



TOGAF® Certification

Level 1 & 2

Courseware

Version 3.1

THE *Open* GROUP

www.firebrandtraining.com

TOGAF® Standard Courseware Version 9.1 Edition

V9.1 Edition, Copyright © 2009-2011



All rights reserved

Published by The Open Group, November 2011



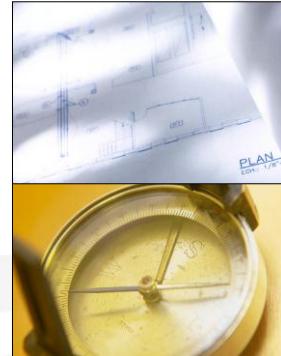
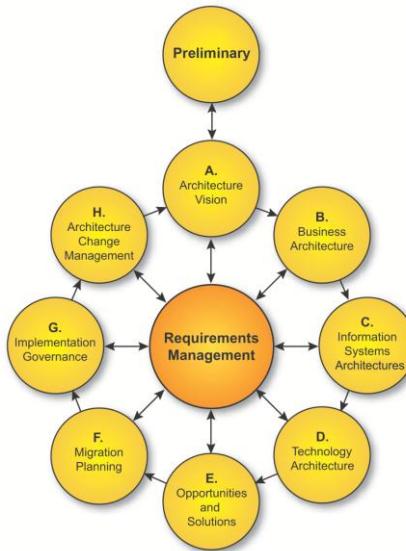
Instructor

Background



Introduction

7/2/2014



TOGAF® is a registered trademark of The Open Group in the United States and other countries.

3



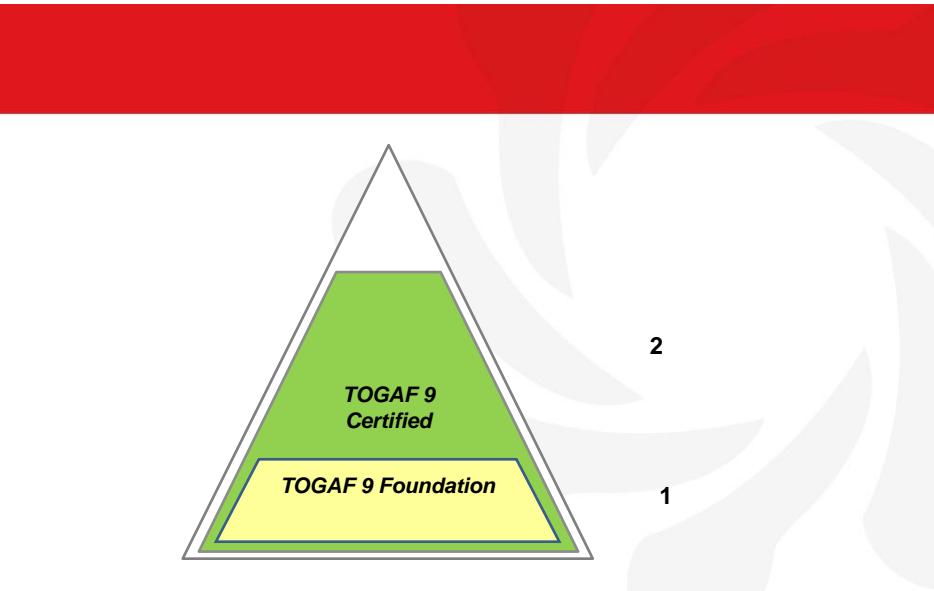
TOGAF 9 Certification Levels

Level	Tag	Purpose
1	<i>TOGAF 9 Foundation</i>	To provide validation that the candidate has gained knowledge of the terminology and basic concepts of TOGAF 9 and understands the core principles of Enterprise Architecture and TOGAF
2	<i>TOGAF 9 Certified</i>	To provide validation that in addition to knowledge and comprehension, the candidate is able to analyze and apply knowledge of TOGAF

7/2/2014

4





Level 2 is a superset of Level 1



About this Course

Prerequisite knowledge:

- ❖ A prior knowledge of Enterprise Architecture is advantageous but not required
- ❖ During the course students will become familiar with the *TOGAF Version 9.1* body of knowledge at <http://www.opengroup.org/architecture/togaf9-doc/arch/>

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

7



Course Objectives

- | | |
|---|--|
| <p>❖ TOGAF 9 Foundation training</p> <ul style="list-style-type: none">• Individuals who require a basic understanding of TOGAF 9• Professionals who are working in roles associated with an architecture project such as those responsible for planning, execution, development, delivery and operation;• Architects who are looking for a first introduction to TOGAF 9• Architects who want to achieve Level 2 certification in a stepwise approach. | <p>❖ TOGAF 9 Certified training</p> <ul style="list-style-type: none">• Individuals who require a deeper understanding of TOGAF 9• Professionals who are working in an organization where TOGAF 9 has been adopted and who need to participate in architecture projects and initiatives• Architects who will be responsible for developing architecture artifacts• Architects who wish to introduce TOGAF 9 into an architecture practice• Architects who want to achieve a recognized qualification to demonstrate their detailed knowledge of TOGAF 9 |
|---|--|

8



TOGAF 9 Certified Training

*Recommended Modules **

* See Checklist for requirements for Accreditation



Conventions Used in this Presentation

❖ Ellipsis (...)

used to indicate a **continuation**; such as an **incomplete list** of example items ...or a **continuation** from **preceding text**

❖ Bold

- used for **emphasis!**
- used to highlight a **subheading**

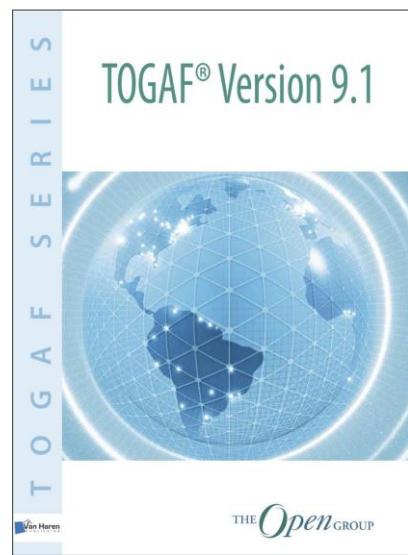


7/2/2014

Recommended Reading



TOGAF Version 9.1

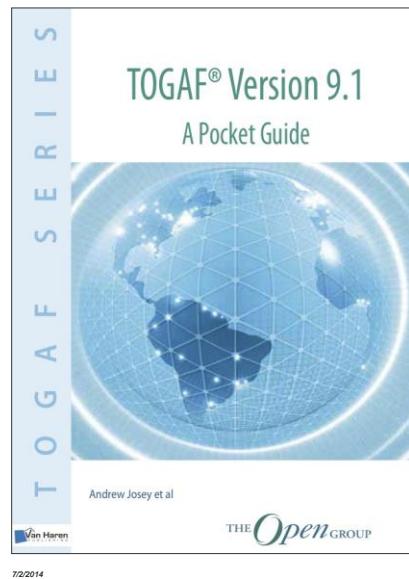


11 TOGAF Version 9.1, The Book

- Document No. G116
- www.opengroup.org
- www.vanharen.net



TOGAF Version 9.1 Pocket Guide

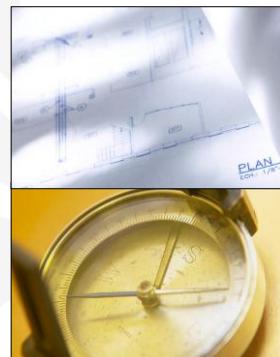
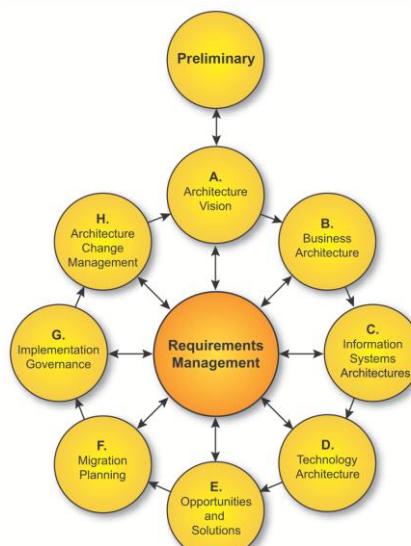


TOGAF Version 9.1, The Pocket Guide

- Document No. G117
- www.opengroup.org
- www.vanharen.net



Introduction



TOGAF is a registered trademark of The Open Group in the United States and other countries



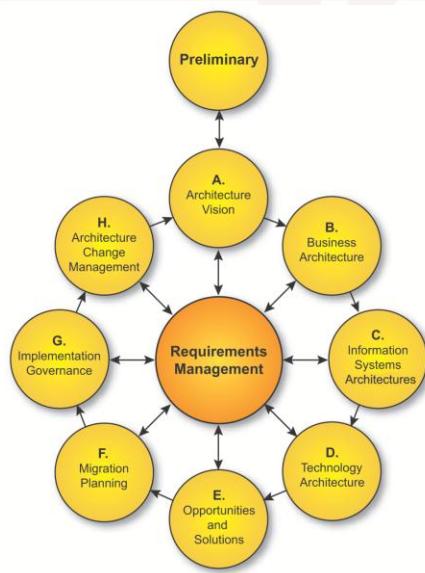
Management Overview

Module 1

V9.1 Edition Copyright © 2009-2011



Management Overview



2



Module Objectives

- ❖ To provide a management overview of TOGAF, an Open Group Standard
 - The Open Group
 - The Architecture Forum
 - Why enterprise architecture
 - Why a framework
 - TOGAF 9.1
 - TOGAF 9 Certification
 - Summary

3



The Open Group ...

- ❖ Is an international vendor - and technology - neutral consortium that organizations rely on to lead the development of IT standards and certifications
- ❖ Provides guidance and open environment to enable interoperability and vendor-neutrality
- ❖ Membership is open to all enterprises, small, medium and large, anywhere in the world

4



Our 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."

5



Our Mission

The mission of The Open Group is to drive the creation of Boundaryless Information Flow™ achieved by:



- ✿ Working with customers to capture, understand and address current and emerging requirements, establish policies, and share best practices;
- ✿ Working with suppliers, consortia and standards bodies to develop consensus and facilitate interoperability, to evolve and integrate specifications and open source technologies;
- ✿ Offering a comprehensive set of services to enhance the operational efficiency of consortia; and
- ✿ Developing and operating the industry's premier certification service and encouraging the procurement of certified products.

6



Activities

- ❖ Governing Board work groups
 - Open CA Work Group
 - Open CITS Work Group
 - UNIX Work Group
- ❖ Member Forums
 - Architecture, ArchiMate®
 - Enterprise Management, Platform
 - Real Time & Embedded, Security and Identity Management
 - Trusted Technology Forum, Jericho Forum
- ❖ Work Groups
 - Business Architecture
 - Cloud Computing
 - Quantum Lifecycle
 - Semantic Interoperability, including Universal Data Element Framework (UDEF)
 - Service Oriented Architecture (SOA)



7



Forums/Work Areas of The Open Group

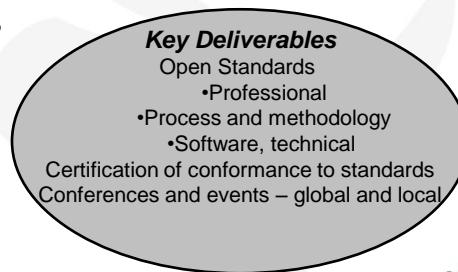
- ❖ Meeting points for Suppliers and Buyers
- ❖ Each Forum is effectively an autonomous consortium operating within The Open Group
 - Direction determined by members
 - Outputs approved by members
 - Must obey some rules to respect anti-trust legislation
- ❖ Forums initiate new areas of work, often in partnership with other Forums
 - ...leading to industry standards
 - ...leading to certification programs based on those standards

8



How members work

- ❖ Mostly virtual
 - E-mail, teleconference, web conference
- ❖ Collaboration infrastructure
 - Track activities for projects, forums etc
- ❖ Quarterly Global Member Meetings
- ❖ Local Member Meetings



7/2/2014

9



Why Customers join



- ❖ We can build relationships with peers in our or other industries and share knowledge
- ❖ We can talk to suppliers in a non-selling environment
- ❖ We can influence the priorities being addressed by the industry
- ❖ We have early access to the solutions being developed to address our urgent issues
- ❖ We can track forums, work groups, projects and activities that are relevant to our enterprise

7/2/2014

10



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



7/2/2014

Stakeholders and Value

- ❖ Customer Architects
 - reduced time, cost, risk
- ❖ Tools Vendors
 - bigger market, bigger market share
- ❖ IT Solution Vendors
 - greater cost-efficiency
- ❖ Integrators
 - greater cost-efficiency, better service
- ❖ Academic /Research Organizations
 - funding support



7/2/2014

What is an Enterprise?

- ❖ A collection of organizations 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

7/2/2014



- ❖ An Architecture is the fundamental organization of something, embodied in:
 - its components,
 - their relationships to each other and the environment,
 - and the principles governing its design and evolution

Adapted from ANSI/IEEE Standard 1471-2000



What is Enterprise Architecture?



- ✿ Enterprise Architecture is:
- ✿ The organizing 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 organization. The intent of an enterprise architecture is to determine how an organization can most effectively achieve its current and future objectives [2]

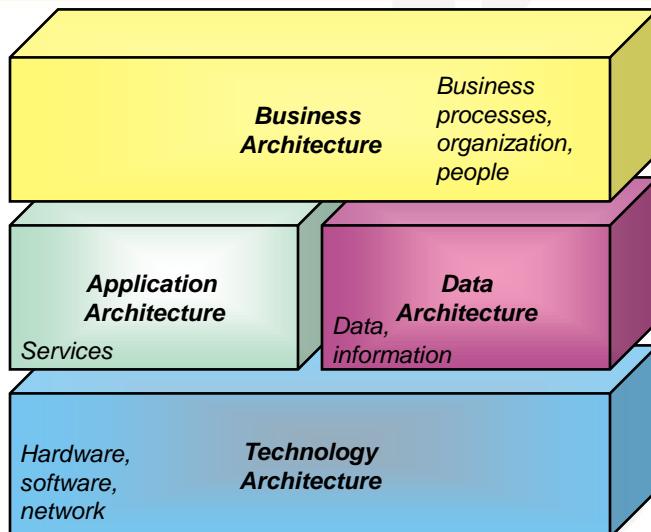
[1] MIT Center for Information Systems Research

[2] SearchCIO.com

7/2/2014



Architecture Domains



7/2/2014



Why Enterprise Architecture?

- ❖ Effective management and exploitation of information through IT is 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

7/2/2014



Why Enterprise Architecture?

- ❖ Two key reasons why you need an enterprise architecture
 - Critical to business survival and success
 - Enables managed innovation within the enterprise

7/2/2014



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



7/2/2014

Business Benefits of Enterprise Architecture

- ❖ 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

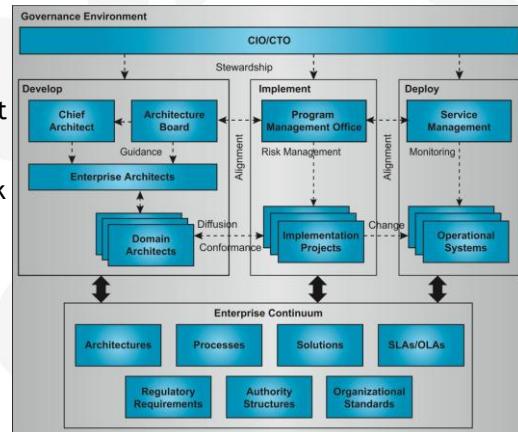
See also: "Why Enterprise Architecture Matters?", The Open Group White Paper, W076



7/2/2014

The Importance of Governance

- ❖ 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



7/2/2014

21



What do we mean by Governance?

- ❖ The way in which decisions are made
- ❖ Who is responsible?
- ❖ Who is involved?
- ❖ Who is accountable?

7/2/2014

22



What is an Architecture Framework?

❖ Definition 3.13: Architecture Framework

- A conceptual structure used to develop, implement and sustain an enterprise 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

23



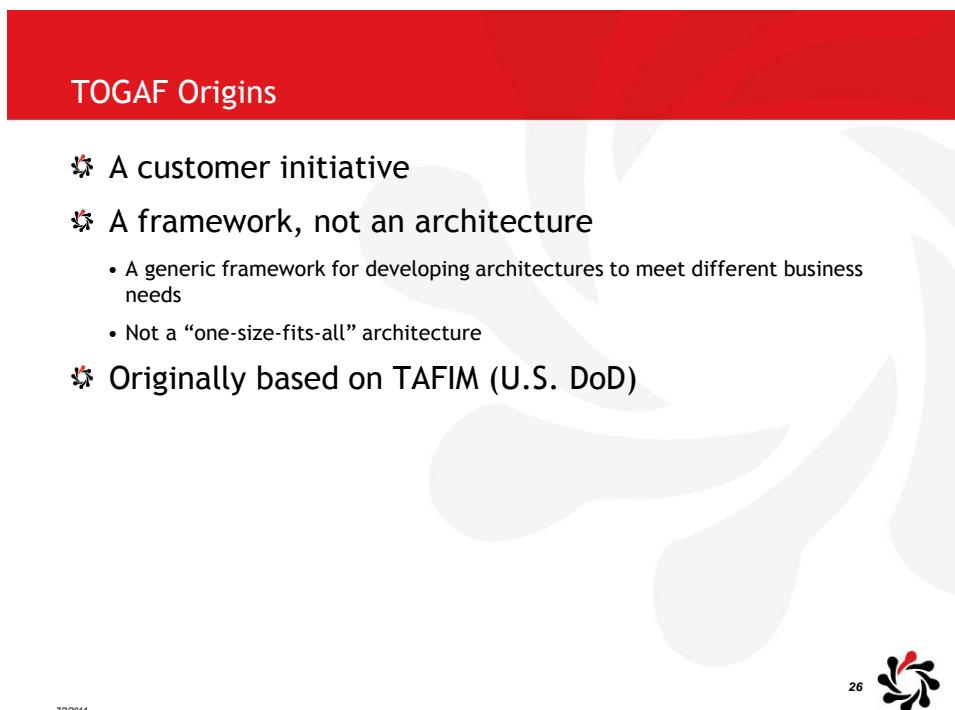
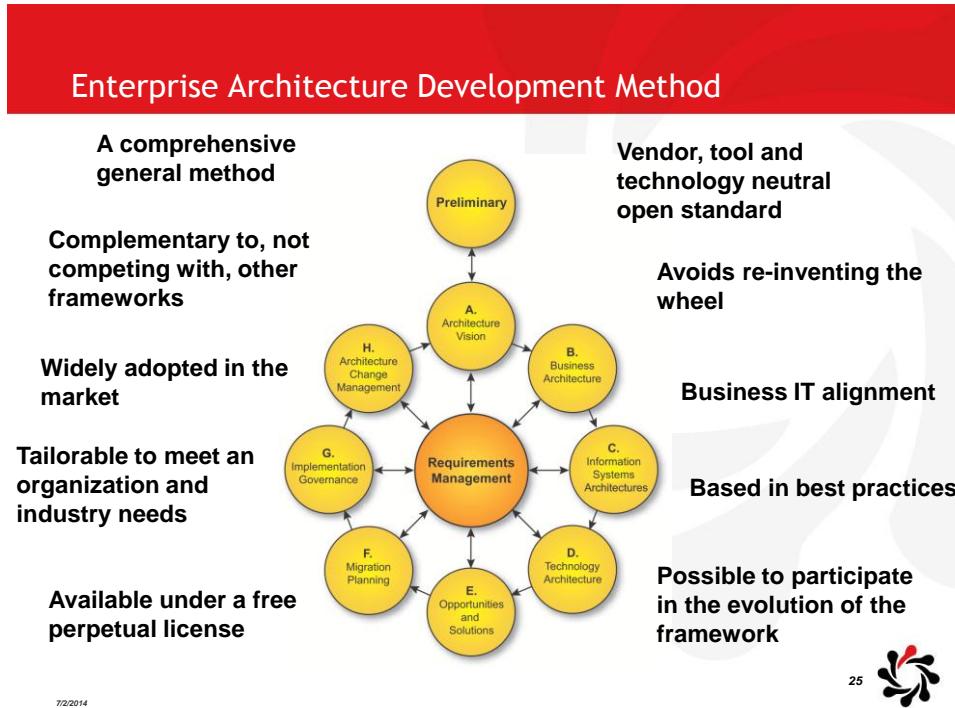
The Value of a Framework

❖ 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

24





TOGAF Development

1994	Requirement	Proof of need
1995	TOGAF Version 1	Proof of concept
1996	TOGAF Version 2	Proof of application
1997	TOGAF Version 3	Relevance to practical architectures (building blocks)
1998	TOGAF Version 4	Enterprise Continuum (TOGAF in context)
1999	TOGAF Version 5	Business Scenarios (architecture requirements)
2000	TOGAF Version 6	Architecture Views (IEEE Std 1471)

27



7/2/2014

TOGAF Development

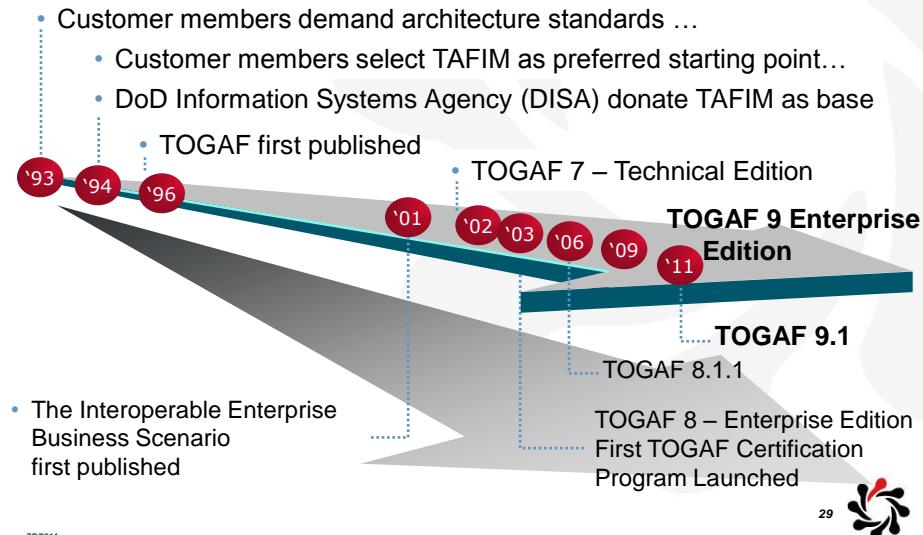
2001	TOGAF Version 7	Architecture Principles; Compliance Reviews
2002	TOGAF Version 8	Extension to Enterprise Architecture
2003	TOGAF Version 8.1	Requirements Management; Governance; Maturity Models; Skills Framework
2006	TOGAF Version 8.1.1	Technical Corrigendum 1 applied
2009	TOGAF Version 9	Evolutionary restructure; Architecture Content Framework
2011	TOGAF Version 9.1	Technical Corrigendum 1 applied

28



7/2/2014

Member (End User) Driven



TOGAF Scope

- TOGAF emphasizes business goals as architecture drivers, and provides a repository of best practice, including
 - TOGAF Architecture Development Method (ADM)
 - ADM Guidelines & Techniques
 - TOGAF Architecture Content Framework
 - Enterprise Continuum
 - TOGAF Reference Models
 - TOGAF Capability Framework

TOGAF Goals

❖ Long-term

- An industry standard, generic enterprise architecture method....
-usable on its own or in conjunction with frameworks having products relevant/specific to particular sectors.
- Several frameworks have mind share:
 - Zachman, Spewak, DoD Framework, FEAf, TEAF, ...
- Almost all focus on products, not method
- TOGAF and.... (not TOGAF or....)

❖ Version 9

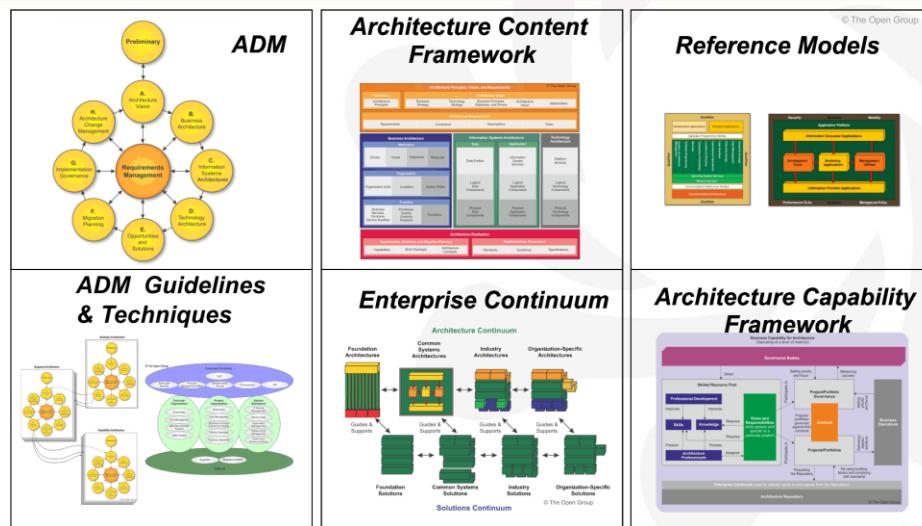
- An evolution from TOGAF 8.1.1. Closer alignment with the business.
Restructuring for ease of use. Overall structure and core method for enterprise architecture that can be filled out in future years.

31



7/2/2014

TOGAF 9 Components



32



7/2/2014

TOGAF 9.1 Standard

Part I – Introduction
Preface, Executive Overview, Core Concepts, Definitions and Release Notes
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
Architecture 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 – TOGAF Reference Models
Foundation Architecture: Technical Reference Model
Integrated Information Infrastructure Reference Model
Part VII – Architecture Capability Framework
Architecture Board
Architecture Compliance
Architecture Contracts
Architecture Governance
Architecture Maturity Models
Architecture Skills Framework

7/2/2014

33



TOGAF 9 Components

❖ Architecture Development Method (ADM)

- An iterative sequence of steps to develop an enterprise-wide architecture

❖ ADM Guidelines and Techniques

- Guidelines and techniques to support the application of the ADM

❖ Architecture Content Framework

- A detailed model of architectural work products, including deliverables, artifacts within deliverables, and the Architecture Building Blocks (ABBs) that deliverables represent.

7/2/2014

34



TOGAF 9 Components

❖ The Enterprise Continuum

- A model for structuring a virtual repository and methods for classifying architecture and solution artifacts

❖ TOGAF Reference Models

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

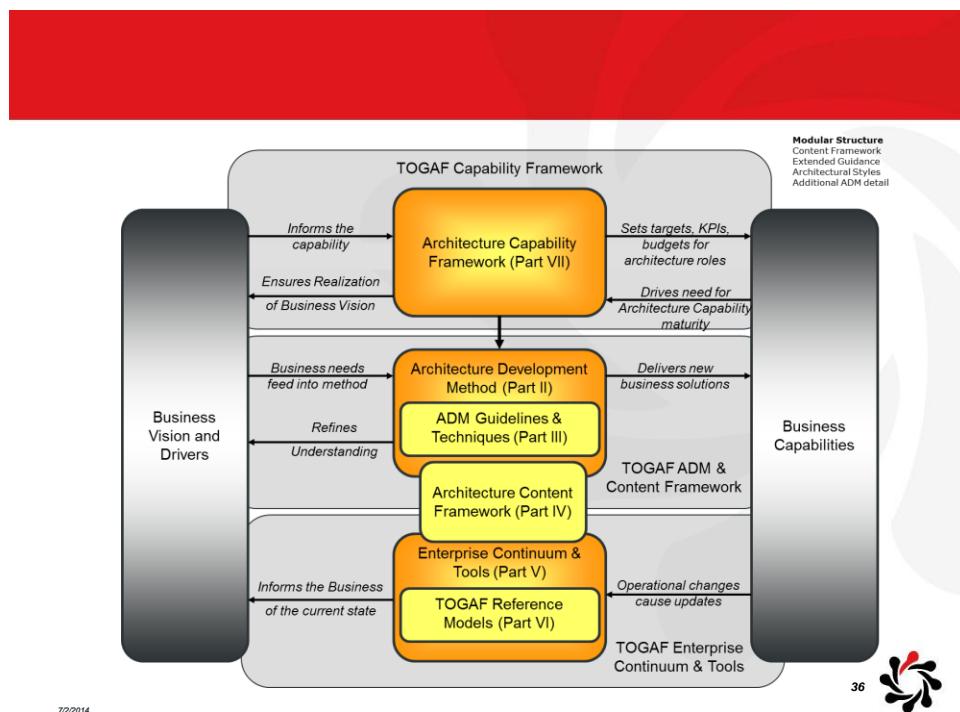
❖ The Architecture Capability Framework

- A structured definition of the organizations, skills, roles and responsibilities to establish and operate an Enterprise Architecture.

35



7/2/2014

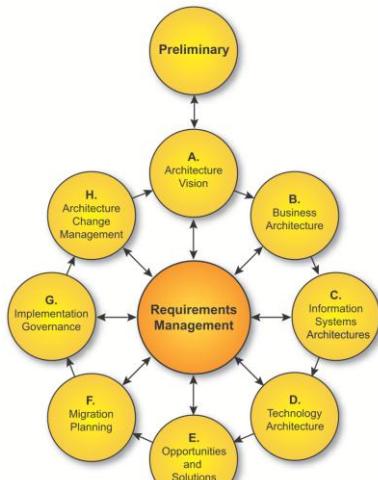


36



7/2/2014

ADM - Basic Principles



7/2/2014

37



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

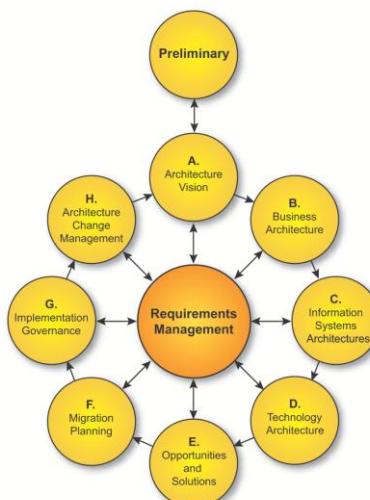
- ❖ Each iteration = new decisions:

- 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.

ADM - Basic Principles



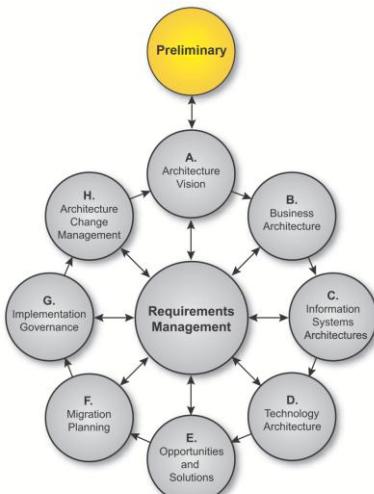
7/2/2014

38



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

Preliminary Phase



* This phase includes the preparation and initiation activities to create an Architecture Capability

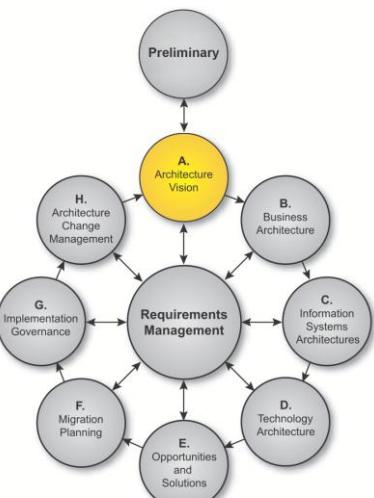
- Understand business environment
- High level management commitment
- Agreement on scope
- Establish principles
- Establish governance structure
- Customization of TOGAF

39



7/2/2014

Phase A Architecture Vision



* Initiates one iteration of the architecture process

- Sets scope, constraints, expectations
- Required at the start of every architecture cycle

* Create the Architecture Vision

* Validates business context

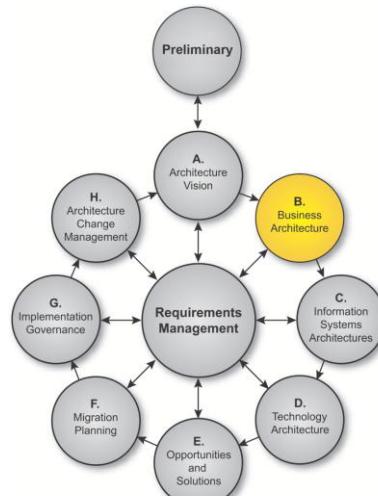
* Creates Statement of Architecture work

40



7/2/2014

Phase B Business Architecture

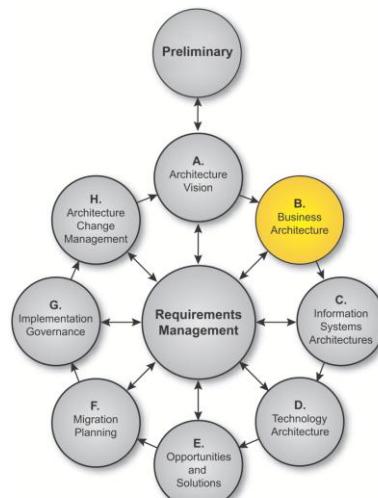


- ❖ The fundamental organization of a business, embodied in
 - its business processes and people,
 - their relationships to each other and the environment
 - and the principles governing its design and evolution
- ❖ Shows how the organization meets its business goals

41



Phase B Business Architecture - Contents

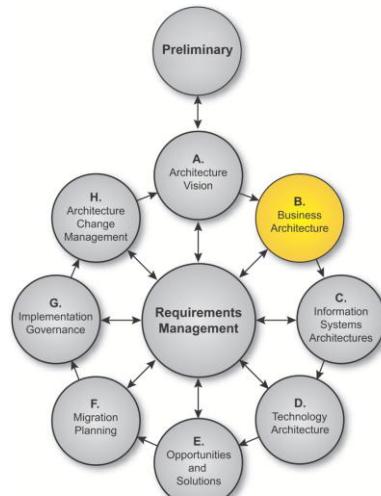


- ❖ Organization structure
- ❖ Business goals and objectives
- ❖ Business functions
- ❖ Business Services
- ❖ Business processes
- ❖ Business roles
- ❖ Correlation of organization and functions

42



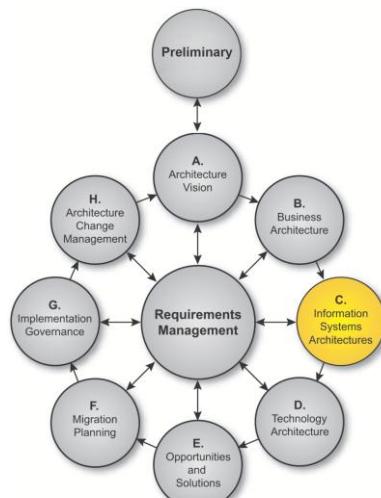
Phase B Business Architecture - Steps



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. Finalize the Architecture
8. Create Architecture Definition Document

43

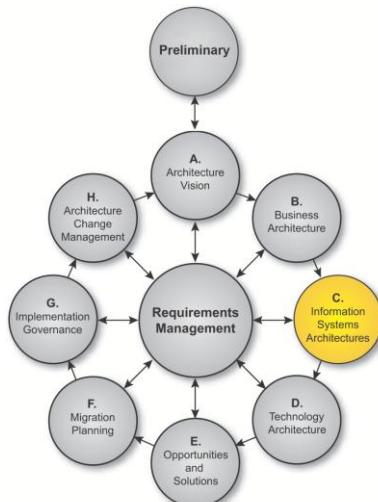
Phase C Information Systems Architectures



- ❖ The fundamental organization of an IT system, embodied in
 - The major types of information and applications that process them
 - The relationships to each other and the environment, and the principles governing its design and evolution
- ❖ Shows how the IT systems meets the business goals of the enterprise

44

Phase C Data or Applications first ?

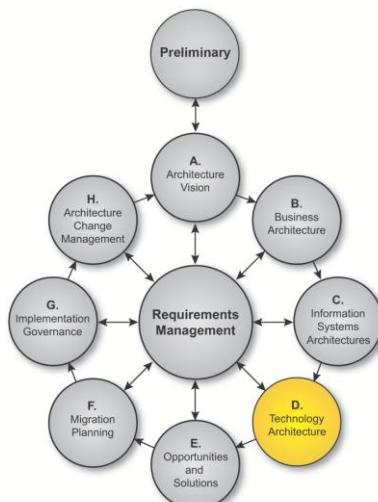


- ✖ It is usually necessary to address both
 - Not always the case, depending on project scope and constraints
- ✖ May be developed in either order, or in parallel
 - Theory suggests Data Architecture comes first
 - Practical considerations may mean that starting with Application Architecture may be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

45



Phase D Technology Architecture

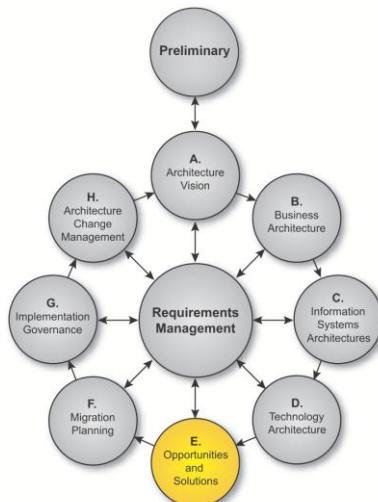


- ✖ The fundamental organization of an IT system, embodied in
 - its hardware, software and communications technology
 - their relationships to each other and the environment,
 - and the principles governing its design and evolution

46



Phase E Opportunities and Solutions

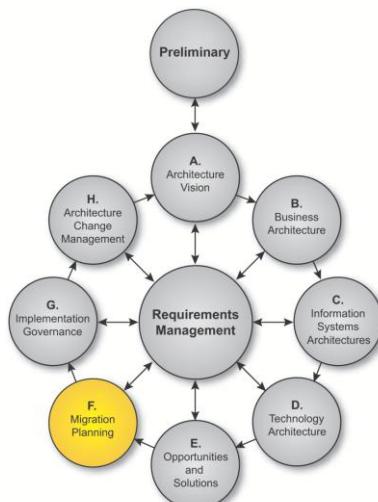


- ❖ Perform initial implementation planning
- ❖ Identify the major implementation projects
- ❖ Determine if an incremental approach is required, if so define Transition Architectures
- ❖ Decide on approach
 - Make v Buy v Re-Use
 - Outsource
 - COTS
 - Open Source
- ❖ Assess priorities
- ❖ Identify dependencies

47



Phase F Migration Planning

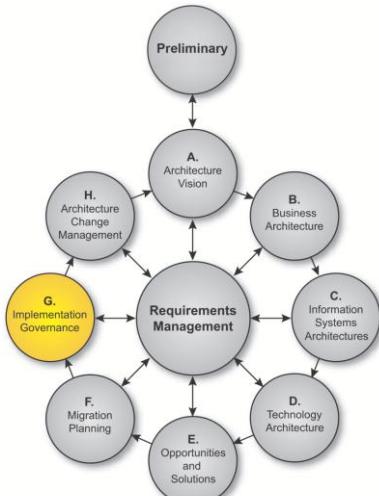


- ❖ For work packages and projects identified in Phase E perform
 - Cost/benefit analysis
 - Risk assessment
- ❖ Finalize a detailed Implementation and Migration Plan

48



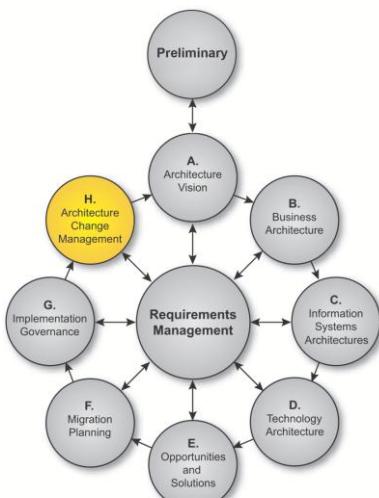
Phase G Implementation Governance



- ❖ 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*

49

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

50

TOGAF Certification

Certification Level	Purpose
TOGAF 9 Foundation	To provide validation that the candidate has gained knowledge of the terminology and basic concepts of TOGAF 9 and understands the core principles of Enterprise Architecture and TOGAF
TOGAF 9 Certified	To provide validation that in addition to knowledge and comprehension, the candidate is able to analyze and apply knowledge of TOGAF

7/2/2014



Some Figures about TOGAF

- ❖ Developed by 300+ organisations worldwide involved in its development
 - Large IT users
 - IT vendors
 - System Integrators
 - Academics
- ❖ Used in major IT projects worldwide
 - IBM, HP, Sun, Infosys,
- ❖ Community of knowledgeable TOGAF practitioners
 - More than 16000 certified
- ❖ Supported by Architecture Tools

7/2/2014



Summary

- ❖ TOGAF®, an Open Group 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
 - “Demystifies” architecture development
- ❖ Vendor, tool, and technology neutral
- ❖ A framework and method for achieving the “Boundaryless Information Flow” vision

53



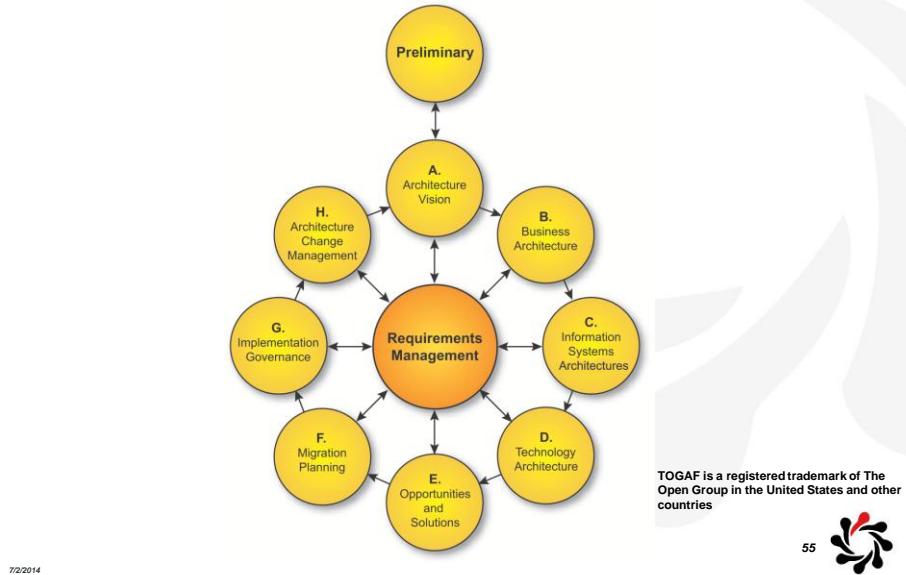
For More Information . . .

- ❖ The TOGAF Web Site
 - <http://www.opengroup.org/togaf/>
- ❖ The Architecture Forum
 - <http://www.opengroup.org/architecture/>
- ❖ TOGAF Version 9.1 on-line
 - <http://www.opengroup.org/architecture/togaf9-doc/arch/>
- ❖ TOGAF Version 9.1 licensing and downloads
 - <http://www.opengroup.org/togaf/>

54



Management Overview



TOGAF 9 Components

Module 2

V9.1 Edition Copyright © 2010-2011

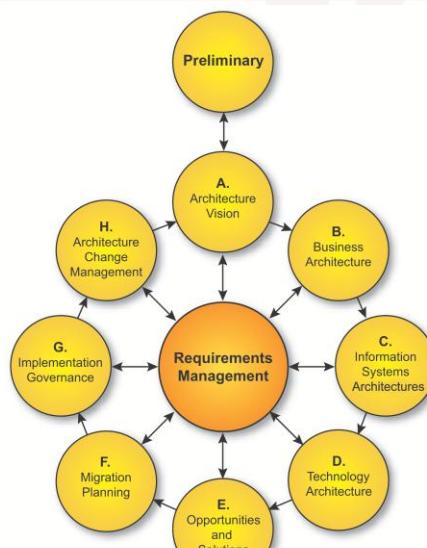


All rights reserved

Published by The Open Group, 2011



TOGAF 9 Components



TOGAF is a registered trademark of The Open Group in the United States and/or other countries.



7/2/2014

Module Objectives

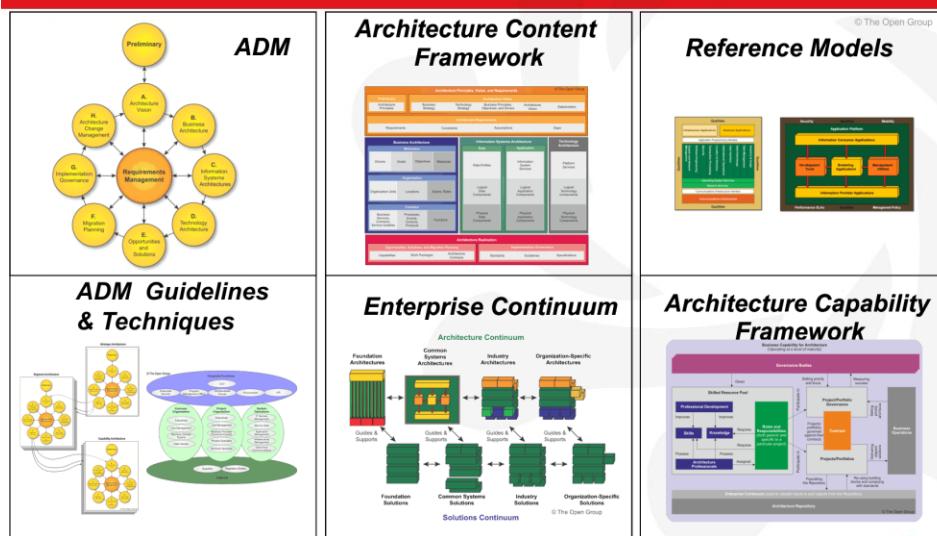
- ❖ To highlight and introduce the main components and key concepts of TOGAF 9
 - The Architecture Development Method (ADM)
 - ADM Guidelines and Techniques
 - Architecture Content Framework
 - Deliverables, artifacts, building blocks
 - The Enterprise Continuum
 - The Architecture Repository
 - TOGAF Reference Models
 - The Architecture Capability Framework
 - Establishing an EA Capability

3



7/2/2014

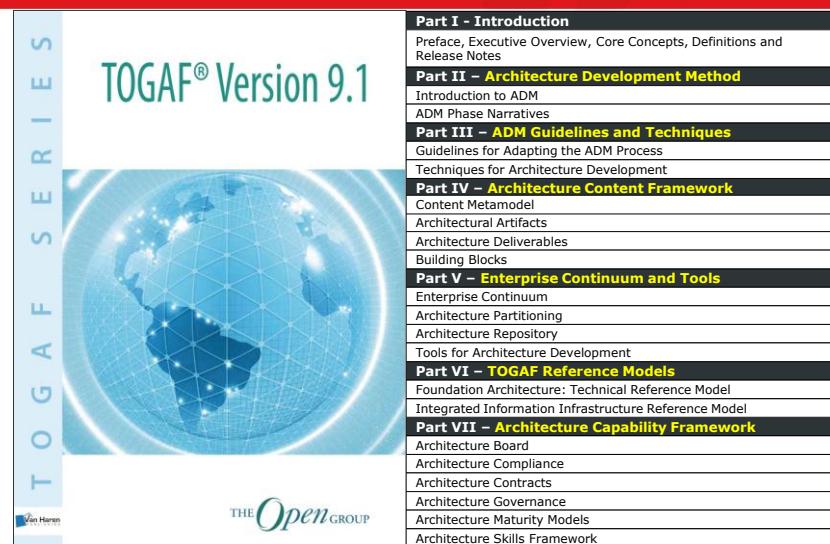
TOGAF 9 Components



4



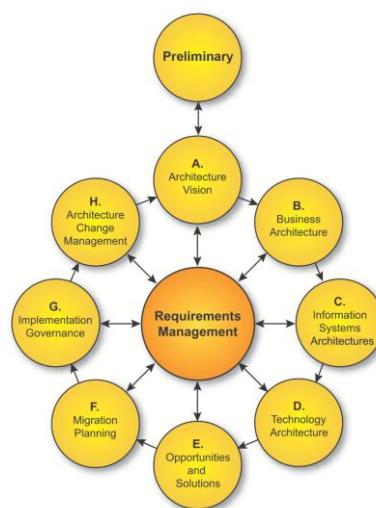
7/2/2014



7/2/2014

5

The Architecture Development Method



- ✿ The core of TOGAF
- ✿ A proven way of developing an architecture
- ✿ Designed to address business requirements
- ✿ An iterative method
- ✿ A set of architecture views to ensure that a complex set of requirements are adequately addressed
- ✿ Each phase includes objectives, approach, inputs, steps and outputs

7/2/2014

6



ADM Guidelines and Techniques

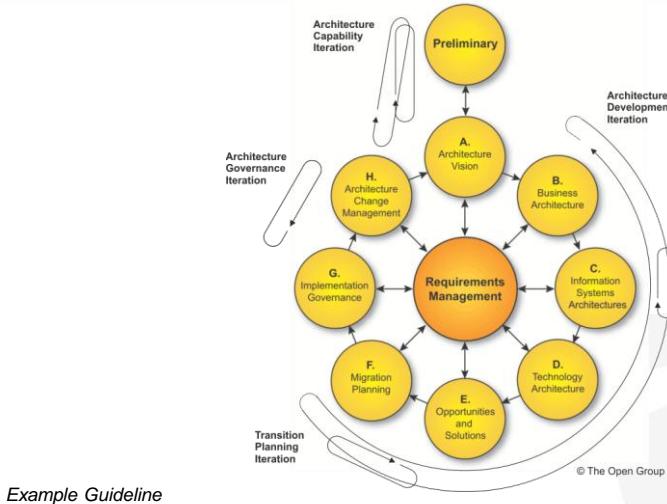
- ❖ A set of guidelines and techniques to support the application of the ADM
- ❖ The guidelines help to adapt the ADM to deal with different scenarios, including different process styles (e.g. the use of iteration) and also specific requirements (e.g. security).
- ❖ The techniques support specific tasks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

7/2/2014

7



Applying Iteration to the ADM

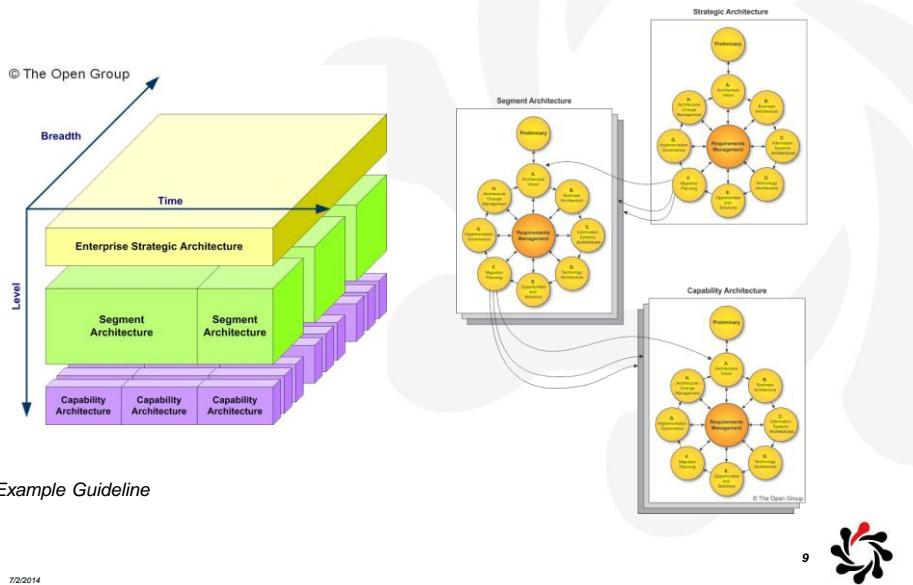
*Example Guideline*

7/2/2014

8



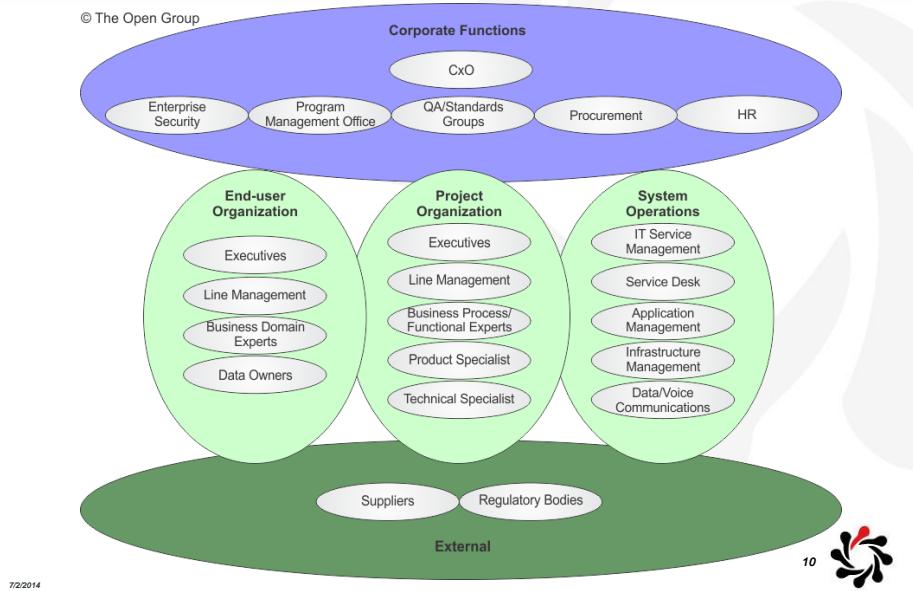
Applying the ADM



9



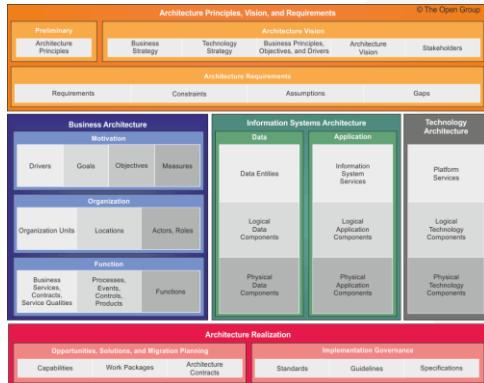
Categories of Stakeholder



10



Architecture Content Framework

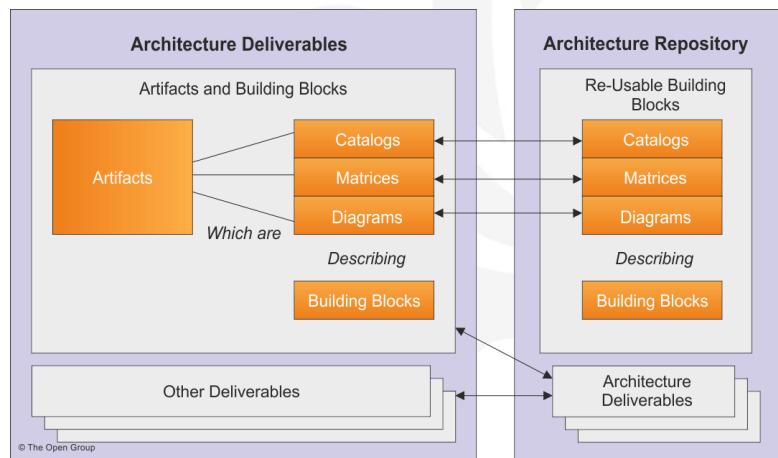


- ✿ Provides a detailed model of architectural work products, including
 - Deliverables, Artifacts within deliverables, and the Architecture Building Blocks (ABBs) that deliverables represent
- ✿ It drives for greater consistency in the outputs of TOGAF
- ✿ It provides a comprehensive checklist of architecture outputs
- ✿ It promotes better integration of work products
- ✿ It provides a detailed open standard for how architectures should be described
- ✿ It includes a detailed metamodel

7/2/2014

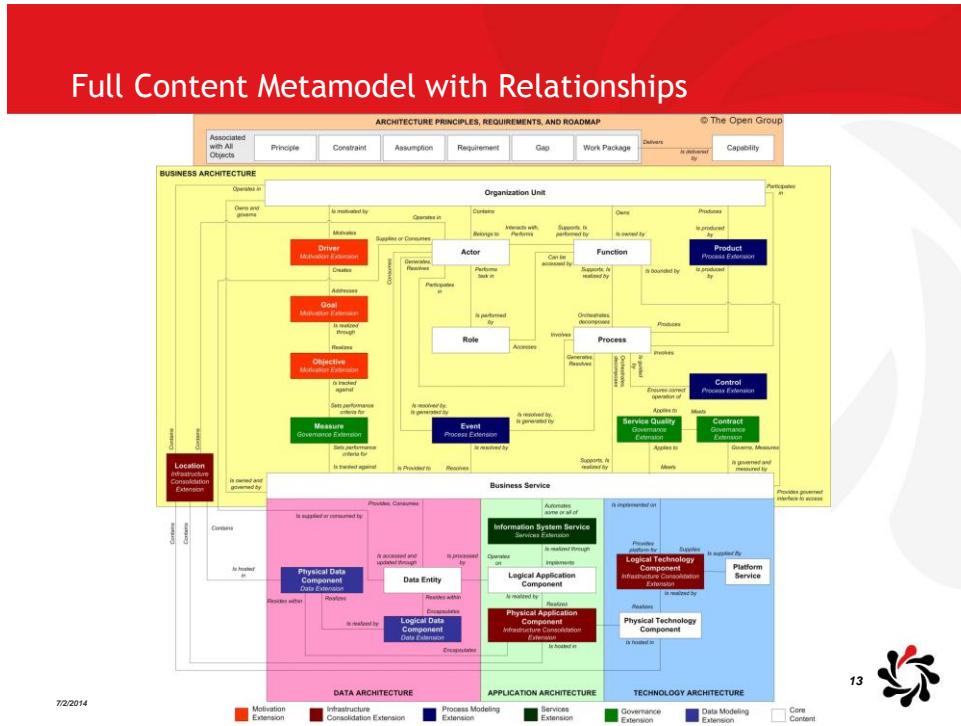


Deliverables, Artifacts and Building Blocks

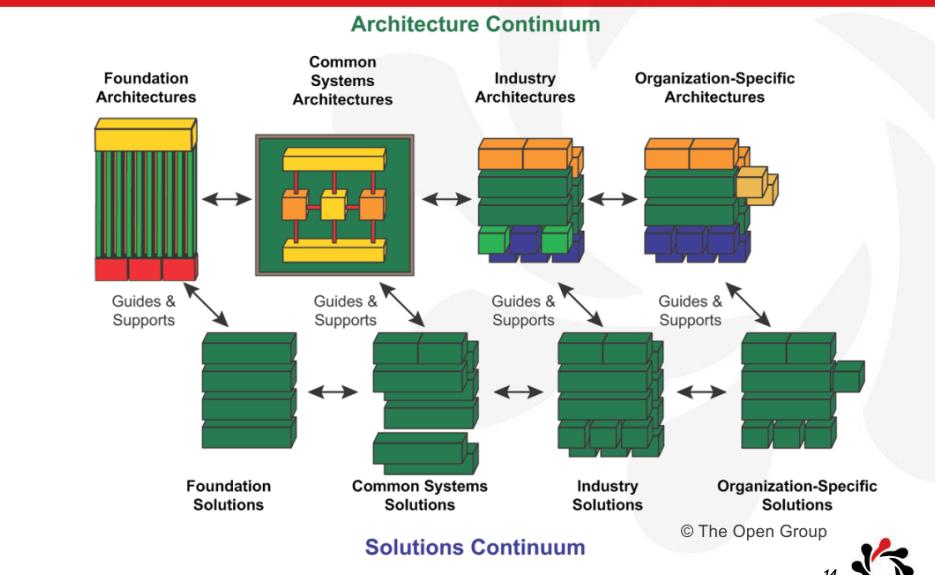


7/2/2014

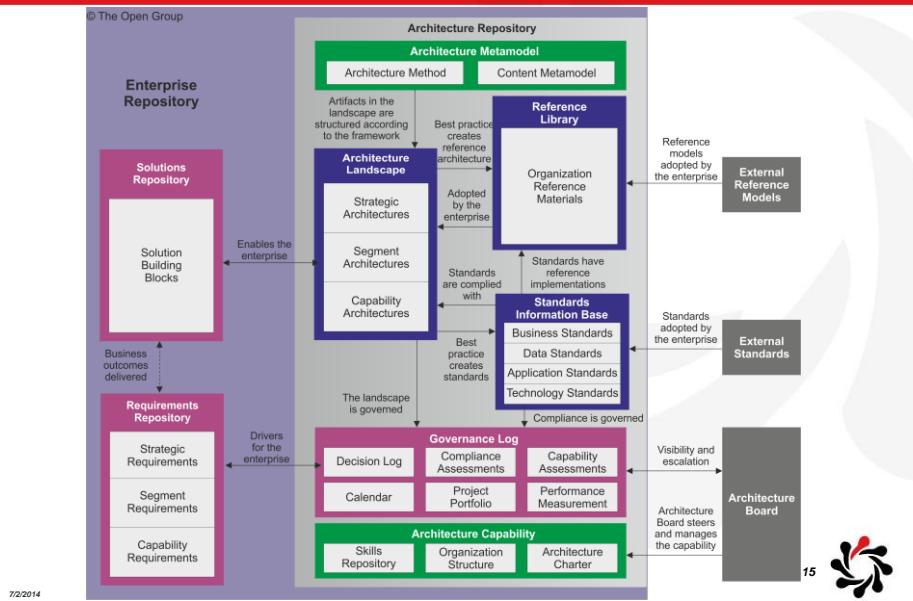




The Enterprise Continuum



Architecture Repository



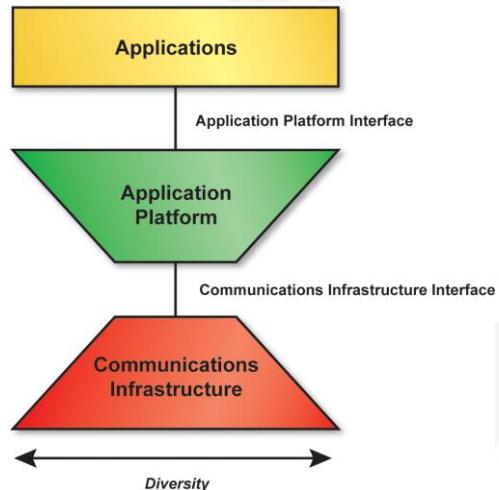
TOGAF Reference Models

✿ Two Reference Models are provided

- The TOGAF Technical Reference Model (TRM)
 - A Foundation Architecture
 - A model and a taxonomy of generic platform services
- The Integrated Information Infrastructure Model (III-RM).
 - A model for business applications and infrastructure applications
 - Specifically aimed to support the vision of Boundaryless Information Flow™

16

High-Level TRM

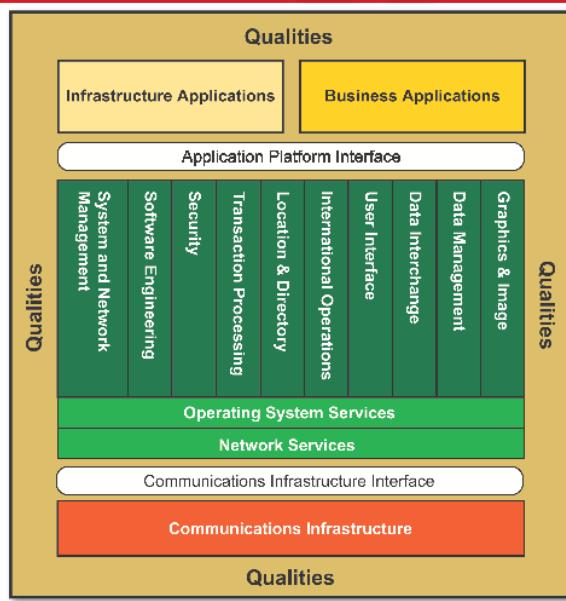


7/2/2014

17



Detailed TRM



7/2/2014

18

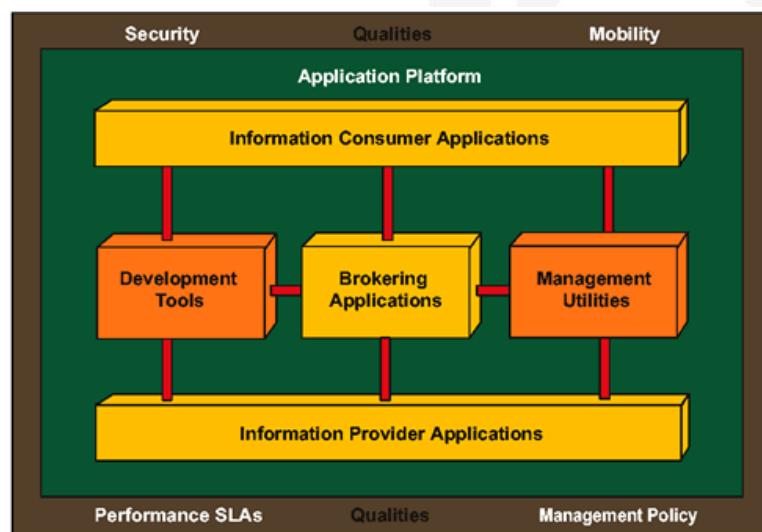


Boundaryless Information Flow™

- ❖ 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

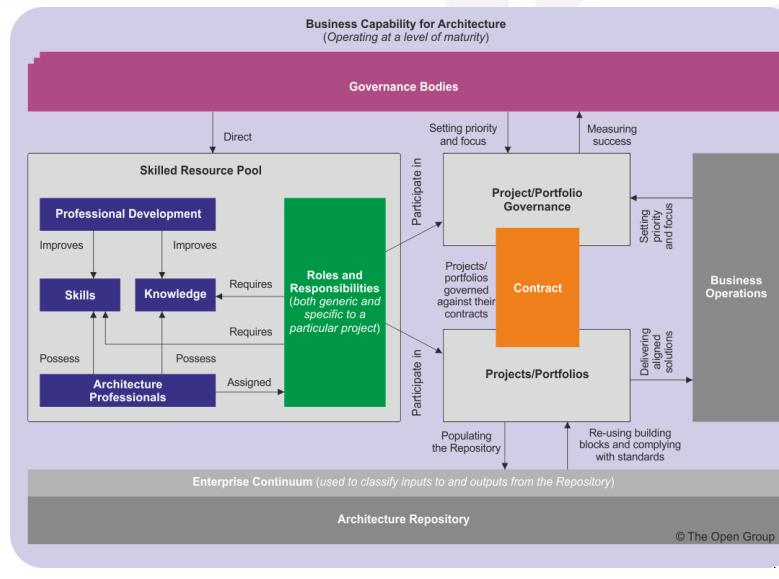
19 

The Integrated Information Infrastructure Reference Model (III-RM)



20 

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

Summary

❖ Architecture Development Method (ADM)

- An iterative sequence of steps to develop an enterprise-wide architecture

❖ ADM Guidelines and Techniques

- Guidelines and techniques to support the application of the ADM

❖ Architecture Content Framework

- A detailed model of architectural work products, including deliverables, artifacts within deliverables, and the Architecture Building Blocks (ABBs) that deliverables represent.

23



Summary

❖ The Enterprise Continuum

- A model for structuring a virtual repository and methods for classifying architecture and solution artifacts.
- Supported by the Architecture Repository, a model for a physical repository

❖ TOGAF Reference Models:

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

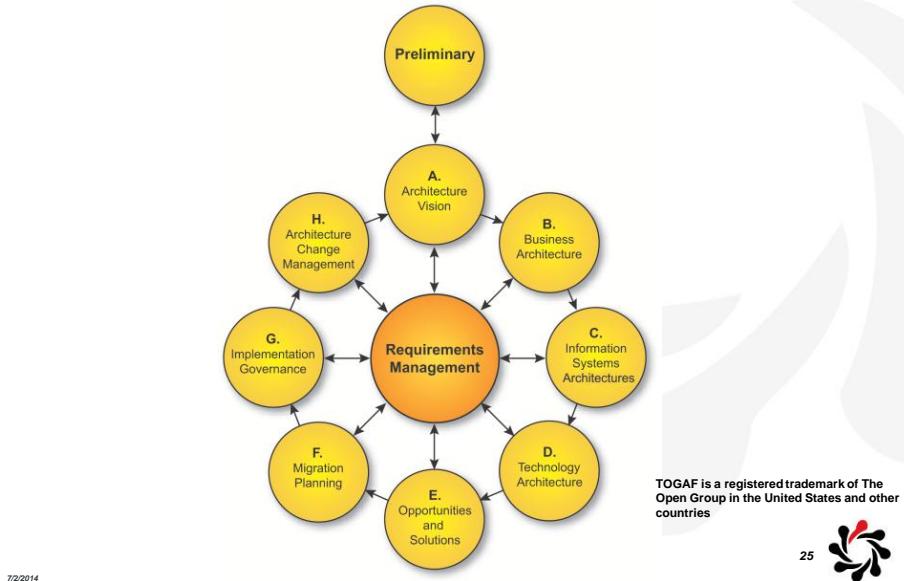
❖ The Architecture Capability Framework

- A structured definition of the organizations, skills, roles and responsibilities to establish and operate an Enterprise Architecture.

24



TOGAF 9 Components



Introduction to the Architecture Development Method

Module 3

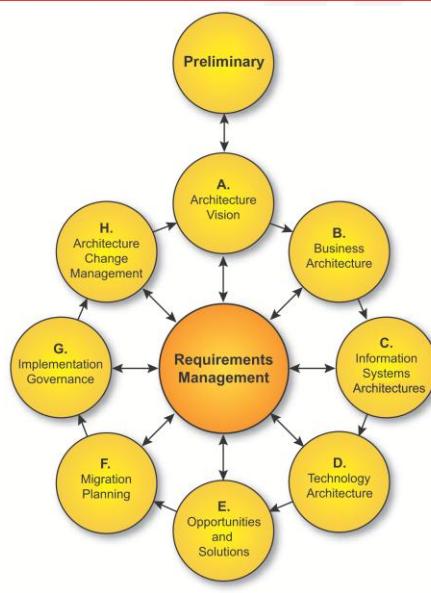
V9.1 Edition Copyright © 2009-2011



All rights reserved
Published by The Open Group, 2011



Introduction to the Architecture Development Method (ADM)



TOGAF is a registered trademark of The Open Group
in the U.S.A. and/or other countries.



7/2/2014

Module Objectives

❖ The objectives of this module are to describe

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

7/2/2014
3



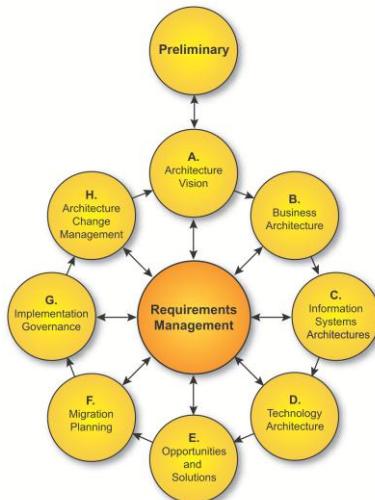
What is the TOGAF ADM?

- ❖ The ADM forms the core of TOGAF
- ❖ The result of contributions from many architecture practitioners
- ❖ A process for developing an enterprise architecture
- ❖ Integrates all the elements within TOGAF
- ❖ 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

7/2/2014
4



Architecture Development Method - Process



✖ The ADM is an iterative process

- Over the whole process
- Between phases
- Within phases

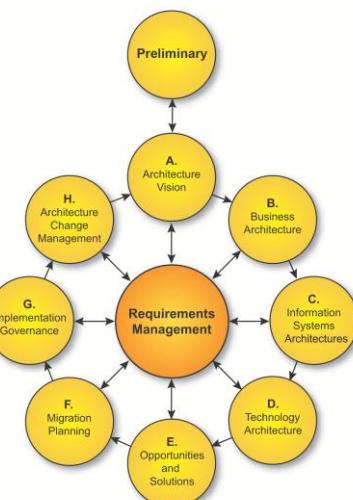
✖ For each iteration, reconsider

- Scope
- Detail
- Schedules, milestones

5



Architecture Development Method - Process



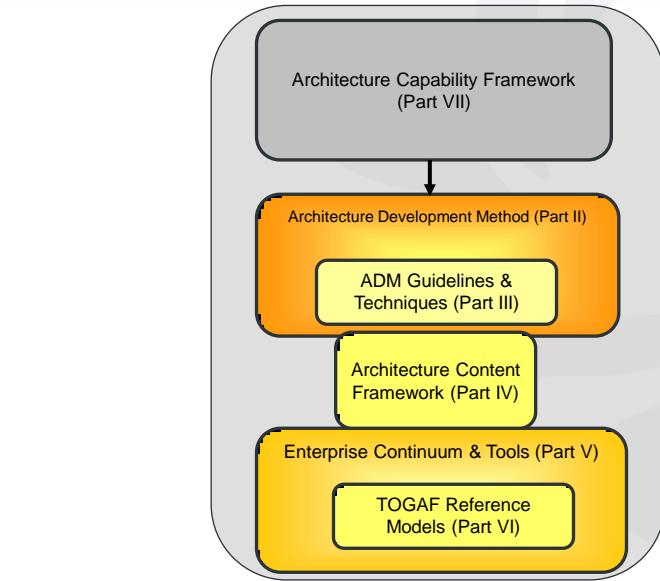
✖ Consider assets from:

- Previous iterations
- Marketplace, according to availability, competence, and value
- Other frameworks
- Systems models
- Vertical Industry models

6



Relationship to other Parts of TOGAF

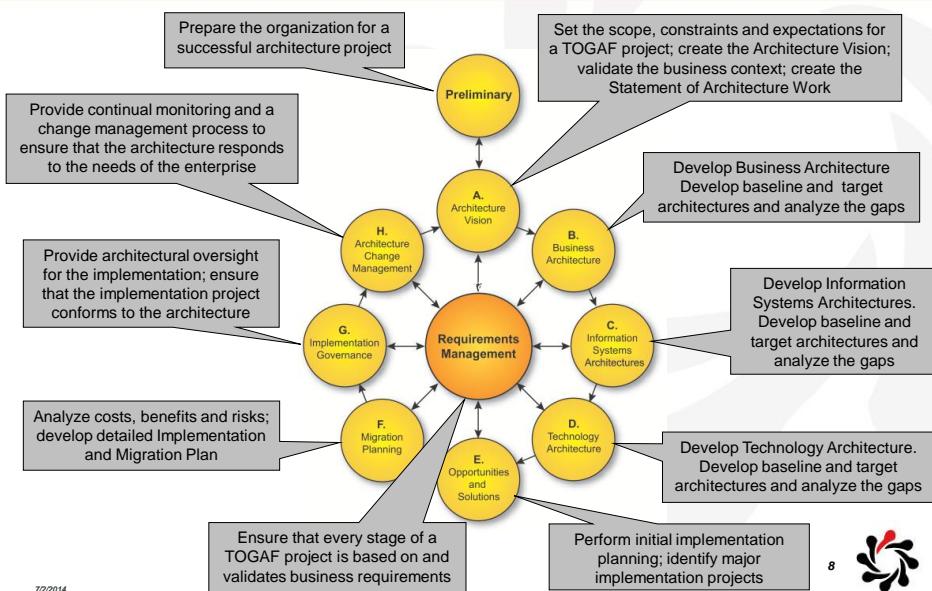


7/2/2014

7



ADM Phases

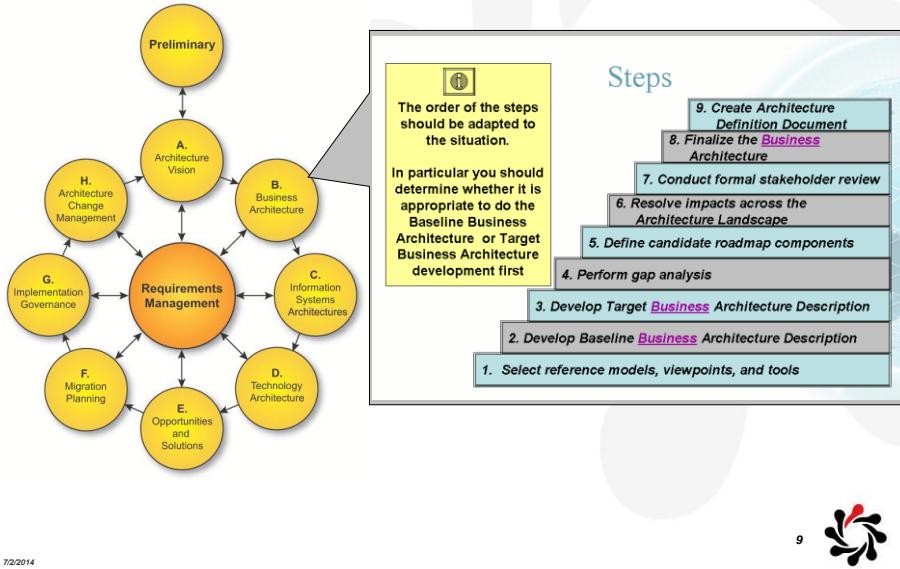


7/2/2014

8



ADM Phase Steps Example



9



ADM Inputs and Outputs

★ TOGAF defines a number of input and output deliverables for each 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

10



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

7/2/2014



Reasons to constrain the Scope of Architectural Activity

- ❖ The organizational 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

7/2/2014



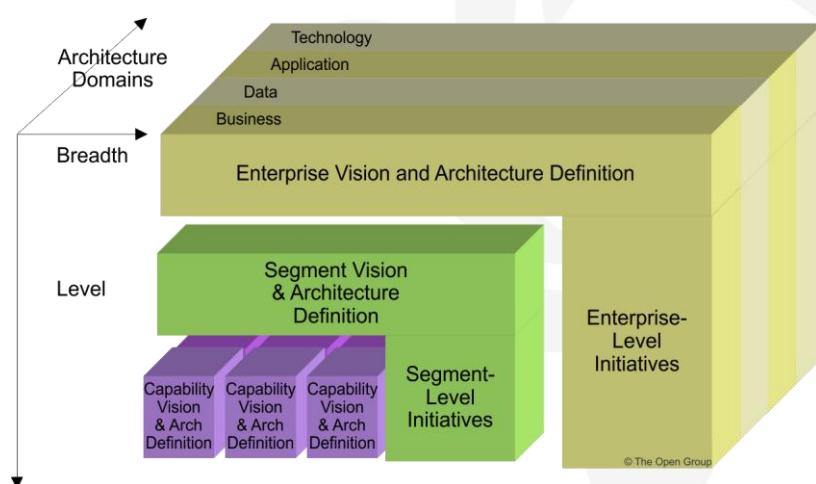
Scoping the Architecture Activity

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

7/2/2014



Architecture Integration



7/2/2014



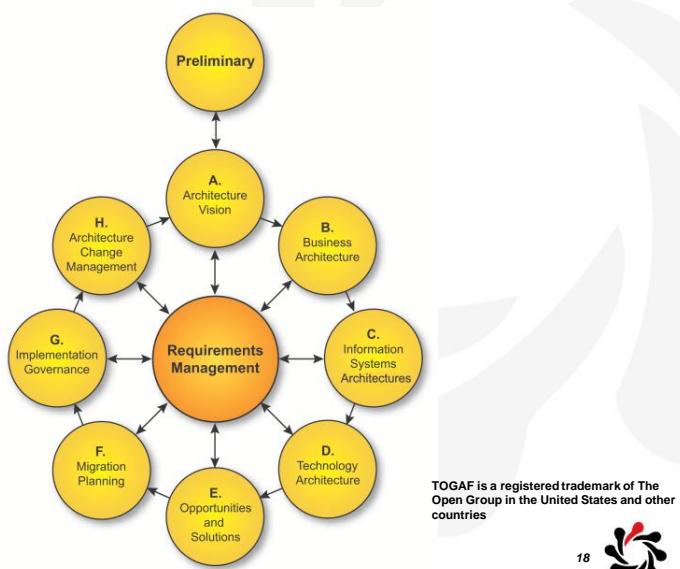
Summary

- ❖ 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 TOGAF for assets and processes
- ❖ It can be used with other deliverables from other frameworks

17



Introduction to the Architecture Development Method (ADM)



18





The Enterprise Continuum & Tools

Module 4

V9.1 Edition Copyright © 2009-2011



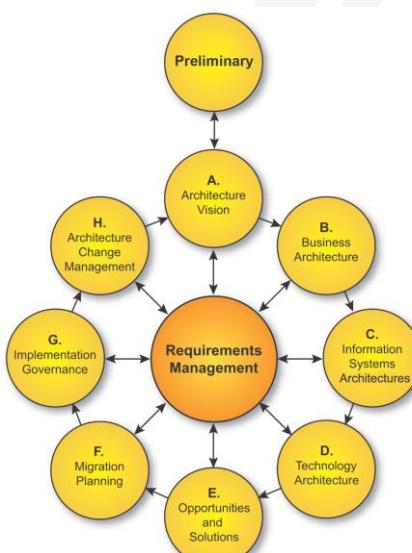
All rights reserved

Published by The Open Group, 2011



The Enterprise Continuum & Tools

7/2/2014



TOGAF is a registered trademark of The Open Group
in the United States and/or other countries.



Roadmap

Part I - Introduction
Preface, Executive Overview, Core Concepts, Definitions and Release Notes
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 - Reference Models
Foundation Architecture: Technical Reference Model
Integrated Information Infrastructure Reference Model
Part VII - Architecture Capability Framework
Architecture Board
Architecture Compliance
Architecture Contracts
Architecture Governance
Architecture Maturity Models
Architecture Skills Framework

✿ Part V, Enterprise Continuum and Tools, Chapter 39



3

7/2/2014

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

4

7/2/2014

Definition of ‘Continuum’

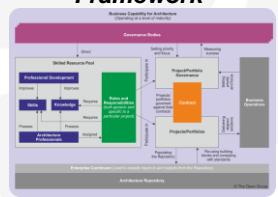
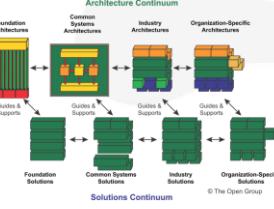
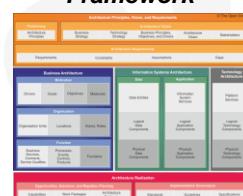
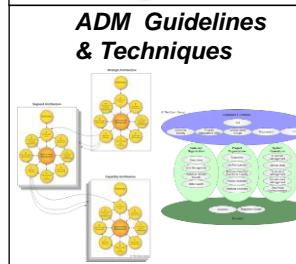
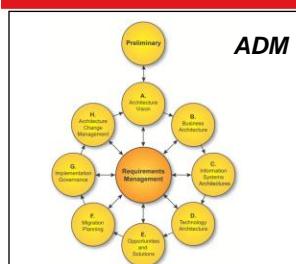
- ❖ Noun: a continuous extent of something, no part of which is different from any other

Source: Wiktionary.org



72/2019

TOGAF 9 Components



7/2/2016

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

7/2/2014



Overview (Cont'd)

- ❖ 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 organization of reusable architecture and solution assets
- ❖ It provides a common language
 - Within enterprises
 - Between customer enterprises and vendors

7/2/2014



Architecture Reuse

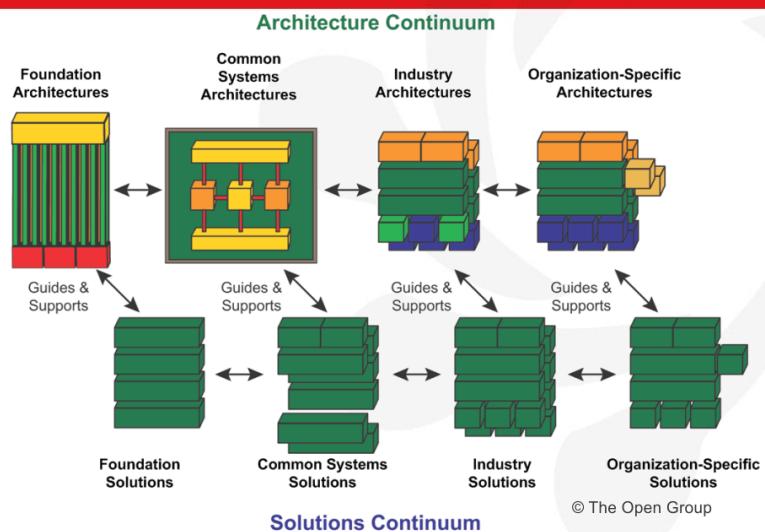
- ❖ The Enterprise Continuum consists of all architecture assets: models, patterns, architecture descriptions, etc.
- ❖ External assets include
 - Generic reference models (eg TOGAF's TRM, Zachmann...)
 - IT-specific models (eg a web services architecture)
 - Information Processing-specific models (eg 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

9



7/2/2014

The Enterprise Continuum

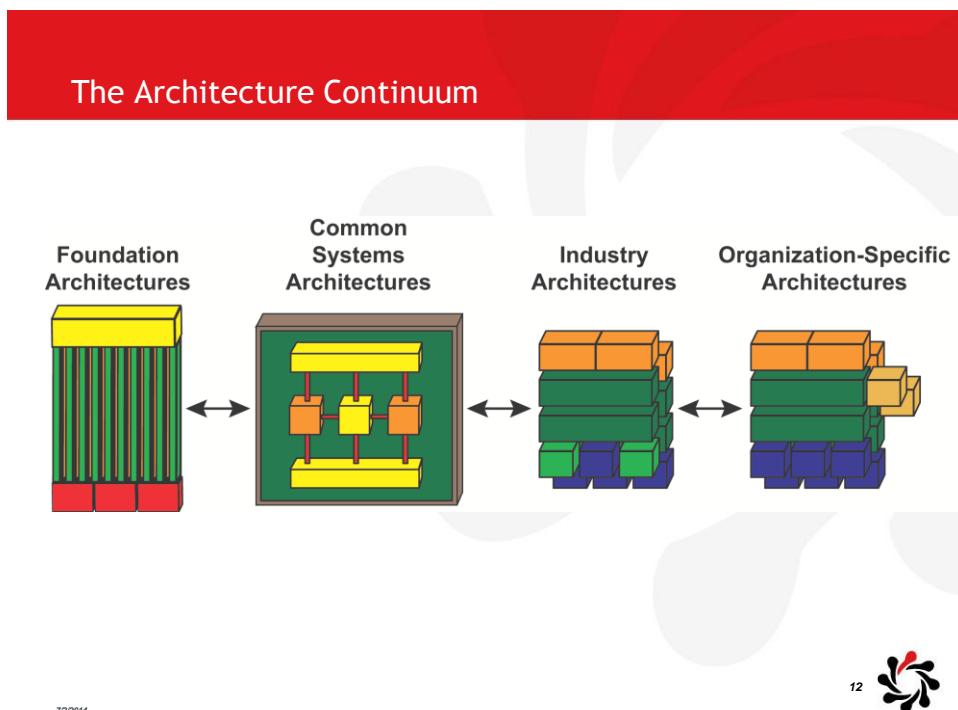
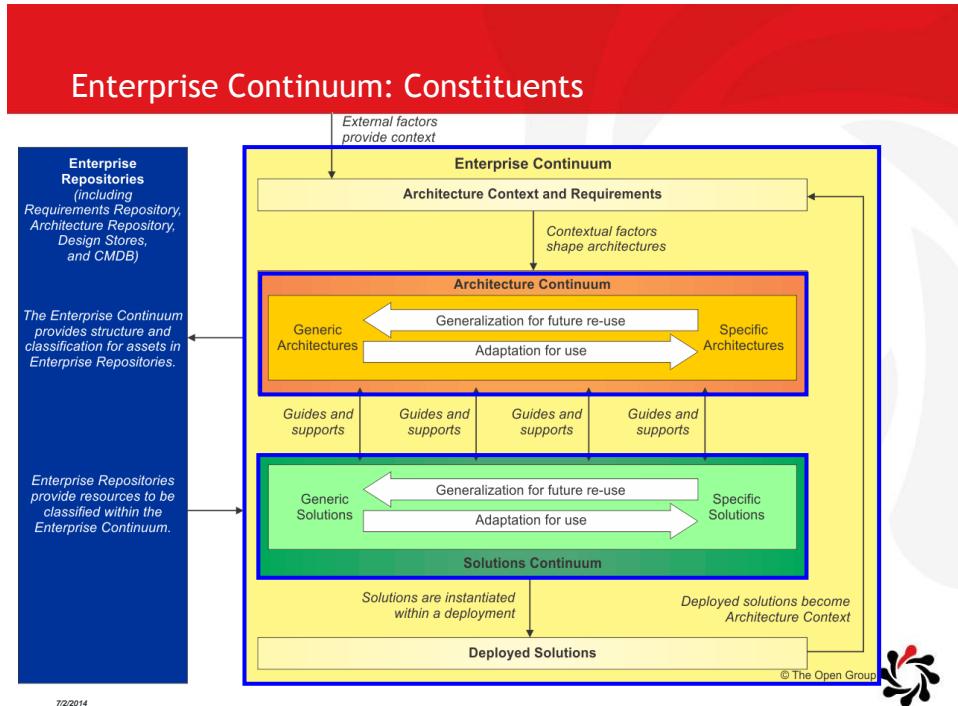


Best case for leveraging of architecture and solution components

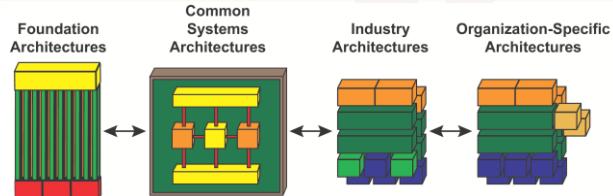
10



7/2/2014



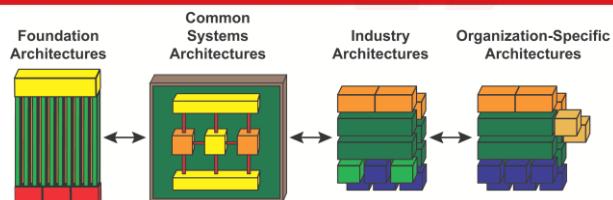
The Architecture Continuum



- ❖ Architectures range from Foundation Architectures through Common Systems Architectures, and Industry Architectures to an enterprise's own Organization-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

13

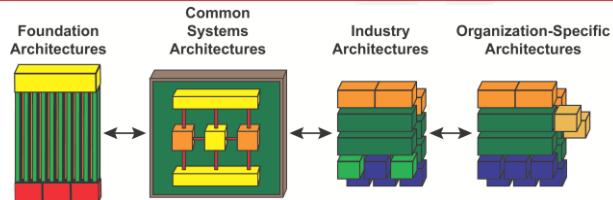
The Architecture Continuum



- ❖ 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

14

The Architecture Continuum

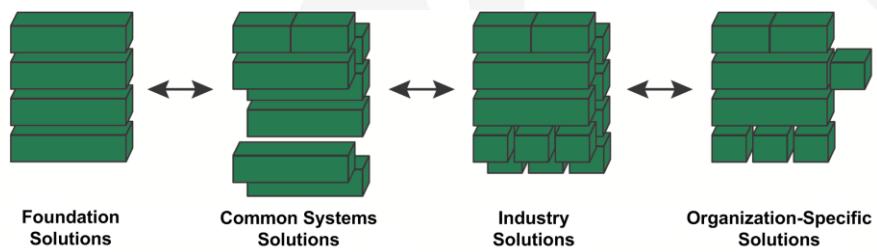


- ❖ Does not represent a formal process but represents a progression occurring at several levels
 - Logical → Physical
 - Horizontal (IT technology-focused) → Vertical (business-focused)
 - Generalization → Specialization
 - Taxonomy → Architecture Specification
- ❖ At each point, an architecture is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

15

7/2/2014

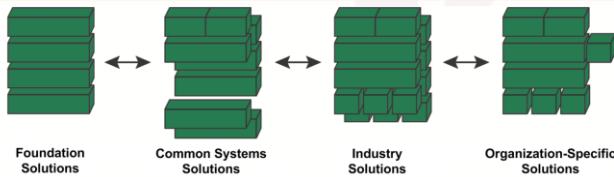
The Solutions Continuum



16

7/2/2014

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 organization-specific solutions
- ❖ The most generic concepts are on the left
- ❖ The entire spectrum is important when balancing cost and value

17

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

18

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's Foundation Architecture consists of the TRM
- ❖ The Open Group's III-RM is an example of a Common Systems Architecture

19 

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

20 

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

21



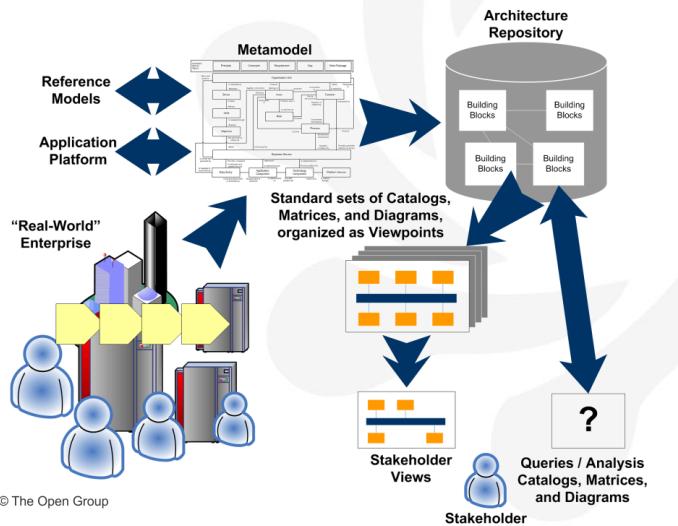
The Need for Tools

- ❖ 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 organization
 - To facilitate easier maintenance of the architecture
 - To ensure common terminology is used
 - To provide stakeholders with relevant models

22



Tools Can Model the Enterprise Architecture



23

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

24

Summary

❖ The Enterprise Continuum is

- a model for structuring a virtual repository and methods for classifying architecture and solution artifacts
- It enables the organization 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



7/2/2014

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 organization that can be implemented to achieve the intent of the architecture



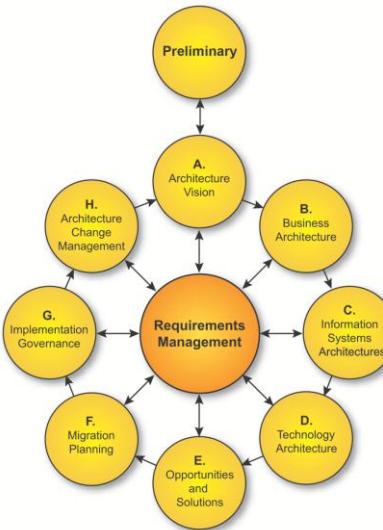
7/2/2014

The Enterprise Continuum & Tools

7/2/2014

TOGAF is a registered trademark of The Open Group in the United States and other countries

27



Architecture Repository

Module 5

V9.1 Edition Copyright © 2009-2011

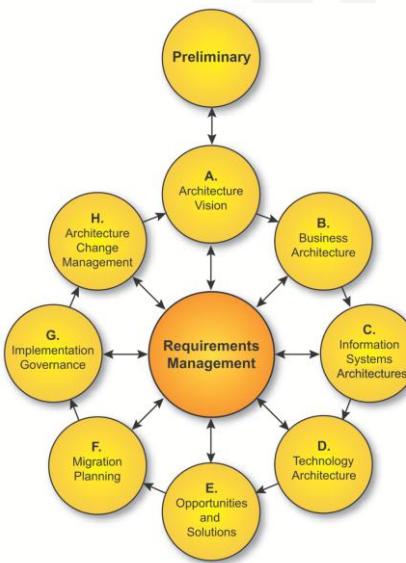


All rights reserved

Published by The Open Group, 2011



Architecture Repository



7/2/2014

TOGAF is a registered trademark of The Open Group in the United States and/or other countries.

z



Roadmap

Part I – Introduction
Preface, Executive Overview, Core Concepts, Definitions and Release Notes
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
Architectural Deliverables
Building Blocks
Part V – Enterprise Continuum and Tools
Enterprise Continuum
Architecture Partitioning
Architecture Repository
Tools for Architecture Development
Part VI – Reference Models
Foundation Architecture: Technical Reference Model
Integrated Information Infrastructure Reference Model
Part VII – Architecture Capability Framework
Architecture Board
Architecture Compliance
Architecture Contracts
Architecture Governance
Architecture Maturity Models
Architecture Skills Framework

Part V, Enterprise Continuum and Tools, Chapter 41



3

7/2/2014

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 TOGAF

4

7/2/2014

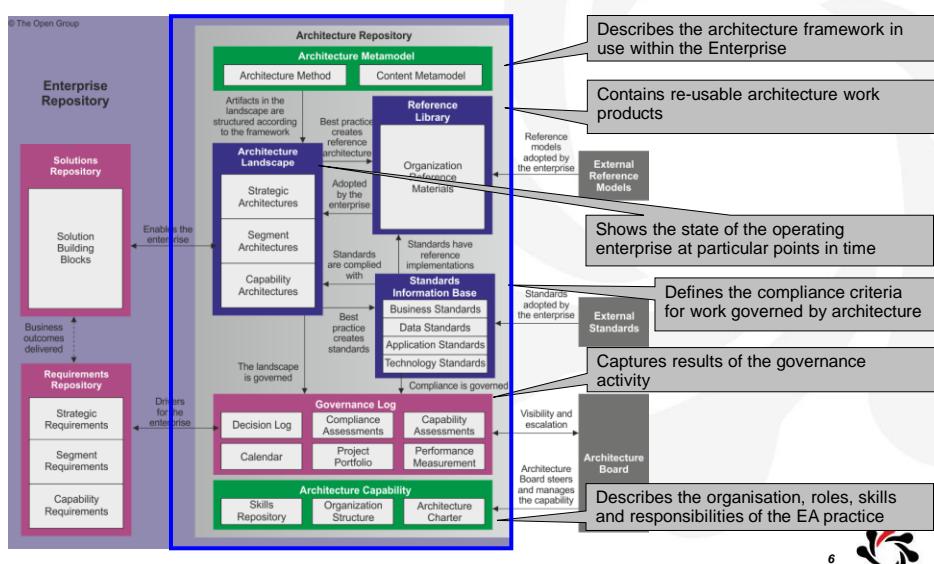
Purpose

- ❖ 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

5 

7/2/2014

Architecture Repository



6 

7/2/2014

Architecture Repository

- ❖ The Architecture Repository is a logical information store for outputs of executing the ADM
 - The Architecture Metamodel describes the architecture framework in use within the Enterprise
 - The Architecture Landscape shows the state of the operating Enterprise at particular points in time
 - The Reference Library contains re-usable architecture work products
 - The Standards Information Base defines the compliance criteria for work governed by architecture
 - The Governance Log captures results of governance activity, such as compliance assessments
 - The Architecture Capability describes the organisation, roles, skills and responsibilities of the Enterprise Architecture practice

7/2/2014



Architecture Landscape



❖ 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

❖ 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

❖ 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

7/2/2014



Reference Library

Reference Library

Organization Reference Materials

- ❖ 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

7/2/2014



Standards Information Base

Standards Information Base

Business Standards
Data Standards
Application Standards
Technology Standards

- ❖ 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

7/2/2014



Standards Information Base



Types of Standard

- Legal and Regulatory
- Industry
- Organizational

Standards Lifecycle

- Trial
- Active
- Deprecated
- Obsolete

7/2/2014



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

7/2/2014

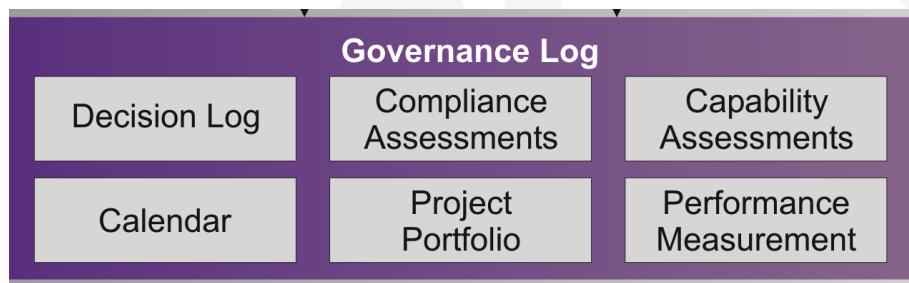




- ❖ A repository area to hold shared information relating to the ongoing governance of projects
- ❖ Maintaining a shared repository of governance information is important, since
 - Decisions made during projects (such as standards deviations or the rationale for a particular architectural approach) are 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.)



7/2/2014



7/2/2014

Relationship to other Parts of TOGAF

- ❖ 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

7/2/2014

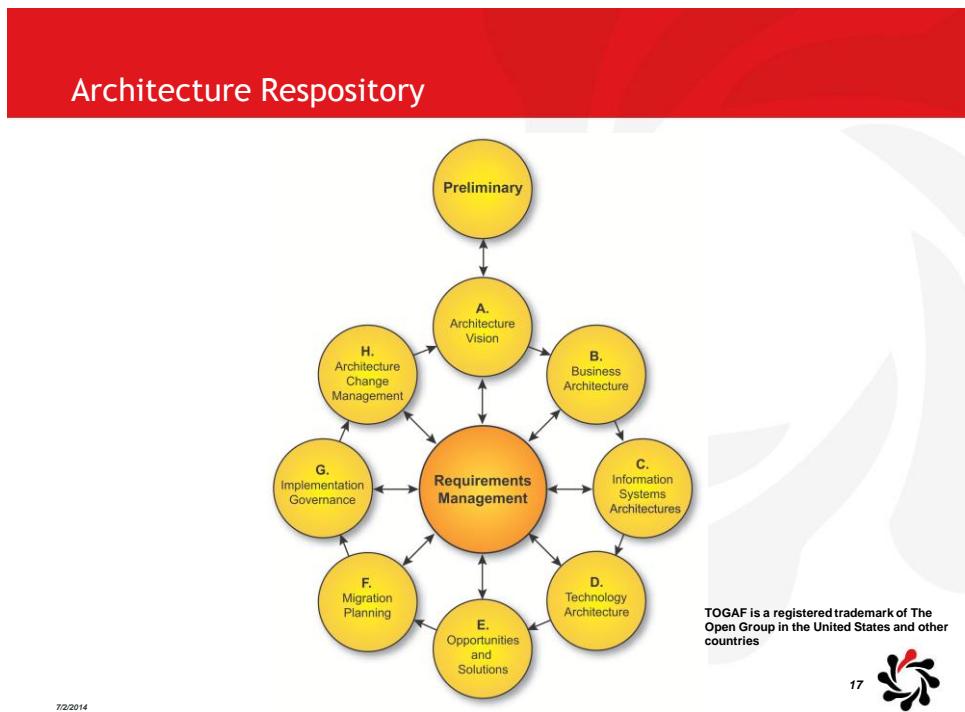


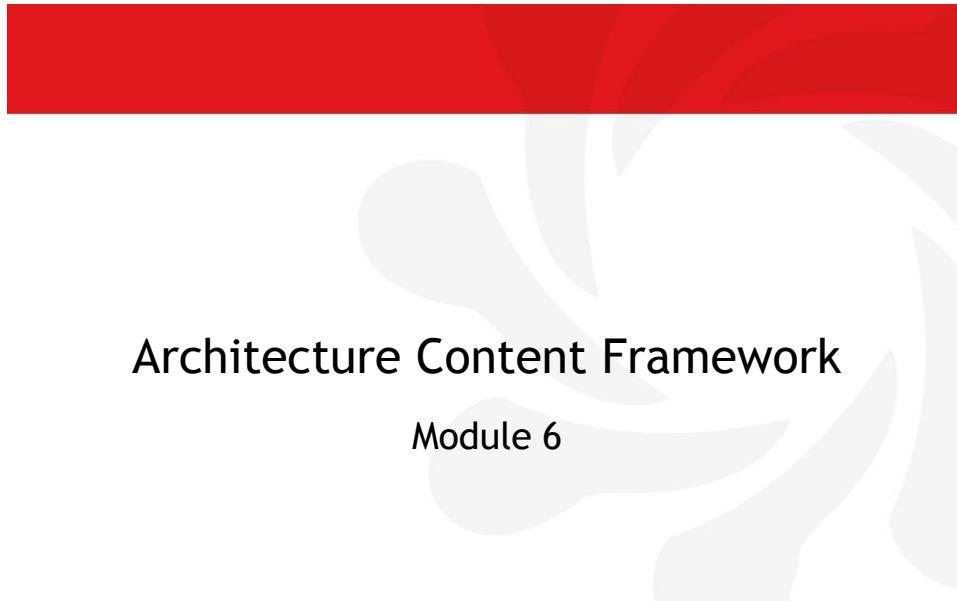
Summary

- ❖ TOGAF provides a structural framework for a repository that is one part of a wider Enterprise Repository
- ❖ The Architecture Repository is a logical information store for ADM outputs with six 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

7/2/2014





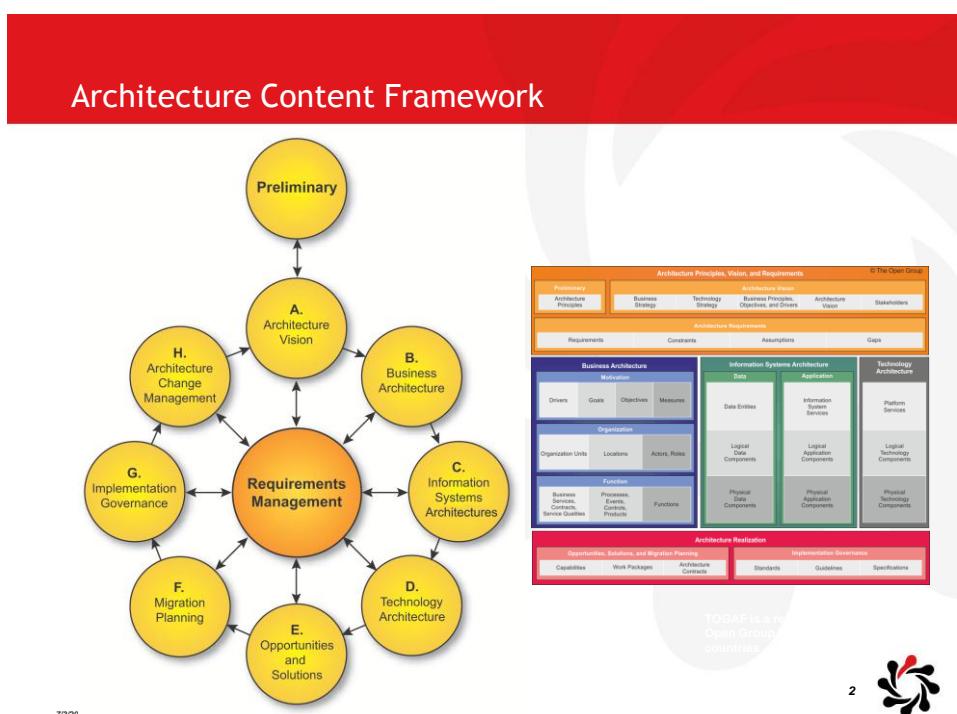


V9.1 Edition Copyright © 2009-2011

THE *Open* GROUP

All rights reserved

Published by The Open Group, 2011



Part IV: Architecture

Part I - Introduction
Preface, Executive Overview, Core Concepts, Definitions and Release Notes
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 – Reference Models
Foundation Architecture: Technical Reference Model
Integrated Information Infrastructure Reference Model
Part VII – Architecture Capability Framework
Architecture Board
Architecture Compliance
Architecture Contracts
Architecture Governance
Architecture Maturity Models
Architecture Skills Framework

✿ New for TOGAF 9

✿ This part describes

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



3

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

4

Introduction

- ❖ The Framework is a significant part of the 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

5 

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

6 

Overview

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

7/3/2014



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

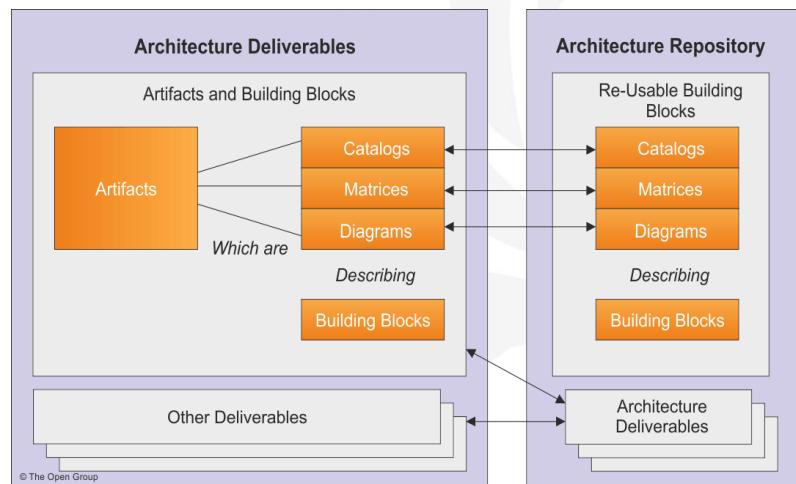
❖ Artifacts

- 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

7/3/2014



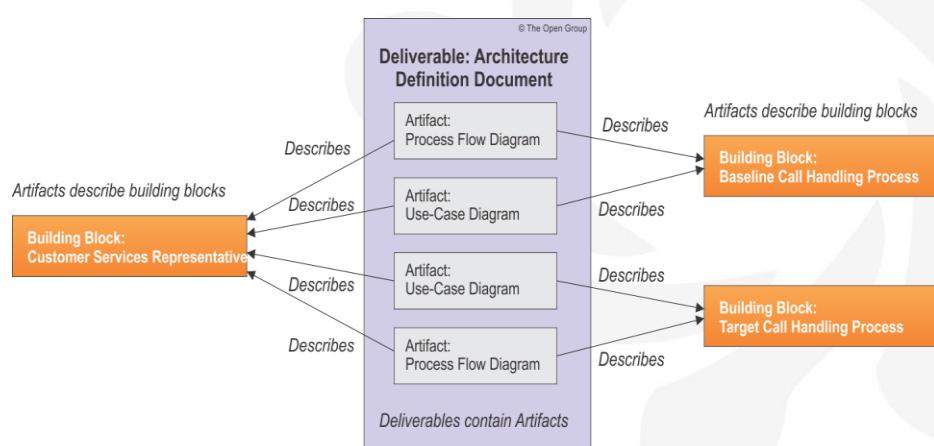
Relationship between Deliverables, Artifacts and Building blocks



9



Example - Architecture Definition Document



10



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



7/3/2014

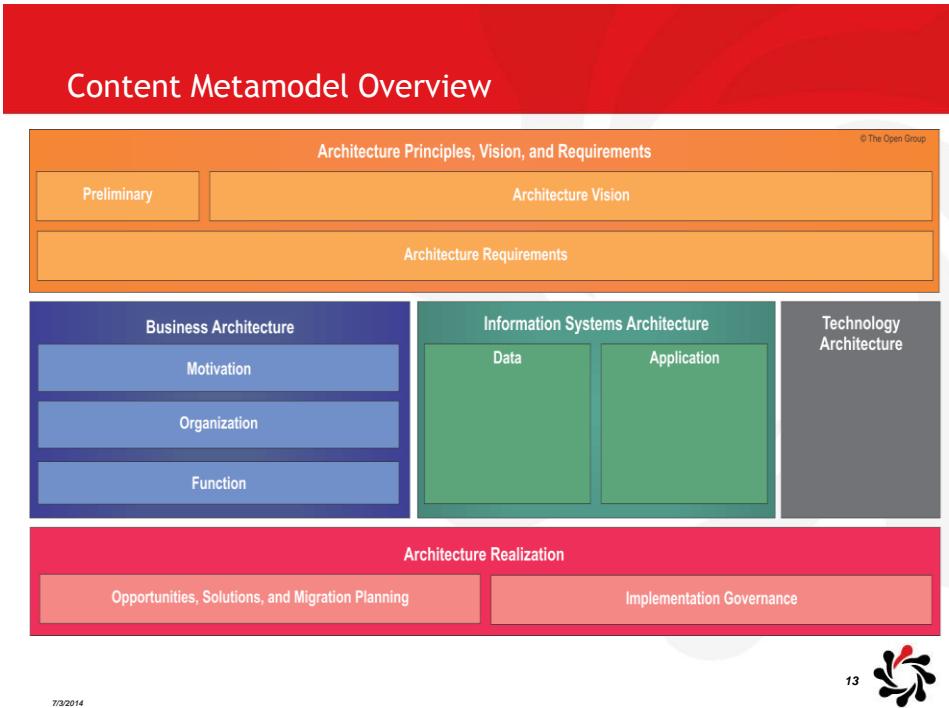
Content Metamodel

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



7/3/2014



13

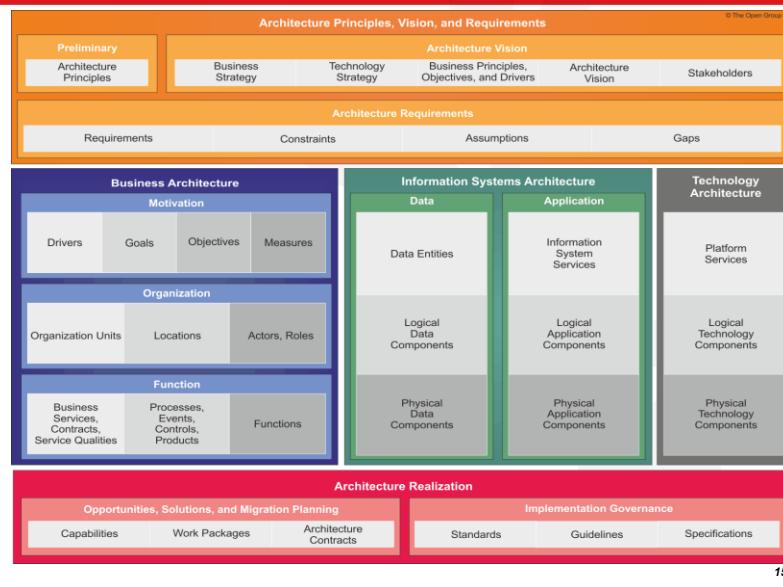
Mapping the Framework and the ADM

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

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

14

Mapping the Framework and the ADM



15



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

16



Summary

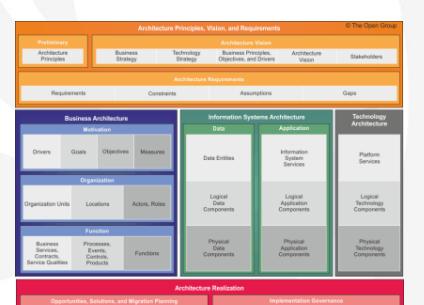
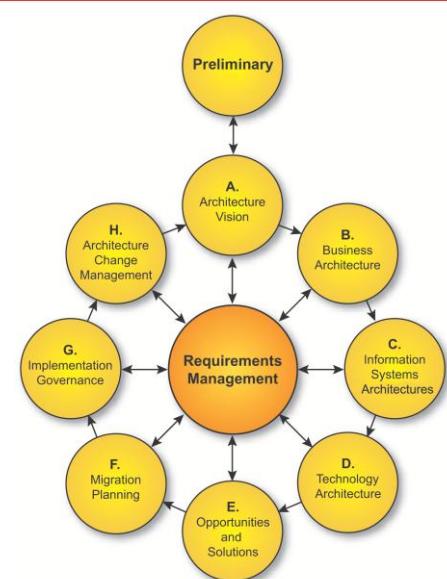
- ❖ The Architecture Content Framework presents outputs in a consistent and structured way
 - It has 3 categories of work products: deliverables, artifacts and building blocks
- ❖ The content metamodel consists of a core and some extensions
- ❖ Catalogs, matrices and diagrams are used to present the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

17



7/3/2014

Architecture Content Framework



18



TOGAF Content Metamodel

Module 7

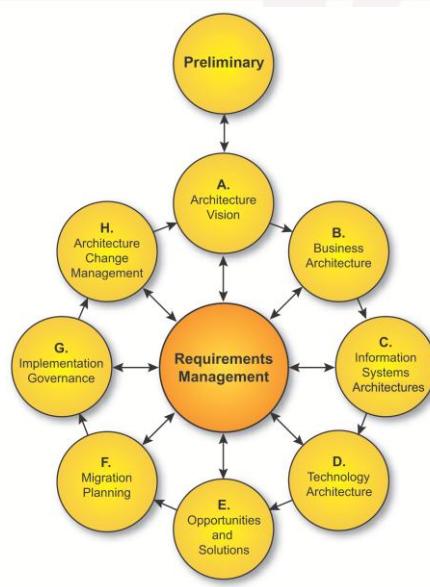
V9.1 Edition Copyright © 2009-2011



All rights reserved
Published by The Open Group, 2011



TOGAF Content Metamodel



7/3/2014



Roadmap

Part I - Introduction
Preface, Executive Overview, Core Concepts, Definitions and Release Notes
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 – Reference Models
Foundation Architecture: Technical Reference Model
Integrated Information Infrastructure Reference Model
Part VII – Architecture Capability Framework
Architecture Board
Architecture Compliance
Architecture Contracts
Architecture Governance
Architecture Maturity Models
Architecture Skills Framework

✿ Part IV, Architecture Content Framework, Chapter 34



3

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

4

What is a metamodel?

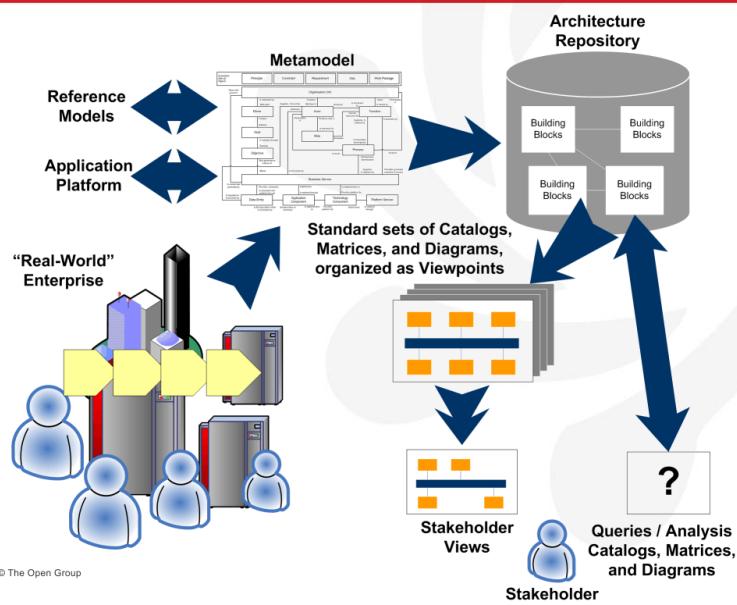
- ❖ A metamodel is a precise definition of the constructs and rules needed for creating models
- ❖ A model that describes how and with what the architecture will be described in a structured way
 - TOGAF 9 definitions

5



7/3/2014

Why a metamodel?



6



Benefits of the Metamodel

The content metamodel provides a number of benefits

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

7



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

8



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

9



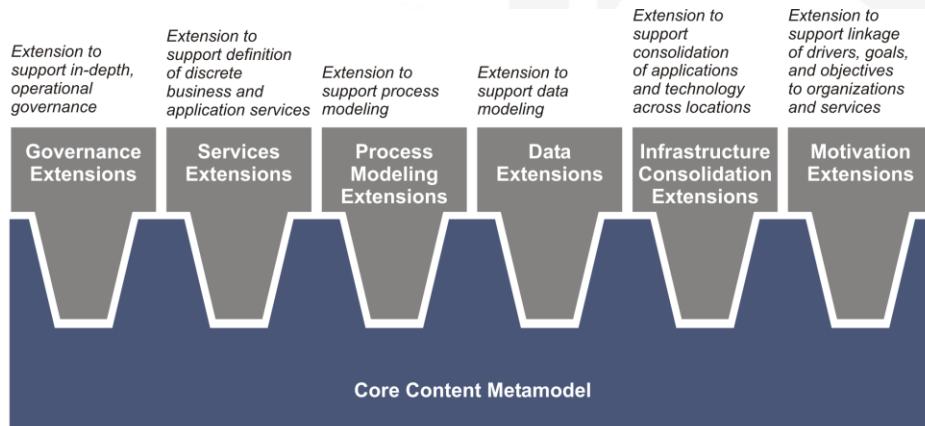
Core and Extension Content

- ❖ 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

10



TOGAF Content Metamodel and its Extensions



Core Metamodel Entities

- ❖ **Actor:** A person, organization, 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 Service:** Supports business capabilities through an explicitly defined interface and is explicitly governed by an organization
- ❖ **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 organization, but not explicitly governed by the organization



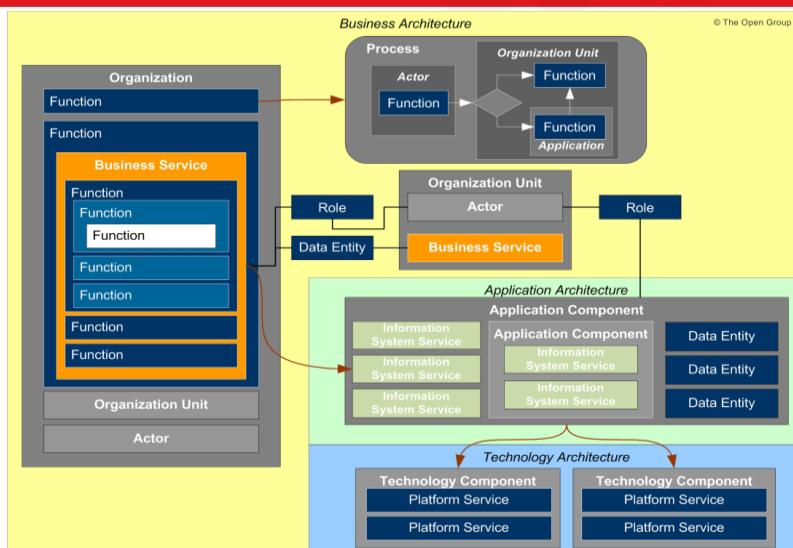
Core Metamodel Entities (Cont'd)

- ❖ **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
- ❖ **Organization Unit:** A self-contained unit of resources with line management responsibility, goals, objectives, and measures. Organization units may include external parties and business partner organizations
- ❖ **Platform Service:** A technical capability required to provide enabling infrastructure that supports the delivery of applications.
- ❖ **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

13

7/3/2014

Core Entities and their Relationships

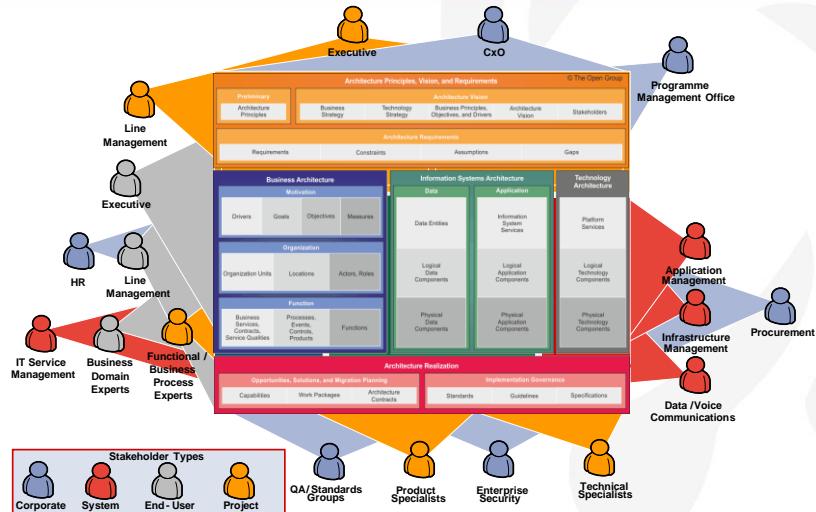


14



7/3/2014

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 organizations that wish to implement their architecture using an architecture tool

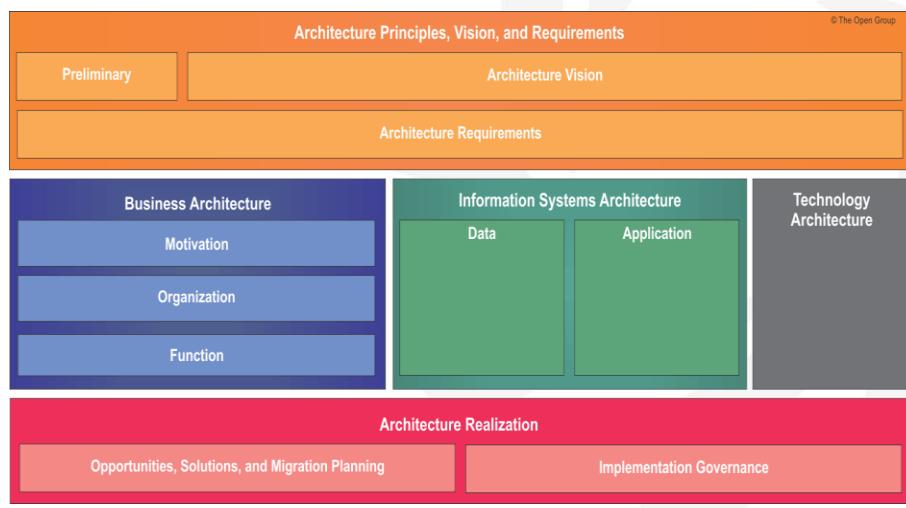
15



16



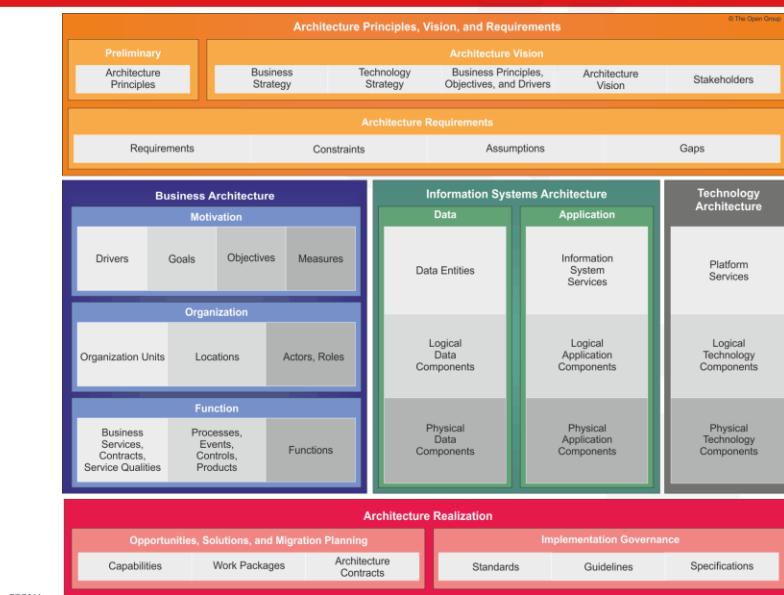
Content Metamodel (Simplified)



7/3/2014



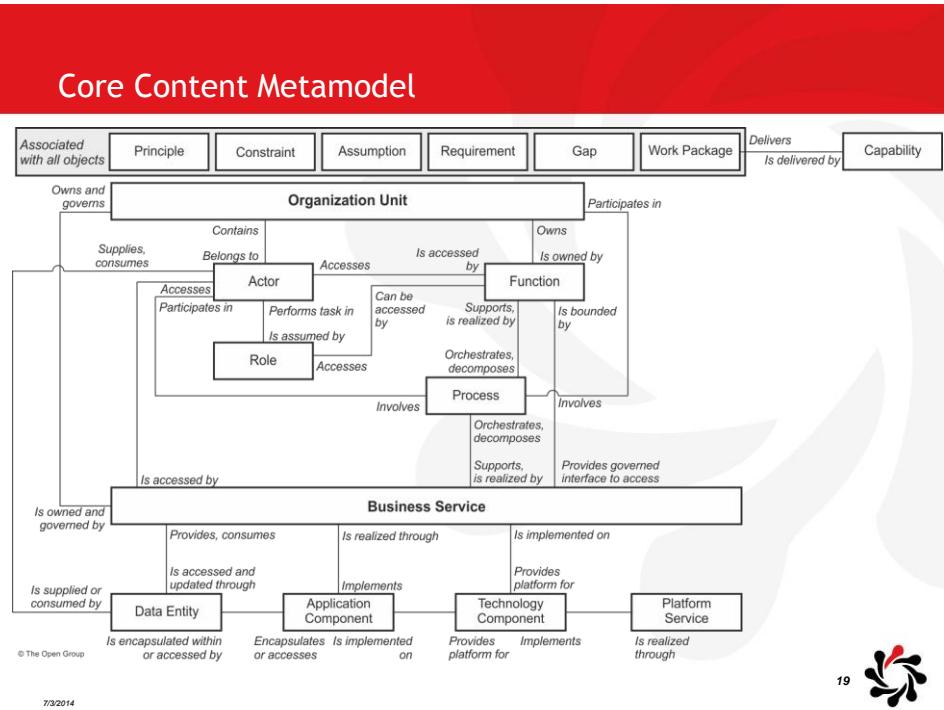
Content Metamodel (Detailed)



7/3/2014



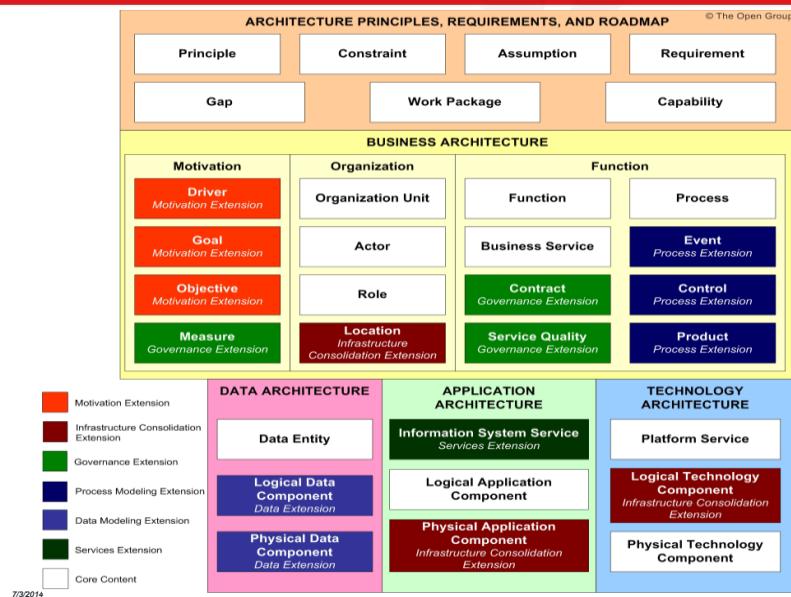
TOGAF® Standard Courseware V9.1 Edition



Core TOGAF 9 Artifacts

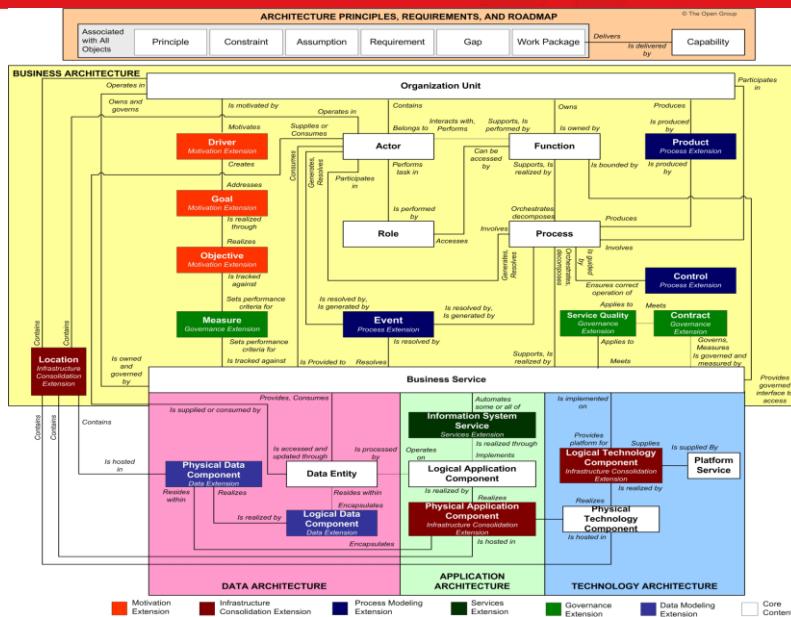
Preliminary Phase Principles catalog	Phase A, Architecture Vision Stakeholder Map matrix	Solution Concept Diagram	Value Chain Diagram
Requirements Management Requirements catalog			
Phase B, Business Architecture	Phase C, Data Architecture	Phase C, Application Architecture	Phase D, Technology Architecture
Catalog <ul style="list-style-type: none"> Organization/Actor Driver/Goal/Objective Role Business Service/Function Location Process/Event/Control/Product Contract/Measure Matrix <ul style="list-style-type: none"> Business Interaction Diagram <ul style="list-style-type: none"> Business Footprint Business Service/Information Functional Decomposition Product Lifecycle Goal/Objective/Service Use-Case Organization Decomposition Process Flow Event 	Catalog <ul style="list-style-type: none"> Data Entity/Data Component Matrix <ul style="list-style-type: none"> Data Entity/Business Function System/Data Diagram <ul style="list-style-type: none"> Class Data Dissemination Data Security Class Hierarchy Data Migration Data Lifecycle 	Catalog <ul style="list-style-type: none"> Application Portfolio Interface Matrix <ul style="list-style-type: none"> System/Organization Role/System System/Function Application Interaction Diagram <ul style="list-style-type: none"> Application Communication Application and User Location System Use-Case Enterprise Manageability Process/System Realization Software Engineering Application Migration Software Distribution 	Catalog <ul style="list-style-type: none"> Technology Standards Technology Portfolio Matrix <ul style="list-style-type: none"> System/Technology Diagram <ul style="list-style-type: none"> Environments and Locations Platform Decomposition Processing Networked Computing/Hardware Communications Engineering
Phase E, Opportunities & Solutions			
Project Context diagram	Benefits diagram		

Full Content Metamodel



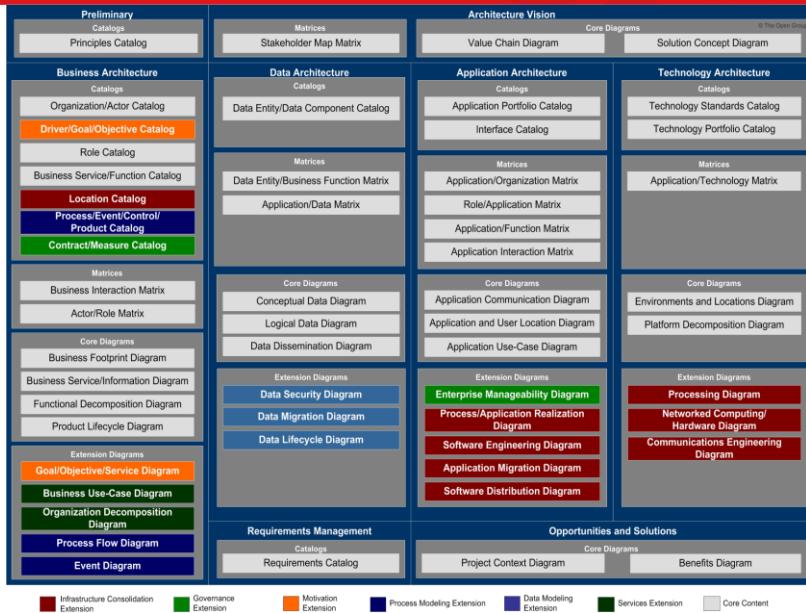
21

Full Content Metamodel with Relationships



22

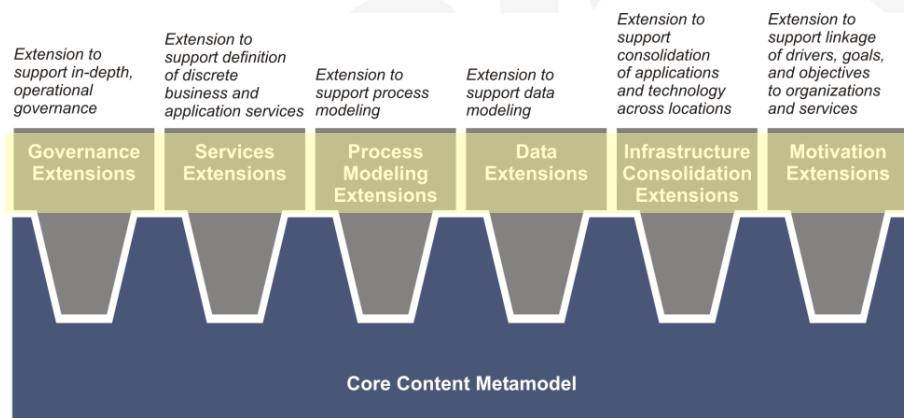
Full Content Metamodel Artifacts



23



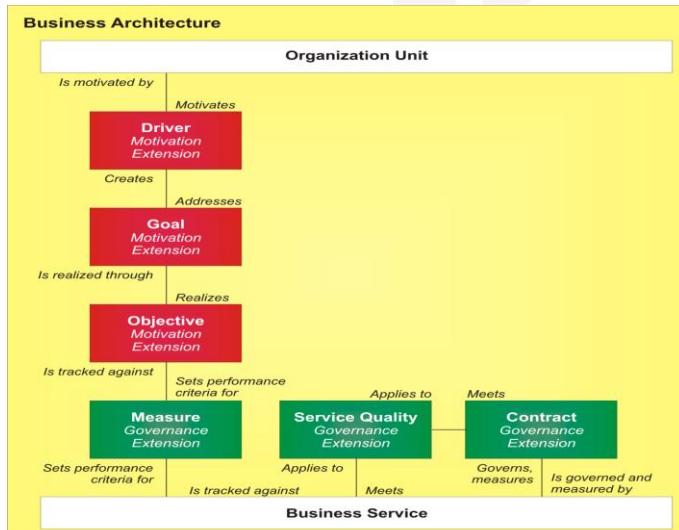
Metamodel Extensions Overview



24



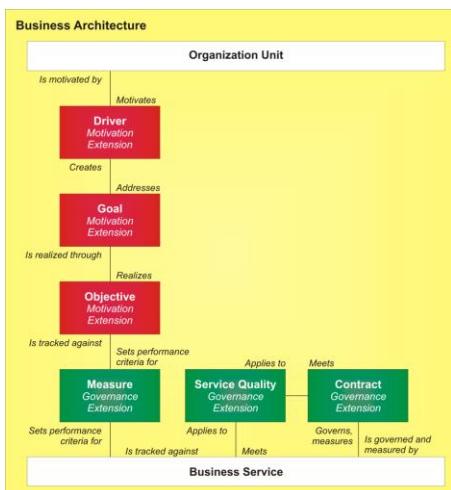
Governance Extension



7333010



Governance Extension



7/3/2014

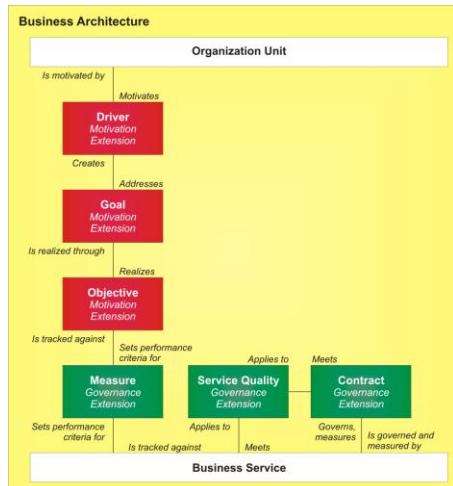
- The ability to apply measures to objectives and then link those measures to services
 - The ability to apply contracts to service communication or service interactions with external users and systems
 - The ability to define re-usable service qualities defining a service-level profile that can be used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

Additional diagrams to be created

 - Enterprise Manageability diagram



Governance Extension



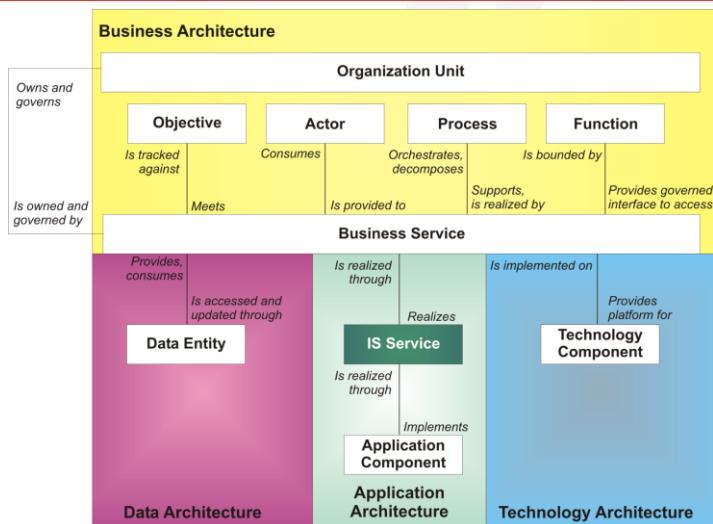
This extension should be used in the following situations

- When an organization is considering IT change that will result in a significant impact to existing operational governance models
- When an organization has granular requirements for service levels that differ from service to service
- When an organization is looking to transform its operational governance practice

27



Services Extension



28



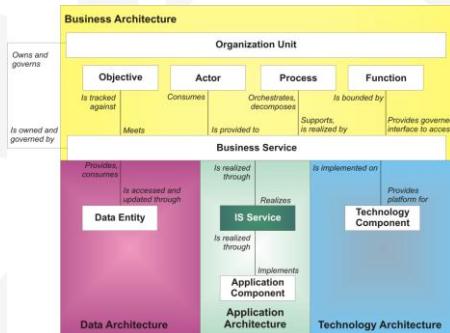
Services Extension

Scope

- Creation of IS services as an extension of business service

Additional diagrams to be created

- Business Use-Case Diagram
- Organization Decomposition Diagram



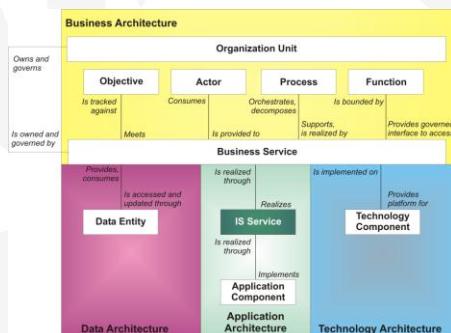
29



Services Extension

This extension should be used in the following situations:

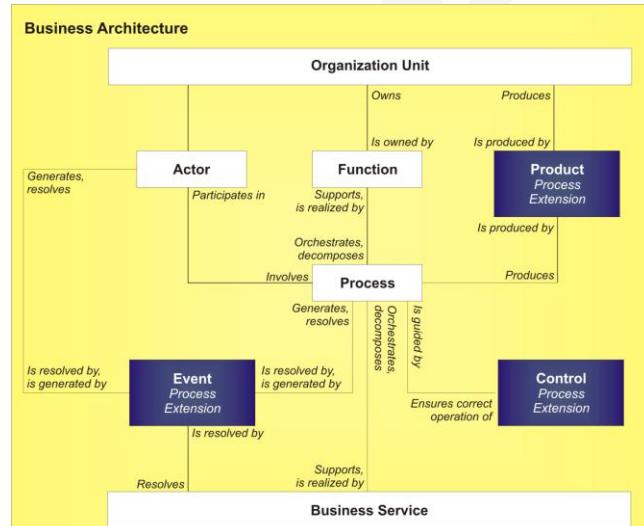
- When the business has a preset definition of its services that does not align well to technical and architectural needs
- When business and IT use different language to describe similar capabilities
- Where IT service is misaligned with business need, particularly around the areas of quality of service,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



30



Process Modeling Extension



31



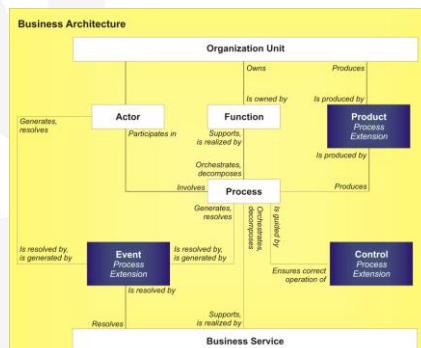
Process Modeling Extension

Scope

- Creation of events as triggers for processes
- Creation of controls that 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 organization

Additional diagrams to be created

- Process Flow diagrams
- Event diagrams

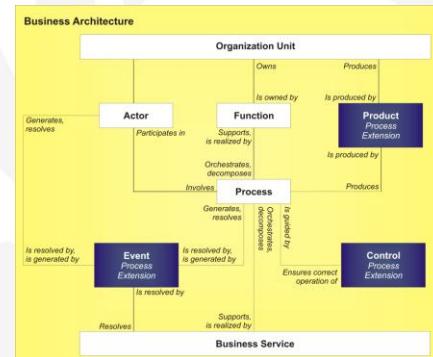


32



Process Modeling Extension

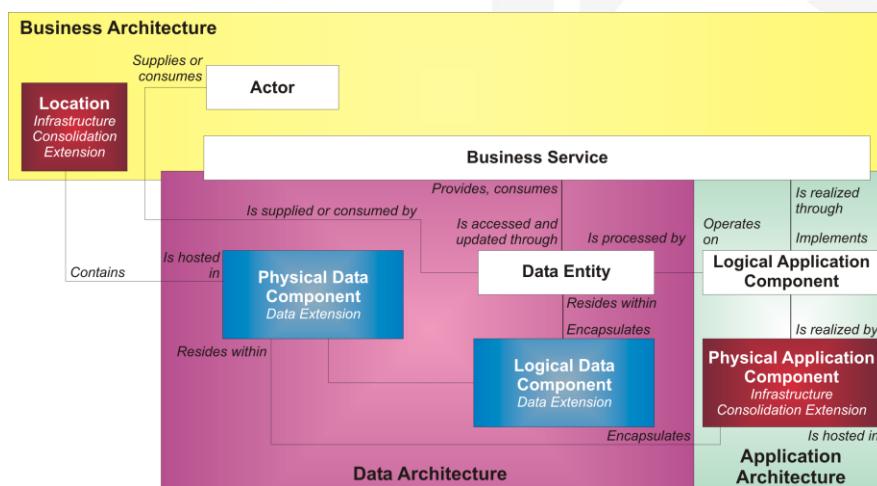
- ❖ This extension should be used in the following situations
 - Where the architecture must pay specific attention to state and events
 - Where the architecture is required to explicitly identify and store process control steps; for example, to support regulatory compliance
 - Where the architecture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



33



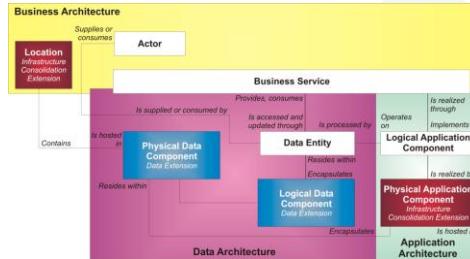
Data Extension



34



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

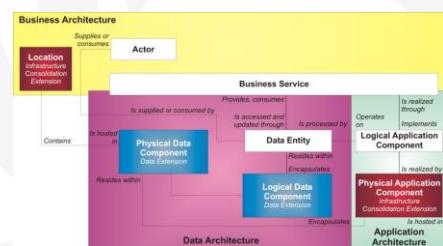
- Data Security diagram
- Class Hierarchy diagram
- Data Migration diagram
- Data Lifecycle diagram

35



Data Extension

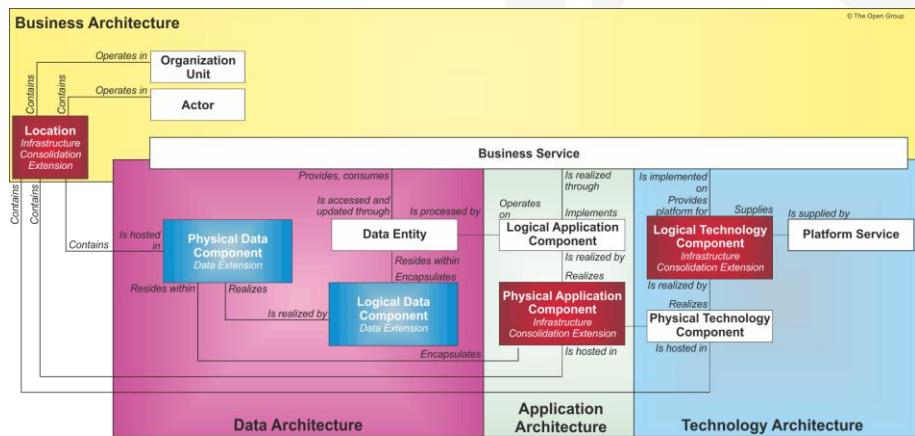
- This extension should be used in the following situations
 - Where the architecture features significant complexity and risk around the location, encapsulation, and management of or access to data



36



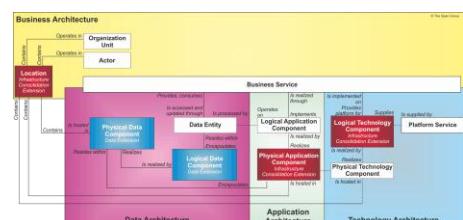
Infrastructure Consolidation Extension



37



Infrastructure Consolidation Extension



Scope

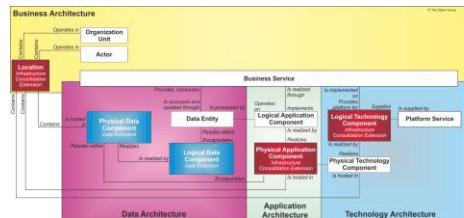
- Creation of a location entity to hold the location of IT assets and external consumers of service
- Creation of logical and physical application components to abstract the capability of an application away from the actual applications in existence
- Creation of logical and physical application components 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

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

38



Infrastructure Consolidation Extension



* This extension should be used in the following situations

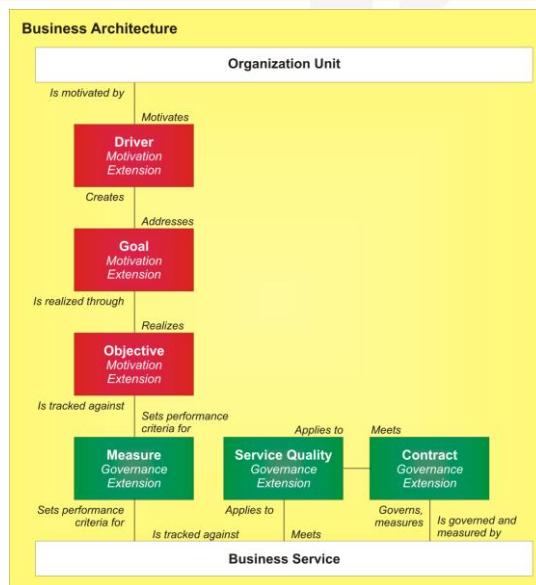
- Where many technology products are in place with duplicate or overlapping capability
- Where many applications are in place with duplicate or overlapping functionality
- Where applications are geographically dispersed and the decision logic for determining the location of an application is not well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

39



7/3/2014

Motivation Extension

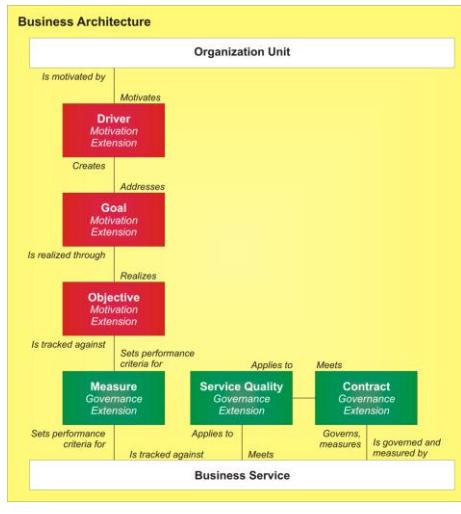


40



7/3/2014

Motivation Extension



7/3/2014

- The scope of this extension is as follows

- Creation of a new metamodel entity for Driver that shows factors generally motivating or constraining an organization
- Creation of a new metamodel entity for Goal that shows the strategic purpose and mission of an organization
- Creation of a new metamodel entity for Objective that shows near to mid-term achievements that an organization would like to attain
- Creation of a Goal/Objective/Service diagram showing the traceability from drivers, goals, and objectives through to services

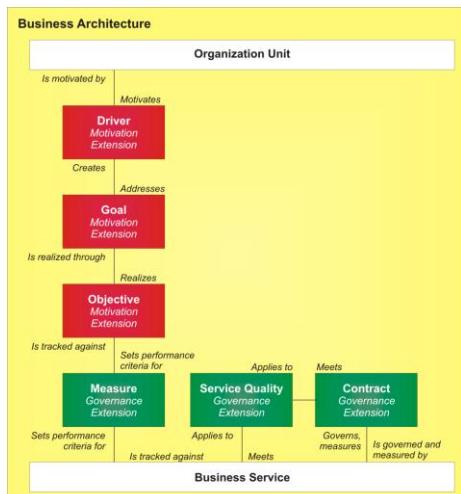
- Additional diagrams to be created

- Goal/Objective/Service diagram



41

Motivation Extension



7/3/2014

- This extension should be used in the following situations

- When the architecture needs to understand the motivation of organizations in more detail than the standard business or engagement principles and objectives that are informally modeled within the core content metamodel
- When organizations 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



42

Summary

TOGAF provides a rich metamodel

This provides a number of benefits

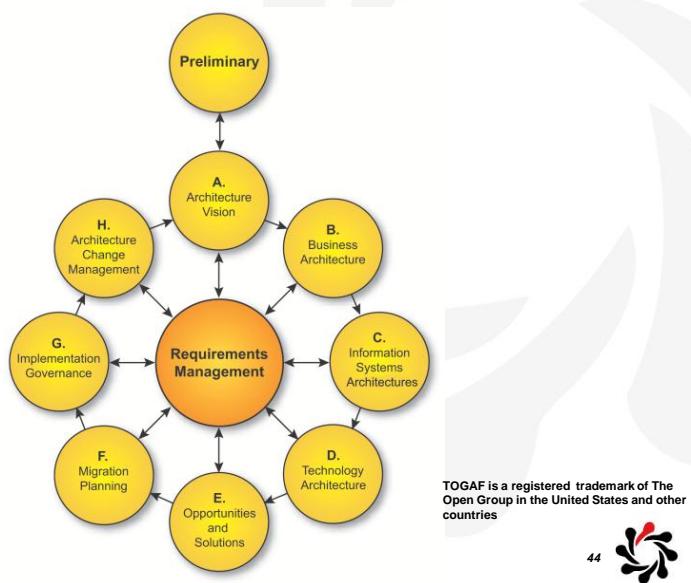
- ❖ It supports both formal and informal modeling
- ❖ It formalizes the definition of an Enterprise Architecture
- ❖ It formalizes the relationship between objects
- ❖ It enables an EA tool mapping

43



7/3/2014

TOGAF Content Metamodel



44



7/3/2014

Preliminary Phase

Module 8

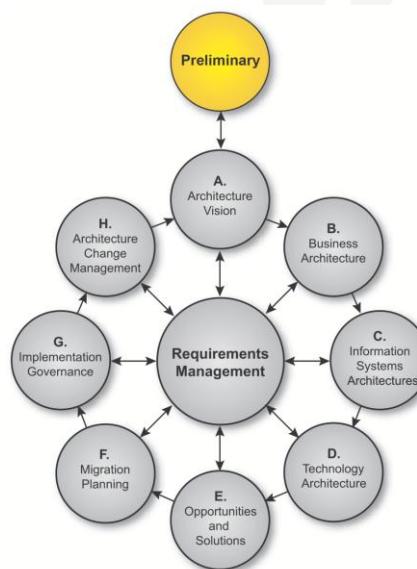
V9.1 Edition Copyright © 2009-2011



All rights reserved
Published by The Open Group, 2011



Preliminary Phase



7/3/2014

TOGAF is a registered trademark of The Open Group in the U.S. and/or other countries.



Module Objectives

The objectives of this module are to understand the Preliminary Phase

- ❖ Objectives
- ❖ Approach
- ❖ Steps
- ❖ Inputs
- ❖ Outputs

3



Preliminary Phase: Objectives in detail

❖ Determine the Architecture Capability desired by the Organization

- Review the organizational context for conducting enterprise architecture
- Identify and scope the elements of the enterprise organizations affected by the Architecture Capability
- Identify the established frameworks, methods, and processes that intersect with the Architecture Capability
- Establish a Capability Maturity target

4



Preliminary Phase: Objectives in detail

❖ Establish the Architecture Capability

- Define and establish the Organizational Model for Enterprise Architecture
- Define and establish the detailed process and resources for architecture governance
- Select and implement tools that support the Architecture Capability
- Define the architecture principles

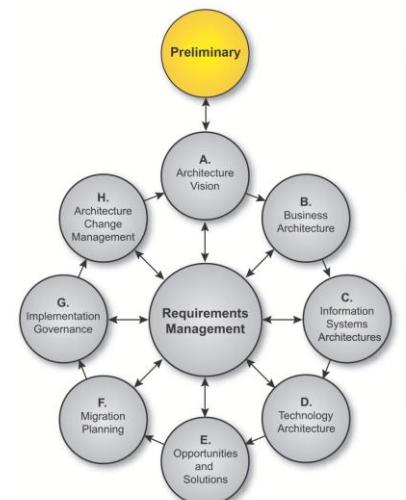
5 

Approach

- ❖ Define the Enterprise
- ❖ Identify key drivers and elements in the organizational 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

6 

Preliminary Phase: Main inputs

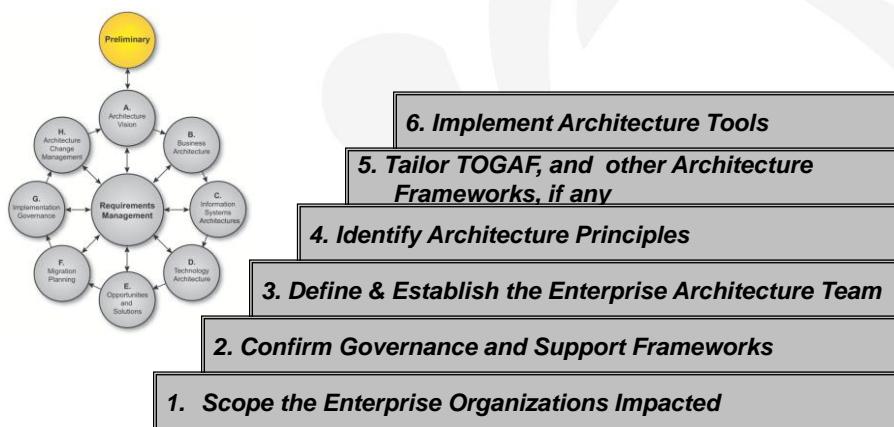


- * TOGAF
- * Other architecture frameworks
- * Business strategies and board business plans, IT strategy
- * Business principles, business goals, and business drivers
- * Governance and legal frameworks
- Any existing
 - * organizational model
 - * architecture framework
 - * architecture principles
 - * architecture repository

7



Steps



8



1. Scope the enterprise organizations impacted

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

9



7/3/2014

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 organization 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

10



7/3/2014

3. Define the team and organization

- ❖ 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



7/3/2014

4. Identify and establish architecture principles

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



7/3/2014

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



7/3/2014

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



7/3/2014

TOGAF Template for Principles

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



7/3/2014

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



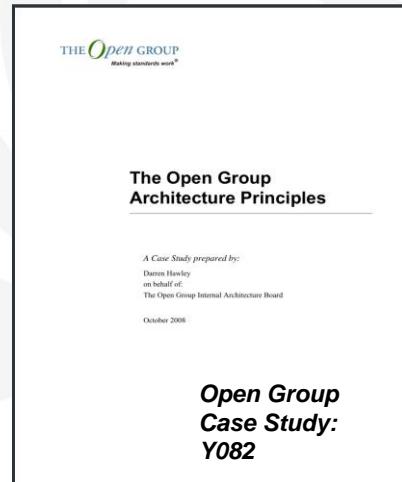
7/3/2014

An Example Statement of Principles

- 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



7/3/2014



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	Without this principle, short-term consideration, supposedly convenient exceptions, and inconsistencies would rapidly undermine the management of information. Information management initiatives will not be permitted to begin until they are examined for compliance with the principles. A conflict with a principle will be resolved by changing the conflicting initiative, which could delay or prevent the initiative.

7/3/2014



Example: Self-Serve

Statement	Customers 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.



7/3/2014

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



7/3/2014

Five Qualities of Principles

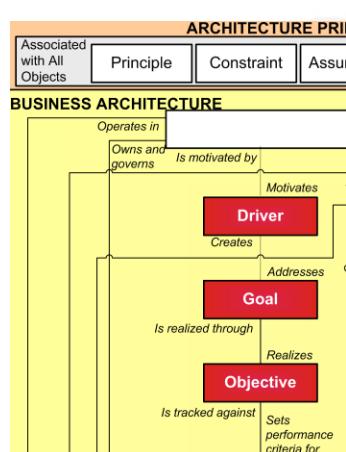
4. **Consistent:** strict adherence to one principle may require loose interpretation of another. Principles must be expressed in a way that allows a balance of interpretations and should not be contradictory
5. **Stable:** Principles must be enduring, yet able to accommodate change

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

21



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

22



5. Tailor TOGAF 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 organization-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 organization-specific requirements

23



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

24



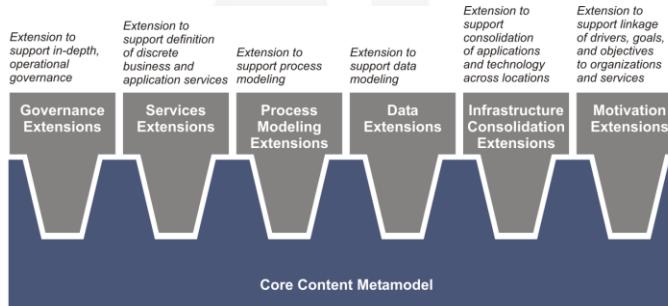
Process Tailoring

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

25

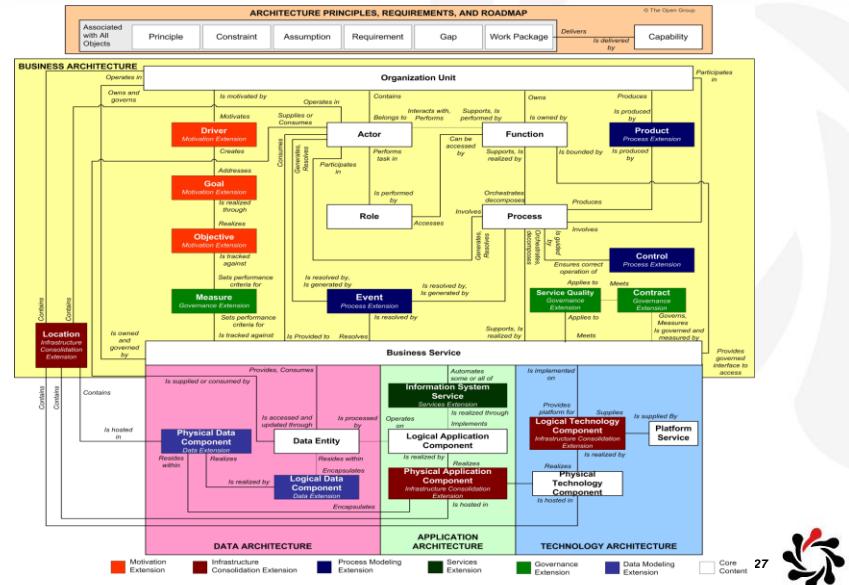


Content Tailoring



26

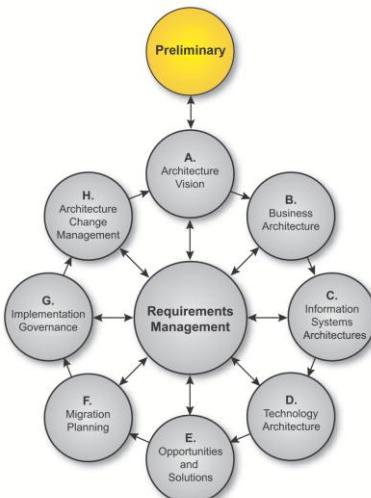




6. Implement Architecture Tools

- ❖ In this step we must select appropriate architecture tools
 - ❖ 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

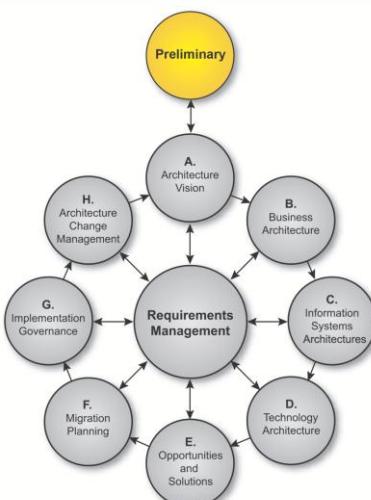


- ❖ Organizational model for enterprise architecture
- ❖ Tailored Architecture Framework, including architecture principles
- ❖ Initial Architecture Repository
- ❖ Restatement of business principles, goals and drivers
- ❖ Request for Architecture Work
- ❖ Architecture Governance Framework

29



Summary



- ❖ The main objective of the preliminary phase is to prepare an organization for a successful Enterprise Architecture project by defining ‘how we do architecture’

30



Summary

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

7/3/2014

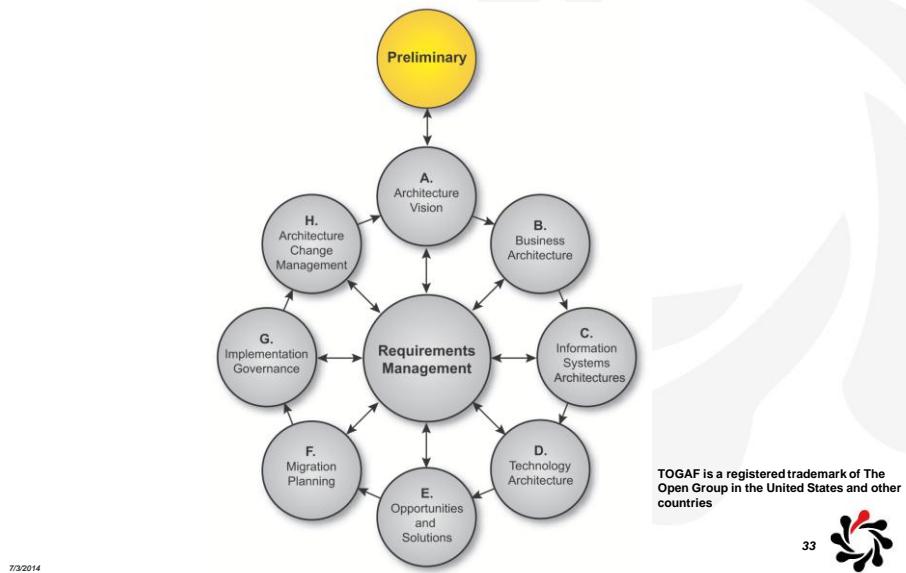
31



32



Preliminary Phase



Architecture Governance

Module 9

V9.1 Edition Copyright © 2009-2011

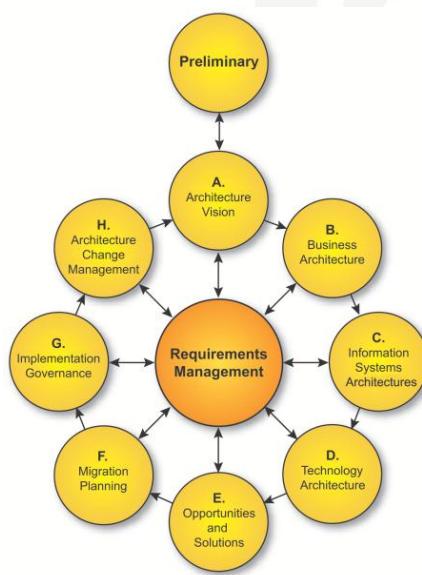


All rights reserved

Published by The Open Group, 2011



Architecture Governance



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

3



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

4



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

7/3/2014

5



Nature of Governance

- ❖ Governance ensures business is conducted properly
- ❖ It is about effective and equitable usage of resources to ensure sustainability of strategic objectives

7/3/2014

6



Nature of Governance

❖ 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

7



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)]

8



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

7/3/2014



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

7/3/2014



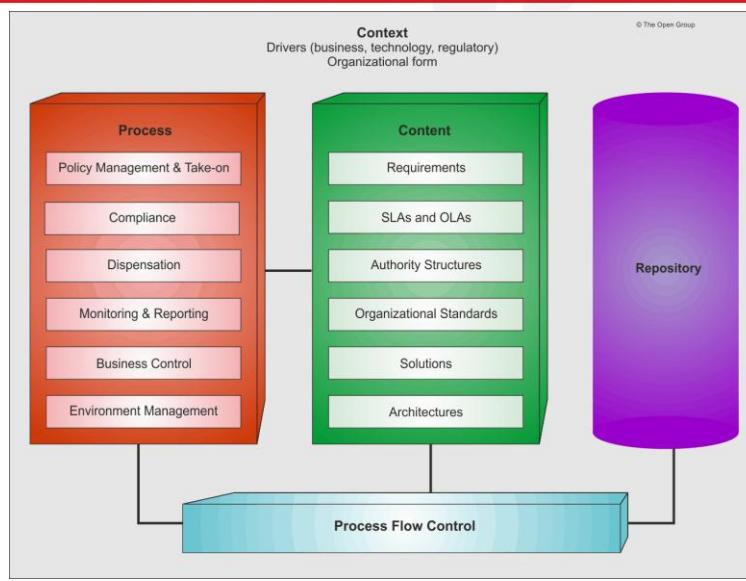
TOGAF Architecture Governance Framework

- ❖ 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 organizational structures, so that the business responsibilities can be elucidated, communicated, and managed



7/3/2014

Conceptual Structure



7/3/2014

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 - allows introduction of new governance material without impacting the processes and ensures framework flexibility

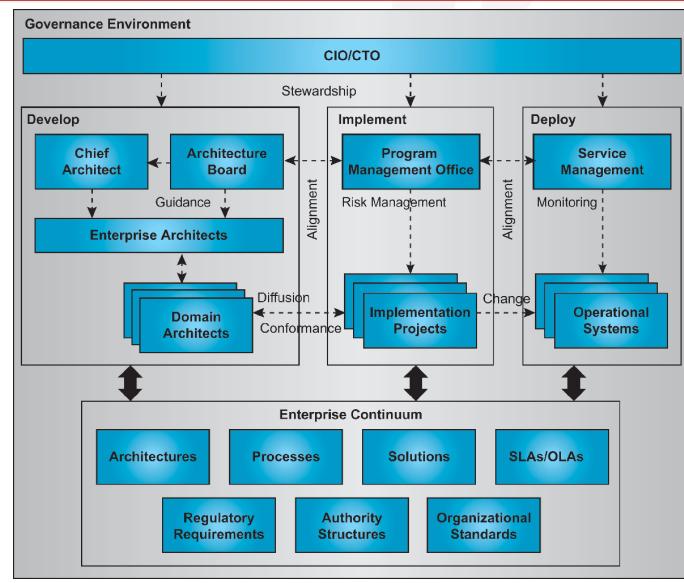
13 

Conceptual Structure

- ❖ The *Architecture Governance Framework* is integral to the Enterprise Continuum, and manages all content for both the architecture and the architecture governance processes

14 

Organizational Structure



7/3/2014



Organizational Structure

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

7/3/2014



Benefits of Architecture Governance

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

17 

Architecture Governance in Practice

Key success factors include

- ❖ Best practices for submission, adoption, reuse, reporting, and retirement of architecture policies, procedures, roles, skills, organizational structures, and support services
- ❖ Organizational responsibilities and structures to support the architecture governance processes and reporting requirements

18 

Architecture Governance in Practice

- ❖ 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

19 

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 (organization-wide responsibility)
 - Board has identifiable and articulated
 - Responsibilities and decision-making capabilities
 - Remit and authority limits

20 

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

21



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 organization
- ❖ Ensuring that the discipline of architecture-based development is adopted
- ❖ Supporting a visible escalation capability for out-of-bounds decisions

22



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

23



Architecture Contracts

- ❖ Joint agreements between development partners and sponsors on the deliverables, qualify and fitness-for-purpose of an architecture
- ❖ Types of contract
 - Statement of Architecture work
 - Architecture Design and Development Contract
 - Business Users' Architecture Contract

24



Architecture Contracts

❖ 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 organization

25 

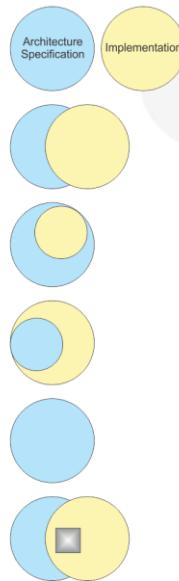
Architecture Contracts and the ADM

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

26 

Architecture Compliance: Terminology

© The Open Group



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.

7/3/2014

27



Architecture Compliance

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

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

7/3/2014

28



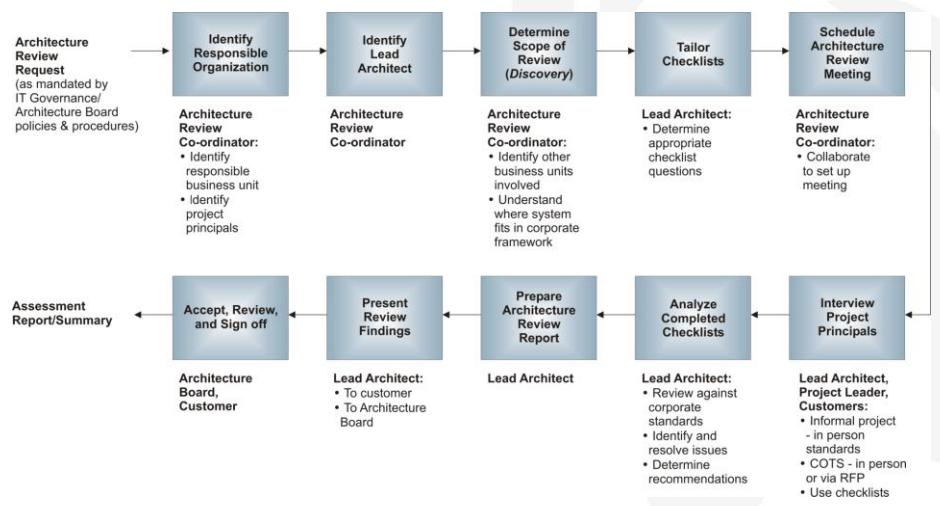
Architecture Compliance Reviews

- ❖ 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

29



Architecture Compliance Review Process



30



Establishing an Architecture Capability

- ❖ TOGAF provides guidelines to establish an EA capability
 - Use of the ADM
 - Treat it as an ongoing practice
 - Address the four domain architectures
 - **Business Architecture** : the architecture governance, architecture processes, architecture organizational structure, architecture information requirements, architecture products, etc.
 - **Data Architecture** : the structure of the organization'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

31



Summary

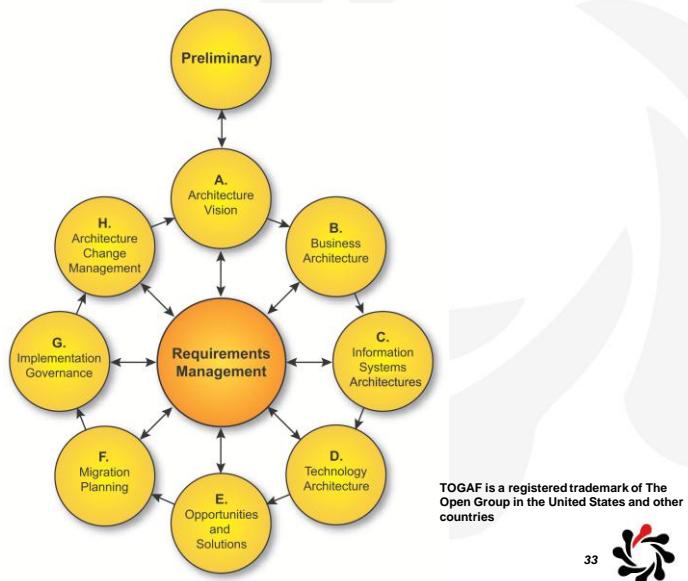
Architecture governance is the practice and orientation by which enterprise architectures and other architectures are managed and controlled at an enterprise-wide level. It includes

- ❖ 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 organization
- ❖ 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 organization

32



Architecture Governance



Business Scenarios

Module 10

V9.1 Edition Copyright © 2009-2011

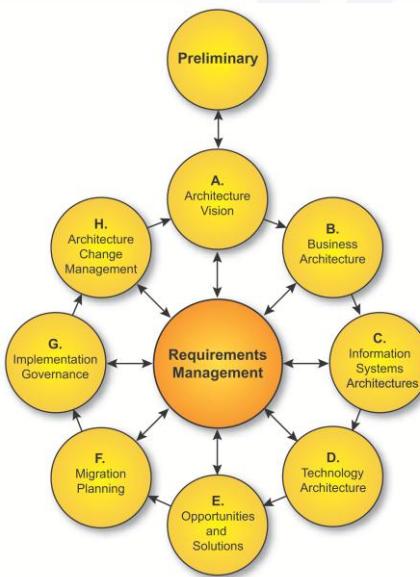


All rights reserved

Published by The Open Group, 2011



Business Scenarios



7/3/2014

TOGAF is a registered trademark of The Open Group in the United States and/or other countries.

z



Module Objectives

- ❖ To understand the Business Scenario technique
- ❖ To understand where it is used in TOGAF

7/3/2014



Introduction

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

7/3/2014



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

7/3/2014



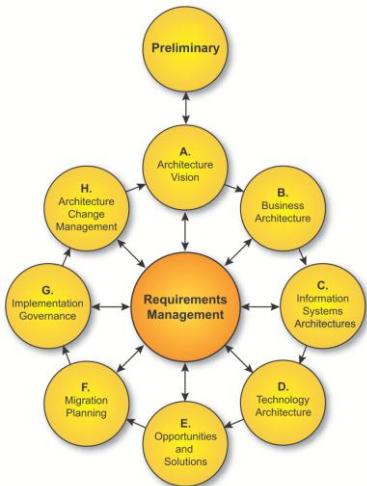
Business Scenarios

- ❖ TOGAF defines a method for developing Business Scenarios
 - A ‘method within a method’
 - Documented in *Part III, ADM Guidelines and Techniques*

7/3/2014



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



7/3/2014

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”



7/3/2014

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

9



7/3/2014

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

10



7/3/2014

Who Contributes to a Business Scenario?

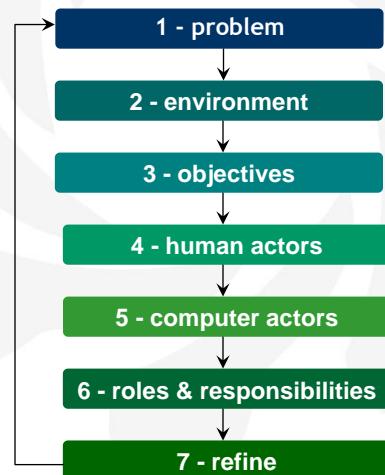
- ❖ The creation of a business scenario is not solely the province of the architect
- ❖ Business line management and other stakeholders for the enterprise must be involved
- ❖ It may also involve an organization's IT vendors
- ❖ Typically involvement of management is greatest in the early stages whereas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

7/3/2014



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 scenario 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



7/3/2014



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**

13 

7/3/2014

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



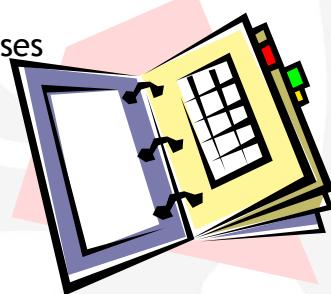
14 

7/3/2014

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

7/3/2014



15 

Resources

- ❖ The Open Group Bookstore (<http://www.opengroup.org/bookstore>)
 - The Managers Guide to Business Scenarios
 - Examples of completed Business Scenarios

7/3/2014

16 

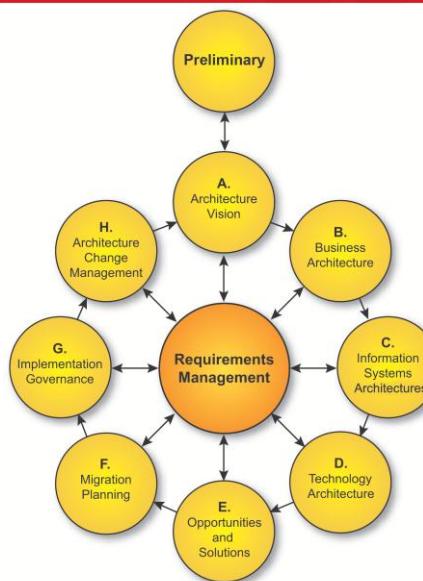
Summary

- ❖ 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

7/3/2014



Business Scenarios



TOGAF is a registered trademark of The Open Group in the United States and other countries

7/3/2014





Stakeholder Management

Module 11

V9.1 Edition Copyright © 2009-2011

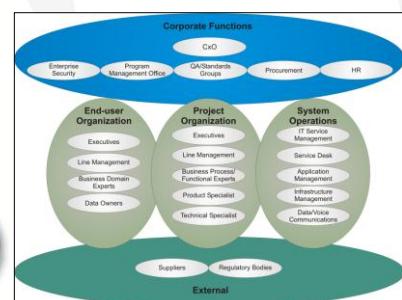
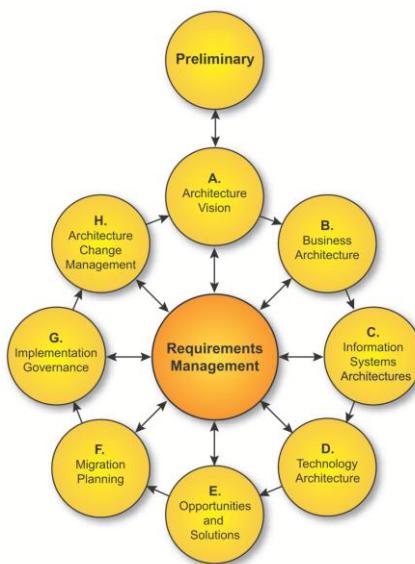
THE *Open* GROUP

All rights reserved

Published by The Open Group, 2011



Stakeholder Management



7/3/2014

TOGAF is a registered
Open Group trademark
in countries



Roadmap

Part I - Introduction
Preface, Executive Overview, Core Concepts, Definitions and Release Notes
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 - Reference Models
Foundation Architecture: Technical Reference Model
Integrated Information Infrastructure Reference Model
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



3

7/3/2014

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

4

7/3/2014

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

7/3/2014

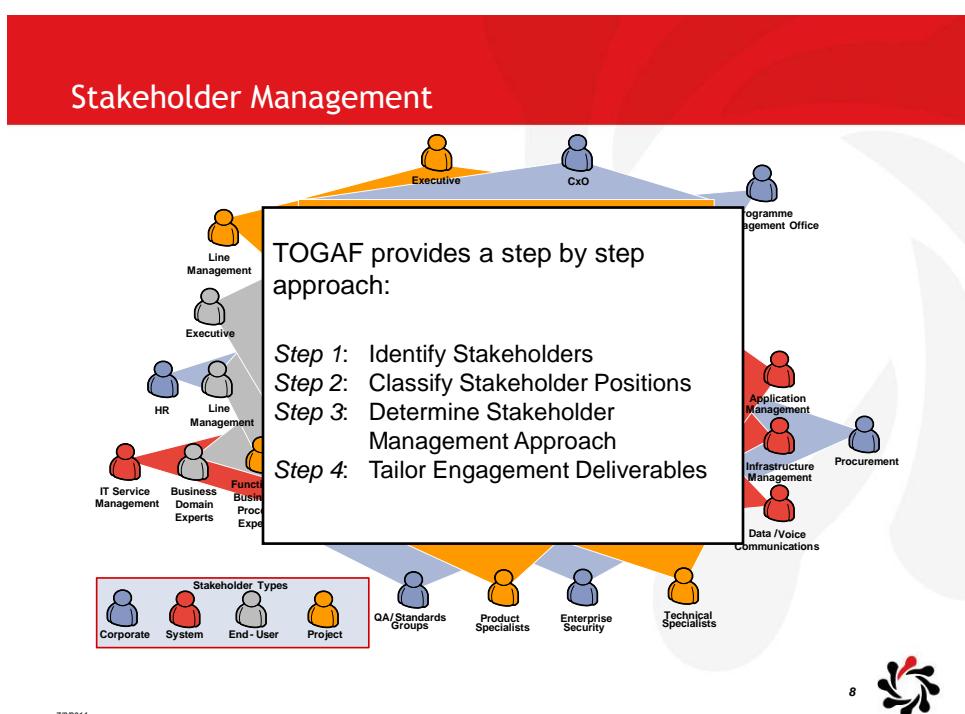
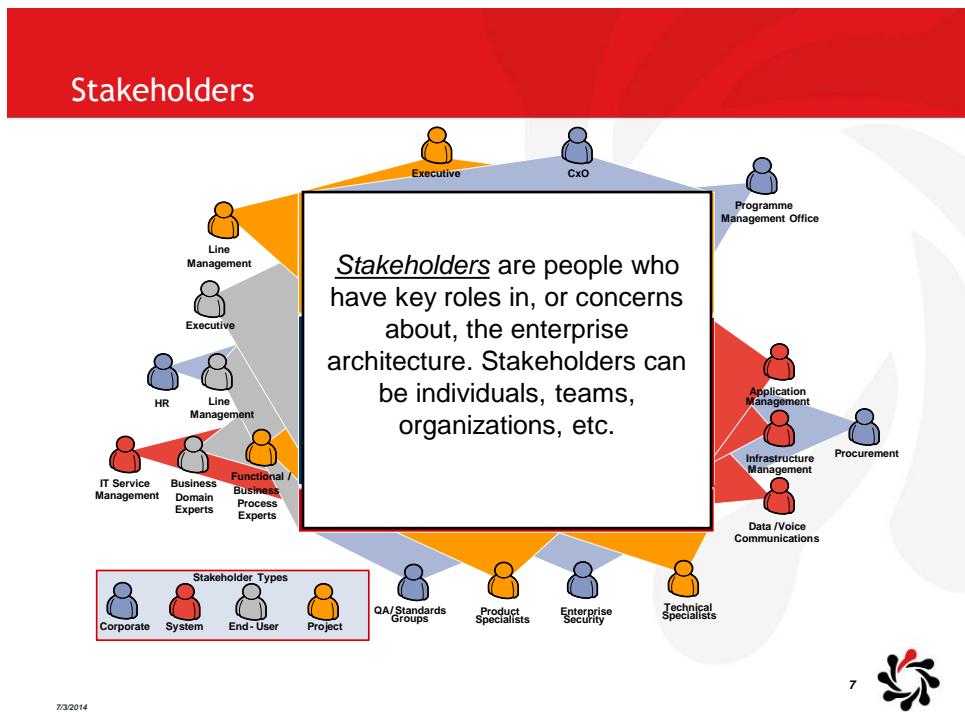


Benefits

- ❖ 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

7/3/2014





Step 1: Identify Stakeholders

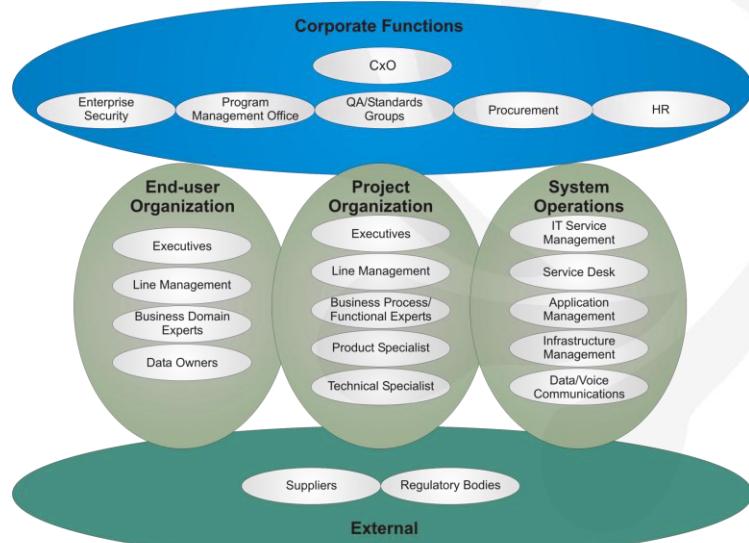
- ❖ Identify the key stakeholders of the enterprise architecture
- ❖ Look at who is impacted by the enterprise architecture project
 - Who gains and who loses from this change?
 - Who controls change management of processes?
 - Who designs new systems?
 - Who will make the decisions?
 - Who procures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

7/3/2014

9



Categories of Stakeholder



7/3/2014

10



Step 2: Classify Stakeholder Positions

- Classify and record positions in a Stakeholder Analysis Matrix

Stakeholder Group	Stakeholder	Ability to Disrupt Change	Current Understanding	Required understanding	Current commitment	Required commitment	Required support
CIO	John Smith	H	M	H	L	M	H
CFO	Jeff Brown	M	M	M	L	M	M

7/3/2014



Step 3: Determine Stakeholder Management Approach

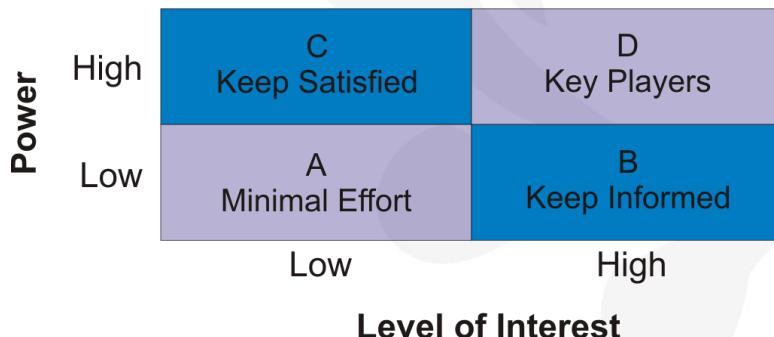
- Work out stakeholder power, influence and interest, so as to focus the engagement on the key individuals
- These can then be mapped onto a power/interest matrix, which is used to determine the strategy for engaging with them

7/3/2014



Step 3: Determine Stakeholder Management Approach

- ❖ Develop a Power/Interest Matrix and place Stakeholder groups within it



7/3/2014

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..



7/3/2014

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 organization, 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 Organization Decomposition diagram
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

15



7/3/2014

Summary

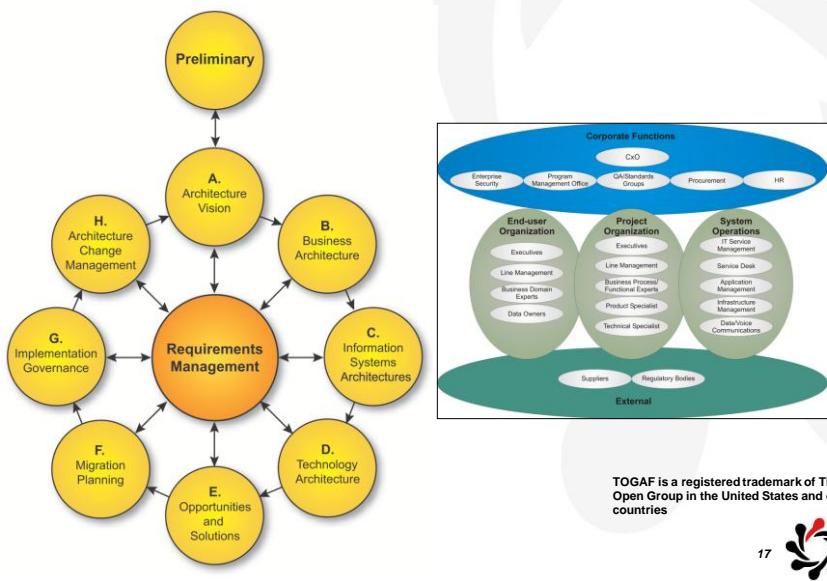
- ✿ Stakeholder Management is an important discipline that successful architecture practitioners can use to win support from others
- ✿ Identifies the most powerful stakeholders early and ensures their input is used to shape the architecture
- ✿ Explicitly identifies viewpoints to address stakeholder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

16



7/3/2014

Stakeholder Management



7/3/2014

17



Views and Viewpoints

Module 12

V9.1 Edition Copyright © 2009-2011

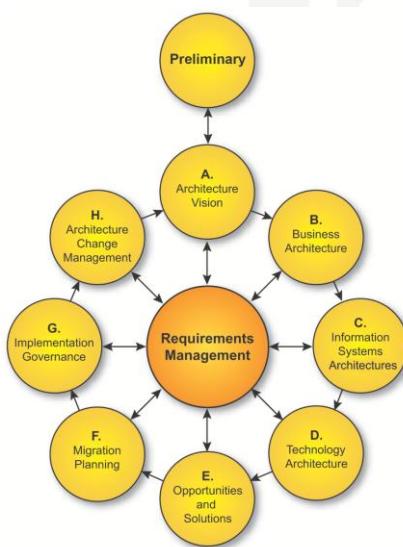


All rights reserved

Published by The Open Group, 2011



Views & Viewpoints



TOGAF is a registered
Open Group trademark
in countries

7/3/2014

2



Module Objectives

- ❖ To understand the concepts of views and viewpoints
- ❖ To understand the role of Architecture Views
- ❖ To introduce some TOGAF resources

Source: www.pfosphene.com



3



7/3/2014

Concepts and Definitions

- ❖ System
- ❖ Stakeholders
- ❖ Concerns
- ❖ View
- ❖ Viewpoint

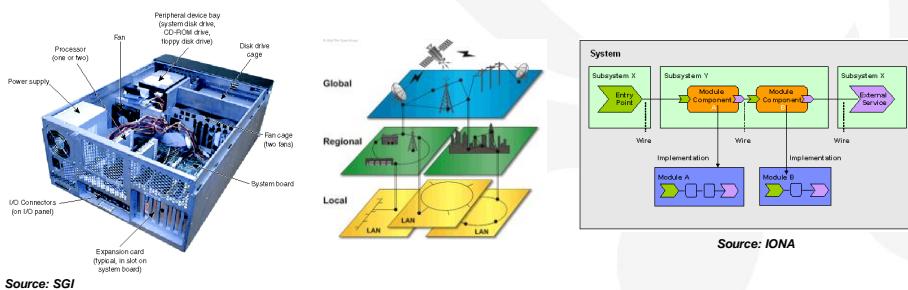
7/3/2014

4



System

- ★ A system is a collection of components organized to accomplish a specific function or set of functions

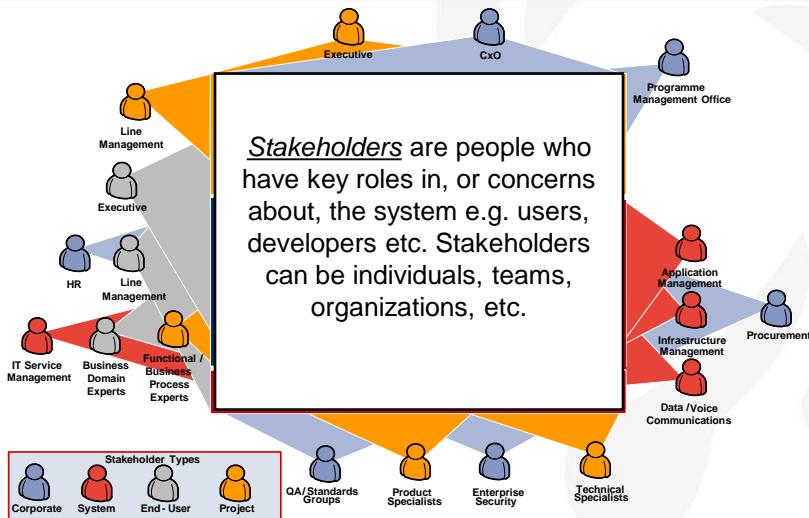


7/3/2014

5



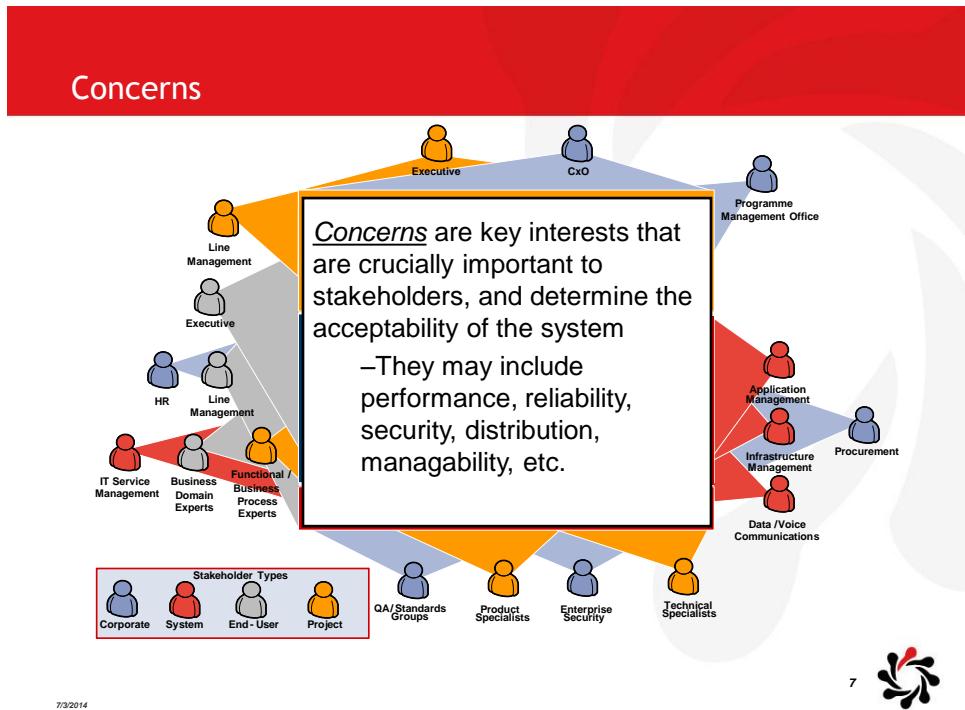
Stakeholders



7/3/2014

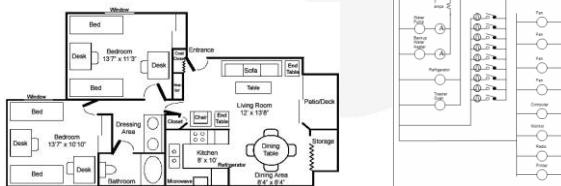
6





View

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



Viewpoint

★ A viewpoint defines the perspective from which a view is taken

- It defines how to construct and use a 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)

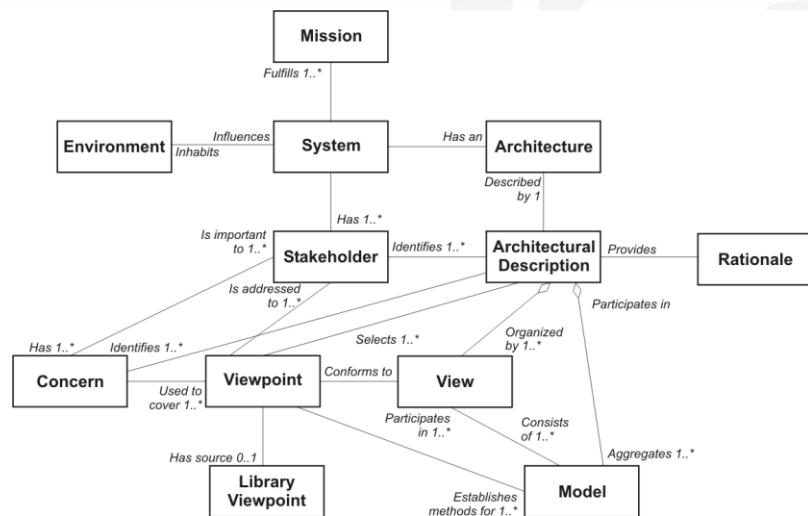


7/3/2014

9



ISO/IEC 42010:2007



Source: IEEE Std 1471-2000. Used with permission

7/3/2014

10



Views and Viewpoints

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

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



7/3/2014

What is an Architecture View?

- ❖ A representation of an overall architecture with meaning to one or more stakeholders in the system
- ❖ Eg 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



7/3/2014

A Simple Example of a Viewpoint

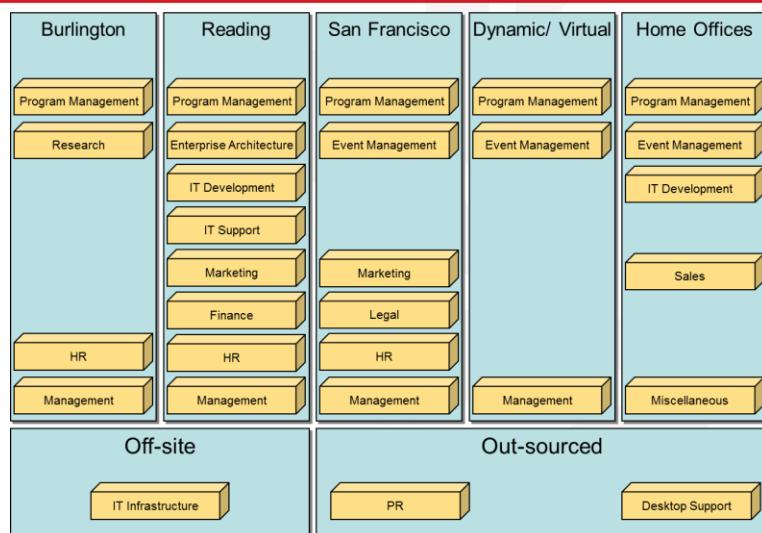
Viewpoint Element	Description
Stakeholders	Management Board, CEO
Concerns	Show the top-level relationships between geographical sites and business functions
Modeling technique	<p>Nested boxes diagram</p> <p>Outer boxes = locations</p> <p>Inner boxes = business functions</p> <p>Semantics of nesting = functions performed in the locations</p>

7/3/2014

13



A Simple Example of a View



7/3/2014

14



Figure 1: Example View - The Open Group Business Domains in 2008

Developing 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 views be connected to each other?
 - can the conflicting concerns be reconciled?
 - what trade-offs have been made (e.g. between security and performance)?

7/3/2014



The View Creation Process

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

7/3/2014



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)

7/3/2014



The View Creation Process

If no libraries of viewpoints exist then

1. Select key stakeholders
 2. Analyze their concerns and document them
 3. Develop new viewpoints (based on the stakeholders and their concerns)
 4. Generate views of the system using the new viewpoints as templates
- ❖ Alternatively create an ad hoc view and then consider whether a generalized form of the implicit viewpoint should be defined explicitly and saved

7/3/2014



Using TOGAF Artifacts

- ❖ TOGAF 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

7/3/2014



Catalogs

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

7/3/2014



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

7/3/2014



Stakeholder Map Matrix

STAKEHOLDER	KEY CONCERNS	CLASS	Catalogs, Matrices and Diagrams
CxO – CEO, CFO, CIO, COO	The high level drivers, goals and objectives of the organization, 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 Organization Decomposition diagram
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
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

7/3/2014



Diagrams

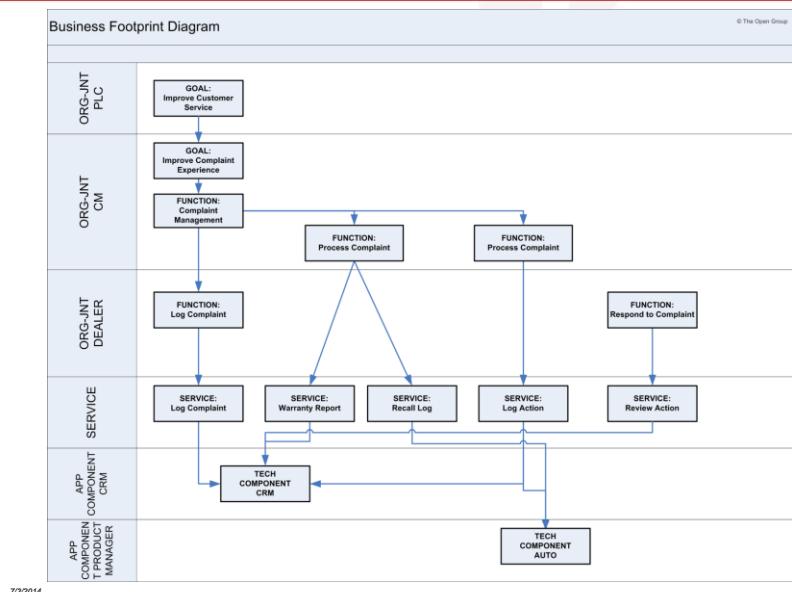
- ❖ Diagrams representing building blocks in a rich and visual way, especially suited to stakeholder communication
- ❖ For example

- Value Chain diagram created in Phase A
- Business footprint diagram created in Phase B

23

7/3/2014

Example Business Footprint Diagram



24

7/3/2014

TOGAF 9 Artifacts

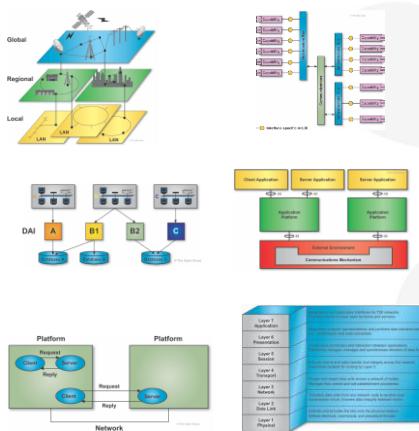
Preliminary Phase Principles catalog	Phase A, Architecture Vision Stakeholder Map matrix Solution Concept Diagram	Value Chain Diagram	
Requirements Management Requirements catalog			
Phase B, Business Architecture	Phase C, Data Architecture	Phase C, Application Architecture	Phase D, Technology Architecture
Catalog <ul style="list-style-type: none"> • Organization/Actor • Driver/Goal/Objective • Role • Business Service/Function • Location • Process/Event/Control/Product • Contract/Measure Matrix <ul style="list-style-type: none"> • Business Interaction Diagram <ul style="list-style-type: none"> • Business Footprint • Business Service/Information • Functional Decomposition • Product Lifecycle • Goal/Objective/Service • Use-Case • Organization Decomposition • Process Flow • Event 	Catalog <ul style="list-style-type: none"> • Data Entity/Data Component Matrix <ul style="list-style-type: none"> • Data Entity/Business Function • System/Data Diagram <ul style="list-style-type: none"> • Class • Data Dissemination • Data Security • Class Hierarchy • Data Migration • Data Lifecycle 	Catalog <ul style="list-style-type: none"> • Application Portfolio • Interface Matrix <ul style="list-style-type: none"> • System/Organization • Role/System • System/Function • Application Interaction Diagram <ul style="list-style-type: none"> • Application Communication • Application and User Location • System Use-Case • Enterprise Manageability • Process/System Realization • Software Engineering • Application Migration • Software Distribution 	Catalog <ul style="list-style-type: none"> • Technology Standards • Technology Portfolio Matrix <ul style="list-style-type: none"> • System/Technology Diagram <ul style="list-style-type: none"> • Environments and Locations • Platform Decomposition • Processing • Networked Computing/Hardware • Communications Engineering
Phase E, Opportunities & Solutions			
Project Context diagram Benefits diagram			

25



7/3/2014

Recommended Architecture Views



- ❖ Business Architecture View
- ❖ Enterprise Security View
- ❖ Software Engineering View
- ❖ System Engineering View
- ❖ Communications Engineering View
- ❖ Data Flow View
- ❖ Enterprise Manageability View
- ❖ Acquirer View

26



7/3/2014

Summary

In general, TOGAF embraces the concepts and definitions of ISO/IEC 42010: 2007, specifically those that guide the development of a view and make the view actionable, such as

- ❖ Selecting key stakeholders
- ❖ Analyzing their concerns and documenting them
- ❖ Understanding how to model and deal with those concerns
- ❖ The language used to depict the view is the viewpoint. Viewpoints provide architecture concepts from different perspectives, including components, interfaces, and allocation of services critical to the view



7/3/2014

Summary

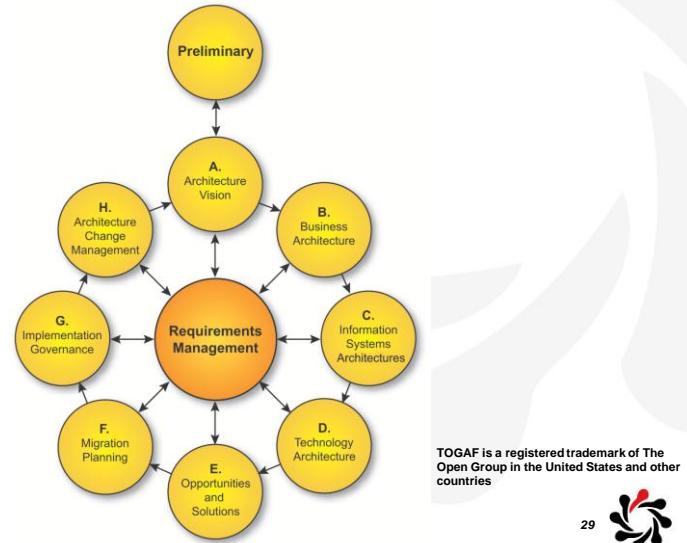
When applying TOGAF a number of tailoring steps should occur:

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



7/3/2014

Views & Viewpoints



7/3/2014

29



Building Blocks

Module 13

V9.1 Edition Copyright © 2009-2011

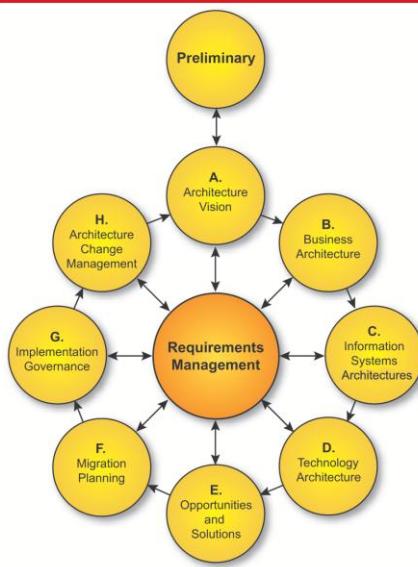


All rights reserved

Published by The Open Group, 2011



Building Blocks



TOGAF is a registered trademark of The Open Group in the U.S. and other countries.

7/3/2014

2



Part I - Introduction
Preface, Executive Overview, Core Concepts, Definitions and Release Notes
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 – Reference Models
Foundation Architecture: Technical Reference Model
Integrated Information Infrastructure Reference Model
Part VII – Architecture Capability Framework
Architecture Board
Architecture Compliance
Architecture Contracts
Architecture Governance
Architecture Maturity Models
Architecture Skills Framework

Part IV, Architecture Content Framework, Chapter 37



3

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

4

7/3/2014

Building Block Characteristics

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

7/3/2014



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

7/3/2014



Building Blocks

- ❖ The way in which functionality, products and custom developments are assembled into building blocks varies widely
- ❖ Every organization must decide for itself the arrangement
- ❖ A good choice can lead to improvements in system integration, interoperability and flexibility

7/3/2014



Building Blocks

- ❖ 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

7/3/2014



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

7/3/2014



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/organizations entities and policies

7/3/2014



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

7/3/2014



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

7/3/2014



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

7/3/2014

13



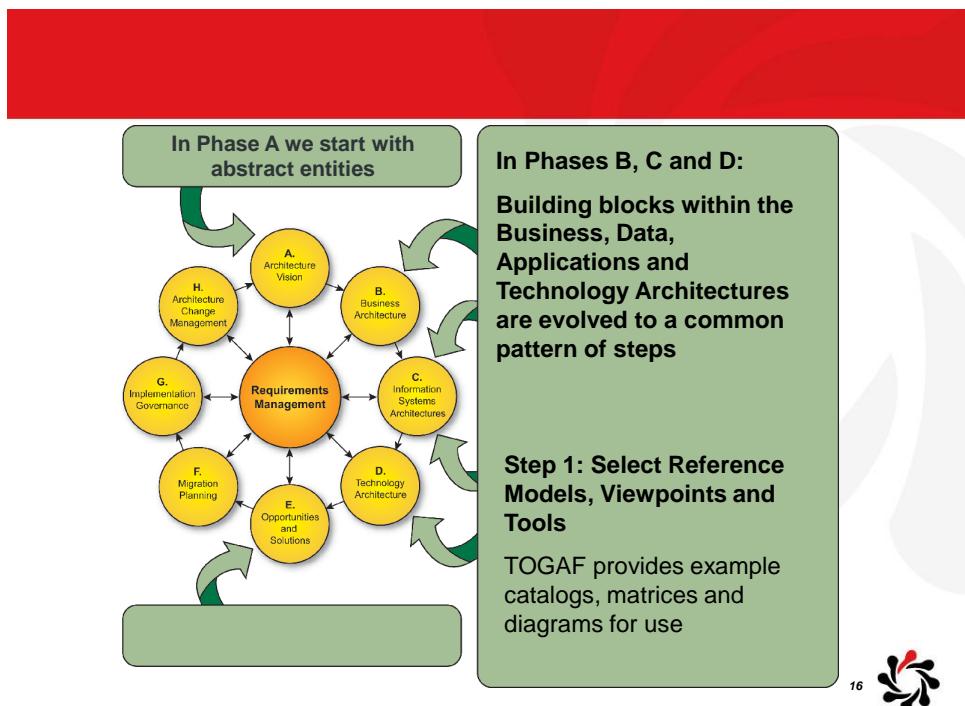
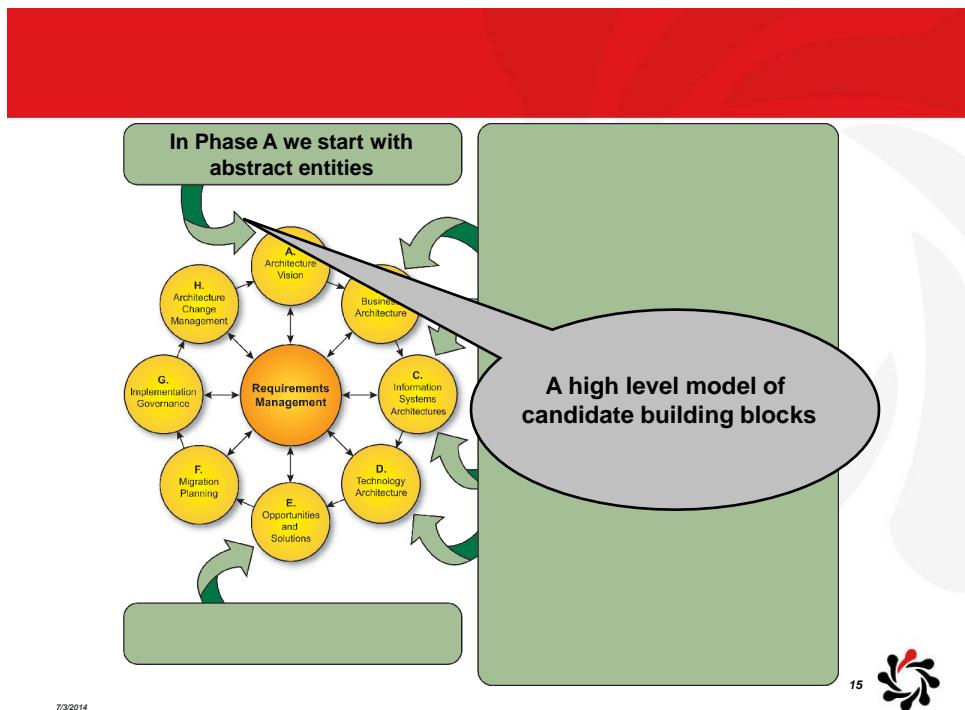
Building Block Design

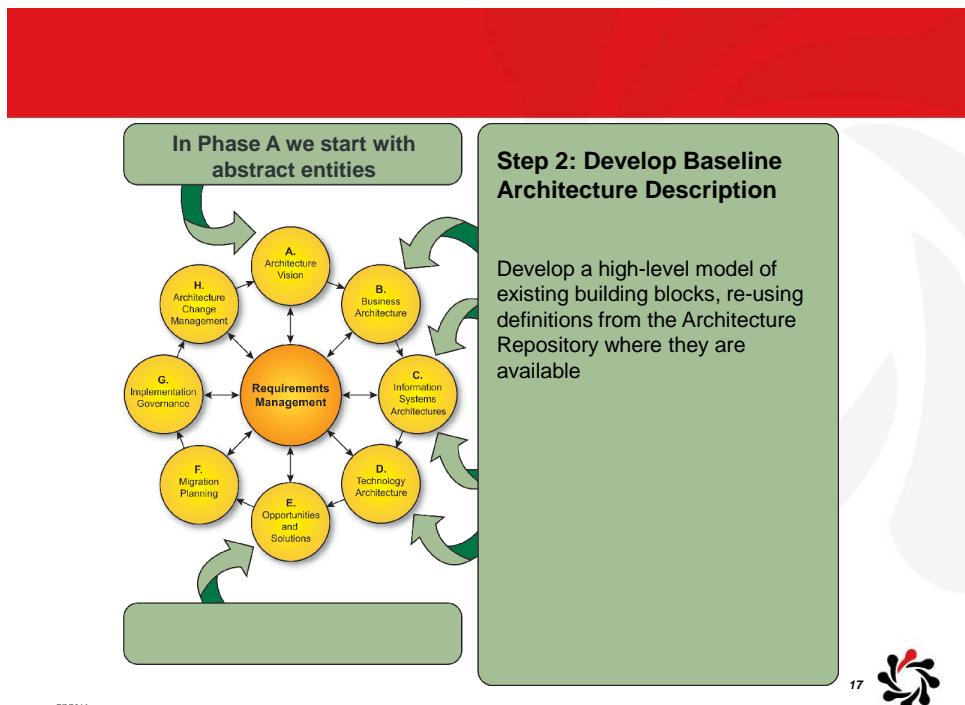
- ❖ The process of identifying building blocks includes looking for collections of functions which require integration
- ❖ Consider three classes of building blocks
 - Re-usable building blocks such as legacy items
 - Building blocks to be developed (new applications)
 - Building blocks to be purchased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

7/3/2014

14



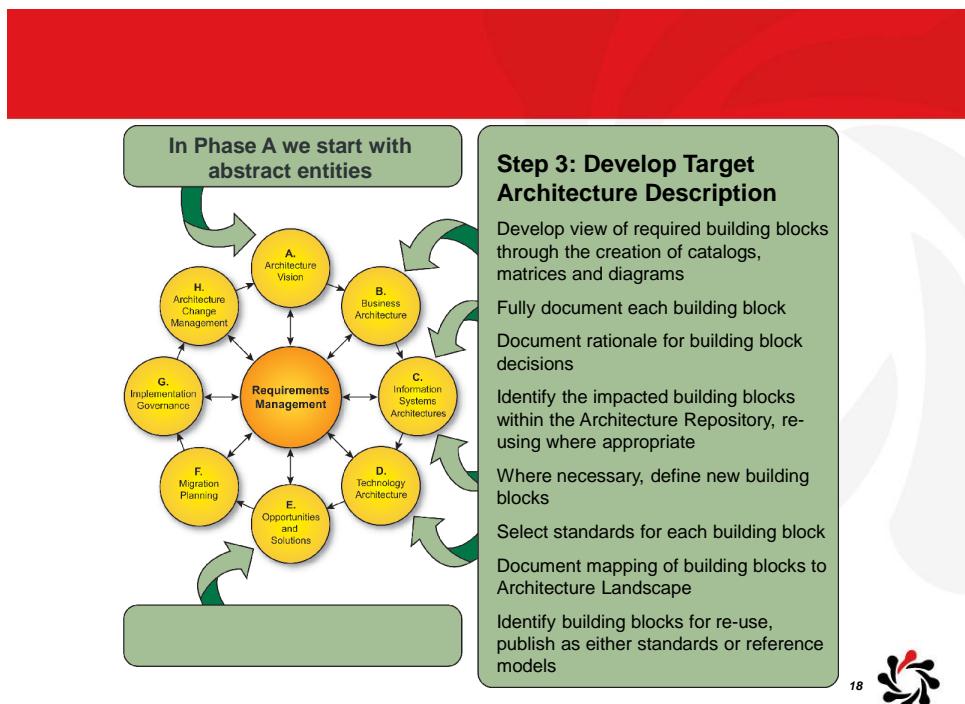




17



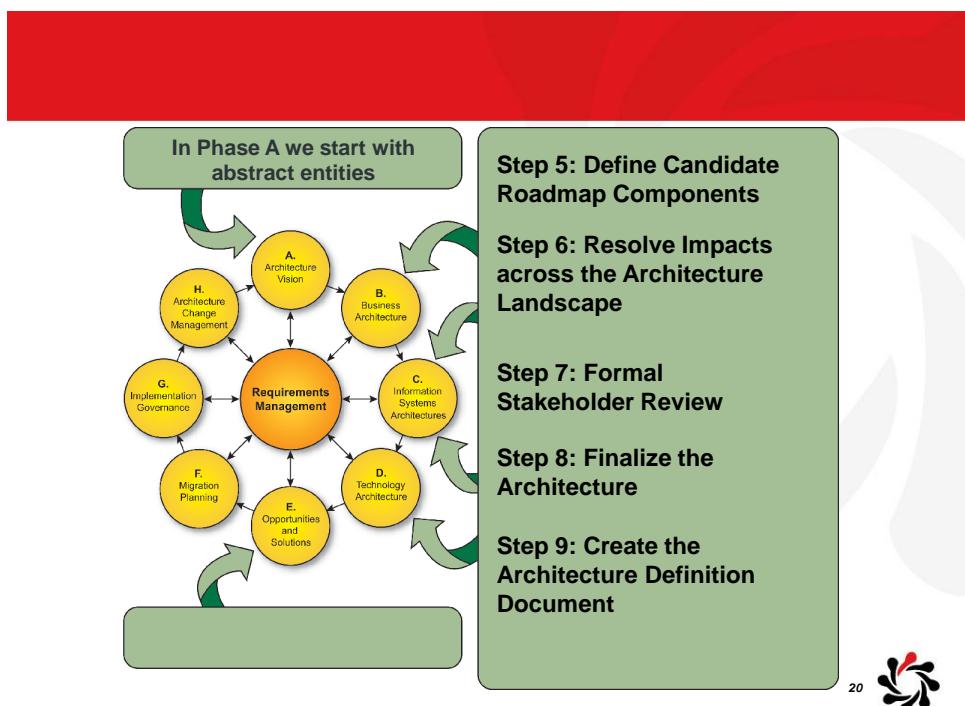
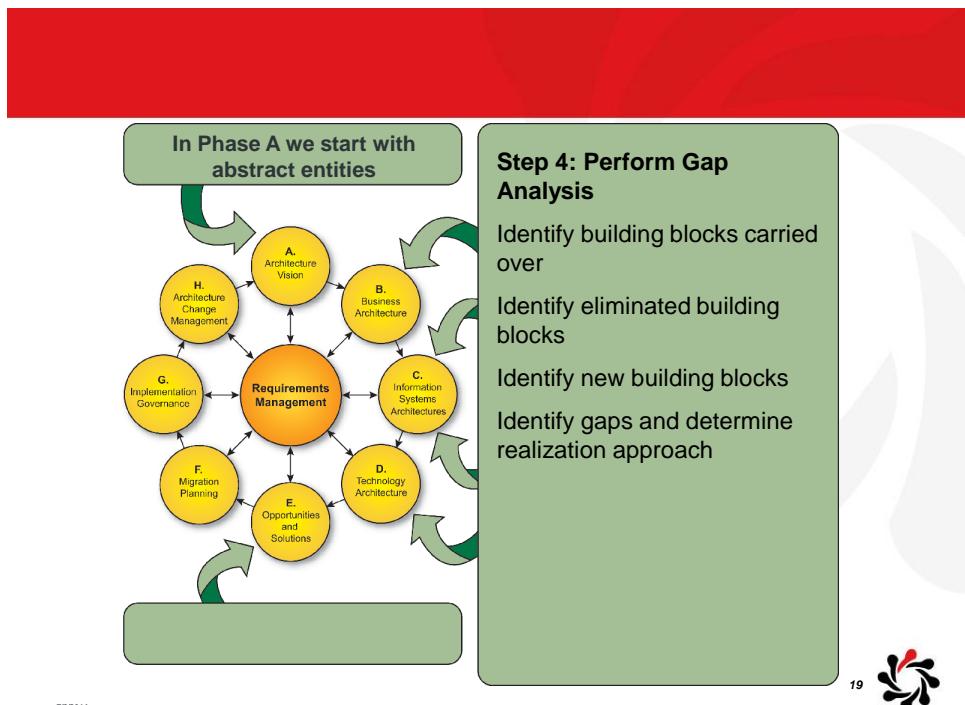
7/3/2014

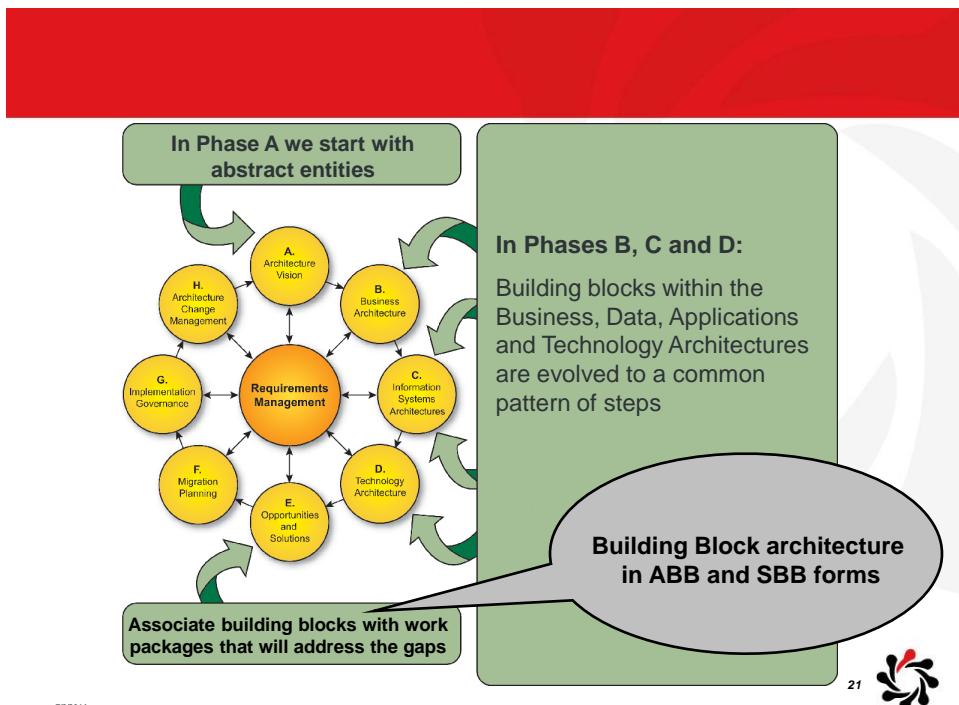


18



7/3/2014

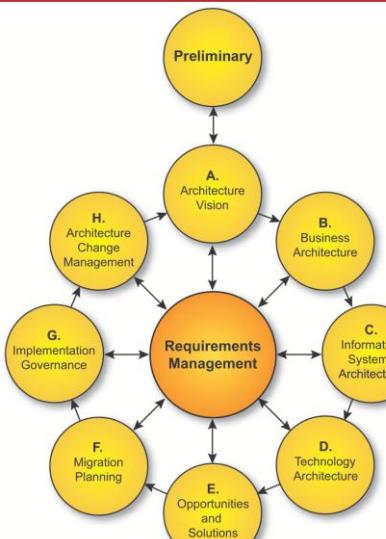




Architecture Patterns

- ❖ Pattern: defined as “*an idea that has been useful in one practical context and will probably be useful in others*”
- ❖ In TOGAF, patterns are considered to be a way of 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

Building Blocks



TOGAF is a registered trademark of The Open Group in the United States and other countries

23

7/3/2014

Architecture Implementation Support Techniques

Module 14

V9.1 Edition Copyright © 2009-2011

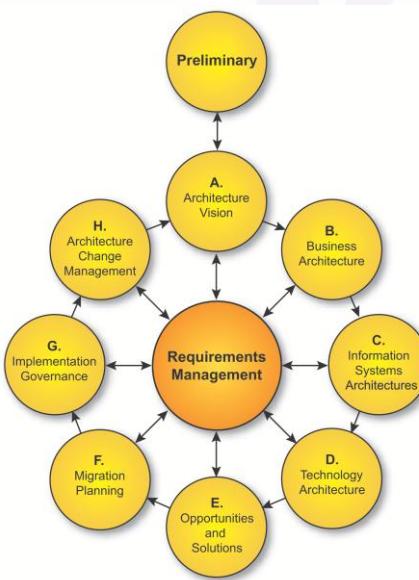
THE *Open* GROUP

All rights reserved

Published by The Open Group, 2011



Architecture Implementation Support Techniques



7/3/2014

TOGAF is a registered trademark of The Open Group
in the United States and/or other countries.

z



Roadmap

Part I - Introduction
Preface, Executive Overview, Core Concepts, Definitions and Release Notes
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 - Reference Models
Foundation Architecture: Technical Reference Model
Integrated Information Infrastructure Reference Model
Part VII - Architecture Capability Framework
Architecture Board
Architecture Compliance
Architecture Contracts
Architecture Governance
Architecture Maturity Models
Architecture Skills Framework

7/3/2014

- ✿ Part III, ADM Guidelines and Techniques

- ✿ Chapters 29, 30, 31 and 32



3



Module Objectives

The objectives are to

- ✿ Obtain an understanding of the following techniques provided by TOGAF to assist in Architecture Development

- Managing Interoperability Requirements
- Business Transformation
- Risk Assessment
- Capability Planning

7/3/2014

4



Interoperability

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

7/3/2014



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

7/3/2014



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	

7/3/2014



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

7/3/2014



Interoperability requirements and solutions

- 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

9



7/3/2014

Business Transformation Readiness Assessment

- ❖ Enterprise architecture often involves considerable change
- ❖ Understanding the readiness of an organization 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

10



7/3/2014

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

Work these actions into Phase E and F Implementation and Migration Plan



7/3/2014

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



7/3/2014

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 Ad Hoc	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								

13



7/3/2014

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			

14



7/3/2014

Readiness Factor Risks & Actions

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

7/3/2014



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

7/3/2014



Risk Management in the ADM

There are two levels of risk that should be considered

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

17



7/3/2014

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.

18



7/3/2014

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

7/3/2014



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

7/3/2014



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



7/3/2014

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



7/3/2014

Risk Identification and Mitigation Worksheet

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

7/3/2014



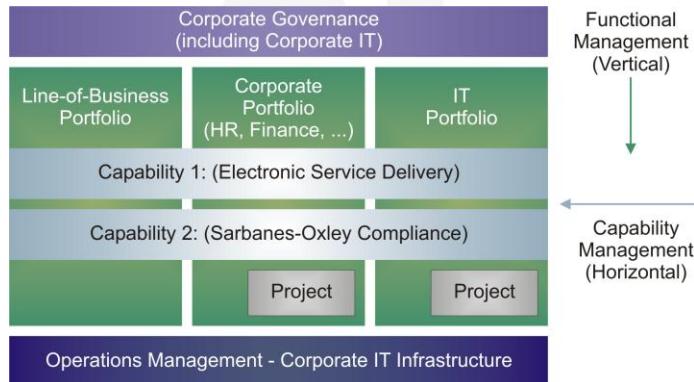
Capability Based Planning

- ❖ 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

7/3/2014



Capabilities



7/3/2014



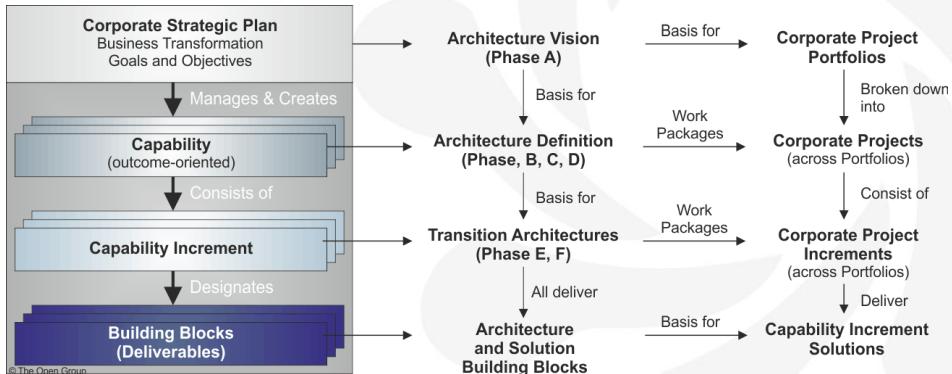
Capability Based Planning

- ❖ Capabilities are directly derived from the corporate strategic plan. They must satisfy the enterprise goals, objectives, and strategies. Most organizations 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

7/3/2014



Capability Based Planning



27



Summary

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

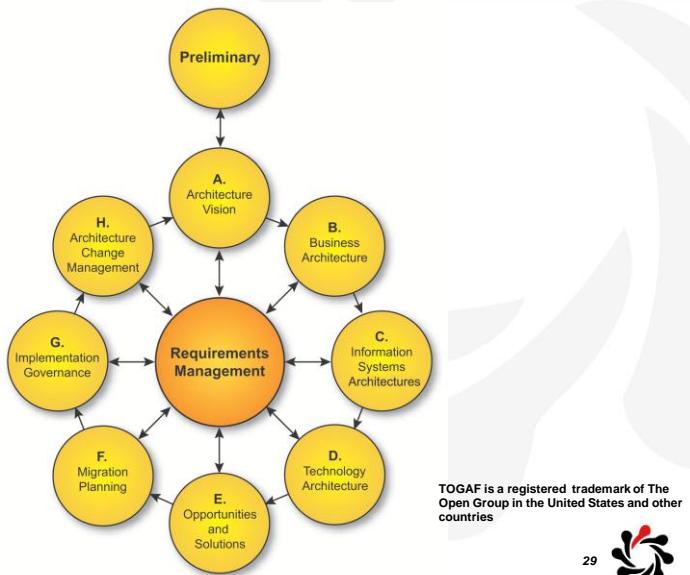
- ❖ Interoperability requirements
- ❖ The factors that influence business transformation readiness
- ❖ How to perform an initial risk assessment
- ❖ How capability based planning can be applied

7/3/2014

28



Architecture Implementation Support Techniques



TOGAF is a registered trademark of The Open Group in the United States and other countries

Phase A

Architecture Vision

Module 15

V9.1 Edition Copyright © 2009-2011

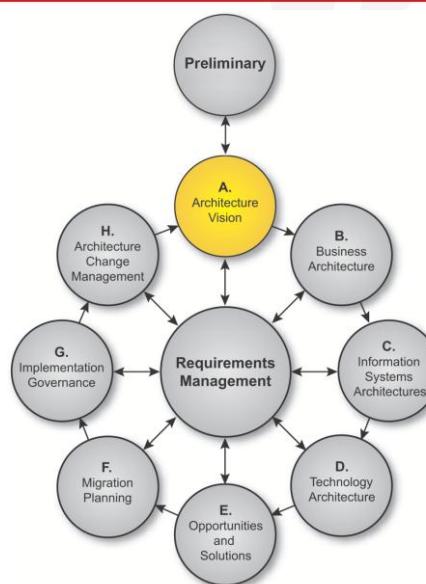


All rights reserved

Published by The Open Group, 2011



Phase A - Architecture Vision



7/3/2014

TOGAF® 9.1
Open Group
certified



Module Objectives

The objectives of this module are to understand Phase A

- ❖ Objectives
- ❖ Approach
- ❖ Steps
- ❖ Inputs
- ❖ Outputs

3



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

4



Approach

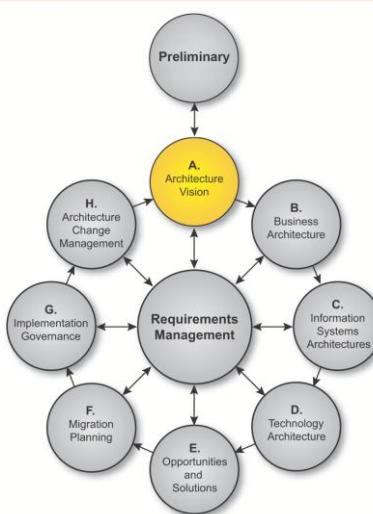
- ❖ Phase A defines what is in and what is outside of the architecture effort, and the constraints
- ❖ Constraints are informed by principles, business goals and strategic drivers
- ❖ Creates the Architecture Vision document
 - Clarifying and agreeing the purpose of the architecture
 - Demonstrating 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

5



7/3/2014

Phase A: Inputs



- ❖ Request for Architecture Work (see next slide)
- ❖ Business principles, business goals and drivers
- ❖ Organization model for enterprise architecture
- ❖ Tailored Architecture Framework, including architecture principles
- ❖ Populated Architecture Repository

6



7/3/2014

Request for Architecture Work

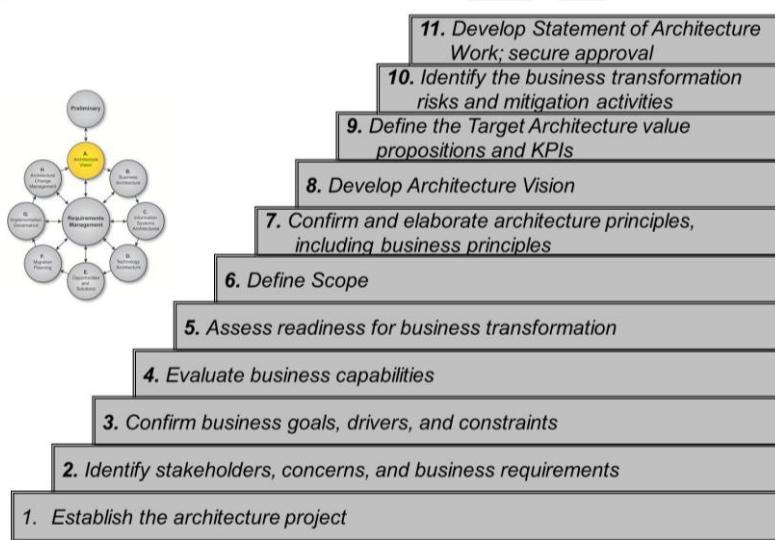
- ❖ Organization Sponsors
- ❖ External constraints, business constraints
- ❖ Organization's mission statement
- ❖ Current business system description
- ❖ Business goals and changes
- ❖ Current architecture/IT system description
- ❖ Strategic plans of the business
- ❖ Description of developing organization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

7



7/3/2014

Phase A Steps



8



7/3/2014

Step 1: Establish the 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

9



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

10



Stakeholder Map

Stakeholder	Key Concerns	Class	Catalogs, Matrices and Diagrams
CxO	The high-level drivers, goals and objectives of the organization, 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 Organization 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 organization. HR are important stakeholders in ensuring that the correct roles and actors are represented.	Keep Informed	Organization Decomposition diagram Organization/Actor catalog Location catalog

11



7/3/2014

Step 3: Confirm business goals, drivers and constraints

- ❖ Identify the business goals and strategic drivers of the organization
- ❖ 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

12



7/3/2014

Step 4: Evaluate business 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 organization's architecture capability
- ❖ Create an initial picture of the new capability that will be required
- ❖ Document the results in a Capability Assessment

13



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

14



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...

15 

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

16 

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

17



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

18



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 categorization prior to determining and implementing mitigating actions
 - Residual Level of Risk: Risk categorization 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

19



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

7/3/2014

20



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

7/3/2014

21



Statement of Architecture Work

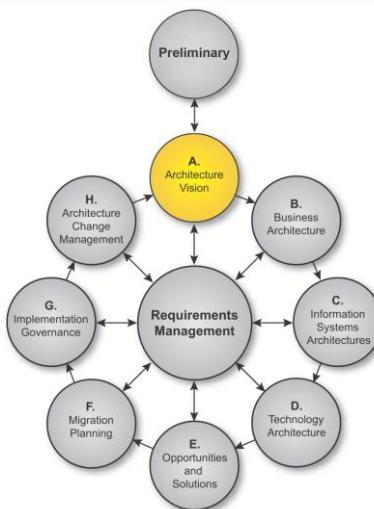
- ❖ Title
- ❖ Roles, responsibilities and deliverables
- ❖ Architecture project request and background
- ❖ Acceptance criteria and procedures
- ❖ Architecture project description and scope
- ❖ Architecture project plan and schedule
- ❖ Overview of Architecture vision
- ❖ Approvals
- ❖ Change of scope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

7/3/2014

22



Phase A: Outputs

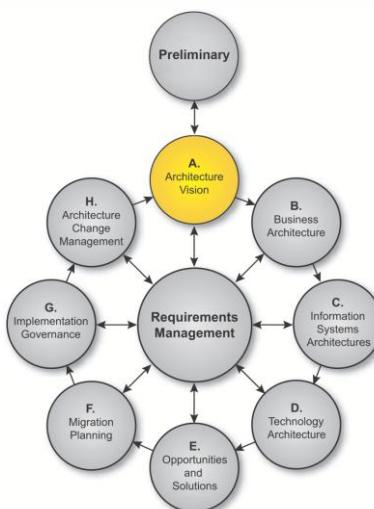


- ❖ Approved Statement of Architecture Work including:
 - Project description and scope
 - Overview of Architecture Vision
 - Project plan and Schedule
- ❖ Refined statements of business principles, goals, and drivers
- ❖ Architecture principles including business principles

23



Phase A: Outputs

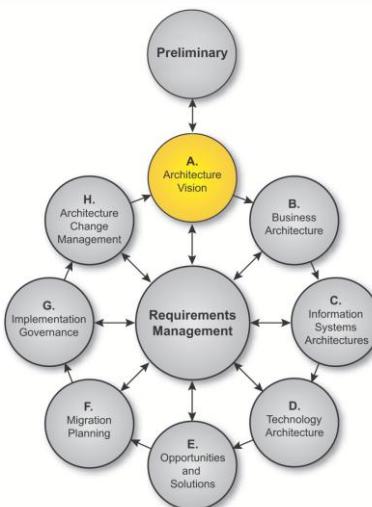


- ❖ Capability Assessment
- ❖ Tailored Architecture Framework
- ❖ Architecture Vision
- ❖ Draft Architecture Definition Document
- ❖ Communications Plan
- ❖ Additional content populating the Architecture Repository

24



Summary



7/3/2014

25



Summary

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

7/3/2014

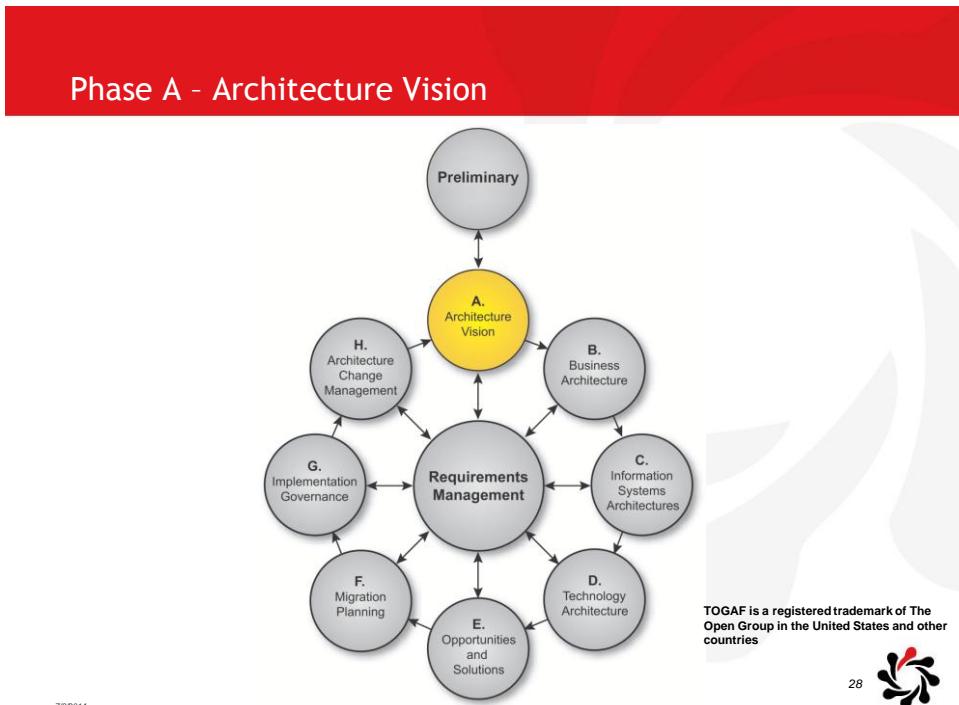
26





7/3/2014

27



7/3/2014

TOGAF is a registered trademark of The Open Group in the United States and other countries

28



Phase B

Business Architecture

Module 16

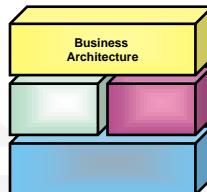
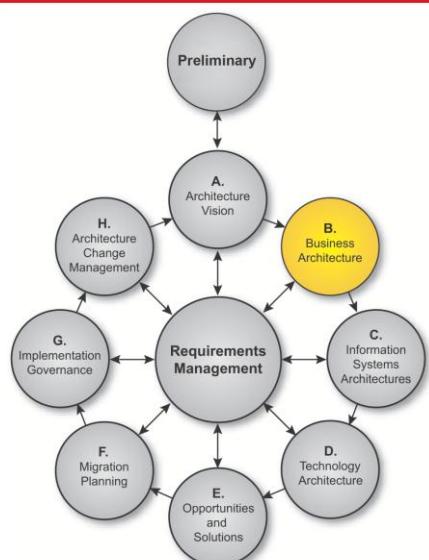
V9.1 Edition Copyright © 2009-2011



All rights reserved
Published by The Open Group, 2011



Phase B - Business Architecture



TOGAF is a registered trademark of The Open Group in the U.S. and/or other countries.



Module Objectives

The objectives of this module are to understand Phase B

- ❖ Objectives
- ❖ Approach
- ❖ Steps
- ❖ Inputs
- ❖ Outputs

3



Business Architecture Objectives

The objectives of Phase B are to

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

4



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

5



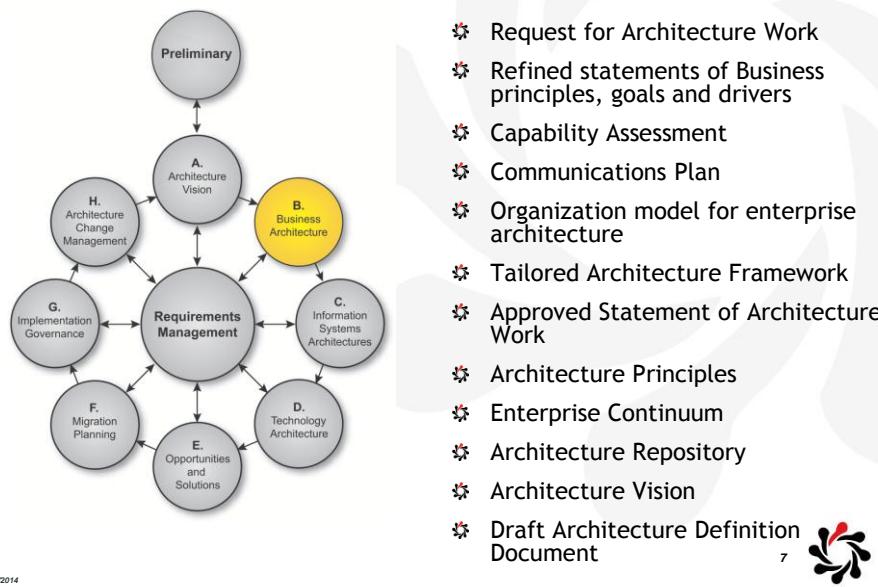
Approach

- ❖ 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

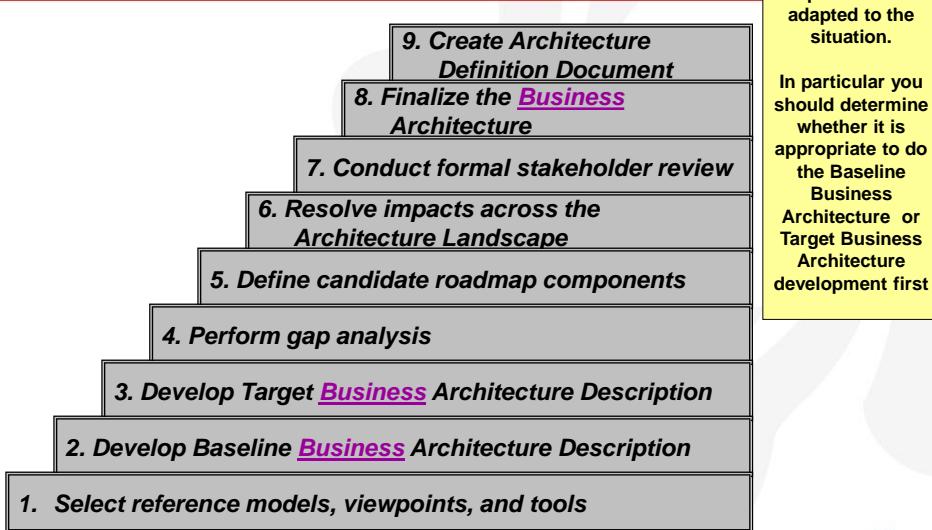
6



Phase B: Inputs



Steps



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

9



7/3/2014

TOGAF 9 Artifacts

Preliminary Phase Principles catalog	Phase A, Architecture Vision Stakeholder Map matrix	Solution Concept Diagram	Value Chain Diagram
Requirements Management Requirements catalog			
Phase B, Business Architecture	Phase C, Data Architecture	Phase C, Application Architecture	Phase D, Technology Architecture
Catalog <ul style="list-style-type: none"> • Organization/Actor • Driver/Goal/Objective • Role • Business Service/Function • Location • Process/Event/Control/Product • Contract/Measure Matrix <ul style="list-style-type: none"> • Business Interaction Diagram <ul style="list-style-type: none"> • Business Footprint • Business Service/Information • Functional Decomposition • Product Lifecycle • Goal/Objective/Service • Use-Case • Organization Decomposition • Process Flow • Event 	Catalog <ul style="list-style-type: none"> • Data Entity/Data Component Matrix <ul style="list-style-type: none"> • Data Entity/Business Function • System/Data Diagram <ul style="list-style-type: none"> • Class • Data Dissemination • Data Security • Class Hierarchy • Data Migration • Data Lifecycle 	Catalog <ul style="list-style-type: none"> • Application Portfolio • Interface Matrix <ul style="list-style-type: none"> • System/Organization • Role/System • System/Function • Application Interaction Diagram <ul style="list-style-type: none"> • Application Communication • Application and User Location • System Use-Case • Enterprise Manageability • Process/System Realization • Software Engineering • Application Migration • Software Distribution 	Catalog <ul style="list-style-type: none"> • Technology Standards • Technology Portfolio Matrix <ul style="list-style-type: none"> • System/Technology Diagram <ul style="list-style-type: none"> • Environments and Locations • Platform Decomposition • Processing • Networked Computing/Hardware • Communications Engineering
Phase E, Opportunities & Solutions	Project Context diagram	Benefits diagram	 <p>Note: Module 16A provides detailed information on Phase B: Business Architecture, Catalogs, Matrices and Diagrams</p>

10



7/3/2014

Step 1: Select reference models, viewpoints, and tools

- ❖ Determine Overall Modeling Process
- ❖ Identify Required Service Granularity Level, Boundaries, and Contracts
- ❖ Identify Required Catalogs of Business Building Blocks
- ❖ 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

11


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

12


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



7/3/2014

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



7/3/2014

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’



Step 4: Perform Gap Analysis

4. Review blocks missing from current
 - Confirm as ‘Eliminated’
 - Else mark for ‘Review’
5. Mark any ‘New Services’ as gap to be filled by acquiring function by either
 - Development
 - Procurement



Gap Analysis Exercise

Given the following ABBs in the baseline architecture

- ❖ Broadcast services, Video conferencing services, Enhanced telephony services, Shared screen services

And the following ABBs in the target architecture

- ❖ Video conferencing services, Enhanced telephony services, Mailing list services
- ❖ Assume that 'Shared screen services' has been unintentionally excluded and that the 'Enhanced telephony services' of the baseline may match those needed
- ❖ Draw the gap analysis matrix

17



Gap Analysis: Answer

Target Architecture →	Video Conferencing Services	Enhanced Telephony Services	Mailing List Services	Eliminated Services ↓
Current Architecture ↓				
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	

18



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



7/3/2014

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 organization?
 - Does this Business Architecture impact other projects ?
 - Will this Business Architecture be impacted by other projects?



7/3/2014

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

21 

Step 8: Finalize 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

22 

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

23



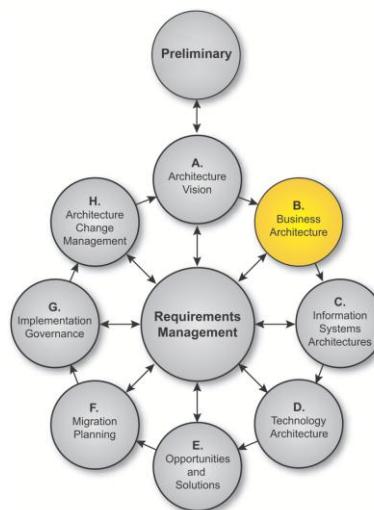
Summary of Building Block usage in Phase B

- ❖ 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

24



Phase B: Outputs



- ❖ Statement of Architecture Work
- ❖ Validated business principles, goals and drivers
- ❖ Elaborated 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



7/3/2014

Architecture Definition Document Business Architecture Components

- ❖ Baseline Business Architecture, if appropriate - this is a description of the existing Business Architecture
- ❖ Target Business Architecture, including:
 - Organization structure - identifying business locations and relating them to organizational units
 - Business goals and objectives - for the enterprise and each organizational unit
 - Business functions - a detailed, recursive step involving successive decomposition of major functional areas into sub-functions
 - Business 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 organization and functions
 - relate business functions to organizational units in the form of a matrix report
- ❖ Views corresponding to the selected viewpoints addressing key stakeholder concerns

7/3/2014

27



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

7/3/2014

28



Architecture Requirements Specification Business Architecture Components

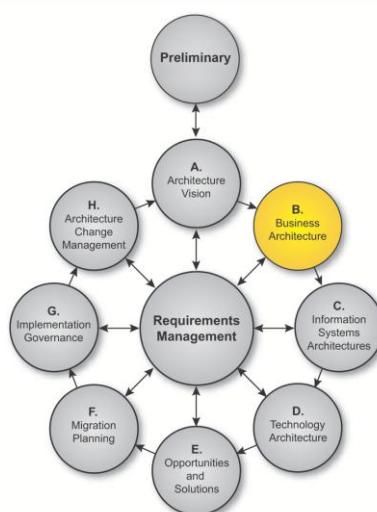
- ❖ Gap analysis results
- ❖ Technical requirements
- ❖ Updated business requirements

29



7/3/2014

Summary



❖ Phase B is about documenting the fundamental organization of a business

- Embodied in its business processes and people
- Their relationships to each other and the environment
- The principles governing its design and evolution
- How the organization meets its business goals

30



7/3/2014

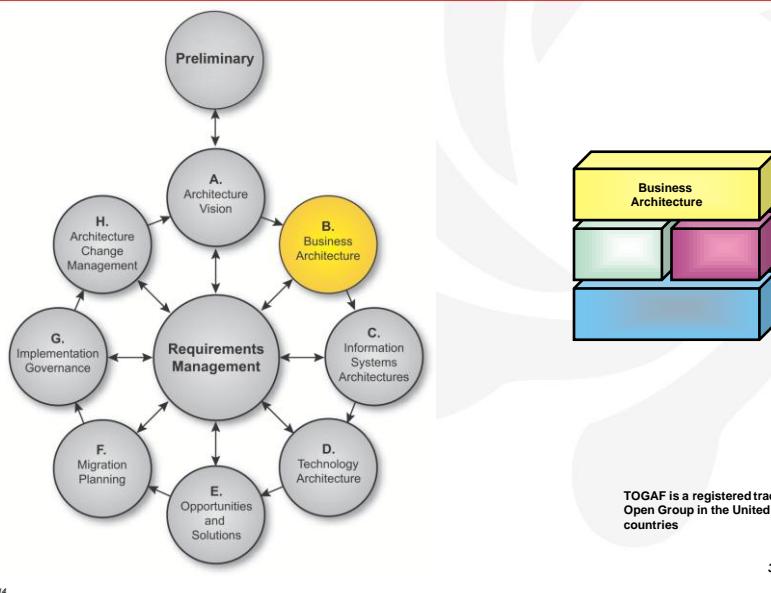
Summary

Phase B: Business Architecture			
Objectives	Steps	Inputs	Outputs
<p>Develop the Target Business Architecture describing how the enterprise needs to operate to achieve the business goals, responds to the strategic drivers set out in the Architecture Vision, and addresses the Request for 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>Finalize 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>Organizational 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 • Draft Architecture Definition Document, including: <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>Elaborated Business Architecture principles</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) • Views corresponding to selected viewpoints addressing key stakeholder concerns • Draft Architecture Requirements Specification including content updates: • Gap analysis results • Technical requirements • Updated business requirements <p>Business Architecture components of an Architecture Roadmap</p>

31



Phase B - Business Architecture



32



Phase B

Business Architecture

Catalogs, Matrices and Diagrams

Module 16A

V9.1 Edition Copyright © 2009-2011

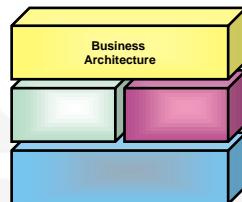
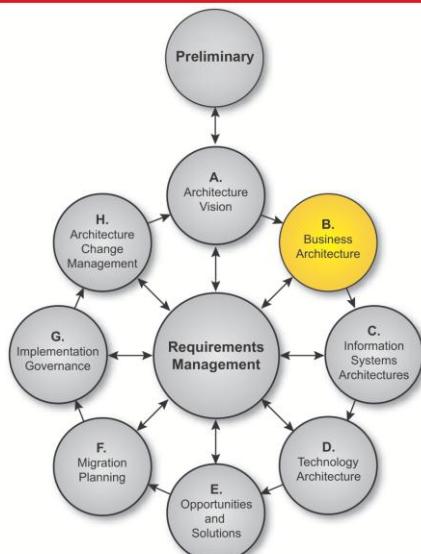


All rights reserved

Published by The Open Group, 2011



Phase B: Business Architecture - Catalogs, Matrices and Diagrams



TOGAF is a registered trademark of The Open Group in the U.S. and/or other countries.

7/3/2014

2



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

3



7/3/2014

Preliminary Phase Principles catalog	Phase A, Architecture Vision Stakeholder Map matrix	Solution Concept Diagram	Value Chain Diagram
Requirements Management Requirements catalog			
Phase B, Business Architecture	Phase C, Data Architecture	Phase C, Application Architecture	Phase D, Technology Architecture
Catalog <ul style="list-style-type: none"> Organization/Actor Driver/Goal/Objective Role Business Service/Function Location Process/Event/Control/Product Contract/Measure Matrix <ul style="list-style-type: none"> Business Interaction Diagram <ul style="list-style-type: none"> Business Footprint Business Service/Information Functional Decomposition Product Lifecycle Goal/Objective/Service Use-Case Organization Decomposition Process Flow Event 	Catalog <ul style="list-style-type: none"> Data Entity/Data Component Matrix <ul style="list-style-type: none"> Data Entity/Business Function System/Data Diagram <ul style="list-style-type: none"> Class Data Dissemination Data Security Class Hierarchy Data Migration Data Lifecycle 	Catalog <ul style="list-style-type: none"> Application Portfolio Interface Matrix <ul style="list-style-type: none"> System/Organization Role/System System/Function Application Interaction Diagram <ul style="list-style-type: none"> Application Communication Application and User Location System Use-Case Enterprise Manageability Process/System Realization Software Engineering Application Migration Software Distribution 	Catalog <ul style="list-style-type: none"> Technology Standards Technology Portfolio Matrix <ul style="list-style-type: none"> System/Technology Diagram <ul style="list-style-type: none"> Environments and Locations Platform Decomposition Processing Networked Computing/Hardware Communications Engineering
Phase E, Opportunities & Solutions Project Context diagram Benefits diagram			

4



7/3/2014

Catalogs, Matrices and Diagrams

Catalogs

- ❖ Organization/Actor catalog
- ❖ Driver/Goal/Objective catalog
- ❖ Role catalog
- ❖ Business Service/Function catalog
- ❖ Location catalog
- ❖ Process/Event/Control/Product catalog
- ❖ Contract/Measure catalog

Matrices

- ❖ Business Interaction matrix
- ❖ Actor/Role matrix

Diagrams

- ❖ Business Footprint diagram
- ❖ Business Service/Information diagram
- ❖ Functional Decomposition diagram
- ❖ Product Lifecycle diagram
- ❖ Goal/Objective/Service diagram
- ❖ Use-Case diagram
- ❖ Organization Decomposition diagram
- ❖ Process Flow diagram
- ❖ Event diagram

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

7/3/2014



Catalogs

Catalog	Purpose
Organization/ Actor Catalog	A definitive listing of all participants that interact with IT, including users and owners of IT systems. It contains the following metamodel entities: •Organization Unit, Actor Location (may be included in this catalog if an independent Location catalog is not maintained)
Driver/Goal/ Objective Catalog	A cross-organizational reference of how an organization meets its drivers in practical terms through goals, objectives, and (optionally) measures. It contains the following metamodel entities: •Organization Unit, Driver, Goal, Objective, Measure (may optionally be included)
Role Catalog	The purpose of the Role catalog is to provide a listing of all authorization levels or zones within an enterprise. Frequently, application security or behavior is defined against locally understood concepts of authorization that create complex and unexpected consequences when combined on the user desktop. It contains the following metamodel entities: •Role



Catalogs

Catalog	Purpose
Business Service / Function Catalog	A functional decomposition in a form that can be filtered, reported on, and queried, as a supplement to graphical Functional Decomposition diagrams. It contains the following metamodel entities: <ul style="list-style-type: none">•Organization Unit, Business Function, Business Service, Information System Service (may optionally be included here)
Location Catalog	A listing of all locations where an enterprise carries out business operations or houses architecturally relevant assets, such as data centers or end-user computing equipment. It contains the following metamodel entities: <ul style="list-style-type: none">•Location
Process/Event/Control/Product Catalog	The Process/Event/Control/Product catalog provides a hierarchy of processes, events that trigger processes, outputs from processes, and controls applied to the execution of processes. This catalog provides a supplement to any Process Flow diagrams that are created and allows an enterprise to filter, report, and query across organizations and processes to identify scope, commonality, or impact. It contains the following metamodel entities: <ul style="list-style-type: none">•Process, Event, Control, Product

7



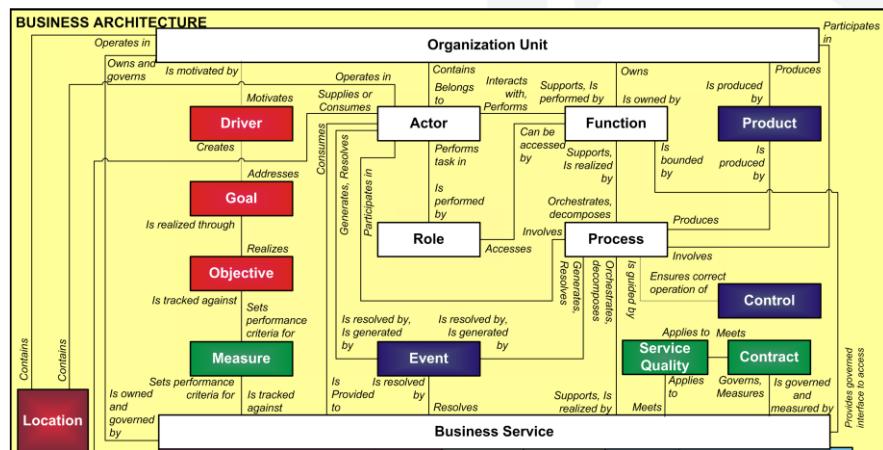
Catalogs

Catalog	Purpose
Contract/Measure Catalog	A listing of all agreed service contracts and (optionally) the measures attached to those contracts. It forms the master list of service levels agreed to across the enterprise. It contains the following metamodel entities: <ul style="list-style-type: none">•Business Service•Information System Service (optionally)•Contract•Measure

8



Exercise



7/3/2014

9

Matrices

- ❖ Business Interaction matrix
 - ❖ Actor/Role matrix

7/3/2014

Business Interaction Matrix

- The purpose of this matrix is to depict the relationship interactions between organizations and business functions across the enterprise.

		Providing Business Services				
Consuming Business Services		Engineering	Procurement	Manufacturing	Sales and Distribution	Customer Service
<i>Engineering</i>						
<i>Procurement</i>						
<i>Manufacturing</i>			Contract for supply of materials		Contract for supply of sales forecasts	
<i>Sales and Distribution</i>		Contract for supply of product specification		Contract for supply of product		
<i>Customer Service</i>					Contract for fulfillment of customer orders	

7/3/2014



Actor/role Matrix

- This matrix show which actors perform which roles, supporting definition of security and skills requirements.

	Office of CIO Actors	Steering Group Actors	Business Unit Actors	Strategy and Architecture Actors	Infrastructure Implementation Actors	IT Operations	Project Manager	External Vendors / Suppliers									
	CIO	Enterprise Architect	Enterprise Design Authority	Technical Design Authority	Business Unit Application Architect	Business Unit Service Owner	Head of Strategy and Architecture	Infrastructure Strategist	Infrastructure Solution Architect	Architecture Configuration Mgr	Enterprise Infrastructure Architect	Head of Implementation	Infrastructure Designer				
<small>R = Responsible for carrying out the role A = Accountable for actors carrying out the role C = Consulted in carrying out the role I = Informed in carrying out the role</small>																	
Strategy Lifecycle Roles	I	R	A	I	C	C	R	C	C	I	I	R	I	C	C		
Architecture Refresh	I	C	A	I	R	C	C	I	C	R	I	I	R	C	C	I	C
Architecture Roadmap	I	I	I	I	I	I	I	I	I	I	R	R	I	C	A		
Benefits Assessment	I	I	I	I	I	I	I	I	I	I	R	I	R	C	C	I	
Change Management	C	C	A	I	I	I	R	I	I	I	R	R	C	C	C	C	
Framework Refresh	C	C	C	C	I	C	A	I	I	I	R	C	C	I	I		
Project Lifecycle Roles	I	I	I	A	I	I	C	C	I	I	R	I	C	C	R		
Solution Architecture Vision	I	I	I	A	I	I	C	C	I	I	R	I	C	C	R		
Logical Solution Architecture				A	I	I	C	C	I	I	R	I	C	C	R		
Physical Solution Architecture				A	I	I	C	C	I	I	R	I	C	C	R		
Design Governance				A	I	I	C	C	I	I	R	I	C	C	C		
Architecture Configuration Management				C			I	I	R	R	R			A			

7/3/2014



Diagrams

- ❖ Business Footprint diagram
- ❖ Business Service/Information diagram
- ❖ Functional Decomposition diagram
- ❖ Product Lifecycle diagram
- ❖ Goal/Objective/Service diagram
- ❖ Use-Case diagram
- ❖ Organization Decomposition diagram
- ❖ Process Flow diagram
- ❖ Event diagram



7/3/2014

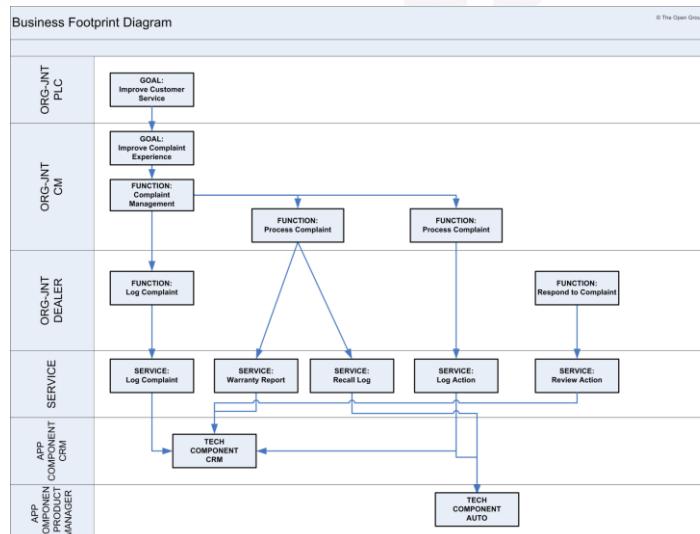
Business Footprint Diagram

- ❖ Describes the links between business goals, organizational units, business functions, and services, and maps these functions to the technical components delivering the required capability
- ❖ Demonstrates only the key facts linking organization unit functions to delivery services and is utilized as a communication platform for senior-level (CxO) stakeholders



7/3/2014

Example Business Footprint Diagram



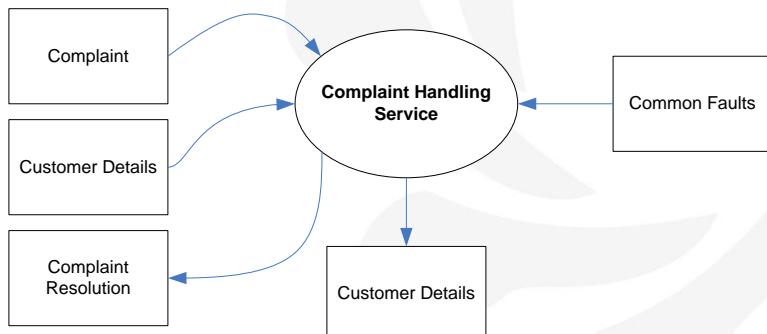
15

Business Service/Information Diagram

- Shows the information needed to support one or more business services
- Shows what data is consumed by or produced by a business service and may also show the source of information
- Shows an initial representation of the information present within the architecture and therefore forms a basis for elaboration and refinement within Phase C (Data Architecture)

16

Example Business Service/Information Diagram

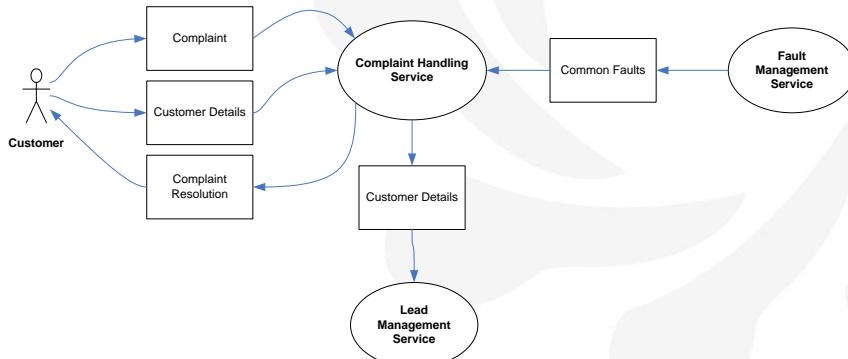


Basic example

7/3/2014



Example Business Service/Information Diagram



Extended example showing actors and service interactions

7/3/2014



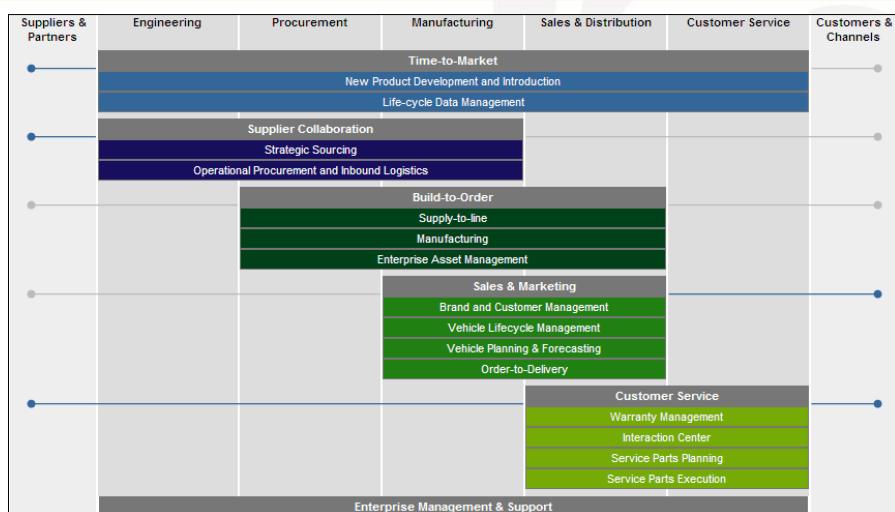
Functional Decomposition Diagram

- ❖ It shows on a single page the capabilities of an organization that are relevant to the consideration of an architecture
- ❖ By examining the capabilities of an organization from a functional perspective, it is possible to quickly develop models of what the organization does without being dragged into extended debate on how the organization does it

19

7/3/2014

Example Functional Decomposition Diagram



20

7/3/2014

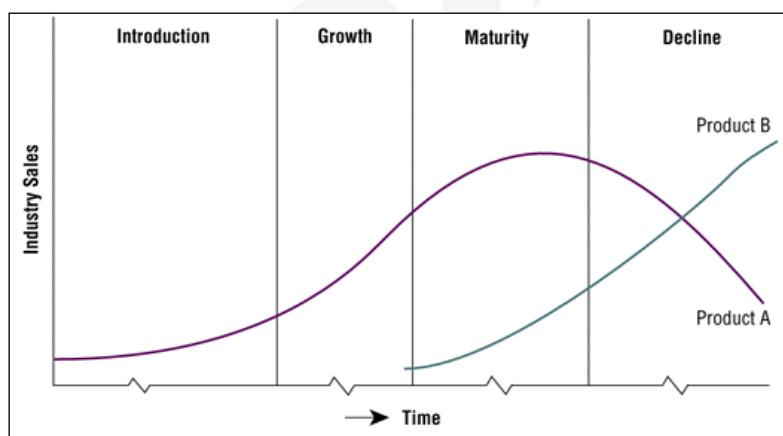
Product Lifecycle Diagram

- ❖ This assists in understanding the lifecycles of key entities within the enterprise
- ❖ Understanding product lifecycles is becoming increasingly important with respect to environmental concerns, legislation, and regulation where products must be tracked from manufacture to disposal
- ❖ Equally, organizations that create products that involve personal or sensitive information must have a detailed understanding of the product lifecycle during the development of Business Architecture in order to ensure rigor in design of controls, processes, and procedures. Examples of this include credit cards, debit cards, store/loyalty cards, smart cards, user identity credentials (identity cards, passports, etc.)

21



Example Product Lifecycle Diagram



22



Goal/Objective/Service Diagram

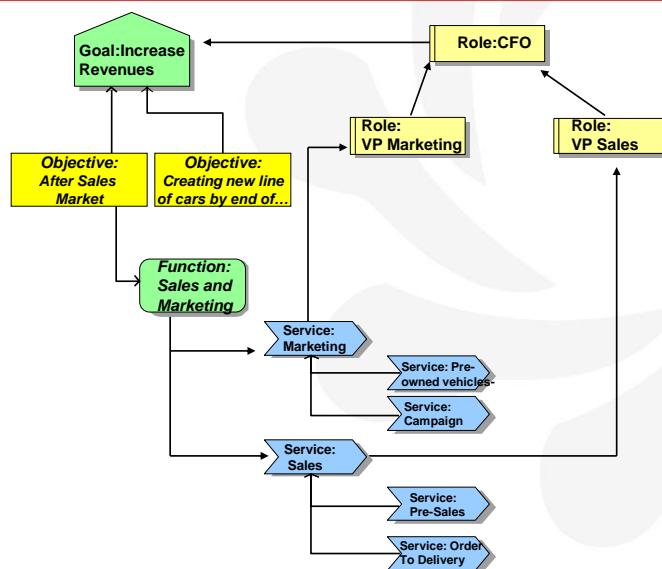
- ❖ This defines the ways in which a service contributes to the achievement of a business vision or strategy
- ❖ Services are associated with the drivers, goals, objectives, and measures that they support, allowing the enterprise to understand which services contribute to similar aspects of business performance
- ❖ This also provides qualitative input on what constitutes high performance for a particular service

23



7/3/2014

Example Goal/Objective/Service Diagram



24



7/3/2014

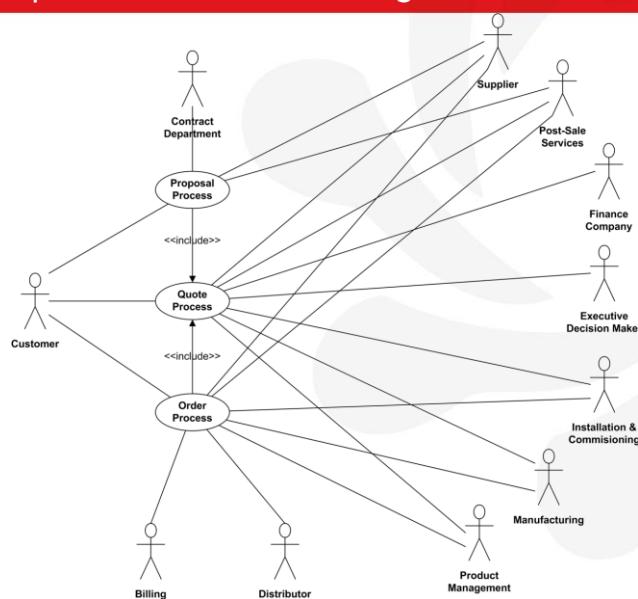
Business Use-case Diagram

- ❖ This displays the relationships between consumers and providers of business services
- ❖ Business services are consumed by actors or other business services and the Business Use-Case diagram provides added richness in describing business capability by illustrating how and when that capability is used
- ❖ They help to describe and validate the interaction between actors and their roles to processes and functions
- ❖ As the architecture progresses, the use-case can evolve from the business level to include data, application, and technology details. Architectural business use-cases can also be re-used in systems design work

25



Example Business Use-case Diagram



26



Organization Decomposition Diagram

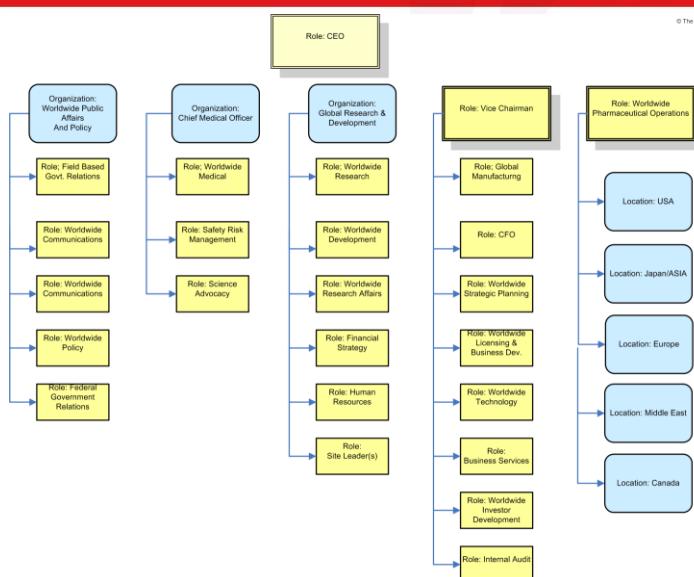
- ❖ This describes the links between actor, roles, and location within an organization tree
- ❖ An organization map should provide a chain of command of owners and decision-makers in the organization

27



7/3/2014

Example Organization Decomposition Diagram



28



7/3/2014

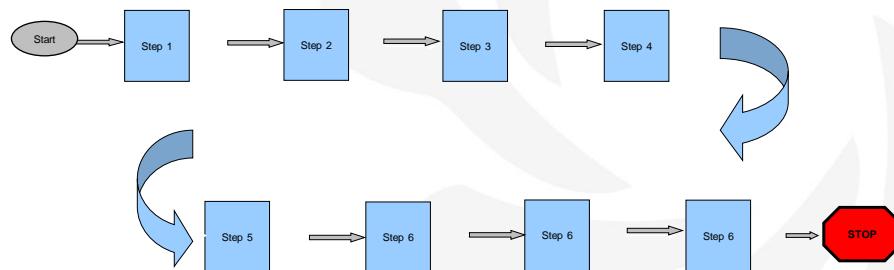
Process Flow Diagram

- ❖ This depicts all models and mappings related to the process metamodel entity
- ❖ It shows sequential flow of control between activities and may utilize swim-lane techniques to represent ownership and realization of process steps
- ❖ In addition to showing a sequence of activity, process flows can also be used to detail the controls that apply to a process, the events that trigger or result from completion of a process, and also the products that are generated from process execution

29



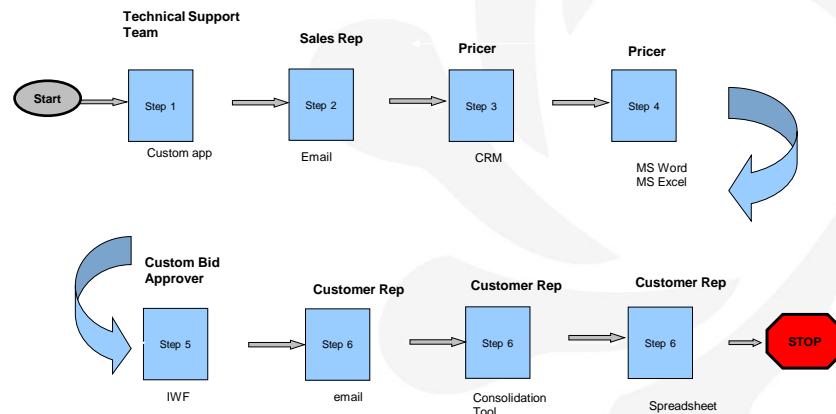
Example Process Flow Diagram



30



Example Process Flow Diagram



Process Flow (w/Roles & Applications)

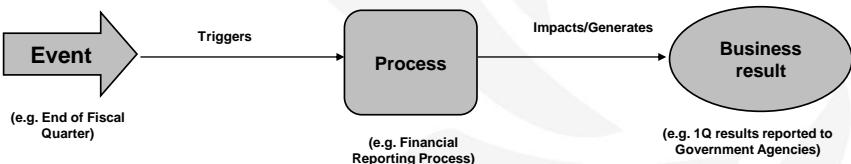
31

Events Diagram

- ❖ This depicts the relationship between events and process
- ❖ Certain events - such as arrival of information (e.g. a customer's sales order) or a point in time (e.g. end of fiscal quarter) cause work and actions to be undertaken within the business

32

Example Events Diagram



7/3/2014

33



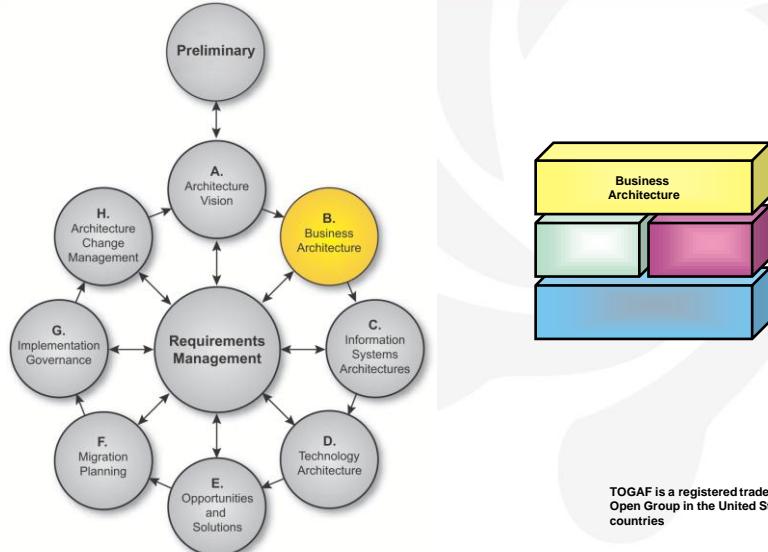
Example Events Matrix

EVENT	PROCESS TRIGGERED	BUSINESS RESULT(S)
Customer submits sales order	Sales order processing <ul style="list-style-type: none"> ▪ Create & save sales order ▪ Generate acknowledgement ▪ Confirm receipt of customer order ▪ Begin order fulfillment activities 	<ul style="list-style-type: none"> ▪ Sales order captured in order book
Customer submits request for custom product	Custom product configuration <ul style="list-style-type: none"> ▪ Capture requirements from customer ▪ Define custom specifications ▪ Price custom configuration ▪ Negotiate with customer ▪ Secure approval from customer regarding configuration and price 	<ul style="list-style-type: none"> ▪ Custom product configured ▪ Customer contract signed
End of quarter	Financial reporting process	<ul style="list-style-type: none"> ▪ Financial report generated

34



Phase B: Business Architecture - Catalogs, Matrices and Diagrams



7/3/2014

35

Phase C

Information Systems Architectures

Overview

Module 17

V9.1 Edition Copyright © 2009-2011

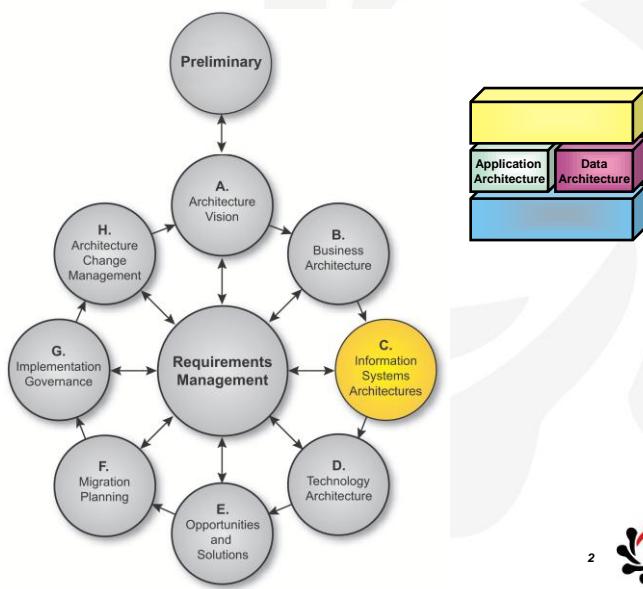


All rights reserved

Published by The Open Group, 2011



Phase C



7/3/2014

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

3



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 Request for Architecture Work and stakeholder concerns
- ❖ Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Information Systems (Data and Application) Architectures

4



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

5



Top-Down Design - Bottom-up Implementation

❖ Design:

- Business Architecture
- Data (or Applications) Architecture
- Applications (or Data) Architecture
- Technology Architecture

❖ Implementation:

- Technology Architecture
- Applications (or Data) Architecture
- Data (or Applications) Architecture
- Business Architecture

6



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

7



7/3/2014

Approach: Architecture Repository

- ❖ Consider generic models relevant to an organization'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)

8



7/3/2014

Considerations for Data Architecture

- ❖ Data Management
- ❖ Data Migration
- ❖ Data Governance

7/3/2014

9



Phase C: Inputs

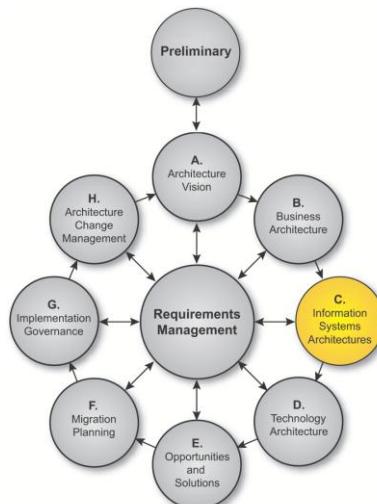
- ❖ Request for Architecture Work
- ❖ Capability Assessment
- ❖ Communications Plan
- ❖ Organization model for enterprise architecture
- ❖ Tailored Architecture Framework
- ❖ Data/Application principles
- ❖ Statement of Architecture Work
- ❖ Architecture Vision
- ❖ Architecture Repository
- ❖ Draft Architecture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

7/3/2014

10



Steps



1. Data Architecture
2. Applications Architecture

Note:

The details for these steps will be covered in the next two modules
The steps follow a common pattern with Phases B and D



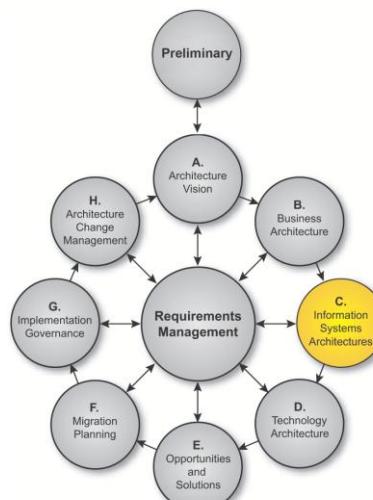
Phase C: Outputs: Application Architecture

- ❖ Statement of Architecture Work
- ❖ Validated principles, or new principles (data/application)
- ❖ Draft Architecture Definition Document, containing:
 - Baseline Application/Data Architecture
 - Target Application /Data Architecture
 - Application/Data Architecture views of key stakeholder concerns
- ❖ Draft Architecture Requirements Specification, including
 - Gap analysis results
 - Application / Data interoperability requirements
 - Relevant technical requirements Constraints on the Technology Architecture
 - Updated business requirements
- ❖ Application / Data Architecture components of an Architecture Roadmap



7/3/2014

Summary



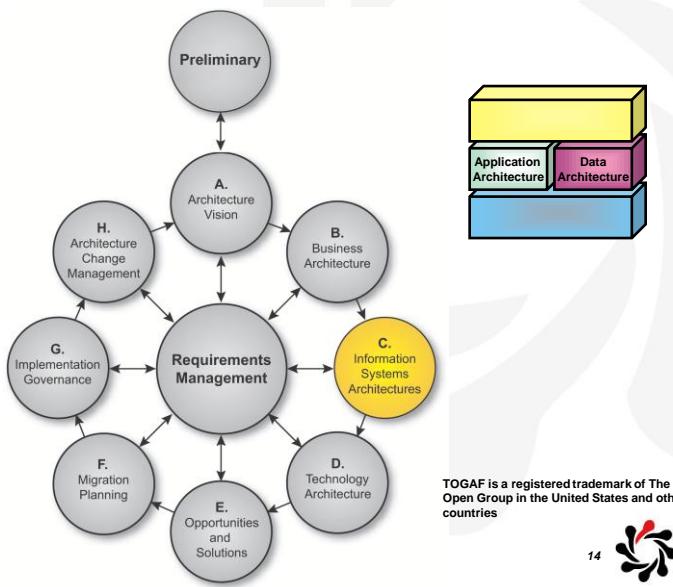
* The objective of Phase C is to document the fundamental organization of an organization's IT System

- Embodied in the major types of information and the application systems that process them
- 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 organization

13

Phase C

7/3/2014



14

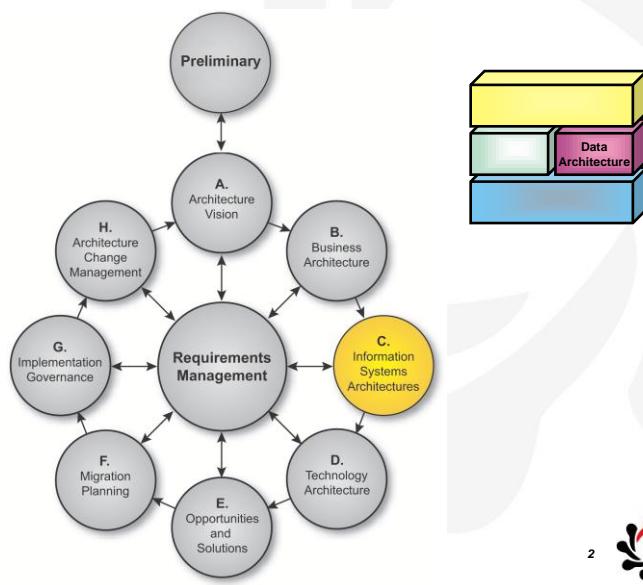
Phase C

Data Architecture

Module 18



Phase C - Data Architecture



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

3



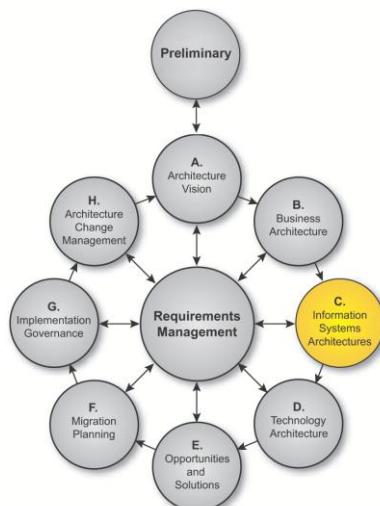
Data Architecture - Objectives

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

4



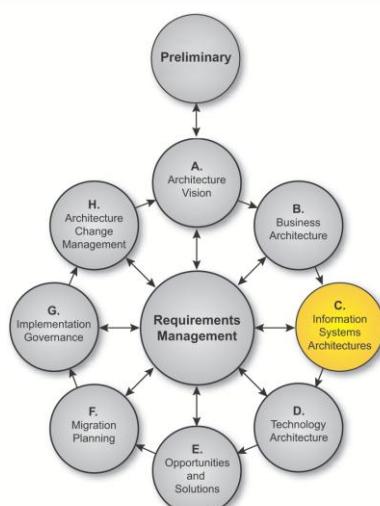
Phase C: Inputs



- * Request for Architecture Work
- * Capability Assessment
- * Communications Plan
- * Organization model for enterprise architecture
- * Tailored Architecture Framework
- * Data principles
- * Statement of Architecture Work

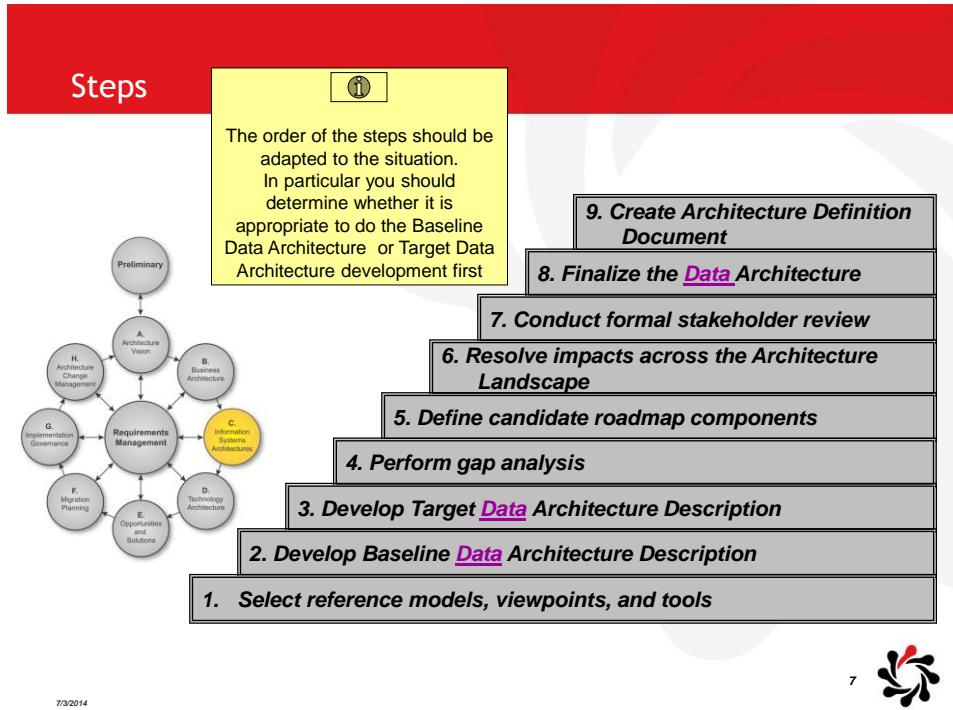
5

Phase C: Inputs



- * 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

6



7



Step 1:

Select reference models, viewpoints, and tools

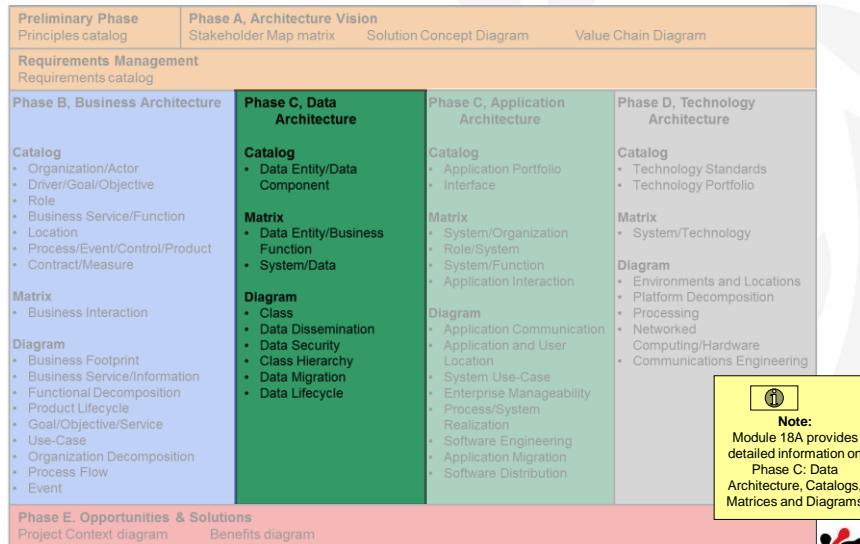
- ❖ Review/generate and validate data principles - see Architecture Principles
- ❖ Select Data Architecture resources (reference models, patterns, ...)
- ❖ Select relevant Data Architecture viewpoints
- ❖ Identify appropriate tools and techniques (including forms) to be used for data capture, modeling,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

7/3/2014

8



TOGAF 9 Artifacts



9



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. Examples of logical data models include
 - the DODAF Logical Data Model
 - the ARTS Data Model for the Retail Industry and
 - the Energistics Data Model 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 organization's data inventory is captured as a catalog within the Architecture Repository

10



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



7/3/2014

Step 2: Develop a Baseline Data Architecture Description

❖ If possible, identify the relevant Data ABBs, drawing on the Architecture Repository

❖ If not, develop new architecture models

- use the models identified within Step 1 as a guideline



7/3/2014

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



7/3/2014

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



7/3/2014

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



7/3/2014

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 organization?
 - Does this Data Architecture impact other projects?
 - Will this Data Architecture be impacted by other projects?



7/3/2014

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.

17 

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

18 

Step 8: Finalize 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
- ❖ Finalize all the work products

7/3/2014



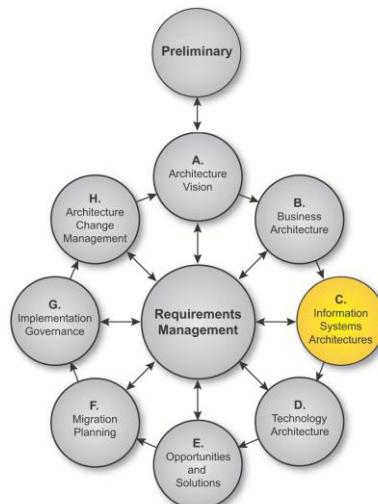
Step 9: Create Architecture Definition Document

- ❖ 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

7/3/2014



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

21

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

22

Architecture Requirements Specification - Data Architecture Components

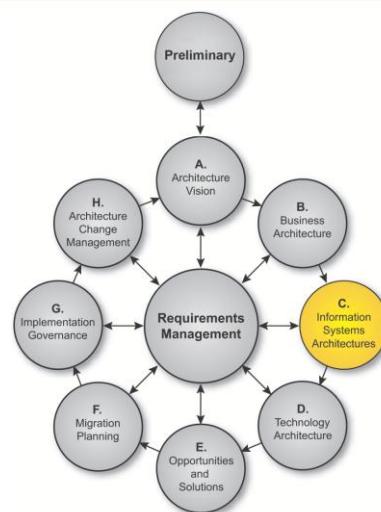
- ❖ Gap analysis results
- ❖ Data interoperability requirements
- ❖ Areas where the Business Architecture may need to change in order to comply with changes in the Data Architecture
- ❖ Constraints on the Technology Architecture about to be designed
- ❖ Updated business/application/data requirements,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

23



7/3/2014

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

24



7/3/2014

Summary

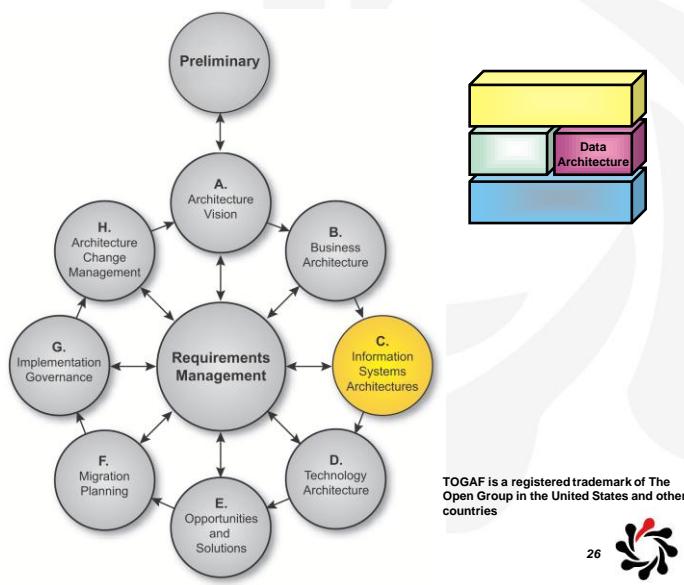
Phase C: Information Systems Architectures – Data Architecture			
Objectives	Steps	Inputs	Outputs
Develop the Target Data Architecture that enables the Business Architecture and the Architecture Vision, while addressing the Request for Architecture Work and stakeholder concerns	Select reference models, viewpoints, and tools	Request for Architecture Work Capability Assessment Communications Plan Organizational Model for Enterprise Architecture	Statement of Architecture Work, updated if necessary Validated data principles, or new data principles
Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Data Architectures	Develop Baseline Data Architecture Description	Tailored Architecture Framework Data principles Statement of Architecture Work Architecture Vision Architecture Repository	Draft Architecture Definition Document containing content updates: • Baseline Data Architecture • Target Data Architecture • Data Architecture views corresponding to the selected viewpoints, addressing key stakeholder concerns
	Perform gap analysis	Define candidate roadmap components	Draft Architecture Definition Document containing: • 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)
	Resolve impacts across the Architecture Landscape	Finalize the Data Architecture	Draft Architecture Requirements Specification including: • Gap analysis results • Relevant technical requirements • Business Architecture components of an Architecture Roadmap
	Conduct formal stakeholder review	Create Architecture Definition Document	Draft Architecture Requirements Specification including: • Gap analysis results • Relevant technical 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
			Data Architecture components of an Architecture Roadmap

25



7/3/2014

Phase C - Data Architecture



26



7/3/2014

Phase C

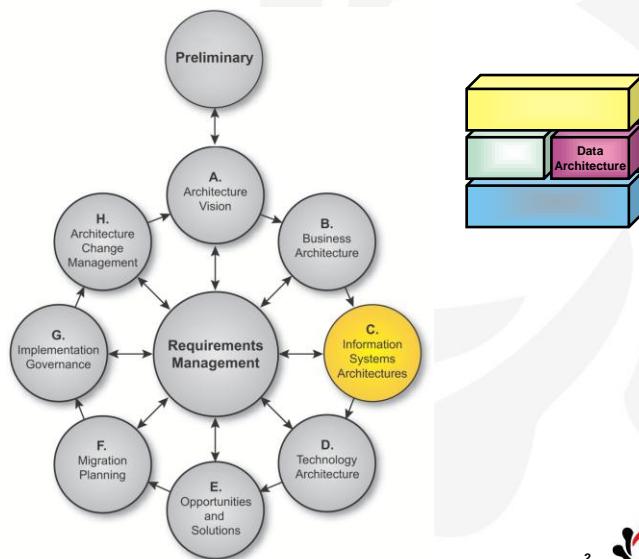
Data Architecture

Catalogs, Matrices and Diagrams

Module 18A



Phase C - Data Architecture - Catalogs, Matrices and Diagrams



7/3/2014

2



Module Objectives

The objectives of this module are to understand

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

7/3/2014

3



Preliminary Phase	Phase A, Architecture Vision		
Principles catalog	Stakeholder Map matrix	Solution Concept Diagram	Value Chain Diagram
Requirements Management	Requirements catalog		
Catalog <ul style="list-style-type: none"> • Organization/Actor • Driver/Goal/Objective • Role • Business Service/Function • Location • Process/Event/Control/Product • Contract/Measure 	Catalog <ul style="list-style-type: none"> • Data Entity/Data Component 	Catalog <ul style="list-style-type: none"> • Application Portfolio • Interface 	Catalog <ul style="list-style-type: none"> • Technology Standards • Technology Portfolio
Matrix <ul style="list-style-type: none"> • Business Interaction 	Matrix <ul style="list-style-type: none"> • Data Entity/Business Function • System/Data 	Matrix <ul style="list-style-type: none"> • System/Organization • Role/System • System/Function • Application Interaction 	Matrix <ul style="list-style-type: none"> • System/Technology
Diagram <ul style="list-style-type: none"> • Business Footprint • Business Service/Information • Functional Decomposition • Product Lifecycle • Goal/Objective/Service • Use-Case • Organization Decomposition • Process Flow • Event 	Diagram <ul style="list-style-type: none"> • Class • Data Dissemination • Data Security • Class Hierarchy • Data Migration • Data Lifecycle 	Diagram <ul style="list-style-type: none"> • Application Communication • Application and User • Location • System Use-Case • Enterprise Manageability • Process/System Realization • Software Engineering • Application Migration • Software Distribution 	Diagram <ul style="list-style-type: none"> • Environments and Locations • Platform Decomposition • Processing • Networked Computing/Hardware • Communications Engineering
Phase E, Opportunities & Solutions	Project Context diagram	Benefits diagram	

7/3/2014

4



Catalogs, Matrices and Diagrams

Catalogs

- ❖ Data Entity/Data Component catalog

Matrices

- ❖ Data Entity/Business Function matrix
- ❖ System/Data matrix

Diagrams

- ❖ Class diagram
- ❖ Data Dissemination diagram
- ❖ Data Security diagram
- ❖ Class Hierarchy diagram
- ❖ Data Migration diagram
- ❖ Data Lifecycle diagram

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

7/3/2014

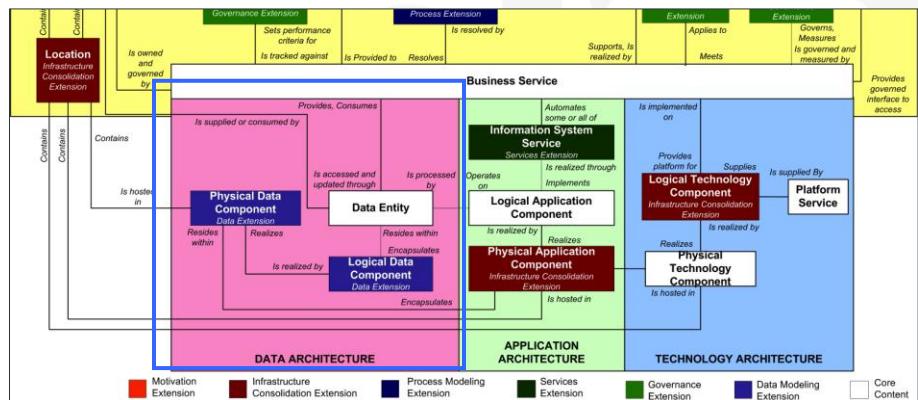


Catalogs

Catalog	Purpose
•Data Entity/Data Component Catalog	To identify and maintain a list of all the data use across the enterprise, including data entities and also the data components where data entities are stored. It contains the following metamodel entities: <ul style="list-style-type: none">•Data Entity•Logical Data Component•Physical Data Component



Exercise



7/3/2014

7



Matrices

- ❖ Data Entity/Business Function matrix
- ❖ Application/Data matrix

7/3/2014

8



Data Entity/Business Function Matrix

- ❖ The purpose of the Data Entity/Business Function matrix is to depict the relationship between data entities and business functions within the enterprise
- ❖ The mapping of the Data Entity-Business Function relationship enables the following to take place
 - Assignment of ownership of data entities to organizations
 - Understand the data and information exchange requirements business services
 - Support the gap analysis and determine whether any data entities are missing and need to be created
 - Define system of origin, system of record, and system of reference for data entities
 - Enable development of data governance programs across the enterprise (establish data steward, develop data standards pertinent to the business function, etc.)

9



Example Data Entity/Business Function Matrix

BUSINESS FUNCTION (Y-AXIS) / DATA ENTITY (X-AXIS)	CUSTOMER MASTER	BUSINESS PARTNER	CUSTOMER LEADS	PRODUCT MASTER
Customer Relationship Management	<ul style="list-style-type: none"> = Business partner data management service = Owner – Sales & Marketing business unit executive = Function can Create, read, update and delete customer master data 	<ul style="list-style-type: none"> = Business partner data management service = Owner of data entity (person or organization) = Function can Create, read, update and delete 	<ul style="list-style-type: none"> = Lead Processing Service = Owner – Customer Relationship Manager = Function can only Create, read, update customer leads 	= N/A
Supply Chain Management	<ul style="list-style-type: none"> = Customer Requirement Processing Service = Owner – Supply Chain Manager 	= N/A	= N/A	<ul style="list-style-type: none"> = Product data management service = Owner – Global product development organization

10



Application/Data Matrix

- ❖ The purpose of the Application/Data matrix is to depict the relationship between applications and the data entities that are accessed and updated by them
- ❖ Applications will create, read, update, and delete specific data entities that are associated with them
 - For example, a CRM application will create, read, update, and delete customer entity information.



7/3/2014

Example Application/Data Matrix

APPLICATION (Y-AXIS) AND DATA (X-AXIS)	DESCRIPTION OR COMMENTS	DATA ENTITY	DATA ENTITY TYPE
CRM	▪ System of record for customer master data	▪ Customer data	▪ Master data
Commerce Engine	▪ System of record for order book	▪ Sales orders	▪ Transactional data
Sales Business Warehouse	▪ Warehouse and data mart that supports North American region	▪ Intersection of multiple data entities (e.g. All sales orders by customer XYZ and by month for 2006)	▪ Historical data



Diagrams

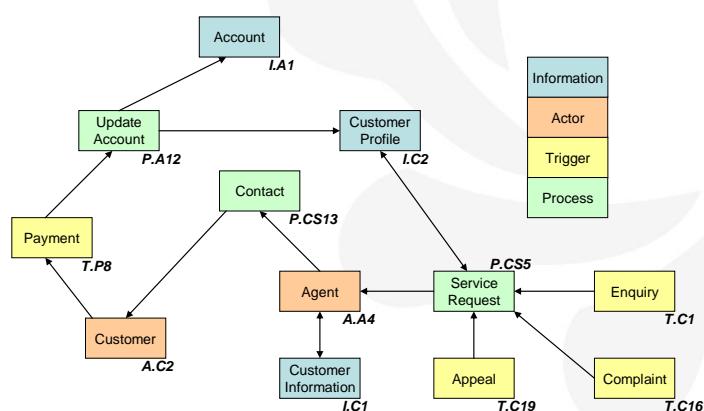
- ❖ Conceptual Data diagram
- ❖ Logical Data diagram
- ❖ Data Dissemination diagram
- ❖ Data Security diagram
- ❖ Data Migration diagram
- ❖ Data Lifecycle diagram



7/3/2014

Conceptual Data Diagram

- ❖ The purpose is to depict the relationships among the critical data entities (or classes) within the enterprise



7/3/2014

Logical Data Diagram

- ❖ The purpose is to depict logical views relationships among the critical data entities (or classes) within the enterprise
- ❖ The audience is
 - Application developers
 - Database designers



7/3/2014

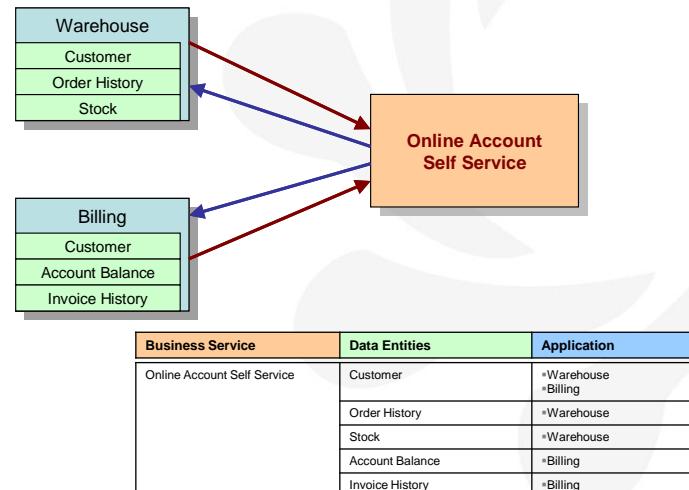
Data Dissemination Diagram

- ❖ The purpose of the Data Dissemination diagram is to show the relationship between
 - data entity
 - business service
 - application components
- ❖ The diagram should show how the logical entities are to be physically realized by application components
- ❖ Additionally, the diagram may show data replication and system ownership of the master reference for data



7/3/2014

Example Data Dissemination Diagram



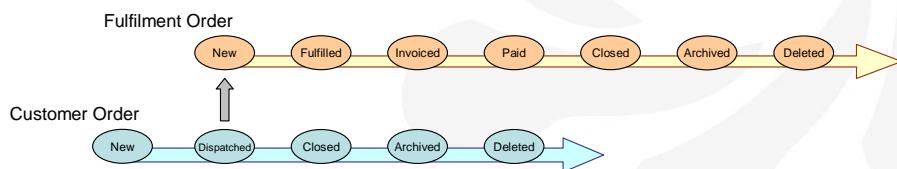
7/3/2014



17

Data Lifecycle Diagram

- The Data Lifecycle diagram is an essential part of managing business data throughout its lifecycle from conception until disposal within the constraints of the business process



7/3/2014



18

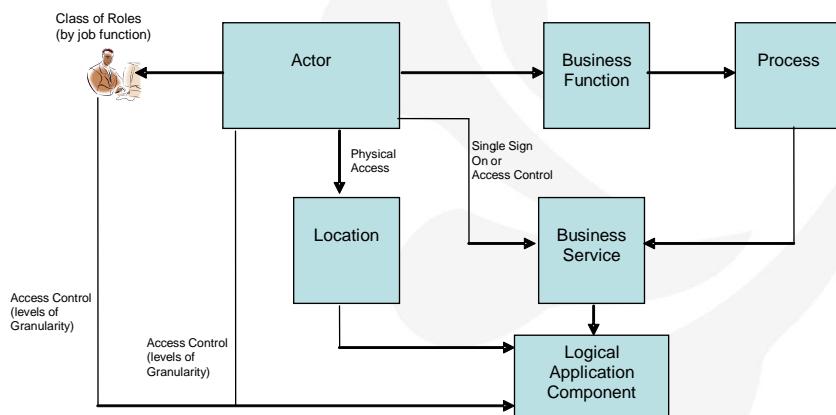
Data Security Diagram

- ❖ The purpose of the Data Security diagram is to depict which actor (person, organization, or system) can access which enterprise data
- ❖ This relationship can also be shown in a matrix form between two objects or can be shown as a mapping

19

7/3/2014

Example Data Security Diagram



20

7/3/2014

Example Data Security Matrix

ACTOR	CLASS OF ROLES (JOB FUNCTION)	FUNCTION	BUSINESS SERVICE	LOCATION	TYPE OF ACCESS
Financial Analyst	SOA Portfolio Financial Analyst	Financial Analysis	SOA portfolio service	# NA (US, CA) # EMEA (UK, DE) # APJ	# Physical Access Control (tables xyz only)
Procurement & Spend Analyst	Procurement Management and Control	WW Direct Procurement	Supplier portal Service	# NA (US Midwest)	# Access control
WW Contracts System (application)	Not applicable	WW Direct Procurement	Supplier Portal Service	# LA	# Access control (system to system)
WW Product Development (Org Unit)	Geo Brand Managers	WW Direct Procurement	Supplier Portal Service	# WW (all Geos)	# Access Control

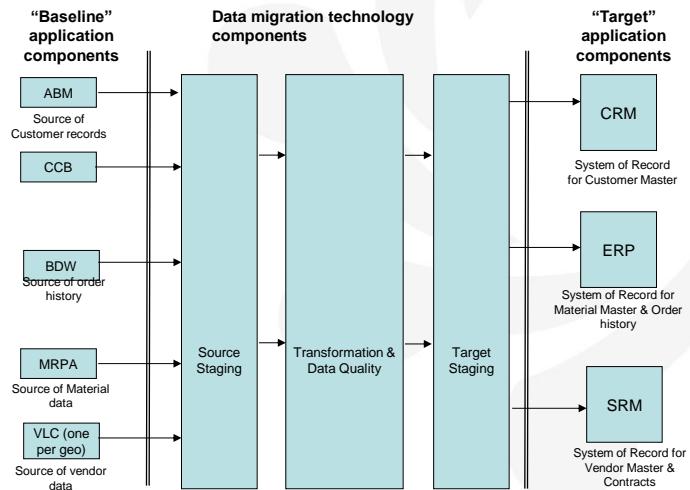
21 

Data Migration Diagram

- ❖ The purpose of the Data Migration diagram is to show the flow of data from the source to the target applications
- ❖ The diagram will provide a visual representation of the spread of sources/targets and serve as a tool for data auditing and establishing traceability

22 

Example Data Migration Diagram



23



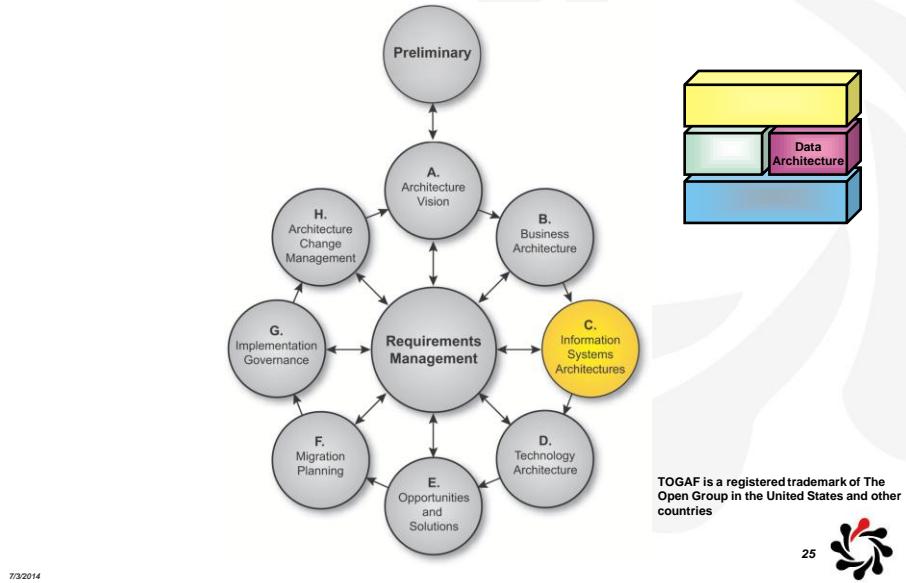
Example Data Migration Mapping

SOURCE LOGICAL APPLICATION COMPONENT	SOURCE DATA ELEMENT	TARGET LOGICAL APPLICATION COMPONENT	TARGET DATA ELEMENT
ABM	Cust_Name	CRM	CUSTNAME
	Cust_Street_Addr		CUSTADDR_LINE1
	Cust_Street_Addr		CUSTADDR_LINE2
	Cust_Street_Addr		CUSTADDR_LINE3
	Cust_ContactName		CUSTCONTACT
	Cust_Tele		CUSTTELEPHONE

24



Phase C - Data Architecture - Catalogs, Matrices and Diagrams

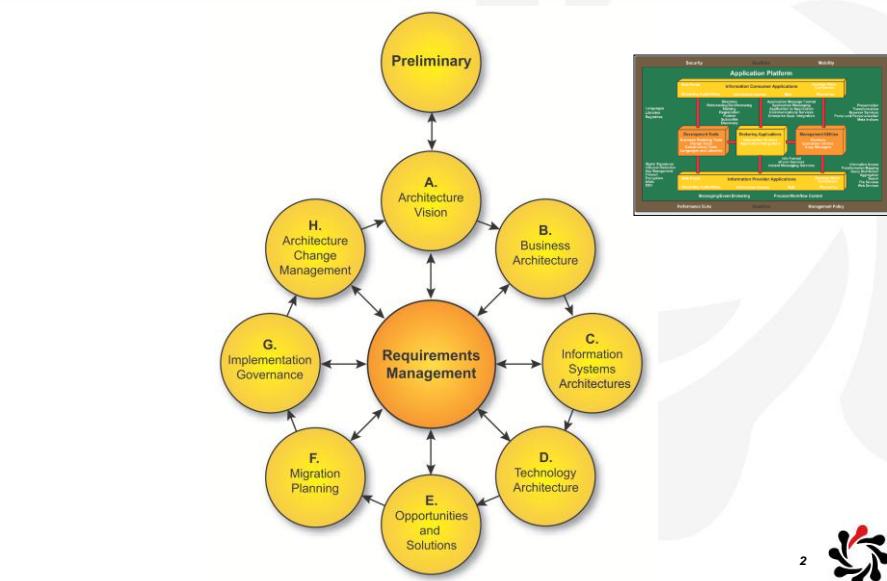


The Integrated Information Infrastructure Reference Model

Module 19



III-RM



7/3/2014

2



Roadmap

Part I – Introduction
Preface, Executive Overview, Core Concepts, Definitions and Release Notes
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
Architectural Deliverables
Building Blocks
Part V – Enterprise Continuum and Tools
Enterprise Continuum
Architecture Partitioning
Architecture Repository
Tools for Architecture Development
Part VI – Reference Models
Foundation Architecture: Technical Reference Model
Integrated Information Infrastructure Reference Model
Part VII – Architecture Capability Framework
Architecture Board
Architecture Compliance
Architecture Contracts
Architecture Governance
Architecture Maturity Models
Architecture Skills Framework

7/3/2014

Part VI, TOGAF Reference Models, Chapter 44



3



Module Objectives

The objectives are to

- ❖ Describe the business and technical drivers for Boundaryless Information Flow that led to the development of the Integrated Information Infrastructure Reference Model (III-RM)
- ❖ Describe the main components of the III-RM
- ❖ Explain how the III-RM was derived
- ❖ Explain the III-RM graphic

7/3/2014

4



Key Business and Technical Drivers

- ❖ Problem Space: The Need for Boundaryless Information Flow
- ❖ The problem of getting information to the right people at the right time in a secure, reliable manner
- ❖ Solution Space: The Need for Integrated Information Infrastructure
- ❖ We need
 - Integrated information so that different and potentially conflicting pieces of information are not distributed throughout different systems
 - Integrated access to that information so that staff can access all the information they need and have a right to, through one convenient interface
 - The infrastructure that enables this vision is called ‘integrated information infrastructure’

7/3/2014



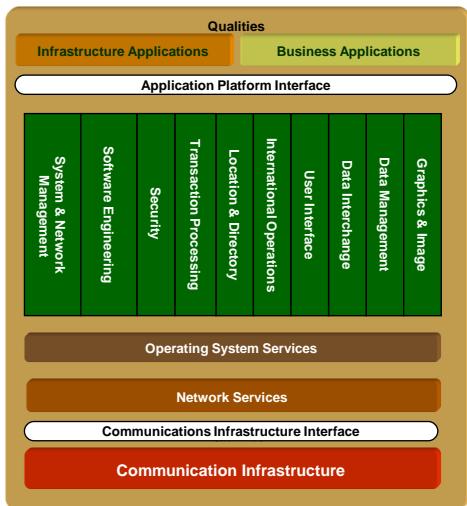
Integrated Information Infrastructure Reference Model

- ❖ 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

7/3/2014



TOGAF TRM



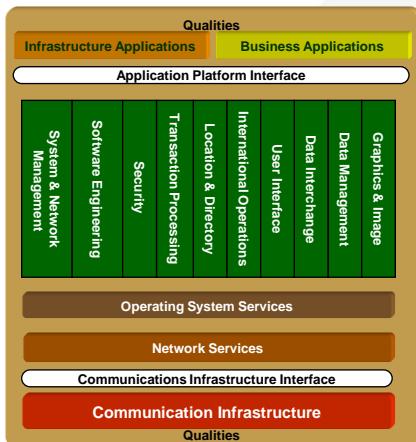
7/3/2014



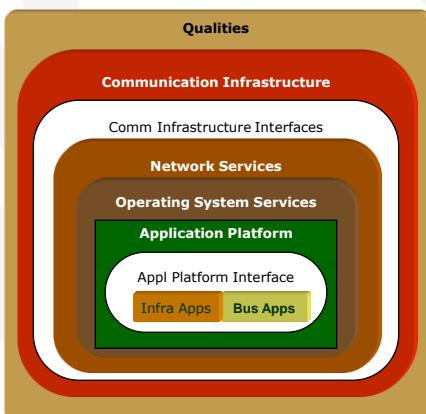
- Fundamentally a layered view, major layers being
- Application
- Application platform
- Communications

TOGAF TRM Orientations

Side View



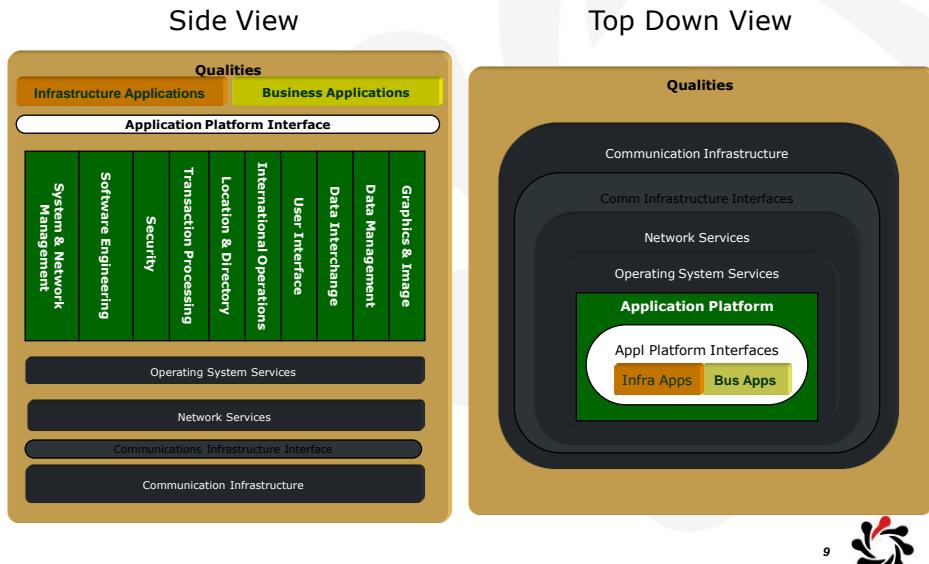
Top Down View



7/3/2014



Boundaryless Information Flow Focus

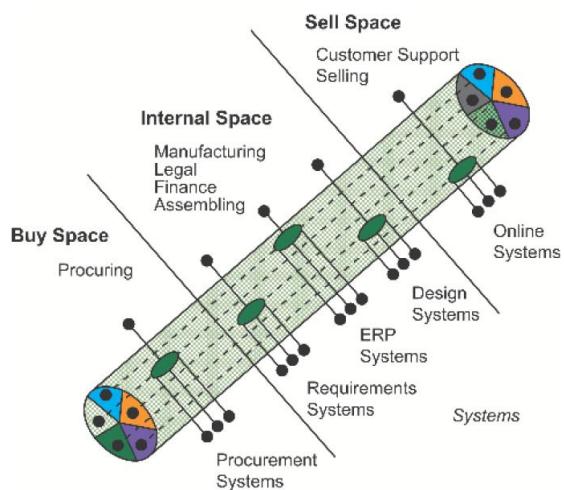


7/3/2014

9



III-RM (i)

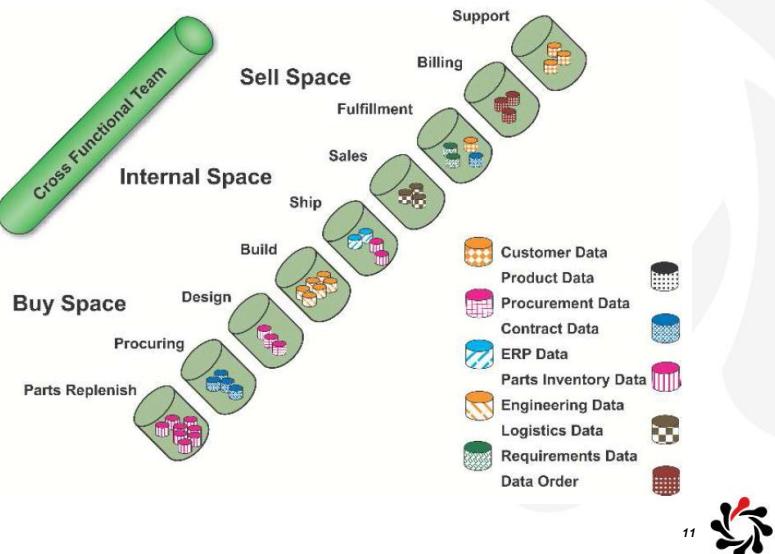


7/3/2014

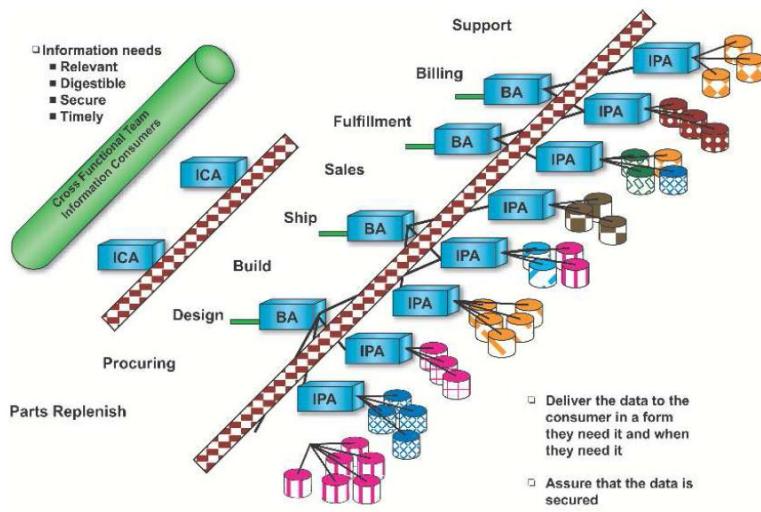
10

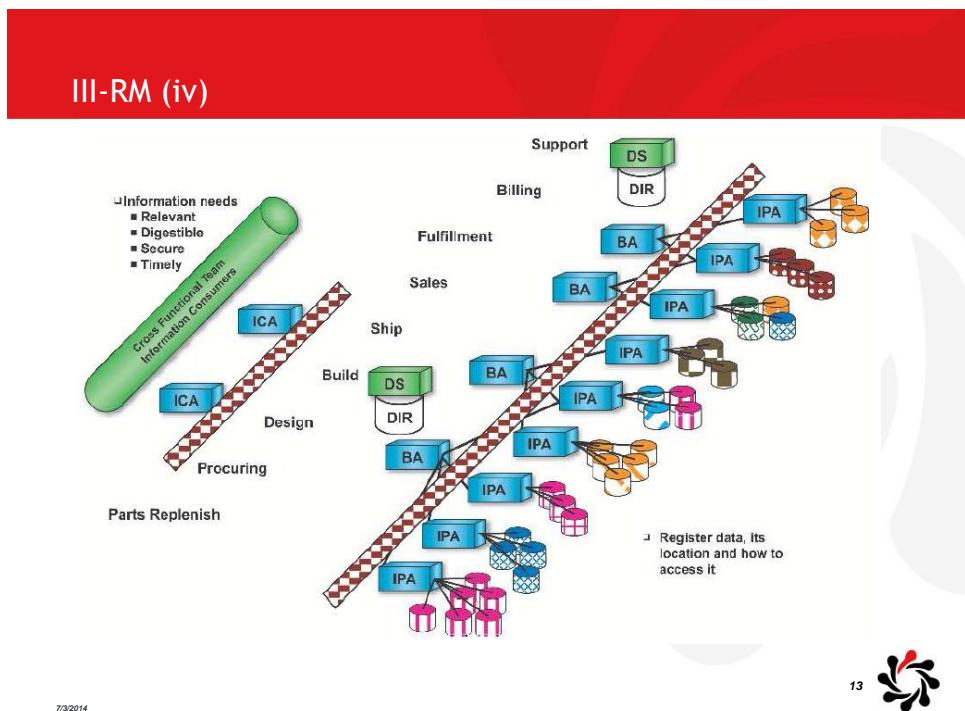


III-RM (ii)

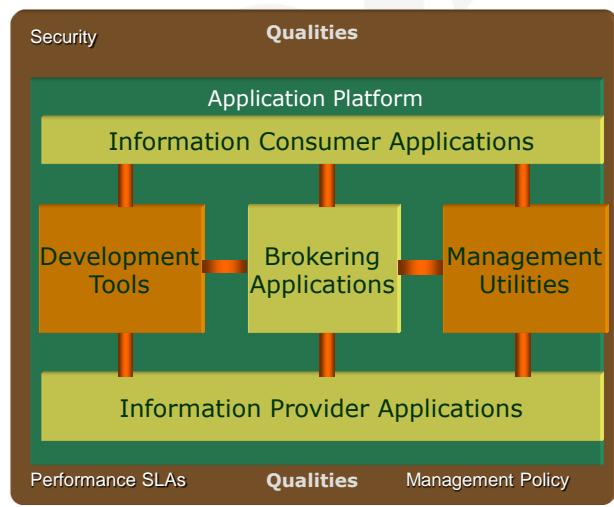


III-RM (iii)





Integrated Information Infrastructure Reference Model - High-level Model



Components of the III-RM

The III-RM has 2 main components

1. A **taxonomy**, which defines terminology, and provides a coherent description of the components and conceptual structure of an integrated information infrastructure
2. 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

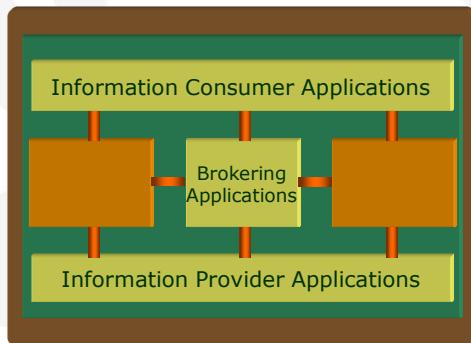
7/3/2014



Components of the High-Level III-RM

❖ Business Applications:

- **Brokering Applications**, which manage the requests from any number of clients to and across any number of Information Provider Applications
- **Information Provider Applications**, which provide responses to client requests and rudimentary access to data managed by a particular server
- **Information Consumer Applications**, which deliver content to the user of the system, and provide services to request access to information in the system on the user's behalf



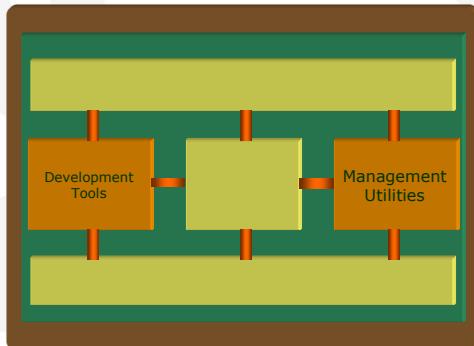
7/3/2014



Components of the High-Level III-RM

❖ Infrastructure Applications:

- **Development Tools**, to develop and deploy applications that require access to the integrated information infrastructure
- **Management Utilities**, to understand, operate, tune, and manage the run-time system in order to meet the demands of an ever-changing business

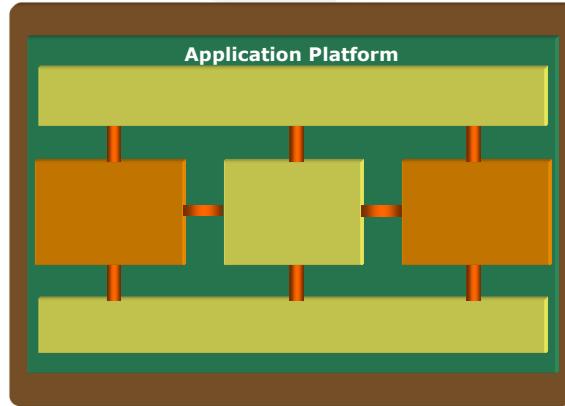


7/3/2014



Components of the High-Level III-RM

❖ An **Application Platform**, which provides supporting services to all the applications and so provides the ability to locate, access, and move information within the environment



7/3/2014



Components of the High-Level III-RM

❖ The Interfaces used between the components.

Interfaces include formats and protocols, APIs, switches, data values, etc

❖ The Qualities backplane

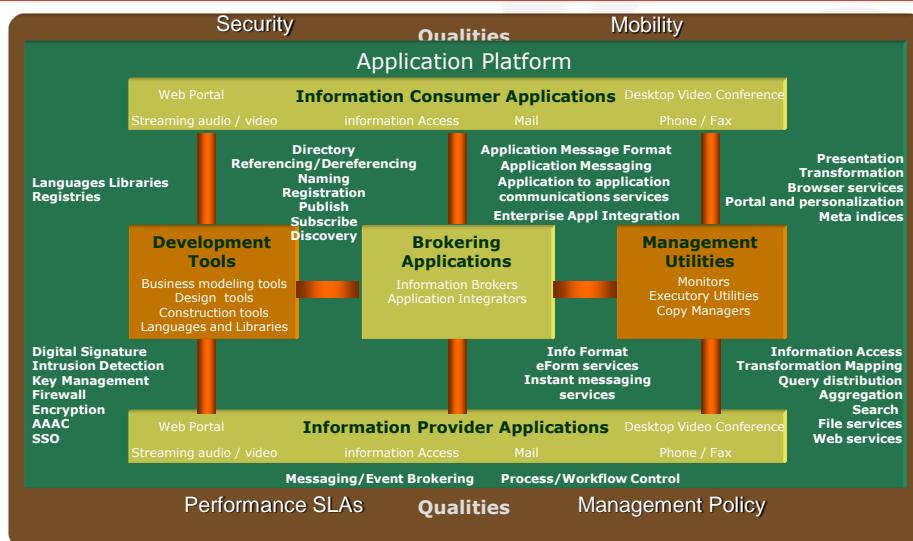
- The Application Software and Application Platform must adhere to the policies and requirements depicted by the qualities backplane

19



7/3/2014

Integrated Information Infrastructure Reference Model - Detailed Model



20



7/3/2014

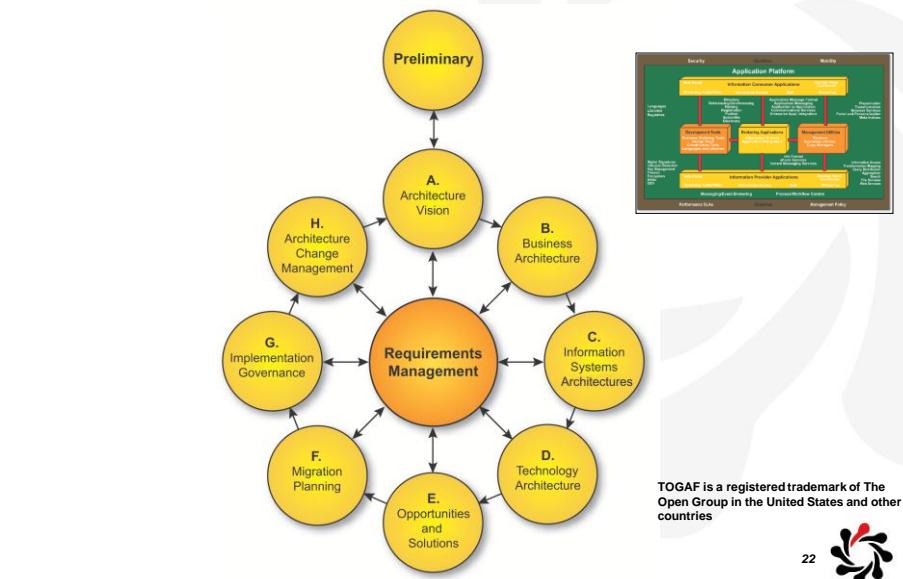
Summary

- ❖ 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”
- ❖ The III-RM has Business Applications, Infrastructure Applications, an Application Platform, Interfaces and Qualities

21

7/3/2014

III-RM



22

7/3/2014

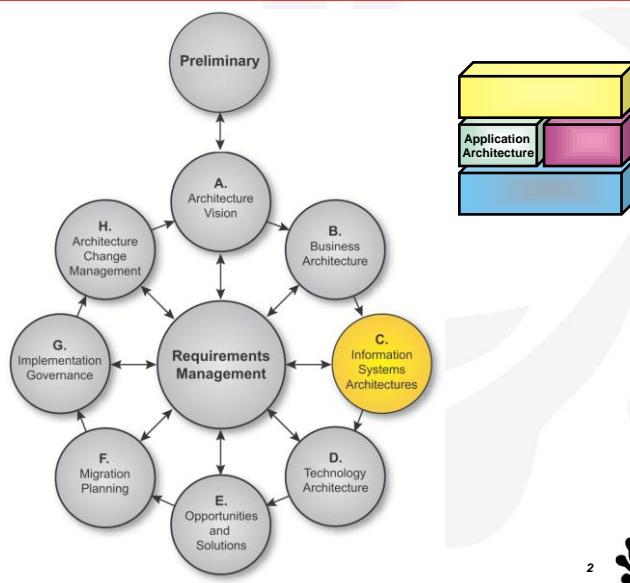
Phase C

Applications Architecture

Module 20



Phase C - Application Architecture



7/3/2014



Module Objectives

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

- ❖ Objectives
- ❖ Inputs
- ❖ Steps
- ❖ Outputs

3



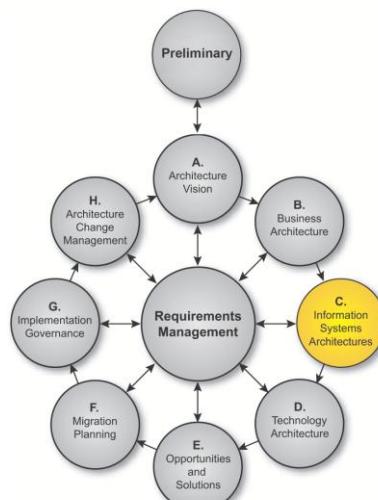
Objectives

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

4



Phase C: Inputs: Application Architecture

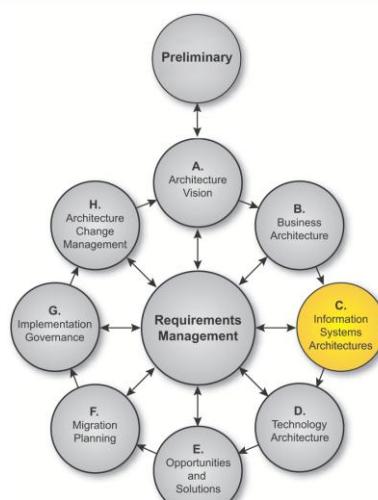


- ❖ Request for Architecture Work
- ❖ Capability Assessment
- ❖ Communications Plan
- ❖ Organization model for enterprise architecture
- ❖ Tailored Architecture Framework
- ❖ Application principles
- ❖ Statement of Architecture Work

5



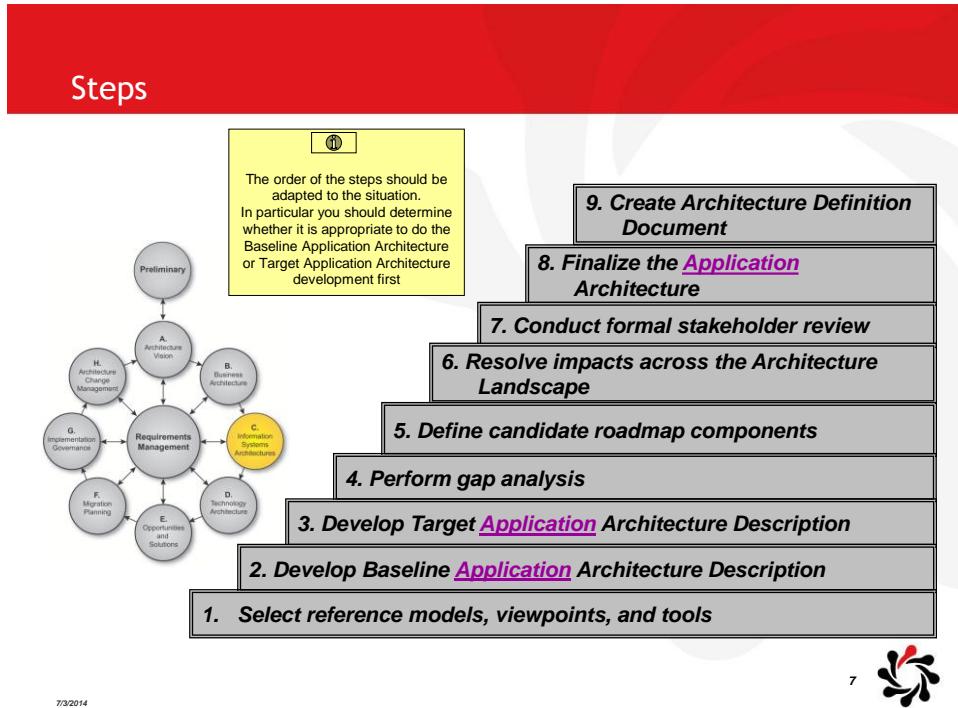
Phase C: Inputs: Application Architecture



- ❖ 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

6



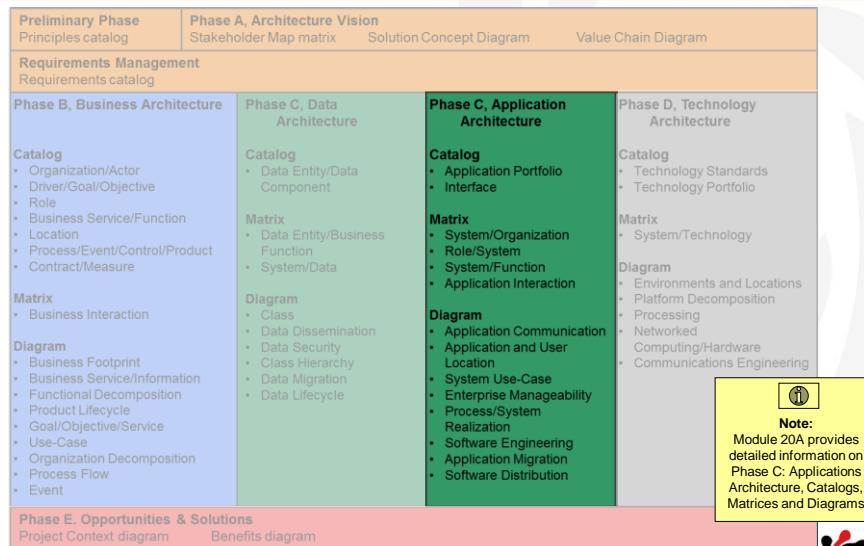


Step 1: Select Reference Models, Viewpoints and Tools

- ❖ 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)

8

TOGAF 9 Artifacts



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 TMF 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

9



10



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

7/3/2014



Step 1: Select Reference Models, Viewpoints and Tools

- ❖ **Identify Required Catalogs of Application Building Blocks**
 - The organization'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

7/3/2014



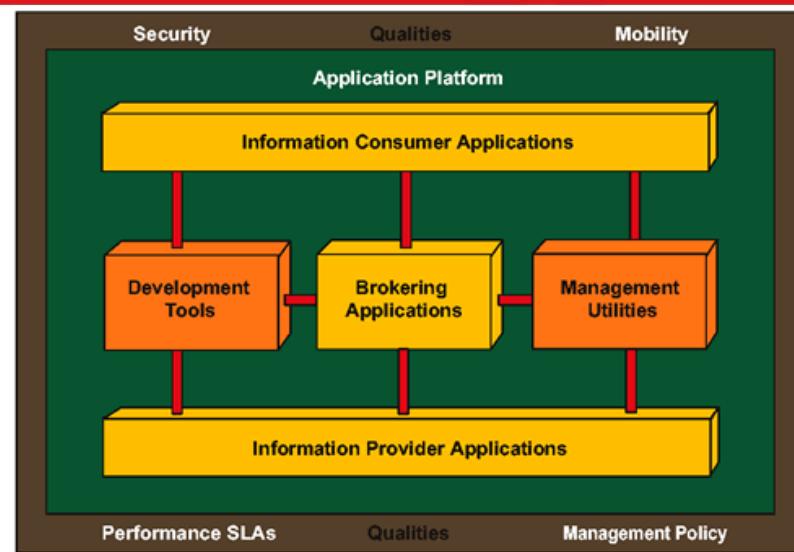
Example - The Integrated Information Infrastructure Model

- ❖ 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

13

7/3/2014

III-RM High Level View



14

7/3/2014

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



7/3/2014

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



7/3/2014

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

17



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

18



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 organization?
 - Does this Application Architecture impact other projects?
 - Will this Application Architecture be impacted by other projects?

19 

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

20 

Step 8: Finalize 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
- ❖ Finalize all the work products

7/3/2014

21



Step 9: Create Architecture Definition Document

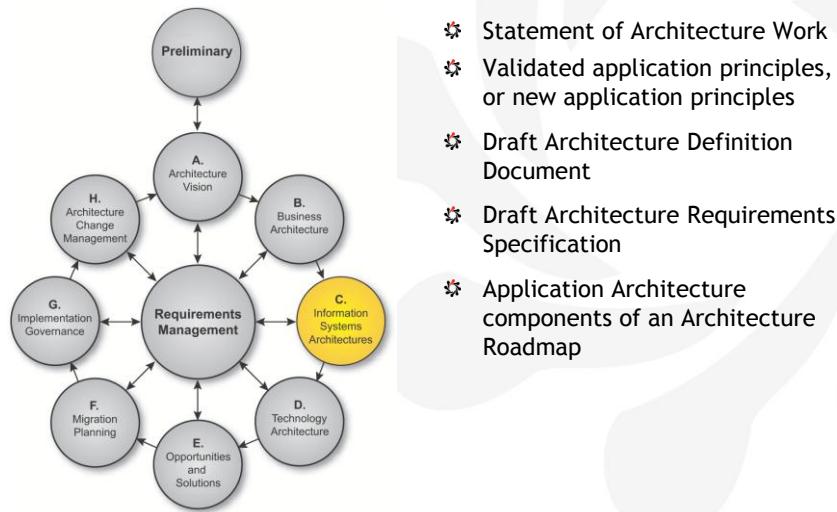
- ❖ Document the rationale for all building block decisions in the architecture definition document
- ❖ Prepare the Application Architecture sections of the architecture definition document report
- ❖ If appropriate, use reports and/or graphics generated by modeling tools to demonstrate key views of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

7/3/2014

22



Phase C: Outputs: Application Architecture



7/3/2014

23



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

7/3/2014

24

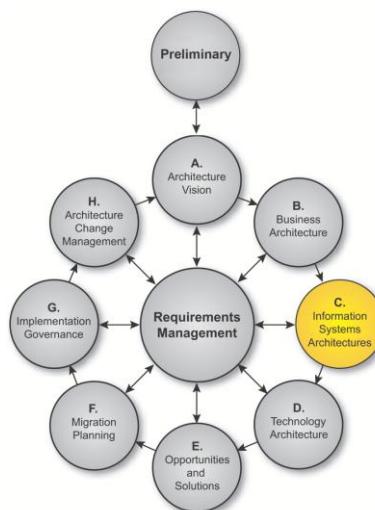


Architecture Requirements Specification Application Architecture Components

- ❖ 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

7/3/2014

25



- ❖ 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

7/3/2014

26



Summary

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

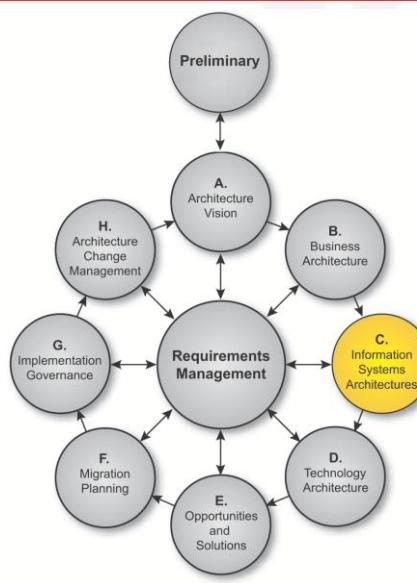
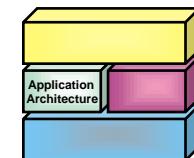
7/3/2014

27



Phase C - Application Architecture

7/3/2014



TOGAF is a registered trademark of The Open Group in the United States and other countries

28



Phase C

Applications Architecture

Catalogs, Matrices and Diagrams

Module 20a

V9.1 Edition Copyright © 2009-2011

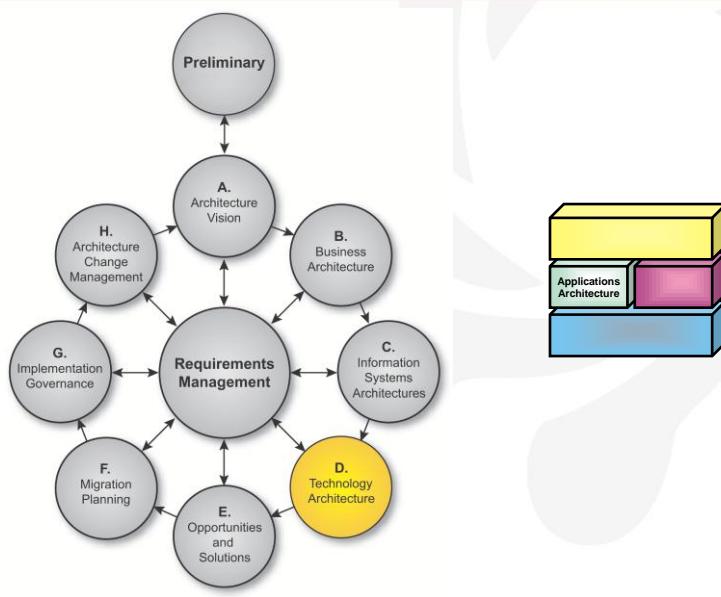


All rights reserved

Published by The Open Group, 2011



Phase C Applications Architecture - Catalogs, Matrices and Diagrams



7/3/2014



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

3



7/3/2014

Preliminary Phase	Phase A, Architecture Vision		
Requirements Management	Requirements catalog	Solution Concept Diagram	Value Chain Diagram
Phase B, Business Architecture	Phase C, Data Architecture	Phase C, Application Architecture	Phase D, Technology Architecture
Catalog <ul style="list-style-type: none"> • Organization/Actor • Driver/Goal/Objective • Role • Business Service/Function • Location • Process/Event/Control/Product • Contract/Measure Matrix <ul style="list-style-type: none"> • Business Interaction Diagram <ul style="list-style-type: none"> • Business Footprint • Business Service/Information • Functional Decomposition • Product Lifecycle • Goal/Objective/Service • Use-Case • Organization Decomposition • Process Flow • Event 	Catalog <ul style="list-style-type: none"> • Data Entity/Data Component Matrix <ul style="list-style-type: none"> • Data Entity/Business Function • System/Data Diagram <ul style="list-style-type: none"> • Class • Data Dissemination • Data Security • Class Hierarchy • Data Migration • Data Lifecycle 	Catalog <ul style="list-style-type: none"> • Application Portfolio • Interface Matrix <ul style="list-style-type: none"> • System/Organization • Role/System • System/Function • Application Interaction Diagram <ul style="list-style-type: none"> • Application Communication • Application and User Location • System Use-Case • Enterprise Manageability • Process/System Realization • Software Engineering • Application Migration • Software Distribution 	Catalog <ul style="list-style-type: none"> • Technology Standards • Technology Portfolio Matrix <ul style="list-style-type: none"> • System/Technology Diagram <ul style="list-style-type: none"> • Environments and Locations • Platform Decomposition • Processing • Networked Computing/Hardware • Communications Engineering
Phase E, Opportunities & Solutions			
Project Context diagram Benefits diagram			

4



7/3/2014

Catalogs, Matrices and Diagrams

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

<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>Diagrams</p> <ul style="list-style-type: none"> ❖ 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
--	--

7/3/2014 

Catalogs

Catalog	Purpose
Application Portfolio Catalog <p>To identify and maintain a list of all the applications in the enterprise. This list helps to define the horizontal scope of change initiatives that may impact particular kinds of applications. An agreed Application Portfolio allows a standard set of applications to be defined and governed.</p> <p>It contains the following metamodel entities:</p> <ul style="list-style-type: none"> •Information System Service •Logical Application Component •Physical Application Component 	Interface Catalog <p>The purpose of the Interface catalog is to scope and document the interfaces between applications to enable the overall dependencies between applications to be scoped as early as possible.</p> <p>It contains the following metamodel entities:</p> <ul style="list-style-type: none"> •Logical Application Component •Physical Application Component •Application communicates with application relationship

7/3/2014 

Matrices

- ❖ Application/Organization matrix
- ❖ Role/Application matrix
- ❖ Application/Function matrix
- ❖ Application Interaction matrix

7



Application/Organization Matrix

- ❖ The purpose of this matrix is to depict the relationship between applications and organizational units within the enterprise.
- ❖ The mapping of the Application Component-Organization Unit relationship is an important step as it enables the following to take place:
 - Assign usage of applications to the organization units that perform business functions
 - Understand the application support requirements of the business services and processes carried out by an organization unit
 - Support the gap analysis and determine whether any of the applications are missing and as a result need to be created
 - Define the application set used by a particular organization unit

8



Example Application/Organization Matrix

APPLICATION (Y-AXIS) AND ORGANISATION UNIT (X-AXIS)	CUSTOMER SERVICES	PROCUREMENT AND WAREHOUSING	HR	CORPORATE FINANCE
SAP HR	X	X	X	
SIEBEL	X	X		
SAP FINANCIALS	X	X		X
PROCUREROFT	X	X		

9



7/3/2014

Role/Application Matrix

- ❖ The purpose of this matrix is to depict the relationship between applications and the business roles that use them within the enterprise
- ❖ The mapping of the Application Component-Role relationship is an important step as it enables the following to take place:
 - Assign usage of applications to the specific roles in the organization
 - Understand the application security requirements of the business services and processes supporting the function, and check these are in line with current policy
 - Support the gap analysis and determine whether any of the applications are missing and as a result need to be created
 - Define the application set used by a particular business role; essential in any move to role-based computing

10



7/3/2014

Example Role/Application Matrix

APPLICATION (Y-AXIS) AND FUNCTION (X-AXIS)	CALL CENTRE OPERATOR	CALL CENTRE MANAGER	FINANCE ANALYST	CHIEF ACCOUNTANT
SAP HR	X	X	X	X
SIEBEL	X	X		
SAP FINANCIALS	X	X	X	X
PROCURESOFT	X	X		



7/3/2014

Application/Function Matrix

- ❖ The purpose of this matrix is to depict the relationship between applications and business functions within the enterprise.
- ❖ The mapping of the Application Component-Function relationship is an important step as it enables the following to take place:
 - Assign usage of applications to the business functions that are supported by them
 - Understand the application support requirements of the business services and processes carried out
 - Support the gap analysis and determine whether any of the applications are missing and as a result need to be created
 - Define the application set used by a particular business function



7/3/2014

Example Application/Function Matrix

APPLICATION (Y-AXIS) AND FUNCTION (X-AXIS)	CALL CENTRE 1 ST LINE	WAREHOUSE CONTROL	VACANCY FILLING	GENERAL LEDGER MAINTENANCE
SAP HR	X	X	X	X
SIEBEL	X	X		
SAP FINANCIALS	X	X		X
PROCURESOFT	X	X		



7/3/2014

Example Application Interaction Matrix

	Application 1	Application 2	Application 3	Application 4
Application 1				Consumes
Application 2	Communicates with			
Application 3		Consumes		Communicates with
Application 4				



7/3/2014

Diagrams

- ❖ Application Communication diagram
- ❖ N2 model or Node Connectivity 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

7/3/2014



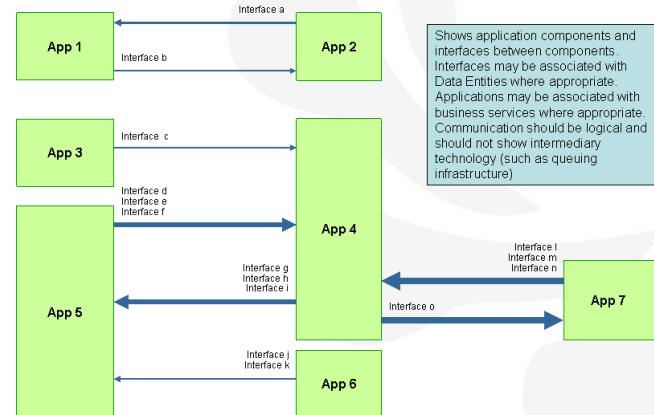
Application Communication Diagram

- ❖ The purpose of this diagram is to depict all models and mappings related to communication between applications in the metamodel entity
- ❖ It shows application components and interfaces between components
- ❖ Communication should be logical and should only show intermediary technology where it is architecturally relevant

7/3/2014



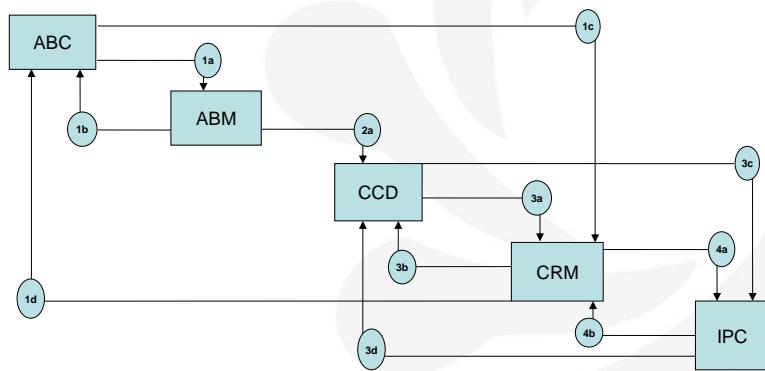
Application Communication Diagram



7/3/2014



Alternate Example: N2 Model



7/3/2014



Alternate Example: Information Exchange Matrix

LABEL	SOURCE	DESTINATION	DATA ENTITY	EVENT TRIGGERED
1a	# ABC	# ABM	# Sales order (create request)	# New sales order from front end
1b	# ABM	# ABC	# Sales order (confirm create)	# Order created in the backend ERP system
2a	# ABM	# CCD	# Product catalog	# Subscribe/Publish timer

19 

Application & User Location Diagram

- ❖ The purpose of this diagram is to clearly depict the business locations from which business users typically interact with the applications, but also the hosting location of the application infrastructure.
- ❖ The diagram enables:
 - Identification of the number of package instances needed
 - Estimation of the number and the type of user licenses
 - Estimation of the level of support needed
 - Selection of system management tools, structure, and management system
 - Appropriate planning for the technological components of the business
 - Performance considerations while implementing solutions

20 

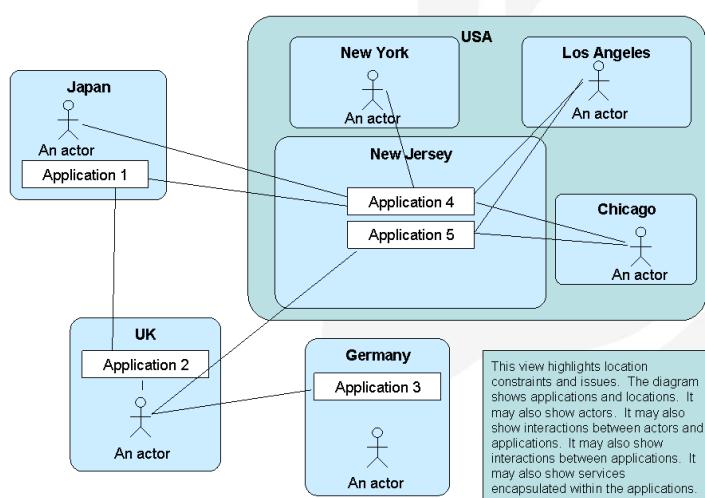
Example Application & User Location Diagram (part 1)

APPLICATION	USER TYPE	INTERNAL, CUSTOMER OR PARTNER	USER BUSINESS LOCATION	LOCATION ADDRESS	ORG UNIT (USER BELONGS TO)
CRM	Developer Super User Administrator	Internal	NA Western Region EMEA Headquarters, UK	Chicago Sears tower office Chicago Downtown office Middlesex, London	NA Sales & Marketing EMEA Sales
SAP R/3	Test Engineers Mechanical Engineers Procurement managers	Internal	Beijing Manufacturing Plant		Manufacturing & logistics

21



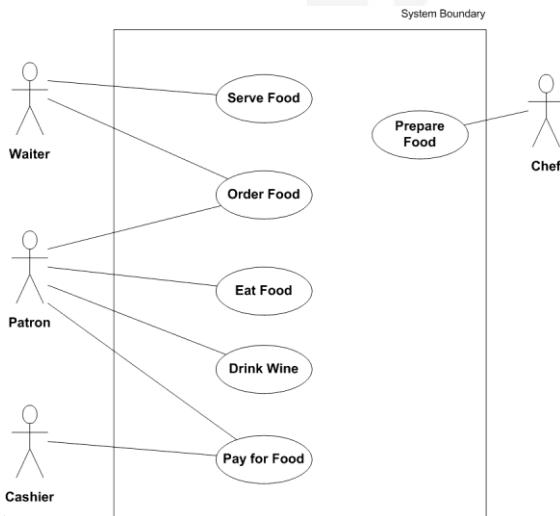
Example Application & User Location Diagram (part 2)



22



Application Use Case Diagram



Source: wikipedia.org

7/3/2014

23



Enterprise Manageability Diagram

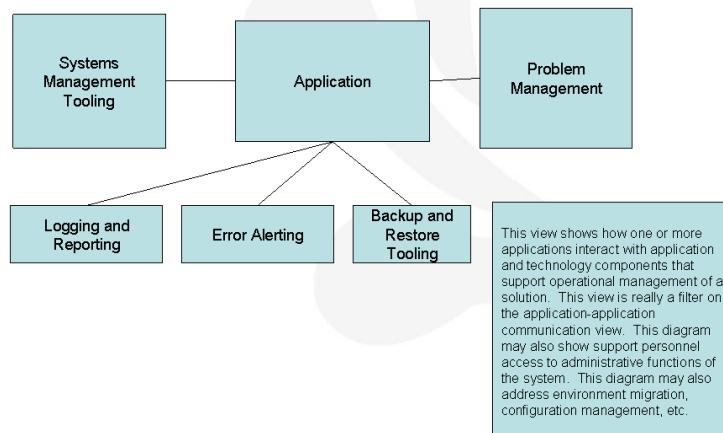
- ❖ The Enterprise Manageability diagram shows how one or more applications interact with application and technology components that support operational management of a solution.
- ❖ Analysis can reveal duplication and gaps, and opportunities in the IT service management operation of an organization.

7/3/2014

24



Example Enterprise Manageability Diagram



7/3/2014

25



Process/Application Realization Diagram

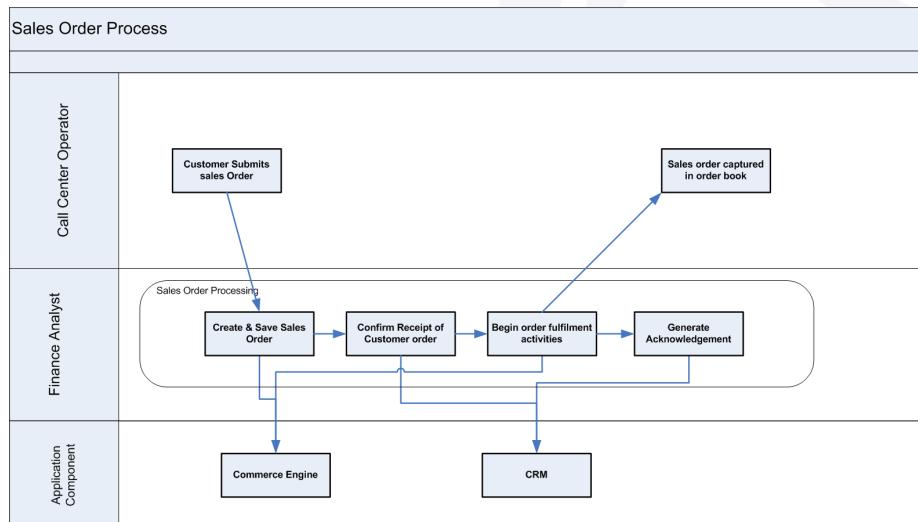
- ❖ The purpose of this diagram is to depict the sequence of events when multiple applications are involved in executing a business process.
- ❖ It enhances the Application Communication diagram by augmenting it with any sequencing constraints, and hand-off points between batch and real-time processing.

7/3/2014

26



Example Process/Application Realization Diagram



27



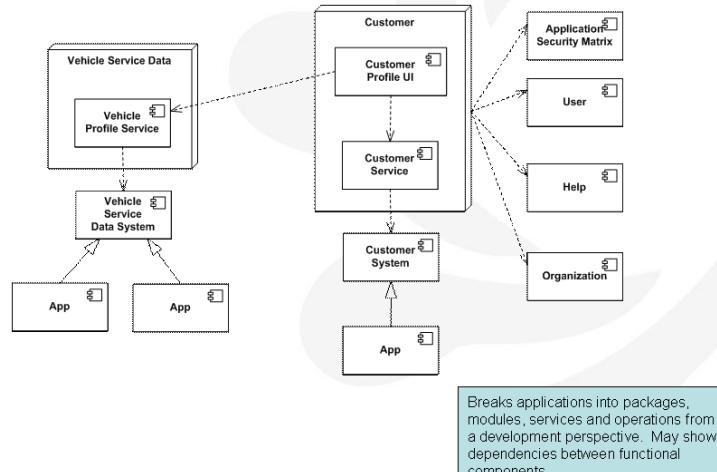
Software Engineering Diagram

- ❖ The Software Engineering diagram breaks applications into packages, modules, services, and operations from a development perspective.
- ❖ It enables more detailed impact analysis when planning migration stages, and analyzing opportunities and solutions.
- ❖ It is ideal for application development teams and application management teams when managing complex development environments.

28



Example Software Engineering Diagram



29



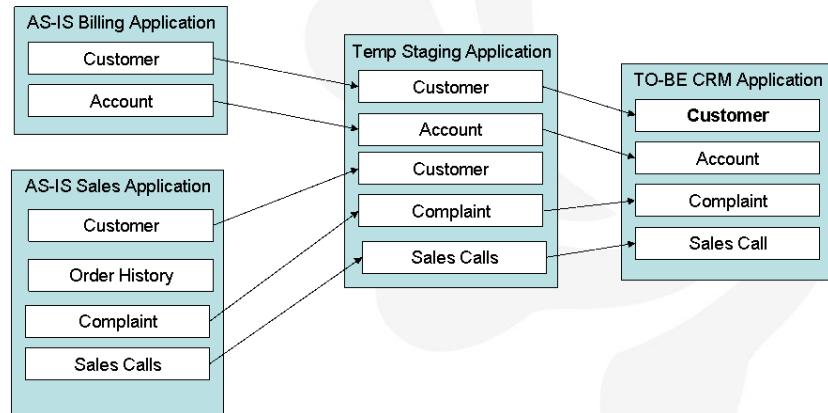
Application/Migration Diagram

- ❖ The Application Migration diagram identifies application migration from baseline to target application components.
- ❖ It enables a more accurate estimation of migration costs
- ❖ It should be used to identify temporary applications, staging areas, and the infrastructure required to support migrations

30



Example Application/Migration Diagram



7/3/2014

31



Software Distribution Diagram

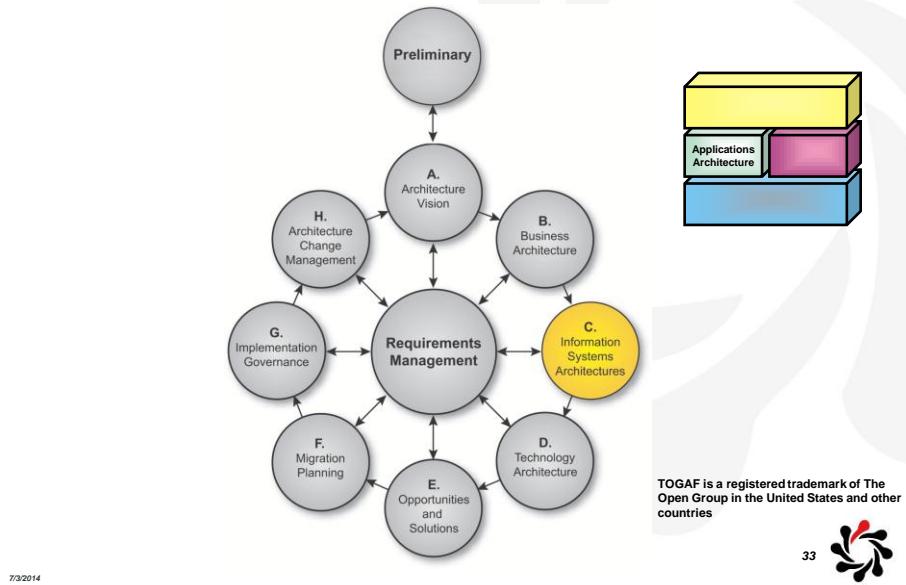
- ❖ This diagram is a composite of the Software Engineering diagram and the Application-User Location diagram.
- ❖ Depending on the circumstances, this diagram alone may be sufficient, or may not be needed.

7/3/2014

32



Phase C - Applications Architecture Catalogs, Matrices and Diagrams



Technical Reference Model

Module 21

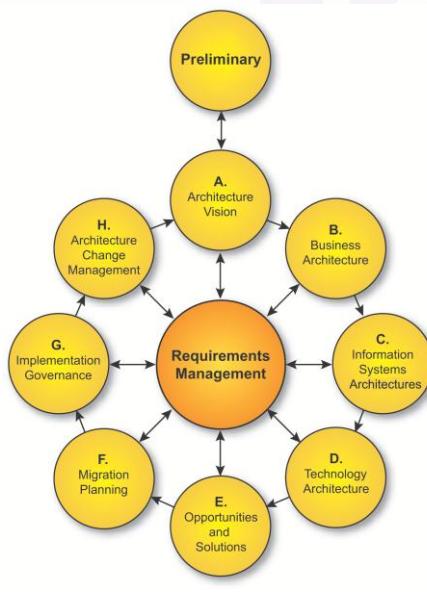
V9.1 Edition Copyright © 2009-2011



All rights reserved.
Published by The Open Group, 2011



Foundation Architecture



7/3/2014



Module Objectives

To understand the TOGAF Foundation Architecture

The TOGAF Technical Reference Model (TRM) is an example of a Foundation Architecture

- ❖ The Purpose, Structure and Use of the TRM
- ❖ The Platform Services Taxonomy
- ❖ Application Platform Service Qualities

3



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

- ❖ TOGAF provides a TRM Foundation Architecture
- ❖ The ADM supports specialization of such Foundation Architectures in order to create organization-specific models.
- ❖ The TRM is an example of a Foundation architecture on which other, more specific architectures can be based.

4



TRM Components

❖ The TRM has two main components:

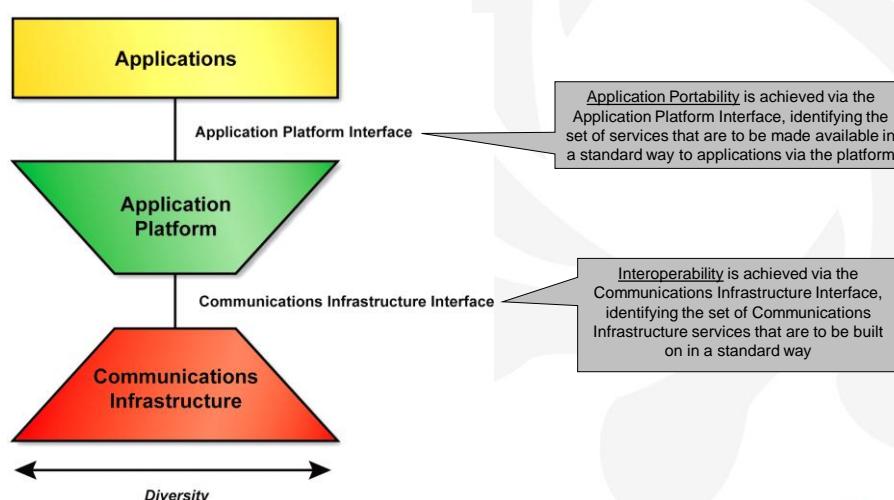
- A taxonomy that defines terminology and provides a coherent description of the components and conceptual structure of an information system
- An associated TRM graphic that provide a visual representation as an aid to understanding

5



7/3/2014

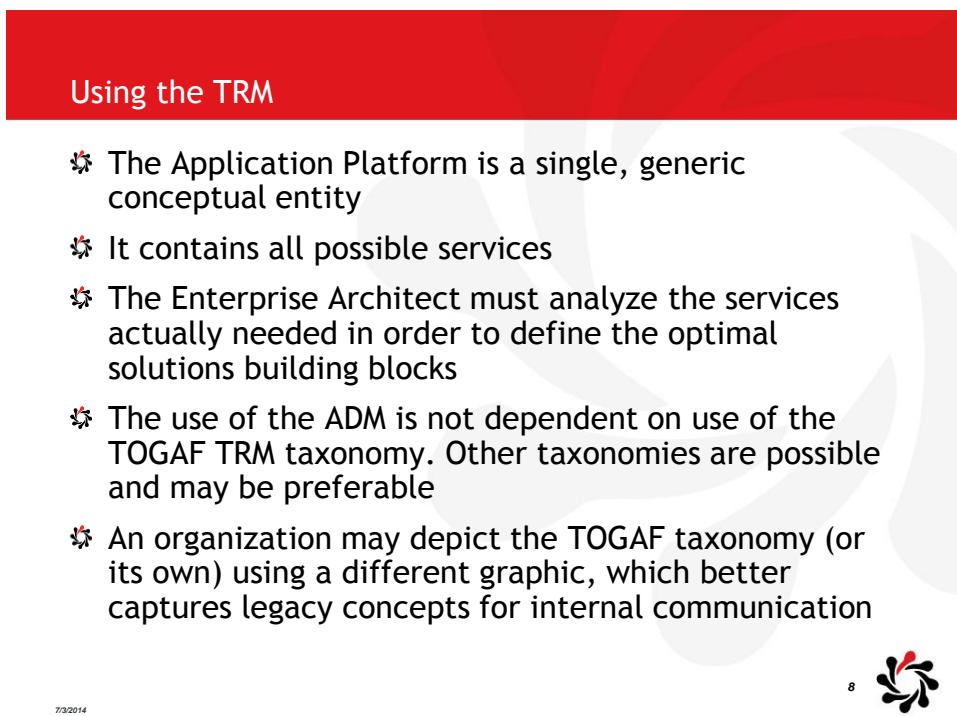
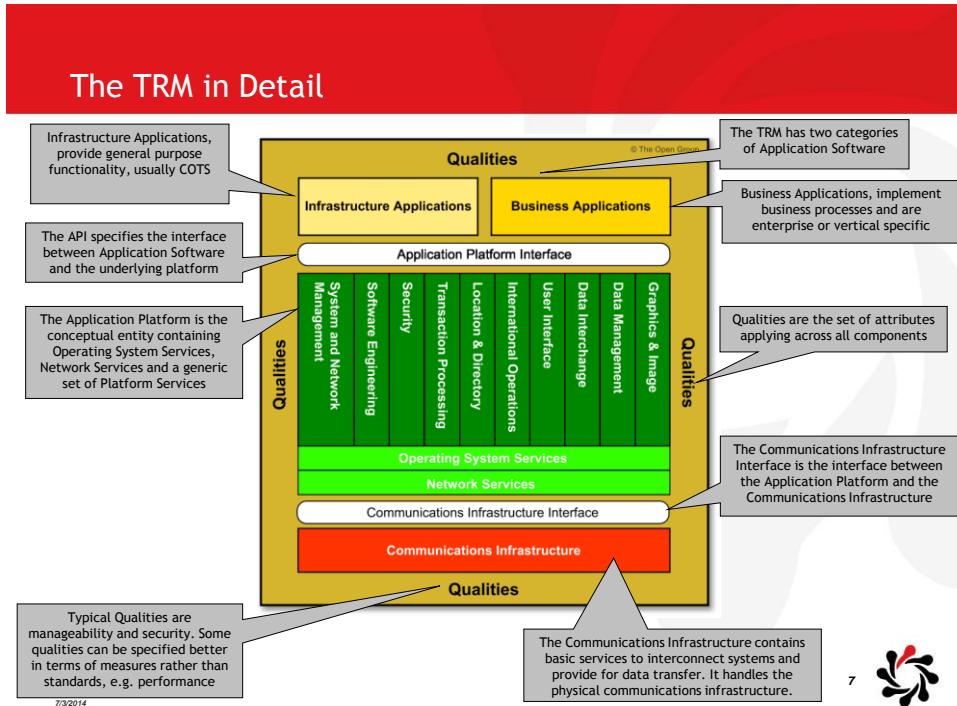
The TRM



6



7/3/2014



Taxonomy of Platform Services

- ❖ This defines terminology
- ❖ Provides a coherent description of an information system:
 - Components termed service categories
 - Conceptual structure
- ❖ Widely-acceptable useful, consistent, structured definition of the application platform entity

7/3/2014

9



Taxonomy of Platform Services

- ❖ Not exclusive or optimal definition
- ❖ The TOGAF ADM is not dependent on the TRM

7/3/2014

10



Taxonomy of Platform Services

- ❖ Data Interchange Services
- ❖ Data Management Services
- ❖ Graphics and Imaging Services
- ❖ International Operation Services
- ❖ Location and Directory Services
- ❖ Network Services
- ❖ Operating System Services
- ❖ Software Engineering Services
- ❖ Transaction Processing Services
- ❖ User Interface Services
- ❖ Security Services
- ❖ System and Network Management Services



7/3/2014

Taxonomy of Application Platform Service Qualities

- ❖ A service quality describes behavior
 - Such as adaptability or manageability
- ❖ Service qualities have a pervasive effect on the operation of most or all functional service categories
- ❖ During architecture development, the architect must be aware of the desired qualities and the extent of their influence on the choice of building blocks



7/3/2014

Availability

- ❖ Availability is the degree to which something is available for use. It can be split into 6 criteria:
1. Manageability, the ability to gather information about the state of something and to control it
 2. Serviceability, the ability to identify problems and take corrective action such as to repair or upgrade a component in a running system
 3. Performance, the ability of a component to perform its tasks in an appropriate time
 4. Reliability, resistance to failure
 5. Recoverability, the ability to restore a system to a working state after an interruption
 6. Locatability, the ability of a system to be found when needed



7/3/2014

Assurance

- ❖ Assurance can be split into the following criteria:

1. Security, the protection of information from unauthorized access
2. Integrity, the assurance that data has not been corrupted
3. Credibility, the level of trust in the integrity of the system and its data



7/3/2014

Usability

❖ Usability is the ease-of-operation by users, including

1. International operation, including multilingual and multicultural abilities



Adaptability

❖ Adaptability can be split into 5 criteria:

1. Interoperability, whether within or outside the organization (for instance interoperability of calendaring or scheduling functions may be key to the usefulness of a system)
2. Scalability, the ability of a component to grow or shrink its performance or capacity appropriately to the demands of the environment in which it operates
3. Portability, of data, people, applications, and components
4. Extensibility, to accept new functionality
5. Accessibility, to services in new paradigms such as object orientation



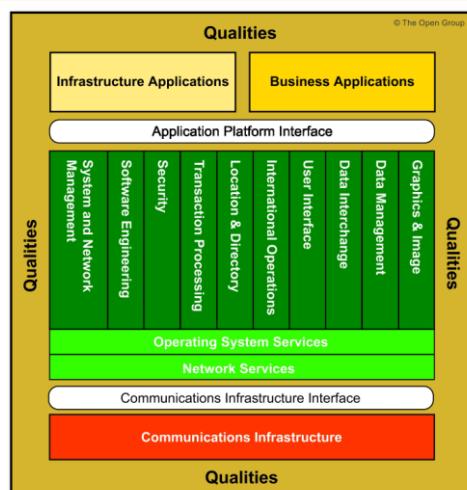
Customizing the TRM

- ❖ Enterprises may need to customize the TRM
 - ‘One-size fits all’ does not work everywhere
- ❖ The underlying aim is to ensure that higher level building blocks making up business solutions have a robust platform
- ❖ Other models, taxonomies and graphics may be preferable for some enterprises
- ❖ The TRM is a tool when applying the ADM
 - The ADM is valid whatever the choice of specific taxonomy

17

7/3/2014

Summary



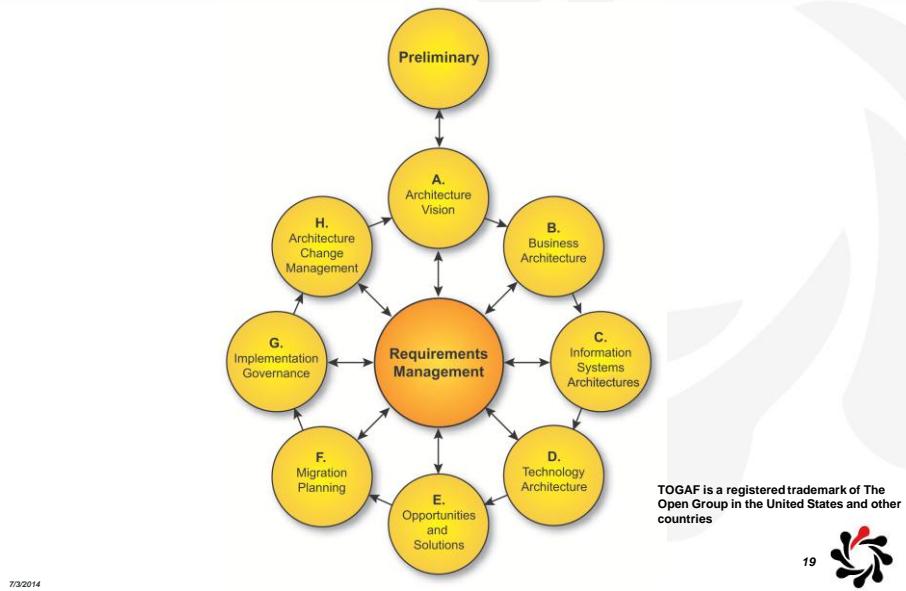
The TOGAF Technical Reference Model provides a model and core taxonomy of generic platform services

- ❖ It can be used to build any system architecture
- ❖ A taxonomy defines consistent terminology

18

7/3/2014

Foundation Architecture



Phase D

Technology Architecture

Module 22

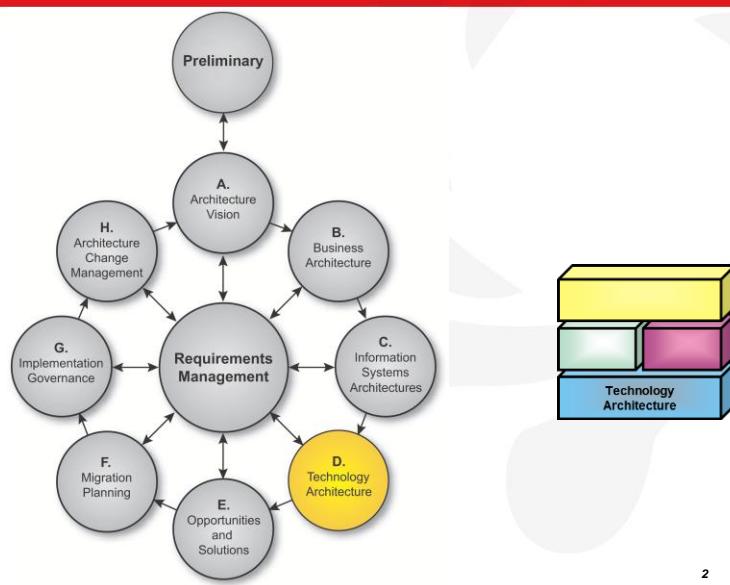
V9.1 Edition Copyright © 2009-2011



All rights reserved.
Published by The Open Group, 2011



Technology Architecture



7/3/2014



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

3



7/3/2014

Objectives

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

4



7/3/2014

Approach

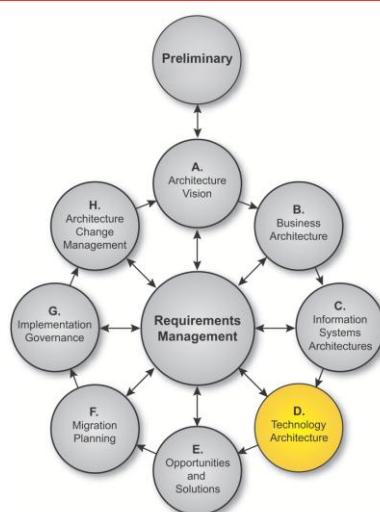
- ❖ Review the Technology Architecture Resources available in the Architecture Repository
 - Existing IT Services in the IT Repository or IT Service Catalog
 - The TOGAF TRM
 - Technology models relevant to the organization

5



7/3/2014

Technology Architecture: Inputs



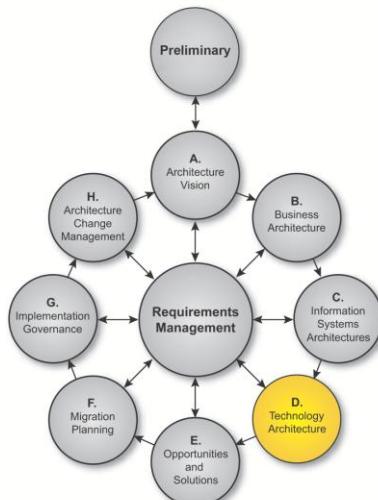
- ❖ Request for Architecture Work
- ❖ Capability Assessment
- ❖ Communications Plan
- ❖ Organization model for enterprise architecture
- ❖ Tailored Architecture Framework
- ❖ Technology principles
- ❖ Statement of Architecture Work
- ❖ Architecture Vision
- ❖ Architecture Repository

6



7/3/2014

Technology Architecture: Inputs



7/3/2014

- ❖ 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

7



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. Finalize the Technology Architecture**
- 9. Create Architecture Definition Document**

7/3/2014

8



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.

9



Step 1: Select reference models, viewpoints, and tools

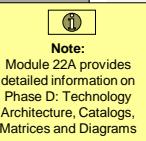
❖ Determine Overall Modelling Process

- For each viewpoint, select the models needed to support the specific view required, using the selected tool or method. Confirm all stakeholders' concerns are addressed. If not, create new models to address concerns not covered, or augment existing models

10



TOGAF 9 Artifacts

Preliminary Phase Principles catalog	Phase A, Architecture Vision Stakeholder Map matrix	Solution Concept Diagram	Value Chain Diagram
Requirements Management Requirements catalog			
Phase B, Business Architecture	Phase C, Data Architecture	Phase C, Application Architecture	Phase D, Technology Architecture
Catalog <ul style="list-style-type: none"> Organization/Actor Driver/Goal/Objective Role Business Service/Function Location Process/Event/Control/Product Contract/Measure Matrix <ul style="list-style-type: none"> Business Interaction Diagram <ul style="list-style-type: none"> Business Footprint Business Service/Information Functional Decomposition Product Lifecycle Goal/Objective/Service Use-Case Organization Decomposition Process Flow Event 	Catalog <ul style="list-style-type: none"> Data Entity/Data Component Matrix <ul style="list-style-type: none"> Data Entity/Business Function System/Data Diagram <ul style="list-style-type: none"> Class Data Dissemination Data Security Class Hierarchy Data Migration Data Lifecycle 	Catalog <ul style="list-style-type: none"> Application Portfolio Interface Matrix <ul style="list-style-type: none"> System/Organization Role/System System/Function Application Interaction Diagram <ul style="list-style-type: none"> Application Communication Application and User Location System Use-Case Enterprise Manageability Realization Software Engineering Application Migration Software Distribution 	Catalog <ul style="list-style-type: none"> Technology Standards Technology Portfolio Matrix <ul style="list-style-type: none"> System/Technology Diagram <ul style="list-style-type: none"> Environments and Locations Platform Decomposition Processing Networked Computing/Hardware Communications Engineering
Phase E, Opportunities & Solutions			 <p>Note: Module 22A provides detailed information on Phase D: Technology Architecture, Catalogs, Matrices and Diagrams</p>
Project Context diagram Benefits diagram			

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

11

12

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

13 

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

14 

Step 1: Select reference models, viewpoints, and tools

❖ Select Services

- The services portfolios are combinations of basic services from the service categories in the TOGAF TRM.
- 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.



7/3/2014

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.



7/3/2014

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

17 

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

18 

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.



7/3/2014

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 organization?
 - Does this Technology Architecture impact other projects ?
 - Will this Technology Architecture be impacted by other projects?



7/3/2014

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

21 

Step 8: Finalize 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
- ❖ Finalize all the work products

22 

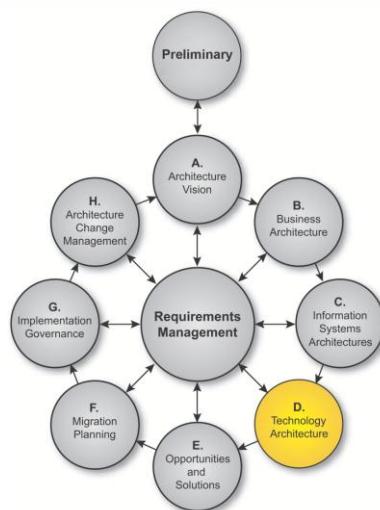
Step 9: Create Architecture Definition Document

- ❖ 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.

23



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

24



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

25



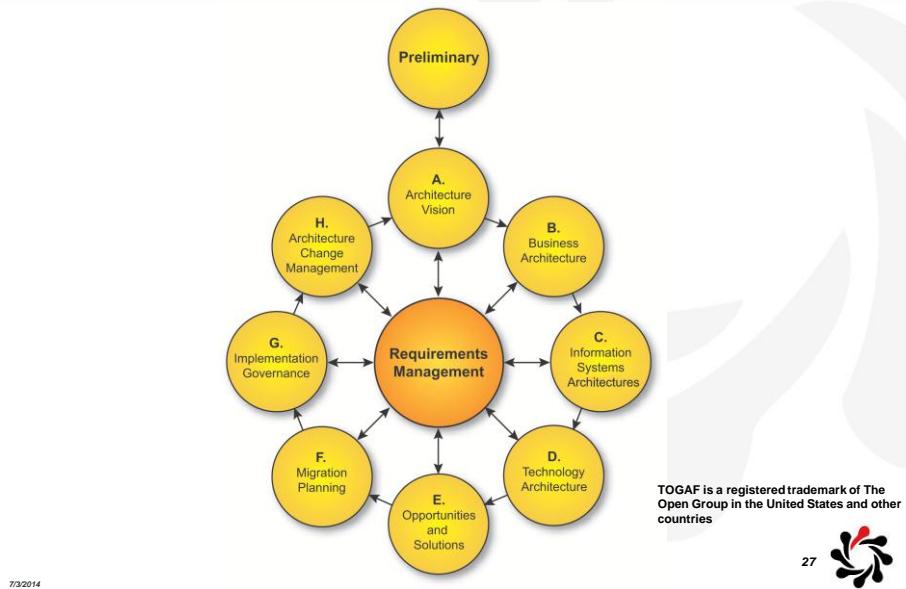
Architecture Requirements Specification Technology Architecture Components

- ❖ Gap analysis results
- ❖ Updated technology requirements

26



Foundation Architecture



Phase D

Technology Architecture

Catalogs, Matrices and Diagrams

Module 22a

V9.1 Edition Copyright © 2009-2011

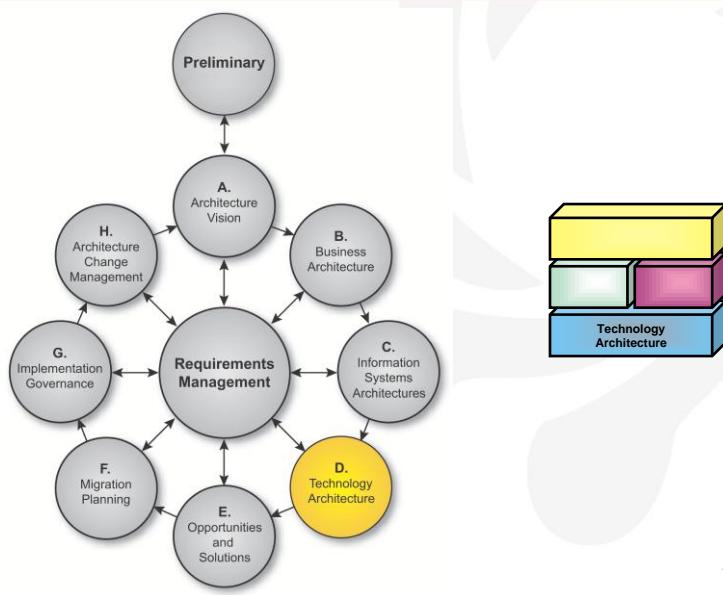


All rights reserved

Published by The Open Group, 2011



Phase D Technology Architecture - Catalogs, Matrices and Diagrams



7/3/2014

2

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

3



7/3/2014

Preliminary Phase	Phase A, Architecture Vision		
Principles catalog	Stakeholder Map matrix	Solution Concept Diagram	Value Chain Diagram
Requirements Management			
Requirements catalog			
Phase B, Business Architecture	Phase C, Data Architecture	Phase D, Application Architecture	Phase E, Technology Architecture
Catalog <ul style="list-style-type: none">• Organization/Actor• Driver/Goal/Objective• Role• Business Service/Function• Location• Process/Event/Control/Product• Contract/Measure Matrix <ul style="list-style-type: none">• Business Interaction Diagram <ul style="list-style-type: none">• Business Footprint• Business Service/Information• Functional Decomposition• Product Lifecycle• Goal/Objective/Service• Use-Case• Organization Decomposition• Process Flow• Event	Catalog <ul style="list-style-type: none">• Data Entity/Data Component Matrix <ul style="list-style-type: none">• Data Entity/Business Function• System/Data Diagram <ul style="list-style-type: none">• Class• Data Dissemination• Data Security• Class Hierarchy• Data Migration• Data Lifecycle	Catalog <ul style="list-style-type: none">• Application Portfolio• Interface Matrix <ul style="list-style-type: none">• System/Organization• Role/System• System/Function• Application Interaction Diagram <ul style="list-style-type: none">• Application Communication• Application and User Location• System Use-Case• Enterprise Manageability• Process/System Realization• Software Engineering• Application Migration• Software Distribution	Catalog <ul style="list-style-type: none">• Technology Standards• Technology Portfolio Matrix <ul style="list-style-type: none">• System/Technology Diagram <ul style="list-style-type: none">• Environments and Locations• Platform Decomposition• Processing• Networked Computing/Hardware• Communications Engineering
Phase E, Opportunities & Solutions			
Project Context diagram	Benefits diagram		

4



7/3/2014

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
- ❖ Communications Engineering diagram

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

5



Catalogs

- ❖ Technology Standards catalog
- ❖ Technology Portfolio catalog

7/3/2014

6



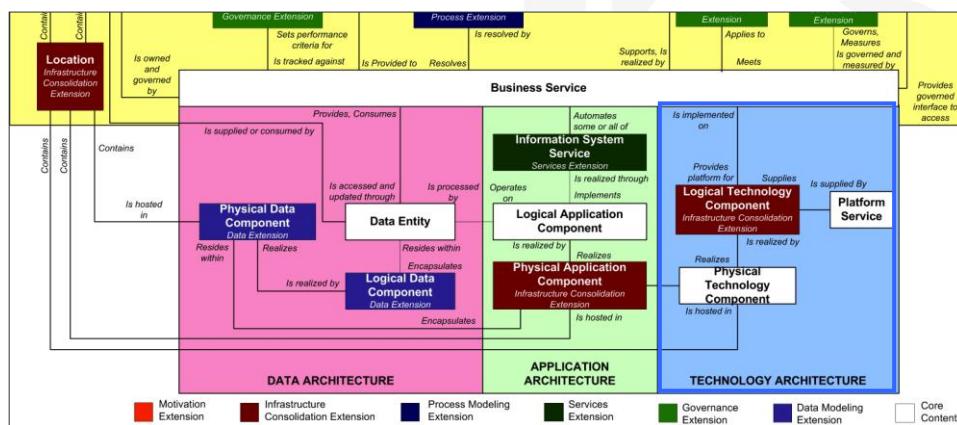
Catalogs

Catalog	Purpose
Technology Standards Catalog	<p>This documents the agreed standards for technology across the enterprise covering technologies, and versions, the technology lifecycles, and the refresh cycles for the technology.</p> <p>It can be implemented as an extension to the Technology Portfolio Catalog and thus will share the same metamodel entities:</p> <ul style="list-style-type: none"> •Platform Service, Logical Technology Component, Physical Technology Component
Technology Portfolio Catalog	<p>This catalog identifies and list all the technology in use across the enterprise, including hardware, infrastructure software, and application software. An agreed technology portfolio supports lifecycle management of technology products and versions and also forms the basis for definition of technology standards</p> <p>It contains the following metamodel entities:</p> <ul style="list-style-type: none"> •Platform Service, Logical Technology Component, Physical Technology Component

7333010



Exercise



7/3/2014



Matrices

❖ Application/Technology matrix

7/3/2014

9



Application/Technology Matrix

- ❖ The Application/Technology matrix documents the mapping of applications to the technology platform.
- ❖ The Application/Technology matrix shows:
 - Logical/Physical Application Components
 - Services, Logical Technology Components, and Physical Technology Components
 - Physical Technology Component realizes Physical Application Component relationships

7/3/2014

10



Example Application/Technology Matrix

LOGICAL APPLICATION COMPONENT	PHYSICAL TECHNOLOGY COMPONENT	SERVER ADDRESS	IP ADDRESS
ABM	Web server - node 1	F01ws001@host.com	10.xx.xx.xx
	Web server - node 2	F01ws002@host.com	10.xx.xx.xx
	Web server - node 3	F01ws003@host.com	10.xx.xx.xx
	App server – node 1	F02as001@host.com	10.xx.xx.xx
	App server – node 2	F02as002@host.com	10.xx.xx.xx
	App server – node 3	F02as003@host.com	10.xx.xx.xx
	Database server (production)	F02dbp001@host.com	10.xx.xx.xx
	Database server (staging)	F03dbs001@host.com	10.xx.xx.xx
Load balancer and Dispatcher	Dispatcher server	F03nd001@host.com	242.xx.xx.xx



7/3/2014

Example Application/Technology Matrix

TECH FUNCTION	HARDWARE LOGICAL	HARDWARE PHYSICAL	SOFTWARE LOGICAL	SOFTWARE PHYSICAL
Load balancing	<ul style="list-style-type: none"> =Name – Balancer =Vendor - IBM =Server Type – eServer =Clustered – No =No. of Nodes – N/A =Server logical address - d04lb01@host.com =Maintenance Window – Sun 0100 to 0300 	<ul style="list-style-type: none"> =Model/Type – IBM P7xx =Serial Number – 1S4568 =Processor Type - RISC Power p5 =Number of Processors - 8 way =Memory - 1GB =Hard drive - 40 GB =IP - 11.xx.xx.xx 	<ul style="list-style-type: none"> =Product- IBM Load balance manager =Vendor - IBM =OS – UNIX 	<ul style="list-style-type: none"> =SW Components – LB v3.2 (list all the other components of the SW product) =AIX 10.2.1 =License Type - Enterprise wide license =License expiry date - 12/31/2014



7/3/2014

Example System/Technology Matrix

APPLICATION COMPONENT	DEPLOYMENT UNIT	TECHNOLOGY COMPONENT
▪ Load Balancer	▪ Smart dispatch v1.2 (both installation and execution code)	▪ Load balancing server (d03lb001@host.com)
▪ Commerce pages	▪ HTML code ▪ Applets ▪ JSP	▪ Web Server cluster (d03ws001@host.com, d03ws002@host.com, d03ws003@host.com)
▪ Commerce Engine	• Order Entry (both installation and execution code) • Shopping Cart (both installation and execution code)	• Application Server (d03as001@host.com, d03as002@host.com)

7/3/2014

13



Diagrams

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

7/3/2014

14



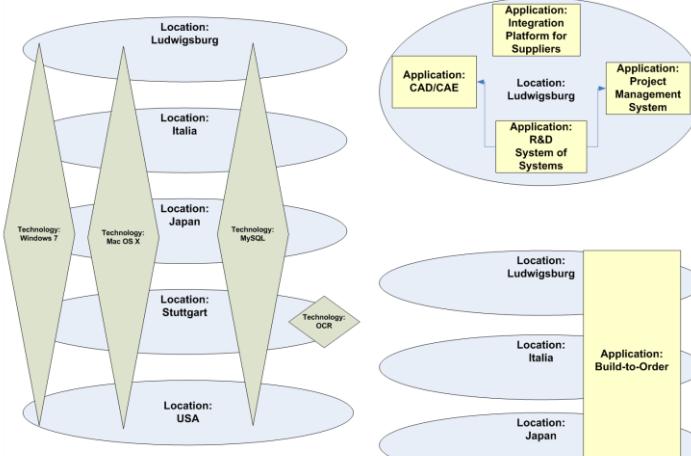
Environments and Locations Diagram

- ❖ Depicts which locations host which applications
- ❖ Identifies what technologies and/or applications are used at which locations
- ❖ Identifies the locations from which business users typically interact with the applications.
- ❖ It should also show the existence and location of different deployment environments
 - including non-production environments, such as development and pre production.

7/3/2014

15

Example Environments and Locations Diagram



7/3/2014

16

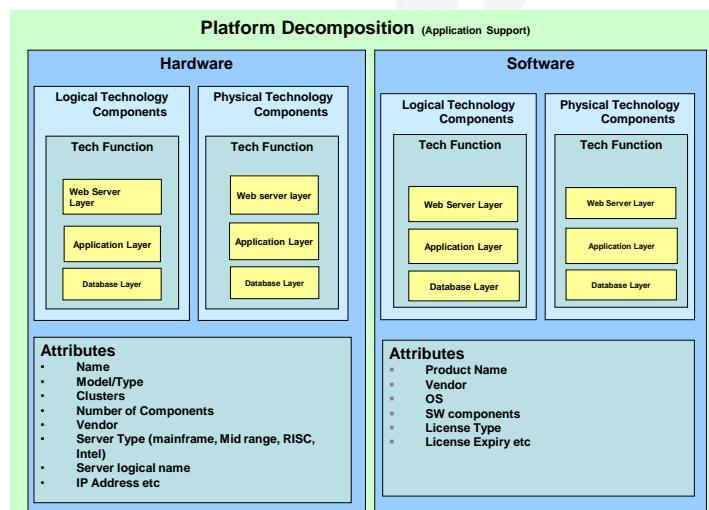
Platform Decomposition Diagram

- ❖ The Platform Decomposition diagram depicts the technology platform that supports the operations of the Information Systems Architecture.
- ❖ The diagram covers all aspects of the infrastructure platform and provides an overview of the enterprise's technology platform.

17



Example Platform Decomposition Diagram



18



Processing Diagram

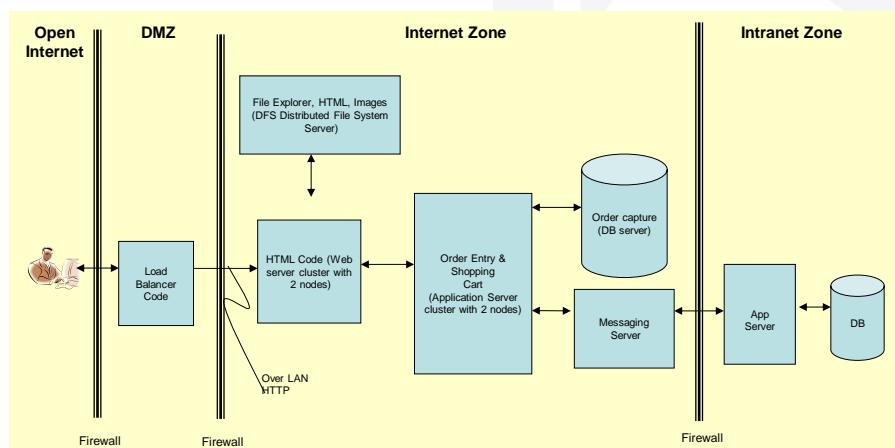
- ❖ The Processing diagram focuses on deployable units of code/configuration and how these are deployed onto the technology platform.
- ❖ The Processing diagram addresses the following:
 - Which set of application components need to be grouped to form a deployment unit
 - How one deployment unit connects/interacts with another (LAN, WAN, and the applicable protocols)
 - How application configuration and usage patterns generate load or capacity requirements for different technology components
- ❖ The organization and grouping of deployment units depends on separation concerns of the presentation, business logic, and data store layers and service-level requirements of the components.

19



7/3/2014

Example Processing Diagram



20



7/3/2014

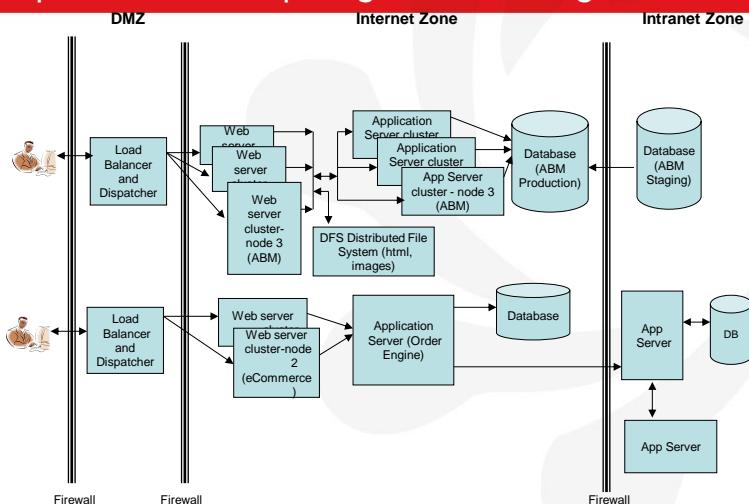
Network Computing Hardware Diagram

- ❖ The purpose of this diagram is to show the "as deployed" logical view of logical application components in a distributed network computing environment.
- ❖ The diagram is useful for the following reasons:
 - Enable understanding of which application is deployed where
 - Establishing authorization, security, and access to these technology components
 - Understand the Technology Architecture that support the applications during problem resolution and troubleshooting
 - Isolate performance problems encountered and perform necessary upgrade to specific physical technology components
 - Identify areas of optimization
 - Enable application/technology auditing and prove compliance
 - Serve as an important tool supporting effective change management

21



Example Network Computing Hardware Diagram



22



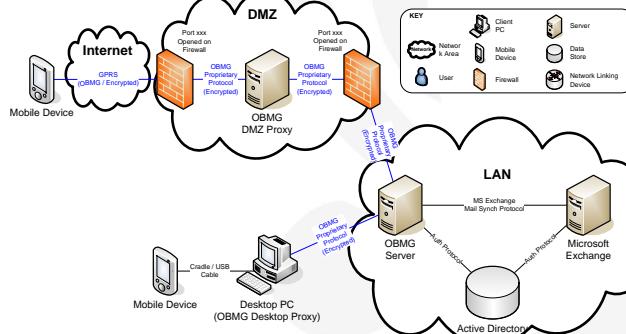
Communications Engineering Diagram

- ❖ The Communications Engineering diagram describes the means of communication between assets in the Technology Architecture
- ❖ It takes logical connections between client and server components and identifies network boundaries and network infrastructure required to physically implement those connections.
- ❖ It does not describe the information format or content, but addresses protocol and capacity issues.

23



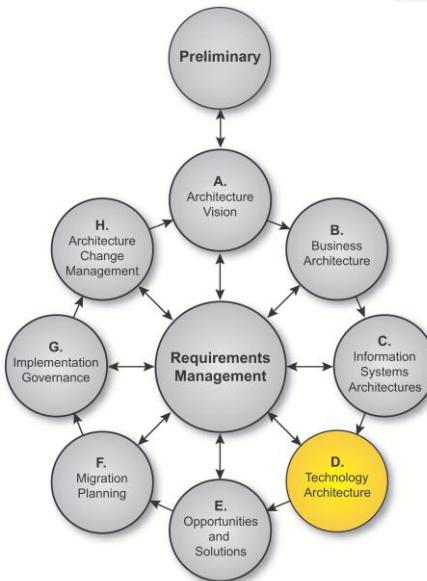
Communications Engineering Diagram



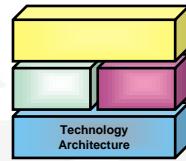
24



Phase D Technology Architecture Catalogs, Matrices and Diagrams



7/3/2014



TOGAF is a registered trademark of The Open Group in the United States and other countries

25



Migration Planning Techniques

Module 23

V9.1 Edition Copyright © 2009-2011

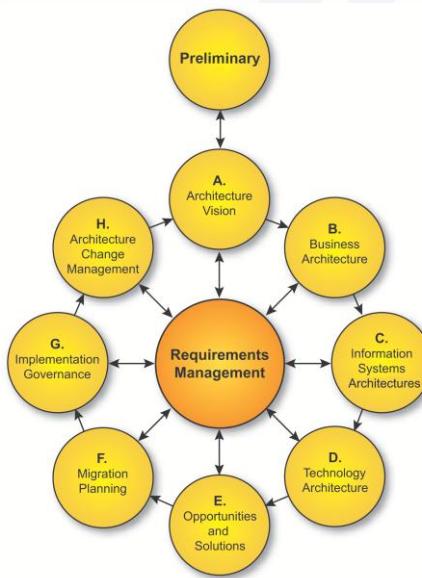
THE *Open* GROUP

All rights reserved

Published by The Open Group, 2011



Migration Planning Techniques



7/3/2014

TOGAF is a registered trademark of The Open Group
in the United States and/or other countries.



Roadmap

Part I - Introduction
Preface, Executive Overview, Core Concepts, Definitions and Release Notes
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 – Reference Models
Foundation Architecture: Technical Reference Model
Integrated Information Infrastructure Reference Model
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 28



3

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*

4

7/3/2014

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

7/3/2014



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		

7/3/2014



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



7/3/2014

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	



7/3/2014

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

7/3/2014



Architecture Definition Increments Table

Architecture Definition - Project Objectives by Increment (Example Only)				
Project	April 2007/2008	April 2008/2009	April 2009/2010	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	
...

7/3/2014



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

7/3/2014



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)
...

7/3/2014



The Business Value Assessment Technique

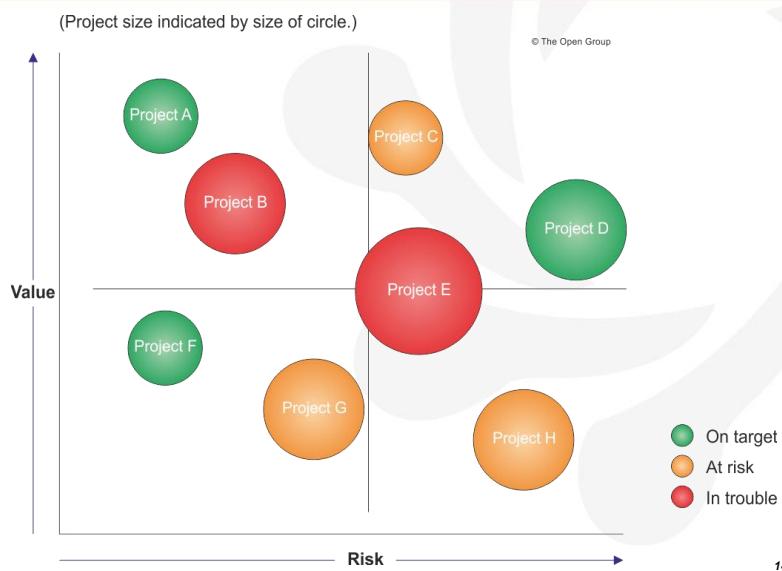
- ❖ This technique to assess business value includes drawing up a matrix with value and risk index dimensions
- ❖ It is used in Phase F to develop an estimated value to the business for each project
- ❖ The value index should include criteria such as compliance to principles, financial contribution,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

7/3/2014

13



The Business Value Assessment Technique



7/3/2014

14



Summary

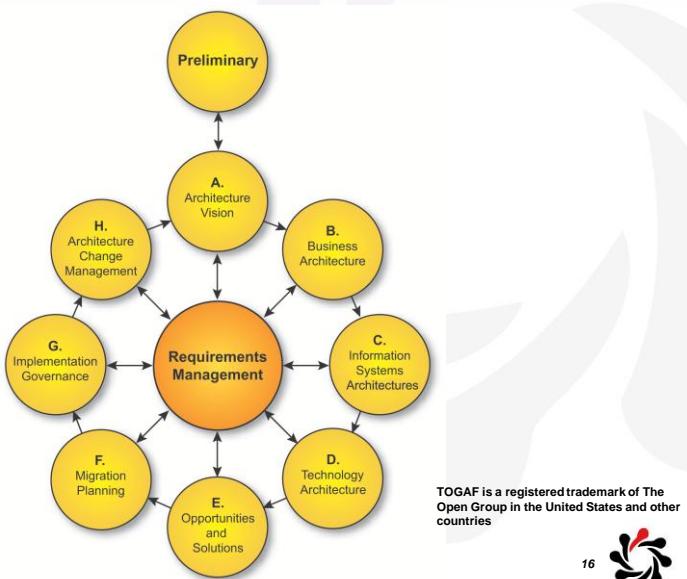
This module has explained the techniques used in Phase E and F for migration planning. In particular, it has discussed

- ❖ 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*)

7/3/2014



Migration Planning Techniques



7/3/2014



Phase E

Opportunities and Solutions

Module 24

V9.1 Edition Copyright © 2009-2011

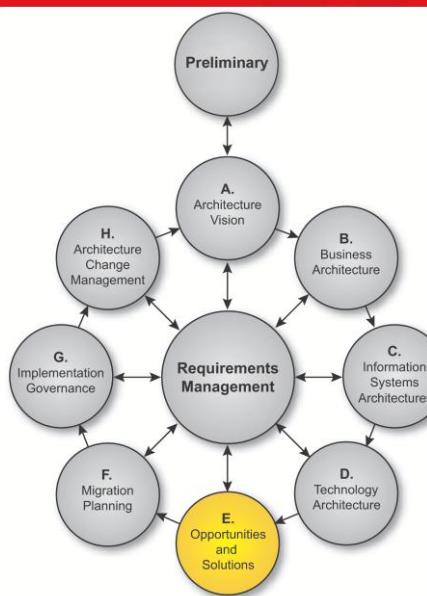


All rights reserved

Published by The Open Group, 2011



Phase E: Opportunities and Solutions



7/3/2014



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

3 

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

4 

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

7/3/2014

5



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

7/3/2014

6



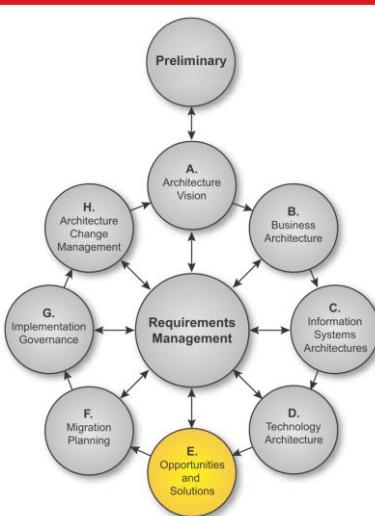
Approach

- ❖ 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

7/3/2014



Phase E: Inputs

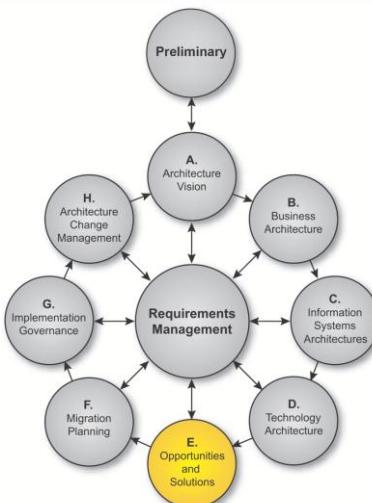


- ❖ Product Information
- ❖ Request for Architecture Work
- ❖ Capability Assessment
- ❖ Communications Plan
- ❖ Planning Methodologies
- ❖ Governance models and frameworks
- ❖ Tailored Architecture Framework

7/3/2014



Phase E: Inputs



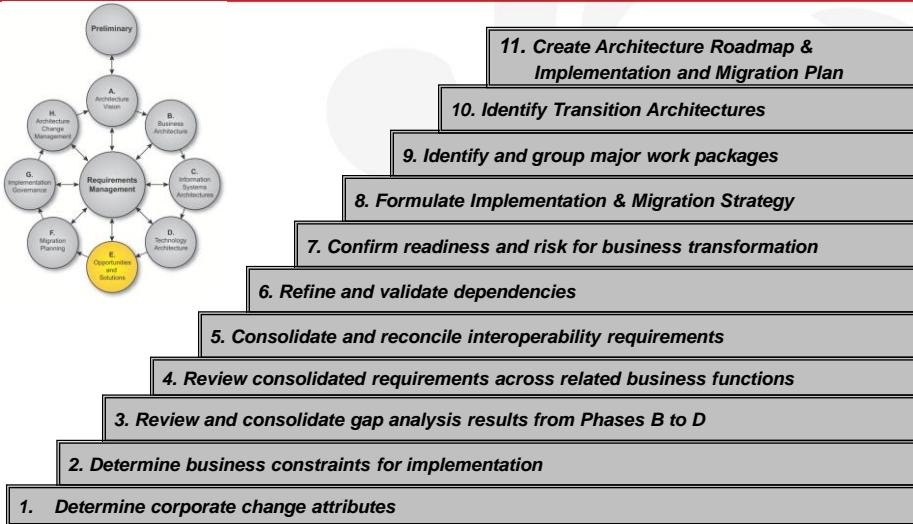
- ❖ Statement of Architecture Work
- ❖ Architecture Vision
- ❖ Architecture Repository
- ❖ Draft Architecture Definition Document
- ❖ Draft Architecture Requirements Specification
- ❖ Change Requests for existing programs and projects
- ❖ Candidate Architecture Roadmap components from Phases B,C, and D

7/3/2014

9



Steps



7/3/2014

10



Step 1: Determine Corporate Change Attributes

- ❖ Create an Implementation Factor Assessment and Deduction Matrix
- ❖ Assess Transition Capabilities of Corporate and Partner Organizations
- ❖ Assess Transition Capabilities of the Enterprise and IT Organization

11


7/3/2014

Step 2: Determine Business Constraints for Implementation

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

12


7/3/2014

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
- ❖ Rationalize the Consolidated Gaps, Solutions, and Dependencies Matrix

13


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

14


7/3/2014

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

15 

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

16 

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

17 

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

18 

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
- ❖ Analyze the Work Packages with Respect to Business Transformation and group into portfolios and projects

7/3/2014



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

7/3/2014



Step 11:

Create the Architecture Roadmap & Implementation and Migration Plan

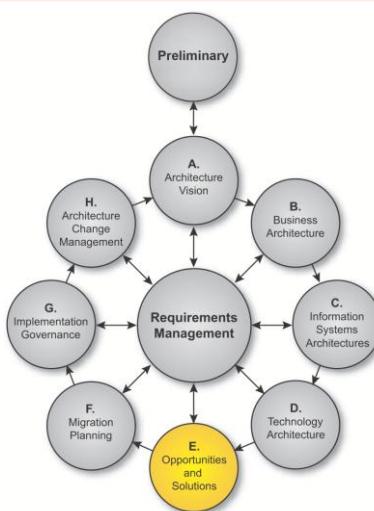
- ❖ Consolidate the work packages and Transition Architectures into the Architecture Roadmap, Version 0.1
 - The Architecture Roadmap must demonstrate how the selection and timeline of Transition Architectures and work packages realizes the Target Architecture
- ❖ The Implementation and Migration Plan, 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

21



7/3/2014

Phase E Outputs



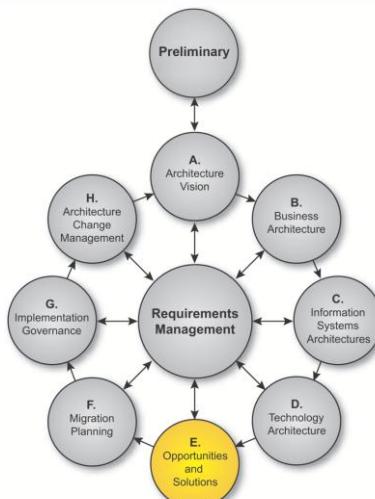
- ❖ Statement of Architecture Work
- ❖ Architecture Vision
- ❖ Draft Architecture Definition Document, including:
 - Transition Architectures, if any
- ❖ Draft Architecture Requirements Specification, including:
 - Consolidated Gaps, Solutions and Dependencies Assessment

22



7/3/2014

Phase E Outputs

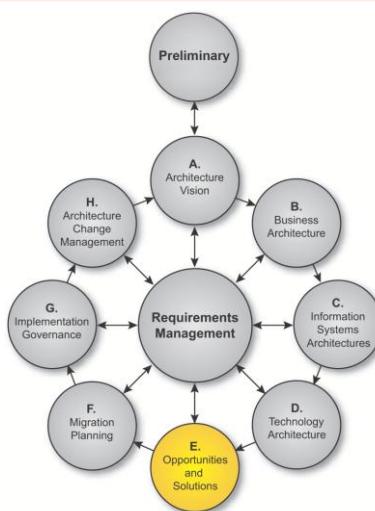


- ❖ Capability Assessment, including:
 - Business Capability Assessment
 - IT Capability Assessment
- ❖ Architecture Roadmap, including
 - Work Package portfolio
 - Identification of Transition Architectures, if any
 - Implementation Recommendations
- ❖ Implementation & Migration Plan (outline)

23



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

24



Summary

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

7/3/2014

25



TOGAF 9 Artifacts

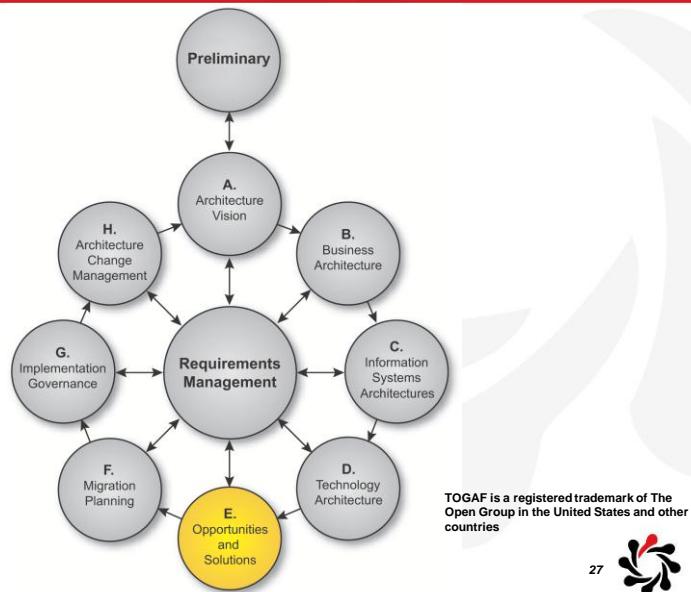
Preliminary Phase	Phase A, Architecture Vision			
Principles catalog	Stakeholder Map matrix	Solution Concept Diagram	Value Chain Diagram	
Requirements Management				
Requirements catalog				
Phase B, Business Architecture	Phase C, Data Architecture	Phase C, Application Architecture	Phase D, Technology Architecture	
Catalog <ul style="list-style-type: none">• Organization/Actor• Driver/Goal/Objective• Role• Business Service/Function• Location• Process/Event/Control/Product• Contract/Measure Matrix <ul style="list-style-type: none">• Business Interaction Diagram <ul style="list-style-type: none">• Business Footprint• Business Service/Information• Functional Decomposition• Product Lifecycle• Goal/Objective/Service• Use-Case• Organization Decomposition• Process Flow• Event	Catalog <ul style="list-style-type: none">• Data Entity/Data Component Matrix <ul style="list-style-type: none">• Data Entity/Business Function• System/Data Diagram <ul style="list-style-type: none">• Class• Data Dissemination• Data Security• Class Hierarchy• Data Migration• Data Lifecycle	Catalog <ul style="list-style-type: none">• Application Portfolio• Interface Matrix <ul style="list-style-type: none">• System/Organization• Role/System• System/Function• Application Interaction Diagram <ul style="list-style-type: none">• Application Communication• Application and User Location• System Use-Case• Enterprise Manageability• Process/System Realization• Software Engineering• Application Migration• Software Distribution	Catalog <ul style="list-style-type: none">• Technology Standards• Technology Portfolio Matrix <ul style="list-style-type: none">• System/Technology Diagram <ul style="list-style-type: none">• Environments and Locations• Platform Decomposition• Processing• Networked Computing/Hardware• Communications Engineering	
Phase E, Opportunities & Solutions				
Project Context diagram	Benefits diagram			

7/3/2014

26



Phase E: Opportunities and Solutions



7/3/2014

Phase F

Migration Planning

Module 25

V9.1 Edition Copyright © 2009-2011



All rights reserved

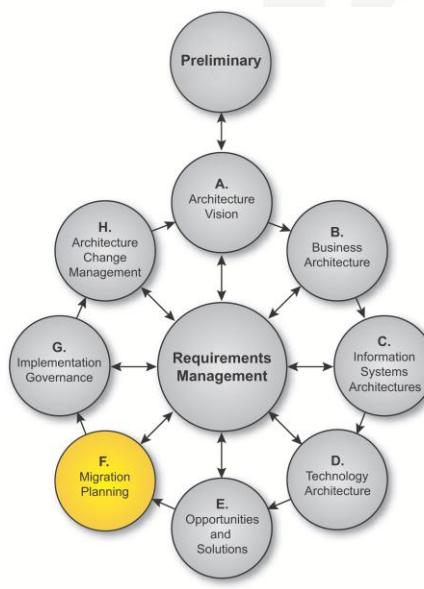
Published by The Open Group, 2011



Phase F Migration Planning

7/3/2014

OGAF is a registered trademark of The Open Group in the U.S. and/or other countries.



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

3



Phase F Objectives

- ❖ Finalize 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

4



Approach

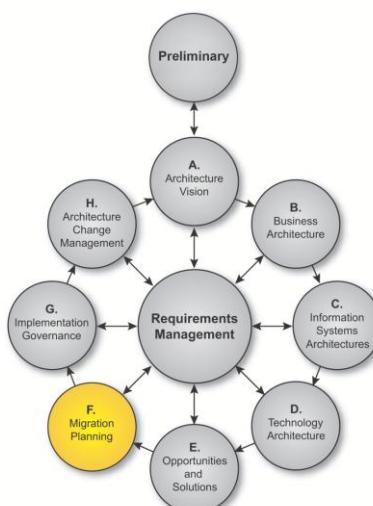
- ❖ The focus is creation of the Implementation and Migration plan in co-operation with project and portfolio managers
- ❖ Activities include the dependencies, costs, and benefits of the various migration projects within the context of the enterprise's other activity

5



7/3/2014

Phase F: Inputs



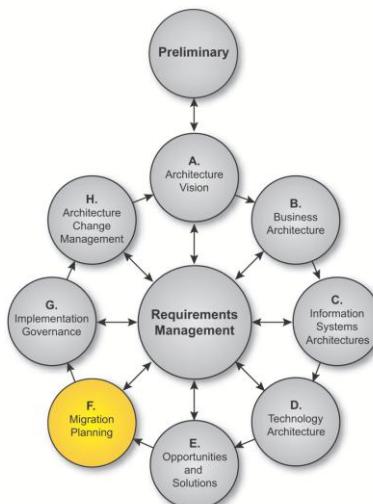
- ❖ Request for Architecture Work
- ❖ Communications Plan
- ❖ Organizational model for enterprise architecture
- ❖ Governance Models and Frameworks
- ❖ Tailored Architecture Framework
- ❖ Statement of Architecture Work
- ❖ Architecture Vision
- ❖ Architecture Repository

6



7/3/2014

Phase F: Inputs

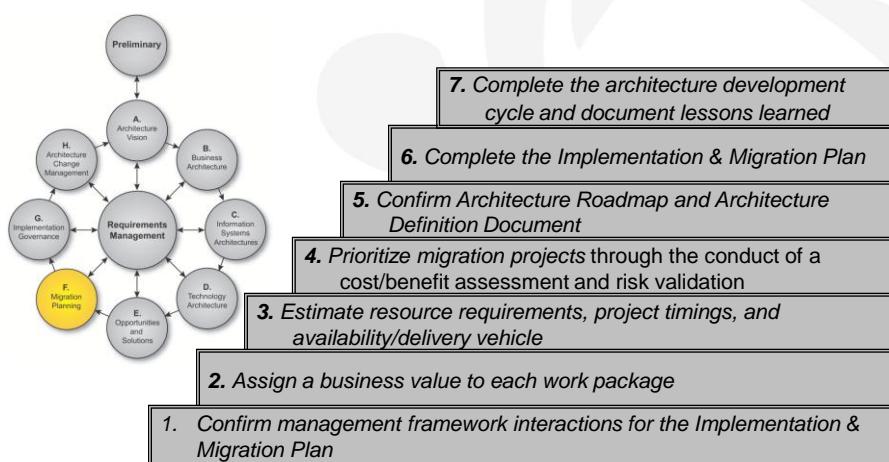


- ❖ Draft Architecture Definition Document, including
 - Transition Architectures, if any
- ❖ Draft Architecture Requirements Specification
- ❖ Change Requests for existing programs and projects
- ❖ Architecture Roadmap, including:
 - Identification of work packages
 - Identification of Transition Architectures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

7



Steps



8



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 organization
 - 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

9



Step 2:

Assign a Business Value to Each Work Package

- ❖ Establish what constitutes business value within the organization, 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

10



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



7/3/2014

Step 4:

Prioritize 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



7/3/2014

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 finalized, 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

7/3/2014



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

7/3/2014



Step 7:

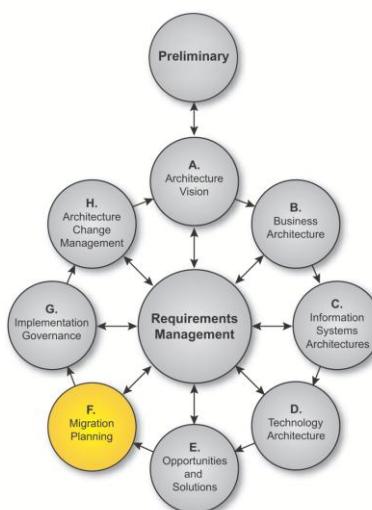
Complete the Architecture Development Cycle and Document Lessons Learned

- ❖ 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



7/3/2014

Phase F Outputs

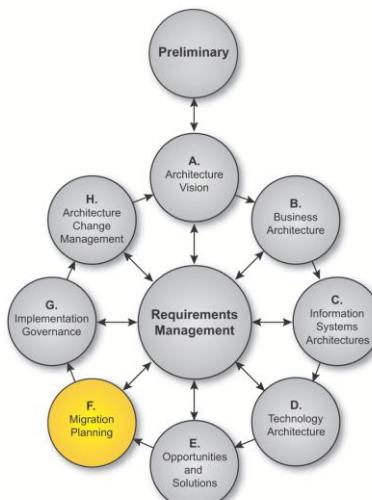


- ❖ Implementation and Migration Plan (detailed)
- ❖ Finalized Architecture Definition Document, including:
 - Finalized Transition Architectures, if any
- ❖ Finalized Architecture Requirements Specification
- ❖ Finalized Architecture Roadmap
- ❖ Re-Usable ABBs
- ❖ Requests for Architecture Work for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



7/3/2014

Summary



7/3/2014

17



- ❖ Phase F addresses migration planning - how to move from the Baseline to the Target
- ❖ It includes creating the finalized 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

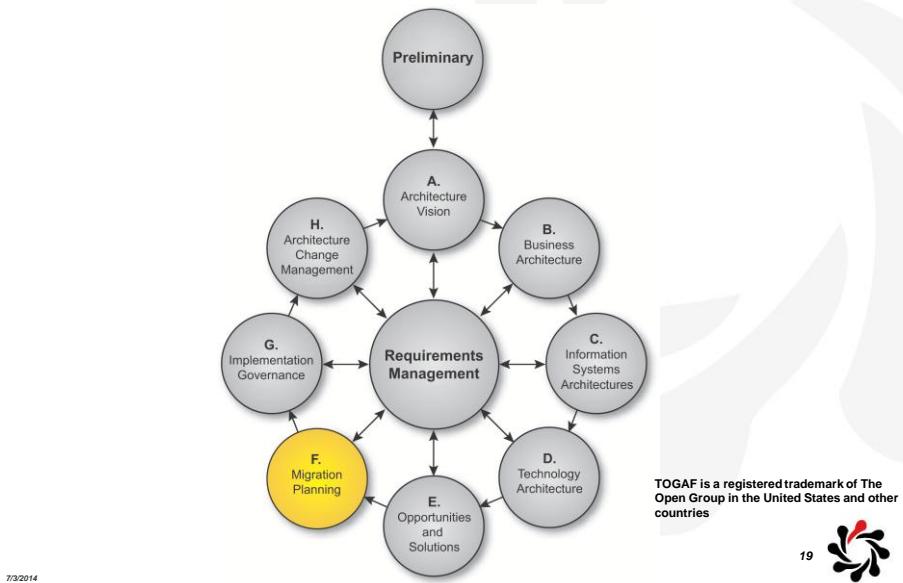
Phase F: Migration Planning			
Objectives	Steps	Inputs	Outputs
<p>Finalize the Architecture Roadmap and the supporting Implementation and Migration Plan</p> <p>Ensure that the Implementation and Migration Plan is coordinated with the enterprise's approach to managing and implementing change in the enterprise's 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 development cycle and document lessons learned</p>	<p>Request for Architecture Work</p> <p>Communications Plan</p> <p>Organizational 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>Finalized Architecture Definition Document, including:</p> <ul style="list-style-type: none"> • Finalized Transition Architectures, if any <p>Finalized Architecture Requirements Specification</p> <p>Finalized 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>

7/3/2014

18



Phase F Migration Planning



Phase G

Implementation Governance

Module 26

V9.1 Edition Copyright © 2009-2011

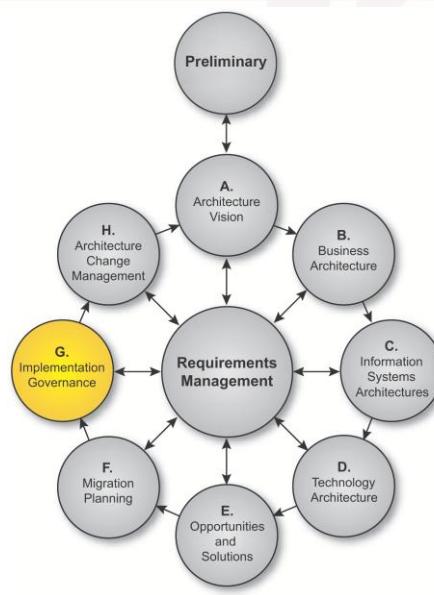


All rights reserved

Published by The Open Group, 2011



Phase G Implementation Governance



7/3/2014



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

3



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

4



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

5



Approach

- ❖ Establish an implementation program that will enable the delivery of the Transition Architectures agreed for implementation during the Migration Planning phase
- ❖ Adopt a phased deployment schedule that reflects the business priorities embodied in the Architecture Roadmap
- ❖ Follow the organization's standard for corporate, IT, and architecture governance
- ❖ Use the organization's established portfolio/program management approach, where this exists
- ❖ Define an operations framework to ensure the effective long life of the deployed solution

6



Approach

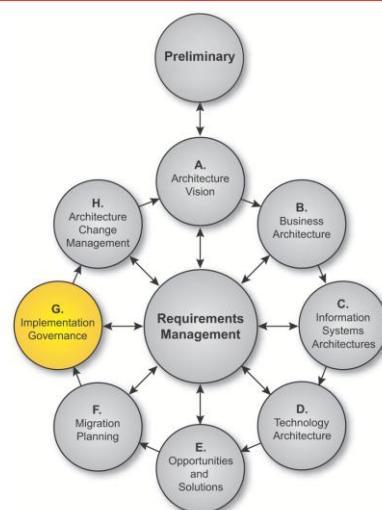
- ❖ Establish the connection between the architecture and implementation organization through the Architecture Contract
- ❖ Project details are developed, including
 - Name, description, and objectives
 - Scope, deliverables, and constraints
 - Measures of effectiveness
 - Acceptance criteria
 - Risks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

7



7/3/2014

Phase G: Inputs



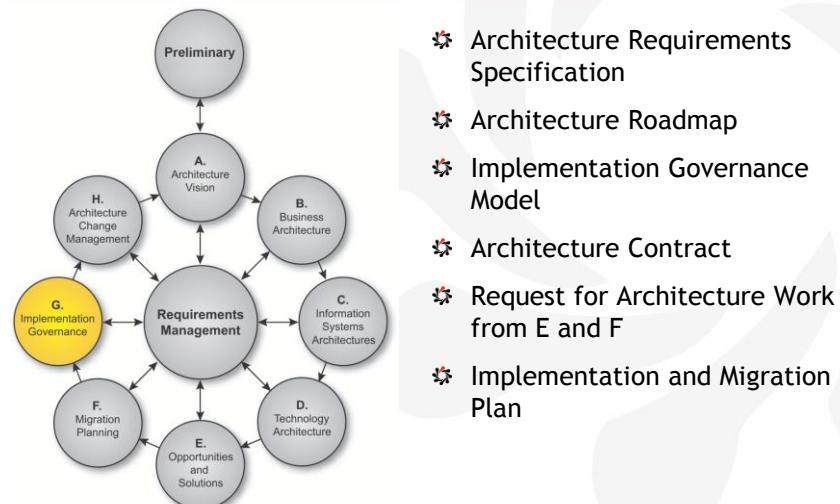
- ❖ Request for Architecture Work
- ❖ Capability Assessment
- ❖ Organizational model for EA
- ❖ Tailored Architecture Framework
- ❖ Statement of Architecture Work
- ❖ Architecture Vision
- ❖ Architecture Repository
- ❖ Architecture Definition Document

8



7/3/2014

Phase G: Inputs

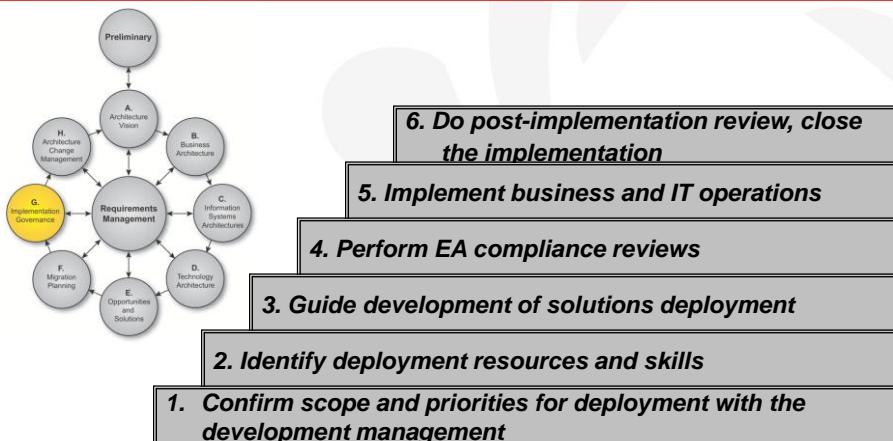


7/3/2014

9



Steps



7/3/2014

10



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

7/3/2014



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

7/3/2014



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

7/3/2014



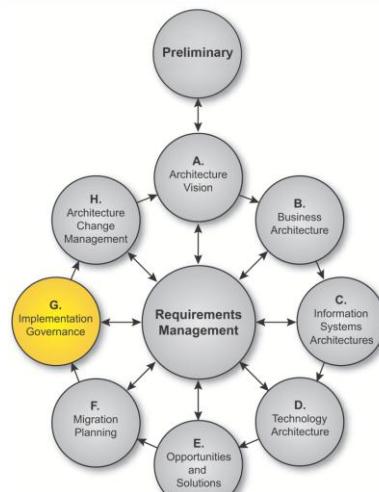
Step 6:
Do post-implementation review, close the implementation

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

7/3/2014



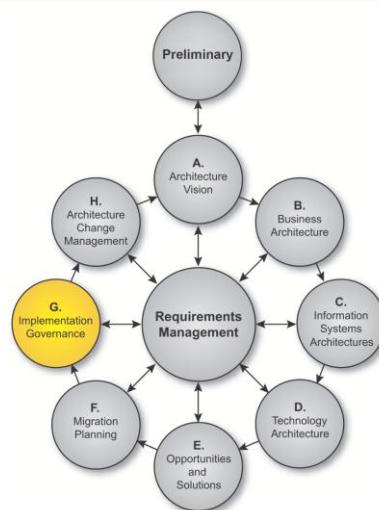
Phase G Outputs



- ❖ 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

17

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

18

Summary

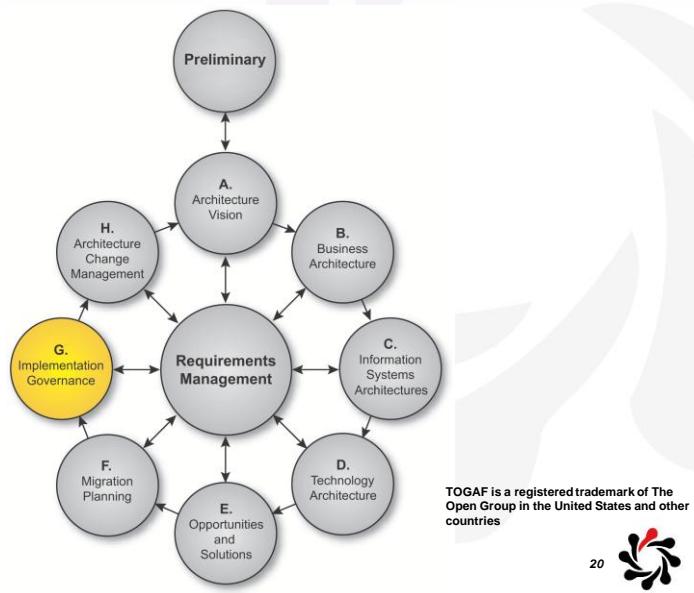
Phase G: Implementation Governance			
Objectives	Steps	Inputs	Outputs
Ensure conformance with the Target Architecture by implementation projects	Confirm scope and priorities for deployment with development management	Request for Architecture Work Capability Assessment Organizational Model for Enterprise Architecture	Architecture Contract (signed) Compliance Assessments Change Requests
Perform appropriate Architecture Governance functions for the solution and any implementation-driven architecture Change Requests	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	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	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

7/3/2014



Phase G Implementation Governance

7/3/2014



Phase H

Architecture Change Management

Module 27

V9.1 Edition Copyright © 2009-2011

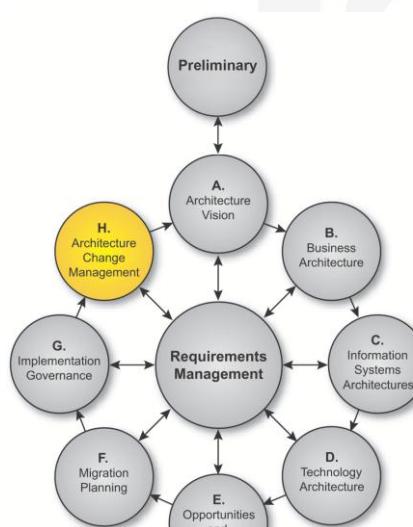


All rights reserved
Published by The Open Group, 2011



Phase H - Architecture Change Management

7/3/2014



TOGAF® 9.1
Open Group
certified



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

3



7/3/2014

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

4



7/3/2014

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

5



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

6



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



7/3/2014

Maintenance versus Redesign

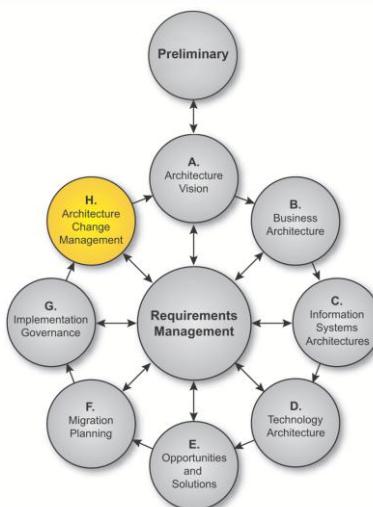
If the change

- ❖ 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



7/3/2014

Phase H: Inputs

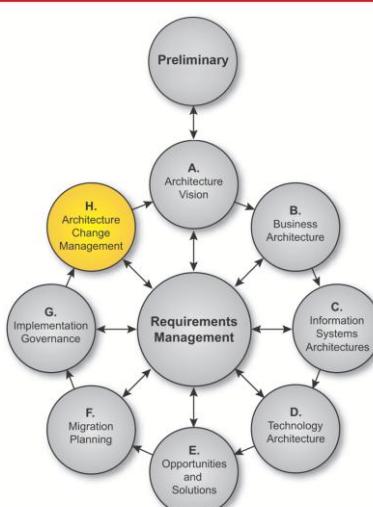


- ✖ Request for Architecture Work
- ✖ Organizational model for EA
- ✖ Tailored Architecture Framework
- ✖ Statement of Architecture Work
- ✖ Architecture Vision
- ✖ Architecture Repository
- ✖ Architecture Definition document
- ✖ Architecture Requirements Specification

9



Phase H: Inputs



- ✖ Architecture Roadmap
- ✖ Change Requests (due to technology changes, business changes, lessons learned)
- ✖ Implementation Governance Model
- ✖ Architecture Contract
- ✖ Compliance Assessments
- ✖ Implementation and Migration Plan

10



Change Requests

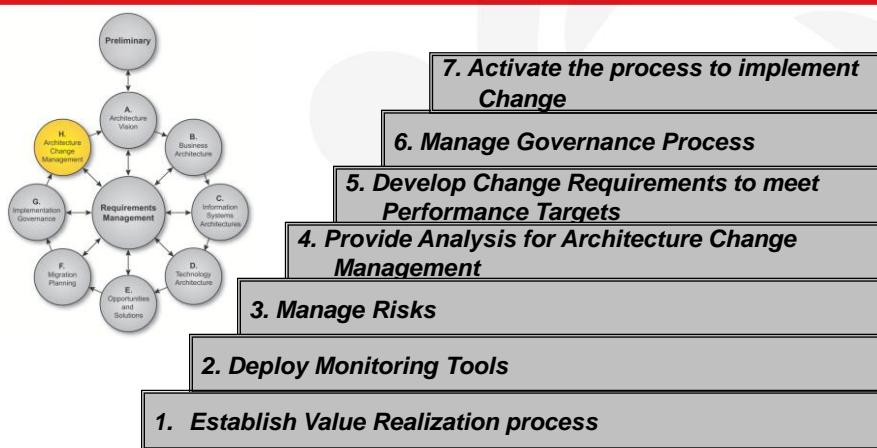
- ❖ Description of the proposed change
- ❖ Rationale for the proposed change
- ❖ Impact assessment of the proposed change, including
 - Reference to specific requirements
 - Stakeholder priority of the requirements to date
 - Phases to be revisited
 - Phase to lead on requirements prioritization
 - Results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

11



7/3/2014

Steps



12



7/3/2014

Step 1: Establish Value Realization Process

- ❖ Influence business projects to exploit the enterprise architecture for value realization (outcomes)

13 

7/3/2014

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

14 

7/3/2014

Step 3: Manage Risks

- ❖ Manage enterprise architecture risks and provide recommendations
- ❖ See Chapter 31 Risk Management

15 

Step 4: Provide Analysis for Architecture Change Management

- ❖ Analyze performance
- ❖ Conduct enterprise architecture performance reviews with service management
- ❖ Assess Change Requests and reporting to ensure that the expected value realization 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

16 

Step 5: Develop Change Requirements to Meet Performance Targets

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

7/3/2014



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)

7/3/2014



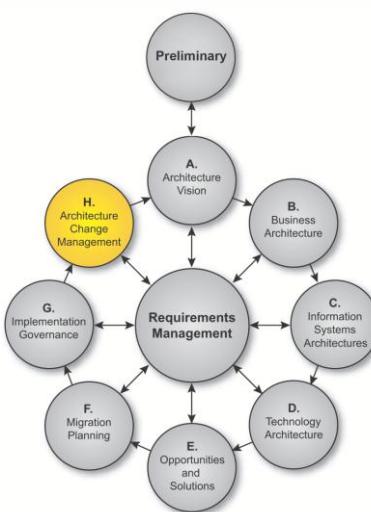
Step 7: Activate the Process to Implement Change

- ❖ 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

19

7/3/2014

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

20

7/3/2014

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))

7/3/2014



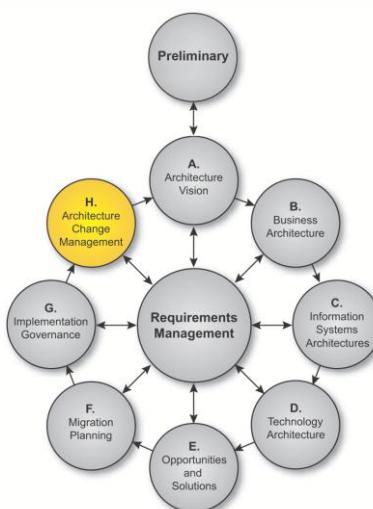
Request for Architecture Work

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

7/3/2014



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

7/3/2014

23



Summary

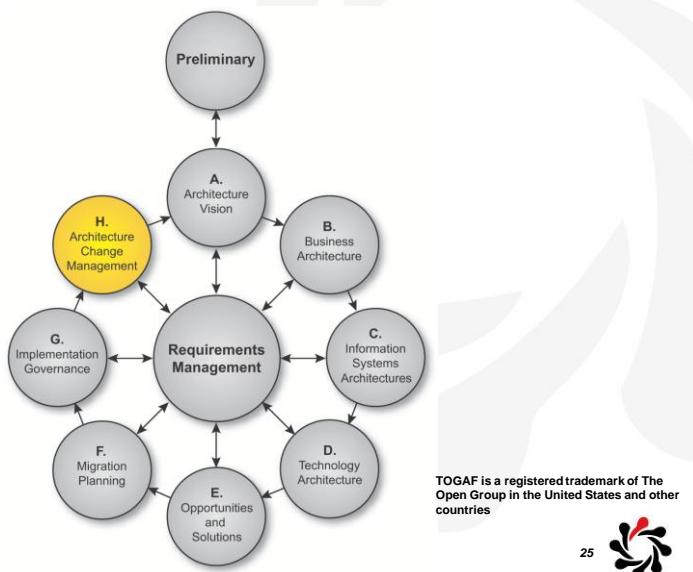
Phase H: Architecture Change Management			
Objectives	Steps	Inputs	Outputs
Ensure that the architecture lifecycle is maintained	Establish value realization process	Request for Architecture Work	Architecture updates
Ensure that the Architecture Governance Framework is executed	Deploy monitoring tools	Organizational Model for Enterprise Architecture	Changes to architecture framework and principles
Ensure that the enterprise Architecture Capability meets current requirements	Manage risks	Tailored Architecture Framework	New Request for Architecture Work, to initiate another cycle of the ADM
	Provide analysis for architecture change management	Statement of Architecture Work	Statement of Architecture Work, updated if necessary
	Develop change requirements to meet performance targets	Architecture Vision	Architecture Contract, updated if necessary
	Manage governance process	Architecture Repository	
	Activate the process to implement change	Architecture Definition Document	
		Architecture Requirements Specification	Compliance Assessments, updated if necessary
		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	

7/3/2014

24



Phase H - Architecture Change Management



Architecture Requirements Management

Module 28

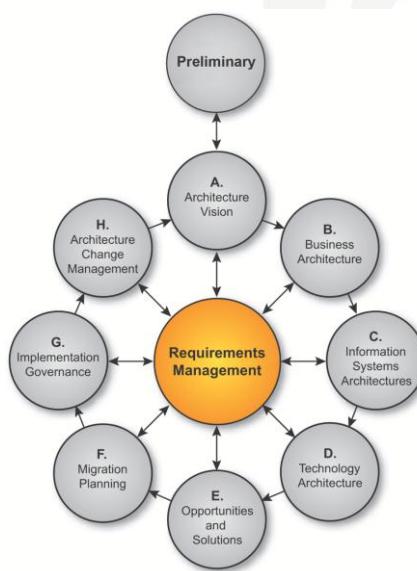
V9.1 Edition Copyright © 2009-2011



All rights reserved
Published by The Open Group, 2011



Architecture Requirements Management



TOGAF is a registered trademark of The Open Group in the U.S. and/or other countries.



Module Objectives

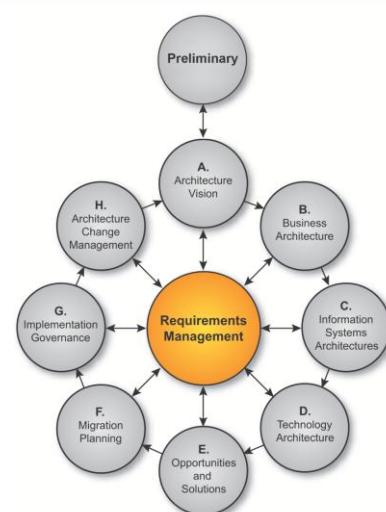
The objectives of this module are to understand

- ❖ 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

3



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

4



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

5



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

6



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

7/3/2014

7



Resources

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

7/3/2014

8



Volère Requirements Specification Template

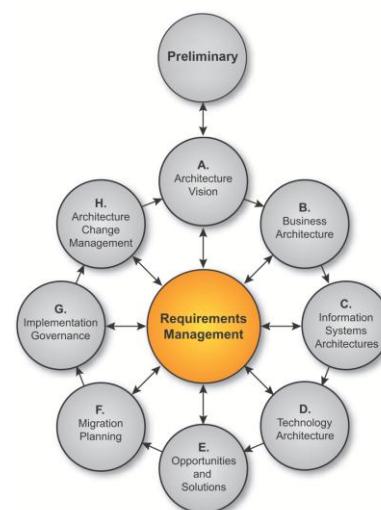
- ❖ This is an example of a suitable requirements template
- ❖ The ‘Waiting Room’
 - This is a repository for requirements that are beyond the planned scope, or the time available, for the current iteration. Having the ability to store future requirements helps avoid the perception that they are simply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

9



7/3/2014

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

10



7/3/2014

Steps Overview

Requirements Management Steps

2. Baseline requirements
3. Monitor baseline requirements

5. Identify changed requirement and record priorities
8. Update the 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



7/3/2014

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



7/3/2014

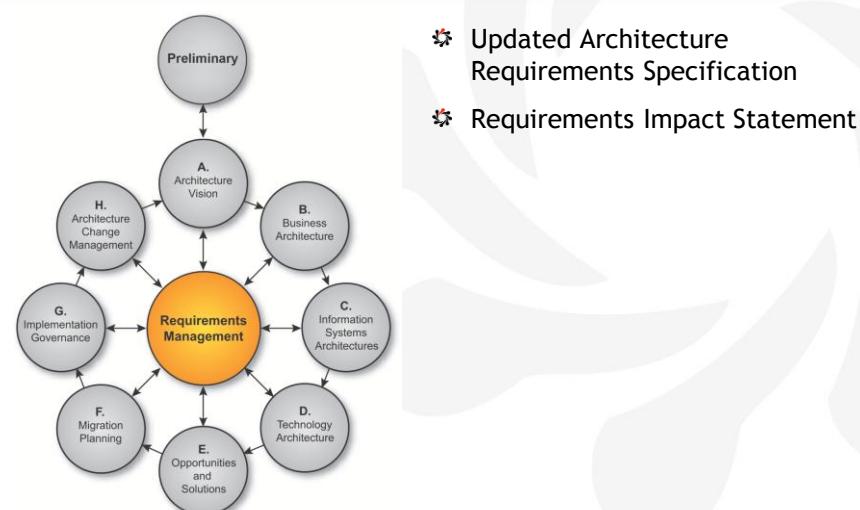
Steps in Detail

8. Update the 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.

15

7/3/2014

Requirements Management: Outputs



16

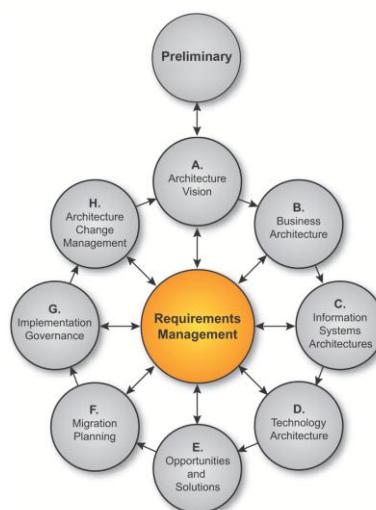
7/3/2014

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 finalized then the Architecture Requirements Specification should be updated

17 

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

18 

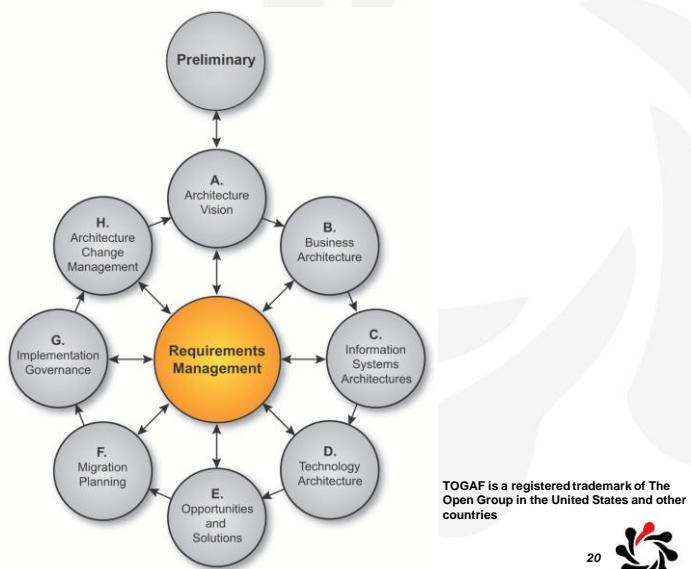
Summary

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 Monitor 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	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 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).	

7/3/2014



Architecture Requirements Management



7/3/2014



Architecture Partitioning

Module 29

V9.1 Edition Copyright © 2009-2011



All rights reserved
Published by The Open Group, 2011



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 organization
- ❖ 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

7/3/2014



Roadmap

Part I - Introduction
Preface, Executive Overview, Core Concepts, Definitions and Release Notes
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 – Reference Models
Foundation Architecture: Technical Reference Model
Integrated Information Infrastructure Reference Model
Part VII – Architecture Capability Framework
Architecture Board
Architecture Compliance
Architecture Contracts
Architecture Governance
Architecture Maturity Models
Architecture Skills Framework

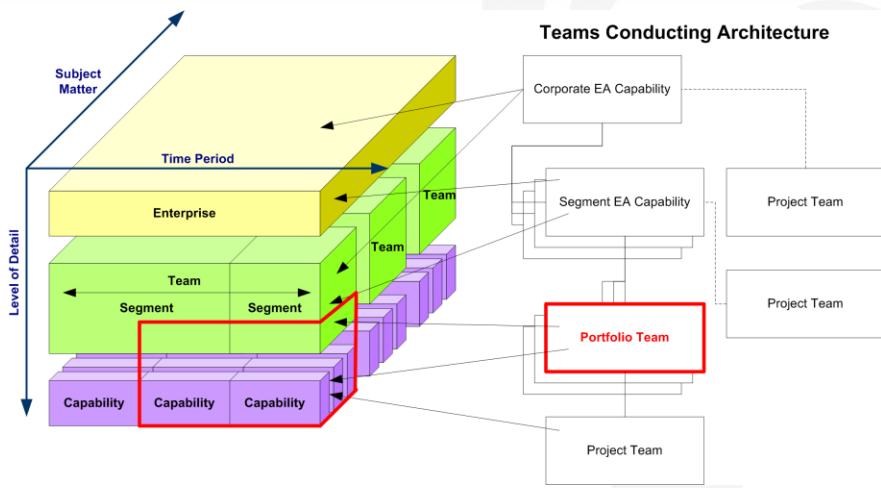
3 Chapter 40 in Part V, Enterprise Continuum and Tools



3 

7/3/2014

Partitioning



4 

7/3/2014

The Need to Partition

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

7/3/2014



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

7/3/2014



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

7/3/2014



Applying Partitioning to the ADM

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

7/3/2014



Preliminary Phase

- ❖ Determine the organization 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?

7/3/2014

9



Summary

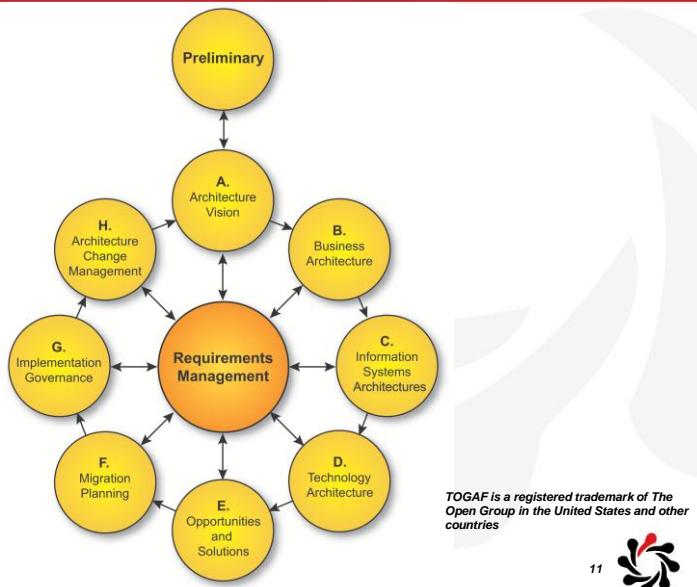
- ❖ Architecture Partitioning can be used to manage complexity, parallel developments, conflicts and re-use
- ❖ Classification criteria are defined for architectures and, solutions
- ❖ TOGAF provides guidance on how to use partitioning in the Preliminary Phase of the ADM cycle

7/3/2014

10



Architecture Partitioning



7/3/2014

11



Adapting the ADM: Iteration and Levels

Module 30

V9.1 Edition Copyright © 2009-2011

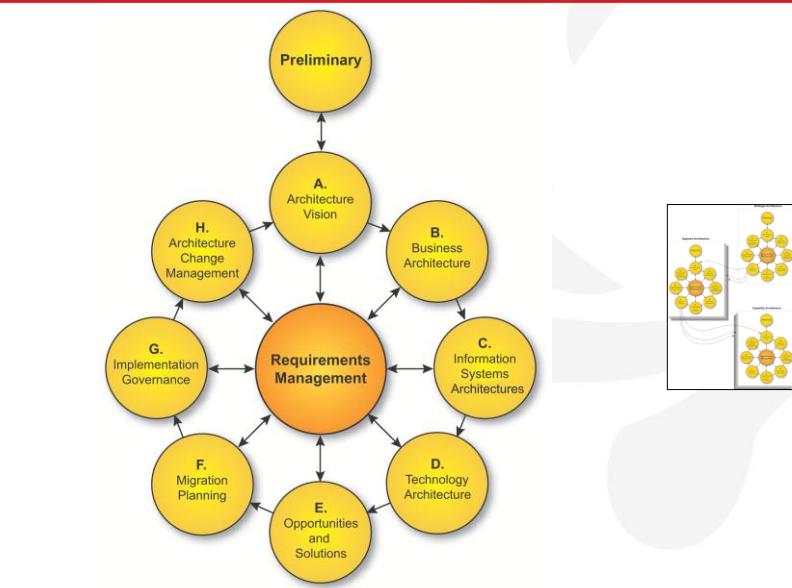


All rights reserved

Published by The Open Group, 2011



Adapting the ADM: Iteration and Levels



7/3/2014

z



Roadmap

Part I - Introduction
Preface, Executive Overview, Core Concepts, Definitions and Release Notes
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 – Reference Models
Foundation Architecture: Technical Reference Model
Integrated Information Infrastructure Reference Model
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, Chapters 19 and 20



3

7/3/2014

Module Objectives

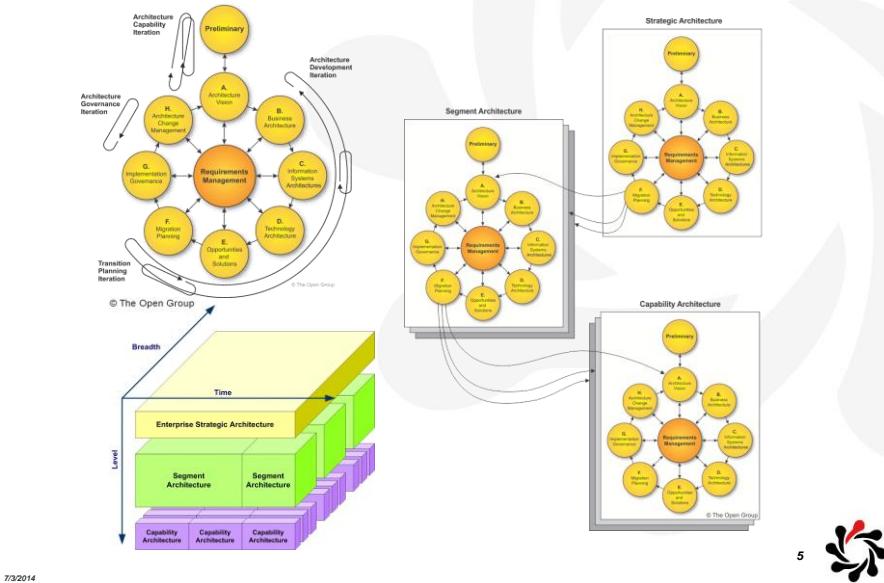
The objectives of this module are

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

4

7/3/2014

Iteration and Levels



5



Iteration and the ADM

- The ADM supports a number of concepts that can be characterized as Iteration

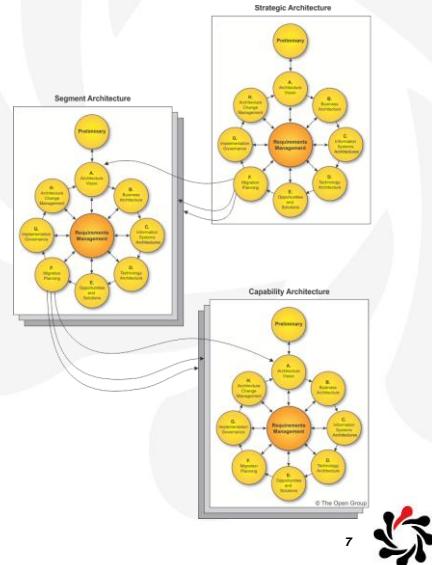
- Iteration to describe a comprehensive Architecture Landscape through multiple ADM cycles based upon individual initiatives bound to the scope of the Request for Architecture Work
- Iteration to describe the integrated process of developing an architecture where the activities described in different ADM phases interact to produce an integrated architecture
- Iteration to describe the process of managing change to the organization's Architecture Capability

6



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



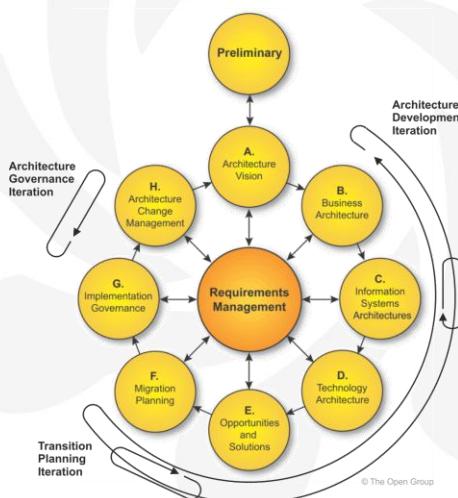
7/3/2014

7



Iteration within an ADM Cycle

- ✿ Projects may operate multiple ADM Phases concurrently
 - Typically used 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



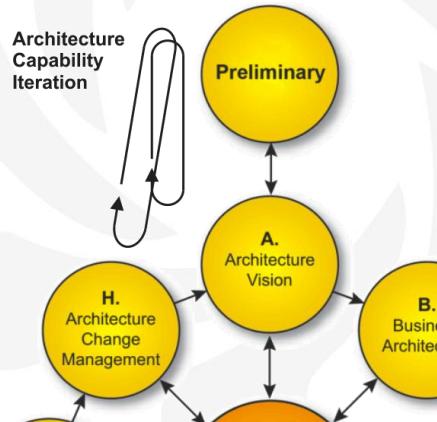
7/3/2014

8



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 organization's Architecture Capability as a result of new or changed requirements as a result of a change request in Phase H



7/3/2014

9



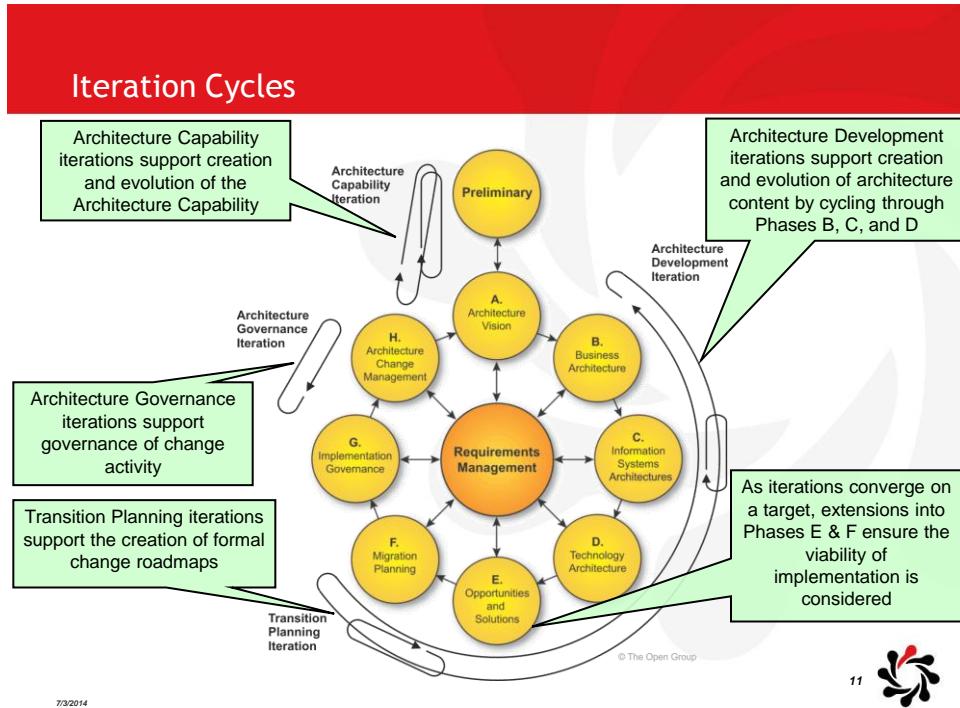
Factors influencing the use of Iteration

- ❖ The formality and nature of established checkpoints within the organization
- ❖ 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

7/3/2014

10





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:

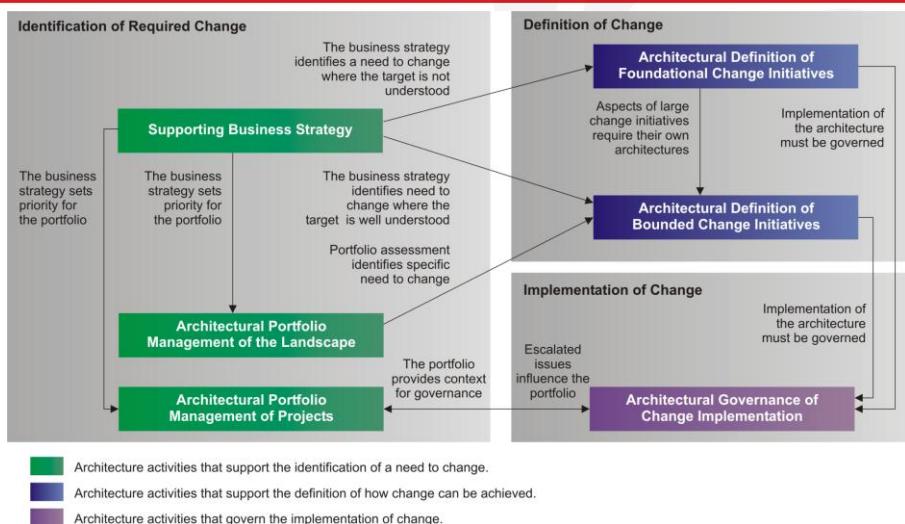
- Identification of Change Required
- Definition of Change
- Implementation of Change

7/3/2014

13



Classes of Architecture Engagement



7/3/2014

14



Iteration Considerations

Iteration between ADM Cycles

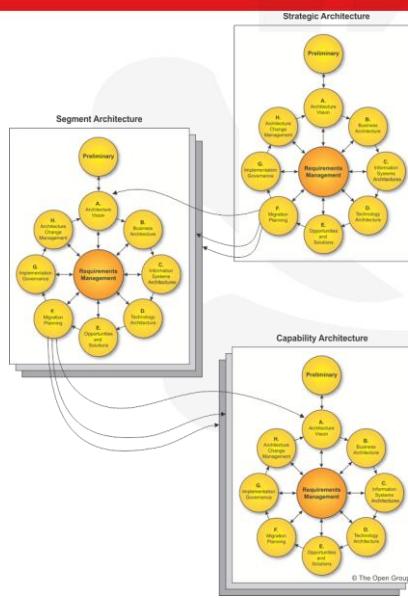
- Suitable where a higher level architecture guides and constrains a more detailed architecture
- This approach uses the Migration Planning phase of one ADM cycle to initiate new projects which will also develop architectures
- It is a method to develop a complete architecture landscape in multiple iterations

7/3/2014

15



A Hierarchy of ADM Processes



7/3/2014

16



Iteration within the ADM Cycle - Baseline First

		Architecture Development			Transition Planning		Architecture Governance	
TOGAF Phase		Iteration 1	Iteration 2	Iteration n	Iteration 1	Iteration n	Iteration 1	Iteration n
Preliminary		Informal	Informal	Informal				Light
Architecture Vision		Informal	Informal	Informal	Informal	Informal		Light
Business Architecture	Baseline	Core	Light	Core	Informal	Informal		Light
	Target	Informal	Core	Core	Informal	Informal		Light
Application Architecture	Baseline	Core	Light	Core	Informal	Informal		Light
	Target	Informal	Core	Core	Informal	Informal		Light
Data Architecture	Baseline	Core	Light	Core	Informal	Informal		Light
	Target	Informal	Core	Core	Informal	Informal		Light
Technology Architecture	Baseline	Core	Light	Core	Informal	Informal		Light
	Target	Informal	Core	Core	Informal	Informal		Light
Opportunities and Solutions		Light	Light	Light	Core	Core	Informal	Informal
Migration Planning		Light	Light	Light	Core	Core	Informal	Informal
Implementation Governance					Informal	Informal	Core	Core
Change Management		Informal	Informal	Informal	Informal	Informal	Core	Core

■ Core: primary focus activity for the iteration

■ Light: secondary focus activity for the iteration

□ Informal: potential activity for the iteration, not formally mentioned in the method

© The Open Group



7/3/2014

17

Iteration within the ADM Cycle - Target First

		Architecture Development			Transition Planning		Architecture Governance	
TOGAF Phase		Iteration 1	Iteration 2	Iteration n	Iteration 1	Iteration n	Iteration 1	Iteration n
Preliminary		Informal	Informal	Informal				Light
Architecture Vision		Informal	Informal	Informal	Informal	Informal		Light
Business Architecture	Baseline	Informal	Core	Core	Informal	Informal		Light
	Target	Core	Light	Core	Informal	Informal		Light
Application Architecture	Baseline	Informal	Core	Core	Informal	Informal		Light
	Target	Core	Light	Core	Informal	Informal		Light
Data Architecture	Baseline	Informal	Core	Core	Informal	Informal		Light
	Target	Core	Light	Core	Informal	Informal		Light
Technology Architecture	Baseline	Informal	Core	Core	Informal	Informal		Light
	Target	Core	Light	Core	Informal	Informal		Light
Opportunities and Solutions		Light	Light	Light	Core	Core	Informal	Informal
Migration Planning		Light	Light	Light	Core	Core	Informal	Informal
Implementation Governance					Informal	Informal	Core	Core
Change Management		Informal	Informal	Informal	Informal	Informal	Core	Core

■ Core: primary focus activity for the iteration

■ Light: secondary focus activity for the iteration

□ Informal: potential activity for the iteration, not formally mentioned in the method

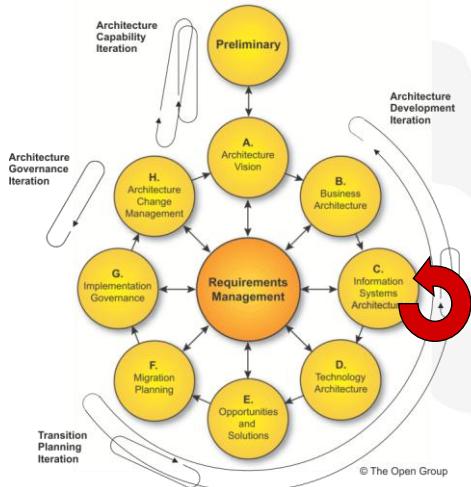
© The Open Group



7/3/2014

18

Architecture Development Iteration “Baseline First”



Iteration 1

- Define the Baseline Architecture

Iteration 2

- Define the Target Architecture and gaps

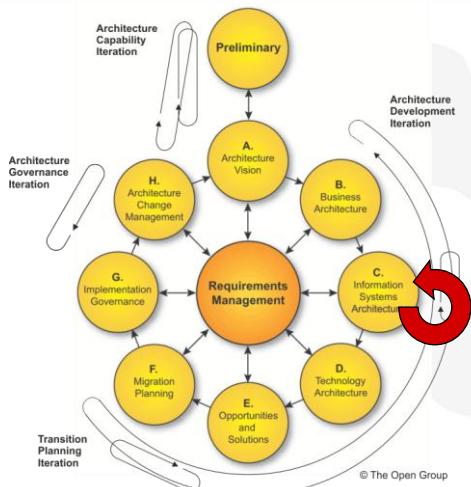
Iteration n

- Refine the Baseline Architecture, Target Architecture, and gaps

19



Architecture Development Iteration “Target First”



Iteration 1

- Define the Target Architecture

Iteration 2

- Define the Baseline Architecture and gaps

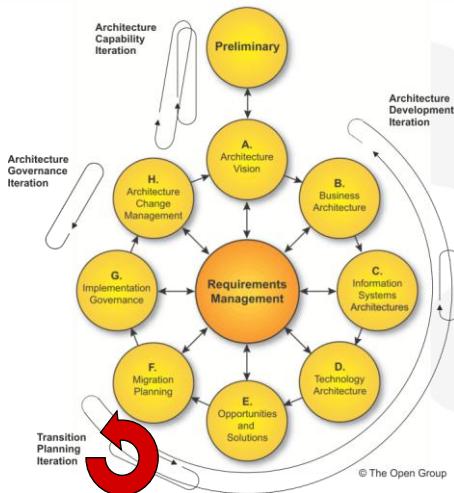
Iteration n

- Refine the Baseline architecture, Target Architecture, and gaps

20



Transition Planning



Iteration 1

- Define and agree a set of improvement opportunities, aligned against a provisional Transition Architecture

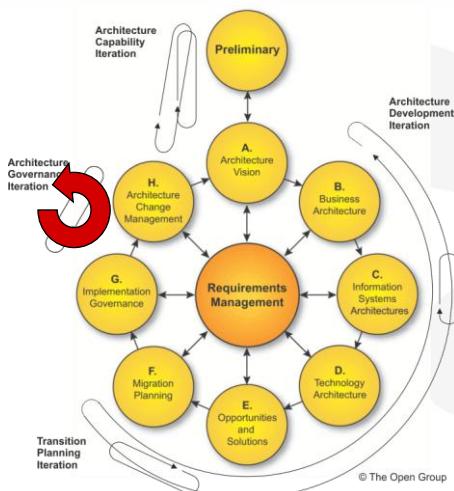
Iteration n

- Agree the Transition Architecture, refining the identified improvement opportunities to fit

21



Architecture Governance



Iteration 1

- Mobilize architecture governance and change management processes.

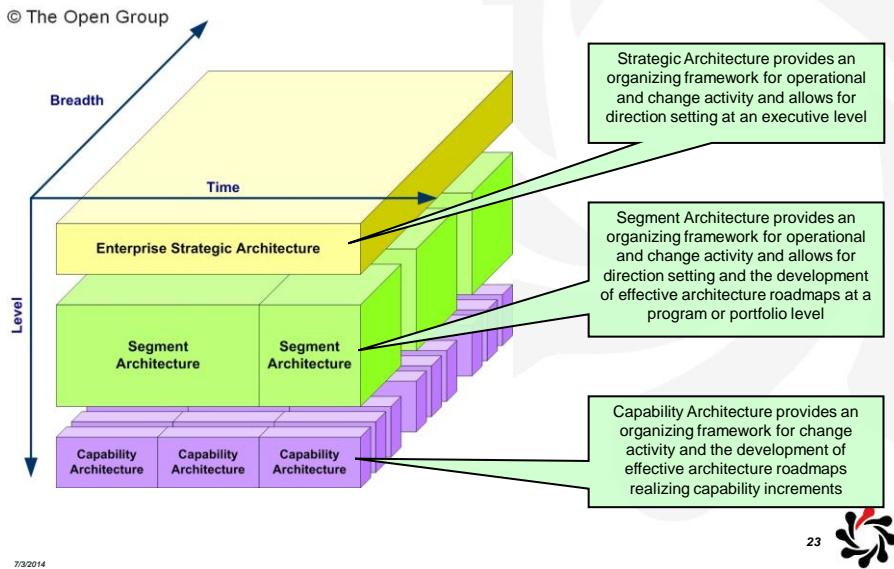
Iteration n

- Carry out architecture governance and change control

22



Applying the ADM Across the Architecture Landscape



7/3/2014



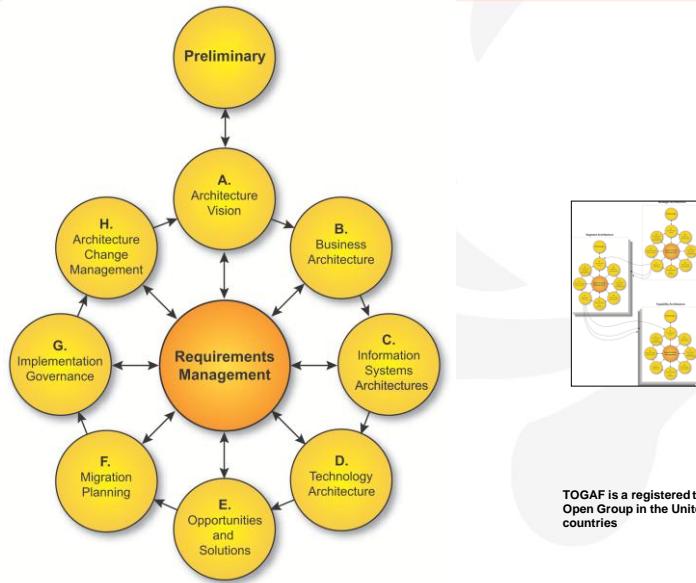
Summary

- ❖ TOGAF provides guidelines for adapting the ADM for iteration
- ❖ This includes proposed iteration cycles for different classes of architecture engagement
- ❖ Guidance is also provided for the use of levels for architecture development across the Architecture Landscape

7/3/2014



Adapting the ADM: Iteration and Levels



TOGAF is a registered trademark of The Open Group in the United States and other countries



7/3/2014

25

Adapting the ADM: Security

Module 31

V9.1 Edition Copyright © 2009-2011



All rights reserved

Published by The Open Group, 2011



Roadmap

Part I – Introduction
Preface, Executive Overview, Core Concepts, Definitions and Release Notes
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 – Reference Models
Foundation Architecture: Technical Reference Model
Integrated Information Infrastructure Reference Model
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 21



7/3/2014

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

3



7/3/2014

Security and the ADM

- ❖ TOGAF introduces guidance to help practitioners avoid missing critical security concerns
- ❖ The guidance is not intended to be a security architecture development methodology
- ❖ It is intended to inform the enterprise architect of the security architecture task and role
- ❖ Security objectives have been developed for each ADM Phase

4



7/3/2014

Security Architecture Characteristics

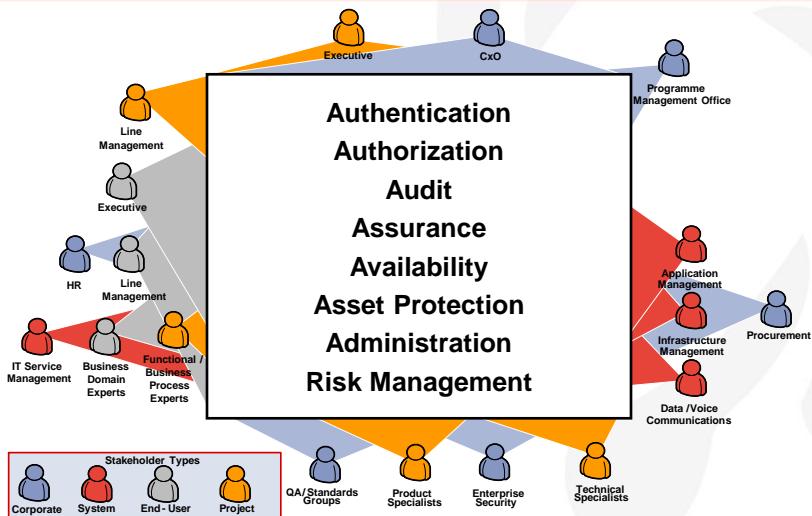
- ❖ It has its own discrete security methodology
- ❖ It composes its own discrete view and viewpoints
- ❖ It addresses non-normative flows
- ❖ It introduces its own unique normative flows
- ❖ Introduces unique, single-purpose components in the design
- ❖ It calls for its own unique set of skill requirements in the enterprise architect

5



7/3/2014

Stakeholder Concerns



6



7/3/2014

Typical Security Artifacts

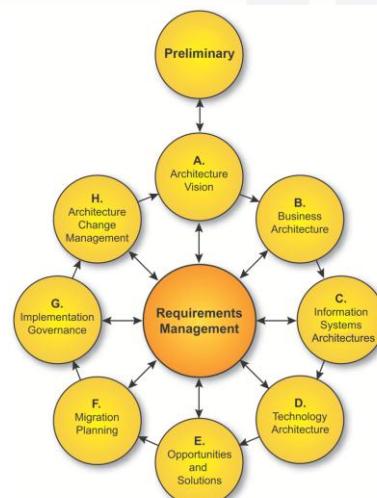
- ❖ Business rules regarding handling of data/information assets
- ❖ Written and published security policy
- ❖ Codified data/information asset ownership and custody
- ❖ Risk analysis documentation
- ❖ Data classification policy documentation

7



7/3/2014

TOGAF ADM

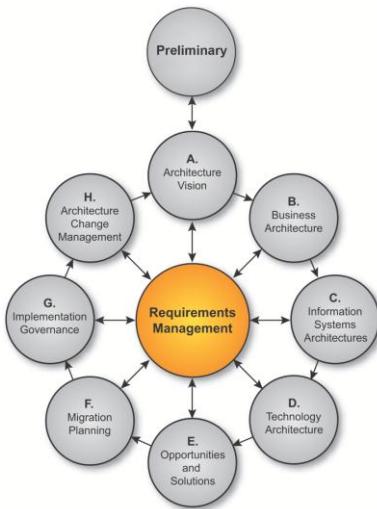


8



7/3/2014

ADM Requirements Management



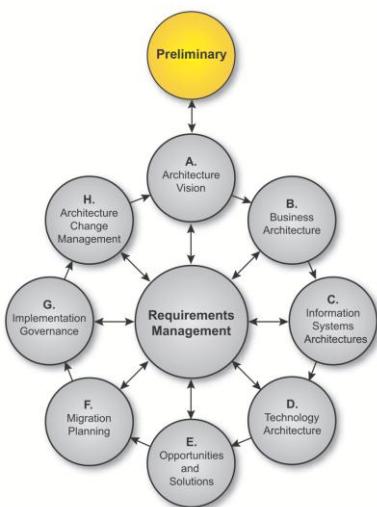
- ✿ Security Policy and Security Standards become part of the requirements management process
- ✿ New Security requirements arise from many sources:
 - A new statutory or regulatory mandate
 - A new threat realized or experienced
 - A new architecture initiative discovers new stakeholders with new requirements

9



7/3/2014

Preliminary Phase



- ✿ Scope the enterprise organization units impacted by the security architecture
- ✿ Define and document applicable regulatory and security policy requirements
- ✿ Define the required security capability as part of the Architecture Capability
- ✿ Implement security architecture tools

10



7/3/2014

Preliminary Phase Inputs/Outputs

✿ Inputs:

- Written security policy
- Relevant statutes
- List of applicable jurisdictions

✿ Outputs:

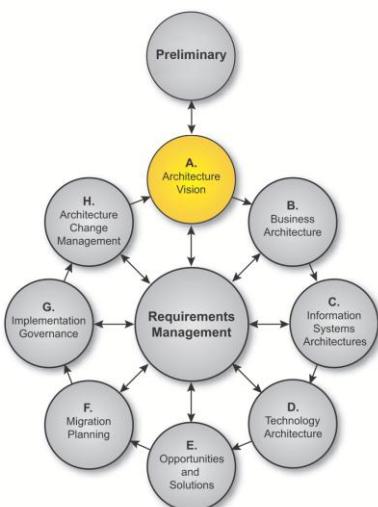
- List of applicable regulations
- List of applicable security policies
- Security team roster
- List of security assumptions and boundary conditions

7/3/2014

11



Phase A Architecture Vision



- ✿ Obtain management support for security measures
- ✿ Define necessary security-related management sign-off milestones
- ✿ Determine applicable disaster recovery or business continuity requirements
- ✿ Identify anticipated physical/business, regulatory environments in which the systems will be deployed
- ✿ Determine the criticality of the system: safety-critical, mission-critical, non-critical

7/3/2014

12



Phase A

Architecture Vision - Inputs/Outputs

Inputs

- List of applicable security policies
- List of applicable jurisdictions
- Complete disaster recover and continuity plans

Outputs

- Physical security statement
- Business security statement
- Regulatory security statement
- Security policy cover letter signed by CEO or delegate
- List of architecture development checkpoints
- List of disaster recover and business continuity plans
- Systems criticality statement

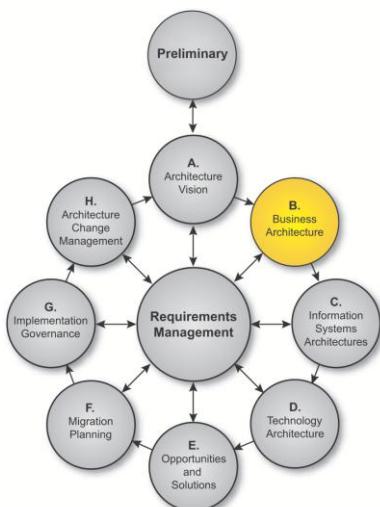
7/3/2014

13



Phase B

Business Architecture



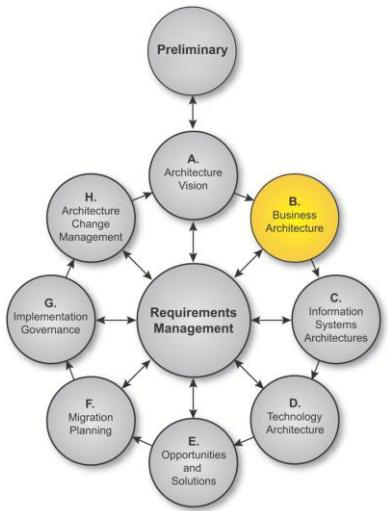
- ✿ Determine who are the legitimate actors who will interact with the system
- ✿ Assess and baseline current security-specific business processes
- ✿ Determine whom/how much it is acceptable to inconvenience with security measures
- ✿ Identify and document interconnecting systems beyond project control
- ✿ Determine the assets at risk if something goes wrong
- ✿ Determine the cost of asset loss/impact in failure cases
- ✿ Identify and document the ownership of assets

7/3/2014

14



Phase B Business Architecture



- ✿ Determine and document appropriate security forensic processes
- ✿ Identify the criticality of the availability and correct operation of the overall service
- ✿ Determine and document how much security (cost) is justified by the threats and value of the assets
- ✿ Reassess and confirm Architecture Vision decisions
- ✿ Assess alignment or conflict of identified security policies with business goals
- ✿ Determine “what can go wrong?”

15



7/3/2014

Phase B Business Architecture - Inputs/Outputs

✿ Inputs

- Initial business and regulatory security statements
- List of applicable disaster recovery and business continuity plans
- List of applicable security policies and regulations

✿ Outputs

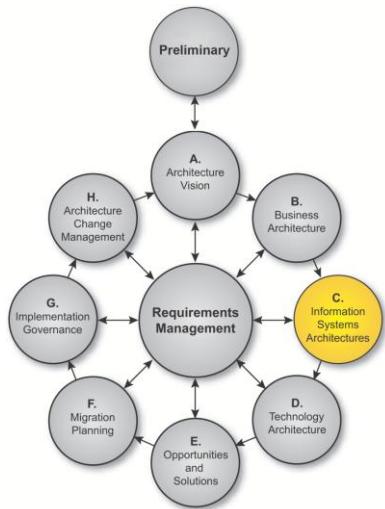
- List of forensic processes
- List of new disaster recovery and business continuity requirements
- Validated business and regulatory environment statements
- List of validated security policies and regulations
- List of target security processes
- List of baseline security processes
- List of security actors
- List of interconnecting systems
- Statement of security tolerance for each class of security actor
- Asset list with values and owners
- List of trust paths
- Availability impact statement(s)
- Threat analysis matrix

16



7/3/2014

Phase C Information Systems Architectures

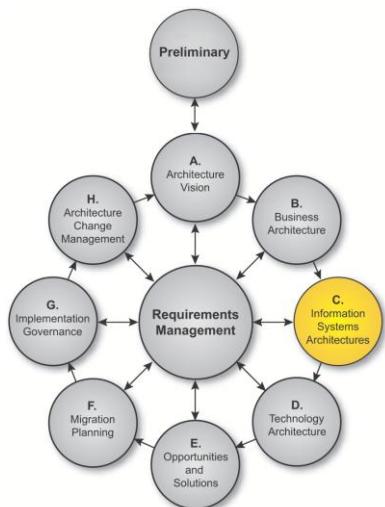


- ✿ Assess and baseline current security-specific architecture elements
- ✿ Identify safe default actions and failure states
- ✿ Identify and evaluate applicable recognized guidelines and standards
- ✿ Revisit assumptions regarding interconnecting systems beyond project control
- ✿ Determine and document the sensitivity or classification level of information stored/created/used
- ✿ Identify and document custody of assets

17



Phase C Information Systems Architectures



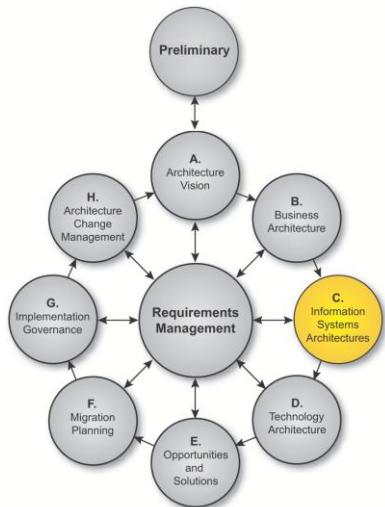
- ✿ Identify the criticality of the availability and correct operation of each function
- ✿ Determine the relationship of the system under design with existing business disaster/continuity plans
- ✿ Identify what aspects of the system must be configurable to reflect changes in policy/business environment/access control
- ✿ Identify lifespan of information used as defined by business needs and regulatory requirements

18



7/3/2014

Phase C Information Systems Architectures



- ✿ Determine approaches to address identified risks
- ✿ Identify actions/events that warrant logging for later review or triggering forensic processes
- ✿ Identify and document requirements for rigor in proving accuracy of logged events (non-repudiation)
- ✿ Identify potential/likely avenues of attack
- ✿ Determine "what can go wrong?"

19



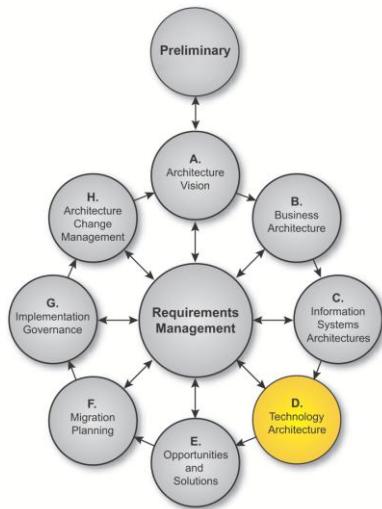
Phase C Information Systems Architectures - Inputs/Outputs

- | | |
|---|--|
| <p>✿ Inputs</p> <ul style="list-style-type: none"> • Threat analysis matrix • Risk analysis • Documented forensic processes • Validated business policies and regulations • List of interconnecting systems • New disaster recovery and business continuity requirements | <p>✿ Outputs</p> <ul style="list-style-type: none"> • Event log-level matrix and requirements • Risk management strategy • Data lifecycle definitions • List of configurable system elements • Baseline list of security-related elements of the system • New or augmented security-related elements of the system • Security use-case models • List of applicable security standards • Validated interconnected system list • Information classification report • List of asset custodians • Function criticality statement • Revised disaster recovery and business continuity plans • Refined threat analysis matrix ²⁰ |
|---|--|

7/3/2014



Phase D Technology Architecture

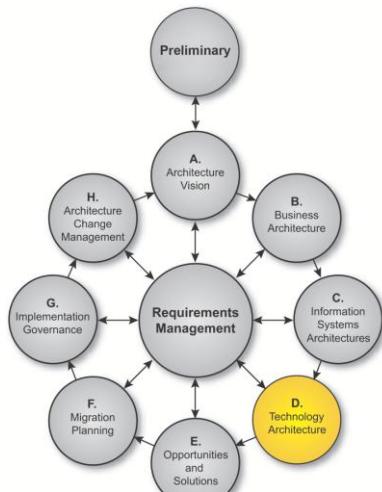


- ✿ Assess and baseline current security-specific technologies
- ✿ Revisit assumptions regarding interconnecting systems beyond project control
- ✿ Identify and evaluate applicable recognized guidelines and standards
- ✿ Identify methods to regulate consumption of resources
- ✿ Engineer a method by which the efficacy of security measures will be measured and communicated on an ongoing basis

21



Phase D Technology Architecture



- ✿ Identify the trust (clearance) levels for the system
- ✿ Identify minimal privileges required for any entity to achieve a technical or business objective
- ✿ Identify mitigating security measures, where justified by risk assessment
- ✿ Determine "what can go wrong?"

22



7/3/2014

Phase D

Technology Architecture - Inputs/Outputs

Inputs

- List of security-related elements of the system
- List of interconnected systems
- List of applicable security standards
- List of security actors
- Risk management strategy
- Validated security policies
- Validated regulatory requirements
- Validated business policies related to trust requirements

Outputs

- Baseline list of security technologies
- Validated interconnected systems list
- Selected security standards list
- Resource conservation plan
- Security metrics and monitoring plan
- User authorization policies
- Risk management plan
- User trust (clearance) requirements

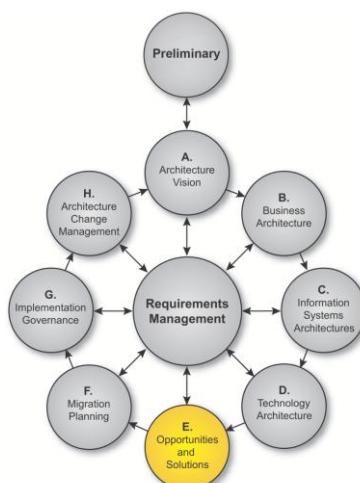
7/3/2014

23



Phase E

Opportunities and Solutions



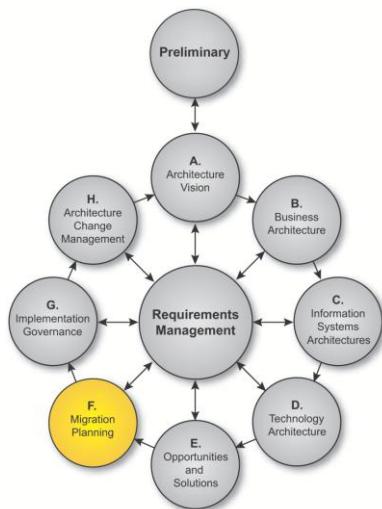
- ✿ Identify existing security services available for re-use
- ✿ Engineer mitigation measures addressing identified risks
- ✿ Evaluate tested and re-usable security software and resources
- ✿ Identify new code/resources/assets appropriate for re-use
- ✿ Determine “what can go wrong?”

7/3/2014

24



Phase F Migration Planning

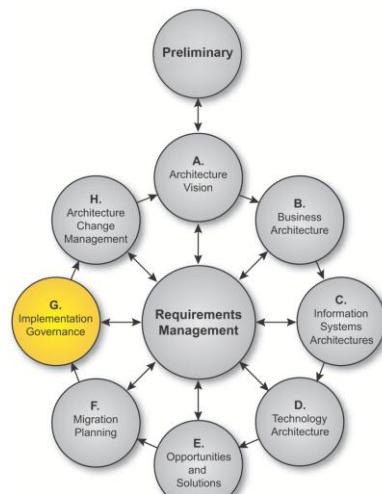


- ✿ Assess the impact of new security measures upon other new components or existing systems
- ✿ Implement assurance methods by which the efficacy of security measures will be measured and communicated on an ongoing basis
- ✿ Identify correct secure installation parameters, initial conditions, and configurations
- ✿ Implement disaster recovery and business continuity plans
- ✿ Determine "what can go wrong?"

25



Phase G Implementation Governance



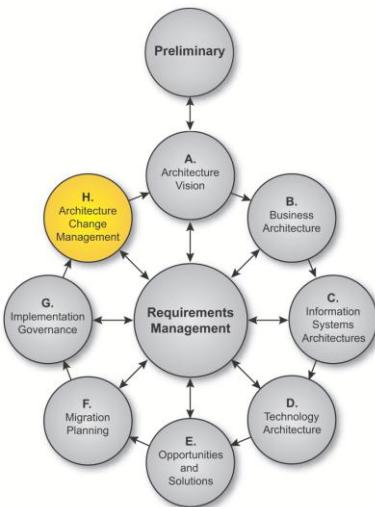
- ✿ Establish design and code reviews
- ✿ Implement methods and procedures to review evidence that reflects operational stability and adherence to security policies
- ✿ Implement training to ensure correct deployment, configuration and operations
- ✿ Determine "What has gone wrong?"

26



7/3/2014

Phase H Architecture Change Management



- ❖ Determine “What has gone wrong?”
- ❖ Incorporate security-relevant changes to the environment into the requirements for future enhancement

27



7/3/2014

Summary

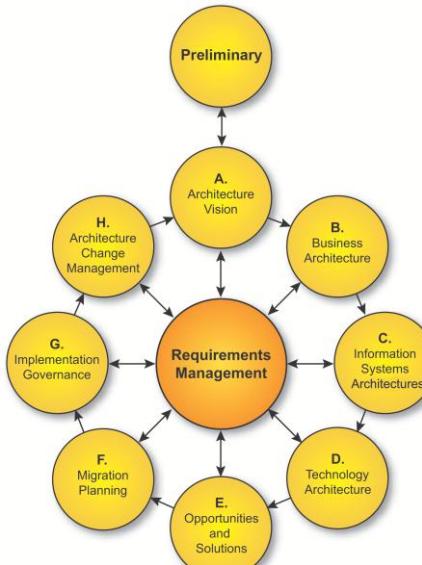
- ❖ TOGAF introduces guidance on Security and the ADM to help practitioners avoid missing a critical security concern
- ❖ The guidance is not intended to be a security architecture development methodology
- ❖ It is intended to inform the enterprise architect of the security architecture task and role

28



7/3/2014

Adapting the ADM: Security



TOGAF is a registered trademark of The Open Group in the United States and other countries

29



7/3/2014

Adapting the ADM: SOA

Module 32

V9.1 Edition Copyright © 2009-2011



All rights reserved

Published by The Open Group, 2011



Part I – Introduction
Preface, Executive Overview, Core Concepts, Definitions and Release Notes
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 – Reference Models
Foundation Architecture: Technical Reference Model
Integrated Information Infrastructure Reference Model
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 22



Module Objectives

The objectives of this module are:

- ❖ Obtain an understanding of how the ADM can be adapted for the SOA style of architecture
 - SOA as an architectural style
 - How Enterprise Architecture supports SOA
 - The recommended SOA adaptations to the ADM

3



7/3/2014

What is Service Oriented Architecture?

- ❖ An *architectural style* that supports *service orientation*
- ❖ Architectural Style
 - The combination of distinctive features in which architecture is performed or expressed
- ❖ Service Orientation
 - A way of thinking in terms of services and service-based development and the outcomes of services

4



7/3/2014

What is Service Oriented Architecture?

❖ It has the following distinctive features:

- It is based on the design of the services
- Service representation utilizes business descriptions to provide context and implements services using service orchestration
- It places unique requirements on the infrastructure
- Implementations are environment-specific - they are constrained or enabled by context and must be described within that context
- It requires strong governance of service representation and implementation
- It requires a "Litmus Test", which determines a "good service"

5



7/3/2014

SOA as an Architectural Style

❖ Is intended to simplify the business

- Including interoperation of parts of the business

❖ Allows for identification of functional capabilities of an organization

❖ Can be used to avoid duplication of similar capabilities across an organization

❖ Allows for applications to be structured so facilitate flexibility and agility

6



7/3/2014

Complexities arising from SOA

❖ It creates a more fine-grained IT Landscape

- 100s or 1000s of services to manage as opposed to 10s or 100s of applications

❖ New Stress points are created:

- Understanding the relationships between technology portfolio and service portfolio
- SLA definition, governance, and impact management
- Tracing business to IT
- Communication, alignment, and semantics
- Platform and interoperability
- Performance, visibility and optimization

7



7/3/2014

How EA supports SOA

❖ Enterprise architecture supports SOA by providing frameworks, tools, and techniques

❖ Key benefits provided by using EA for SOAs include:

- Consistent abstractions of strategies and deliverables to support planning and analysis
- The ability to link different perspectives to a single business problem providing a consistent model to address various domains and tests for completeness
- Identification of clear roadmaps to achieve future state
- Traceability that links IT and other assets to the business they support
- Support for impact assessment, risk/value analysis, and portfolio management
- Identified and documented principles, constraints, frameworks, patterns, and standards
- Governance frameworks and process that ensure the appropriate authority for decision-making

8



7/3/2014

How EA supports SOA (Cont'd)

Enterprise architecture provides the context and analysis capabilities to:

- Show how SOA solutions can be effectively architected to support business capabilities
- Show which services should be built and which should be re-used
- Show how services should be designed

9



7/3/2014

Adapting the ADM for SOA

10



Preliminary Phase

- ❖ This is where the Architecture Capability is adapted to support SOA
- ❖ Principles
 - Service Orientation
- ❖ Determining Organization Readiness for SOA
 - OSIMM
- ❖ Governance
 - The Open Group SOA Governance Model and Vitality Method
- ❖ Adapting Reference Architectures to the Organization:
 - The SOA Reference Architecture
- ❖ Establishing a SOA Center of Excellence as an initial ‘Footprint’
 - Consideration for Partitioning

11



7/3/2014

Preliminary Phase Enhancements

Objectives

- Ensure SOA supporting Principles in place
- Ensure SOA Governance in place

Inputs	Steps	Outputs
<ul style="list-style-type: none">• Existing SOA Reference Architectures• Existing industry SOA Maturity models• Existing SOA Governance Frameworks• Existing Industry best practice SOA principles	<ul style="list-style-type: none">• Identify and establish Principles<ul style="list-style-type: none">• SOA supporting Principles• Confirm governance<ul style="list-style-type: none">• Refer to The Open Group SOA Governance Framework, and specifically the SOA Governance Vitality Method (SGVM)• Evaluate SOA Maturity<ul style="list-style-type: none">• Use The Open Group Service Integration Maturity Model (OSIMM)• Define and establish architecture organization<ul style="list-style-type: none">• Establish an SOA Center of Excellence	<ul style="list-style-type: none">• SOA Maturity Assessment• Architecture principles<ul style="list-style-type: none">• including SOA principles• Architecture Governance Framework<ul style="list-style-type: none">• The Open Group SOA Governance Framework

12



7/3/2014

Phase A Architecture Vision

- ❖ The Architecture Vision will reflect SOA
- ❖ One difference is the style of language used
 - The Open Group SOA Ontology provides a taxonomy and ontology for SOA
- ❖ It is important to ensure that stakeholders understand the implications of SOA and are prepared for the organizational impacts of SOA services

7/3/2014

13



Phase A Enhancements

Objectives

- No additional objective material

Inputs	Steps	Outputs
<ul style="list-style-type: none">• Organizational Model<ul style="list-style-type: none">• SOA Centre of Excellence• SOA Maturity Assessment• SOA Readiness Assessment• SOA Governance• Tailored Architecture Framework<ul style="list-style-type: none">• SOA meta-model extensions• SAO Reference Architecture• Available higher-level (Strategic/ Segment) architecture	<ul style="list-style-type: none">• Identify stakeholder concerns<ul style="list-style-type: none">• SOA specific concerns• Define scope<ul style="list-style-type: none">• Ensure scope is appropriate for SOA• Tailor deliverables to level of architecture• Evaluate Business Capabilities<ul style="list-style-type: none">• SOA readiness• Confirm Principles<ul style="list-style-type: none">• SOA supporting Principles	<ul style="list-style-type: none">• Statement of Architecture Work<ul style="list-style-type: none">• with SOA as an approach• Architecture principles<ul style="list-style-type: none">• including SOA principles• Capability assessment<ul style="list-style-type: none">• including SOA readiness• Architecture Vision<ul style="list-style-type: none">• with SOA thinking• Additional content populating the Architecture Repository<ul style="list-style-type: none">• including SOA Reference Architecture

7/3/2014

14

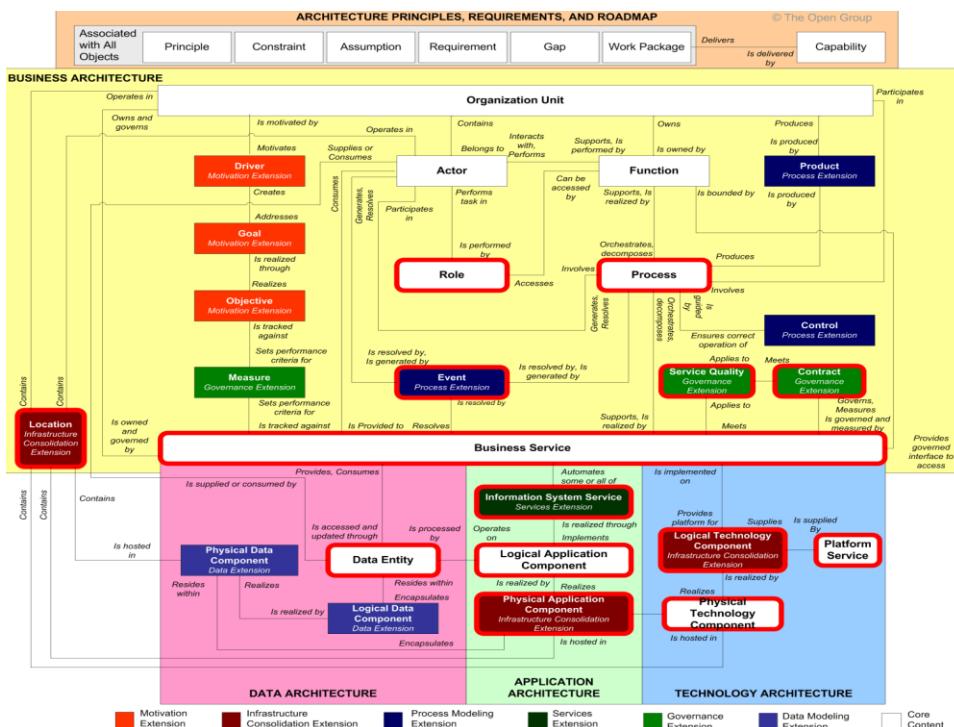


Architecture Development Phases B,C and D

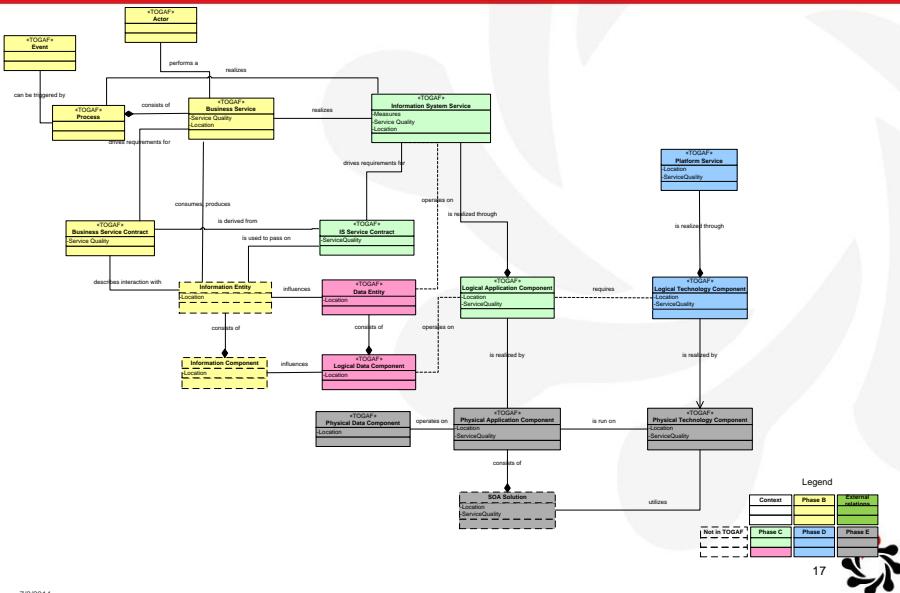
- There are a number of Metamodel entities that are key to SOA
- It is typically necessary to extend the Metamodel to fully support SOA

15

7/3/2014



SOA Meta model



7/3/2014

17

Phase B Artifacts

Artifact	Purpose
Business Service Interaction Diagram	This diagram shows all the business services in scope and their relations and the information flowing between the business services
Business Process Diagram	This is a set of diagrams that show the business processes and their decomposition, their interactions, and the information with which they are concerned.
Business Vocabulary Catalog	List of the key terms used in describing the business processes and information.
Business Services Catalog	This is a list of the enterprise's business services and their functional and non-functional requirements.
Business Service/Location Catalog	To understand where the business services needs to be executed.
Event/Process Catalog	To understand which process is run in relation to an event
Contract/Service Quality Catalog	To understand the non-functional properties of a contract
Business Service Interaction Matrix	To show relations between Business Services
Business Service/Information Matrix	To show how information entities are used by business services and to find faults in that model
Information Component Model	To define the logical structure of the information in the organization.

7/3/2014

18



Phase B Enhancements

Objectives

- No additional objective material

Inputs	Steps	Outputs
<ul style="list-style-type: none">Organizational Model<ul style="list-style-type: none">SOA Centre of ExcellenceSOA Maturity AssessmentSOA Readiness AssessmentSOA GovernanceTailored Architecture Framework<ul style="list-style-type: none">SOA meta-model extensionsSOA Reference ArchitectureAvailable higher-level (Strategic/ Segment) architecture	<ul style="list-style-type: none">Select Reference models, viewpoints & tools<ul style="list-style-type: none">SOA meta-model & content extensionsInformation Entity & Information Component	<ul style="list-style-type: none">Validated business Principles<ul style="list-style-type: none">SOA supporting PrinciplesTarget Business Architecture<ul style="list-style-type: none">Business Service (with contract)Business ProcessInformation EntityInformation ComponentDraft Architecture Requirements<ul style="list-style-type: none">Technical requirements for SOAOutputs may include<ul style="list-style-type: none">Business Service Interaction DiagramBusiness Process DiagramBusiness Vocabulary CatalogBusiness Services CatalogBusiness Service/Location catalogEvent/Process catalogContract/Service Quality CatalogBusiness Service Interaction MatrixBusiness Service/Information matrixInformation component model

7/3/2014

19 

Phase C Information Systems Architectures

- ✿ SOA makes little difference to the Data Architecture
- ✿ But has a major impact on Application Architecture
- ✿ With SOA, the traditional software applications are replaced by sets of loosely-coupled services
- ✿ But SOA is not only about services, it is also the solutions created by using combinations of services
 - These solutions are usually structured using the Business Processes and Business Services defined in Phase B

7/3/2014

20 

Phase C Artifacts

Artifact	Purpose
IS Service Interaction Diagram	This shows potential SOA services (IS Services) and the interactions between them, and their use of information.
Business Process/IS Service Matrix	This matrix shows the relation between each Business Process and the IS Services supporting the process
IS Service Contract Catalog	The catalog lists all IS Services, their Contracts and the related Service Qualities to enable analysis of the non-functional requirements for potential SOA Services.
IS Service/Application (existing) catalog	This catalog connects IS Services (potential SOA Services), Contracts and Service Qualities with existing applications (baseline Physical Application Components)
IS Service/Data entity matrix	This matrix shows what data is handled by potential SOA Services (IS Services).
Logical SOA Component Matrix	This matrix shows the relationship between the logical SOA Components (Logical Application Components) and the potential SOA Services (IS Services)
Logical SOA Solution Diagram	This diagram shows the relations between the logical SOA components (Logical Application Components) and other logical solutions (Logical Application Components).
Service Distribution Matrix	This matrix shows the services distributed on physical locations to fulfill legal or other requirement

21



7/3/2014

Phase C Enhancements

Objectives

- Extend Applications section to include 'Applications & Services'

Inputs	Steps	Outputs
<ul style="list-style-type: none"> Organizational Model <ul style="list-style-type: none"> SOA Centre of Excellence SOA Maturity Assessment SOA Readiness Assessment SOA Governance Tailored Architecture Framework <ul style="list-style-type: none"> SOA meta-model extensions SOA Reference Architecture Available higher-level (Strategic/ Segment) architecture 	<ul style="list-style-type: none"> Select Reference models, viewpoints & tools SOA meta-model & content extensions IS Service Contract Relationship between IS Service & Data Entity 	<ul style="list-style-type: none"> Validated business Principles <ul style="list-style-type: none"> SOA supporting Principles Target Information Systems Architecture <ul style="list-style-type: none"> IS Service (with contract) Service Portfolio Draft Architecture Requirements <ul style="list-style-type: none"> Technical requirements for SOA Outputs may include <ul style="list-style-type: none"> Service Interaction Diagram Business Process/Service Matrix Service Contract Catalog IS Service/Application (existing) catalog IS Service/Data entity matrix Logical SOA Component Matrix Logical SOA Solution Diagram Service Distribution Matrix

22



7/3/2014

Phase D Technology Architecture

- ❖ The Technology Architecture defines the software and hardware infrastructure needed to support the portfolio of services
- ❖ A good starting point is The Open Group SOA Reference Architecture
- ❖ The Open Group Service-Oriented Infrastructure (SOI) Reference Model also provides guidance for adapting an organization's infrastructure for service-orientation

23



7/3/2014

Phase D Artifacts

Artifact	Purpose
Logical Technology Architecture Diagram	This diagram is used to show and analyze the instance of the Open Group SOA Reference Architecture.
Logical Application and Technology Matrix	This matrix is used to show and analyze the relations between the Logical Application Components and the Logical Technology Components

24



7/3/2014

Phase D Enhancements

Objectives

- No additional objective material

Inputs	Steps	Outputs
<ul style="list-style-type: none">• Organizational Model<ul style="list-style-type: none">• SOA Centre of Excellence• SOA Maturity Assessment• SOA Readiness Assessment• SOA Governance• Tailored Architecture Framework<ul style="list-style-type: none">• SOA meta-model extensions• SAO Reference Architecture• Available higher-level (Strategic/ Segment) architecture	<ul style="list-style-type: none">• Select Reference models, viewpoints & tools<ul style="list-style-type: none">• SOI Reference Model• Relationship between Logical Technology Component & Logical Application Component	<ul style="list-style-type: none">• Validated business Principles<ul style="list-style-type: none">• SOA supporting Principles• Target Technology Architecture<ul style="list-style-type: none">• Expected processing load & distribution of load across technology• Draft Architecture Requirements<ul style="list-style-type: none">• Technical requirements for SOA• Outputs may include<ul style="list-style-type: none">• Logical Technology Architecture Diagram• Logical Application and Technology Matrix

7/3/2014

25



Phase E Opportunities and Solutions

❖ This phase addresses the question of what SOA solutions the enterprise will have, and how they will be managed

❖ Solution delivery options are considered

- A delivery option that is often considered is out-sourcing of services, as opposed to the development of services in-house or acquisition of software products that perform the services

7/3/2014

26



Phase E Artifacts

Artifact	Purpose
Physical SOA Solution Matrix	This matrix shows all the components of a SOA Solution
Physical SOA Solution Diagram	This diagram shows the relations between the physical SOA solution (Physical Application Components) and other solutions (Physical Application Components).
Physical Service Solution Matrix	This matrix shows which existing services are re-used, which services could be provided by external services (SaaS) and which services needs to be developed as wrappings of new/existing applications and which needs to be developed.
Application Guidelines	This document provides the guidelines on how to develop the SOA Solution and Services.
Physical Technology Architecture diagram	This diagram is used to show and analyze the physical technical solution for the SOA infrastructure.
Physical Application and Technology Matrix	This matrix is used to show and analyze the physical infrastructure used to run the physical application
Technology Portfolio Catalog	This is a list of products and kinds of product that will be used in the implementation, including SOA run-time infrastructure,
Technology Guidelines	This document provides the guidelines on how to use SOA infrastructure

7/3/2014

27



Phase E Enhancements

Objectives

- No additional objective material

Inputs	Steps	Outputs
<ul style="list-style-type: none"> Organizational Model <ul style="list-style-type: none"> SOA Centre of Excellence SOA Maturity Assessment SOA Readiness Assessment SOA Governance Tailored Architecture Framework <ul style="list-style-type: none"> SOA meta-model extensions SOA Reference Architecture Available higher-level (Strategic/ Segment) architecture 	<ul style="list-style-type: none"> Select Reference models, viewpoints & tools <ul style="list-style-type: none"> Physical Data Component Physical Application Component Technology Application Component SOA Solution 	<ul style="list-style-type: none"> Architecture Roadmap <ul style="list-style-type: none"> SOA & SOI Roadmap Draft Architecture Requirements <ul style="list-style-type: none"> Technical requirements for SOA Outputs may include <ul style="list-style-type: none"> Physical SOA Solution Matrix Physical SOA Solution Diagram Physical Service Solution Matrix Application Guidelines Physical Technology Architecture diagram Physical Application and Technology Matrix Technology Portfolio Catalog Technology Guidelines

7/3/2014

28



Summary

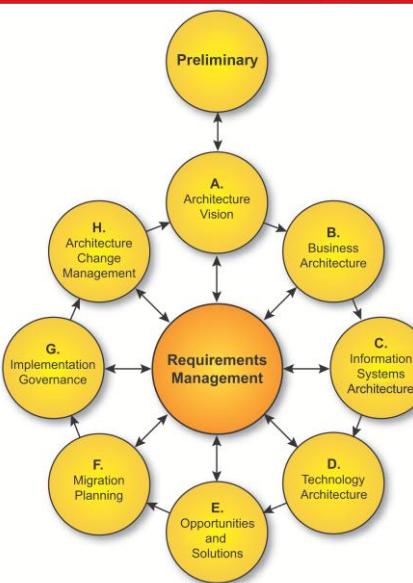
- ✿ The use of SOA as an architectural style is intended to simplify the business
- ✿ Concepts from the TOGAF content metamodel relate directly to SOA
- ✿ Enterprise architecture can be used to support SOA by providing a set of tools and techniques to address many of the non-technical challenges associated with SOA adoption
- ✿ TOGAF provides guidance and a set of resources for adapting the ADM for SOA development
- ✿ The Open Group SOA Work Group has a number of other documents that support SOA development

29



7/3/2014

Adapting the ADM: SOA



TOGAF is a registered trademark of The Open Group in the United States and other countries

30



7/3/2014

Architecture Maturity Models

Module 33

V9.1 Edition Copyright © 2009-2011



All rights reserved

Published by The Open Group, 2011



Part I - Introduction
Preface, Executive Overview, Core Concepts, Definitions and Release Notes
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 - Reference Models
Foundation Architecture: Technical Reference Model
Integrated Information Infrastructure Reference Model
Part VII - Architecture Capability Framework
Architecture Board
Architecture Compliance
Architecture Contracts
Architecture Governance
Architecture Maturity Models
Architecture Skills Framework

Part VII - Architecture Capability Framework, Chapter 51



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 (Department of Commerce)
- ❖ Explain the role of Maturity Assessments in the ADM

3



7/3/2014

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 organization 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

4



7/3/2014

Capability Maturity Models

- ❖ An evaluation of the organization's practices against the model (an 'assessment') is performed to find the current level at which the organization currently stands
- ❖ This shows the organization's maturity and the areas to focus on for the greatest improvement and the highest ROI

5



7/3/2014

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

6



7/3/2014

Capability Maturity Models

There are templates available to assess:

- ❖ The state of the IT architecture process
- ❖ The IT architecture
- ❖ The organization's 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

7



7/3/2014

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)

8



7/3/2014

The CMMI

According to the SEI, the use of the CMMI models improves on best practices by enabling organizations 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 organizational functions
- ❖ Comply with ISO standards
- ❖ CMMI is adopted worldwide

9



7/3/2014

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

10



7/3/2014

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

11



7/3/2014

ACMM Enterprise Architecture Elements

- ❖ **Architecture process**
 - Is there an established Enterprise Architecture process?
- ❖ **Architecture development**
 - To what extent is the development and progression of the Operating Units' Enterprise Architecture documented?
- ❖ **Business linkage**
 - To what extent is the Enterprise Architecture linked to business strategies or drivers?
- ❖ **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?
- ❖ **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 organization?

12



7/3/2014

ACMM Enterprise Architecture Elements

❖ 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 organization?
- To what extent is architecture education done across the business on the Enterprise Architecture process and contents?

❖ IT security

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

❖ Architecture governance

- To what extent is an Enterprise Architecture governance (governing body) process in place and accepted by senior management ?

❖ IT investment and acquisition strategy

- To what extent does the Enterprise Architecture influence the IT Investment and Acquisition Strategy?



7/3/2014

Example: ACMM Scoring Criteria

Score			Element 1 - 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	Optimising		Concerted efforts to optimize and continuously improve architecture process.



7/3/2014

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 Organizational 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

15



7/3/2014

Maturity Assessments in the ADM (Cont'd)

- ❖ When using CMMs with the ADM, it is recommended that they be customized and discussed in workshops involving the major stakeholders within the organization
- ❖ The actual levels of maturity can provide a strategic measure of the organization's ability to change, as well as a series of sequential steps to improve that ability

16



7/3/2014

Summary

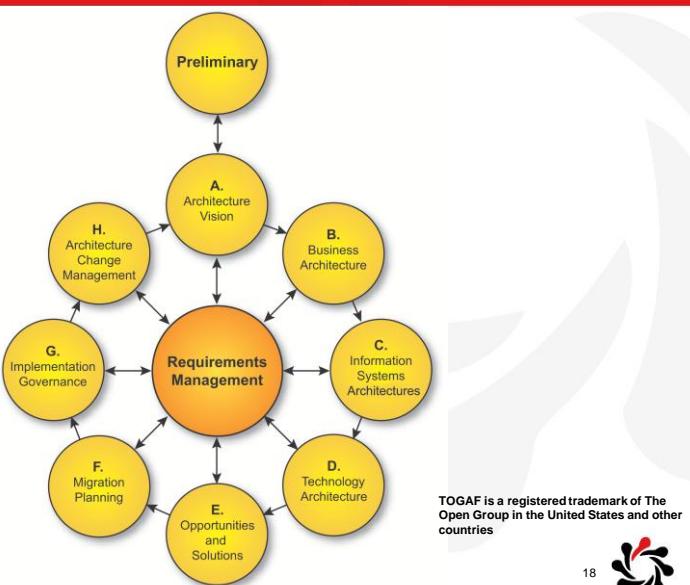
- ❖ This module has explained the role of Architecture Capability Maturity Models in enabling an enterprise to determine the state of its Enterprise Architecture process and to evaluate risks and options during the development of the Enterprise Architecture
- ❖ Performing a maturity assessment may involve the use of a number of models. The assessment focuses on measuring business benefits and return on investment

17



7/3/2014

Architecture Maturity Models



18



7/3/2014

Architecture Skills Framework

Module 34

V9.1 Edition Copyright © 2009-2011



All rights reserved

Published by The Open Group, 2011



Part I - Introduction
Preface, Executive Overview, Core Concepts, Definitions and Release Notes
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 - Reference Models
Foundation Architecture: Technical Reference Model
Integrated Information Infrastructure Reference Model
Part VII - Architecture Capability Framework
Architecture Board
Architecture Compliance
Architecture Contracts
Architecture Governance
Architecture Maturity Models
Architecture Skills Framework

Part VII - Architecture Capability Framework, Chapter 52



Module Objectives

The objectives are to:

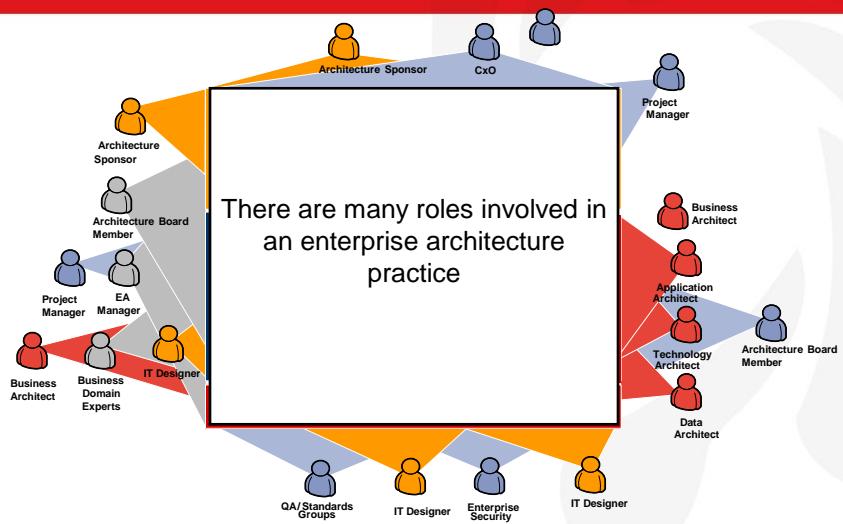
- ❖ Explain the purpose of the Architecture Skills Framework and why it is needed
- ❖ Describe the benefits of using the Architecture Skills Framework
- ❖ Describe the structure of the Architecture Skills Framework, including roles, skills and proficiency levels

3



7/3/2014

Roles



4



7/3/2014

Purpose

Definitional Rigor

- ❖ “Enterprise Architecture” and “Enterprise Architect” are widely used but poorly defined terms in industry today. 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

5



7/3/2014

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

6



7/3/2014

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

7



7/3/2014

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

8



7/3/2014

The structure of the Architecture Skills Framework

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
- ❖ ...

9



7/3/2014

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.

10



7/3/2014

The structure of the Architecture Skills Framework

✿ Proficiency Levels

Level	Achievement	Description
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.

11



7/3/2014

The Architecture Skills Framework Part I of II

✿ Enterprise Architecture 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
Enterprise Architecture Skills									
Business Modeling	2	2	4	3	3	4	4	2	2
Business Process Design	1	1	4	3	3	4	4	2	2
Role Design	2	2	4	3	3	4	4	2	2
Organization Design	2	2	4	3	3	4	4	2	2
Data Design	1	1	3	3	4	3	3	2	3
Application Design	1	1	3	3	3	4	3	2	3
Systems Integration	1	1	4	4	3	3	3	2	2
IT Industry Standards	1	1	4	4	4	4	3	2	3
Services Design	2	2	4	4	3	4	3	2	2
Architecture Principles Design	2	2	4	4	4	4	4	2	2
Architecture Views & Viewpoints Design	2	2	4	4	4	4	4	2	2
Building Block Design	1	1	4	4	4	4	4	2	3
Solutions Modeling	1	1	4	4	4	4	4	2	3
Benefits Analysis	2	2	4	4	4	4	4	4	2
Business Interworking	3	3	4	3	3	4	4	3	1
Systems Behavior	1	1	4	4	4	4	3	3	2
Project Management	1	1	3	3	3	3	3	4	2

12



7/3/2014

The Architecture Skills Framework Part II of II

✿ 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

✿ Business Skills

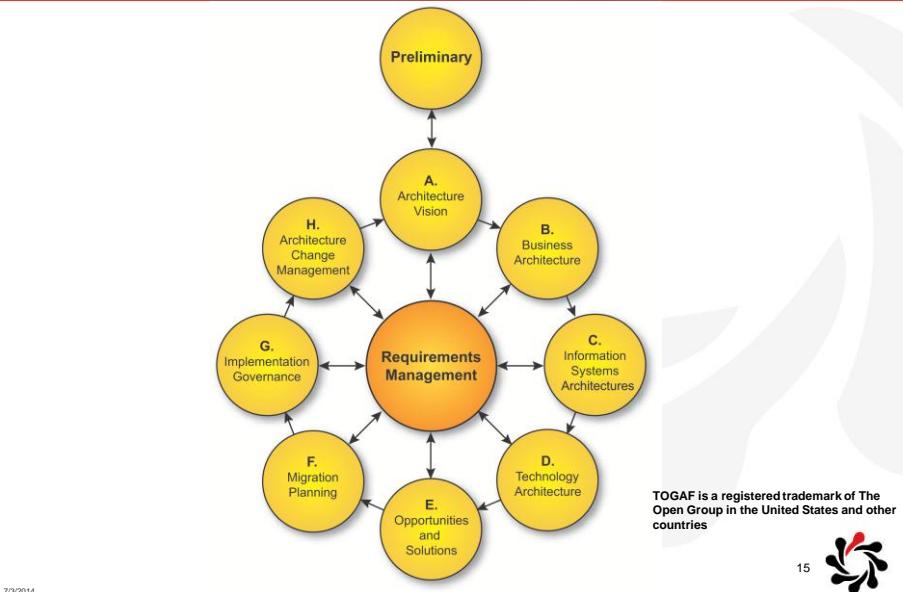
Roles	Architecture Board Member	Architecture Sponsor	Enterprise Architecture Manager	Enterprise Architecture Technology	Enterprise Architecture Data	Enterprise Architecture Applications	Enterprise Architecture Business	Program/Project Manager	IT Designer
Business Skills & Methods									
Business Case	3	4	4	4	4	4	4	4	2
Business Scenario	2	3	4	4	4	4	4	3	2
Organization	3	3	4	3	3	3	4	3	2
Business Process	3	3	4	4	4	4	4	3	2
Strategic Planning	2	3	3	3	3	3	4	3	1
Budget Management	3	3	3	3	3	3	3	4	3
Visioning	3	3	4	3	3	3	4	3	2
Business Metrics	3	4	4	4	4	4	4	4	3
Business Culture	4	4	4	3	3	3	3	3	1
Legacy Investments	4	4	3	2	2	2	2	3	2
Business Functions	3	3	3	3	4	4	4	3	2

Summary

- ✿ This module has explained the Architecture Skills Framework, a classification model for architect roles



Architecture Skills Framework



7/3/2014