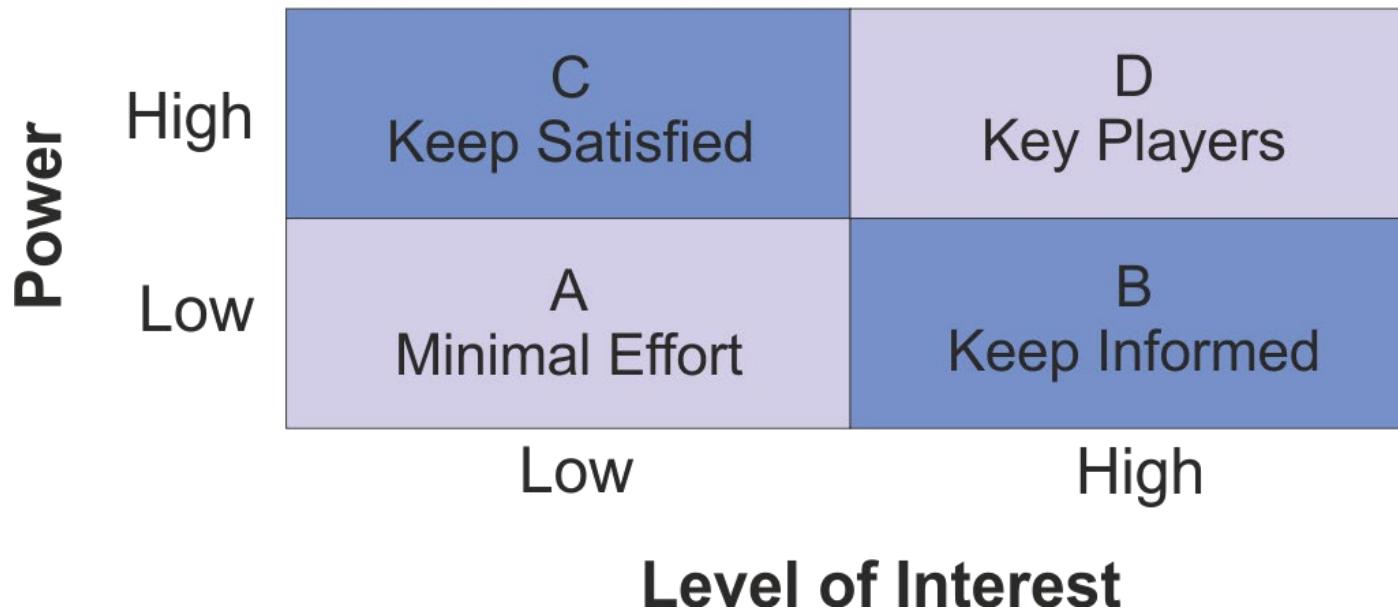
- Classify and record positions in a Stakeholder Analysis Matrix

| Stakeholder Group | Stakeholder | Ability to Disrupt the 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 |

Step 3: Determine Stakeholder Management Approach

- Work out stakeholder power, influence and interest, so as to focus the engagement on the key individuals.
- These can then be mapped onto a power/interest matrix, which is used to determine the strategy for engaging with them.
- Develop a Power/Interest Matrix and place Stakeholder groups within it

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Step 4: Tailor Engagement Deliverables

- For each Stakeholder Group:
 - Identify the viewpoints that the architecture engagement needs to produce and validate with each stakeholder group
 - Define specific viewpoints, matrices, and views of the enterprise architecture model..

Example: Stakeholder Map

| STAKEHOLDER GROUP | CLASS | EXAMPLE ROLES | KEY CONCERNS | CLASS | Catalogs, Matrices and Diagrams |
|---------------------|---------------------------|----------------------------|---|----------------|--|
| Corporate Functions | CxO | CEO, CFO, CIO, COO | The high level drivers, goals and objectives of the organisation, and how these are translated into an effective process and IT architecture to advance the business. | KEEP SATISFIED | Business Footprint diagram Goal/Objective/Service diagram organisation Decomposition diagram Business Capabilities catalog Capability/organisation matrix Strategy/Capability Map |
| Corporate Functions | Program Management Office | Project Portfolio Managers | Prioritizing, funding and aligning change activity. An understanding of project content and technical dependencies between projects adds a further dimension of richness to portfolio management decision making. | KEEP SATISFIED | Requirements Catalog Business Footprint diagram Application Communication diagram Functional Decomposition diagram |
| Corporate Functions | Procurement | Acquirers | Understanding what building blocks of the architecture can be bought, and what constraints (or rules) exist that are relevant to the purchase. The acquirer will shop with multiple vendors looking for the best cost solution while adhering to the constraints (or rules) applied by the architecture, such as standards. The key concern is to make purchasing decisions that fit the architecture, and thereby to reduce the risk of added costs arising from non-compliant components. | KEY PLAYERS | Technology Portfolio catalog Technology Standards Catalog |

Summary

- Stakeholder Management is an important discipline that successful architecture practitioners can use to win support from others
- Identifies the most powerful stakeholders early and ensures their input is used to shape the architecture
- Explicitly identifies viewpoints to address stakeholder concerns

Exercise

- Develop a stakeholder map for the following individuals and groups:
 - Infrastructure Architect
 - Program Manager
 - Human Resources function
- For the example view from Chapter 31 (TOGAF 9.2 section 31.4.1)
 - Describe the stakeholders and their concerns
 - Define a Stakeholder Map



Module 12: Architecture Views and Viewpoints



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Module Objectives

- To understand the concepts of Architecture Views and Architecture Viewpoints
- To understand the role of Architecture Views
- To introduce some TOGAF resources

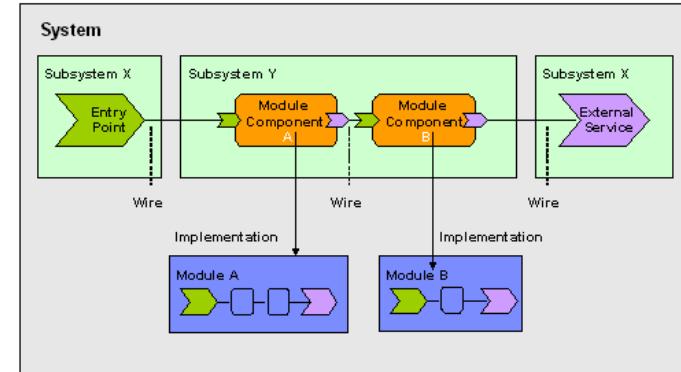
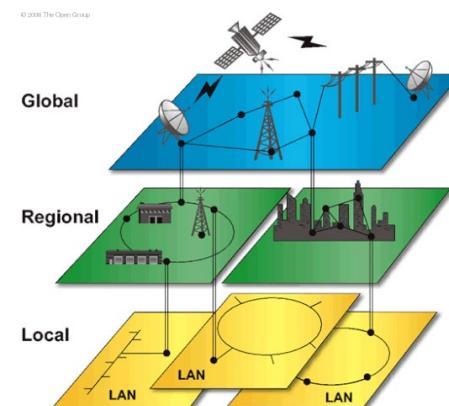
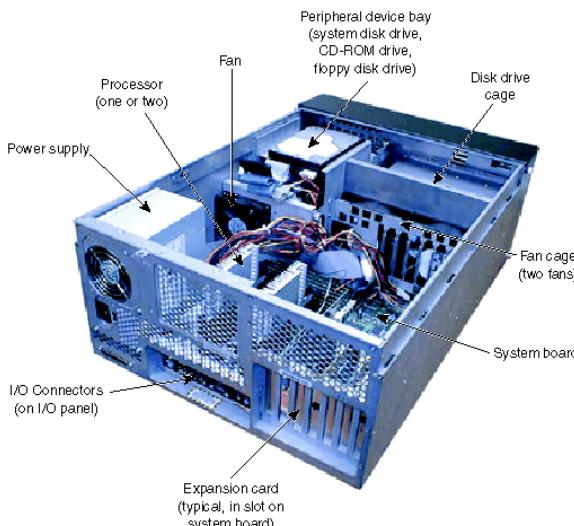


Concepts and Definitions

- System
- Stakeholder
- Concern
- Architecture View
- Architecture Viewpoint

System

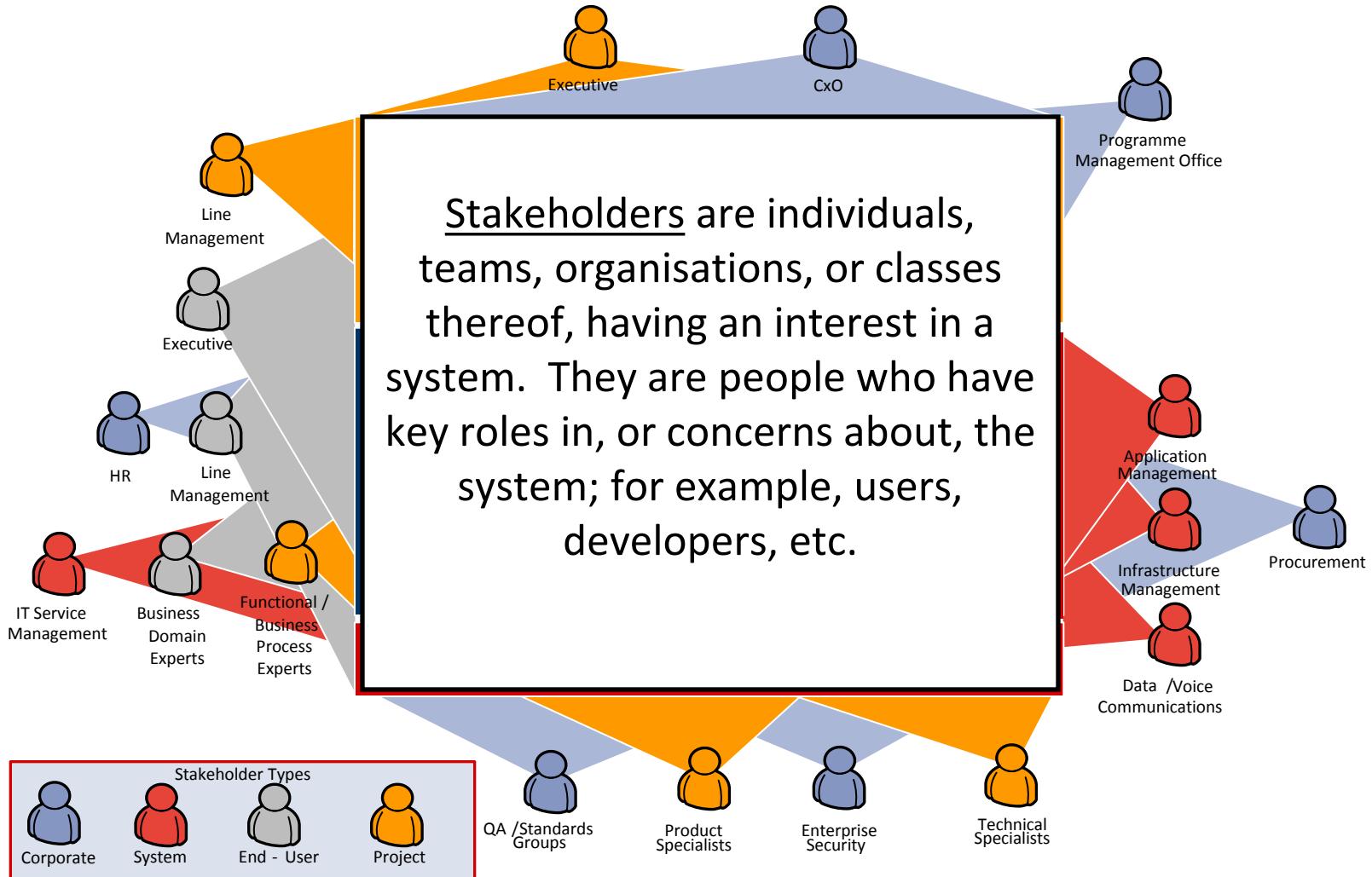
- A system is a combination of interacting elements organized to achieve one or more stated purposes.



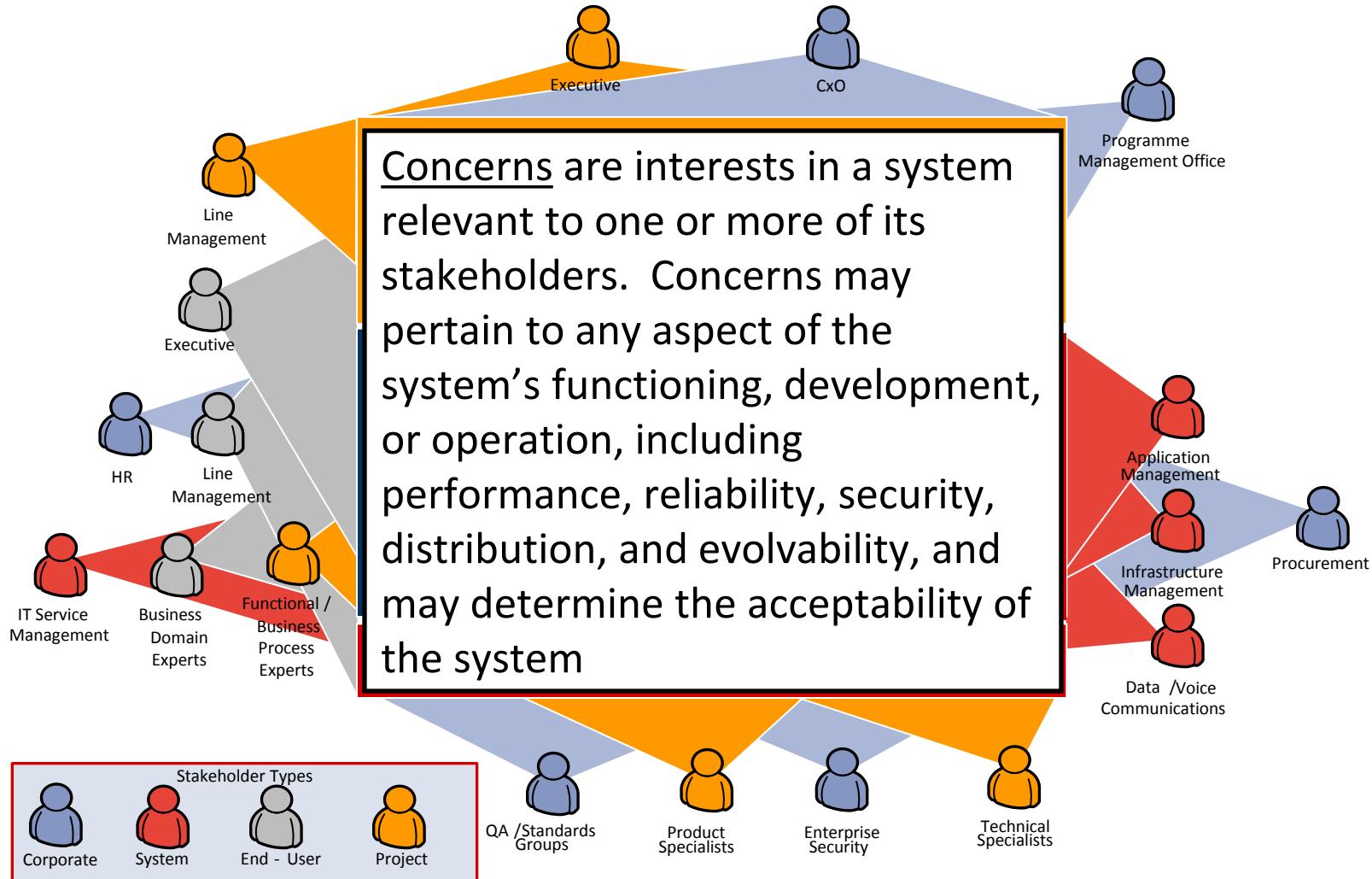
Source: IONA

Source: SGI

Stakeholders

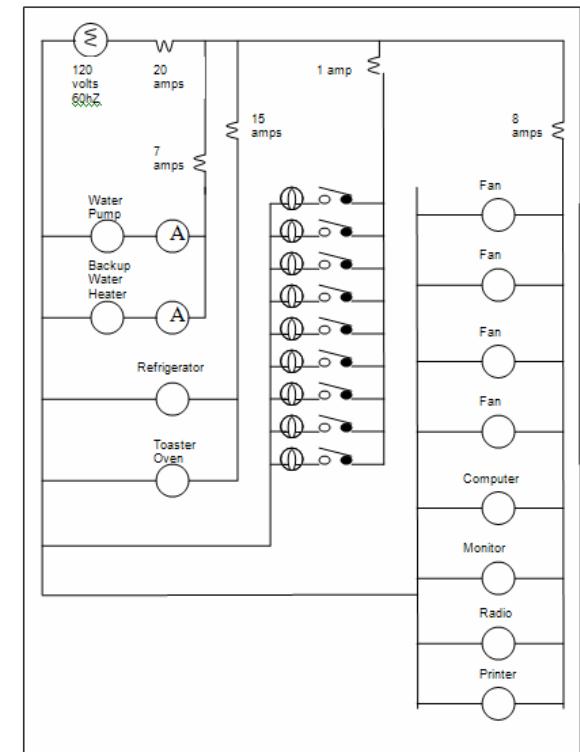
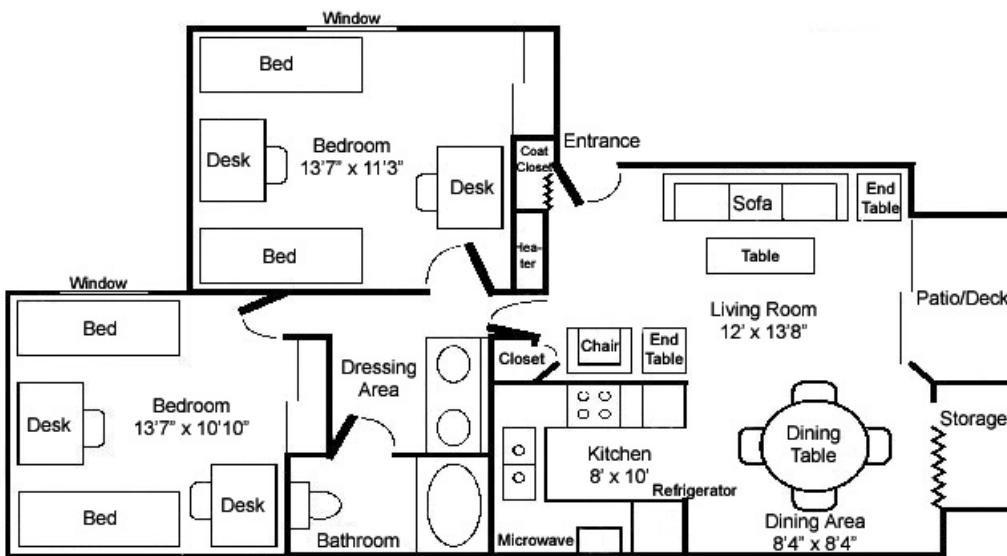


Concerns



Architecture View (synonym: View)

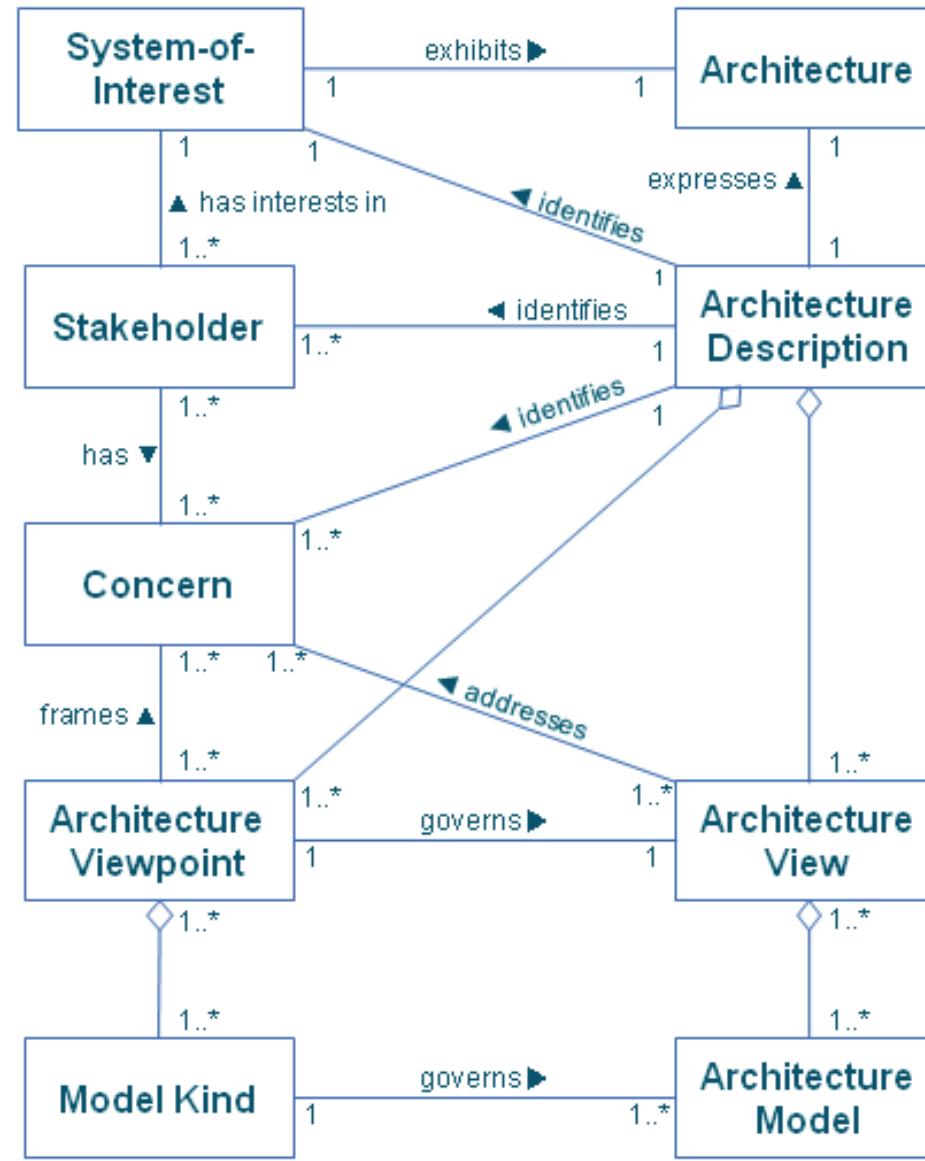
- An Architecture View is a representation of a system from the perspective of a related set of concerns.
 - An architect creates architecture models. An architecture view consists of parts of these, chosen to show stakeholders that their concerns are being met.



Architecture Viewpoint (synonym: Viewpoint)

- An Architecture Viewpoint defines the perspective from which an architecture view is taken.
 - It defines how to construct and use an architecture view, the information needed, the modeling techniques for expressing and analyzing it and a rationale for these choices (e.g. by describing the purpose and intended audience of the view).





Source: ISO/IEC/IEEE Std 40210-2011. Used with permission



Architecture Views and Viewpoints

The architect uses architecture views and architecture viewpoints in phases A to D for developing architectures for each domain (business, data, application, technology).

- An *architecture view* is what you see.
- An *architecture viewpoint* is where you are looking from, the vantage point or perspective that determines what you see
- Every architecture view has an associated architecture viewpoint that describes it, at least implicitly.
- Architecture viewpoints are generic, and can be stored in libraries for reuse. An architecture view is always specific to the architecture for which it is created.



What is an Architecture View?

- A representation of an overall architecture with meaning to one or more stakeholders in the system
- For example: a building architect might create wiring diagrams, floor plans, and elevations to describe different facets of a building to its different stakeholders (electricians, owners, planning officials etc.)
- An enterprise architect might create physical and security views of an IT system

A Simple Example of an Architecture Viewpoint

| Architecture Viewpoint Element | Description |
|--------------------------------|---|
| Stakeholders | Management Board, CEO |
| Concerns | Show the top-level relationships between US/UK geographical sites and business functions |
| Modeling Technique | Nested boxes diagram. technique Outer boxes = locations; Inner boxes = business functions. Semantics of nesting = functions performed in the locations. |

A Simple Example of an Architecture Viewpoint

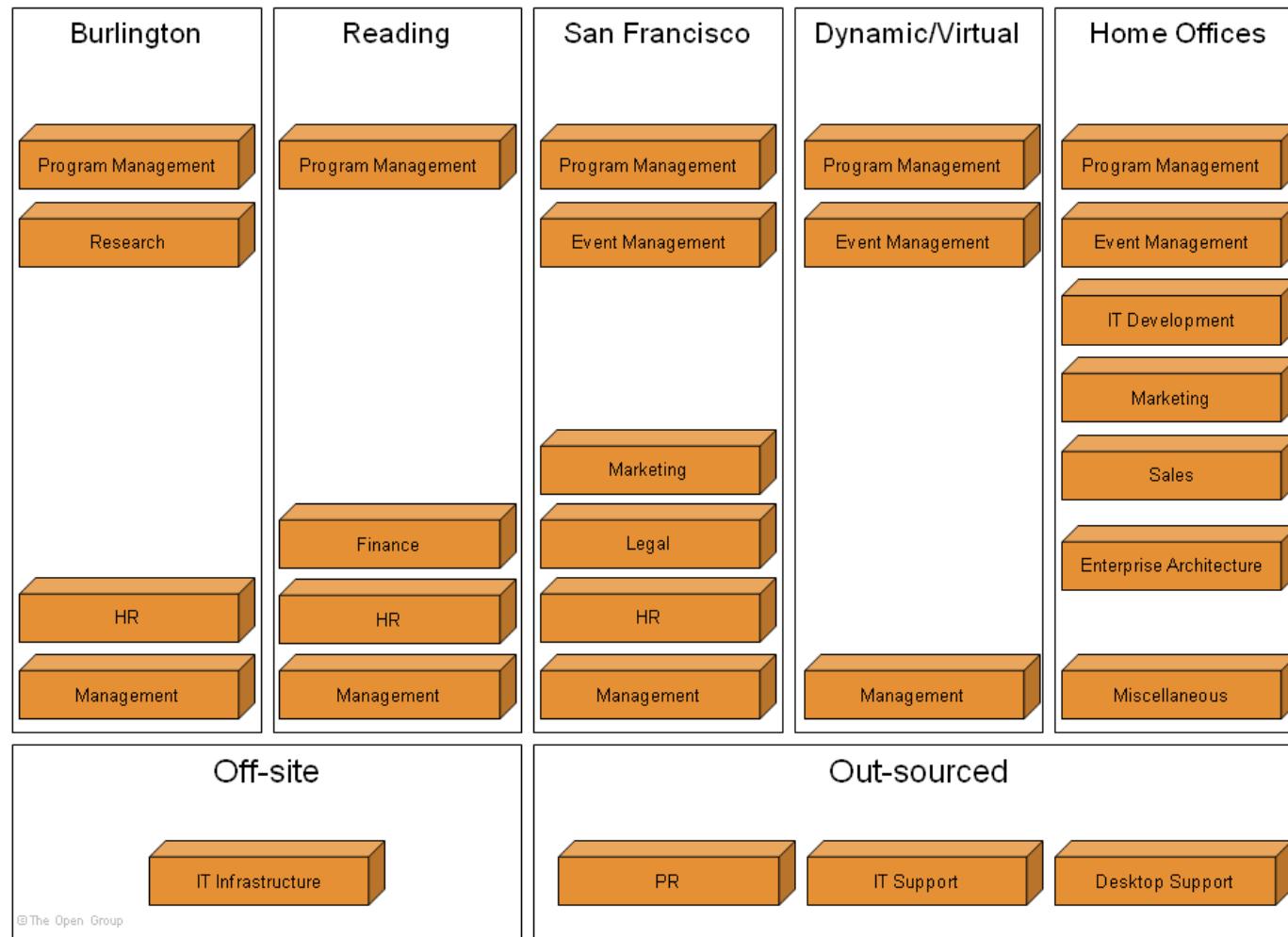


Figure 1: Example View - The Open Group Business Domains

Developing Architecture Views in the ADM

The choice of which particular architecture views to develop is one of the key decisions that the architect has to make.

The architect has a responsibility for ensuring:

- the completeness of the architecture
 - does it address all the concerns of its stakeholders?
- the integrity of the architecture
 - can the architecture views be connected to each other?
 - can the conflicting concerns be reconciled?
 - what trade-offs have been made (e.g. between security and performance)?



Exercise: Views and Viewpoints for a Simple Airport System

The pilot has one view of the system, the air traffic controller has another. Neither view represents the whole system - the perspective of each stakeholder constrains how they see the overall system.

Questions:

1. Name some elements in the pilot's view not viewed by the controller
1. Name some elements in the controller's view not viewed by the pilot
1. Name some shared elements
1. Describe 2 viewpoints for this system
1. Why is using viewpoints helpful?



The Architecture View Creation Process

1. Refer to any existing libraries of architecture viewpoints
2. Select key stakeholders
3. Analyse their concerns and document them
4. Select appropriate architecture viewpoints (based on the stakeholders and their concerns)
5. Generate architecture views of the system using the selected architecture viewpoints as templates

Benefits

- Less work for the architects (the viewpoints have already been defined and so the views can be created faster)
- Better comprehensibility for stakeholders (the viewpoints are already familiar)
- Greater confidence in the validity of the views (their viewpoints have a known track record)

The Architecture View Creation Process

If no libraries of architecture viewpoints exist then:

1. Select key stakeholders
2. Analyse their concerns and document them
3. Develop new architecture viewpoints (based on the stakeholders and their concerns)
4. Generate views of the system using the new architecture viewpoints as templates

Alternatively create an *ad hoc* architecture view and then consider whether a generalised form of the implicit viewpoint should be defined explicitly and saved.



Using TOGAF Artifacts

- The TOGAF standard includes an example set of recommended artifacts that can be adopted, enhanced and combined to produce architecture views
- Three classes of artifacts are defined:
 - Catalogs
 - Matrices
 - Diagrams



Catalogs

- Catalogs are lists of building blocks of a specific type, or of related types
- For example
 - Principles Catalog created in the Preliminary Phase
 - Organisation/Actor Catalog created in Phase B
 - Driver/Goal/Objective Catalog

Matrices

- Matrices show the relationships between building blocks of specific types
- Matrices are used to represent list-based rather than graphical-based relationships
- For example
 - The Stakeholder Map Matrix created in Phase A

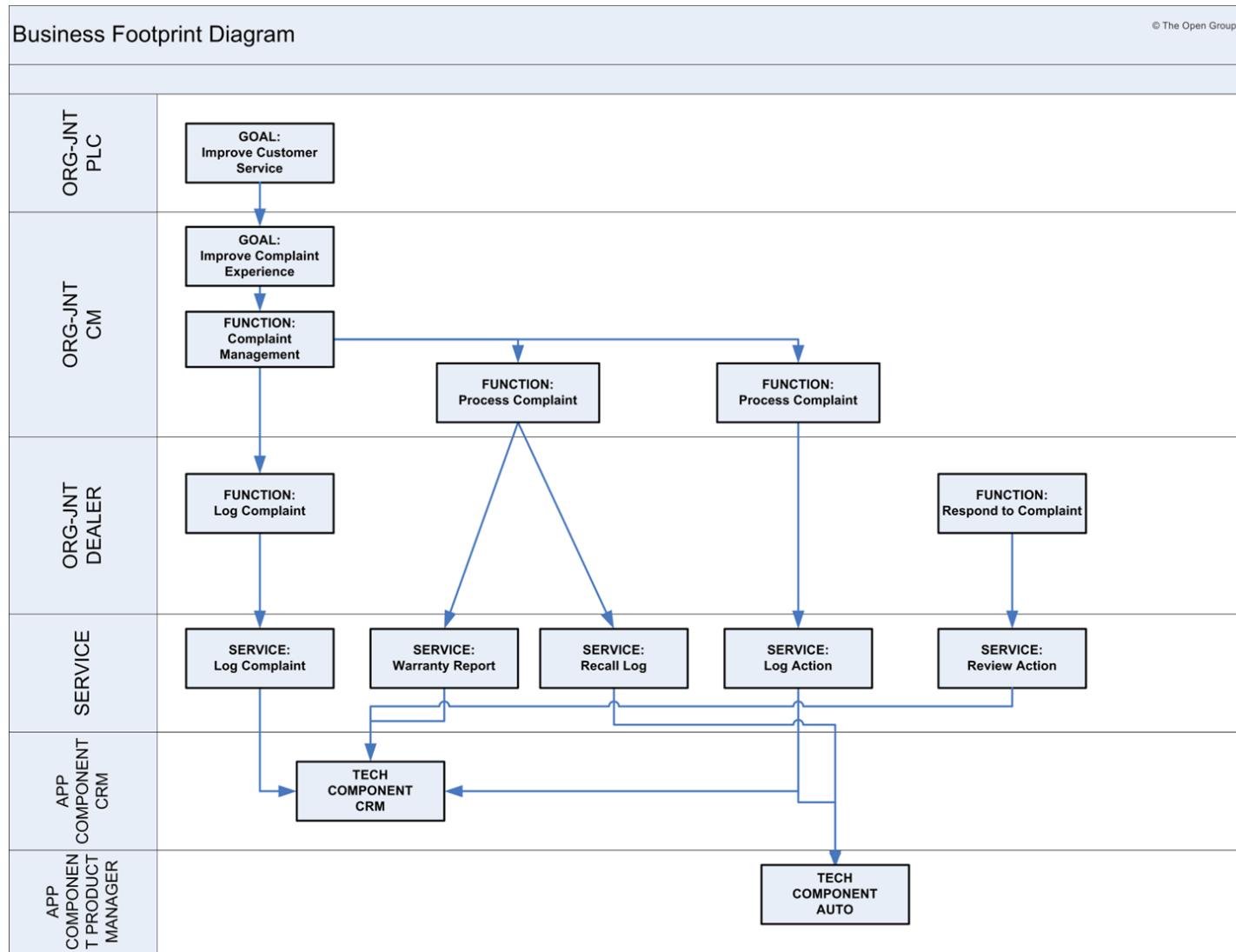
Stakeholder Map Matrix

| STAKEHOLDER | KEY CONCERNS | CLASS | Catalogs, Matrices and Diagrams |
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Diagrams

- Diagrams representing building blocks in a rich and visual way, especially suited to stakeholder communication.
- For example
 - Value Chain diagram created in Phase A
 - Business footprint diagram created in Phase B

Example Business Footprint Diagram



Summary

In general, TOGAF embraces the concepts and definitions of ISO/IEC/IEEE 42010: 2011, specifically those that guide the development of an architecture view and make the view actionable, such as:

- Selecting key stakeholders
- Analysing their concerns and documenting them
- Understanding how to model and deal with those concerns

The language used to depict the architecture view is the architecture viewpoint. Viewpoints provide architecture concepts from different perspectives, including components, interfaces, and allocation of services critical to the view.

When applying the TOGAF framework a number of tailoring steps should occur:

- The architecture viewpoints provided should be customized to create a set of architecture views that ensure all stakeholder concerns are met
- New architecture viewpoints and architecture views should be created to address specific needs



Test Yourself Question

Views and viewpoints are used by an architect to capture or model the design of a system architecture. Which of the following statements is true?

1. A view is the perspective of an individual stakeholder
2. Different stakeholders always share the same views
3. Some views do not have associated viewpoints
4. A viewpoint is the perspective of an individual stakeholder
5. Views and viewpoints are rarely used in TOGAF



Exercises

Select a scenario (i.e. a business problem) from your own organisation.

- Identify two stakeholders (i.e. human actors) and their place in the business model.
- State the views and viewpoints for each stakeholder.

For a Vehicle Licensing Bureau, which has the following stakeholders:
licensing authority, individual car driver, tax authority, car
insurance firms, vehicle roadworthiness authority, law
enforcement

- Identify two stakeholders (i.e. human actors) and their place in the business model.
- State the views and viewpoints for each stakeholder.



Module 13: Building Blocks



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Roadmap

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| Architecture Repository |
| Tools for Architecture Development |
| Part VI – Architecture Capability Framework |
| Architecture Board |
| Architecture Compliance |
| Architecture Contracts |
| Architecture Governance |
| Architecture Maturity Models |
| Architecture Skills Framework |

- **Part IV, Architecture Content Framework, Chapter 33**





Module Objectives

- To understand the concepts of Building Blocks within TOGAF
 - Architecture Building Blocks
 - Solution Building Blocks
- To understand their role within application of the ADM
- A comparison with Architecture Patterns



Building Block Characteristics

- A package of functionality defined to meet the business needs across an organisation
- A building block has published interfaces to access functionality
- A building block may interoperate with other, inter-dependent building blocks

A Good Building Block

- Considers implementation and usage and evolves to exploit technology and standards
- May be assembled from or a subassembly of other building blocks
- Is reusable and replaceable



Building Blocks

- The way in which functionality, products and custom developments are assembled into building blocks varies widely
- Every organisation must decide for itself the arrangement
- A good choice can lead to improvements in system integration, interoperability and flexibility
- Systems are built from collections of building blocks
- They can be defined at many levels of detail
 - Groupings at the functional such as a customer database are known as Architecture Building Blocks
 - Real products or specific custom developments are known as Solutions Building Blocks



Architecture Building Blocks (ABBs)

- Architecture documentation and models from the enterprise's Architecture Continuum.
- They are defined or selected during application of the ADM
 - Mainly in Phases A, B, C and D
- The characteristics are as follows
 - They define what functionality will be implemented
 - They capture business and technical requirements
 - They are technology-aware
 - They direct and guide the development of Solution Building Blocks



ABB Specifications

- Fundamental functionality and attributes: semantics, unambiguous, including security capability and manageability
- Interfaces: chosen set, supplied (APIs, data formats, protocols, hardware interfaces, standards)
- Dependent building blocks with required functionality and named interfaces
- Map to business/organisations entities and policies

Solution Building Blocks (SBBs)

- Solutions Building Blocks relate to the Solutions Continuum
- They can either be procured or developed
- The characteristics are as follows:
 - They define what products and components will implement the functionality
 - They define the implementation
 - They fulfil business requirements
 - They are product or vendor-aware

SBB Specifications

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



Building Blocks and the ADM

- An architecture is a set of building blocks
 - Depicted in an architectural model
 - A specification of how those building blocks are connected to meet the overall requirements of an information system
- The various building blocks in an architecture specify the services required in an enterprise specific system
- The following general principles should apply:
 - An architecture need only contain building blocks to implement those services it requires
 - Building blocks may implement one, more than one, or only part of a service identified in the architecture
 - Building blocks should conform to standards



Building Block Design

- The process of identifying building blocks includes looking for collections of functions which require integration
- Consider three classes of building blocks:
 1. Re-usable building blocks such as legacy items
 2. Building blocks to be developed (new applications)
 3. Building blocks to be purchased (COTS applications)
- Use the desired level of integration to decide how to bind functions into building blocks



Architecture Patterns

- Pattern: defined as “*an idea that has been useful in one practical context and will probably be useful in others*”
- In the TOGAF standard, patterns are considered to be a technique for putting building blocks into context; for example, to describe a re-usable solution to a problem.
- Building blocks are what you use: patterns can tell you how you use them, when, why, and what trade-offs you have to make in doing so.



Test Yourself Question

- Q. Which of the following statements describe generic building blocks?
- A. A building block is a package of functionality defined to meet the business needs.
 - B. A building block has published interfaces to access the functionality.
 - C. A building block may be assembled from other building blocks.
 - D. A building block may have multiple implementations.
 - E. All of these



Module 14: Architecture Implementation Support Techniques



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Roadmap

| |
|---|
| Part I - Introduction |
| Preface, Executive Overview, Core Concepts, Definitions |
| Part II – Architecture Development Method |
| Introduction to ADM |
| ADM Phase Narratives |
| Part III – ADM Guidelines & Techniques |
| Guidelines for Adapting the ADM Process |
| Techniques for Architecture Development |
| Part IV – Architecture Content Framework |
| Content Metamodel |
| Architectural Artifacts |
| Architecture Deliverables |
| Building Blocks |
| Part V – Enterprise Continuum & Tools |
| Enterprise Continuum |
| Architecture Partitioning |
| Architecture Repository |
| Tools for Architecture Development |
| Part VI – Architecture Capability Framework |
| Architecture Board |
| Architecture Compliance |
| Architecture Contracts |
| Architecture Governance |
| Architecture Maturity Models |
| Architecture Skills Framework |

- Part III, ADM Guidelines and Techniques
- Chapters 25, 26, 28 and 28





Module Objectives

The objectives are to:

- Obtain an understanding of the following techniques provided with the TOGAF standard to assist in Architecture Development
 - Managing Interoperability Requirements
 - Business Transformation
 - Risk Assessment
 - Capability Planning



Interoperability

- Interoperability is “*the ability to share information and services*”.
- The TOGAF standard provides techniques for
 - Defining interoperability
 - Refining interoperability
 - Determining interoperability requirements
- The determination of interoperability occurs throughout the ADM cycle



Interoperability and the ADM

The determination of interoperability occurs throughout the ADM:

- Architecture Vision: the nature and security considerations of information and service exchanges are found using business scenarios.
- Business Architecture: information and service exchanges are defined in business terms.
- Data Architecture: the content of information exchanges is detailed using the corporate data and/or information exchange model.
- Application Architecture: the way applications are to share information and services is specified.
- Technology Architecture: appropriate technical mechanisms to permit information and service exchanges are specified.
- Opportunities & Solutions: actual solutions are selected.
- Migration Planning: interoperability is implemented logically.



Phase B: Inter-stakeholder Information Interoperability Requirements (Using degrees of information interoperability)

| Stakeholders | A | B | C | D | E | F | G |
|--------------|---|---|---|---|---|---|---|
| A | | 2 | 3 | 2 | 3 | 3 | 3 |
| B | 2 | | 3 | 2 | 3 | 2 | 2 |
| C | 3 | 3 | | 2 | 2 | 2 | 3 |
| D | 2 | 2 | 2 | | 3 | 3 | 3 |
| E | 4 | 4 | 2 | 3 | | 3 | 3 |
| F | 4 | 4 | 2 | 3 | 3 | | 2 |
| G | 2 | 2 | 3 | 3 | 3 | 3 | |

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Phase C: Inter-system Interoperability Requirements

| | System A | System B | System C | System D | System E | System F | System G |
|----------|----------|----------|----------|----------|----------|----------|----------|
| System A | | 2A | 3D | 2B | 3A | 3A | 3B |
| System B | 2E | | 3F | 2C | 3A | 2B | 2C |
| System C | 3E | 3F | | 2B | 2A | 2A | 3B |
| System D | 2B | 2B | 2B | | 3A | 3A | 3B |
| System E | 4A | 4B | 2B | 3A | | 3B | 3B |
| System F | 4A | 4A | 2B | 3B | 3A | | 2D |
| System G | 2B | 2B | 3A | 3A | 3B | 3B | |

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Interoperability Requirements and Solutions

The architect must ensure that there are no interoperability conflicts, especially if re-using existing SBBs or using COTS which have their own business processes and information architectures.

Changes to the business processes will be the most difficult.

The workflow between the various systems must also be taken into account.

The enterprise architect must also ensure that any change to the business interoperability requirements is agreed by the business architects and sponsors in a revised Statement of Architecture Work.

To find interoperability constraints consider:

- the Architecture Vision
- the Target Architecture
- the Implementation Factor Assessment and Deduction matrix
- the Consolidated Gaps, Solutions, and Dependencies matrix



Business Transformation Readiness Assessment

- Enterprise architecture often involves considerable change.
- Understanding the readiness of an organisation to accept change, identifying the issues, and dealing with them in the Implementation and Migration Plans is key to successful architecture transformation in Phases E and F. An initial assessment is carried out in Phase A.
- This is a joint effort between corporate (especially human resources) staff, lines of business and IT planners.



The Business Transformation Readiness Assessment

Recommended activities when assessing readiness for business transformation are:

1. Determine the readiness factors
2. Present the readiness factors using maturity models
3. Assess the readiness factors, and determine the readiness factor ratings
4. Assess the risks for each readiness factor and identify mitigating actions
5. Work these actions into Phase E and F Implementation and Migration Plan



Readiness Factors

Typical factors that may affect the business transformation include:

- Vision - the ability to clearly define and communicate what is to be achieved.
- Desire, Willingness, and Resolve
- Need
- Business Case
- Funding
- Sponsorship and Leadership
- Governance
- Accountability
- Workable Approach and Execution Model
- IT Capacity to Execute
- Enterprise Capacity to Execute
- Enterprise Ability to Implement and Operate

Assess the Readiness Factors

| Business Transformation Readiness Assessment - Maturity Model | | | | | |
|--|---|--|--|--|--|
| Factor 2: Need for Enterprise Information Architecture | | Class | Organizational Context | | |
| | | BTEP Readiness Factor | YES | | |
| Definition | There is recognition by the organization that information is a strategic corporate asset requiring stewardship. There is also recognition that the data is not universally understandable, of requisite quality, and accessible. | | | | |
| Maturity Model Levels | | | | | |
| 0 Not defined | 1 <i>Ad Hoc</i> | 2 Repeatable | 3 Defined | 4 Managed | 5 Optimized |
| Information is not recognized as an asset. There is no clear stewardship of data. | Data Management (DM) concepts are intuitively understood and practiced on an <i>ad hoc</i> basis. Stewardship of the data is informal. Data is recognized by certain internal experts and senior management as being of strategic importance to the organization. Focus is primarily on technically managing redundant data at the applications level. | Many parts of the organization value information/data as a strategic asset. Internal DM experts maintain clear lines of responsibility and stewardship of the data, organized along lines of business and at all senior levels. Staff put into practice DM principles and standards in their daily activities. | Data is recognized as a strategic asset in most parts of the organization, and throughout most levels from operations to senior management. Resources are committed to ensuring strong stewardship of data at the lower management and information expert levels. | Data is recognized as a strategic asset in all parts of the organization, and throughout most levels from operations to senior management. Resources are committed to ensuring strong stewardship of data at the senior management and information expert levels. | Data is treated in all levels throughout the organization as a strategic asset to be exploited and re-used. Data products and services are strongly integrated with the management practice of the organization. All staff are empowered and equipped to take stewardship of information, and are seen as “knowledge workers”. |
| | | | | Recommended Target State | |

Readiness Factor Rating

| Business Factor Assessment Summary | | | | |
|------------------------------------|---------------------------------------|---------|------------------|-----------------------------|
| Ser | Readiness Factor | Urgency | Readiness Status | Degree of Difficulty to Fix |
| 1 | Vision | | | |
| 2 | Desire/willingness/resolve | | | |
| 3 | Need | | | |
| 4 | Business case | | | |
| 5 | Funding | | | |
| 6 | Sponsorship and leadership | | | |
| 7 | Governance | | | |
| 8 | Accountability | | | |
| 9 | Workable approach and execution model | | | |
| 10 | IT capacity to execute | | | |
| 11 | Departmental capacity to execute | | | |
| 12 | Ability to implement and operate | | | |

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Readiness Factor Risks & Actions

- Assess each factor using Risk Management techniques
- Identify a series of improvement actions
- Incorporate into the Implementation and Migration Plan

Risk Management

- A technique used to mitigate risk when implementing an architecture project
- It is important to identify, classify, and mitigate these risks before starting so that they can be tracked throughout the transformation effort

Risk Management in the ADM

There are two levels of risk that should be considered:

1. **Initial Level of Risk:** Risk categorisation prior to determining and implementing mitigating actions.
2. **Residual Level of Risk:** Risk categorisation after implementation of mitigating actions

The process for risk management is:

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

Risk Management in the ADM

Risks are identified in Phase A as part of the initial Business Transformation Readiness Assessment

The risk identification and mitigation assessment worksheets are maintained as governance artifacts and are kept up-to-date in Phase G (Implementation Governance) where risk monitoring is conducted.

Implementation governance can identify critical risks that are not being mitigated and might require another full or partial ADM cycle.

Initial Risk Assessment

The initial risk assessment is done by classifying risks with respect to effect and frequency.

Effect can be assessed as:

- **Catastrophic:** critical financial loss that could result in bankruptcy.
- **Critical:** serious financial loss in more than one line of business leading to a loss in productivity and no ROI
- **Marginal:** minor financial loss in a line of business and a reduced ROI on the IT investment.
- **Negligible:** minimal impact on services and/or products.



Initial Risk Assessment

Frequency can be assessed as:

- **Frequent:** Likely to occur very often and/or continuously.
- **Likely:** Occurs several times over the course of a transformation cycle.
- **Occasional:** Occurs sporadically.
- **Seldom:** Remotely possible and would probably occur not more than once in the course of a transformation cycle.
- **Unlikely:** Will probably not occur during the course of a transformation cycle.



Initial Risk Assessment

The assessments of effect and frequency can then be combined:

- **Extremely High Risk (E):** The transformation will most likely fail with severe consequences.
- **High Risk (H):** Significant failure of parts of the transformation resulting in certain goals not being achieved.
- **Moderate Risk (M):** Noticeable failure of parts of the transformation, threatening the success of some goals.
- **Low Risk (L):** Some goals will not be wholly successful.



Risk Classification Scheme

Corporate Risk Impact Assessment

| Effect | Frequency | | | | |
|--------------|-----------|--------|------------|--------|----------|
| | Frequent | Likely | Occasional | Seldom | Unlikely |
| Catastrophic | E | E | H | H | M |
| Critical | E | H | H | M | L |
| Marginal | H | M | M | L | L |
| Negligible | M | L | L | L | L |

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Risk Identification and Mitigation Worksheet

| Risk ID | Risk | Preliminary Risk | | | Mitigation | Residual Risk | | |
|---------|------|------------------|-----------|--------|------------|---------------|-----------|--------|
| | | Effect | Frequency | Impact | | Effect | Frequency | Impact |
| | | | | | | | | |
| | | | | | | | | |

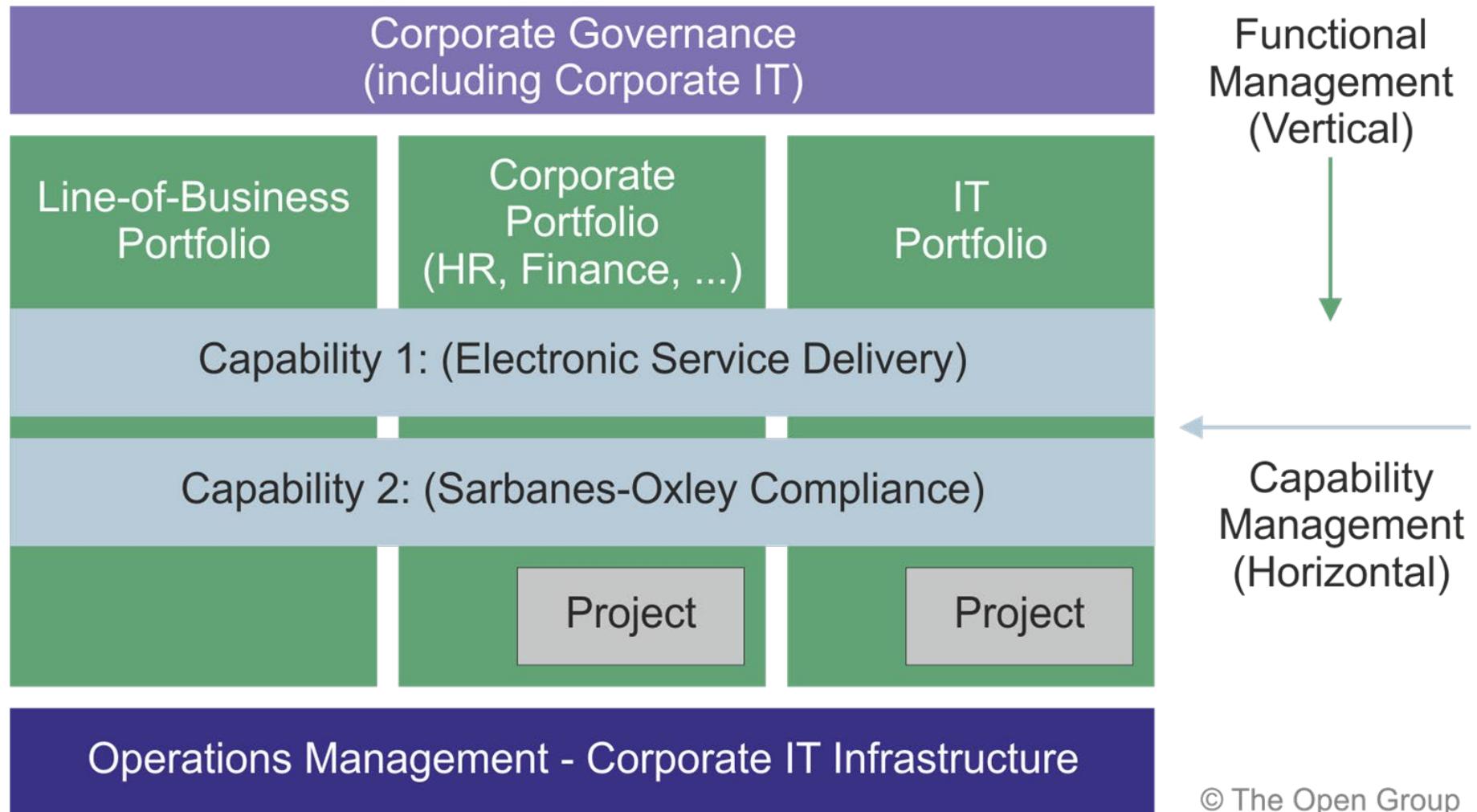
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Capability Based Planning

Capability-based planning is a technique that focuses on the planning, engineering and delivery of strategic business capabilities.

It frames all phases of the architecture development in the context of business outcomes, clearly linking the IT vision, architectures (ABBs and SBBs), and the Implementation and Migration Plans with the corporate strategic, business, and line of business plans.

Capabilities



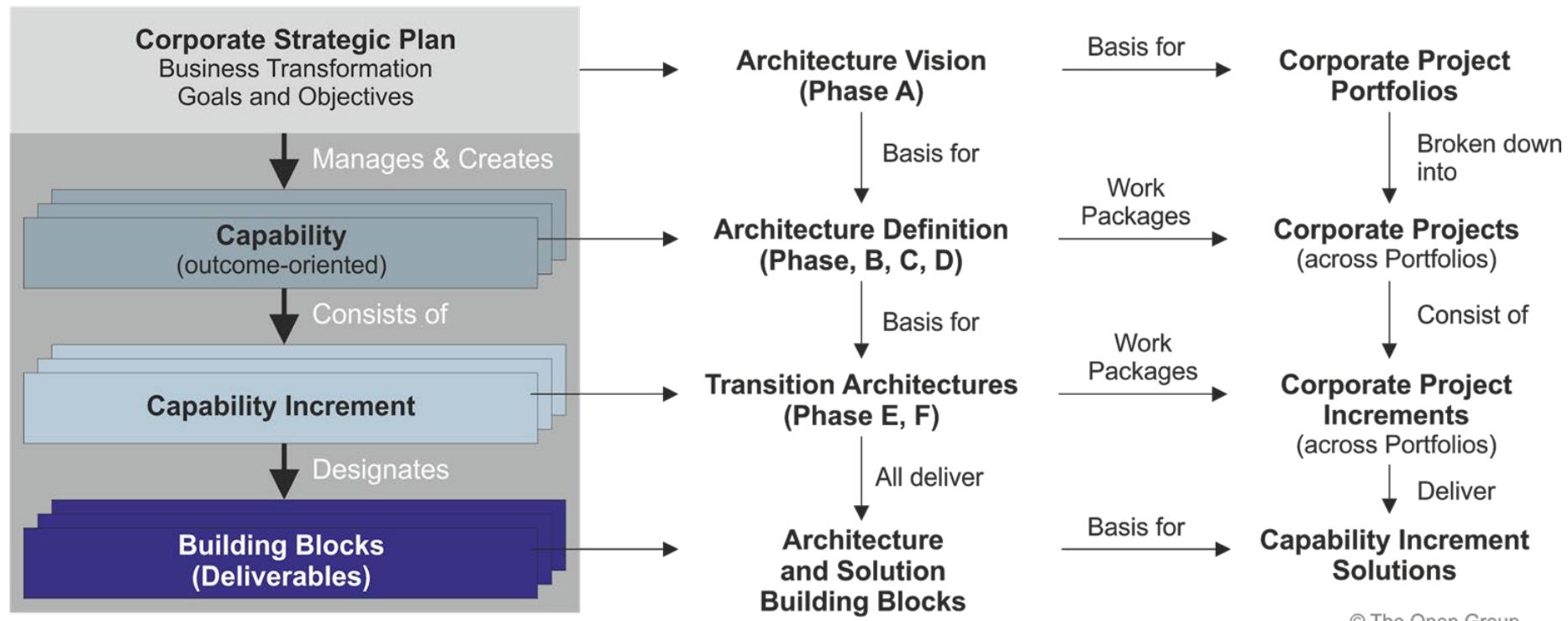
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Capability Based Planning

Capabilities are directly derived from the corporate strategic plan. They must satisfy the enterprise goals, objectives, and strategies. Most organisations will also have an annual business plan.

- All of the architectures will be expressed in terms of business outcomes and value.
- Phase A: the corporate strategic direction must drive this
- Phases B, C, and D: specific capabilities must be targeted for completion.
- Phase E: the capability increments must drive this.

Capability Based Planning



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Summary

This module has explained how to apply different techniques to help with the implementation of the architectures defined in the ADM phases, including:

- Interoperability requirements
- The factors that influence business transformation readiness
- How to perform an initial risk assessment
- How capability based planning can be applied

Exercise

- Draw a capability increment radar diagram to communicate the current capability of an enterprise which has reached capability increment 2 and has obtained the following scores for 5 capability dimensions:

| | |
|--------------------------|-----|
| Professional Development | 70% |
| Business processes | 80% |
| Research & development | 60% |
| Information management | 70% |
| Equipment | 60% |



Module 15

Phase A: Architecture

Vision



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Module Objectives

The objectives of this module are to understand Phase A:

- Objectives
- Approach
- Steps
- Inputs
- Outputs

Architecture Vision Objectives

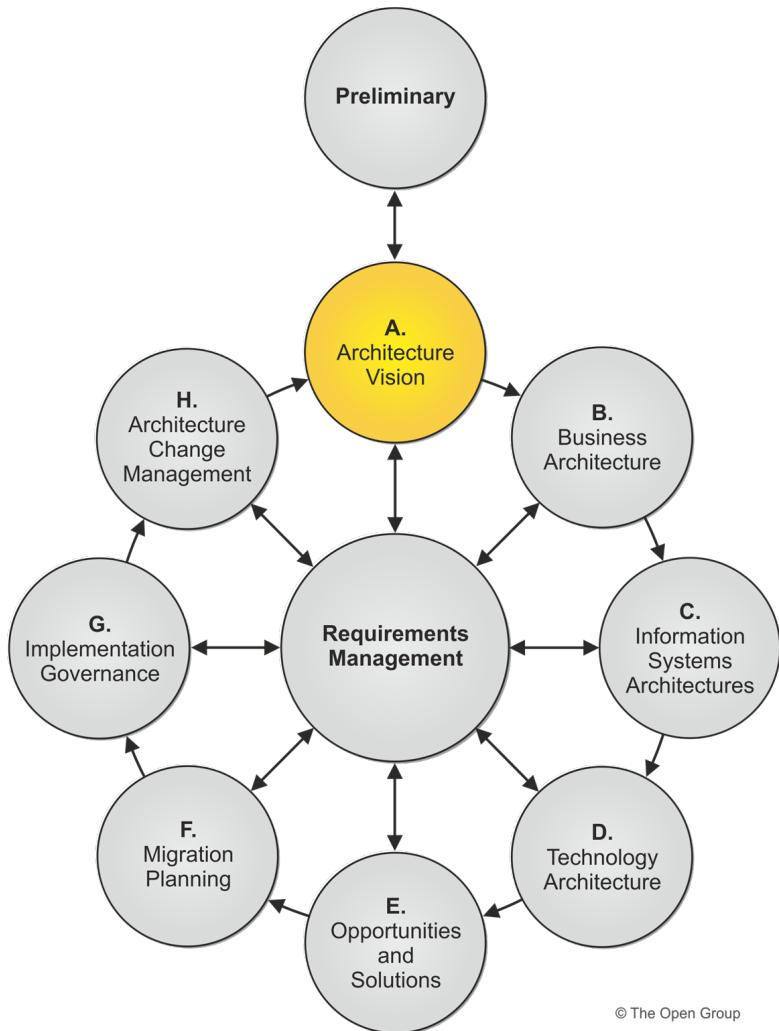
- Develop a high-level aspirational vision of the capabilities and business value to be delivered as a result of the proposed Enterprise Architecture
- Obtain approval for a Statement of Architecture Work that defines a program of works to develop and deploy the architecture outlined in the Architecture Vision



Approach

- Phase A defines what is in and what is outside of the architecture effort, and the constraints
- Constraints are informed by principles, business goals and strategic drivers
- Creates the Architecture Vision document
 - Clarifying and agreeing the purpose of the architecture
 - Demonstrating how it will be achieved
 - A first-cut high-level description of the Baseline and Target architectures
 - Integral to the Architecture Vision is an understanding of emerging technologies and potential impact
 - Business models and the business scenarios technique can be used to develop the Architecture Vision

Phase A: Inputs



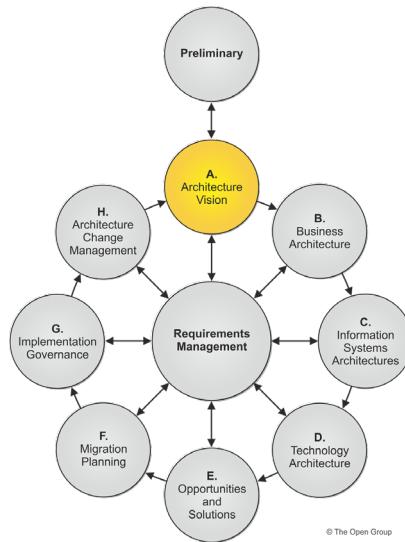
- Request for Architecture Work (*see next slide*)
- Business principles, business goals and drivers
- organisation Model for Enterprise Architecture
- Tailored Architecture Framework, including Architecture Principles
- Populated Architecture Repository



Request for Architecture Work

- Organisation Sponsors
- Organisation's mission statement
- Business goals and changes
- Strategic plans of the business
- Time limits
- Changes in the business environment
- Organisational constraints
- Budget information, financial constraints
- External constraints, business constraints
- Current business system description
- Current architecture/IT system description
- Description of developing organisation
- Description of resources developing organisation has available

Steps



- 1. Establish the architecture project**
- 2. Identify stakeholders, concerns, and business requirements**
- 3. Confirm business goals, drivers, and constraints**
- 4. Evaluate 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**



Step 1: Establish the Architecture Project

Conduct the necessary procedures to secure:

- Recognition of the project
- Endorsement of corporate management
- Support and commitment of line management

Refer to other management frameworks:

- Explain how this project relates to those frameworks



Step 2: Identify Stakeholders, Concerns, and Business Requirements

- Here we must identify:
 - Candidate vision components and requirements
 - Candidate scope boundaries for the engagement
 - Stakeholder concerns, issues, and cultural factors
 - The concerns and viewpoints that are relevant to this project
 - The stakeholders that are involved with the project
 - The key roles and responsibilities within the project

Another key task will be to consider which architecture views and viewpoints need to be developed to satisfy the various stakeholder requirements.

Stakeholder Map

| Stakeholder | Key Concerns | Class | Catalogs, Matrices and Diagrams |
|---------------------------|---|----------------|--|
| CxO | The high-level drivers, goals and objectives of the organisation, and how these are translated into an effective process and IT architecture to advance the business | Keep Satisfied | Business Footprint diagram Goal/Objective/Service diagram organisation Decomposition diagram |
| Program Management Office | Prioritizing, funding, and aligning change activity. An understanding of project content and technical dependencies adds a further dimension of richness to portfolio management and decision making. | Keep Satisfied | Project Context diagram Business Footprint diagram Application Communication diagram Functional Decomposition diagram |
| HR | The roles and Actors that support the functions, applications, and technology of the organisation. HR are important stakeholders in ensuring that the correct roles and actors are represented. | Keep Informed | organisation Decomposition diagram organisation/Actor catalog Location catalog |

Step 3: Confirm Business Goals, Drivers, and Constraints

Identify the business goals and strategic drivers of the organisation.

- If these have been defined elsewhere ensure that the definitions are current, and clarify any areas of ambiguity.
- Otherwise, define the goals and secure their endorsement by management.

Define any constraints that must be dealt with.



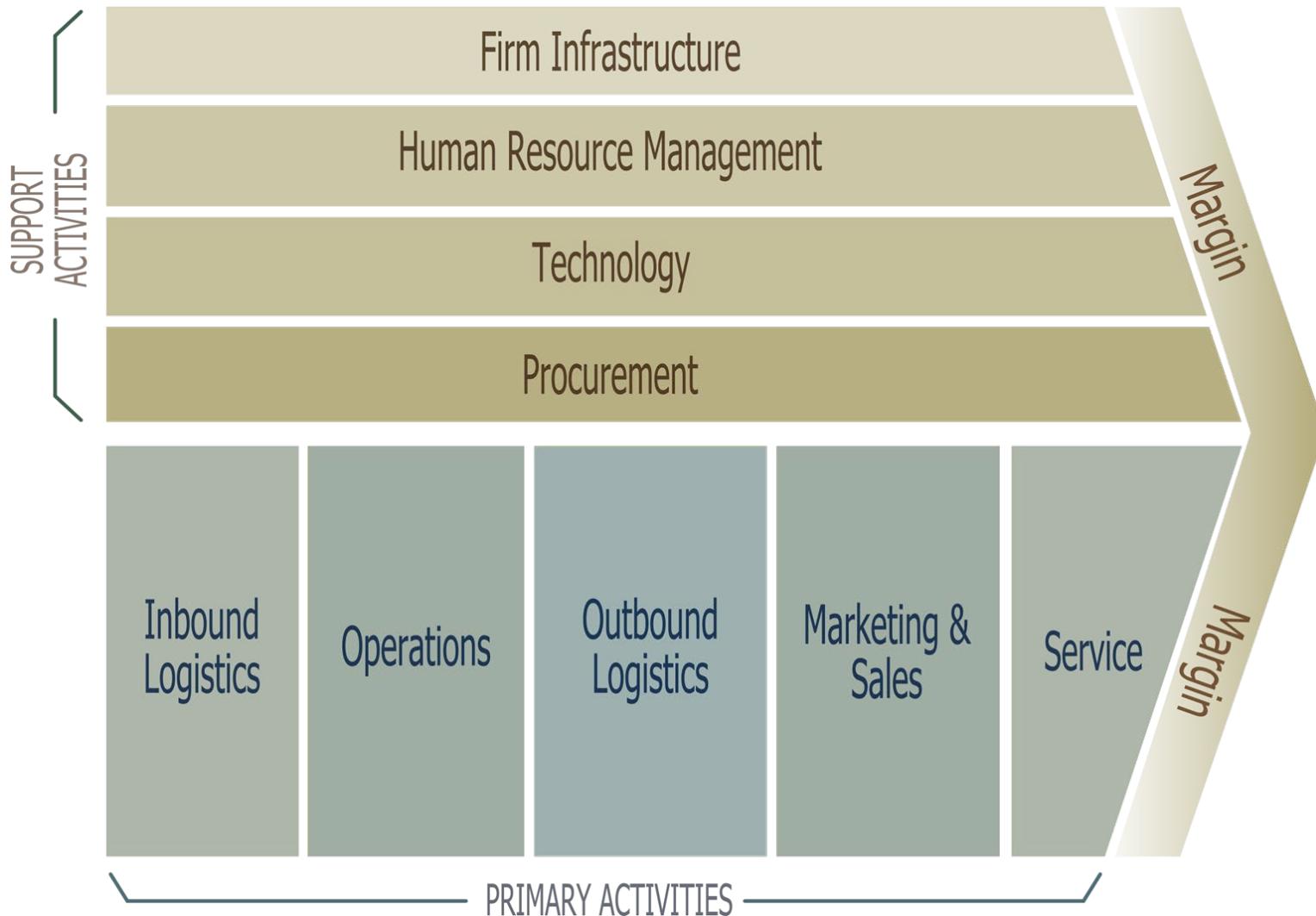
Step 4: Evaluate Capabilities

In this step we:

- Seek to understand the capabilities and desires of the business
- Identify options to realize those capabilities
- Assess the implications for the organisation's architecture capability
- Create an initial picture of the new capability that will be required
- Document the results in a Capability Assessment



Value Chain Diagram



Step 5: Assess Readiness for Business Transformation

This assessment is based upon the determination and rating of a series of readiness factors

These results are then used to:

- shape the scope of the architecture,
- identify activities required within the architecture project, and to
- identify risk areas to be addressed



Step 6: Define the Scope

Define:

- Breadth of coverage
- Level of detail
- The partitioning characteristics of the architecture
- Domains to be covered
- Schedule project milestones
- Identify Enterprise Continuum assets for use:
 - Created from previous ADM cycles
 - Existing reference frameworks, models, and so on...



Step 7: Confirm and Elaborate Architecture Principles, including Business Principles

- Ensure that any existing definitions are current, and clarify any areas of ambiguity.
- If principles do not exist, go to the body responsible for architecture governance and together define the principles.
- Secure their endorsement by management.

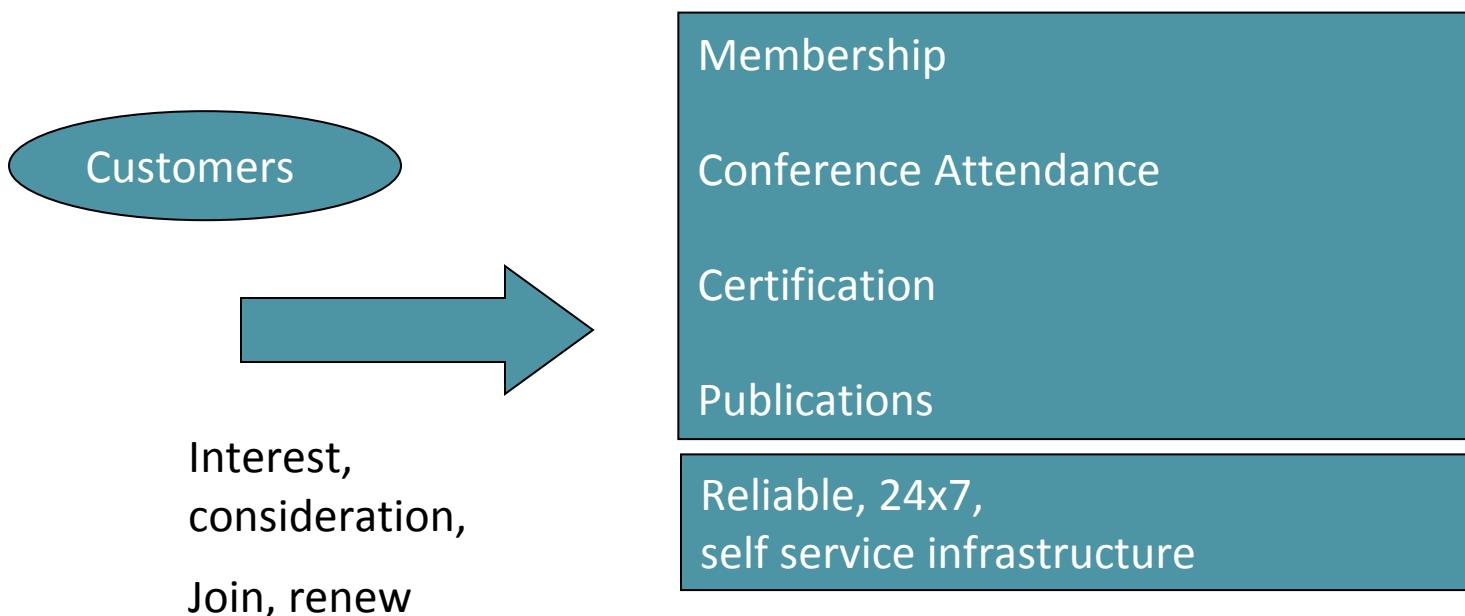
Step 8: Develop Architecture Vision

Create a high-level view of the Baseline and Target Architectures.

- Informal techniques are often used e.g. a simple solution concept diagram can illustrate the main components of the solution and its advantages.
- Business scenarios are useful here for discovering and documenting business requirements.
- The result is the first, very high-level definition of the baseline and target environments, from a business, IS and technology perspective.
- This should be stored in the Architecture Repository.

Solution Concept Diagram

- A high-level representation of the solution envisaged
- A *pencil sketch* of the expected solution at the outset of the engagement





Step 9: Define the Target Architecture Value Propositions and KPIs

- Develop the business case for the architectures and changes required
- Produce the value proposition for each of the stakeholder groupings
- Assess and define the procurement requirements
- Review and agree the value propositions with the sponsors and stakeholders
- Define the performance metrics
- Assess the business risk
- Incorporate the outputs in the Statement of Architecture Work



Step 10: Identify the Business Transformation Risks and Mitigation Activities

- Identify the risks associated with the Architecture Vision, assess the initial level of risk and its potential frequency. There are two levels of risk to consider:
 - Initial Level of Risk: Risk categorisation prior to determining and implementing mitigating actions
 - Residual Level of Risk: Risk categorisation after implementation of mitigating actions (if any)
- Assign a mitigation strategy for each risk. These should be considered for inclusion within the Statement of Architecture Work



Step 11: Develop Statement of Architecture Work; Secure Approval

Assess the work products that are required to be produced against the set of business performance requirements.

Activities will include:

- Identify new work products that need to be changed
- Provide direction on which existing work products, including building blocks, need to be changed. Ensure that all dependencies are coordinated
- Identify the impact of change on other work products
- Choose which architecture domains to develop, depending on purpose, focus, scope, constraints



Step 11: Develop Statement of Architecture Work; Secure Approval

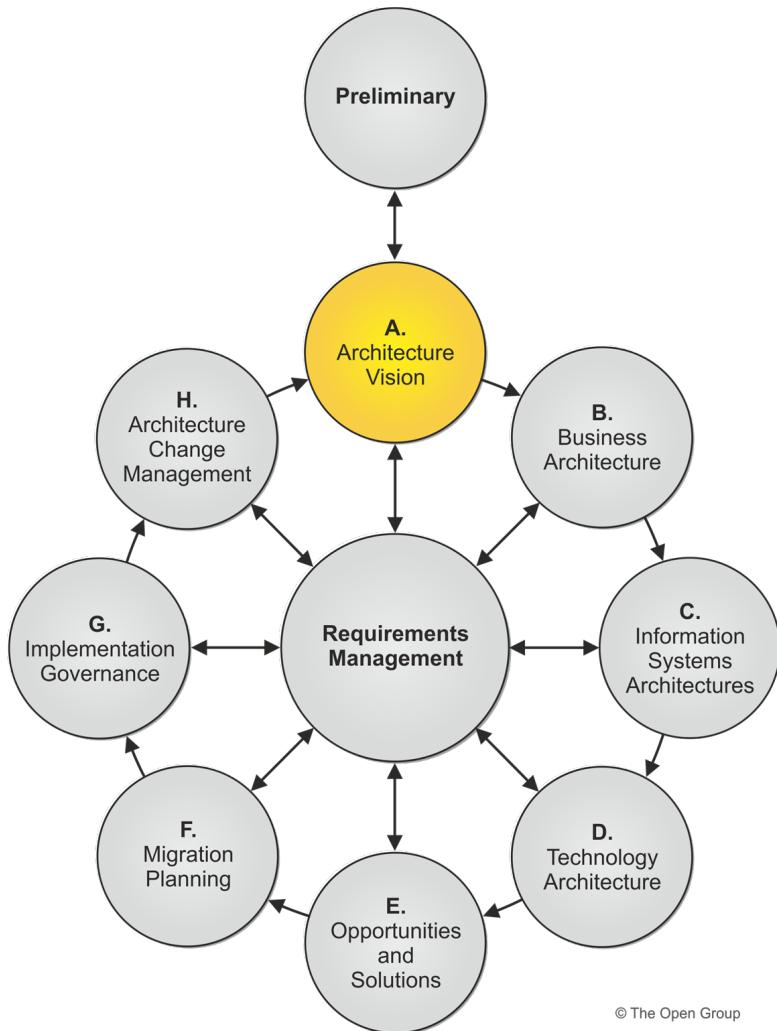
- Assess the resource requirements
- Estimate the resources needed, develop a roadmap and schedule for the proposed development and document in the Statement of Architecture Work
- Define the performance metrics
- Develop the specific Enterprise Architecture Communications Plan
- Review and agree the plans with the sponsors, and secure formal approval of the Statement of Architecture Work under the appropriate governance procedures
- Gain sponsor's sign-off



Statement of Architecture Work

- Title
- Architecture project request and background
- Architecture project description and scope
- Overview of Architecture vision
- Change of scope procedures
- Roles, responsibilities and deliverables
- Acceptance criteria and procedures
- Architecture project plan and schedule
- Approvals

Phase A: Outputs



- Approved Statement of Architecture Work including:
 - Project description and scope
 - Overview of Architecture Vision
 - Project plan and Schedule
- Refined statements of business principles, goals, and drivers
- Architecture Principles including business principles
- Capability Assessment
- Tailored Architecture Framework
- Architecture Vision
- Draft Architecture Definition Document
- Communications Plan
- Additional content populating the Architecture Repository

Summary



| Phase A: Architecture Vision | | | |
|--|--|--|---|
| Objectives | Steps | Inputs | Outputs |
| <p>Develop a high-level aspirational vision of the capabilities and business value to be delivered as a result of the proposed Enterprise Architecture</p> <p>Obtain approval for a Statement of Architecture</p> <p>Work that defines a program of works to develop and deploy the architecture outlined in the Architecture Vision</p> | <p>Establish the architecture project</p> <p>Identify stakeholders, concerns, and business requirements</p> <p>Confirm and elaborate business goals, business drivers, and constraints</p> <p>Evaluate business capabilities</p> <p>Assess readiness for business transformation</p> <p>Define scope</p> <p>Confirm and elaborate Architecture Principles, including business principles</p> <p>Develop Architecture Vision</p> <p>Define the Target Architecture value propositions and KPIs</p> <p>Identify business transformation risks and mitigation activities</p> <p>Develop Statement of Architecture Work; secure approval</p> | <p>Request for Architecture Work</p> <p>Business principles, business goals, and business drivers</p> <p>organisational Model for Enterprise Architecture</p> <p>Tailored Architecture Framework, including tailored architecture method, architecture content, Architecture Principles, configured and deployed tools</p> <p>Populated Architecture Repository; that is, existing architecture documentation (framework description, architecture descriptions, existing baseline descriptions, etc.)</p> | <p>Approved Statement of Architecture Work</p> <p>Refined statements of business principles, business goals, and business drivers</p> <p>Architecture Principles</p> <p>Capability Assessment</p> <p>Tailored Architecture Framework</p> <p>Architecture Vision, including:</p> <ul style="list-style-type: none">• Refined key high-level stakeholder requirements <p>Draft Architecture Definition Document, including (when in scope):</p> <ul style="list-style-type: none">• Baseline Business Architecture (high-level)• Baseline Data Architecture (high-level)• Baseline Application Architecture (high-level)• Baseline Technology Architecture (high-level)• Target Business Architecture (high-level)• Target Data Architecture (high-level)• Target Application Architecture (high-level)• Target Technology Architecture (high-level) <p>Communications Plan</p> <p>Additional content populating the Architecture Repository</p> |



Summary

- Phase A is about project establishment
- It initiates an iteration of the architecture process
- It sets the scope, constraints and expectations for this iteration
- It validates the business context
- It creates the Statement of Architecture Work

Exercise

Complete the following sentence: Phase A Architecture Vision is intended to do all the following except:

- A. Validate the business principles and goals of the organisation
- B. Ensure that the architecture principles are correct
- C. Establish IT Governance
- D. Clarify and correct ambiguities in the architecture principles
- E. Define the specific architecture domains to be addressed



Module 16A

Phase B:

Business Architecture –

Catalogs, Matrices

and Diagrams



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Module Objectives

The objectives of this module are to understand:

- The Catalogs, Matrices and Diagrams of Phase B, Business Architecture
- What they consist of
- How they can be used

TOGAF Standard, Version 9.2 Artifacts

| Preliminary | Business Architecture | Data Architecture | Application Architecture | Technology Architecture |
|--|--|--|---|---|
| Catalogs Principles Catalog | Catalogs Organization/Actor Catalog Role Catalog Business Service/Function Catalog Location Catalog Process/Event/Control/ Product Catalog | Catalogs Value Stream Catalog Business Capabilities Catalog Value Stream Stages Catalog Driver/Goal/Objective Catalog Contract/Measure Catalog | Catalogs Data Entity/Data Component Catalog | Catalogs Technology Standards Catalog Technology Portfolio Catalog |
| Architecture Vision Matrices Stakeholder Map Matrix | Matrices Business Interaction Matrix Actor/Role Matrix Value Stream/Capability Matrix | Matrices Strategy/Capability Matrix Capability/Organization Matrix | Matrices Data Entity/Business Function Matrix Application/Data Matrix | Matrices Application/Organization Matrix Role/Application Matrix Application/Function Matrix Application Interaction Matrix |
| Core Diagrams Value Chain Diagram Solution Concept Diagram | Core Diagrams Business Footprint Diagram Business Service/ Information Diagram Functional Decomposition Diagram Product Lifecycle Diagram Business Model Diagram Business Capability Map Value Stream Map Organization Map | Extension Diagrams Goal/Objective/Service Diagram Business Use-Case Diagram Organization Decomposition Diagram Process Flow Diagram Event Diagram | Core Diagrams Conceptual Data Diagram Logical Data Diagram Data Dissemination Diagram | Core Diagrams Application Communication Diagram Application and User Location Diagram Application Use-Case Diagram |
| Requirements Management Catalogs Requirements Catalog | Core Diagrams Project Context Diagram Business Model Diagram Business Capability Map Value Stream Map Organization Map | Extension Diagrams Data Security Diagram Data Migration Diagram Data Lifecycle Diagram | Extension Diagrams Enterprise Manageability Diagram Process/Application Realization Diagram Software Engineering Diagram Application Migration Diagram Software Distribution Diagram | Extension Diagrams Processing Diagram Networked Computing/ Hardware Diagram Network and Communications Diagram |
| Opportunities and Solutions Core Diagrams Project Context Diagram Benefits Diagram | | | | © The Open Group |
| <p>The legend identifies the following extensions:</p> <ul style="list-style-type: none"> Infrastructure Consolidation Extension (Red) Governance Extension (Green) Motivation Extension (Orange) Process Modeling Extension (Dark Blue) Data Modeling Extension (Light Blue) Services Extension (Dark Green) Core Content (Grey) | | | | |



Catalogs, Matrices and Diagrams

Catalogs

- Business Capabilities catalog
- Value Stream catalog
- Value Stream Stages catalog
- organisation/Actor catalog
- Driver/Goal/Objective catalog
- Role catalog
- Business Service/Function catalog
- Location catalog
- Process/Event/Control/Product catalog
- Contract/Measure catalog

Matrices

- Value Stream/Capability matrix
- Strategy/Capability matrix
- Capability/organisation matrix
- Business Interaction matrix
- Actor/Role matrix

Diagrams

- Business Model diagram (*)
- Business Capability map
- Value Stream map
- organisation map
- Business Footprint diagram
- Business Service/Information diagram
- Functional Decomposition diagram
- Product Lifecycle diagram
- Goal/Objective/Service diagram
- Use-Case diagram
- organisation Decomposition diagram
- Process Flow diagram
- Event diagram



Module 16

Phase B:

Business Architecture



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Module Objectives

The objectives of this module are to understand Phase B:

- Objectives
- Approach
- Steps
- Inputs
- Outputs

Business Architecture Objectives

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



Approach

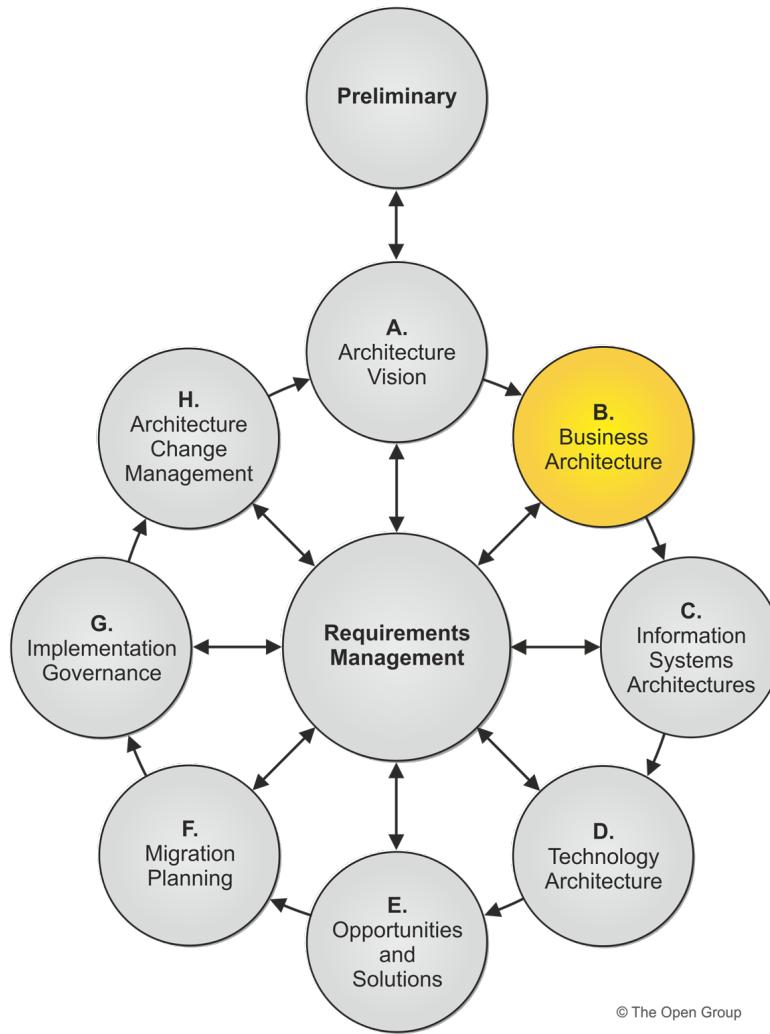
- Knowledge of the Business Architecture is a prerequisite for architecture work in the other domains (Data, Applications, Technology)
 - and so is the first activity that needs to be undertaken.
- Business Strategy defines *what* to achieve
- Business Architecture describes *how* to achieve it
- This Phase is often required to demonstrate business value of subsequent work to key stakeholders.



Approach

- Scope depends on existing strategy and planning
 - Update and verify
 - bridge between high-level business drivers, strategy, and
 - goals on the one hand, and specific business requirements
 - Existing architecture discovery must include all relevant detail
- If there is no existing strategy or planning:
 - Identify any existing architecture definitions, then verify and update
 - New process definitions may require detailed work
- In both cases, use business scenarios to identify key business objectives and processes

Phase B: Inputs



- Request for Architecture Work
- Business principles, business goals and business drivers
- Capability Assessment
- Communications Plan
- organisation Model for Enterprise Architecture
- Tailored Architecture Framework
- Approved Statement of Architecture Work
- Architecture Principles
- Enterprise Continuum
- Architecture Repository
- Architecture Vision
- Draft Architecture Definition Document

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 candidate roadmap components
6. Resolve impacts across the Architecture Landscape
7. Conduct formal stakeholder review
8. finalise the Business Architecture
9. Create Architecture Definition Document



Step 1: Select Reference Models, Viewpoints, and Tools

- Select relevant Business Architecture resources from the Architecture Repository, on the basis of the business drivers, stakeholders and concerns.
- Select relevant Business Architecture viewpoints that will enable the architect to demonstrate how the stakeholder concerns are being addressed.
- Identify appropriate tools and techniques to be used for capture, modeling, and analysis with the viewpoints.
- Determine Overall Modeling Process
 - Techniques include:
 - Capability Mapping
 - organisation Mapping
 - Value Stream Mapping
 - Structured Analysis
 - Use-Case Analysis
 - Process Modeling



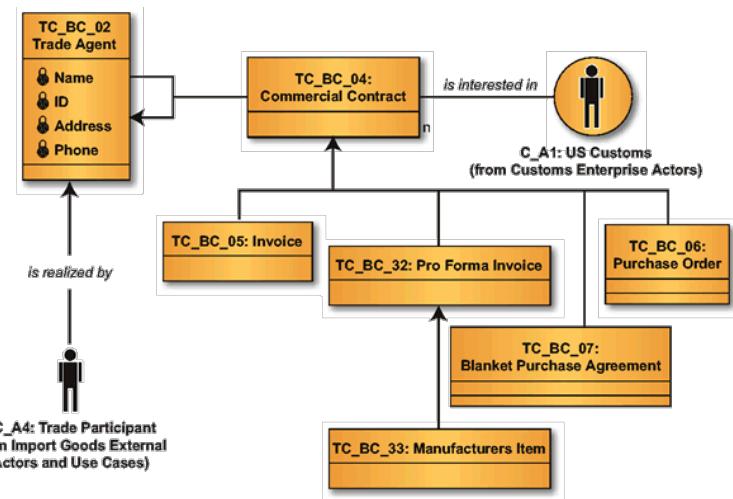
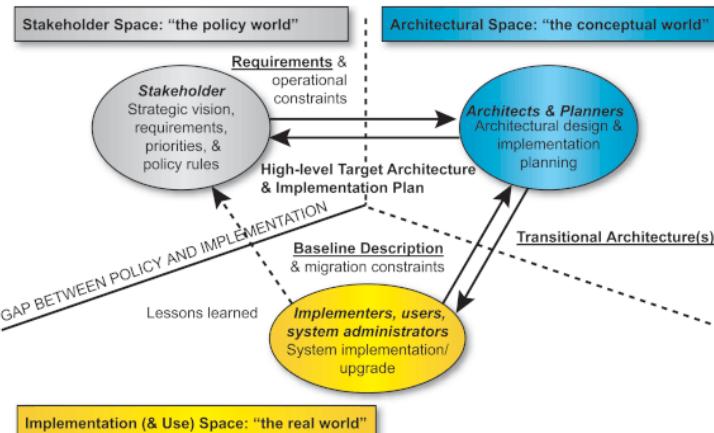
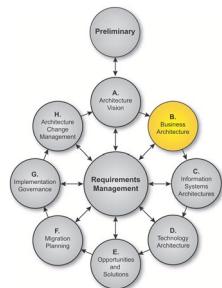
Step 1: Select Reference Models, Viewpoints, and Tools

- Identify Required Service Granularity Level, Boundaries, and Contracts
- Identify Required Catalogs. Matrices, and Diagrams
 - See next slide
- Identify Types of Requirement to be Collected
 - Identify requirements to be met by the Architecture
 - Formalize the business-focused requirements
 - Provide requirements input for Data, Application and Technology Architectures
 - If applicable, provide detailed guidance to be reflected during design and implementation

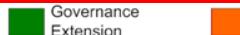
Additional Techniques

| | 1:Initiate | 2:Discuss Reqs. | 3:Create Config | 4:Verify Config | 5:Price | 6:Confirm | 7: Order | 8:Accept |
|-----------------------|-----------------------|------------------------------|---|--|---|--|--|--------------------|
| Sales Person | Greets customer. | Listens. | Represents options with different capabilities. | Accesses ICSys and SchSys and presents availability to customer. | Accesses price system and presents price to customer. | Presents offer. | Accesses order system. | Presents contract. |
| Customer | Accepts sales person. | Discusses problems/ desires. | Listens and decides on options based on capabilities. | Accepts or rejects. | | Accepts or rejects. | | Signs or rejects. |
| Sales Person's Laptop | | | Interacts with configurator. | Interacts with ICSys and SchSys. | Interacts with price system. | | Interacts with order system and receives fax response. | |
| Sales Person's CIPR | | | Provides central information processing. | | | | | |
| Sales Person's LIPR | | | Provides local information processing. | | | | | |
| ProdConfig | | | Presents configs to sales person per needs, providing capabilities. | | | | | |
| ICSys | | | | Provides availability. | | | | |
| SchSys | | | | Provides delivery date. | | | | |
| SSys | | | | | Provides price information on a config. | | | |
| OrderSys | | | | | | Processes order and sends fax of order to sales person's laptop. | | |

Table 32.1: Use-Case Table of Sales Process



TOGAF Standard, Version 9.2 Artifacts

| Preliminary | Business Architecture | Data Architecture | Application Architecture | Technology Architecture |
|---|--|---|---|---|
| Catalogs Principles Catalog | Catalogs Organization/Actor Catalog Value Stream Catalog Role Catalog Business Capabilities Catalog Business Service/Function Catalog Value Stream Stages Catalog Location Catalog Driver/Goal/Objective Catalog Process/Event/Control/ Product Catalog Contract/Measure Catalog | Catalogs Data Entity/Data Component Catalog | Catalogs Application Portfolio Catalog Interface Catalog | Catalogs Technology Standards Catalog Technology Portfolio Catalog |
| Architecture Vision Matrices Stakeholder Map Matrix | Matrices Business Interaction Matrix Strategy/Capability Matrix Actor/Role Matrix Capability/Organization Matrix Value Stream/Capability Matrix | Matrices Data Entity/Business Function Matrix Application/Data Matrix | Matrices Application/Organization Matrix Role/Application Matrix Application/Function Matrix Application Interaction Matrix | Matrices Application/Technology Matrix |
| Core Diagrams Value Chain Diagram Solution Concept Diagram | Core Diagrams Business Footprint Diagram Business Service/ Information Diagram Functional Decomposition Diagram Product Lifecycle Diagram Business Model Diagram Business Capability Map Value Stream Map Organization Map | Core Diagrams Conceptual Data Diagram Logical Data Diagram Data Dissemination Diagram | Core Diagrams Application Communication Diagram Application and User Location Diagram Application Use-Case Diagram | Core Diagrams Environments and Locations Diagram Platform Decomposition Diagram |
| Requirements Management Catalogs Requirements Catalog | Extension Diagrams Goal/Objective/Service Diagram Business Use-Case Diagram Organization Decomposition Diagram Process Flow Diagram Event Diagram | Extension Diagrams Data Security Diagram Data Migration Diagram Data Lifecycle Diagram | Extension Diagrams Enterprise Manageability Diagram Process/Application Realization Diagram Software Engineering Diagram Application Migration Diagram Software Distribution Diagram | Extension Diagrams Processing Diagram Networked Computing/ Hardware Diagram Network and Communications Diagram |
| Opportunities and Solutions Core Diagrams Project Context Diagram Benefits Diagram | | | | © The Open Group |
| |  Infrastructure Consolidation Extension  Governance Extension  Motivation Extension  Process Modeling Extension |  Data Modeling Extension  Services Extension  Core Content | | |



Step 2: Develop Baseline Business Architecture Description

- Must be complete, but without unnecessary detail
- If possible, identify the relevant Business Architecture building blocks, drawing on the Architecture Repository
- If not, develop a new architecture description:
 - use the models identified within Step 1 as a guideline

Step 3: Develop Target Business Architecture Description

- If possible, identify the relevant Business Architecture building blocks, drawing on the Architecture Repository
- If not, develop a new architecture description:
 - use the models identified within Step 1 as a guideline

Step 4: 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
- Test architecture models for completeness against requirements
- Identify gaps between the baseline and target using Gap Analysis technique

Step 4: Perform Gap Analysis

Gap analysis highlights services and/or functions that have been omitted or are yet to be developed; these are the gaps. They should be marked as ‘correctly eliminated’ or as ‘to be addressed by reinstating, developing or procuring’.

1. Create a matrix of business ABBs:
 - Put ‘Current architecture’ + ‘New Services’ on the vertical axis
 - Put ‘Target Architecture’ + ‘Eliminated Services’ on the horizontal axis
2. Mark ABBs that are common to both as ‘Included’
3. Review blocks missing from current:
 - Confirm as ‘Eliminated’
 - Else mark for ‘Review’
4. Mark any ‘New Services’ as gap to be filled by acquiring function by either:
 - Development
 - Procurement



Step 5: Define Candidate Roadmap Components

- The initial Business Architecture roadmap will be used as raw material to support more detailed definition of a consolidated, cross-discipline roadmap within the Opportunities & Solutions phase.

Step 6: Resolve Impacts Across the Architecture Landscape

- Architecture artifacts in the Architecture Landscape should be examined to identify:
 - Does this Business Architecture create an impact on any pre-existing architectures?
 - Have recent changes been made that impact on the Business Architecture?
 - Are there any opportunities to leverage work from this Business Architecture in other areas of the organisation?
 - Does this Business Architecture impact other projects ?
 - Will this Business Architecture be impacted by other projects?

Step 7: Conduct Formal Stakeholder Review

- This is a formal review of the model and building blocks selected.
- The purpose is to compare proposed business architecture against the SOW.
- It is possible to loop back to earlier steps if necessary.

Step 8: Finalise the Business Architecture

- Select standards for each of the ABBs, reusing where possible from the Architecture Repository.
- Fully document each ABB.
- Cross check the overall architecture against the business goals.
- Document final requirements traceability report.
- Document final mapping of the architecture within the Architecture Repository. From the selected ABBs, identify those that might be reused and publish via the architecture repository.

Step 9: Create Architecture Definition Document

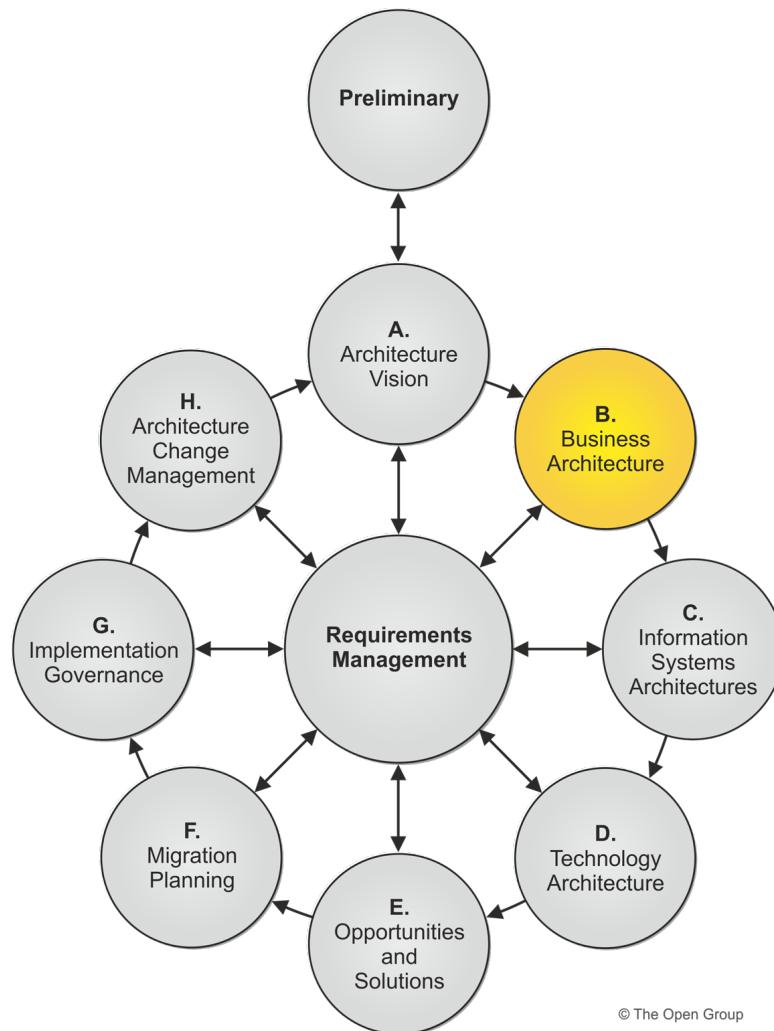
- Document the rationale for all building block decisions in the architecture definition document.
- Prepare the Business sections of the architecture definition document report.
- If appropriate, use reports and/or graphics generated by modeling tools to demonstrate key views of the architecture. Route the document for review by relevant stakeholders, and incorporate feedback.



Summary of Building Block usage in Phase B

- When creating the Baseline and Target Architecture descriptions, the architect should identify relevant Business Architecture building blocks
 - Drawing from the Architecture Repository
 - TOGAF includes example catalogs, matrices and diagrams that can be used to model the decomposition of a building block
- Gap Analysis is used to identify building blocks to carry over to the target; eliminated building blocks; and new, required building blocks
- When finalizing the Business Architecture, standards are selected for each building block
 - each building block is documented
 - those which look likely to be re-usable are published in the Architecture Repository

Phase B: Outputs



- Statement of Architecture Work
- Validated business principles, goals and drivers
- Refined and updated Business Architecture Principles
- Draft Architecture Definition Document
- Draft Architecture Requirements Specification
- Business Architecture components of an Architecture Roadmap



Architecture Definition Document

- Scope
- Goals, objectives, and constraints
- Architecture Principles
- Baseline Architecture
- Architecture models (for each state to be modeled):
 - Business Architecture models
 - Data Architecture models
 - Application Architecture models
 - Technology Architecture models
- Rationale and justification for architectural approach
- Mapping to Architecture Repository:
 - Mapping to Architecture Landscape
 - Mapping to reference models
 - Mapping to standards
 - Re-use assessment
- Gap analysis
- Impact assessment
- Transition Architecture

Architecture Definition Document – Business Architecture Components

- Baseline Business Architecture, if appropriate – this is a description of the existing Business Architecture
- Target Business Architecture, including:
 - organisation structure – identifying business locations and relating them to organisational units
 - Business goals and objectives – for the enterprise and each organisational unit
 - Business functions – a detailed, recursive step involving successive decomposition of major functional areas into sub-functions
 - Business services – the services that the enterprise and each enterprise unit provides to its customers, both internally and externally
 - Business processes, including measures and deliverables
 - Business roles, including development and modification of skills requirements
 - Business data model
 - Correlation of organisation and functions – relate business functions to organisational units in the form of a matrix report
- Views corresponding to the selected viewpoints addressing key stakeholder concerns



Architecture Requirements Specification

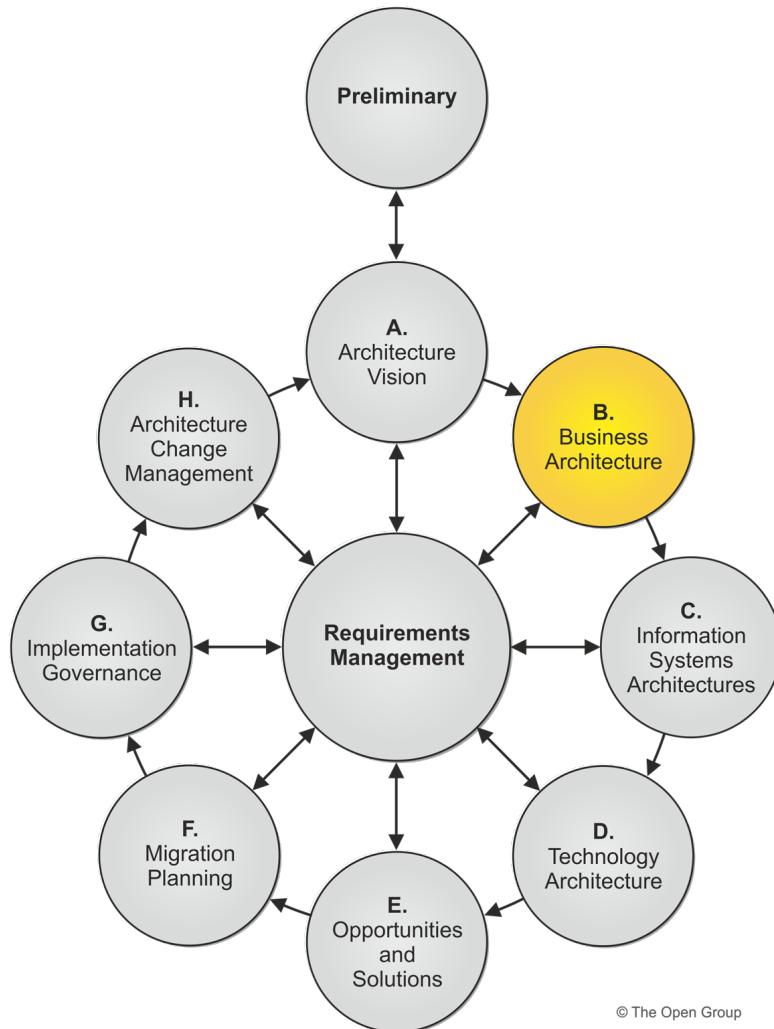
- Success measures
- Architecture requirements
- Business service contracts
- Application service contracts
- Implementation guidelines
- Implementation specifications
- Implementation standards
- Interoperability requirements
- IT service management requirements
- Constraints
- Assumptions



Architecture Requirements Specification – Business Architecture Components

- Gap analysis results
- Technical requirements
- Updated business requirements

Summary



- Phase B is about development of the Business Architecture:
 - a holistic representation of business capabilities, end-to-end value delivery, information, and organisational structure, along with the relationships to strategies, products, policies, initiatives, and stakeholders.
- It should show how the organisation meets its business goals.

Summary

| Phase B: Business Architecture | | | |
|--|---|---|--|
| Objectives | Steps | Inputs | Outputs |
| <p>Develop the Target Business Architecture that describes how the enterprise needs to operate to achieve the business goals, and respond to the strategic drivers set out in the Architecture Vision in a way that addresses the Statement of Architecture Work and stakeholder concerns</p> <p>Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Business Architectures</p> | <p>Select reference models, viewpoints, and tools</p> <p>Develop Baseline Business Architecture Description</p> <p>Develop Target Business Architecture Description</p> <p>Perform gap analysis</p> <p>Define candidate roadmap components</p> <p>Resolve impacts across the Architecture Landscape</p> <p>Conduct formal stakeholder review</p> <p>finalise the Business Architecture</p> <p>Create Architecture Definition Document</p> | <p>Request for Architecture Work</p> <p>Business principles, business goals, and business drivers</p> <p>Capability Assessment</p> <p>Communications Plan</p> <p>organisational Model for Enterprise Architecture</p> <p>Tailored Architecture Framework</p> <p>Approved Statement of Architecture Work</p> <p>Architecture Principles, including business principles, when pre-existing</p> <p>Enterprise Continuum</p> <p>Architecture Repository</p> <p>Architecture Vision, including:</p> <ul style="list-style-type: none"> • Refined key high-level stakeholder requirements <p>Draft Architecture Definition Document, including:</p> <ul style="list-style-type: none"> • Baseline Business Architecture (high-level) • Baseline Data Architecture (high-level) • Baseline Application Architecture (high-level) • Baseline Technology Architecture (high-level) • Target Business Architecture (high-level) • Target Data Architecture (high-level) • Target Application Architecture (high-level) • Target Technology Architecture (high-level) | <p>Statement of Architecture Work, updated if necessary</p> <p>Validated business principles, business goals, and business drivers</p> <p>Refined and updated Architecture Principles, if applicable</p> <p>Draft Architecture Definition Document containing content updates:</p> <ul style="list-style-type: none"> • Baseline Business Architecture (detailed), if appropriate • Target Business Architecture (detailed with Business Capabilities, Value Streams, and organisation Map as core artifacts) • Views corresponding to selected viewpoints addressing key stakeholder concerns <p>Draft Architecture Requirements Specification including content updates:</p> <ul style="list-style-type: none"> • Gap analysis results • Technical requirements • Updated business requirements <p>Business Architecture components of an Architecture Roadmap</p> |



Exercise

Q. Choose the correct ending for the following phrase:

**“Business Architecture is the first architecture activity undertaken because
...”**

- A. It is often necessary to demonstrate the business value of the overall architecture activity
- B. It provides knowledge that is a prerequisite for undertaking architecture work in the other domains (data, applications, technology)
- C. It can be used to demonstrate the return on investment to key stakeholders
- D. It embodies the fundamental organisation of a business and shows how an organisation meets its business goals
- E. All of the above

Identify five sources of information within your organisation that could be used to draw up a Baseline Business Architecture Description.



Module 17

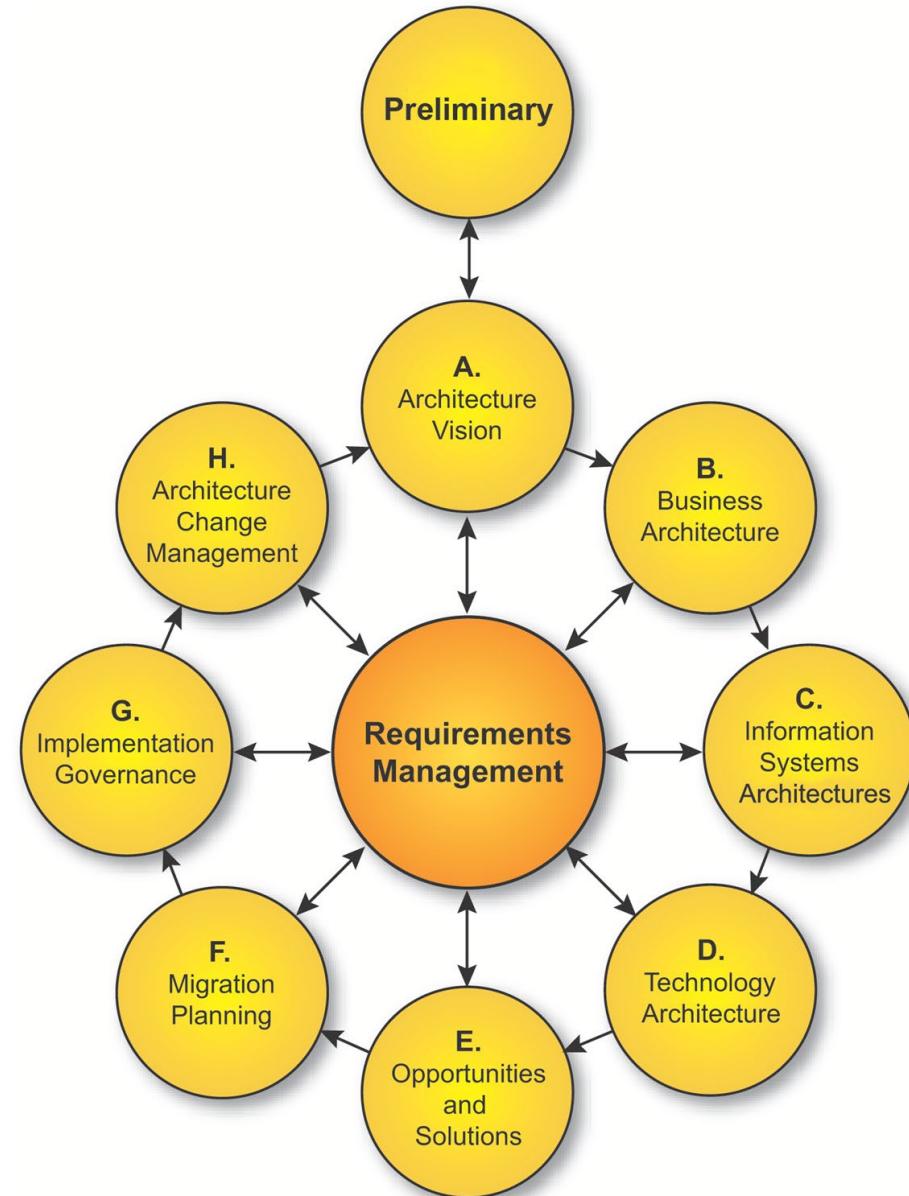
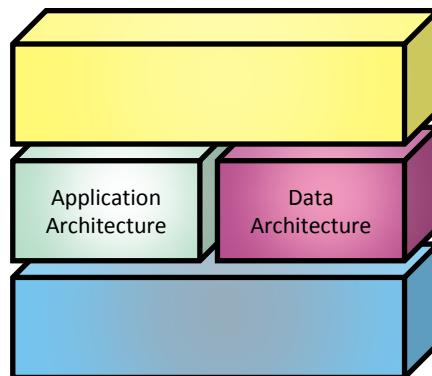
Phase C:

Information Systems Architectures – Overview



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Phase C: Information Systems Architectures – Overview



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Module Objectives

The aim of this module is to understand:

- The objectives of Phase C, Information Systems Architectures
- The Approach
- A brief overview of the inputs and outputs

This module is an introduction to the next two modules that look at the two Information Systems Architectures



Information Systems Architectures – Objectives

- Develop the Target Data/Application Architecture that enables the Business Architecture and the 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 Information Systems (Data and Application) Architectures

Approach

Phase C involves Data and Applications Architecture, in either order.

Advocates exist for both sequences:

- Spewak's *Enterprise Architecture Planning* recommends a data-driven sequence.
- Major applications systems (ERP, CRM, ...) often combine technology infrastructure and application logic.
An application-driven approach takes core applications (underpinning mission-critical business processes) as the primary focus of the architecture effort.
- Integration issues often constitute a major challenge.



Top-Down Design – Bottom-up Implementation

- **Design:**
 1. Business Architecture
 2. Data (or Applications) Architecture
 3. Applications (or Data) Architecture
 4. Technology Architecture
- **Implementation:**
 1. Technology Architecture
 2. Applications (or Data) Architecture
 3. Data (or Applications) Architecture
 4. Business Architecture



Alternative Approach: Data-Driven Sequence Implementation

1. First implement application systems that **create** data
2. Then applications that **process** the data
3. Finally, applications that **archive** data

Considerations for Data Architecture

- Data Management
- Data Migration
- Data Governance



Approach: Architecture Repository

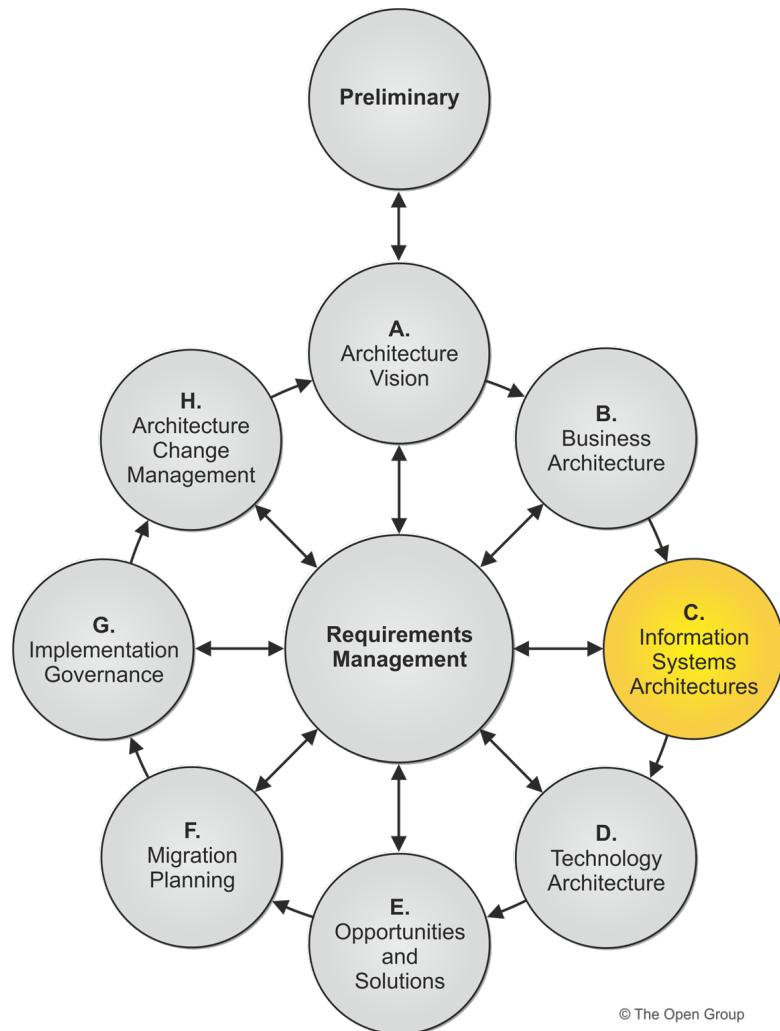
- Consider generic models relevant to an organisation's industry
 - Data Architecture Resources
 - Generic data models, for example the ARTS data models (Retail industry), Energistics Data Exchange Standards (Petrotechnical industry)
 - Application Architecture Resources
 - Generic application models, for example from the TM Forum (telecommunications industry), the OMG has a number of software models for specific verticals (Healthcare, Transportation, Finance etc)



Phase C: Inputs

- Request for Architecture Work
- Capability Assessment
- Communications Plan
- organisation model for enterprise architecture
- Tailored Architecture Framework
- Data/Application principles
- Statement of Architecture Work
- Architecture Vision
- Architecture Repository
- Draft Architecture Definition Document
- Draft Architecture Requirements Specification, including:
 - Gap analysis results
 - Relevant technical requirements
- Business Architecture components of an Architecture Roadmap

Summary



- The objective of Phase C is to document the fundamental organisation of an organisation's IT System
 - Embodied in the major types of information and the application systems that process hem
 - Their relationships to each other and the environment
 - The principles governing its design and evolution
 - It should document how the IT systems meets the business goals of the organisation



Test Yourself Question

- Q. Which of the following describes the order of steps in Phase C?
- A Data Architecture first
 - B Applications Architecture first
 - C Either Data Architecture or Applications Architectures first, as long as both are done
 - D Data Architecture and Applications Architecture must be carried out in parallel
 - E Either Data Architecture or Applications Architecture first, or both in parallel depending on the project scope and the best fit with the Business Architecture



Module 18

Phase C:

Data Architecture



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Module Objectives

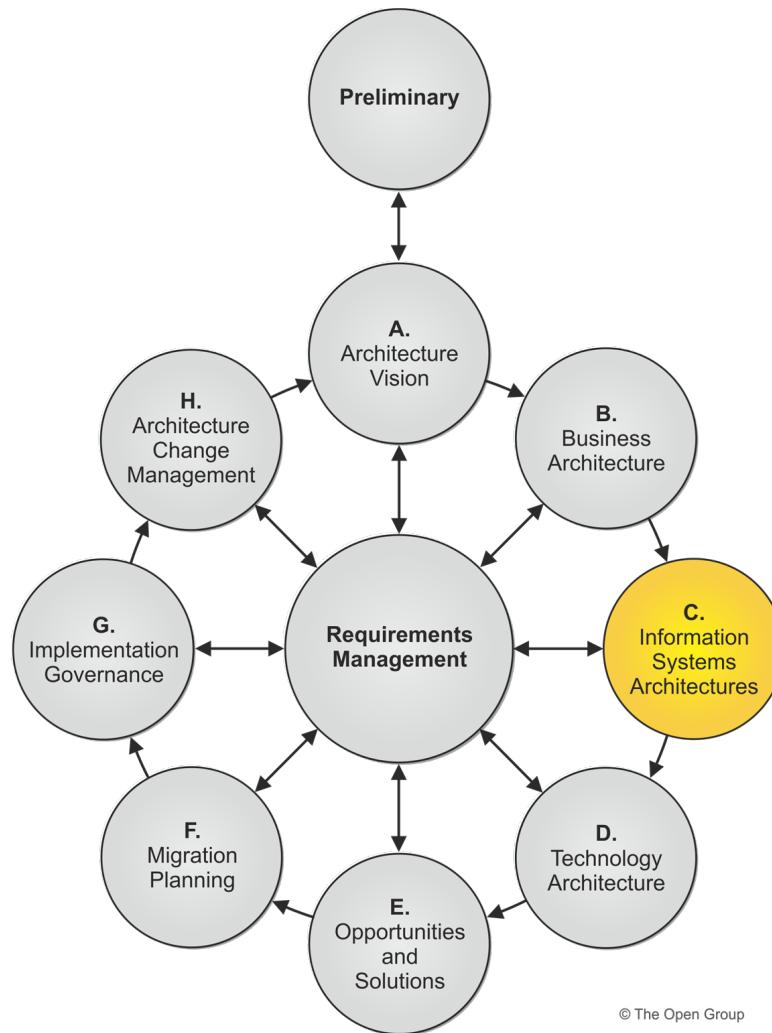
The aim of this module is to understand:

- The objectives of the Data Architecture part of Phase C
- What it consists of
- What inputs are needed for it
- What the outputs are

Data Architecture Objectives

- Develop the Target Data Architecture that enables the Business Architecture and the Architecture Vision, in a way that addresses the Statement of Architecture Work and stakeholder concerns
- Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Data Architectures

Phase C – Data: Inputs



- Request for Architecture Work
- Capability Assessment
- Communications Plan
- organisation model for enterprise architecture
- Tailored Architecture Framework
- Data principles
- Statement of Architecture Work
- Architecture Vision
- Architecture Repository
- Draft Architecture Definition Document
- Draft Architecture Requirements Specification, including:
 - Gap analysis results
 - Relevant technical requirements
- Business Architecture components of an Architecture Roadmap

Steps



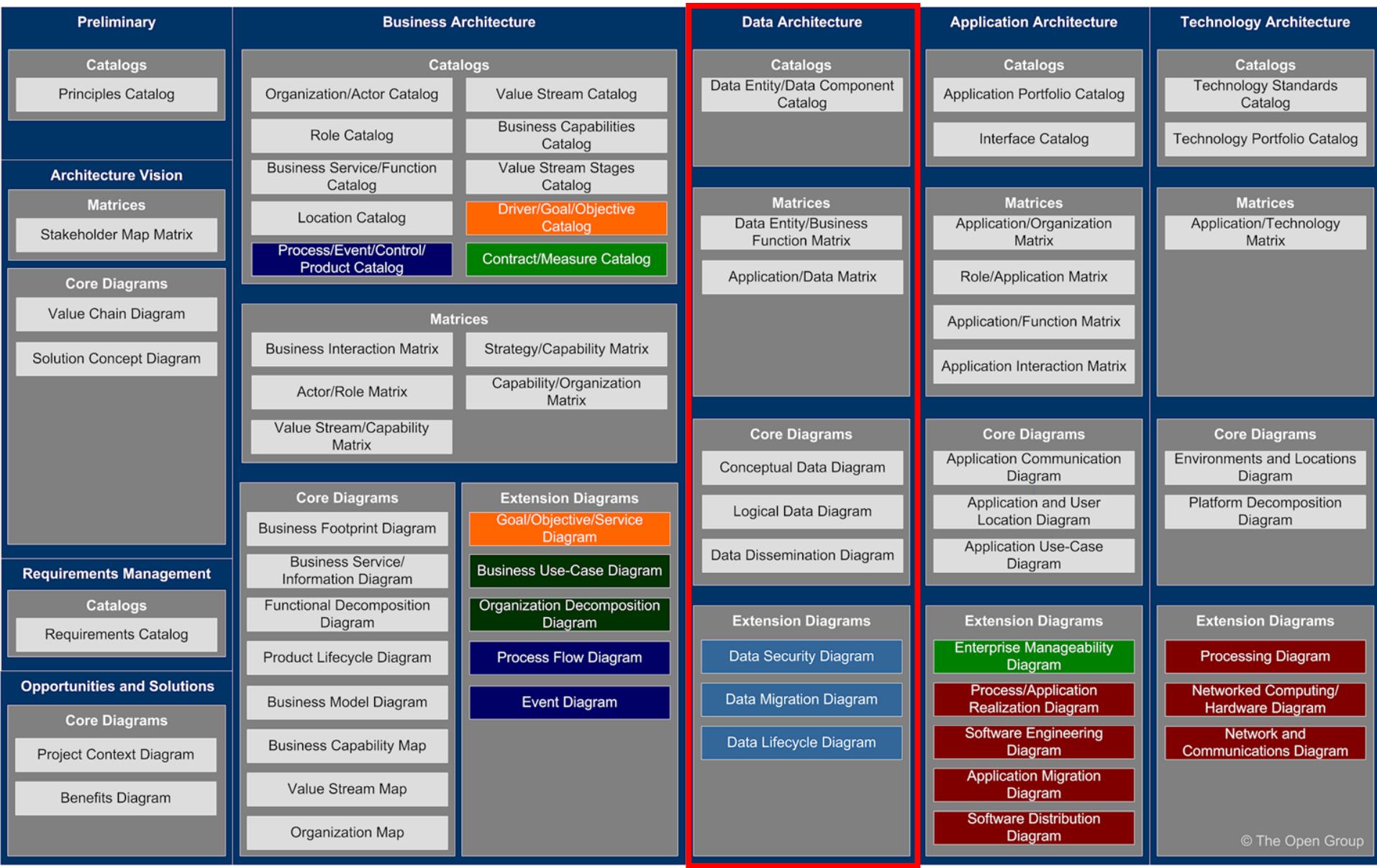
The order of the steps should be adapted to the situation.
In particular you should determine whether it is appropriate to do the Baseline Data Architecture or Target Data Architecture development first

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 candidate roadmap components
6. Resolve impacts across the Architecture Landscape
7. Conduct formal stakeholder review
8. finalise the Data Architecture
9. Create Architecture Definition Document

Step 1: Select Reference Models, Viewpoints, and Tools

- Review/generate and validate data principles – see Architecture Principles
- Select Data Architecture resources (reference models, patterns, ...)
- Select relevant Data Architecture viewpoints
- Identify appropriate tools and techniques (including forms) to be used for data capture, modeling, and analysis, in association with the selected viewpoints.
- Examples of data modeling techniques are:
 - Entity-relationship diagram
 - Class diagrams

TOGAF Standard, Version 9.2 Artifacts



Step 1: Select Reference Models, Viewpoints, and Tools

- Determine Overall Modelling Process
 - For each viewpoint, select the models needed to support the specific view required, using the selected tool or method. Examples of logical data models include:
 - the DODAF Logical Data Model
 - the ARTS Data Model for the Retail Industry and
 - the Energistics Data Models for the Petrotechnical industry
 - Confirm all stakeholders' concerns are addressed. If not, create new models to address concerns not covered, or augment existing models
- Identify Required Catalogs of Data Building Blocks
 - The organisation's data inventory is captured as a catalog within the Architecture Repository..

Step 1: Select Reference Models, Viewpoints, and Tools

- Identify Required Matrices
 - Matrices show the core relationships between related model entities.
- Identify Required Diagrams
 - Diagrams present the Data Architecture information from a set of different viewpoints
- Identify Types of Requirements to be Collected
 - Identify requirements to be met by the Architecture
 - Formalize the data-focused requirements
 - Provide requirements input for the Application and Technology architectures



Step 2: Develop a Baseline Data Architecture Description

If possible, identify the relevant Data ABs, drawing on the Architecture Repository.

- If not, develop new architecture models:
 - use the models identified within Step 1 as a guideline

Step 3: Develop Target Data Architecture Description

- If possible, identify the relevant Data Architecture building blocks, drawing on the Architecture Repository
- If not, develop a new architecture model:
 - use the models identified within Step 1 as a guideline



Step 4: Perform Gap Analysis

- Verify the architecture models for internal consistency and accuracy
- Note changes to the viewpoint represented in the selected models from the Architecture Repository, and document
- Test architecture models for completeness against requirements
- Identify gaps between the baseline and target using the standard Gap Analysis technique

Step 5: Define Candidate Roadmap Components

- This initial Data Architecture roadmap will be used as raw material to support more detailed definition of a consolidated, cross-discipline roadmap within the Opportunities & Solutions phase.

Step 6: Resolve Impacts across the Architecture Landscape

- 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 on 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 ?
 - Will this Data Architecture be impacted by other projects?

Step 7: Conduct Formal Stakeholder Review

Check the original motivation for the architecture project and the Statement of Architecture Work against the proposed Data Architecture. Conduct an impact analysis to:

- Identify any areas where the Business and Application Architecture may need to change to cater for changes in the Data Architecture. If the impact is significant revisit the Business Architecture.

Step 7: Conduct Formal Stakeholder Review

- Identify any areas where the Application Architecture may need to change to cater for changes in the Data Architecture (or to identify constraints on the Application Architecture about to be designed). If the impact is significant revisit the Application Architecture.
- Identify any constraints on the Technology Architecture.
- Refine the proposed Data Architecture if necessary.

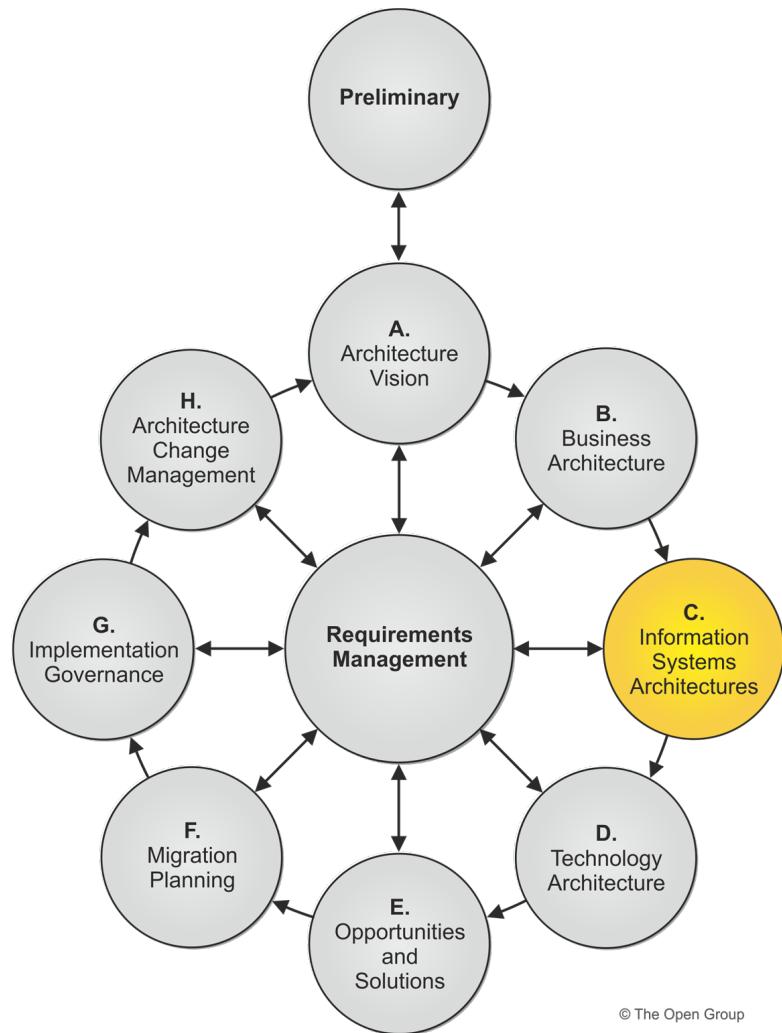
Step 8: Finalise the Data Architecture

- Select standards for each of the ABBs, reusing as much as possible.
- Fully document each ABB.
- Cross check the overall architecture against the business requirements.
- Document the final requirements traceability report.
- Document the final mapping of the architecture within the Architecture repository. Identify the ABBs that might be reused and publish them via the architecture repository.
- finalise all the work products

Step 9: Create Architecture Definition Document

- Document the rationale for all building block decisions in the architecture definition document.
- Prepare the Data Architecture sections of the architecture definition document report.
- If appropriate, use reports and/or graphics generated by modeling tools to demonstrate key views of the architecture. Route the document for review by relevant stakeholders, and incorporate feedback.

Phase C: Outputs: Data Architecture



- Statement of Architecture Work
- Validated data principles, or new data principles
- Draft Architecture Definition Document
- Draft Architecture Requirements Specification
- Data Architecture components of an Architecture Roadmap

Architecture Definition Document –

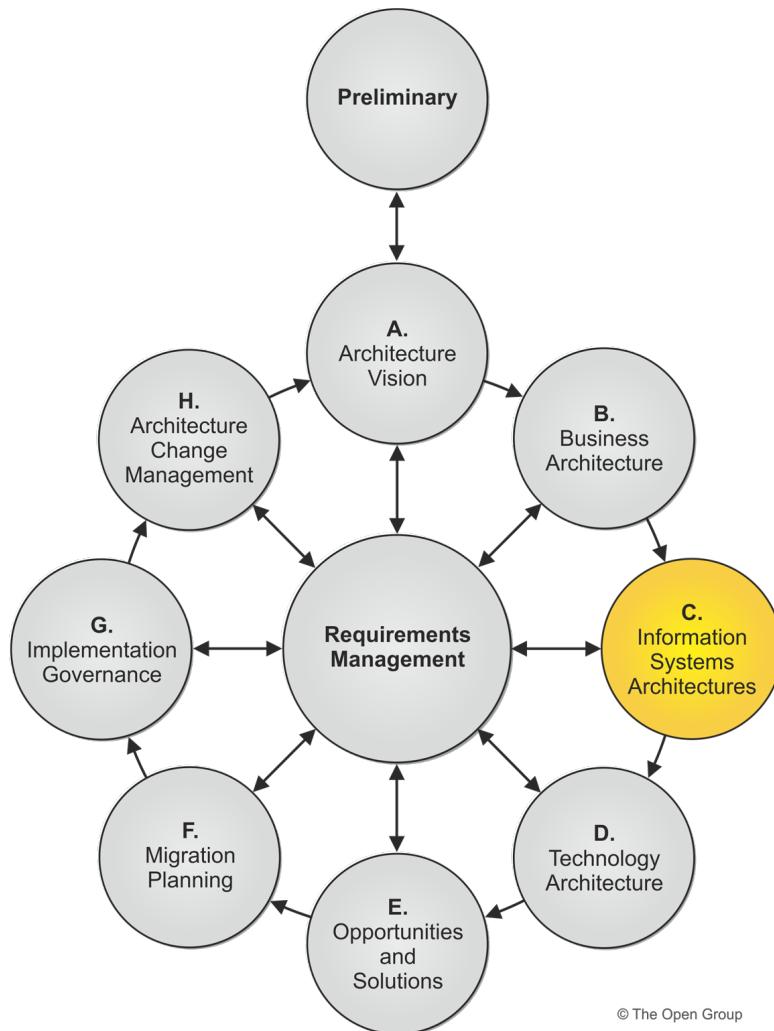
Data Architecture Components

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

Architecture Requirements Specification – Data Architecture Components

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

Summary



- The Data Architecture phase defines the types and sources of data needed to support the business, in a way that can be understood by stakeholders.
- The architecture team should consider existing relevant data models, such as the ARTS and Energistics models.

Summary

| Phase C: Information Systems Architectures – Data Architecture | | | |
|--|---|--|---|
| Objectives | Steps | Inputs | Outputs |
| <p>Develop the Target Data Architecture that enables the Business Architecture and the Architecture Vision, in a way that addresses the Statement of Architecture Work and stakeholder concerns</p> <p>Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Data Architectures</p> | <p>Select reference models, viewpoints, and tools</p> <p>Develop Baseline Data Architecture Description</p> <p>Develop Target Data Architecture Description</p> <p>Perform gap analysis</p> <p>Define candidate roadmap components</p> <p>Resolve impacts across the Architecture Landscape</p> <p>Conduct formal stakeholder review</p> <p>finalise the Data Architecture</p> <p>Create Architecture Definition Document</p> | <p>Request for Architecture Work</p> <p>Capability Assessment</p> <p>Communications Plan</p> <p>organisational Model for Enterprise Architecture</p> <p>Tailored Architecture Framework</p> <p>Data principles</p> <p>Statement of Architecture Work</p> <p>Architecture Vision</p> <p>Architecture Repository</p> <p>Draft Architecture Definition Document containing:</p> <ul style="list-style-type: none"> • Baseline Business Architecture (detailed) • Target Business Architecture (detailed) • Baseline Data Architecture (high-level) • Target Data Architecture (high-level) • Baseline Application Architecture (detailed or high-level) • Target Application Architecture (detailed or high-level) • Baseline Technology Architecture (high-level) • Target Technology Architecture (high-level) <p>Draft Architecture Requirements Specification including:</p> <ul style="list-style-type: none"> • Gap analysis results • Relevant technical requirements Business Architecture components of an Architecture Roadmap | <p>Statement of Architecture Work, updated if necessary</p> <p>Validated data principles, or new data principles</p> <p>Draft Architecture Definition Document containing content updates:</p> <ul style="list-style-type: none"> • Baseline Data Architecture • Target Data Architecture • Data Architecture views corresponding to the selected viewpoints, addressing key stakeholder concerns <p>Draft Architecture Requirements Specification including content updates:</p> <ul style="list-style-type: none"> • Gap analysis results • Data interoperability requirements • Relevant technical requirements that will apply to this evolution of the architecture development cycle • Constraints on the Technology Architecture • Updated business requirements • Updated application requirements <p>Data Architecture components of an Architecture Roadmap</p> <p>582</p> |



Exercise

Which of the following is/are logical data model(s) which can be used during Data Architecture?

- A. DODAF
- B. ARTS
- C. Energistics Data Model for the Petrotechnical industry
- D. Zachman

Identify five sources of information within your organisation that could be used to draw up a Baseline Data Architecture description.



Module 20A

Phase C:

Application Architecture –

Catalogs, Matrices

and Diagrams



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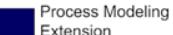


Module Objectives

The objectives of this module are to understand:

- The Catalogs, Matrices and Diagrams of Phase C, Application Architecture
- What they consist of
- How they are used

TOGAF Standard, Version 9.2 Artifacts

| Preliminary | Business Architecture | Data Architecture | Application Architecture | Technology Architecture |
|---|---|--|--|--|
| Catalogs Principles Catalog | Catalogs Organization/Actor Catalog Value Stream Catalog Role Catalog Business Capabilities Catalog Business Service/Function Catalog Value Stream Stages Catalog Location Catalog Driver/Goal/Objective Catalog Process/Event/Control/ Product Catalog Contract/Measure Catalog | Catalogs Data Entity/Data Component Catalog | Catalogs Application Portfolio Catalog Interface Catalog | Catalogs Technology Standards Catalog Technology Portfolio Catalog |
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| |  Infrastructure Consolidation Extension  Governance Extension  Motivation Extension  Process Modeling Extension  Data Modeling Extension  Services Extension  Core Content | | | |

Catalogs, Matrices and Diagrams

Catalogs

- Application Portfolio catalog
- Interface catalog

Matrices

- Application/organisation matrix
- Role/Application matrix
- Application/Function matrix
- Application Interaction matrix



The exact format of the catalogs, matrices and diagrams will depend on the tools used

Diagrams

- Application Communication diagram
- Application and User Location diagram
- Application Use-Case diagram
- Enterprise Manageability diagram
- Process/Application Realization diagram
- Software Engineering diagram
- Application Migration diagram
- Software Distribution diagram



Software Distribution Diagram

- This diagram is a composite of the Software Engineering diagram and the Application-User Location diagram.
- Depending on the circumstances, this diagram alone may be sufficient, or may not be needed.



Module 20

Phase C: Application Architecture



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Module Objectives

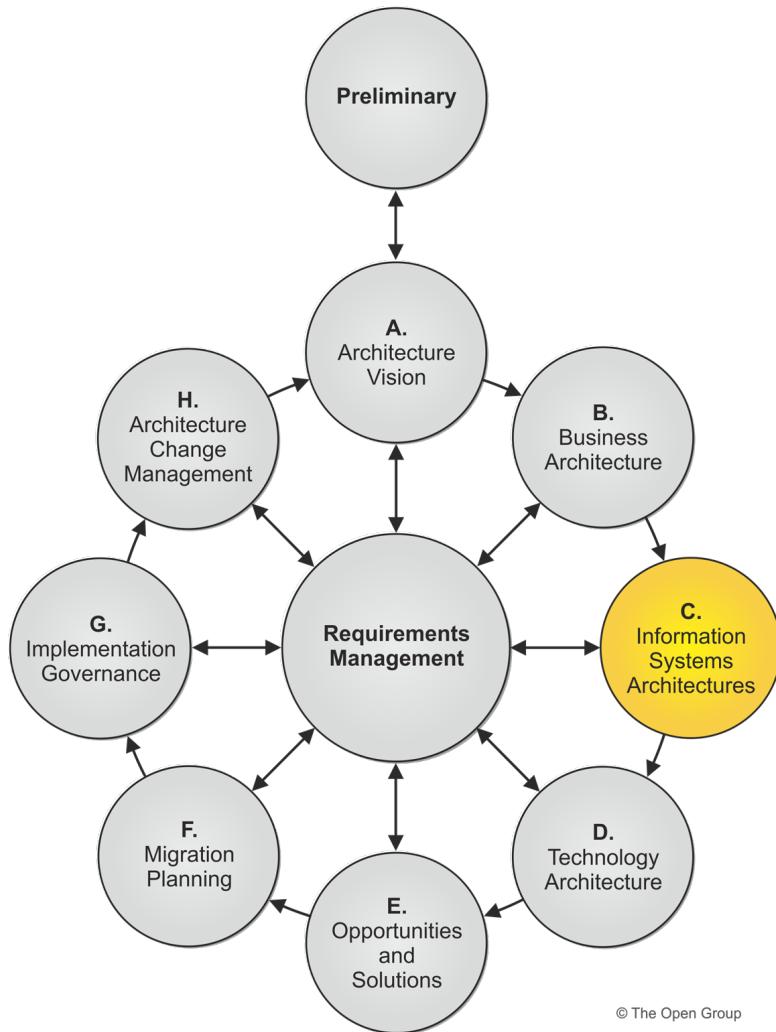
The aim of this module is to understand Phase C: Application Architecture:

- Objectives
- Inputs
- Steps
- Outputs

Develop the Target Application Architecture that enables the Business Architecture and the Architecture Vision, in a way that addresses the Statement of Architecture Work and stakeholder concerns.

Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Application Architectures.

Phase C: Inputs: Application Architecture



- Request for Architecture Work
- Capability Assessment
- Communications Plan
- organisation model for enterprise architecture
- Tailored Architecture Framework
- Application principles
- Statement of Architecture Work
- Architecture Vision
- Architecture Repository
- Draft Architecture Definition Document
- Draft Architecture Requirements Specification, including:
 - Gap analysis results
 - Relevant technical requirements
- Business and Data Architecture components of an Architecture Roadmap

Steps



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

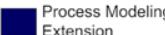
In particular you should determine whether it is appropriate to do the Baseline Application Architecture or Target Application Architecture development first

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 candidate roadmap components
6. Resolve impacts across the Architecture Landscape
7. Conduct formal stakeholder review
8. finalise the Application Architecture
9. Create Architecture Definition Document

Step 1: Select Reference Models, Viewpoints, and Tools

- Review/generate and validate application principles – see Architecture Principles
- Select Application Architecture resources (reference models, patterns, ...)
- Select relevant Application Architecture viewpoints
- Identify appropriate tools and techniques (including forms) to be used for capture, modeling, and analysis, in association with the selected viewpoints.
- Consider using platform-independent descriptions of business logic (e.g. the OMG's MDA)

TOGAF Standard, Version 9.2 Artifacts

| Preliminary | Business Architecture | Data Architecture | Application Architecture | Technology Architecture |
|---|---|--|--|--|
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Step 1: Select Reference Models, Viewpoints, and Tools

- Determine Overall Modeling Process
 - For each viewpoint, select the models needed to support the specific view required, using the selected tool or method. E.g.: The TM Forum has developed detailed applications models relevant to the Telecommunications industry. The OMG has some vertical Domain Task Forces developing models for specific vertical domains such as Healthcare, Transportation, Finance, etc.
 - Confirm all stakeholders' concerns are addressed. If not, create new models to address concerns not covered, or augment existing models



Recommended Process

- Understand the list of applications or application components that are required, based on the baseline Application Portfolio, what the requirements are, and the business architecture scope
- Simplify complicated applications by decomposing them into two or more applications
- Ensure that the set of application definitions is internally consistent, by removing duplicate functionality as far as possible, and combining similar applications into one
- Identify logical applications 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 examining how the application will function, capturing integration, migration, development, and operational concerns



Step 1: Select Reference Models, Viewpoints, and Tools

- Identify Required Catalogs of Application Building Blocks
 - The organisation's Application portfolio is captured as a catalog within the Architecture Repository..
- Identify Required Matrices
 - Matrices show the core relationships between related model entities.
- Identify Required Diagrams
 - Diagrams present the Application Architecture information from a set of different viewpoints
- Identify Types of Requirements to be Collected
 - Identify requirements to be met by the Architecture
 - Formalize the application-focused requirements
 - Provide requirements input for the Data and Technology architectures

Example – The Integrated Information Infrastructure Model

- An Applications Architecture reference model
 - a model of the application components and application services software essential for an integrated information infrastructure
- Based on the TRM
- Aimed at the helping the design of architectures to enable and support the vision of Boundaryless Information Flow

Step 2: Develop a Baseline Application Architecture Description

- If possible, identify the relevant Application ABBs, drawing on the Architecture Repository
- If not, define each application in line with the Application Portfolio catalog

Step 3: Develop Target Application Architecture Description

- If possible, identify the relevant Application Architecture building blocks, drawing on the Architecture Repository
- If not, develop a new architecture model:
 - use the models identified within Step 1 as a guideline



Step 4: Perform Gap Analysis

- Verify the architecture models for internal consistency and accuracy
- Note changes to the viewpoint represented in the selected models from the Architecture Repository, and document
- Test architecture models for completeness against requirements
- Identify gaps between the baseline and target using the standard Gap Analysis Technique

Step 5: Define Candidate Roadmap Components

This initial Application Architecture roadmap will be used as raw material to support more detailed definition of a consolidated, cross-discipline roadmap within the Opportunities & Solutions phase.

Step 6: Resolve Impacts across the Architecture Landscape

- Architecture artifacts in the Architecture Landscape should be examined to identify:
 - Does this Application Architecture create an impact on any pre-existing architectures?
 - Have recent changes been made that impact on the Application Architecture?
 - Are there any opportunities to leverage work from this Application Architecture in other areas of the organisation?
 - Does this Application Architecture impact other projects ?
 - Will this Application Architecture be impacted by other projects?

Step 7: Conduct Formal Stakeholder Review

Check the original motivation for the architecture project and the Statement of Architecture Work against the proposed Application Architecture. Conduct an impact analysis to:

- Identify any areas where the Business and Data Architecture may need to change to cater for changes in the Application Architecture. If the impact is significant revisit the Business and Data Architectures.

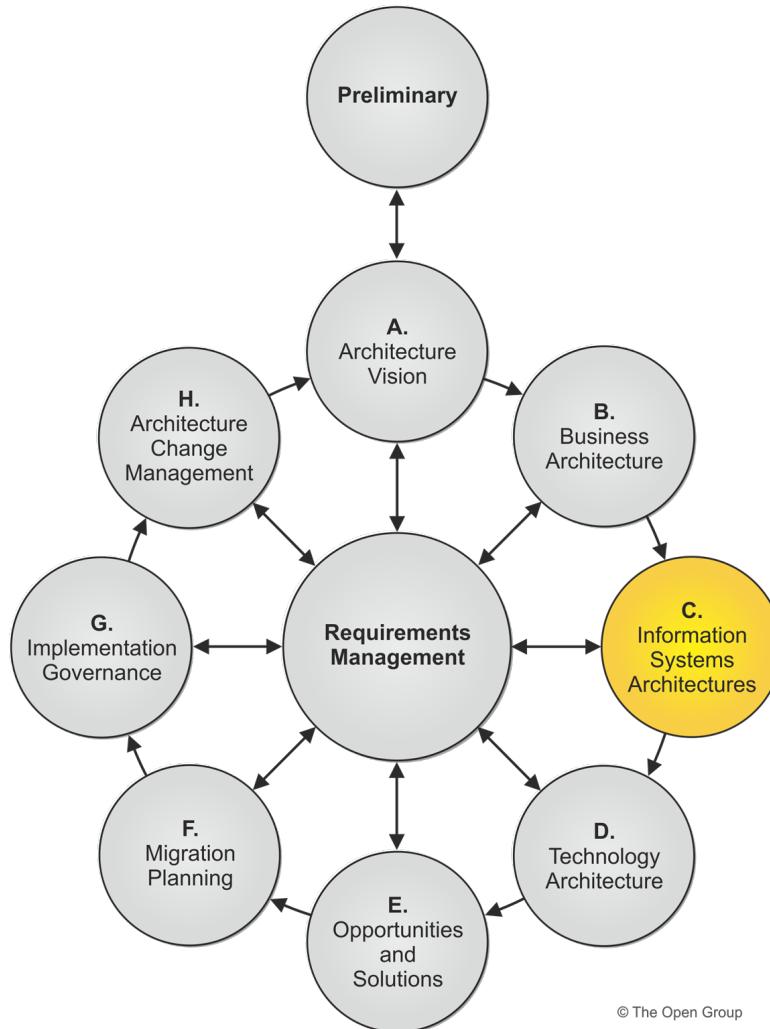
Step 8: Finalise the Application Architecture

- Select standards for each of the ABBs, reusing as much as possible.
- Fully document each ABB.
- Cross check the overall architecture against the business requirements.
- Document the final requirements traceability report.
- Document the final mapping of the architecture within the Architecture repository. Identify the ABBs that might be reused and publish them via the architecture repository.
- finalise all the work products

Step 9: Create Architecture Definition Document

- Document the rationale for all building block decisions in the architecture definition document.
- Prepare the Application Architecture sections of the architecture definition document report.
- If appropriate, use reports and/or graphics generated by modeling tools to demonstrate key views of the architecture. Route the document for review by relevant stakeholders, and incorporate feedback.

Phase C: Outputs: Application Architecture



- Statement of Architecture Work
- Validated application principles, or new application principles
- Draft Architecture Definition Document
- Draft Architecture Requirements Specification
- Application Architecture components of an Architecture Roadmap



Architecture Definition Document – Application Architecture Components

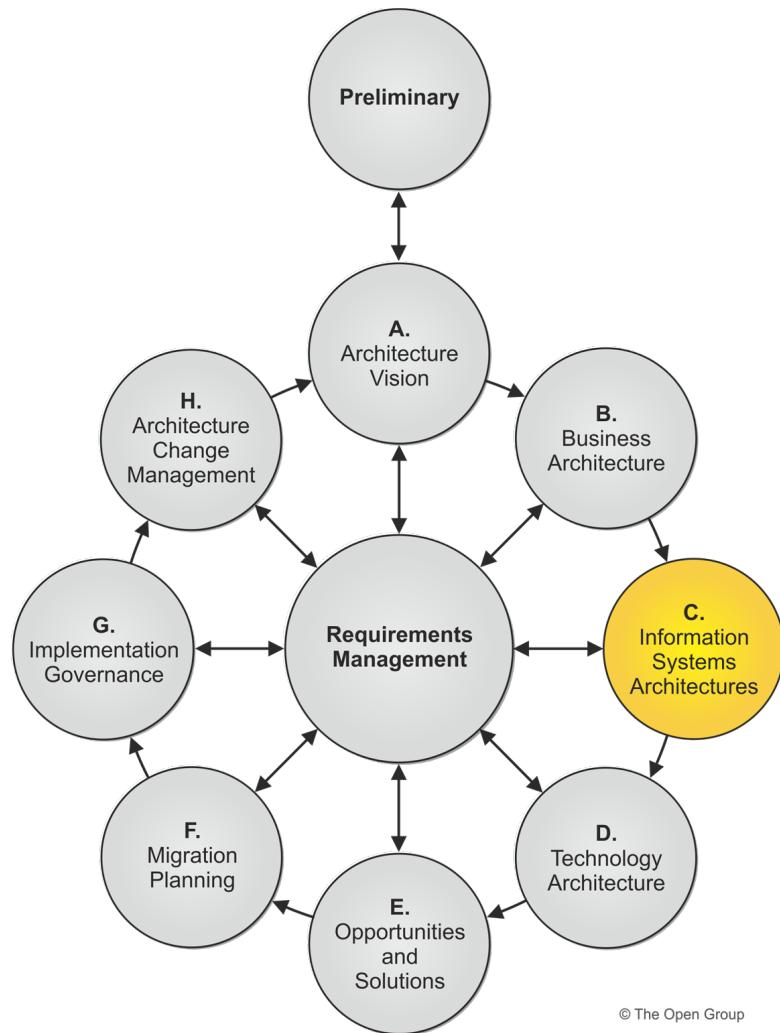
- Baseline Application Architecture, if appropriate
- Target Application Architecture, including:
 - Process systems model
 - Place systems model
 - Time systems model
 - People systems model
- Application Architecture views corresponding to the selected viewpoints addressing key stakeholder concerns



Architecture Requirements Specification – Application Architecture Components

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

Summary



- This phase defines the *kinds* of applications necessary to process the data and support the business.
- The goal is to define what kinds of applications are relevant and what those applications need to do.

Summary

| Phase C: Information Systems Architectures – Application Architecture | | | |
|--|--|--|--|
| Objectives | Steps | Inputs | Outputs |
| <p>Develop the Target Application Architecture that enables the Business Architecture and the Architecture Vision, in a way that addresses the Statement of Architecture Work and stakeholder concerns</p> <p>Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Application Architectures</p> | <p>Select reference models, viewpoints, and tools</p> <p>Develop Baseline Application Architecture Description</p> <p>Develop Target Application Architecture Description</p> <p>Perform gap analysis</p> <p>Define candidate roadmap components</p> <p>Resolve impacts across the Architecture Landscape</p> <p>Conduct formal stakeholder review</p> <p>finalise the Application Architecture</p> <p>Create Architecture Definition Document</p> | <p>Request for Architecture Work</p> <p>Capability Assessment</p> <p>Communications Plan</p> <p>organisational Model for Enterprise Architecture</p> <p>Tailored Architecture Framework</p> <p>Application Principles</p> <p>Statement of Architecture Work</p> <p>Architecture Vision</p> <p>Architecture Repository</p> <p>Draft Architecture Definition Document containing:</p> <ul style="list-style-type: none"> • Baseline Business Architecture (detailed) • Target Business Architecture (detailed) • Baseline Data Architecture (detailed or high-level) • Target Data Architecture (detailed or high-level) • Baseline Application Architecture (high-level) • Target Application Architecture (high-level) • Baseline Technology Architecture (high-level) • Target Technology Architecture (high-level) <p>Draft Architecture Requirements Specification including:</p> <ul style="list-style-type: none"> • Gap analysis results • Relevant technical requirements <p>Business and Data Architecture components of an Architecture Roadmap</p> | <p>Statement of Architecture Work, updated if necessary</p> <p>Validated application principles, or new application principles</p> <p>Draft Architecture Definition Document containing content updates:</p> <ul style="list-style-type: none"> • Baseline Application Architecture • Target Application Architecture • Application Architecture views corresponding to the selected viewpoints, addressing key stakeholder concerns <p>Draft Architecture Requirements Specification including content updates:</p> <ul style="list-style-type: none"> • Gap analysis results • Application interoperability requirements • Relevant technical requirements that will apply to this evolution of the architecture development cycle • Constraints on the Technology Architecture • Updated business requirements • Updated data requirements <p>Application Architecture components of an Architecture Roadmap</p> |



Test Yourself Question

Q1. How should the applications best be described?

- A. As computer systems
- B. As logical groups of capabilities
- C. As schemas
- D. As data-flow diagrams
- E. As UML diagrams

Exercise

Identify five sources of information within your organisation that could be used to draw up a Baseline Application Architecture Description.



Test Yourself Question

1. Which of the following best describes the purpose of the TRM?

- a) To provide a framework for IT Governance
- b) To provide a visual model, terminology and coherent description of components and structure of an information system
- c) To provide a list of standards
- d) To provide a method for architecture development
- e) To provide a system engineering viewpoint on a possible solution

1. Which of the following statements about the Taxonomy of Platform Services is true?

- a) It provides a description of a specific vertical industry information system
- b) It defines a number of service qualities
- c) It provides a widely accepted, useful definition of an Application Platform entity
- d) It is used in structuring the III-RM
- e) It provides a list of standards



Module 22A

Phase D: Technology Architecture – Catalogs, Matrices and Diagrams



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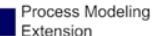


Module Objectives

The objectives of this module are to understand:

- The Catalogs, Matrices and Diagrams of Phase D, Technology Architecture
- What they consist of
- How they are used

TOGAF Standard, Version 9.2 Artifacts

| Preliminary | Business Architecture | Data Architecture | Application Architecture | Technology Architecture |
|---|---|--|--|--|
| Catalogs Principles Catalog | Catalogs Organization/Actor Catalog Value Stream Catalog Role Catalog Business Capabilities Catalog Business Service/Function Catalog Value Stream Stages Catalog Location Catalog Driver/Goal/Objective Catalog Process/Event/Control/ Product Catalog Contract/Measure Catalog | Catalogs Data Entity/Data Component Catalog | Catalogs Application Portfolio Catalog Interface Catalog | Catalogs Technology Standards Catalog Technology Portfolio Catalog |
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| Opportunities and Solutions Core Diagrams Project Context Diagram Benefits Diagram | | | | © The Open Group |
|  Infrastructure Consolidation Extension |  Governance Extension |  Motivation Extension |  Data Modeling Extension |  Services Extension |
| | | |  Core Content | |

Catalogs, Matrices and Diagrams

Catalogs

- Technology Standards catalog
- Technology Portfolio catalog
- **Matrices**
- Application/Technology matrix

Diagrams

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



The exact format of the catalogs, matrices and diagrams will depend on the tools used



Module 22

Phase D:

Technology Architecture



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Module Objectives

The objectives of this module are to understand:

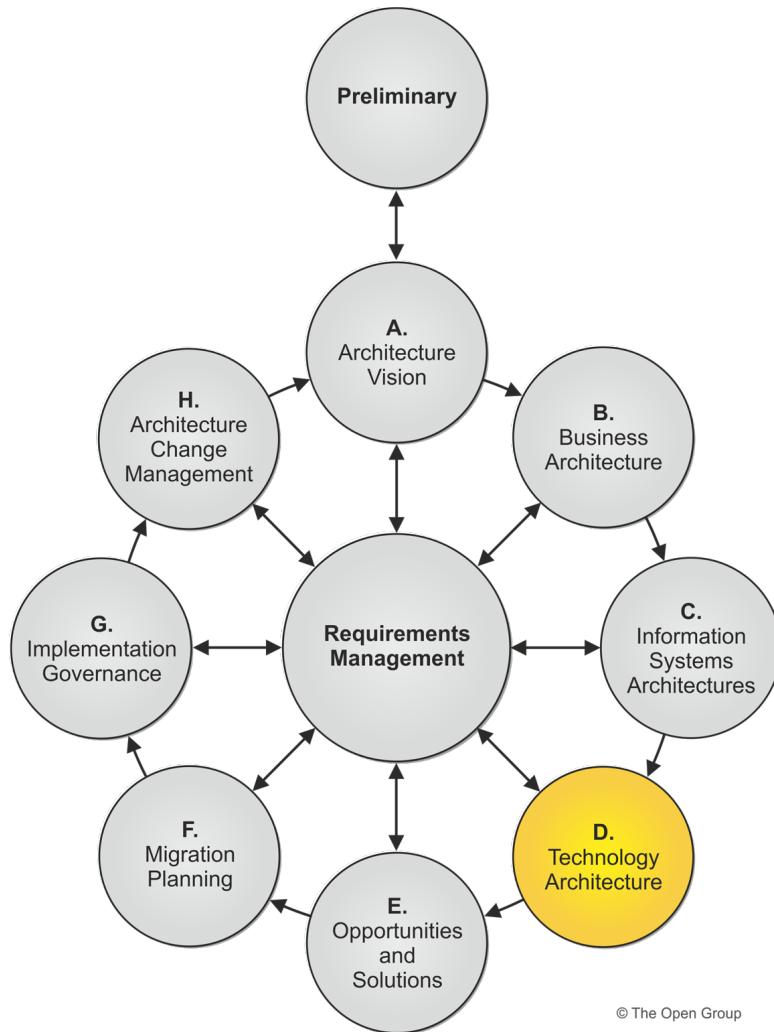
- The objectives of Phase D, Technology Architecture
- What it consists of
- What inputs are needed for it
- What the outputs are
- Develop the Target Technology Architecture that enables the Architecture Vision, target business, data, and application building blocks to be delivered through technology components and technology services, in a way that addresses the Statement of Architecture Work and stakeholder concerns
- Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Technology Architectures



Approach

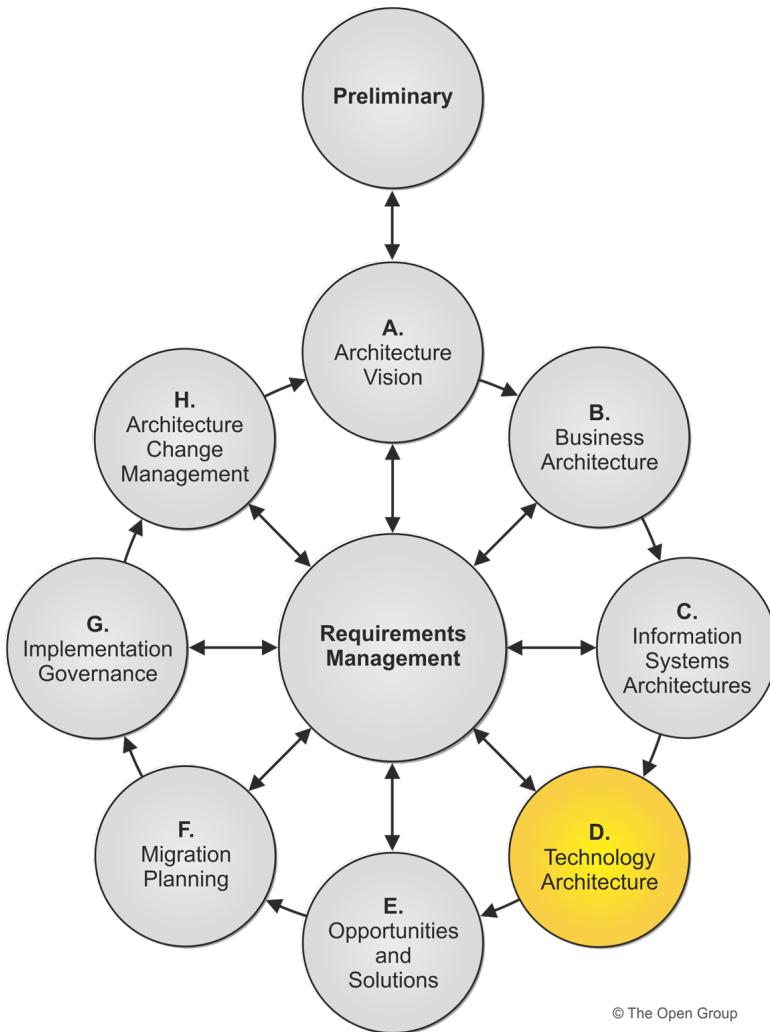
- Consider Emerging Technologies
 - The Technology Architecture needs to capture the transformation opportunities available through the adoption of new technology
- Review the Technology Architecture Resources available in the Architecture Repository
 - Existing IT Services in the IT Repository or IT Service Catalog
 - The adopted technical reference model, if applicable
 - Technology models relevant to the organisation

Technology Architecture: Inputs



- Request for Architecture Work
- Capability Assessment
- Communications Plan
- organisation model for enterprise architecture
- Tailored Architecture Framework
- Technology principles
- Statement of Architecture Work
- Architecture Vision
- Architecture Repository

Technology Architecture: Inputs



- Draft Architecture Definition Document, containing:
 - Baseline Business Architecture (detailed)
 - Target Business Architecture (detailed)
 - Baseline Data Architecture (detailed)
 - Target Data Architecture (detailed)
 - Baseline Application Architecture (detailed)
 - Target Application Architecture (detailed)
 - Baseline Technology Architecture (high-level)
 - Target Technology Architecture (high-level)
- Draft Architecture Requirements Specification, including gap analysis results and technical requirements
- Business, Data, and Application Architecture components of an Architecture Roadmap

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 Technology Architecture or Target Technology Architecture development first

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 candidate roadmap components
6. Resolve impacts across the Architecture Landscape
7. Conduct formal stakeholder review
8. finalise the Technology Architecture
9. Create Architecture Definition Document



Step 1: Select Reference Models, Viewpoints, and Tools

- Review/generate and validate technology principles – see Architecture Principles
- Select Technology Architecture resources (reference models, patterns, ...)
- Select relevant Technology Architecture viewpoints
- Identify appropriate tools and techniques to be used for data capture, modeling, and analysis, in association with the selected viewpoints.
- Determine Overall Modeling Process
 - For each viewpoint, select the models needed to support the specific view required, using the selected tool or method. Confirm all stakeholders' concerns are addressed. If not, create new models to address concerns not covered, or augment existing models

TOGAF Standard, Version 9.2 Artifacts

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■ Infrastructure Consolidation Extension

■ Governance Extension

■ Motivation Extension

■ Process Modeling Extension

■ Data Modeling Extension

■ Services Extension

■ Core Content



Step 1: Select Reference Models, Viewpoints, and Tools

- Identify Required Catalogs of Data Building Blocks

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

- Technology Standards catalog
- Technology Portfolio catalog



Step 1: Select Reference Models, Viewpoints, and Tools

- Identify Required Matrices
 - Matrices show the core relationships between related model entities.
 - Recommended to develop an Application/Technology Matrix
- Identify Required Diagrams
 - Diagrams present the Technology Architecture information from a set of different viewpoints
 - The following diagrams are recommended
 - Environments and Locations diagram
 - Platform Decomposition diagram
 - Networked Computing /Hardware diagram
 - Communication diagram



Step 1: Select Reference Models, Viewpoints, and Tools

- Identify Types of Requirements to be Collected
 - Identify requirements to be met by the Architecture
 - Formalize the technology-focused requirements
 - If applicable, provide detailed guidance to be reflected during design and implementation
- Select Services
 - The services portfolios are combinations of basic services from the service categories in the defined taxonomy.
 - For each building block, build up a service description portfolio as a set of non-conflicting services.
 - The set of services must be tested to ensure that the functionality provided meets application requirements.

Step 2: Develop a Baseline Technology Architecture Description

If possible, identify the relevant Technology ABBs, drawing on the Architecture Repository.

- If nothing exists, define each application in line with the Technology Portfolio catalog
- Where new architecture models need to be developed use the models identified in Step 1 as a guideline for creating new architecture content to describe the Baseline Architecture

Step 3: Develop Target Technology Architecture Description

- If possible, identify the relevant Technology Architecture building blocks, drawing on the Architecture Repository
- Where new architecture models need to be developed use the models identified within Step 1 as a guideline



Step 4: Perform Gap Analysis

- Verify the architecture models for internal consistency and accuracy
- Note changes to the viewpoint represented in the selected models from the Architecture Repository, and document
- Test architecture models for completeness against requirements
- Identify gaps between the baseline and target using standard Gap Analysis technique

Step 5: Define Candidate Roadmap Components

- This initial Technology Architecture roadmap will be used as raw material to support more detailed definition of a consolidated, cross-discipline roadmap within the Opportunities & Solutions phase.



Step 6: Resolve Impacts across the Architecture Landscape

- Architecture artifacts in the Architecture Landscape should be examined to identify:
 - Does this Technology Architecture create an impact on any pre-existing architectures?
 - Have recent changes been made that impact on the Technology Architecture?
 - Are there any opportunities to leverage work from this Technology Architecture in other areas of the organisation?
 - Does this Technology Architecture impact other projects ?
 - Will this Technology Architecture be impacted by other projects?

Step 7: Conduct Formal Stakeholder Review

Check the original motivation for the architecture project and the Statement of Architecture Work against the proposed Technology Architecture.

- Is the Technology Architecture fit for the purpose of supporting subsequent work in the other architecture domains?
- Refine the proposed Technology Architecture only if necessary.

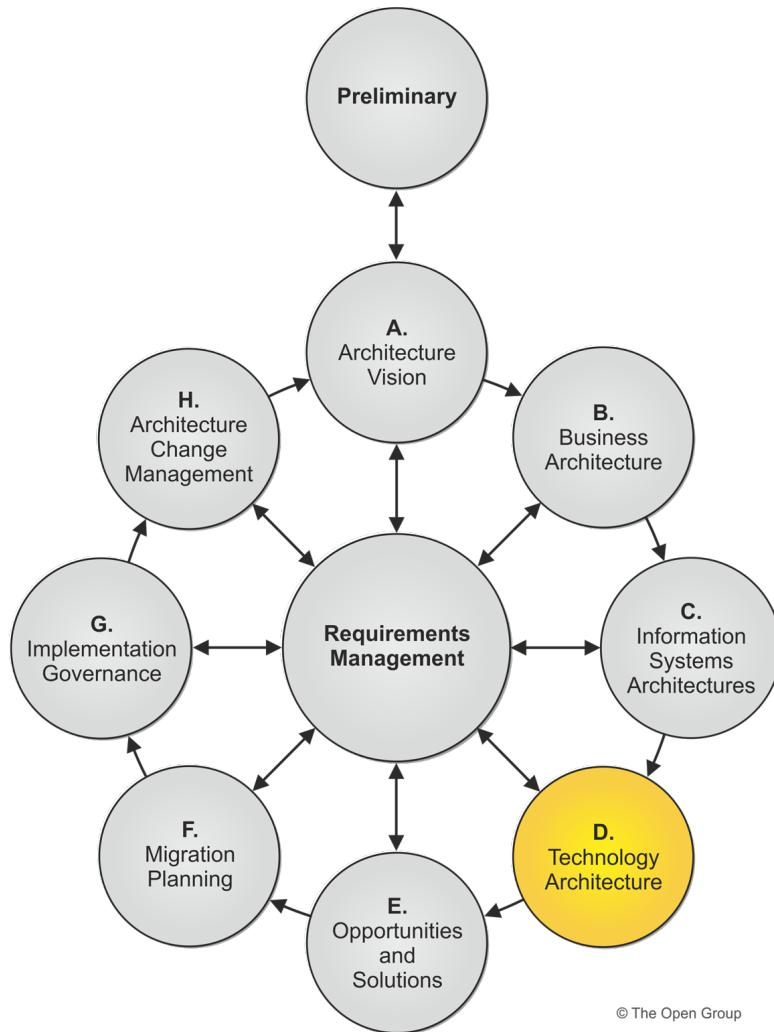
Step 8: Finalise the Technology Architecture

- Select standards for each of the ABBs, reusing as much as possible.
- Fully document each ABB.
- Cross check the overall architecture against the business goals.
- Document the final requirements traceability report.
- Document the final mapping of the architecture within the Architecture repository. Identify the ABBs that might be reused and publish them via the Architecture Repository.
- finalise all the work products.

Step 9: Create Architecture Definition Document

- Document the rationale for all building block decisions in the architecture definition document.
- Prepare the Technology Architecture sections of the architecture definition document report.
- If appropriate, use reports and/or graphics generated by modeling tools to demonstrate key views of the architecture. Send the document to relevant stakeholders for review and incorporate feedback.

Technology Architecture Outputs



- Statement of Architecture Work, updated if necessary
- Validated technology principles or new technology principles
- Draft Architecture Definition Document
- Draft Architecture Requirements Specification
- Technology Architecture components of an Architecture Roadmap

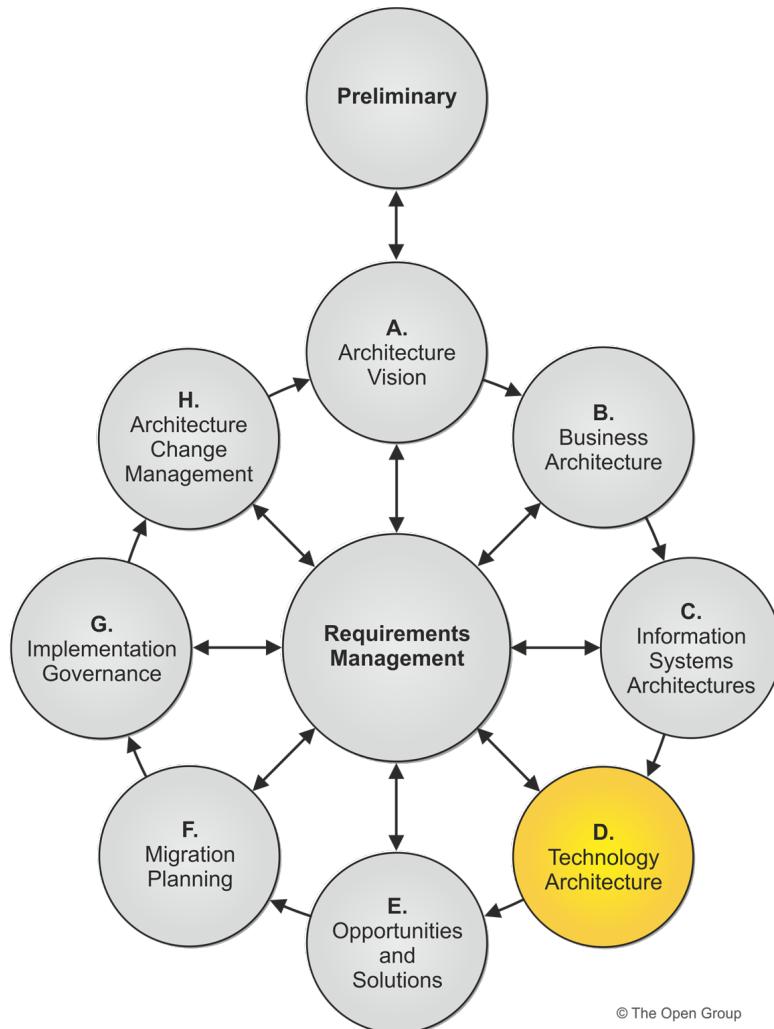
Architecture Definition Document – Technology Architecture Components

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

Architecture Requirements Specification – Technology Architecture Components

- Gap analysis results
- Updated technology requirements

Summary



- The purpose of Phase D: Technology Architecture is to transform application components into a set of technology components.
- The technology components can be both software and hardware components, available from the market or configured within the organisation

Summary

| Phase D: Technology Architecture | | | |
|--|---|---|---|
| Objectives | Steps | Inputs | Outputs |
| <p>Develop the Target Technology Architecture that enables the Architecture Vision, target business, data, and application building blocks to be delivered through technology components and technology services, in a way that addresses the Statement of Architecture Work and stakeholder concerns</p> <p>Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Technology Architectures</p> | <p>Select reference models, viewpoints, and tools</p> <p>Develop Baseline Technology Architecture Description</p> <p>Develop Target Technology Architecture Description</p> <p>Perform gap analysis</p> <p>Define candidate roadmap components</p> <p>Resolve impacts across the Architecture Landscape</p> <p>Conduct formal stakeholder review</p> <p>finalise the Technology Architecture</p> <p>Create Architecture Definition Document</p> | <p>Request for Architecture Work</p> <p>Capability Assessment</p> <p>Communications Plan</p> <p>organisational Model for Enterprise Architecture</p> <p>Tailored Architecture Framework</p> <p>Technology principles</p> <p>Statement of Architecture Work</p> <p>Architecture Vision</p> <p>Architecture Repository</p> <p>Draft Architecture Definition Document containing:</p> <ul style="list-style-type: none"> • Baseline Business Architecture (detailed) • Target Business Architecture (detailed) • Baseline Data Architecture (detailed) • Target Data Architecture (detailed) • Baseline Application Architecture (detailed) • Target Application Architecture (detailed) • Baseline Technology Architecture (high-level) • Target Technology Architecture (high-level) <p>Draft Architecture Requirements Specification including:</p> <ul style="list-style-type: none"> • Gap analysis results • Relevant technical requirements <p>Business, Data, and Application Architecture components of an Architecture Roadmap</p> | <p>Statement of Architecture Work, updated if necessary</p> <p>Validated technology principles or new technology principles (if generated here)</p> <p>Draft Architecture Definition Document containing content updates:</p> <ul style="list-style-type: none"> • Baseline Technology Architecture • Target Technology Architecture • Technology Architecture views corresponding to the selected viewpoints, addressing key stakeholder concerns <p>Draft Architecture Requirements Specification including content updates:</p> <ul style="list-style-type: none"> • Gap analysis results • Requirements output from Phases B and C • Updated technology requirements <p>Technology Architecture components of an Architecture Roadmap</p> |



Exercise

Identify five sources of information within your organisation that could be used to draw up a Baseline Technology Architecture Description.



Module 23:

Migration Planning

Techniques



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Roadmap

| |
|---|
| Part I - Introduction |
| Preface, Executive Overview, Core Concepts, Definitions |
| Part II – Architecture Development Method |
| Introduction to ADM |
| ADM Phase Narratives |
| Part III – ADM Guidelines and Techniques |
| Guidelines for Adapting the ADM Process |
| Techniques for Architecture Development |
| Part IV – Architecture Content Framework |
| Content Metamodel |
| Architectural Artifacts |
| Architecture Deliverables |
| Building Blocks |
| Part V – Enterprise Continuum and Tools |
| Enterprise Continuum |
| Architecture Partitioning |
| Architecture Repository |
| Tools for Architecture Development |
| Part VII – Architecture Capability Framework |
| Architecture Board |
| Architecture Compliance |
| Architecture Contracts |
| Architecture Governance |
| Architecture Maturity Models |
| Architecture Skills Framework |

- **Part III, ADM Guidelines and Techniques, Chapter 24**





Module Objectives

The objectives are to:

- Understand the techniques used in Phases E and F for Migration Planning
- Key areas include:
 - Using the *Implementation Factor Assessment and Deduction Matrix* to document factors impacting the Architecture Implementation and Migration Plan.
 - The purpose of the *Consolidated Gaps, Solutions and Dependencies Matrix*
 - The purpose of an *Architecture Definition Increments table*
 - Using the *Enterprise Architecture State Evolution Table* with the TRM
 - Using the *Business Value Assessment Technique*



The Implementation Factor Assessment and Deduction Matrix

- This matrix documents the factors impacting the Implementation and Migration Plan
- It is created in Step 1 of Phase E and updated throughout Phase E
- It is an input to Phase F
- It serves as a repository for architecture implementation and migration decisions
- The matrix should include
 - a list of the factors to be considered
 - their descriptions, and
 - the deductions that indicate the actions or constraints that have to be taken into consideration when formulating the plans

Example – Implementation Factor Assessment and Deduction Matrix

| Implementation Factor Assessment and Deduction Matrix | | |
|---|---|---|
| Factor | Description | Deduction |
| <Name of Factor> | <Description of Factor> | <Impact on Migration Plan> |
| Change in Technology | Shut down the message centers, saving 700 personnel, and have them replaced by email. | <ul style="list-style-type: none">• Need for personnel training, re-assignment• Email has major personnel savings and should be given priority |
| Consolidation of Services | | |
| Introduction of New Customer Service | | |



The Consolidated Gaps, Solutions and Dependencies Matrix

- This matrix is used when consolidating the gap analysis results from Phases B to D
- It is used to group the gaps identified in the domain architecture gap analysis results and assess potential solutions and dependencies to one or more gaps
- It is first created in Step 3 of Phase E
- It is an input to Phase F
- This matrix can be used as a planning tool when creating work packages
- The identified dependencies will drive the creation of projects and migration planning in Phases E and F

Example – Consolidated Gaps, Solutions and Dependencies Matrix

Consolidated Gaps, Solutions, and Dependencies Matrix

| No. | Architecture | Gap | Potential Solutions | Dependencies |
|-----|--------------|--|---|-------------------------|
| 1 | Business | New Order Processing Process | Use COTS software tool process Implement custom solution | Drives applications (2) |
| 2 | Application | New Order Processing Application | COTS software tool X Develop in-house | |
| 3 | Information | Consolidated Customer Information Base | Use COTS customer base Develop customer data mart | |

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Architecture Definition Increments

Table

- This table allows the architect to plan a series of Transition Architectures outlining the status of the Enterprise Architecture at specified times
- It is created in Phase F
- It consists of listing the projects and then assigning their incremental deliverables across the Transition Architectures



Architecture Definition Increments Table

Architecture Definition - Project Objectives by Increment
(Example Only)

| Project | April 2018/2019 | April 2019/2020 | April 2020/2021 | Comments |
|----------------------------------|--|---|--|----------|
| | Transition Architecture 1: Preparation | Transition Architecture 2: Initial Operational Capability | Transition Architecture 3: Benefits | |
| Enterprise e-Services Capability | Training and Business Process | e-Licensing Capability | e-Employment Benefits | |
| IT e-Forms | Design and Build | | | |
| IT e-Information Environment | Design and Build Information Environment | Client Common Data Web Content Design and Build | Enterprise Common Data Component Management Design and Build | |
| | | | | |

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The Transition Architecture State Evolution Table

- This allows the architect to show the proposed state of the architectures at various levels using the TRM
- This is part of the Implementation and Migration Plan
 - showing proposed state of the architectures as they evolve
- It should be drawn up in Phase F, listing:
 - Services from the TRM used in the enterprise
 - Transition Architectures
 - Proposed transformations,
- All Solution Building Blocks (SBBs) should be described with respect to their delivery and impact on services



The Transition Architecture State Evolution Table

| Architectural State using the Technical Reference Model | | | | |
|---|-------------------------------|-----------------------------|----------------------------------|----------------------------|
| Sub-Domain | Service | Transition Architecture 1 | Transition Architecture 2 | Transition Architecture 3 |
| Infrastructure Applications | Information Exchange Services | Solution System A (replace) | Solution System B-1 (transition) | Solution System B-2 (new) |
| | Data Management Services | Solution System D (retain) | Solution System D (retain) | Solution System D (retain) |
| ... | ... | ... | ... | ... |

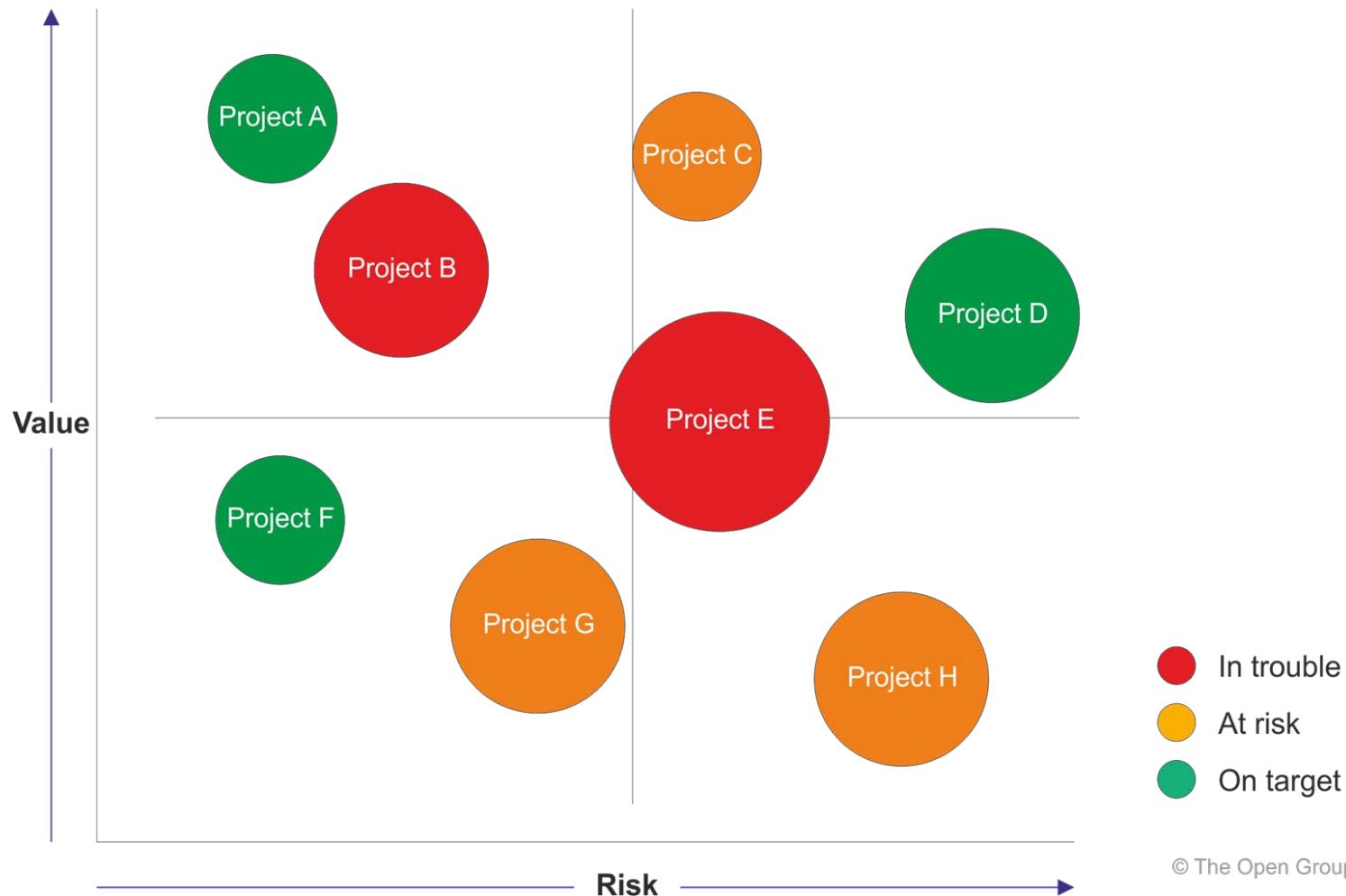
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The Business Value Assessment Technique

- This technique to assess business value includes drawing up a matrix with value and risk index dimensions
- It is used in Phase F to develop an estimated value to the business for each project
- The value index should include criteria such as compliance to principles, financial contribution, strategic alignment, and competitive position
- The risk index should include criteria such as size and complexity, technology, organisational capacity, and impact of a failure. Each criterion should be assigned an individual weight

The Business Value Assessment Technique

(Project size indicated by size of circle.)





Summary

This module has explained the techniques used in Phase E and F for migration planning. In particular, it has discussed:

- 2 matrices (the *Implementation Factor Assessment and Deduction Matrix* and the *Consolidated Gaps, Solutions and Dependencies Matrix*).
- 2 tables (the *Architecture Definition Increments table* and the *Enterprise Architecture State Evolution Table*).
- 1 technique (the *Business Value Assessment Technique*)



Exercise: The Business Value Assessment Technique

- Suppose that you are the Chief Architect of a large project in your enterprise. The project complies with your architecture principles. It will make a considerable financial contribution. It is strategically aligned with your business and it will strengthen your competitive advantage.
- However the project is complex and will use cutting-edge technology. Your organisational capacity is high, but the impact of failure is also high.
- Score each criterion on a scale of 0 to 10 and give each a weighting using this information and your experience and so produce a value index dimension and a risk index dimension for the project.



Module 24

Phase E:

Opportunities and Solutions



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Module Objectives

The objectives of this module are to understand:

- The objectives of Phase E, Opportunities and Solutions
 - Which is the first phase directly concerned with implementation
- What it consists of
- What inputs are needed for it
- What the outputs are
- Generate the initial complete version of the Architecture Roadmap, based upon the gap analysis and candidate Architecture Roadmap components from Phases B, C, and D
- Determine whether an incremental approach is required, and if so identify Transition Architectures that will deliver continuous business value
- Define the overall solution building blocks to finalise the Target Architecture based on the Architecture Building Blocks (ABBs)



Stakeholders

- Phase E is a collaborative effort
 - Stakeholders required from both the business and IT sides
- It should include those that implement and those that operate the infrastructure
- It should also include those responsible for strategic planning
 - especially for creating the Transition Architectures, if required



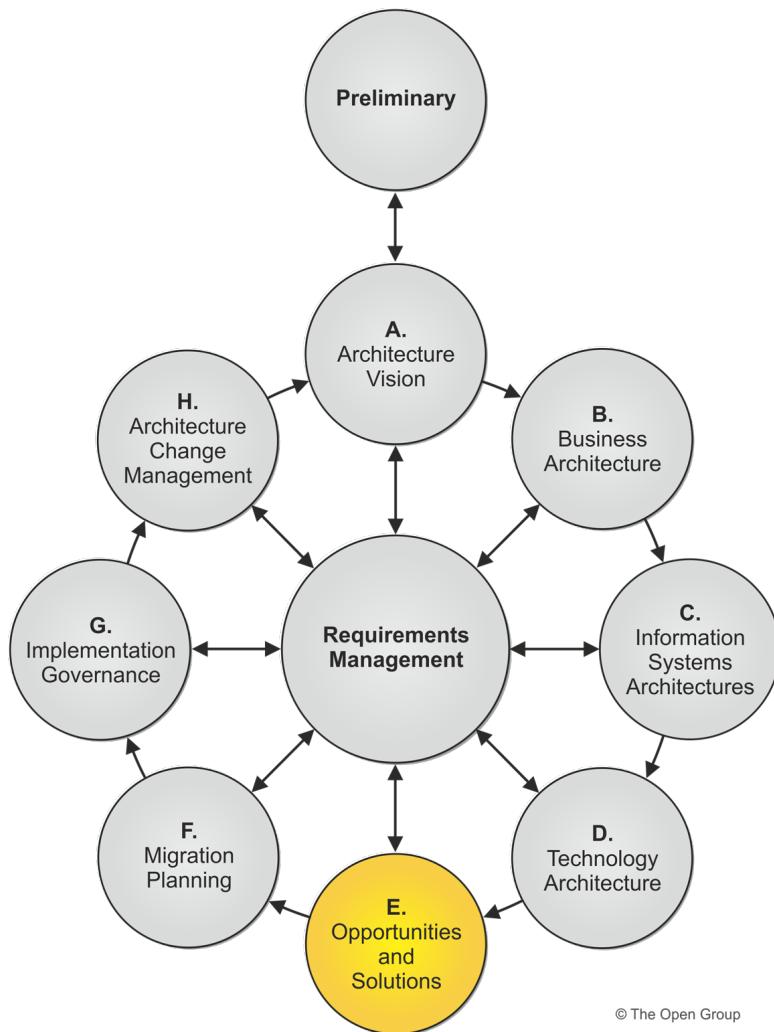
Approach

- This is the first phase concerning implementation
- It takes into account the complete set of gaps between the Target and Baseline Architectures in all architecture domains
- It logically groups changes into work packages
- It builds a best-fit roadmap based upon:
 - Stakeholder requirements
 - The enterprise's business transformation readiness
 - Identified opportunities and solutions
 - Identified implementation constraints.

The following four concepts are key to transitioning from developing to delivering a Target Architecture:

- Architecture Roadmap
- Work Packages
- Transition Architectures
- Implementation and Migration Plan

Phase E: Inputs



- Product Information
- Request for Architecture Work
- Capability Assessment
- Communications Plan
- Planning Methodologies
- Governance models and frameworks
- Tailored Architecture Framework
- Statement of Architecture Work
- Architecture Vision
- Architecture Repository
- Draft Architecture Definition Document
- Draft Architecture Requirements Specification
- Change Requests for existing programs and projects
- Candidate Architecture Roadmap components from Phases B,C, and D

Steps

11. Create Architecture Roadmap & Implementation and Migration Plan

10. Identify Transition Architectures

9. Identify and group major work packages

8. Formulate Implementation & Migration Strategy

7. Confirm readiness and risk for business transformation

6. Refine and validate dependencies

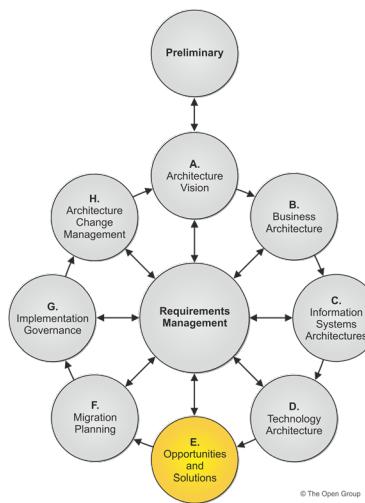
5. Consolidate and reconcile interoperability requirements

4. Review consolidated requirements across related business functions

3. Review and consolidate gap analysis results from Phases B to D

2. Determine business constraints for implementation

1. Determine corporate change attributes





Step 1: Determine Corporate Change Attributes

- Create an Implementation Factor Assessment and Deduction Matrix
- Assess Transition Capabilities of Corporate and Partner organisations
- Assess Transition Capabilities of the Enterprise and IT organisation

Step 2: Determine Business Constraints for Implementation

- Review Corporate Strategic Plan
- Review Corporate Line-of-Business Strategic Plans
- Review the Enterprise Architecture Maturity Assessment



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

- Create a Consolidated Gaps, Solutions, and Dependencies Matrix
- Review the Phase B, C, and D Gap Analysis Results
- Rationalise the Consolidated Gaps, Solutions, and Dependencies Matrix

Step 4: Review Consolidated Requirements Across Related Business Functions

- Assess the requirements, gaps, solutions and factors to identify a minimal set of requirements for work packages
- This functional perspective leads to the satisfaction of multiple requirements through the provision of shared solutions and services



Step 5: Consolidate and Reconcile Interoperability Requirements

- Consolidate Interoperability Requirements identified in previous phases
- Identify any constraints on Interoperability required by the potential set of solutions

Step 6: Refine and Validate Dependencies

- Refine the initial dependencies ensuring any constraints on the Implementation and Migration Plans are identified
- Key dependencies include:
 - Existing implementations of Business Services
 - Existing implementations of Information Systems Services
- Dependencies should be used to determine the sequence of implementation and coordination required
- They can also be used to identify logical increments of deliverables and when they can be delivered
- Once complete document as part of the Architecture Roadmap and any necessary Transition Architectures



Step 7: Confirm Readiness and Risk for Business Transformation

- Review the Business Transformation Readiness Assessment previously conducted in Phase A
- Determine the impact on the Architecture Roadmap and the Implementation and Migration Strategy
- It is important to identify, classify, and mitigate risks associated with the transformation effort
- Risks should be documented in the Consolidated Gaps, Solutions, and Dependencies matrix



Step 8: Formulate Implementation and Migration Strategy

- Determine an overall strategic approach to implementing the solutions and/or exploiting opportunities
 - Greenfield
 - Revolutionary
 - Evolutionary
- Determine an Implementation Approach
 - Quick win (snapshots)
 - Achievable targets
 - Value chain method (e.g. NASCIO methodology)
- These approaches and identified dependencies should become the basis for creation of work packages



Step 9: Identify and Group Major Work Packages

- Use the Consolidated Gaps, Solutions, and Dependencies matrix together with the Implementation Factor Assessment and Deduction matrix, to logically group activities into work packages
- Fill in the "Solution" column in the Consolidated Gaps, Solutions, and Dependencies matrix to recommend the proposed solution
- Indicate for every gap/activity whether the solution should be a new development, or based on an existing product, and/or a solution that can be purchased
- Classify every current system
 - Mainstream Systems
 - Contain Systems
 - Replace Systems
- analyse the Work Packages with Respect to Business Transformation and group into portfolios and projects



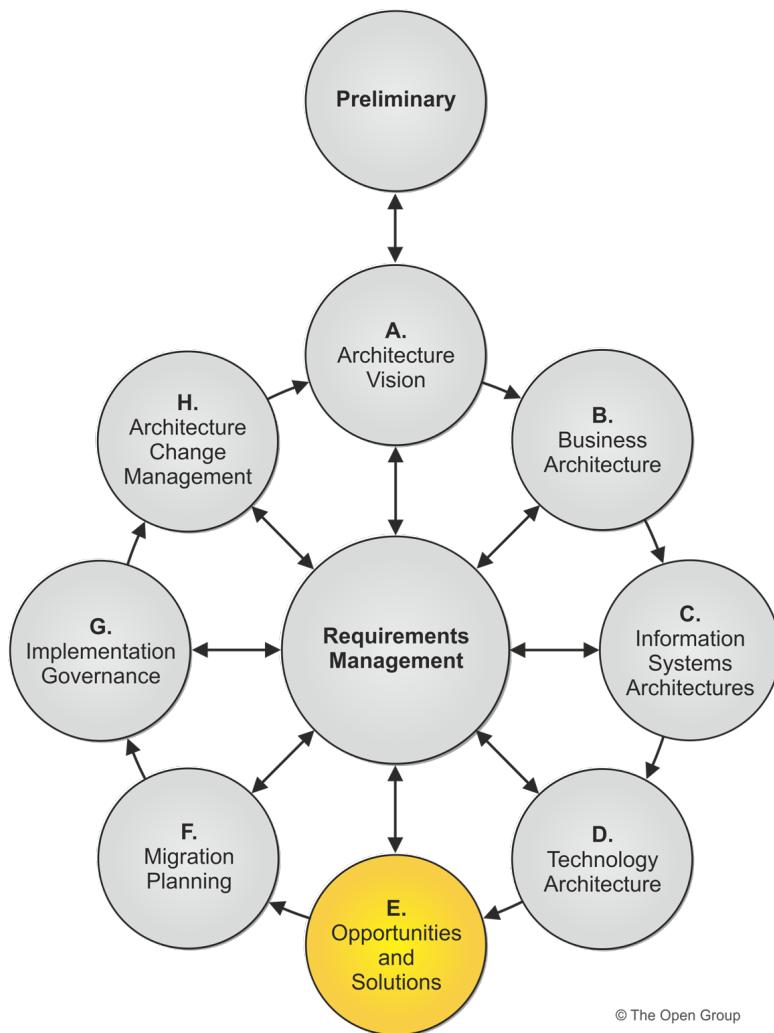
Step 10: Identify Transition Architectures

- Applicable when the scope of change to implement the Target Architecture requires an incremental approach
- Identifies one or more clear targets along the roadmap to realizing the Target Architecture
- Development 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

Step 11: Create the Architecture Roadmap & Implementation and Migration Plan

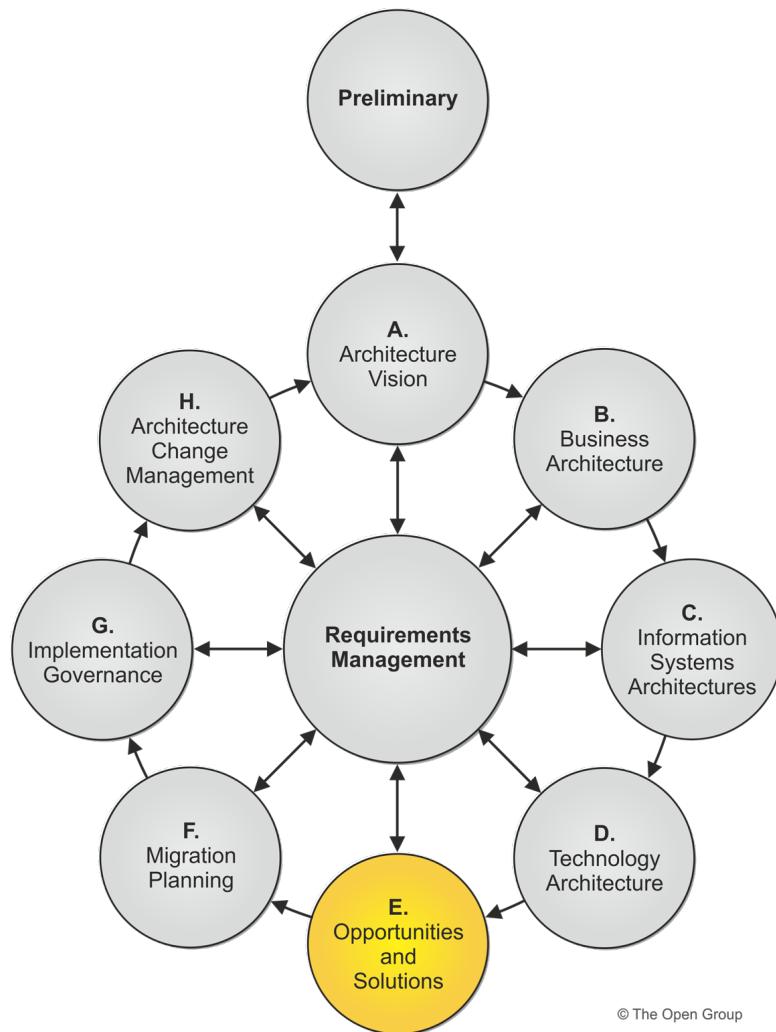
- Consolidate the work packages and Transition Architectures into the Architecture Roadmap, Version 0.1
 - The Architecture Roadmap must demonstrate how the selection and timeline of Transition Architectures and work packages realizes the Target Architecture
- The Implementation and Migration Plan, Version 0.1 must be aligned to the Architecture Roadmap and sufficient to identify the necessary projects and resource requirements to realize the roadmap
- Update the Architecture Vision, Architecture Definition Document, and Architecture Requirements Specification, if necessary

Phase E Outputs



- Statement of Architecture Work
- Architecture Vision
- Draft Architecture Definition Document, including:
 - Transition Architectures, if any
- Draft Architecture Requirements Specification, including
 - Consolidated Gaps, Solutions and Dependencies Assessment
- Capability Assessment, including:
 - Business Capability Assessment
 - IT Capability Assessment
- Architecture Roadmap, including:
 - Work Package portfolio
 - Identification of Transition Architectures, if any
 - Implementation Recommendations
- Implementation & Migration Plan (outline)

Summary

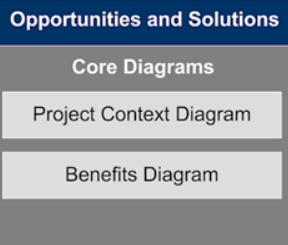
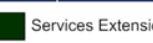


- Phase E is the first phase concerned with implementation
- It identifies the parameters of change, the phases and necessary projects
- The output forms the basis of the Implementation Plan

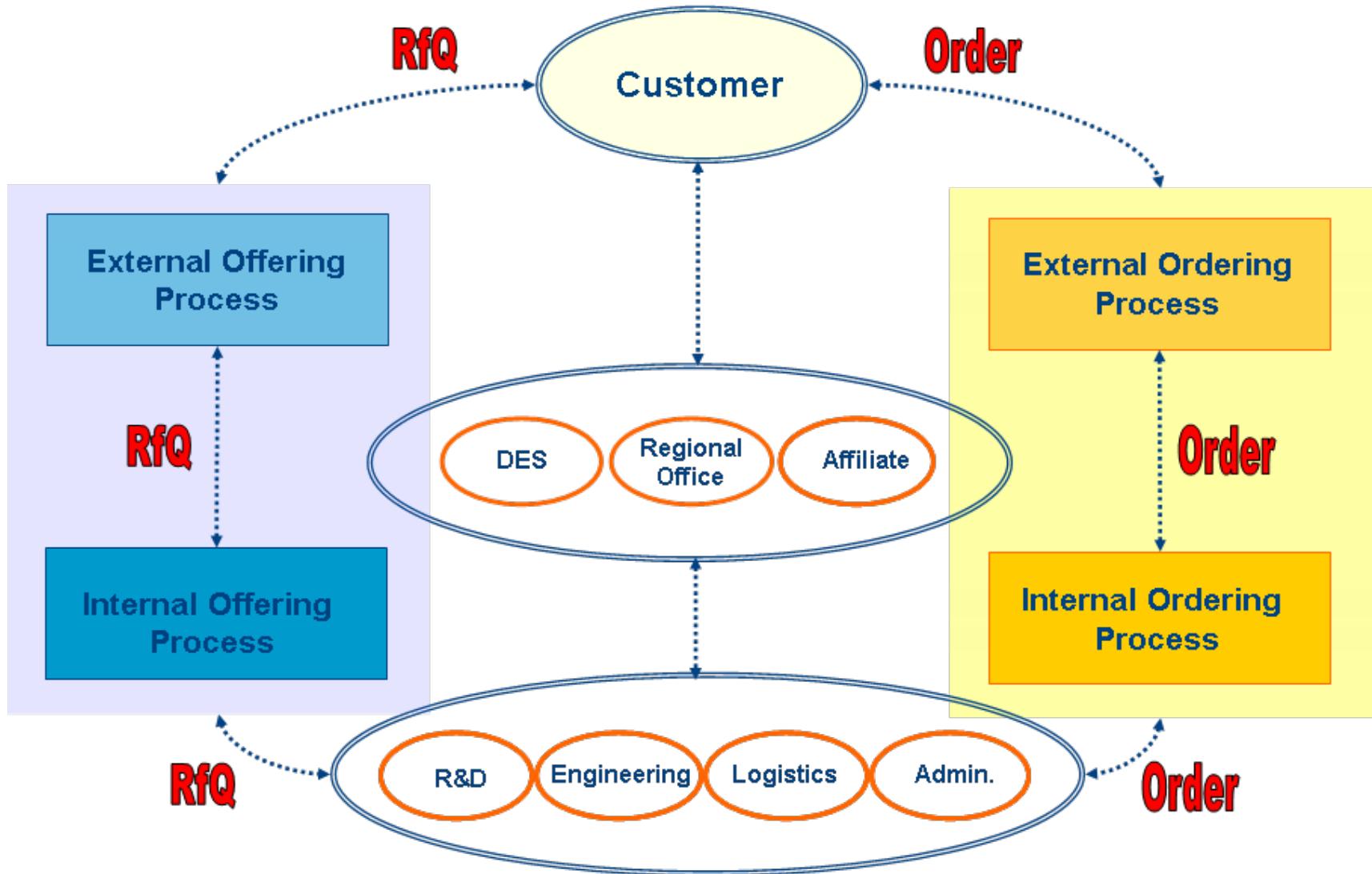
Summary

| Phase E: Opportunities & Solutions | | | |
|---|---|--|--|
| Objectives | Steps | Inputs | Outputs |
| <p>Generate the initial complete version of the Architecture Roadmap, based upon the gap analysis and candidate Architecture Roadmap components from Phases B, C, and D</p> <p>Determine whether an incremental approach is required, and if so identify Transition Architectures that will deliver continuous business value</p> <p>Define the overall solution building blocks to finalise the Target Architecture based on the Architecture Building Blocks (ABBs)</p> | <p>Determine/confirm key corporate change attributes</p> <p>Determine business constraints for implementation</p> <p>Review and consolidate gap analysis results from Phases B to D</p> <p>Review consolidated requirements across related business functions</p> <p>Consolidate and reconcile interoperability requirements</p> <p>Refine and validate dependencies</p> <p>Confirm readiness and risk for business transformation</p> <p>Formulate Implementation and Migration Strategy</p> <p>Identify and group major work packages</p> <p>Identify Transition Architectures</p> <p>Create Architecture Roadmap & Implementation and Migration Plan</p> | <p>Product information</p> <p>Request for Architecture Work</p> <p>Capability Assessment</p> <p>Communications Plan</p> <p>Planning methodologies</p> <p>organisational model for Enterprise Architecture</p> <p>Governance models and frameworks</p> <p>Tailored Architecture Framework</p> <p>Statement of Architecture Work</p> <p>Architecture Vision</p> <p>Architecture Repository</p> <p>Draft Architecture Definition Document</p> <p>Draft Architecture Requirements Specification</p> <p>Change Requests for existing programs and projects</p> <p>Candidate Architecture Roadmap components from Phases B, C, and D</p> | <p>Statement of Architecture Work, updated if necessary</p> <p>Architecture Vision, updated if necessary</p> <p>Draft Architecture Definition Document, including:</p> <ul style="list-style-type: none"> • Transition Architecture, number and scope, if any <p>Draft Architecture Requirements Specification, updated if necessary</p> <p>Consolidated and validated Architecture Roadmap</p> <p>Capability Assessment, including:</p> <ul style="list-style-type: none"> • Business Capability • IT Capability <p>Architecture Roadmap, including:</p> <ul style="list-style-type: none"> • Work Package portfolio • Identification of Transition Architectures, if any • Impact analysis – project list • Implementation Recommendations <p>Implementation and Migration Plan (outline), including:</p> <ul style="list-style-type: none"> • Implementation and Migration Strategy |

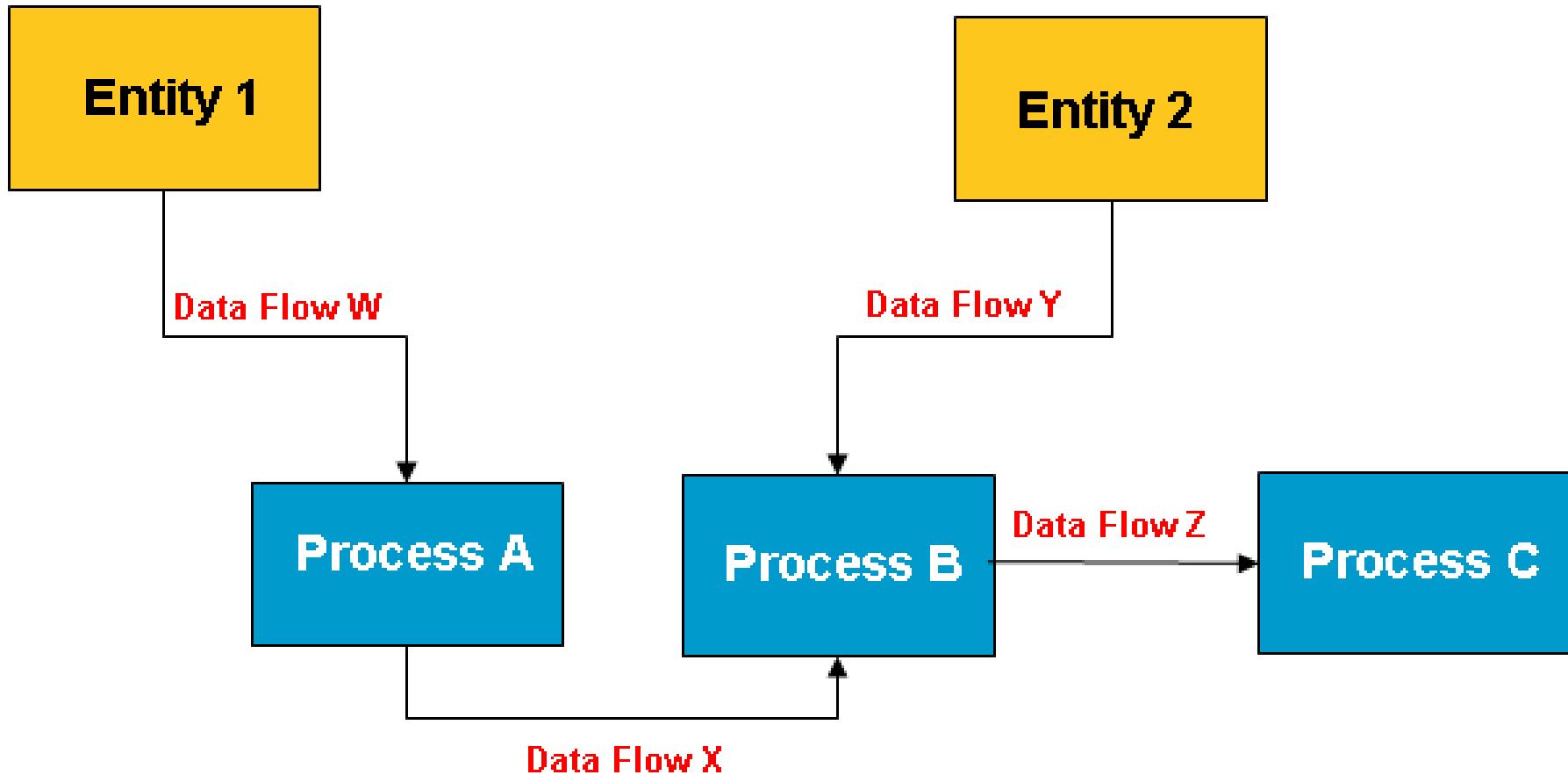
TOGAF Version 9.2 Artifacts

| Preliminary | Business Architecture | Data Architecture | Application Architecture | Technology Architecture |
|---|---|---|--|--|
| Catalogs Principles Catalog | Catalogs Organization/Actor Catalog Value Stream Catalog Role Catalog Business Capabilities Catalog Business Service/Function Catalog Value Stream Stages Catalog Location Catalog Driver/Goal/Objective Catalog Process/Event/Control/ Product Catalog Contract/Measure Catalog | Catalogs Data Entity/Data Component Catalog | Catalogs Application Portfolio Catalog Interface Catalog | Catalogs Technology Standards Catalog Technology Portfolio Catalog |
| Architecture Vision Matrices Stakeholder Map Matrix | Matrices Business Interaction Matrix Strategy/Capability Matrix Actor/Role Matrix Capability/Organization Matrix Value Stream/Capability Matrix | Matrices Data Entity/Business Function Matrix Application/Data Matrix | Matrices Application/Organization Matrix Role/Application Matrix Application/Function Matrix Application Interaction Matrix | Matrices Application/Technology Matrix |
| Core Diagrams Value Chain Diagram Solution Concept Diagram | Core Diagrams Business Footprint Diagram Business Service/ Information Diagram Functional Decomposition Diagram Product Lifecycle Diagram Business Model Diagram Business Capability Map Value Stream Map Organization Map | Core Diagrams Conceptual Data Diagram Logical Data Diagram Data Dissemination Diagram | Core Diagrams Application Communication Diagram Application and User Location Diagram Application Use-Case Diagram | Core Diagrams Environments and Locations Diagram Platform Decomposition Diagram |
| Requirements Management Catalogs Requirements Catalog | Extension Diagrams Goal/Objective/Service Diagram Business Use-Case Diagram Organization Decomposition Diagram Process Flow Diagram Event Diagram | Extension Diagrams Data Security Diagram Data Migration Diagram Data Lifecycle Diagram | Extension Diagrams Enterprise Manageability Diagram Process/Application Realization Diagram Software Engineering Diagram Application Migration Diagram Software Distribution Diagram | Extension Diagrams Processing Diagram Networked Computing/ Hardware Diagram Network and Communications Diagram |
| Opportunities and Solutions Core Diagrams Project Context Diagram Benefits Diagram | | | | © The Open Group |
|  |  Infrastructure Consolidation Extension |  Governance Extension |  Motivation Extension |  Process Modeling Extension |
| |  Data Modeling Extension |  Services Extension |  Core Content | |

Project Context Diagram



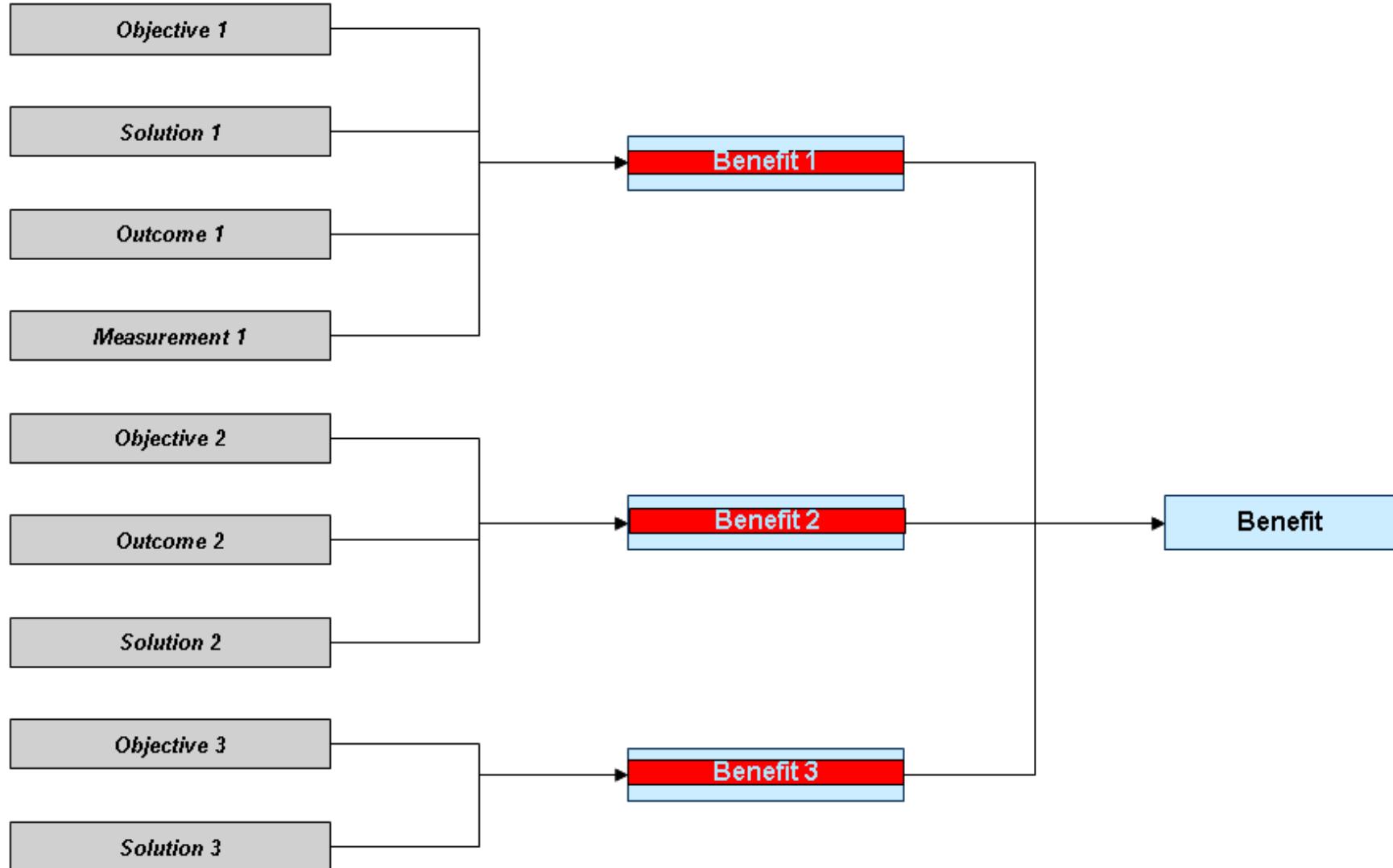
Project Context Diagram





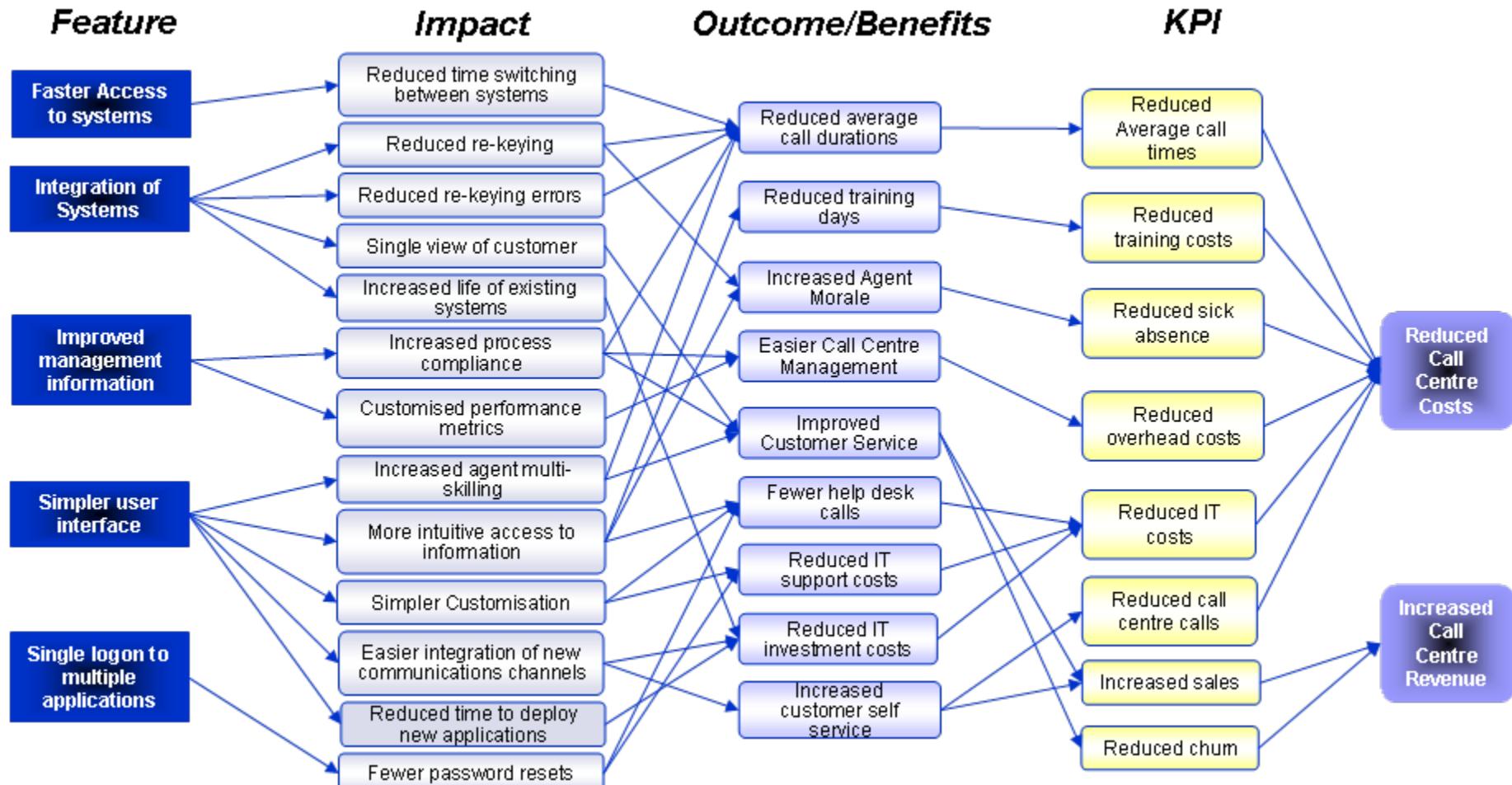
E

Benefits Diagram



E

Benefits Diagram





Test Yourself Question

Q. Which of the following is the most successful strategy for Phase E?

- A Focus on the application systems that are relevant to the enterprise
- B Focus on projects that will deliver short-term payoffs
- C Focus on top-down development
- D Reverse engineering
- E Trial and error



Module 25

Phase F:

Migration Planning



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Module Objectives

The objectives of this module are to understand:

- The objectives of Phase F, Migration Planning
- What it consists of
- What inputs are needed for it
- What the outputs are

Phase F Objectives

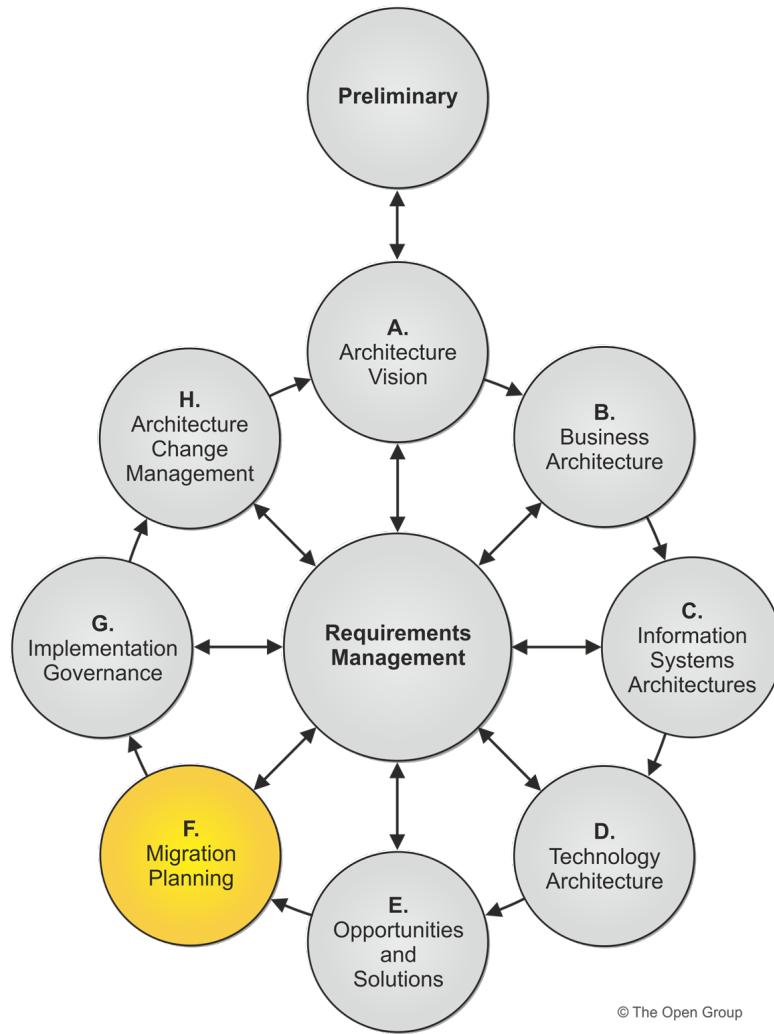
- Finalise the Architecture Roadmap and the supporting Implementation and Migration Plan
- Ensure that the Implementation and Migration Plan is coordinated with the enterprise's approach to managing and implementing change in the enterprise's overall change portfolio
- Ensure that the business value and cost of work packages and Transition Architectures is understood by key stakeholders



Approach

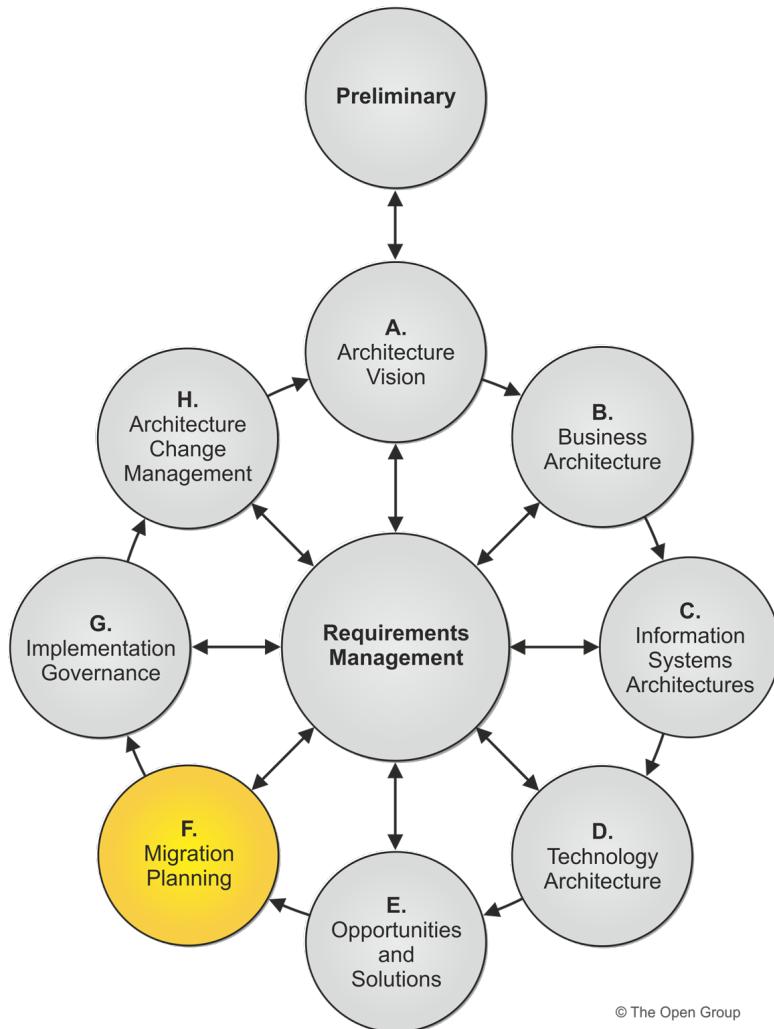
- The focus is creation of the Implementation and Migration plan in co-operation with project and portfolio managers
- Activities include the dependencies, costs, and benefits of the various migration projects within the context of the enterprise's other activity

Phase F: Inputs



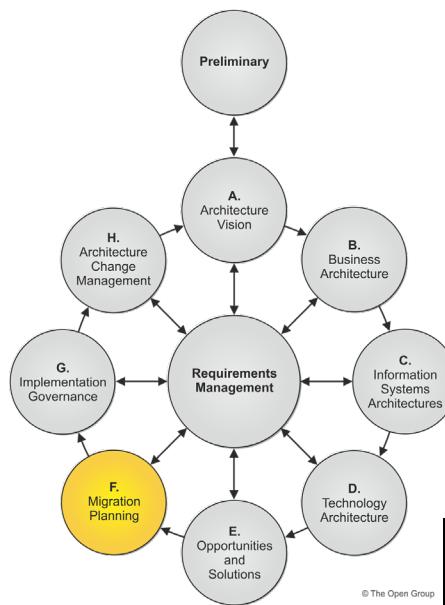
- Request for Architecture Work
- Communications Plan
- Organisational model for Enterprise Architecture
- Governance Models and Frameworks
- Tailored Architecture Framework
- Statement of Architecture Work
- Architecture Vision
- Architecture Repository

Phase F: Inputs



- Draft Architecture Definition Document, including:
 - Transition Architectures, if any
- Draft Architecture Requirements Specification
- Change Requests for existing programs and projects
- Architecture Roadmap, including:
 - Identification of work packages
 - Identification of Transition Architectures
 - Implementation Factor Assessment and Deduction Matrix
- Capability Assessment
- Implementation and Migration Plan (outline)

Steps



1. Confirm management framework interactions for the Implementation & Migration Plan
2. Assign a business value to each work package
3. Estimate resource requirements, project timings, and availability/delivery vehicle
4. Prioritize migration projects through the conduct of a cost/benefit assessment and risk validation
5. Confirm Architecture Roadmap and Architecture Definition Document
6. Complete the Implementation & Migration Plan
7. Complete the architecture development cycle and document lessons learned

Step 1: Confirm Management Framework Interactions for the Implementation and Migration Plan

- Coordinate the Implementation and Migration Plan with the management frameworks in use within the organisation
 - Business Planning
 - Enterprise Architecture
 - Portfolio/Project Management
 - Operations Management
- The outcome of this step may well be that the Implementation and Migration Plan could be part of a different plan produced by another one of the frameworks with Enterprise Architecture participation



Step 2: Assign a Business Value to Each Work Package

- Establish what constitutes business value within the organisation, how value can be measured, and then apply this to each one of the projects and project increments
- If Capability-Based Planning is in use, then business values associated with the capabilities and associated capability increments should be used to assign the business values for deliverables
- Use the work packages as a basis of identifying projects that will be in the Implementation and Migration Plan
- Risks should be assigned to the projects by aggregating risks identified in the Consolidated Gaps, Solutions, and Dependencies Matrix
- Estimate the business value for each project using the Business Value Assessment Technique



Step 3: Estimate Resource Requirements, Project Timings, and Availability/Delivery Vehicle

- Determine costs to create the capability
- Determine costs to run and sustain the capability
- Identify opportunities to offset costs by decommissioning existing systems
- Assign resources to each activity and aggregate them at the project increment and project level



Step 4: Prioritise the Migration Projects through the Conduct of a Cost/Benefit Assessment and Risk Validation

- Prioritize the projects by ascertaining their business value against the cost of delivering them
- Determine the net benefit of all of the SBBs delivered by the projects
- Verify that the risks have been effectively mitigated and factored in
- Gain the requisite consensus to create a prioritized list of projects that will provide the basis for resource allocation



Step 5: Confirm Architecture Roadmap and Update Architecture Definition Document

- Update the Architecture Roadmap including any Transition Architectures
 - Review the work to date to assess what the time-spans between Transition Architecture should be, taking into consideration the increments in business value and capability and other factors, such as risk.
 - Once the capability increments have been finalised, consolidate the deliverables by project.
 - A Transition Architecture State Evolution Table can be used to show the proposed state of the domain architectures
- If the implementation approach has shifted as a result of confirming the implementation increments, update the Architecture Definition Document.



Step 6: Generate the Implementation & Migration Plan

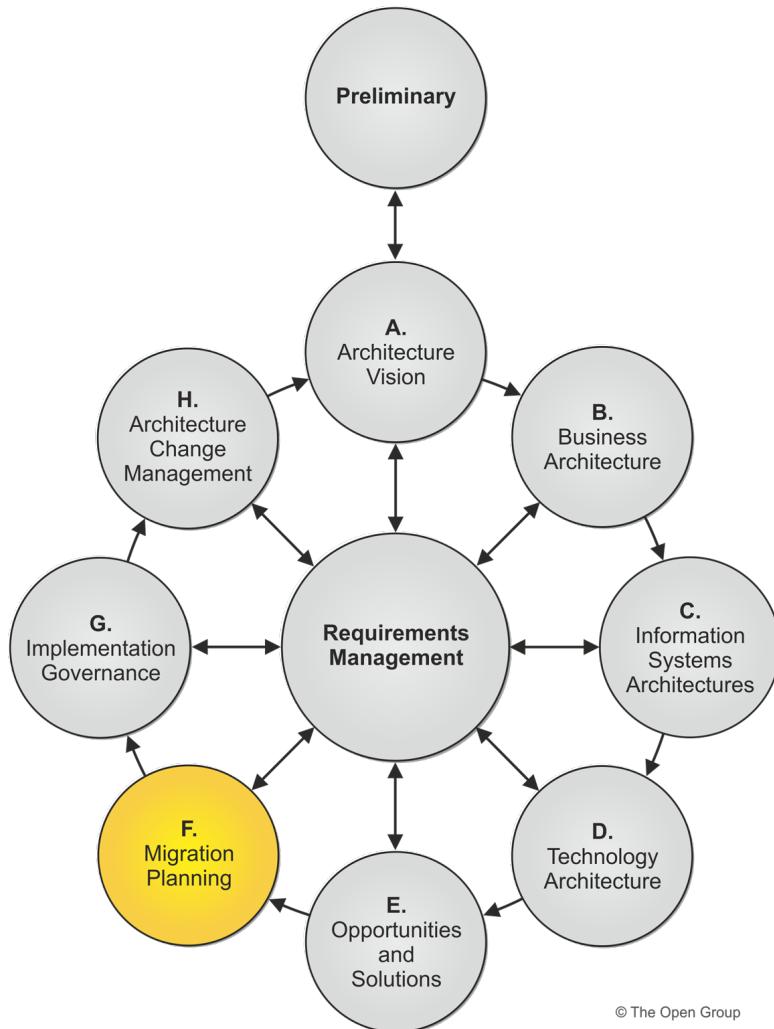
- Integrate all of the projects and activities as well as dependencies and impact of change into a project plan
- Any Transition Architectures will act as portfolio milestones
- All external dependencies should be captured and included, and the overall availability of resources assessed
- Project plans may be included within the Implementation and Migration Plan



Step 7: Complete the Architecture Development Cycle and Document Lessons Learned

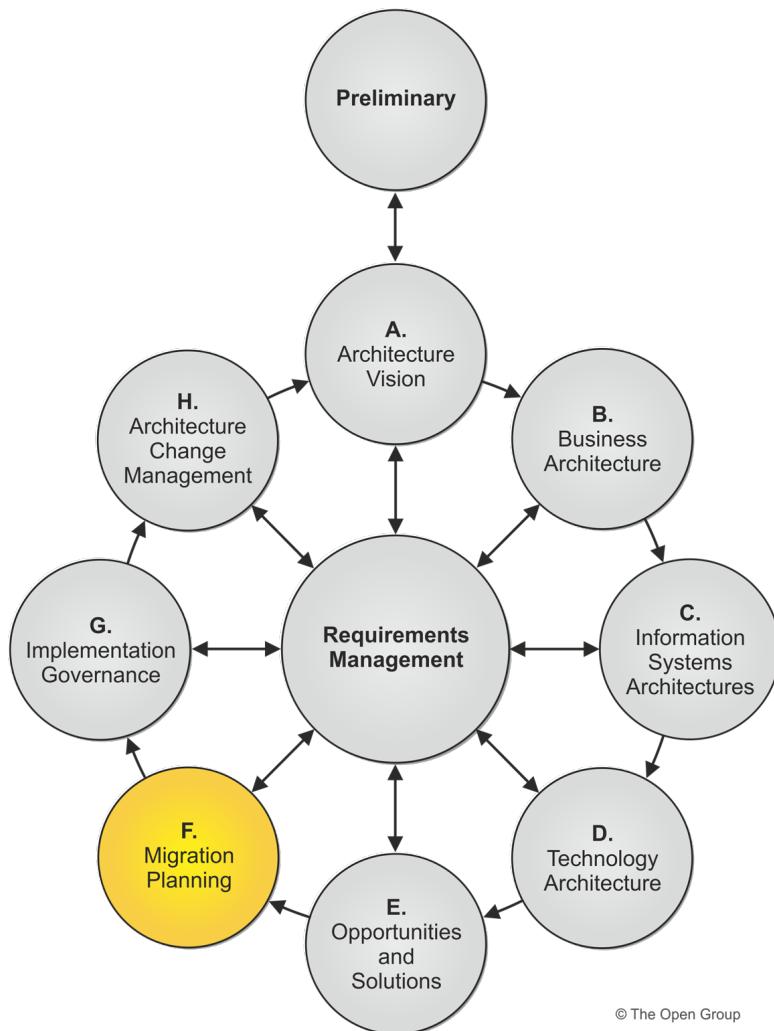
- This step transitions governance from the development of the architecture to the realization of the architecture
- Lessons learned during the development of the architecture should be documented and captured by the appropriate governance process in Phase H as inputs to managing the Architecture Capability

Phase F Outputs



- Implementation and Migration Plan (detailed)
- finalised Architecture Definition Document, including:
 - finalised Transition Architectures, if any
- finalised Architecture Requirements Specification
- finalised Architecture Roadmap
- Re-Usable ABBs
- Requests for Architecture Work for a new iteration of the ADM (if any)
- Implementation Governance Model
- Change Requests

Summary



- Phase F addresses migration planning – how to move from the Baseline to the Target
- It includes creating the finalised Architecture Definition Document, Architecture Roadmap and the detailed Implementation & Migration Plan
- At the completion of this phase the preparation for implementation has been completed

Summary

| Phase F: Migration Planning | | | |
|--|--|--|--|
| Objectives | Steps | Inputs | Outputs |
| <p>finalise the Architecture Roadmap and the supporting Implementation and Migration Plan</p> <p>Ensure that the Implementation and Migration Plan is coordinated with the enterprise's approach to managing and implementing change in the enterprise's overall change portfolio</p> <p>Ensure that the business value and cost of work packages and Transition Architectures is understood by key stakeholders</p> | <p>Confirm management framework interactions for Implementation and Migration Plan</p> <p>Assign a business value to each work package</p> <p>Estimate resource requirements, project timings, and availability/delivery vehicle</p> <p>Prioritize the migration projects through the conduct of a cost/benefit assessment and risk validation</p> <p>Confirm Architecture Roadmap and update Architecture Definition Document</p> <p>Complete the Implementation Roadmap and Migration Plan</p> <p>Complete the architecture development cycle and document lessons learned</p> | <p>Request for Architecture Work</p> <p>Communications Plan</p> <p>organisational Model for Enterprise Architecture</p> <p>Governance models and frameworks</p> <p>Tailored Architecture Framework</p> <p>Statement of Architecture Work</p> <p>Architecture Vision</p> <p>Architecture Repository</p> <p>Draft Architecture Definition Document, including:</p> <ul style="list-style-type: none"> · Transition Architectures, if any <p>Draft Architecture Requirements Specification</p> <p>Change Requests for existing programs and projects</p> <p>Architecture Roadmap</p> <p>Capability Assessment, including:</p> <ul style="list-style-type: none"> · Business Capability · IT Capability <p>Implementation and Migration Plan (outline), including:</p> <ul style="list-style-type: none"> · High-level Implementation and Migration Strategy | <p>Implementation and Migration Plan (detailed), including:</p> <ul style="list-style-type: none"> · Implementation and Migration Strategy · Project and portfolio breakdown of the implementation · Project charters (optional) <p>finalised Architecture Definition Document, including:</p> <ul style="list-style-type: none"> · finalised Transition Architectures, if any <p>finalised Architecture Requirements Specification</p> <p>finalised Architecture Roadmap</p> <p>Re-usable Architecture Building Blocks</p> <p>Requests for Architecture Work for a new iteration of the ADM cycle (if any)</p> <p>Implementation Governance Model</p> <p>Change Requests for the Architecture Capability arising from lessons learned</p> |



Test Yourself Question

- Q. When preparing the detailed Migration Plan, which of the following should not be a consideration?
- A Risk Assessment
 - B Project Priorities
 - C Availability of Resources
 - D Cost/benefit assessment
 - E Choice of target platform





Module 26

Phase G:

Implementation Governance



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Module Objectives

The objectives of this module are to understand:

- The objectives of Phase G, Implementation Governance
- What it consists of
- What inputs are needed for it
- What the outputs are

Phase G Objectives

- Ensure conformance with the Target Architecture by implementation projects
- Perform appropriate Architecture Governance functions for the solution and any implementation-driven architecture Change Requests



Approach

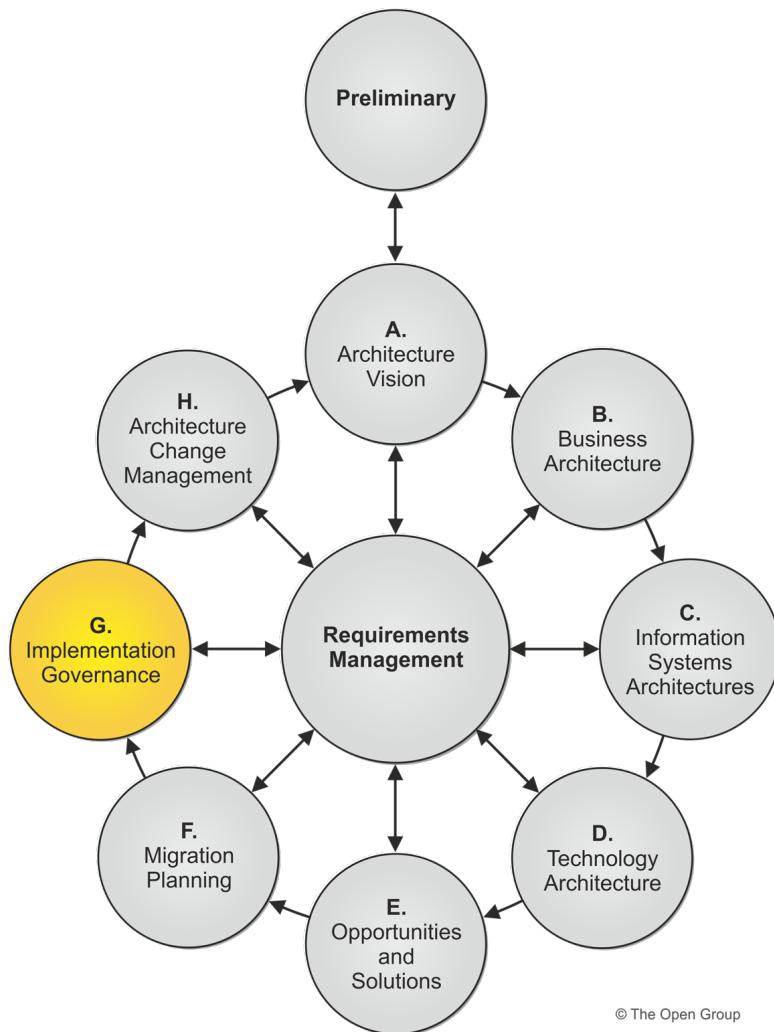
- Phase G relates the architecture to the implementation through the Architecture Contract
- The information for successful management of the projects must be brought together
- The development happens in parallel with Phase G
- Establish an implementation program that will enable the delivery of the 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 solution



Approach

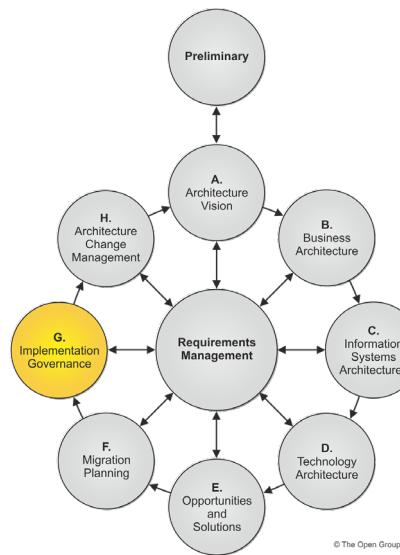
- Establish the connection between the architecture and implementation organisation through the Architecture Contract
- Project details are developed, including:
 - Name, description, and objectives
 - Scope, deliverables, and constraints
 - Measures of effectiveness
 - Acceptance criteria
 - Risks and issues

Phase G: Inputs



- Request for Architecture Work
- Capability Assessment
- organisational model for EA
- Tailored Architecture Framework
- Statement of Architecture Work
- Architecture Vision
- Architecture Repository
- Architecture Definition Document
- Architecture Requirements Specification
- Architecture Roadmap
- Implementation Governance Model
- Architecture Contract
- Request for Architecture Work from E and F
- Implementation and Migration Plan

Steps



1. Confirm scope and priorities for deployment with the development management
2. Identify deployment resources and skills
3. Guide development of solutions deployment
4. Perform EA compliance reviews
5. Implement business and IT operations
6. Do post-implementation review, close the implementation

Step 1: Confirm Scope and Priorities

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

Step 2: Identify Deployment Resources and Skills

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

Step 3: Guide Development of Solutions Deployment

- Formulate project recommendations
- Document Architecture Contract
- Update Enterprise Continuum directory and repository for solutions
- Guide development of business & IT operating models for services
- Provide service requirements derived from EA
- Guide definition of business & IT operational requirements
- Carry out gap analysis: Solution Architecture vs. operations
- Produce Implementation Plan

Step 4: Perform EA Compliance Reviews

- Review ongoing implementation governance and architecture compliance for each BB
- Conduct post-development reviews
- Close development part of deployment projects

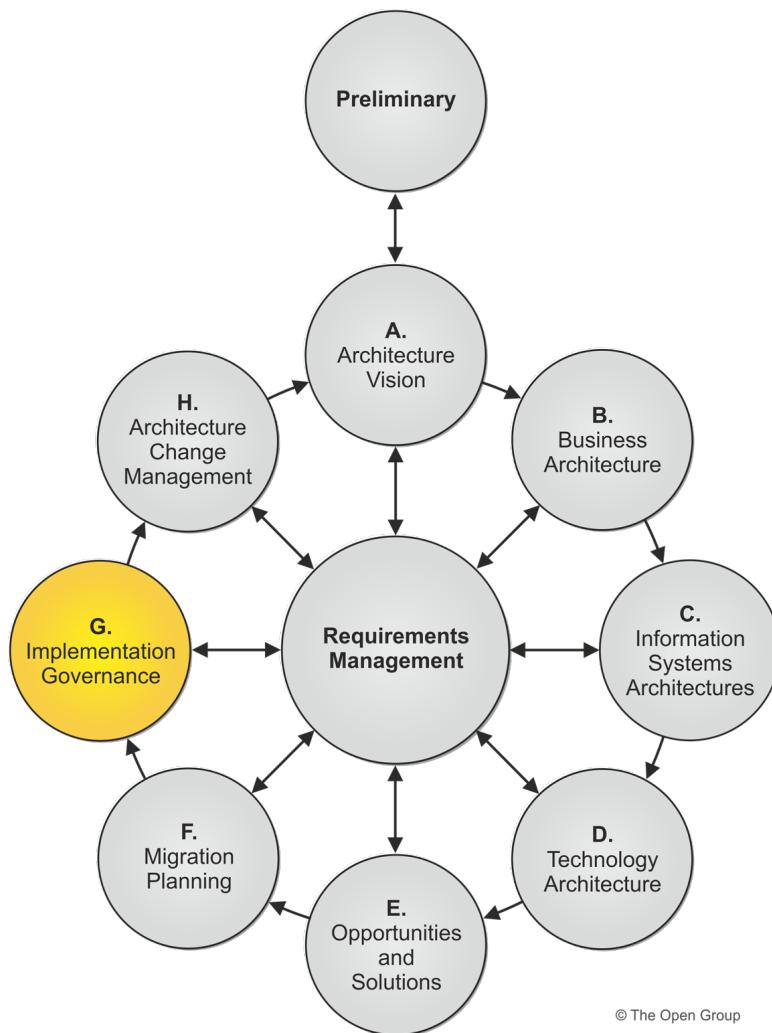
Step 5: Implement Business and IT Operations

- Carry out deployment projects including: IT services delivery implementation; business services delivery implementation; skills development & training implementation; communications documentation publication
- Publish new Baseline Architectures in the Architecture Repository and update other repositories, such as operational configuration management stores

Step 6: Do Post-Implementation Review, Close the Implementation

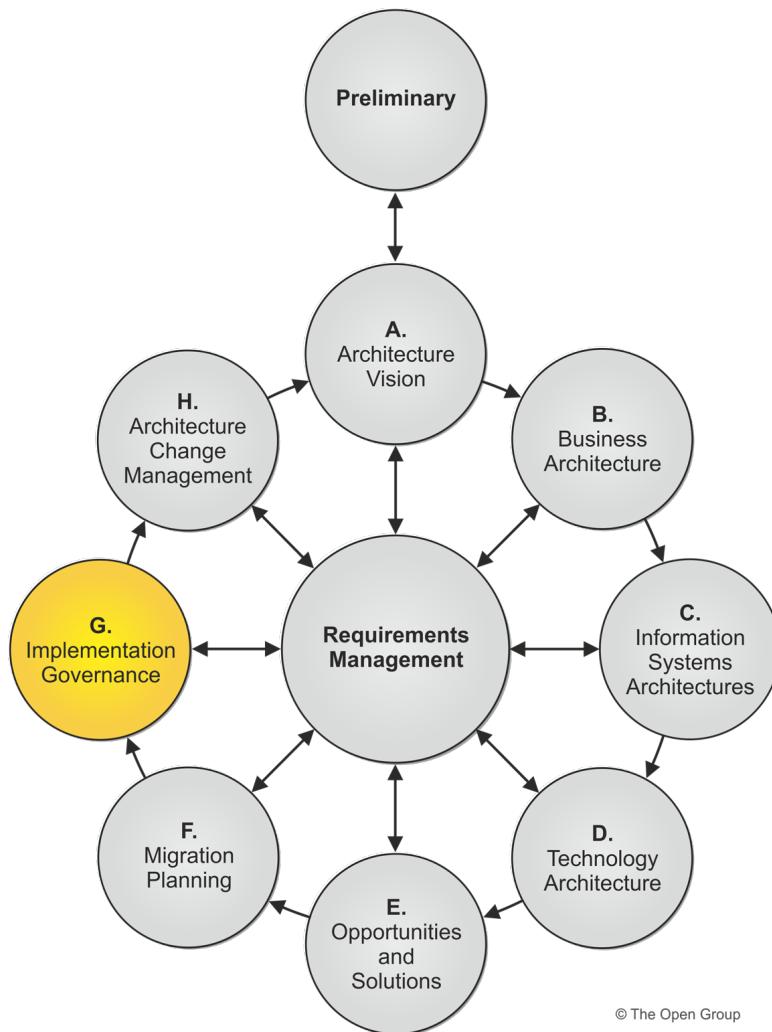
- Conduct post-implementation reviews
- Publish reviews and close projects

Phase G Outputs



- Architecture Contract (signed)
- Compliance Assessments
- Change Requests
- Architecture-compliant solutions deployed, including:
 - Implemented system
 - Populated Architecture Repository
 - Recommendations and dispensations
 - Service delivery requirements
 - Performance metrics
 - SLAs
 - Architecture Vision
 - Architecture Definition Document
 - Transition Architecture
 - Business and IT operating models

Summary



- Phase G defines architecture constraints on the implementation projects and constructs and obtains signatures on an Architecture Contract
- The contract and documentation is delivered to the implementation team
- The phase includes governing the architecture through implementation by compliance reviews and by risk monitoring

Summary

| Phase G: Implementation Governance | | | |
|--|---|---|--|
| Objectives | Steps | Inputs | Outputs |
| <p>Ensure conformance with the Target Architecture by implementation projects</p> <p>Perform appropriate Architecture Governance functions for the solution and any implementation-driven architecture Change Requests</p> | <ul style="list-style-type: none"> Confirm scope and priorities for deployment with development management Identify deployment resources and skills Guide development of solutions deployment Perform Enterprise Architecture compliance reviews Implement business and IT operations Perform post-implementation review and close the implementation | <ul style="list-style-type: none"> Request for Architecture Work Capability Assessment organisational Model for Enterprise Architecture Tailored Architecture Framework Statement of Architecture Work Architecture Vision Architecture Repository Architecture Definition Document Architecture Requirements Specification Architecture Roadmap Implementation Governance Model Architecture Contract Request for Architecture Work identified in Phases E and F Implementation and Migration Plan | <ul style="list-style-type: none"> Architecture Contract (signed) Compliance Assessments Change Requests Architecture-compliant solutions deployed, including: <ul style="list-style-type: none"> The architecture-compliant implemented system Populated Architecture Repository Architecture compliance recommendations and dispensations Recommendations on service delivery requirements Recommendations on performance metrics Service Level Agreements (SLAs) Architecture Vision, updated post-implementation Architecture Definition Document, updated post-implementation Business and IT operating models for the implemented solution |



Test Yourself Question

- Q. Which one of the following provides a foundation for governing the implementation of the recommended projects?
- A Impact Analysis
 - B Principles
 - C Strategic Plan
 - D Architecture Contracts
 - E Risk Assessment



Module 27

Phase H:

Architecture Change Management



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Module Objectives

The objectives of this module are to understand:

- The objectives of Phase H, Architecture Change Management
- What it consists of
- What inputs are needed for it
- What the outputs are

Phase H 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



Approach

- The goal of an architecture change management process is to ensure that the architecture achieves its original target business value.
- This can be done by:
 1. ensuring that changes to the architecture are managed properly
 2. supporting a dynamic architecture.
- The process will determine the circumstances under which:
 1. The architecture will be permitted to change after deployment, and the process for this.
 2. The ADM will be used again.



Exercise: Drivers for Architecture Change

1. Brainstorm as many examples of technology-related drivers for change as you can.
1. Brainstorm as many examples of business-related drivers for change as you can.



Change Management Process

There are three main categories of architecture change:

1. **Simplification:** this can be handled via change management techniques.
2. **Incremental:** this may be handled via change management techniques, or it may require partial re-architecting.
3. **Re-architecting:** this requires putting the whole architecture through the architecture development cycle again.

Exercise: why might each of these changes occur?

Change Management Process

To determine whether a change is simplification, incremental, or re-architecting:

1. Register all events that may impact the architecture
2. Allocate resources and management for the architecture tasks
3. The process (or role) responsible for resources has to make an assessment of what should be done
4. Evaluate the impact

Maintenance versus Redesign

If the change:

- Impacts 2 stakeholders or more, then it is likely to require an architecture redesign and re-entry to the ADM
- Impacts only 1 stakeholder, then it is likely to be a candidate for change management
- Can be allowed under a dispensation, then it is likely to be a candidate for change management

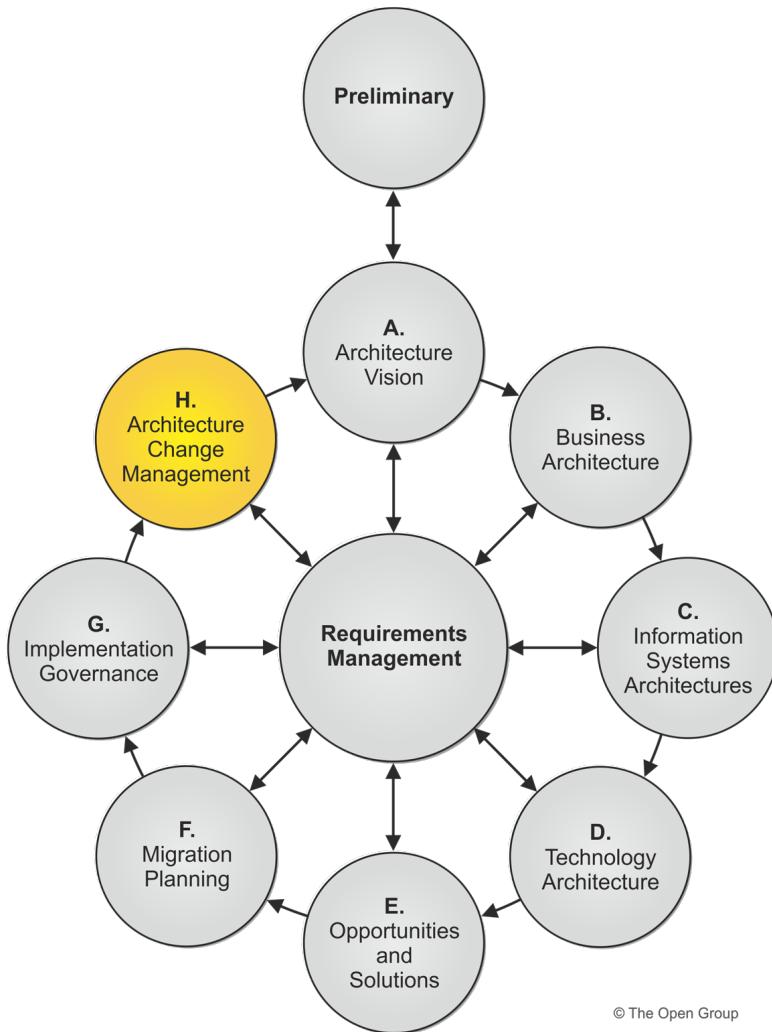


Change Impact Exercise

Q. Determine the change impact of the following scenarios:

1. The impact of the change is significant for the business strategy.
2. A new technology or standard emerges.
3. The change is at an infrastructure level; for example, 10 systems are reduced to 1 system.
4. The Foundation Architecture needs to be re-aligned with the business strategy.
5. Substantial change is required to components and guidelines for use in deployment of the architecture.

Phase H: Inputs



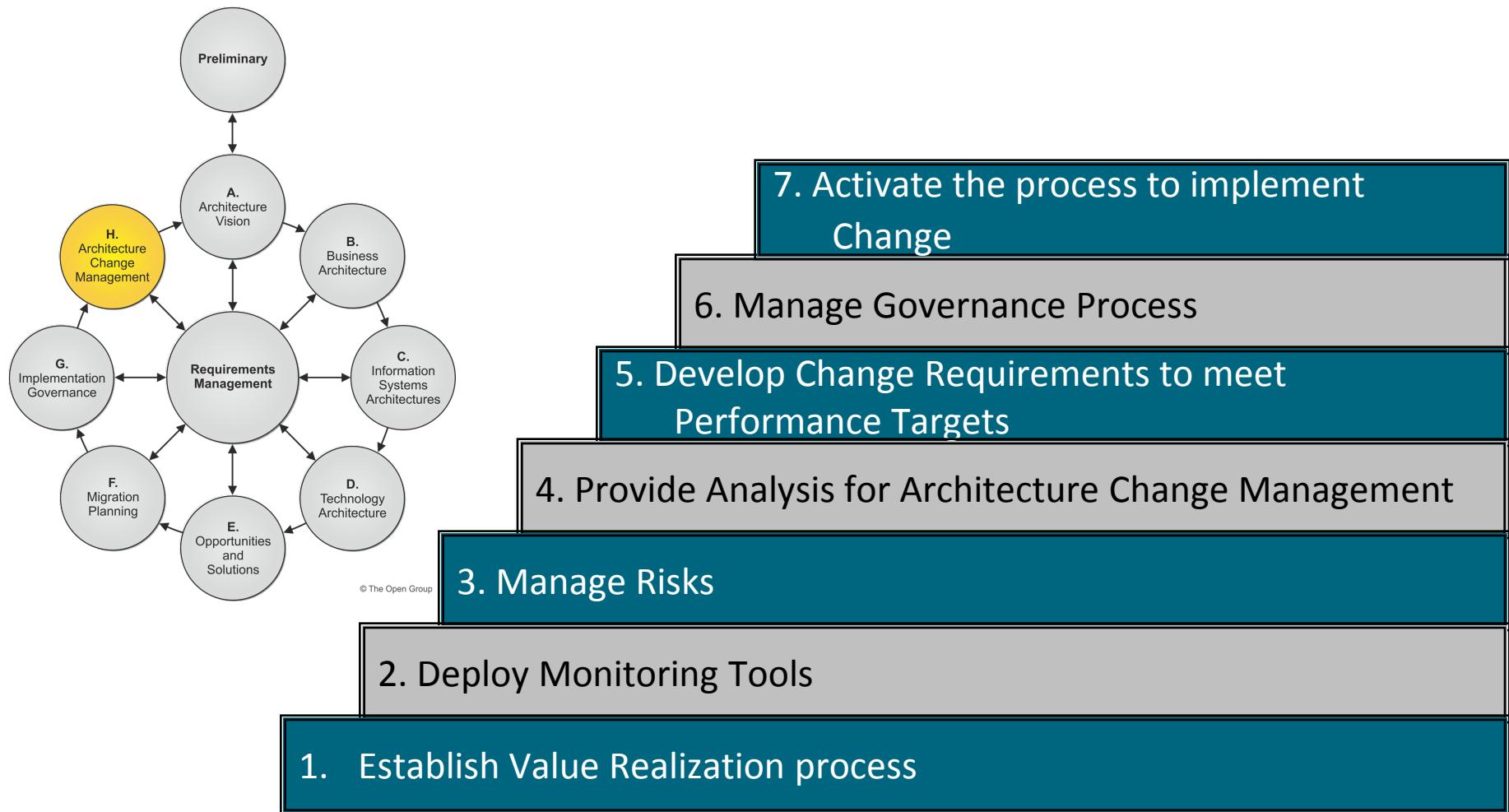
- Request for Architecture Work
- organisational model for EA
- Tailored Architecture Framework
- Statement of Architecture Work
- Architecture Vision
- Architecture Repository
- Architecture Definition document
- Architecture Requirements Specification
- Architecture Roadmap
- Change Requests (due to technology changes, business changes, lessons learned)
- Implementation Governance Model
- Architecture Contract
- Compliance Assessments
- Implementation and Migration Plan



Change Requests

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

Steps



Step 1. Establish Value Realisation Process

- Influence business projects to exploit the Enterprise Architecture for value realisation (outcomes)

Step 2. Deploy Monitoring Tools

- Monitor technology changes which could impact the Baseline Architecture
- Monitor business changes which could impact the 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 performances and usage
- Determine and track business continuity requirements

Step 3. Manage Risks

- Manage Enterprise Architecture risks and provide recommendations
- See Chapter 31 Risk Management

Step 4. Provide Analysis for Architecture Change Management

- Analyse performance
- Conduct Enterprise Architecture performance reviews with service management
- Assess Change Requests and reporting to ensure that the expected value realisation and Service Level Agreement (SLA) expectations of the customers are met
- Undertake a gap analysis of the performance of the Enterprise Architecture
- Ensure change management requests adhere to the Enterprise Architecture governance and framework

Step 5. Develop Change Requirements to Meet Performance Targets

- Make recommendations on change requirements
 - To meet performance requirements
 - To develop a position to act

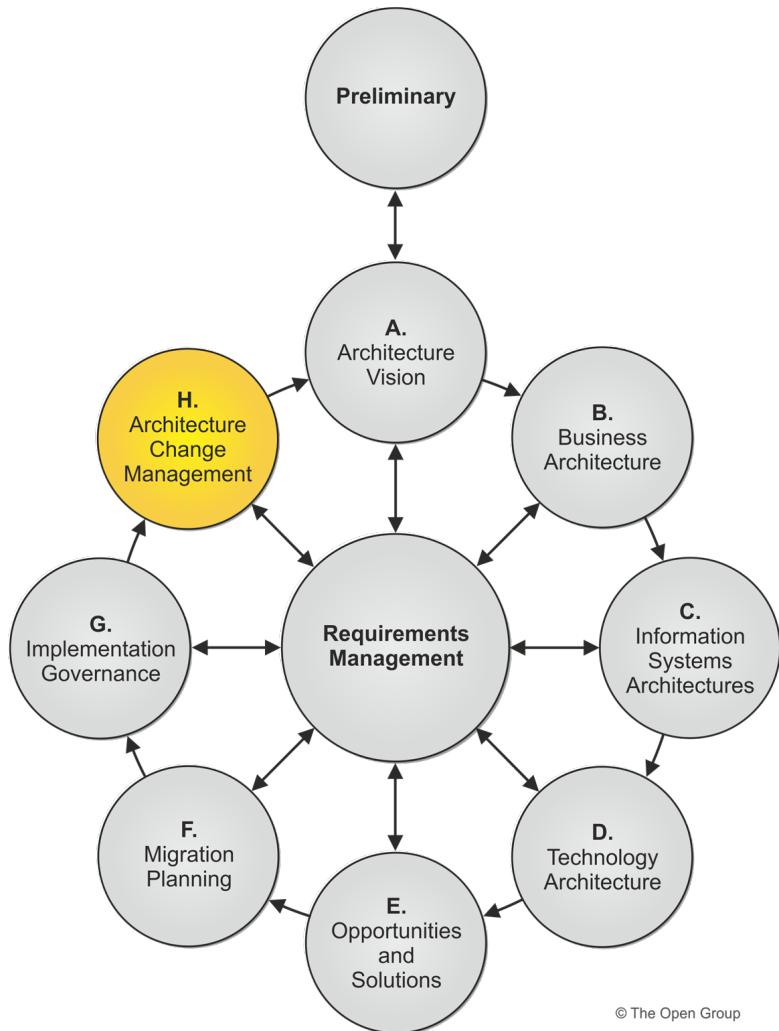
Step 6. Manage Governance Process

- Arrange meeting of Architecture Board (or other Governing Council)
- Hold meeting of the Architecture Board with the aim of the meeting to decide on handling changes (technology and business and dispensations)

Step 7. Activate the Process to Implement Change

- Produce a new Request for Architecture Work and request for investment
- Ensure any changes implemented in this phase are captured and documented in the Architecture Repository

Phase H Outputs



- Architecture updates
- Changes to architecture framework and principles
- New Request for Architecture Work, to initiate another cycle of the ADM
- Statement of Architecture Work
- Architecture Contract
- Compliance Assessments



Business Users' Architecture Contract

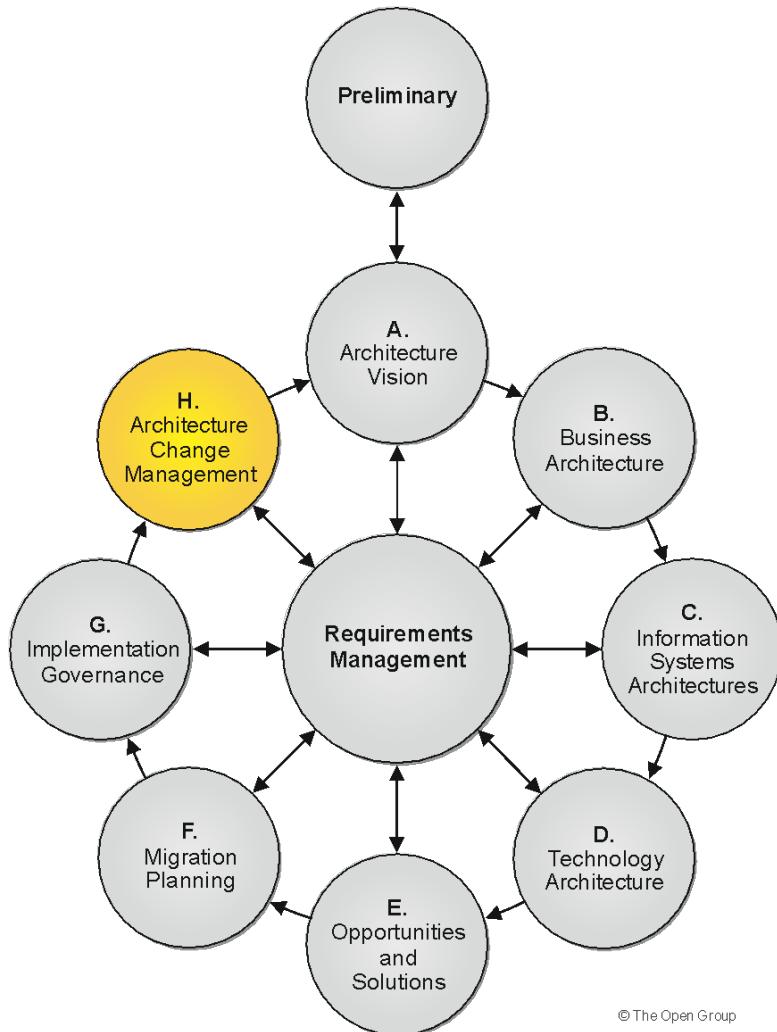
- Introduction and background
- The nature of the agreement
- Scope
- Strategic requirements
- Conformance requirements
- Architecture adopters
- Time window
- Architecture business metrics
- Service architecture (includes Service Level Agreement (SLA))



Request for Architecture Work

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

Summary



- Phase H Change Management
 - Ensures that changes to the architecture are managed in a cohesive and controlled manner
 - Establishes and supports the architecture to provide flexibility to evolve the architecture rapidly in responses to changes in technology and business

Summary

| Phase H: Architecture Change Management | | | |
|---|---|---|--|
| Objectives | Steps | Inputs | Outputs |
| Ensure that the architecture lifecycle is maintained | Establish value realization process | Request for Architecture Work | Architecture updates |
| Ensure that the Architecture Governance Framework is executed | Deploy monitoring tools Manage risks | organisational Model for Enterprise Architecture Tailored Architecture Framework | Changes to architecture framework and principles |
| Ensure that the Enterprise Architecture Capability meets current requirements | Provide analysis for architecture change management Develop change requirements to meet performance targets Manage governance process Activate the process to implement change | Statement of Architecture Work Architecture Vision Architecture Repository Architecture Definition Document Architecture Requirements Specification Architecture Roadmap Change Requests due to technology changes Change Requests due to business changes Change Requests from lessons learned Implementation Governance Model Architecture Contract (signed) Compliance Assessments Implementation and Migration Plan | New Request for Architecture Work, to initiate another cycle of the ADM Statement of Architecture Work, updated if necessary Architecture Contract, updated if necessary Compliance Assessments, updated if necessary |

Test Yourself Question

- Q. Which of the following is part of an architecture change management process?
- A Ensuring that business continues as usual
 - B Determining whether a change warrants an update to the architecture
 - C Determining whether a change requires a new cycle of the ADM
 - D Managing change properly
 - E Establishing criteria for judging change requests



Module 28

ADM Architecture

Requirements Management



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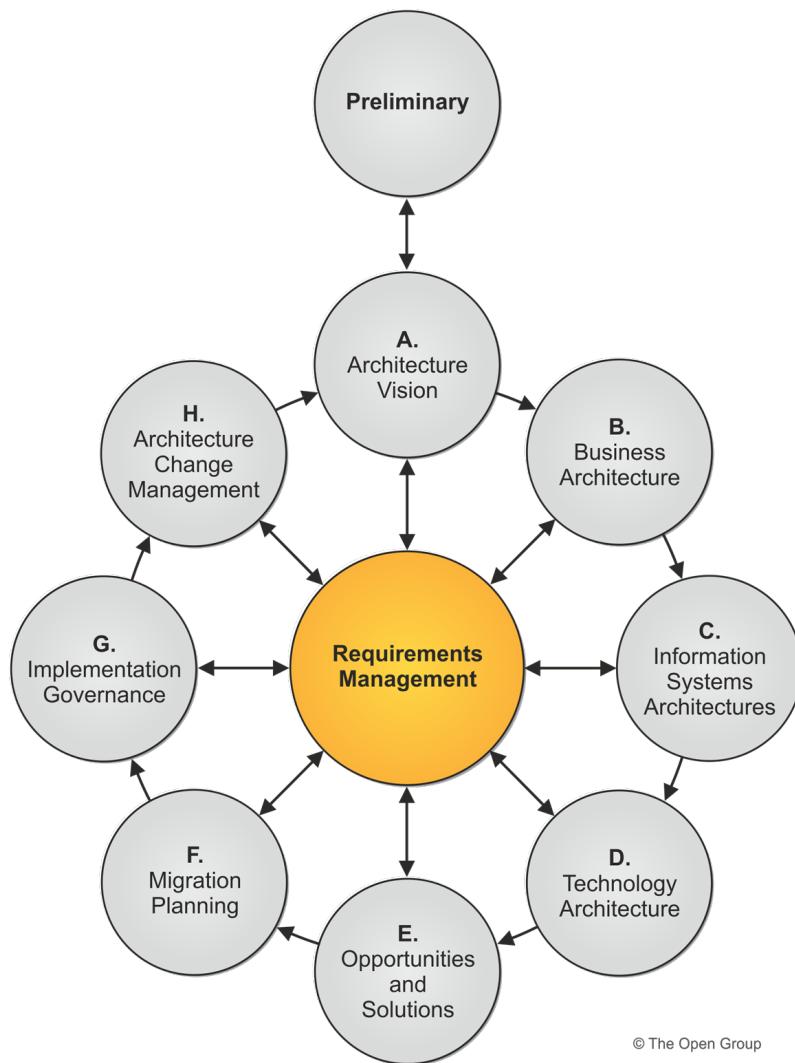


Module Objectives

The objectives of this module are to understand:

- The process of managing Architecture Requirements during application of the ADM
- What it consists of
- What inputs are needed for it
- What the outputs are

ADM Requirements Management



The process of managing architecture requirements:

- Applies to all phases of the ADM cycle
- Is central to the ADM process
- Is a dynamic process addressing the identification of requirements, their storage and delivery to the phases



Objectives

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

Approach

- The ability to deal with changes in the requirements is crucial to the ADM process since architecture deals with uncertainty and change
- Architecture bridges the divide between the aspirations of the stakeholders and a practical solution
- The Requirements Management process does not dispose of, address or prioritize requirements; this is done within the phases of the ADM
- It is recommended that a Requirements Repository is used to record and manage all architecture requirements

Requirements Development

- The first high level requirements are developed in the Architecture Vision
- For each ADM phase, from Preliminary to Phase H
 - Select the approved requirements for that phase as held in the Requirements Repository and Architecture Requirements Specification
 - At the completion of a phase the status of all such requirements needs to be updated
- During phase execution
 - New requirements generated for future architecture work within the scope of the current Statement of Architecture Work need to be documented within the Architecture Requirements Specification
 - New requirements which are outside of the scope of the current Statement of Architecture Work must be input to the Requirements Repository for management through the Requirements Management process



Resources

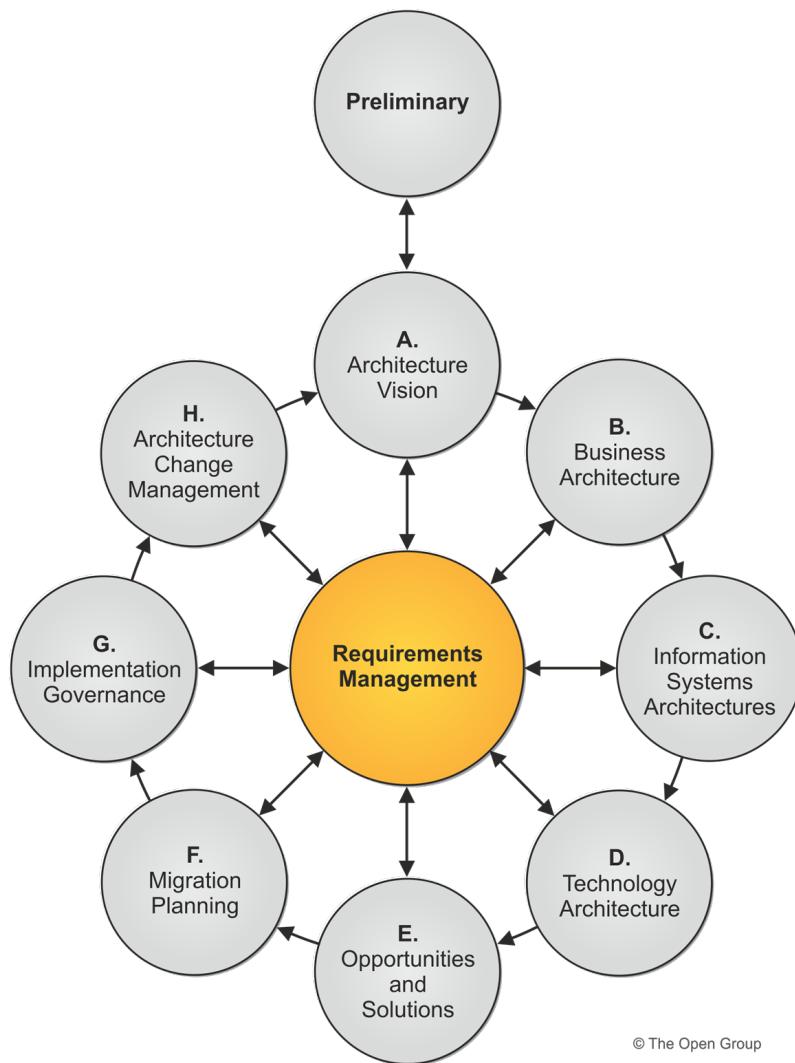
- TOGAF specifies generic needs for requirements, not specific tools or processes
- It recommends use of
 - Business Scenarios
 - Commercial off the shelf tools



Volère Requirements Specification Template

- This is an example of a suitable requirements template
- **The “Waiting Room”**
 - This is a repository for requirements that are beyond the planned scope, or the time available, for the current iteration. Having the ability to store future requirements helps avoid the perception that they are simply being discarded, while at the same time helping to manage expectations about what will be delivered.

Requirements Management: Inputs



- Requirements-related outputs from each ADM phase.
- The first high-level requirements are produced as part of the Architecture Vision.
- Each architecture domain then generates detailed requirements.
- Deliverables in later ADM phases contain mappings to new types of requirements



Steps Overview

Requirements Management Steps

2. Baseline requirements
3. Monitor baseline requirements
5. Identify changed requirement and record priorities
8. Update the Architecture Requirements Repository with information relating to the changes requested, including stakeholder views affected

ADM Phase Steps

1. Identify/document requirements
4. Identify changed requirement
6. Assess impact of change
7. Implement changes arising from Phase H
9. Implement change in the current phase
10. Assess and revise gap analysis for past phases



Steps in Detail

1. Identify/document requirements (*ADM Phase Step*)
 - Use Business Scenarios or an equivalent technique
2. Baseline requirements (*Requirements Management Step*)
 1. Determine priorities arising from current phase of ADM
 2. Confirm stakeholder buy-in to resultant priorities
 3. Record requirements priorities and place in Requirements Repository.
3. Monitor baseline requirements (*Requirements Management Step*)



Steps in Detail

4. Identify changed requirement (*ADM Phase Step*)
 1. Remove or re-assess priorities
 2. Add requirements and re-assess priorities
 3. Modify existing requirements
5. Identify changed requirements and record priorities (*Requirements Management Step*)
 1. Identify changed requirements and ensure the requirements are prioritized by the architects and the stakeholders
 2. Record new priorities
 3. Ensure that any conflicts are identified and managed through the phases to a successful conclusion and prioritization
 4. Generate Requirements Impact Statement for steering the architecture team

Steps in Detail

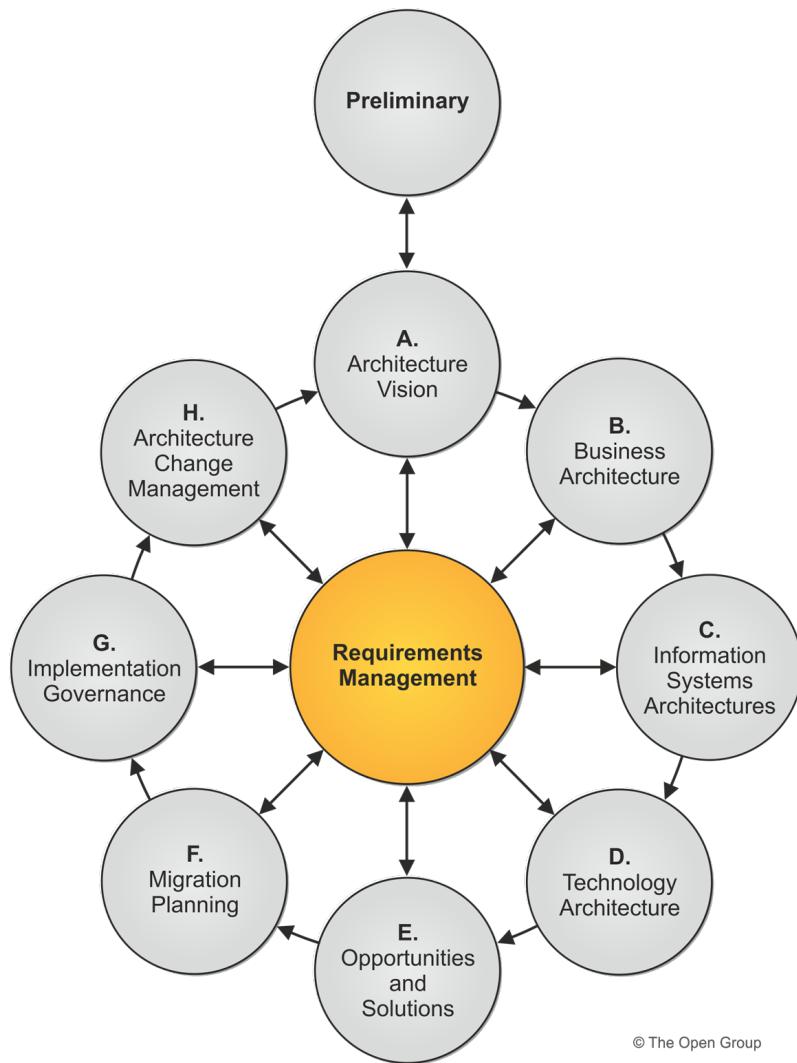
6. Assess impact of changed requirements on *(ADM Phase Step)*
 1. Current phase
 2. Previous phases
 3. Decide whether to:
 - Implement change (requires schedule for change management implementation)
 - Defer to future ADM cycle
 4. Issue new version of Requirements Impact Statement
7. Implement requirements arising from Phase H (Architecture Change Management) *(ADM Phase Step)*
 - The architecture can be changed through its lifecycle by Phase H. The Requirements Management process ensures that new or changing requirements are managed accordingly



Steps in Detail

8. Update the Architecture Requirements Repository with information relating to the changes requested, including stakeholder views affected (*Requirements Management Step*)
9. Implement change in the current phase (*ADM Phase Step*)
10. Assess and revise gap analysis for past phases (*ADM Phase Step*)
 - If the gap analysis generates gap requirements, then this step will ensure that they are addressed, documented, and recorded in the requirements repository, and that the Target Architecture is revised accordingly.

Requirements Management: Outputs

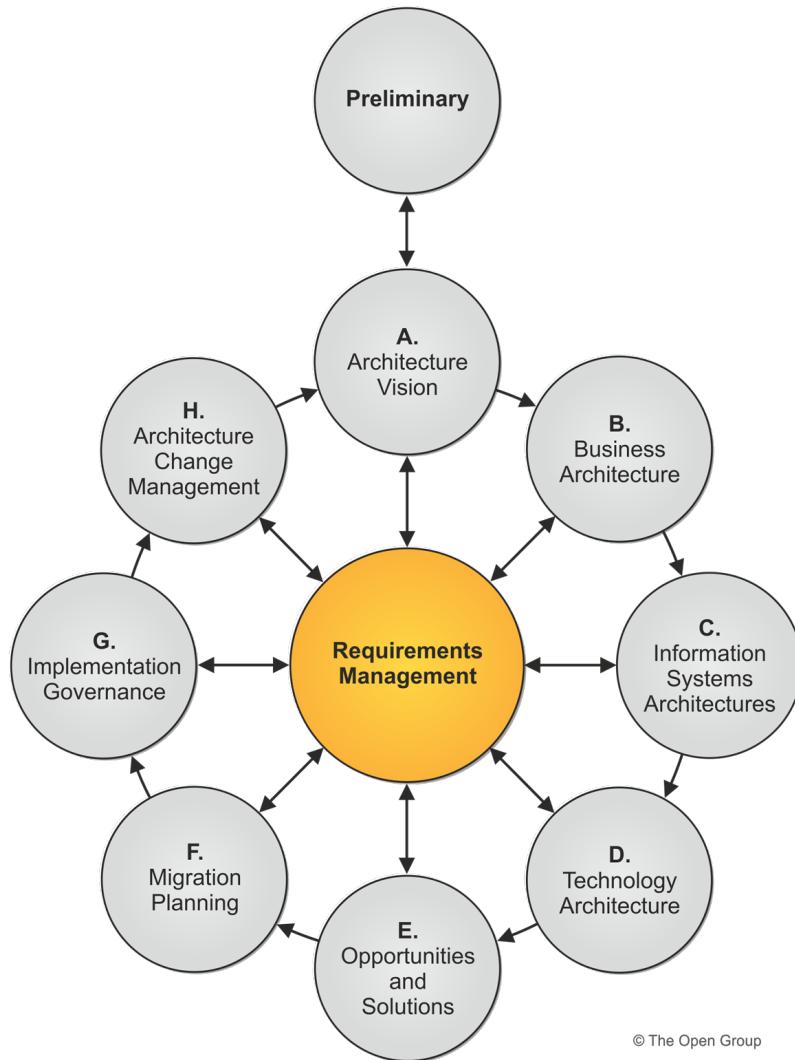


- Updated Architecture Requirements Specification
- Requirements Impact Statement

Requirements Impact Assessment

- When new requirements arise, or existing ones are changed, a Requirements Impact Statement is generated
- It identifies the phases of the ADM that need to be revisited to address the changes
- The statement goes through various iterations until the final version, which includes the full implications of the requirements (e.g., costs, timescales, and business metrics) on the architecture development
- Once requirements for the current ADM cycle have been finalised then the Architecture Requirements Specification should be updated

Summary



- Requirements Management is an ongoing activity of the ADM.
- The Requirements Repository contains the current requirements for the Target Architecture.
- When new requirements arise, or existing ones are changed, a Requirements Impact Statement is generated that identifies the phase of the ADM to be revisited. This goes through various iterations until a final version is produced.

Summary

| Requirements Management | | | |
|---|--|--|--|
| Objectives | Steps | Inputs | Outputs |
| Ensure that the Requirements Management process is sustained and operates for all relevant ADM phases | Identify/document requirements Baseline requirements | The inputs to the Requirements Management process are the requirements-related outputs from each ADM phase. | Changed requirements |
| Manage architecture requirements identified during any execution of the ADM cycle or a phase | Monitor baseline requirements Identify changed requirement; remove, add, modify, and re-assess priorities | The first high-level requirements are produced as part of the Architecture Vision. | Requirements Impact Assessment, which identifies the phases of the ADM that need to be revisited to address any changes. The final version must include the full implications of the requirements (e.g., costs, timescales, and business metrics). |
| Ensure that relevant architecture requirements are available for use by each phase as the phase is executed | Identify changed requirement and record priorities; identify and resolve conflicts; generate Requirements Impact Statements Assess impact of changed requirements on current and previous ADM phases Implement requirements arising from Phase H Update the Architecture Requirements Repository Implement change in the current phase Assess and revise gap analysis for past phases | Each architecture domain then generates detailed requirements. Deliverables in later ADM phases contain mappings to new types of requirements (for example, conformance requirements). | |



Test Yourself Question

- Q. Which of the following is not a resource recommended for Requirements Management?
- A Business Scenarios
 - B Gap Analysis
 - C Volère Requirements Specification template
 - D Requirements Tools
 - E Volère “waiting toom” template



Module 29:

Architecture Partitioning



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Roadmap

| |
|---|
| Part I - Introduction |
| Preface, Executive Overview, Core Concepts, Definitions |
| Part II – Architecture Development Method |
| Introduction to ADM |
| ADM Phase Narratives |
| Part III – ADM Guidelines and Techniques |
| Guidelines for Adapting the ADM Process |
| Techniques for Architecture Development |
| Part IV – Architecture Content Framework |
| Architectural Artifacts |
| Architecture Deliverables |
| Building Blocks |
| Part V – Enterprise Continuum and Tools |
| Enterprise Continuum |
| Architecture Partitioning |
| Architecture Repository |
| Tools for Architecture Development |
| Part VI – Architecture Capability Framework |
| Architecture Board |
| Architecture Compliance |
| Architecture Contracts |
| Architecture Governance |
| Architecture Maturity Models |
| Architecture Skills Framework |

- Chapter 36 in Part V, Enterprise Continuum and Tools



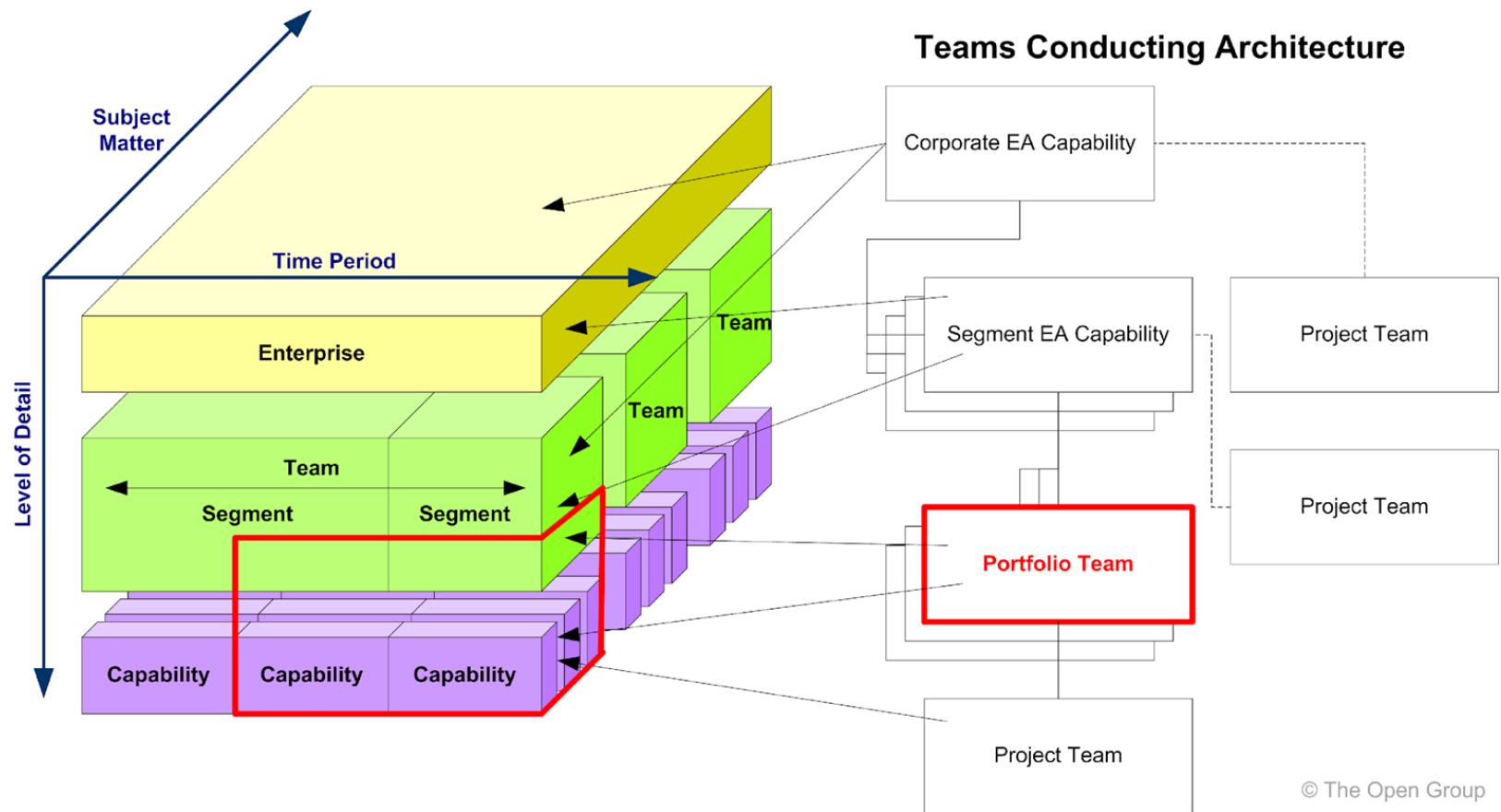


Module Objectives

The objectives of this module are to describe:

- How an overall Enterprise Architecture can be partitioned to meet the specific needs of the organisation
- Key learning outcomes:
 - The purpose of Architecture Partitioning
 - The classification criteria for solutions and architectures when considering partitioning
 - How Architecture Partitioning can be employed in the Preliminary Phase of the ADM

Partitioning



Allows for management of costs and complexity by dividing up the Enterprise and assigning appropriate roles and responsibilities to each partition



The Need to Partition

- Managing Complexity
- Managing Conflicts
- Managing Parallel developments
- Managing Re-use



Applying Classification to Partitioned Architectures: Solution Partitioning

- Subject Matter (breadth)
 - Its content, structure and function
- Time
 - All solutions exist for a period of time
- Maturity/Volatility
 - The extent to which subject matter and environment of a solutions are likely to change over time



Applying Classification to Partitioned Architectures: Architecture Partitioning

- Depth (Level of detail)
 - The level of detail has a strong correlation to the stakeholder groups interested
 - Typically, less detailed architectures are of interest to executive level stakeholders
 - As architectures increase in detail, their relevance to implementation and operational personnel increases

Applying Partitioning to the ADM

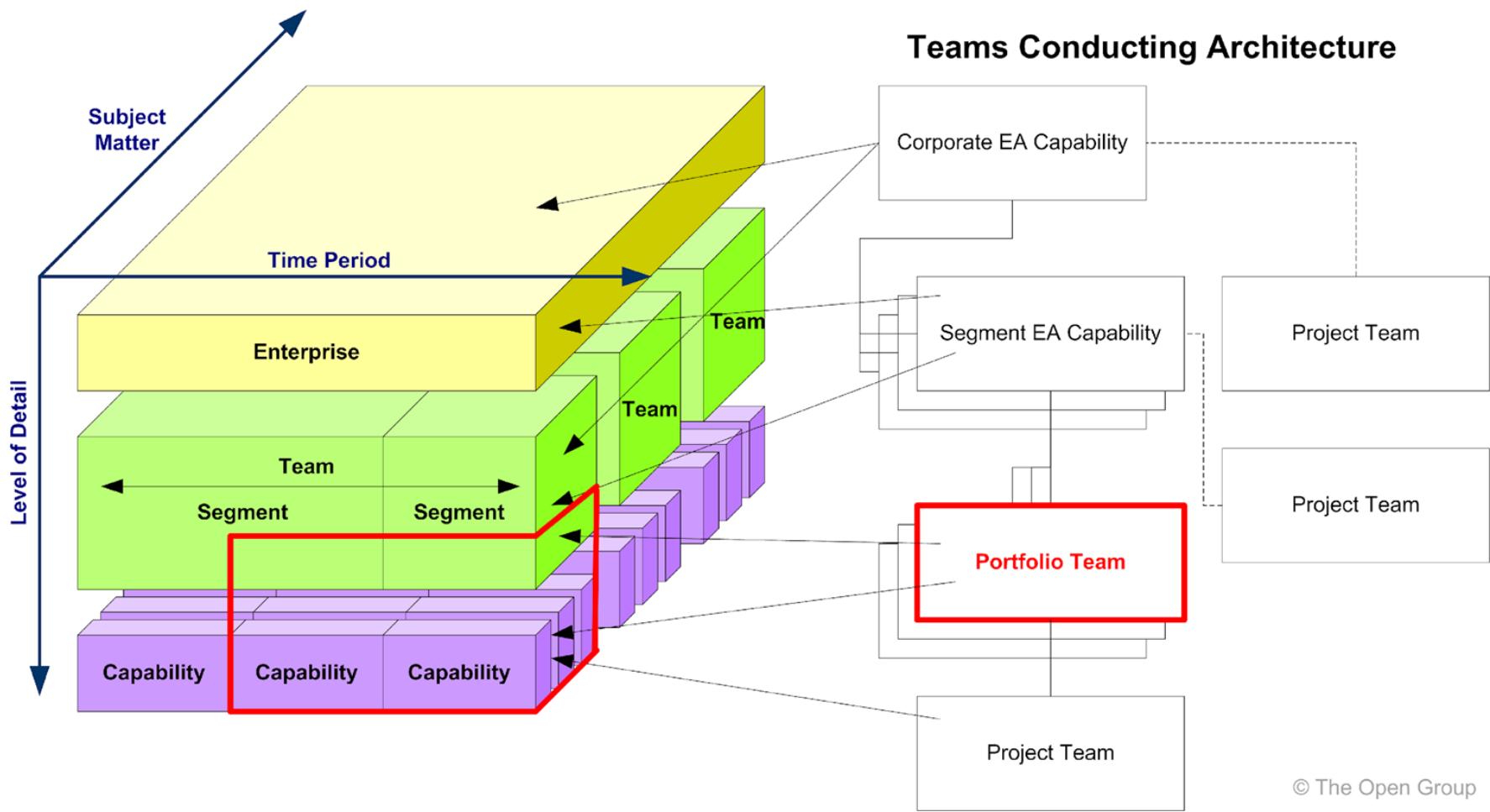
- The Preliminary phase supports the identification of appropriate architecture partitions and establishment of governance relationships between related architecture partitions.



Preliminary Phase

- Determine the organisation structure for architecture within the enterprise
 - Identify the teams
- Determine responsibilities for each architecture team
 - Subject matter areas
 - Level of detail
 - Time period
 - Stakeholders
- Determine the relationship between architectures
 - Where do architectures overlap?
 - What are the compliance requirements between architectures?

Example Teams Allocated





Summary

- Architecture Partitioning can be used to manage complexity, parallel developments, conflicts and re-use
- Classification criteria are defined for architectures and, solutions
- TOGAF provides guidance on how to use partitioning in the Preliminary Phase of the ADM cycle



Module 30:

Adapting the ADM:

Iteration and Levels



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Roadmap

| |
|---|
| Part I - Introduction |
| Preface, Executive Overview, Core Concepts, Definitions |
| Part II – Architecture Development Method |
| Introduction to ADM |
| ADM Phase Narratives |
| Part III – ADM Guidelines and Techniques |
| Guidelines for Adapting the ADM Process |
| Techniques for Architecture Development |
| Part IV – Architecture Content Framework |
| Content Metamodel |
| Architectural Artifacts |
| Architecture Deliverables |
| Building Blocks |
| Part V – Enterprise Continuum and Tools |
| Enterprise Continuum |
| Architecture Partitioning |
| Architecture Repository |
| Tools for Architecture Development |
| Part VI – Architecture Capability Framework |
| Architecture Board |
| Architecture Compliance |
| Architecture Contracts |
| Architecture Governance |
| Architecture Maturity Models |
| Architecture Skills Framework |

- Part III, ADM Guidelines and Techniques, Chapters 18 and 19



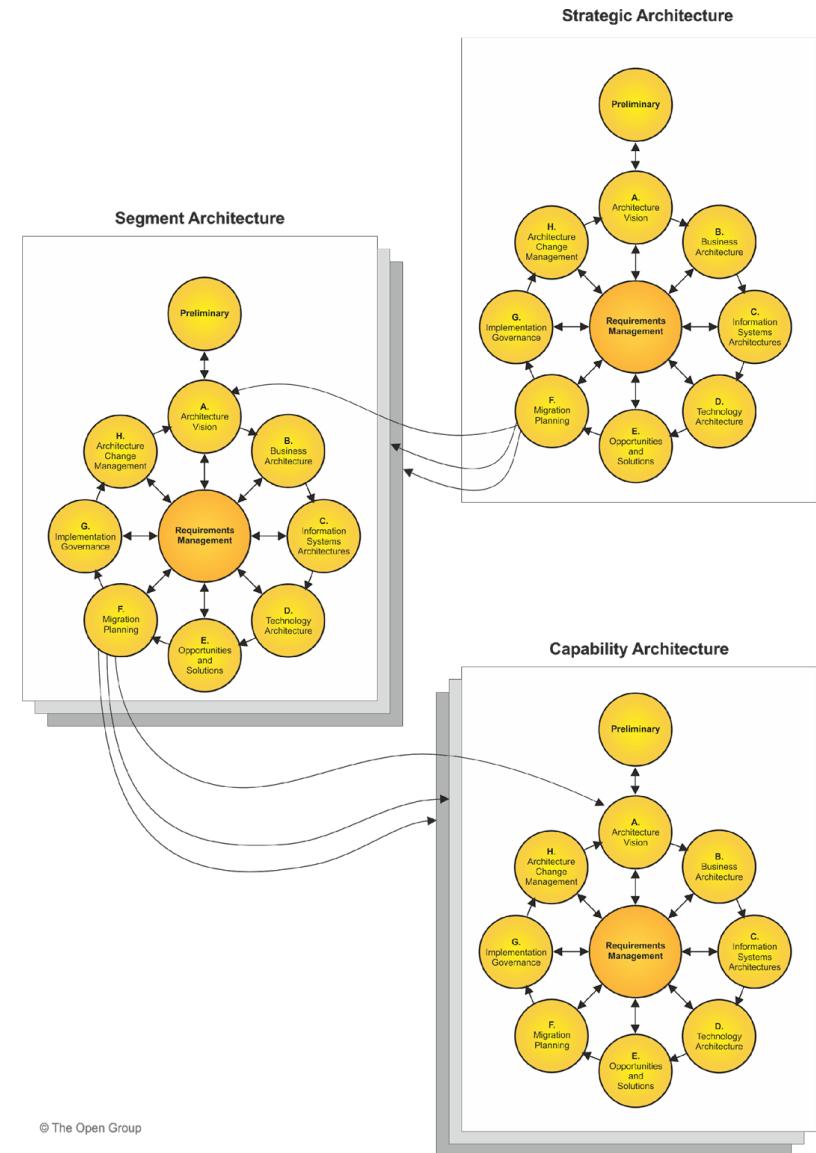
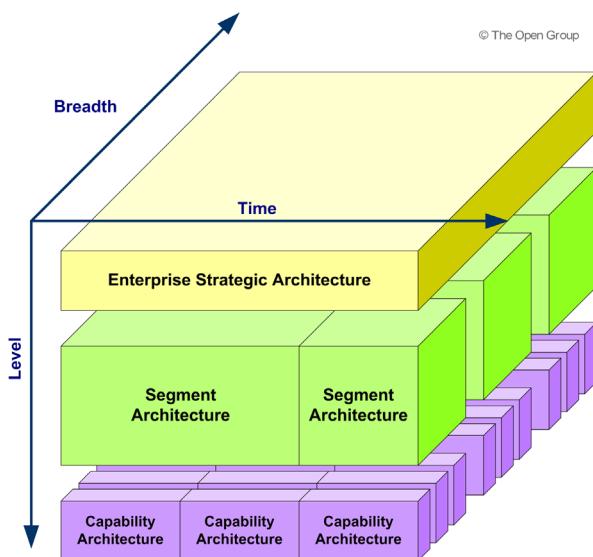
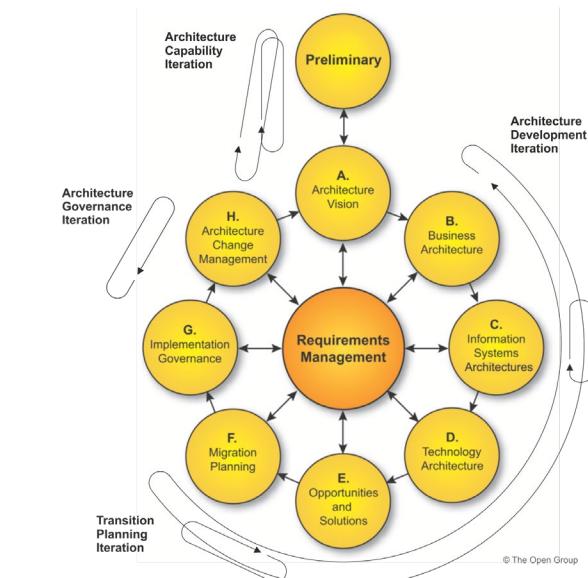


Module Objectives

The objectives of this module are:

- How to adapt the ADM using iteration and different levels of architecture engagement

Iteration and Levels



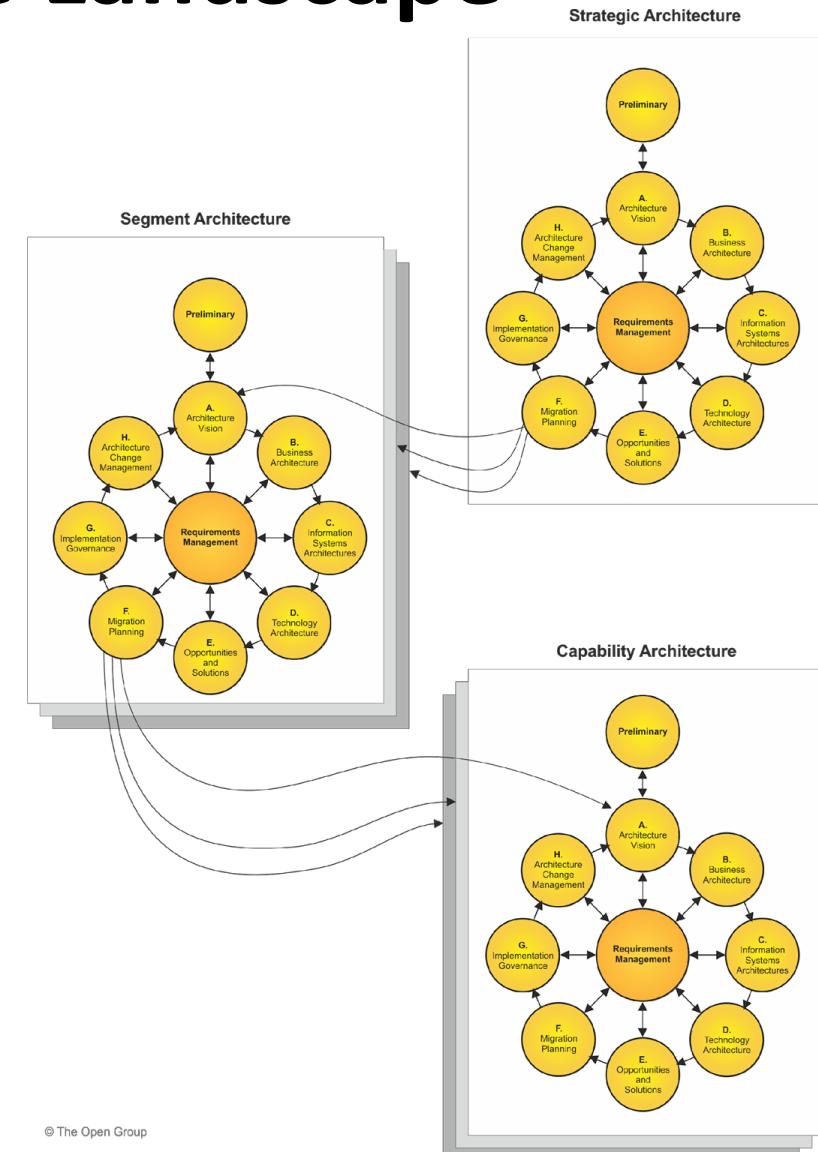


Iteration and the ADM

- The ADM supports a number of concepts that can be characterized as Iteration:
 - Iteration to describe a comprehensive Architecture Landscape through multiple ADM cycles based upon individual initiatives bound to the scope of the Request for Architecture Work
 - Iteration to describe the integrated process of developing an architecture where the activities described in different ADM phases interact to produce an integrated architecture
 - Iteration to describe the process of managing change to the organisation's Architecture Capability

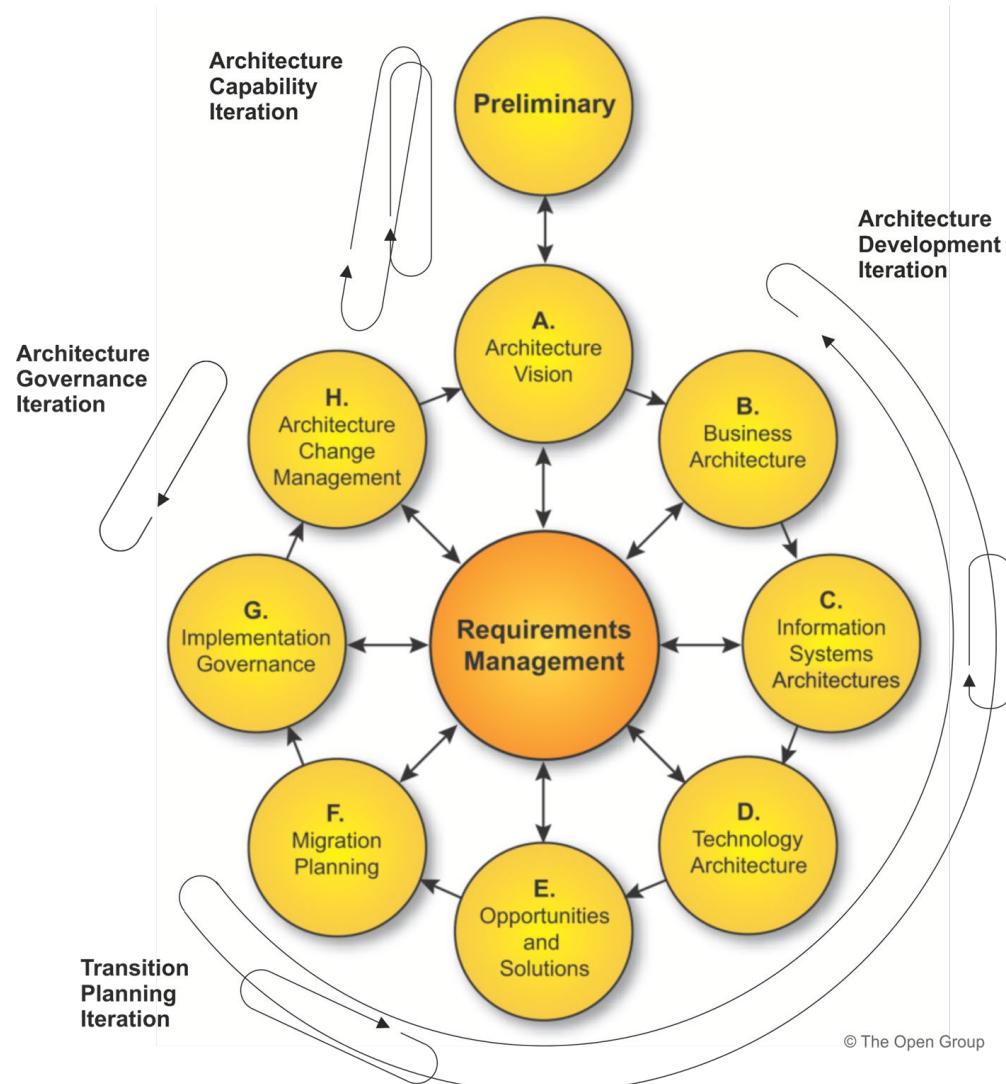
Iteration to Develop a Comprehensive Architecture Landscape

- Projects will exercise through the entire ADM cycle, commencing with Phase A.
 - Each cycle of the ADM is bounded by a Request for Architecture Work
 - The output populates the Architecture Landscape, either extending or changing the landscape
- Separate projects may operate their own ADM cycles concurrently, with relationships between them
- One project may trigger the initiation of another project.



Iteration within an ADM Cycle

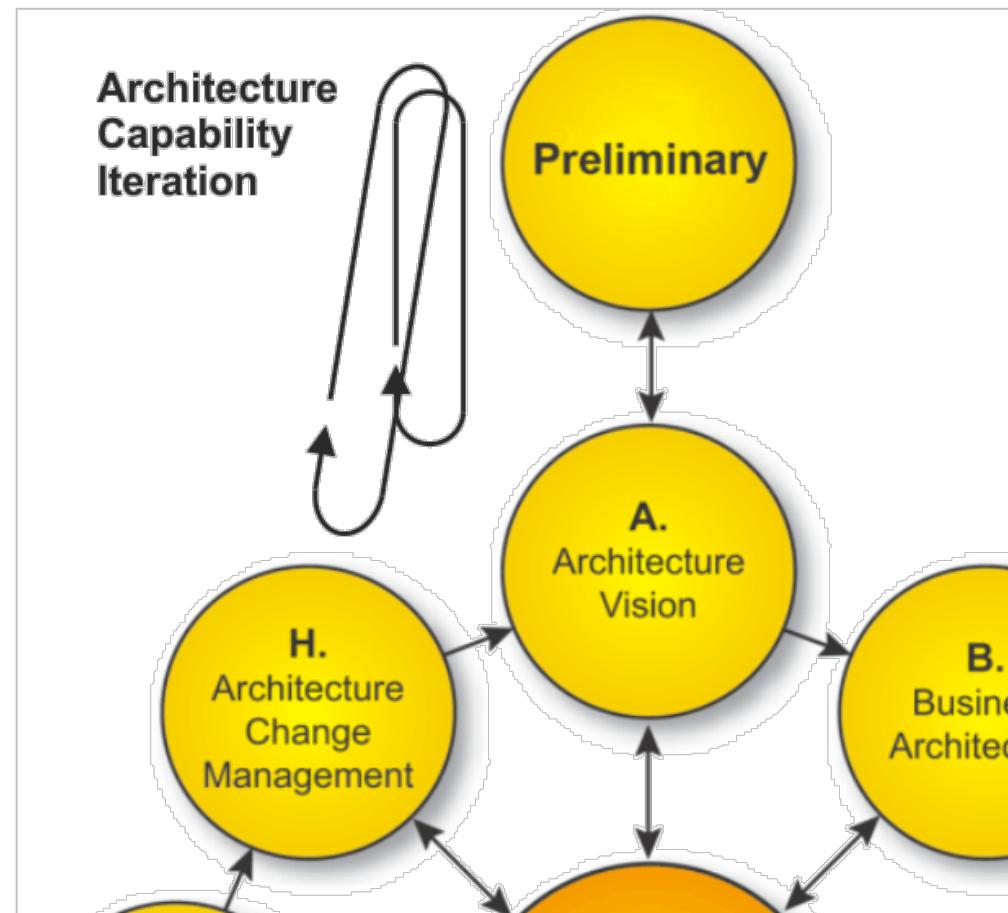
- Projects may operate multiple ADM Phases concurrently
 - Typically uses to manage the inter-relationship between the Business Architecture, Information Systems Architectures and Technology Architecture
- Projects may cycle between phases to converge on a Target Architecture
- Projects may return to previous phases in order to update work products with new information



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Iteration to Manage the Architecture Capability

- Projects may require a new iteration of the Preliminary Phase to establish aspects of the Architecture capability identified in Phase A to address a Request for Architecture work
- Projects may require a new iteration of the Preliminary Phase to adjust the organisation's Architecture Capability as a result of new or changed requirements as a result of a change request in Phase H





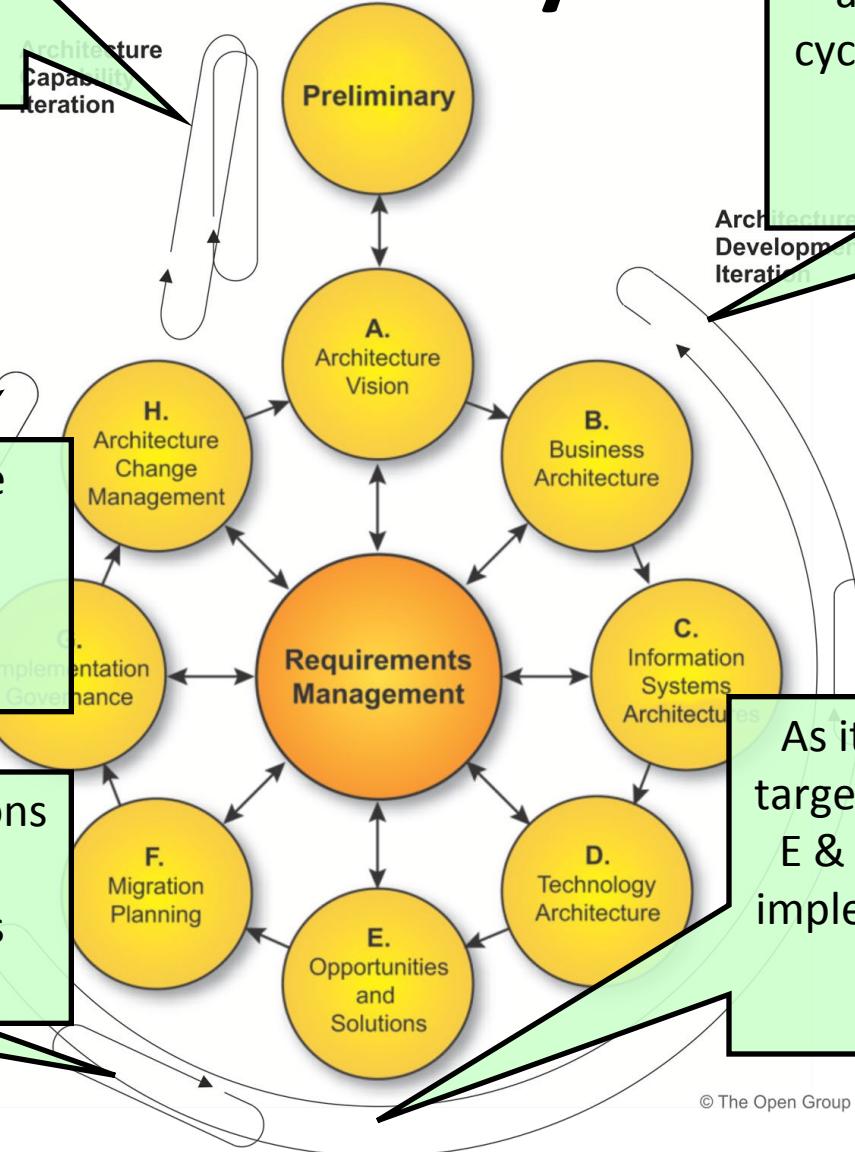
Factors Influencing the Use of Iteration

- The formality and nature of established checkpoints within the organisation
- The level of stakeholder involvement expected within the process
- The number of teams involved and the relationships between different teams
- The maturity of the solution area and expected rework to arrive at an acceptable solution
- Attitude to risk



Architecture Capability iterations support creation and evolution of the Architecture Capability

Iteration Cycles



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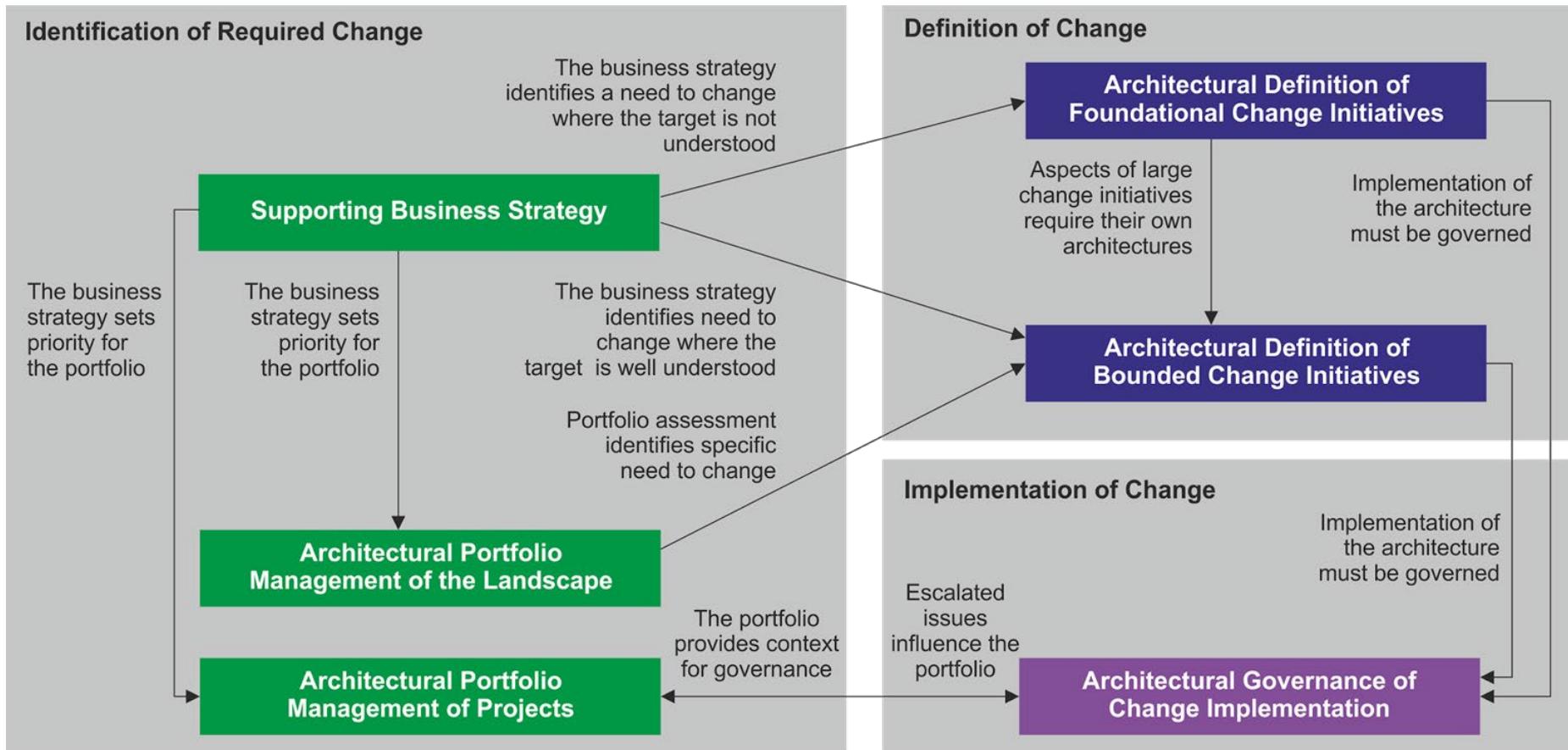
Approaches to Architecture Development

- Baseline First
 - An assessment of the baseline landscape is used to identify problem areas and opportunities for improvement
 - A suitable approach for when baseline is complex or not clearly understood
- Target First
 - The target solution is elaborated in detail and then mapped back to the baseline
 - A suitable approach for when the target state is agreed at a high level and where the enterprise wishes to effectively transition to the target model

Classes of Architecture Engagement

- TOGAF defines three typical areas of engagement:
 - Identification of Change Required
 - Definition of Change
 - Implementation of Change

Classes of Architecture Engagement



Architecture activities that support the identification of a need to change.

Architecture activities that support the definition of how change can be achieved.

Architecture activities that govern the implementation of change.

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Module 31:

Adapting the ADM:

Security



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Module Objectives

The objectives of this module are:

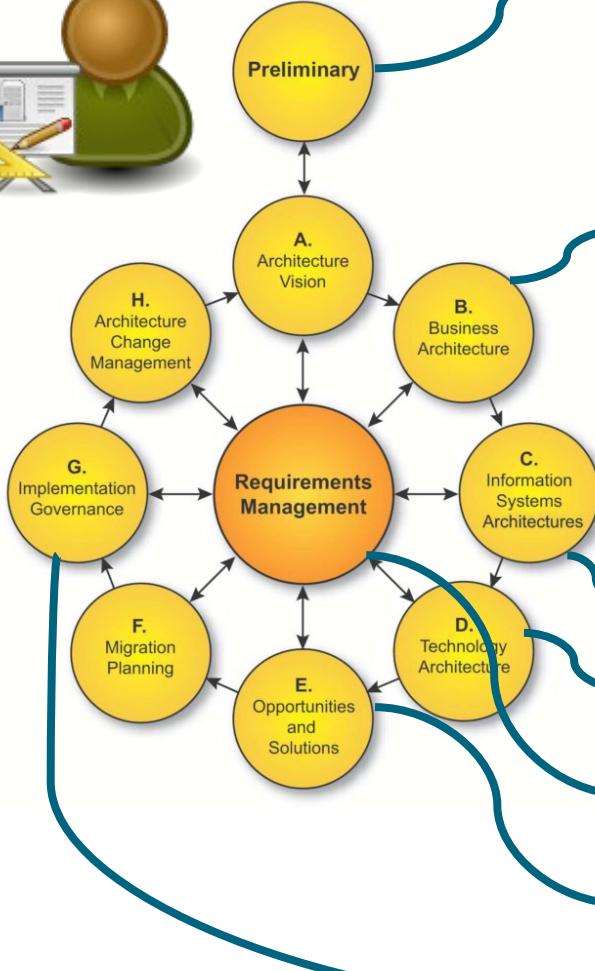
- Obtain an understanding of the security considerations that need to be addressed during application of the ADM

The Open Group Guide: Integrating Risk and Security within a TOGAF® Enterprise Architecture

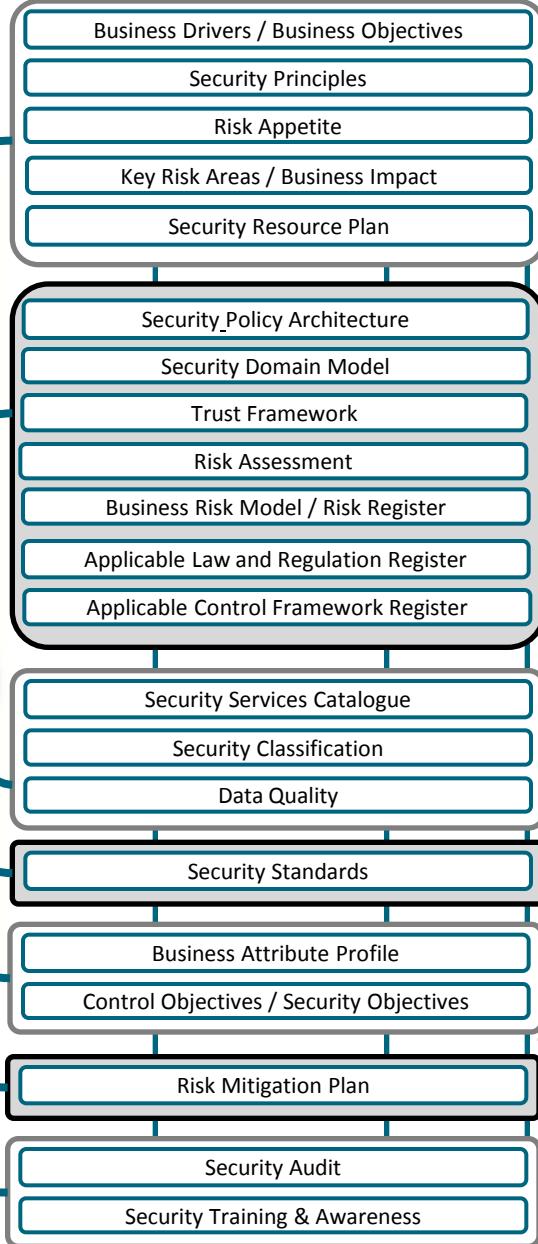
- Provides guidance for security practitioners and Enterprise Architects who need to work with the TOGAF standard to develop an Enterprise Architecture.
- Explains how the TOGAF method and framework can be tailored to make use of an existing Enterprise Security Architecture in order to address security and risk properly.

Enterprise Security Architecture

Enterprise Architecture



Enterprise Security Architecture



- Identity & Access Mgt
- Continuity Management
- Security Intelligence
- Security Monitoring
- Compliance Management
- Etc.

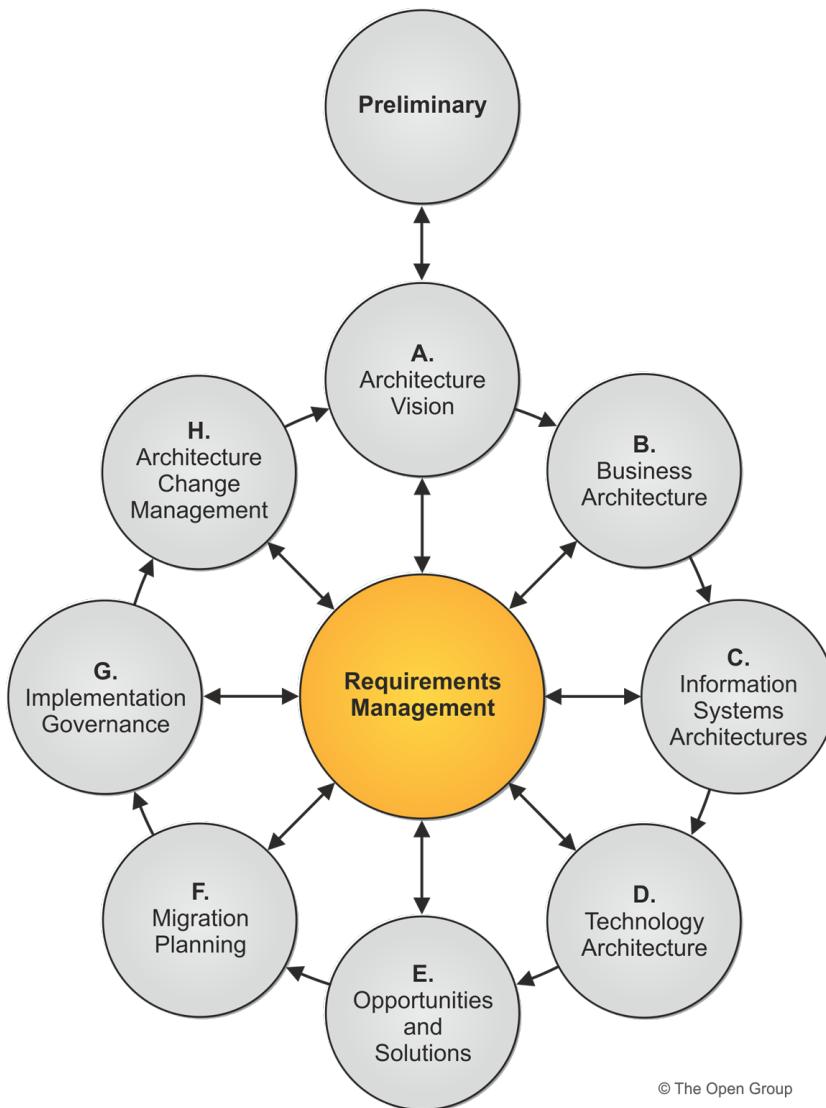




Security as a Cross-Cutting Concern

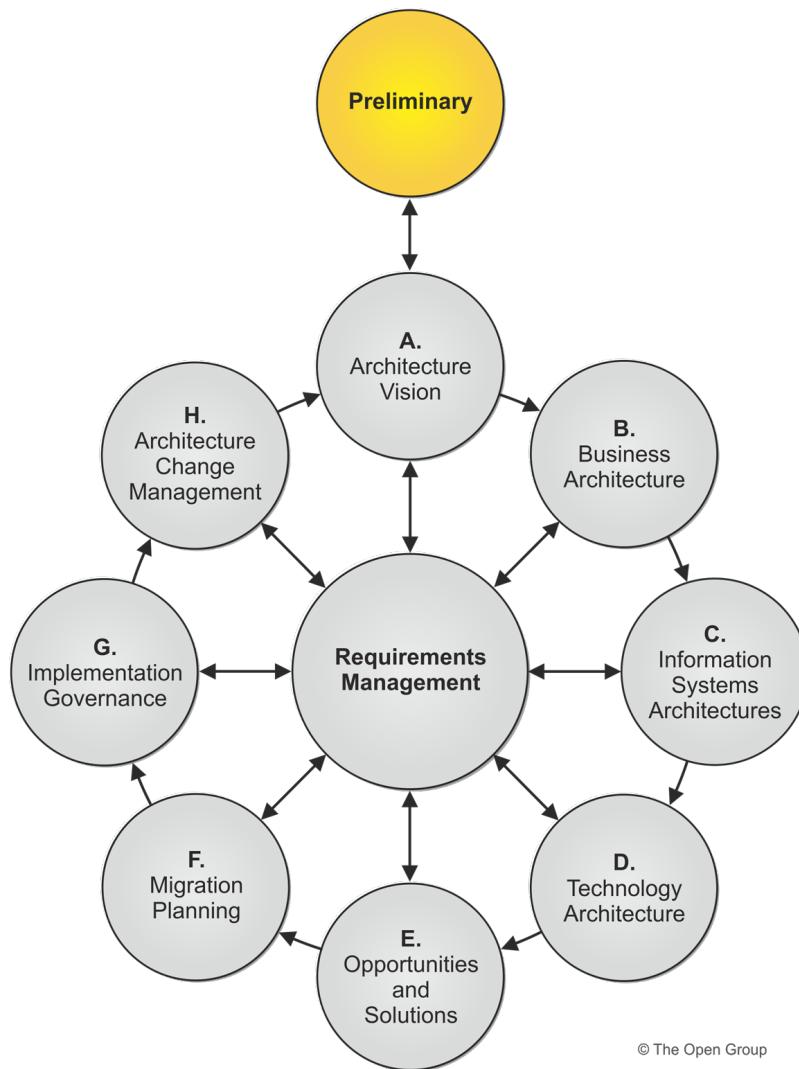


ADM Requirements Management



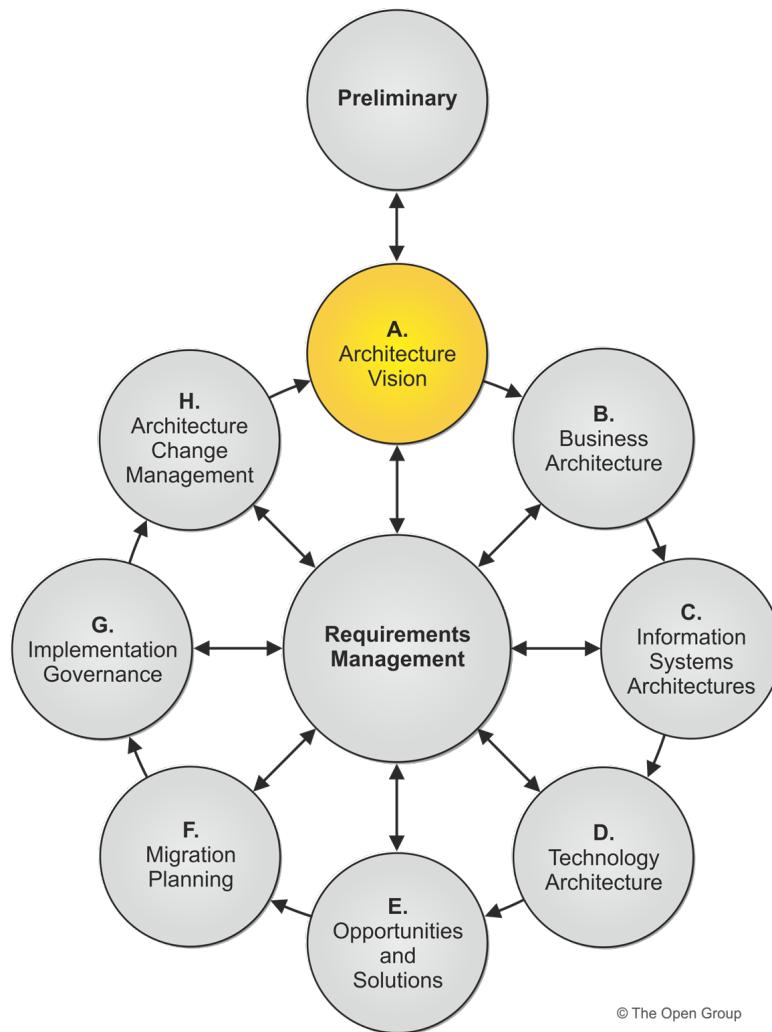
- Use Business Attribute Profiling, a requirements engineering technique from The SABSA® Institute
- Advantages:
 - Executive communication in non-IT terms
 - Traceability mapping between business drivers and requirements
 - Performance measurement against business-defined targets
 - Grouping and structuring of requirements, which facilitates understanding and oversight by architects

Preliminary Phase



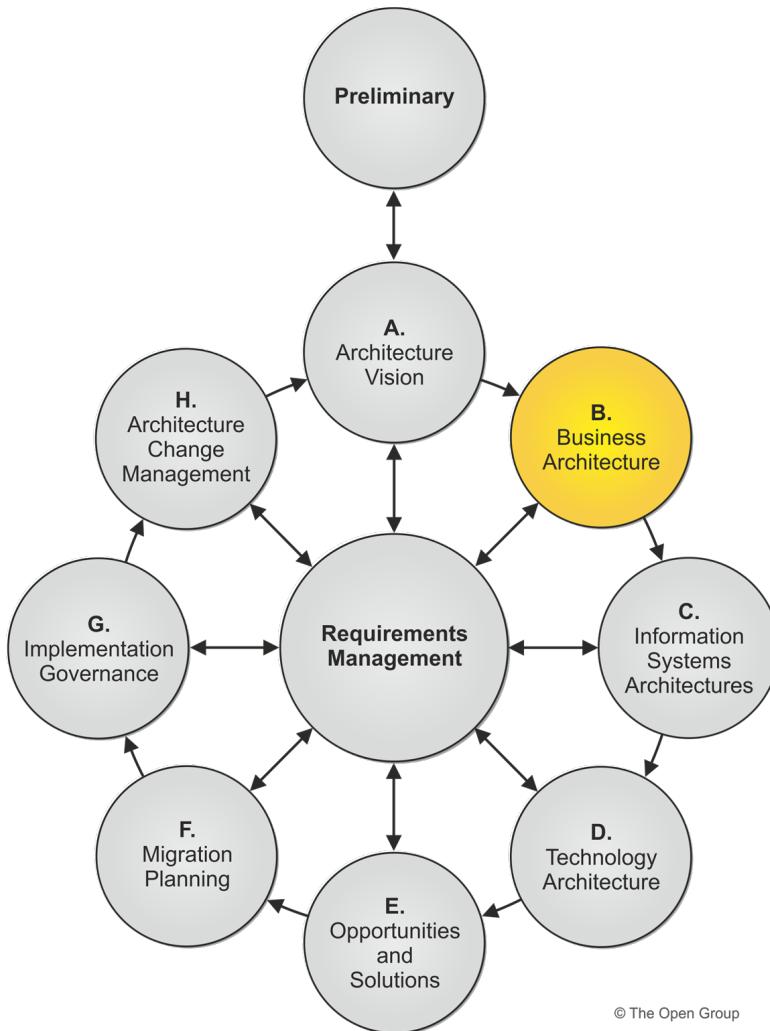
- The following security artifacts should be integrated into architecture documentation:
 - Business Drivers/Business Objectives affecting security
 - Security Principles
 - Risk Appetite
 - Key Risk Areas/Business Impact Analysis
 - Security Resource Plan

Phase A: Architecture Vision



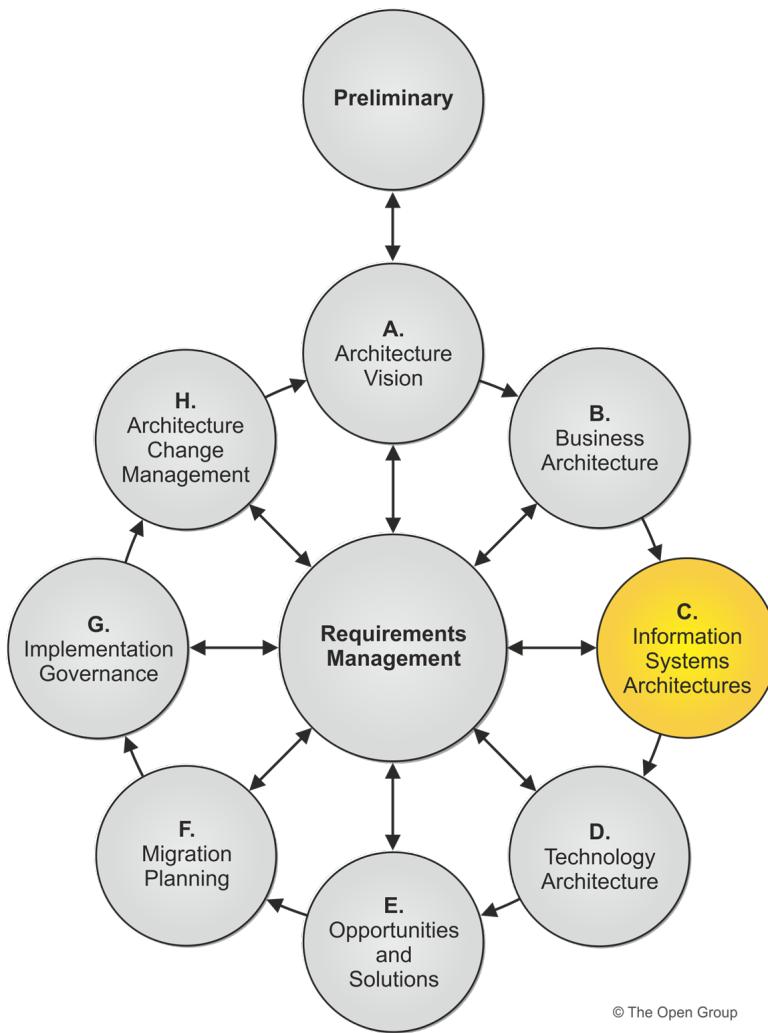
- Identify the complete list of all stakeholders, their concerns, and associated requirements for approval of the architecture
- Satisfy security stakeholders
- Satisfy business stakeholders

Phase B: Business Architecture



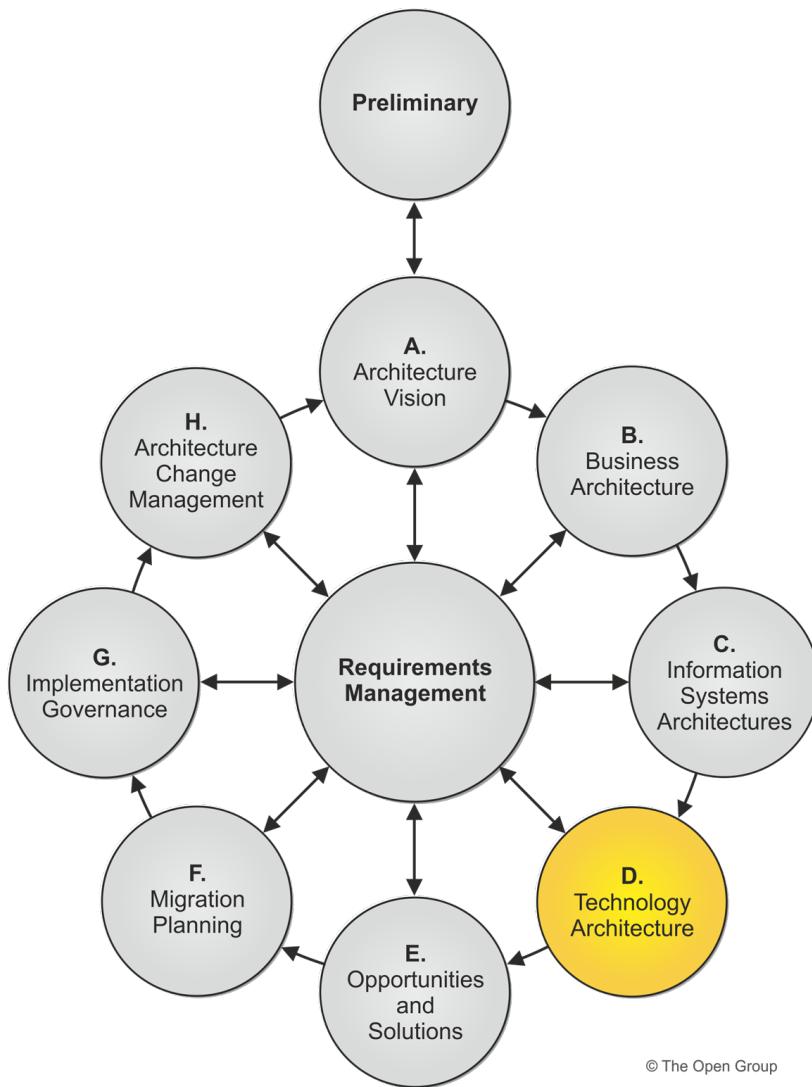
- The security elements of Phase B comprise business-level trust, risk, and controls, independent from specific IT or other systems within the specific scope of the architecture engagement.
- Artifacts include:
 - Security Policy Architecture
 - Security Domain Model
 - Trust Framework
 - Risk Assessment
 - Business Risk Model/Risk Register
 - Applicable Law and Regulation Register
 - Application Control Framework Register

Phase C: Information Systems Architectures



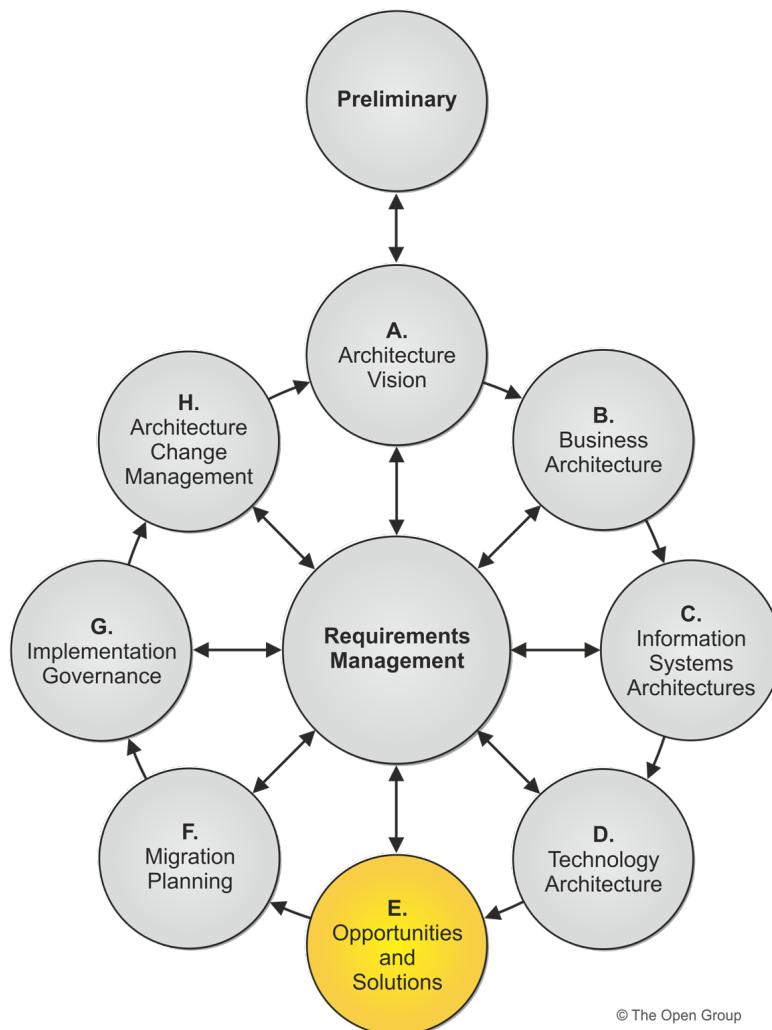
- The security elements of Phase C comprise functional security services and their security classification.
- Artifacts include:
 - Security Services Catalog
 - Security Classification
 - Data Quality

Phase D: Technology Architecture



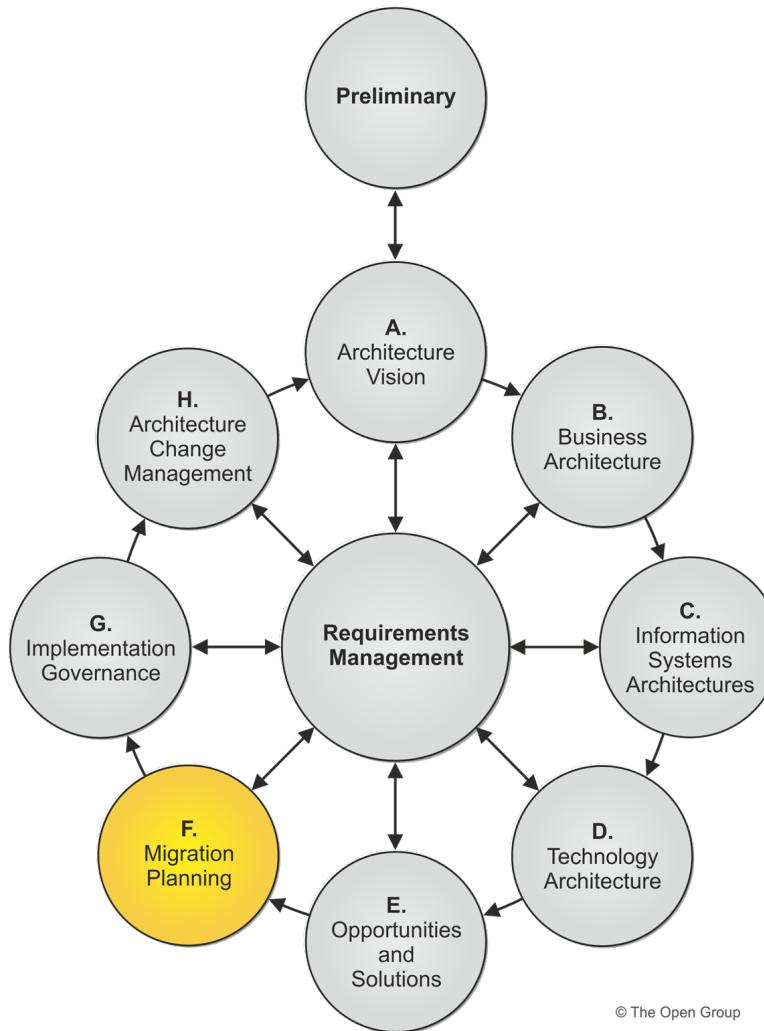
- The Security Architect must ensure that the required controls are included in the Technology Architecture and verify whether the controls are used in an effective and efficient way
- A security stakeholder may request the creation of a specific Technology Architecture security view or deliverable that describes all security-related technology components and how they inter-relate

Phase E: Opportunities and Solutions



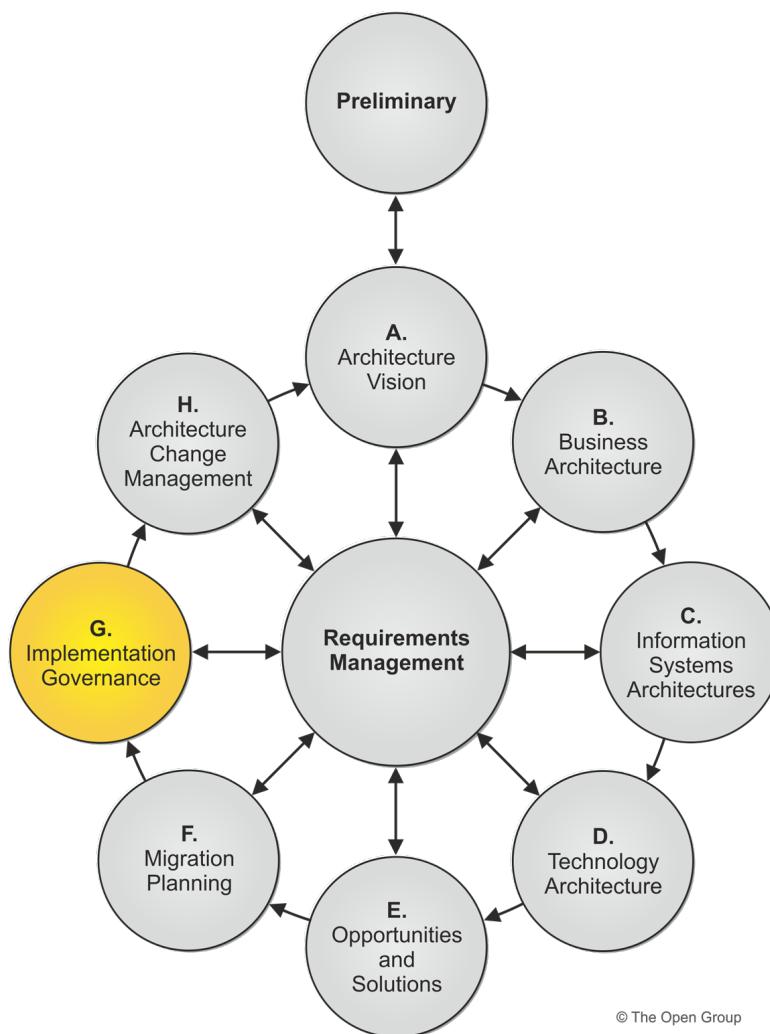
- In defining the roadmap, it is imperative that security and risk are evaluated
- The security building blocks defined in the previous phases become SBBs in this phase
- This phase should include a Risk Mitigation Plan

Phase F: Migration Planning



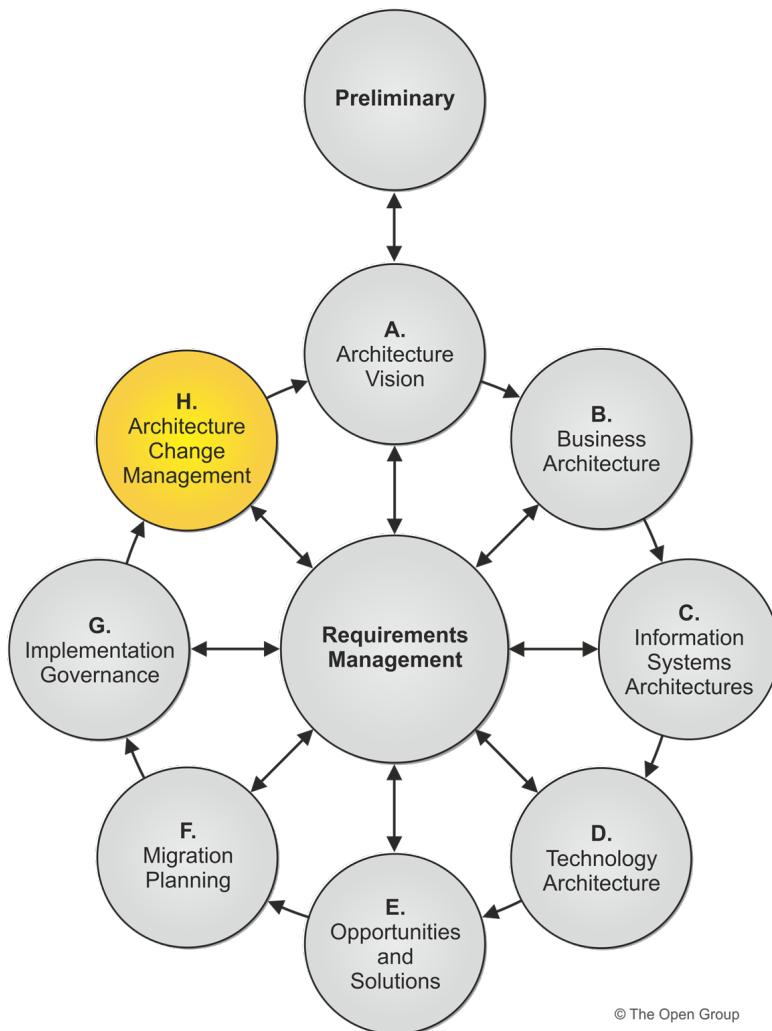
- Migration is itself a business process that needs to be secured
- The migration strategy should include a risk assessment and a Risk Mitigation Plan
- In addition, migration planning should include a security impact analysis to understand any security impacts of the target state of the change.

Phase G: Implementation Governance



- Security Architecture implementation governance provides assurance that the detailed design and implemented processes and systems adhere to the overall Security Architecture
- This ensures that deviations from Architecture Principles and implementation guidelines don't create any unacceptable risk

Phase H: Architecture Change Management



- This phase defines two essential processes:
 - Risk Management: the process in which the existing architecture is continuously evaluated regarding changes to business opportunity and security threat
 - Architecture Governance: the process in which decisions are made on changes to the existing architecture, either by minor changes in the current iteration or by means of a completely new iteration. This is explained in the TOGAF Architecture Governance Framework



Summary

- The Open Group Guide: Integrating Risk and Security within a TOGAF® Enterprise Architecture introduces guidance on Security and the ADM to help practitioners avoid missing a critical security concern
- It is intended to inform the enterprise architect of how the TOGAF method and framework can be tailored to address security and risk properly

Exercise

New security requirements arise from many sources:

- A new statutory or regulatory mandate
- A new threat realised or experienced
- A new Enterprise Architecture initiative discovers new stakeholders and/or new requirements
- For each of these discuss its impact on the ADM



Module 33:

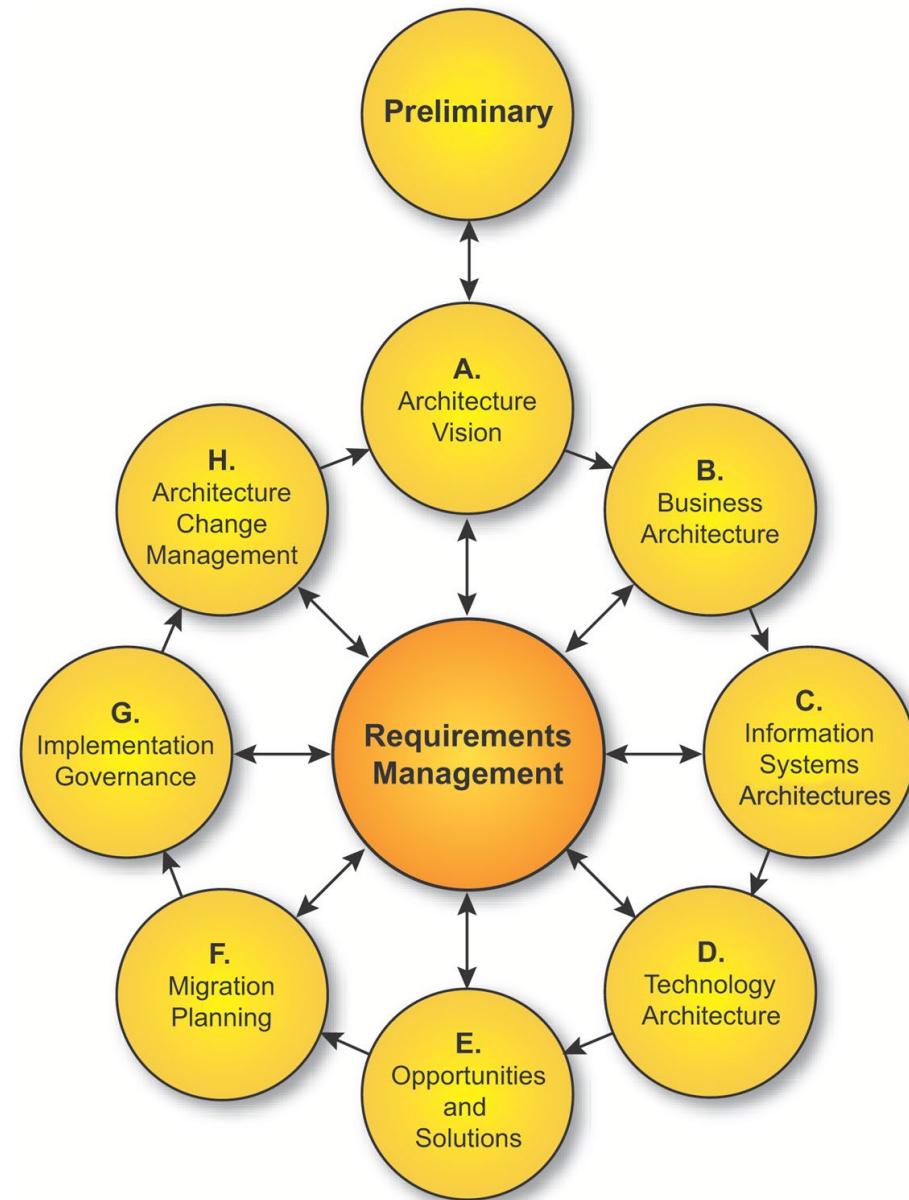
Architecture

Maturity Models



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Architecture Maturity Models



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Roadmap

| |
|---|
| Part I - Introduction |
| Preface, Executive Overview, Core Concepts, Definitions |
| Part II – Architecture Development Method |
| Introduction to ADM |
| ADM Phase Narratives |
| Part III – ADM Guidelines & Techniques |
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| Architecture Deliverables |
| Building Blocks |
| Part V – Enterprise Continuum & Tools |
| Enterprise Continuum |
| Architecture Partitioning |
| Architecture Repository |
| Tools for Architecture Development |
| Part VI- Architecture Capability Framework |
| Architecture Board |
| Architecture Compliance |
| Architecture Contracts |
| Architecture Governance |
| Architecture Maturity Models |
| Architecture Skills Framework |

- Part VI – Architecture Capability Framework, Chapter





Module Objectives

The objectives are to:

- Explain the role of a Capability Maturity Model
- Explain the CMMI process improvement approach development by CMU
- Describe the structure and levels of the ACMM developed by CMU for the US DoC
- Explain the role of Maturity Assessments in the ADM



Capability Maturity Models

- Capability Maturity Models (CMMs) provide an effective method for control and improvement of change processes
- Benefits of such models include:
 - They describe the practices that any organisation must perform in order to improve its processes
 - They provide measures for improvement
 - They provide a framework for managing the improvement efforts
 - They organize the various practices into levels, each level representing an increased ability to control and manage the development environment
- An evaluation of the organisation's practices against the model (an “assessment”) is performed to find the current level at which the organisation currently stands
- This shows the organisation’s maturity and the areas to focus on for the greatest improvement and the highest ROI

Capability Maturity Models

- The original CMM was developed in the early 1990s by CMU and is still widely used today.
- CMMs have also been developed for other areas such as:
 - People: the P-CMM (People Capability Maturity Model), and the IDEAL Life Cycle Model for Improvement
 - Systems Engineering: the SE-CMM (Systems Engineering Capability Maturity Model)
 - Software Acquisition: the SA-CMM (Software Acquisition Capability Maturity Model)
 - CMMI: Capability Maturity Model Integration



Capability Maturity Models

There are templates available to assess:

- The state of the IT architecture process
- The IT architecture
- The organisations buy-in to both

CMM models can also be used to assess a wide range of domains:

- e-Commerce maturity
- Process implementation and audit
- Quality measurements
- People competencies
- Investment management



The CMMI

- CMMI stands for Capability Maturity Model Integration.
- CMMI is a framework used to manage the complexity of multiple different models:
 - IPD-CMM (Integrated Product Development Capability Maturity Model)
 - P-CMM (People Capability Maturity Model)
 - SA-CMM (Software Acquisition Capability Maturity Model)
 - SE-CMM (Systems Engineering Capability Maturity Model)
 - SW-CMM (Capability Maturity Model for Software)

The CMMI

According to the SEI, the use of the CMMI models improves on best practices by enabling organisations to:

- Explicitly link management and engineering activities to business objectives
- Expand the scope of and visibility into the product lifecycle and engineering activities
- Incorporate lessons learned from additional areas of best practice (e.g., measurement, risk management etc.)
- Implement more robust high-maturity practices
- Address additional organisational functions
- Comply with ISO standards

CMMI has been adopted worldwide.

The CMMI

- SCAMPI, the Standard CMMI Appraisal Method for Process Improvement, is used to identify strengths, weaknesses, and ratings relative to CMMI reference models.
- It incorporates best practice and is based on the features of several appraisal methods.
- It is applicable to a wide range of appraisal usage modes, including both internal process improvement and external capability determinations.

US Department of Commerce ACMM

The enterprise Architecture Capability Maturity Model (ACMM) was developed for conducting internal assessments. It is a framework that represents the key components of a productive EA process. The goal is to identify weak areas and provide a way to improve the overall architecture process.

The ACMM has 3 sections:

- The enterprise architecture maturity model
- EA characteristics of processes at different maturity levels
- The EA CMM scorecard



ACMM Maturity Levels

5: Measured

4: Managed

3: Defined

2: Under Development

1: Initial

0: None

- The DoC ACMM consists of
 - 6 maturity levels
 - 9 architecture elements



ACMM Enterprise Architecture Elements

1. Architecture process:
 - *Is there an established Enterprise Architecture process?*
2. Architecture development:
 - *To what extent is the development and progression of the Operating Units' Enterprise Architecture documented?*
3. Business linkage:
 - *To what extent is the Enterprise Architecture linked to business strategies or drivers?*
4. Senior management involvement:
 - *To what extent are the senior managers of the Operating Unit involved in the establishment and ongoing development of an IT Architecture?*
5. Operating unit participation
 - *To what extent is the Enterprise Architecture process accepted by the Operating Unit?*
 - *To what extent is the Enterprise Architecture process an effort representative of the whole organisation?*

ACMM Enterprise Architecture Elements

6. Architecture communication

- *To what extent are the decisions of Enterprise Architecture practice documented?*
- *To what extent is the content of the Enterprise Architecture made available electronically to everybody in the organisation?*
- *To what extent is architecture education done across the business on the Enterprise Architecture process and contents?*

7. IT security

- *To what extent is IT Security integrated with the Enterprise Architecture?*

8. Architecture governance

- *To what extent is an Enterprise Architecture governance (governing body) process in place and accepted by senior management ?*

9. IT investment and acquisition strategy

- *To what extent does the Enterprise Architecture influence the IT Investment and Acquisition Strategy?*

Example: ACMM Scoring Criteria

| Score | Element | Architecture Process |
|-------|------------|---|
| 0 | No EA | Not established or does not exist. |
| 1 | Initial | Exists in ad-hoc or localized form or early draft form may exist. Some Enterprise Architecture processes are defined. There is no unified architecture process across technologies or business processes. Success depends on individual efforts. |
| 2 | Developing | Being actively developed. Basic Enterprise Architecture Process program is documented based on OMB Circular A-130 and Department of Commerce Enterprise Architecture Guidance. The architecture process has developed clear roles and responsibilities. |
| 3 | Defined | The architecture is well defined and communicated to IT staff and business management with Operating Unit IT responsibilities. The process is largely followed. |
| 4 | Managed | Enterprise Architecture process is part of the culture, with strong linkages to other core IT and business processes. Quality metrics associated with the architecture process are captured. These metrics include the cycle times necessary to generate Enterprise Architecture revisions, technical environment stability, and time to implement a new or upgraded application or system. |
| 5 | Measured | Continuous improvement of Enterprise Architecture processes. |



Maturity Assessments in the ADM

- Maturity Assessments are referred to in the Preliminary Phase, Phase A, and Phase E of the ADM
- The approach to the Preliminary Phase recommends their use as part of developing the organisational Model for Enterprise Architecture
- In Phase A, a maturity assessment is part of the Capability Assessment used to determine the baseline and target capability of the enterprise
- This Capability Assessment is also revisited in Phase E, when preparing the Implementation and Migration Plan
- When using CMMs with the ADM, it is recommended that they be customized and discussed in workshops involving the major stakeholders within the organisation
- The actual levels of maturity can provide a strategic measure of the organisation's ability to change, as well as a series of sequential steps to improve that ability



Summary

- This module has explained the role of Architecture Capability Maturity Models in enabling an enterprise to determine the state of its Enterprise Architecture process and to evaluate risks and options during the development of the Enterprise Architecture
- Performing a maturity assessment may involve the use of a number of models. The assessment focuses on measuring business benefits and return on investment

Exercise

- Provide an assessment of your own company's EA process maturity, on a scale from Level 0 to Level 5 using the templates provided with the DoC ACMM 1.2 document (provided as a handout)



Module 34:

Architecture

Skills Framework



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Roadmap

| |
|---|
| Part I - Introduction |
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| Architecture Contracts |
| Architecture Governance |
| Architecture Maturity Models |
| Architecture Skills Framework |

- Part VI – Architecture Capability Framework, Chapter



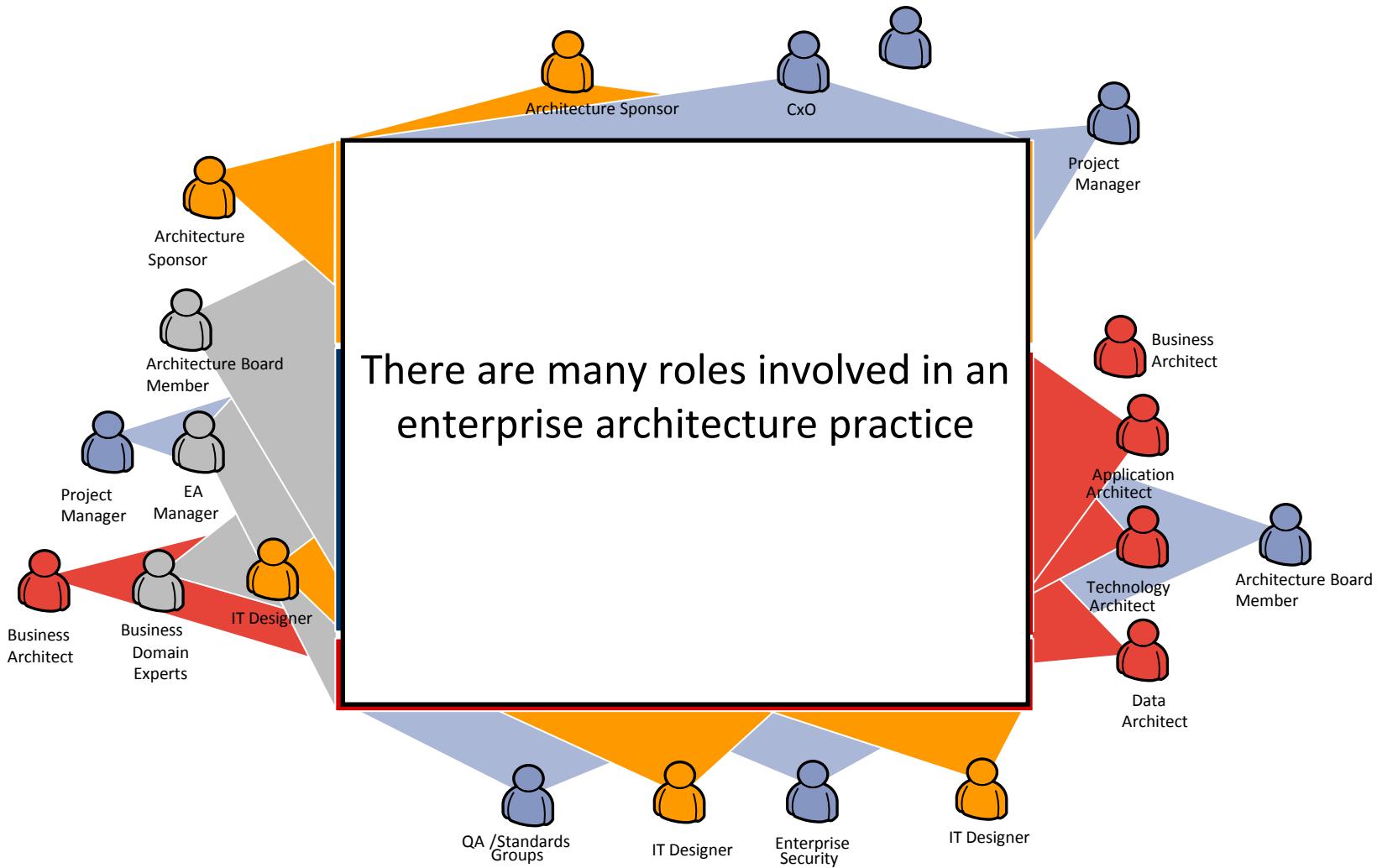


Module Objectives

The objectives are to:

- Explain the purpose of the Architecture Skills Framework and why it is needed
- Describe the benefits of using the Architecture Skills Framework
- Describe the structure of the Architecture Skills Framework, including roles, skills and proficiency levels

Roles





Purpose

Definitional Rigor

- “Enterprise Architecture” and “Enterprise Architect” are widely used but poorly defined terms.
- There is a need for clearer definitions.

Basis of an Internal Architecture Practice

- An enterprise architecture practice is a formal program of development and certification by which an enterprise recognizes the skills of its architects
- Such a program is essential in order to ensure the alignment of staff skills and experience with the architecture tasks that the enterprise wishes to perform

Purpose

- An enterprise architecture practice is both difficult and costly to set up
- The TOGAF Architecture Skills Framework attempts to address this need
 - By providing definitions of the architecting skills and proficiency levels required of personnel, internal or external, who are to perform the various architecting roles defined within the TOGAF Framework

Benefits of using the Architecture Skills Framework

Specific benefits anticipated include:

- Reduced time, cost, and risk in training, hiring, and managing architecture professionals, both internal and external.
- Reduced time and cost to set up an internal architecture practice
- This in turn helps reduce the time, cost and risk of overall solution development

The Structure of the Architecture Skills Framework

The TOGAF Architecture Skills Framework provides a view of the competency levels for specific roles within the enterprise architecture team.

The Framework defines:

- The roles within an enterprise architecture work area
- The skills required by those roles
- The depth of knowledge required to fulfil each role successfully

A typical architecture team undertaking the development of an enterprise architecture comprises the following roles:

- Architecture Board Members
- Architecture Sponsor
- Architecture Manager
- Architects for :
 - Enterprise Architecture
 - Business Architecture
 - Data Architecture
 - Application Architecture
 - Technology Architecture
 - Program and/or Project Managers
 - IT Designer
 - Etc...

The Structure of the Architecture Skills Framework

Categories of Skills

The TOGAF team skill set will need to include the following main categories of skills:

- **Generic Skills:** leadership, team working, inter-personal skills, etc.
- **Business Skills & Methods:** business cases, business process, strategic planning, etc.
- **Enterprise Architecture Skills:** modeling, building block design, applications and role design, systems integration, etc.
- **Program or Project Management Skills:** managing business change, project management methods and tools, etc.
- **IT General Knowledge Skills:** brokering applications, asset management, migration planning, SLAs, etc.
- **Technical IT Skills:** software engineering, security, data interchange, data management, etc.
- **Legal Environment:** data protection laws, contract law, procurement law, fraud, etc.

The Structure of the Architecture Skills Framework

- Proficiency Levels

| Level | Achievement | Description | © The Open Group |
|-------|-------------|---|------------------|
| 1 | Background | Not a required skill, though should be able to define and manage skill if required. | |
| 2 | Awareness | Understands the background, issues, and implications sufficiently to be able to understand how to proceed further and advise client accordingly. | |
| 3 | Knowledge | Detailed knowledge of subject area and capable of providing professional advice and guidance. Ability to integrate capability into architecture design. | |
| 4 | Expert | Extensive and substantial practical experience and applied knowledge on the subject. | |

- Skills Matrices – Example Generic Skills

| Roles | Architecture Board Member | Architecture Sponsor | Enterprise Architecture Manager | Enterprise Architecture Technology | Enterprise Architecture Data | Enterprise Architecture Applications | Enterprise Architecture Business | Program/ Project Manager | IT Designer |
|------------------------|---------------------------|----------------------|---------------------------------|------------------------------------|------------------------------|--------------------------------------|----------------------------------|--------------------------|-------------|
| Generic Skills | | | | | | | | | |
| Leadership | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 1 |
| Teamwork | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 2 |
| Inter-personal | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 |
| Oral Communications | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 2 |
| Written Communications | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 3 |
| Logical Analysis | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 3 | 3 |
| Stakeholder Management | 4 | 3 | 4 | 3 | 3 | 3 | 3 | 4 | 2 |
| Risk Management | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 4 | 1 |



Summary

- This module has introduced the Architecture Skills Framework, a classification model for architect roles.

Exercise

Place yourself within the Architecture Skills Framework and write a brief summary of your role, your skills, and proficiency level.

Congratulations



Congratulations on completing this
course!

Keep in touch

info@theknowledgeacademy.com

Thank you

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