ARCHITECTURE

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AGENDA

EA Framework

ENTERPRISE ARCHITECTURE

- *Establish Enterprise Architecture Practice & regulate compliance*
- *Develop Architecture Governance Framework*
- *Develop Reference Architecture Repositories & Content Framework*
- *Implement Architecture Development Methods, techniques and guidelines*
- *Build Capability Framework; Refine and prioritize Business-IT Vision & Strategy.*
- *Develop Baseline and target Architecture , Gap analysis & Transitional States.*
- *Deploy and Publish Roadmap. Maintain Architecture Assets & Artifacts through Transitional States.*

Enterprise Architecture Practice

Key Activities

Identify EA Governance Framework

Identify methodology and select a Governance framework.

Build Architecture Repository`

Identify Capability Maturity, build Architecture Content Framework.

Develop Architecture

stablish Architecture Development Process. Define AS-IS and TO-BE.

Roadmap & Implement

Plan & Prioritize, Publish Transitional Roadmap, Deploy & Monitor.

Key Deliverables

1 Initial Stage

- *Architecture Framework & Contract*
- *Architecture Repository*
- *Architecture Principles, Business Goals and Drivers*

2 Second Stage

- *Architecture Vision*
- *Communications Plan & Architecture SOW*
- *Architecture Requirements & Impact Assessment*
- *Governance Model & Change Request*
- *Migration Plan & Compliance Assessment*
- *Architecture & Solution Building Blocks*
- *Architecture Definition Document (Business, Systems, Technology)*

3 Final Stage

- *Architecture Roadmap & Implementation*

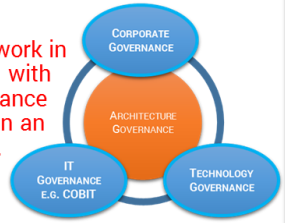
Capability Framework

TOGAF

Architecture Capability Framework

1 Governance Framework How we define responsibilities for architecture development and conformance to defined architecture.

Architecture governance work in collaboration with other Governance frameworks in an Organization.



4 Architecture Development process, method and techniques that will be followed for developing and managing the lifecycle of an enterprise architecture.

Typically an initial development cycle will be used to populate the Foundation Architecture of an enterprise.

6 Architecture Continuum provide reference models and guidelines to be used during Architecture Development Phase. It provides a view that shows the evolution of these related architectures from generic to specific, from abstract to concrete.

1 Governance Framework

2 Architecture Board

3 Compliance

4 Architecture Development Process, Method & Techniques

5 Architecture Content Framework

6 Enterprise Continuum & Reference Models

Architecture Capability Framework provides a set of reference materials for how to establish an architecture practice. This include establishing an Architecture Capability, Architecture Board, Compliance, Contracts, Governance, Maturity Models, and Skills Framework.

A Framework also helps in identifying if your team has relevant skills to take up the Architecture work!!

2 Cross-organization **Architecture Review Board** is key to governance strategy to oversee the implementation of the strategy. This body should be representative of all the key stakeholders in the architecture

3 To ensure Projects are **compliant** to Architecture two process are identified:

- Project Level Architecture
- Formal Compliance Review

Think of it like a certification institute that confirms if the project complies with desired criteria for standards and goals.

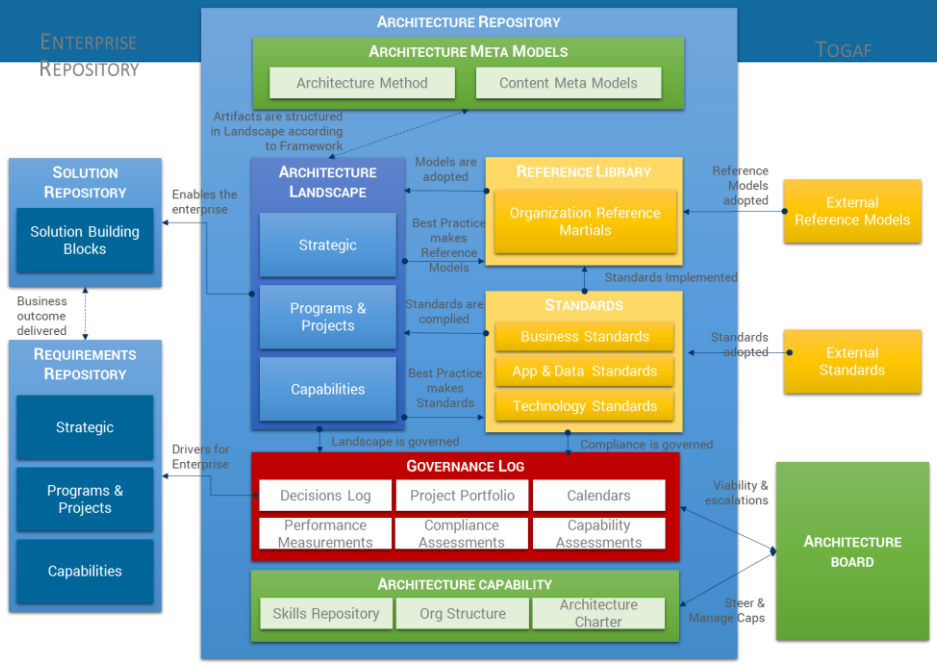
5 Meta model for architecture repository.

- Explains what is covered by architecture
- Used during Architecture Development Process.
- Ensure Architectural work is consistent and structured. Like templates.

Delivered Packages:

- Items delivered can be bundled as Architecture Build Block, which can be re-usable in other projects.
- Includes artifacts that can be catalogs, matrices or diagrams

Repositories

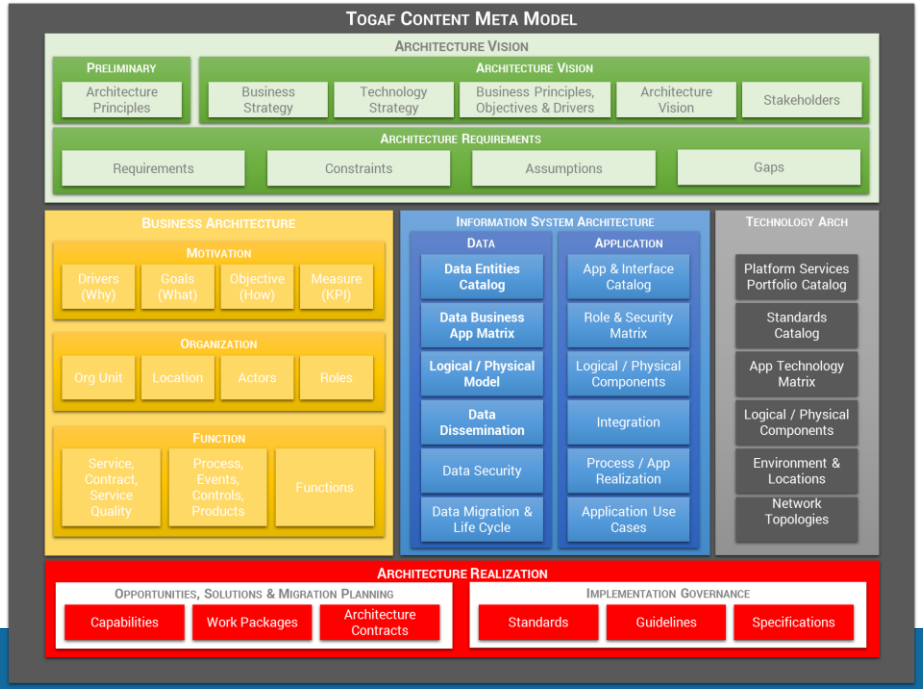


Architecture Repository

Key architecture repository that define Architecture Metamodel on how to Govern and organize Contents in an Architecture Engagement. Hold Capabilities and Requirements, Reference Models and Industry Standards, Architecture landscape, Solution Architecture, and Governance logs.

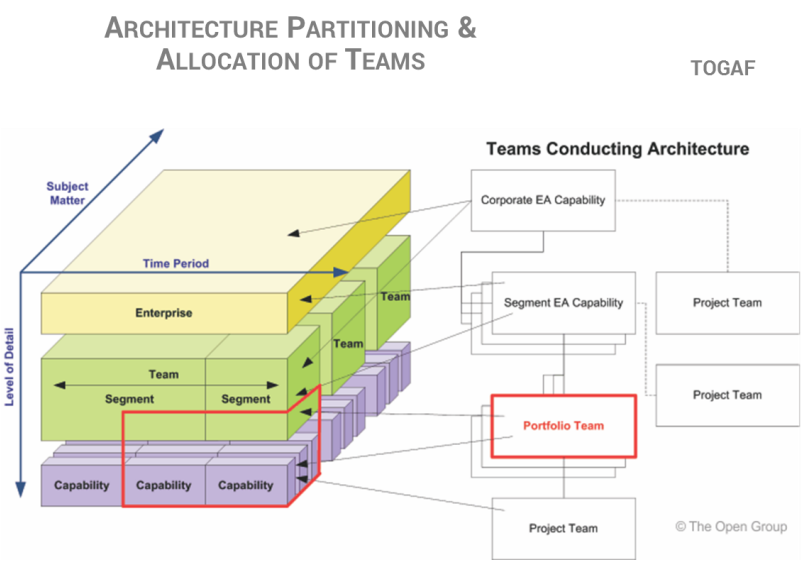
Content Metamodel

Key architecture repository that define Architecture Metamodel on how to Govern and organize Contents in an Architecture Engagement. Hold Capabilities and Requirements, Reference Models and Industry Standards, Architecture landscape, Solution Architecture, and Governance logs.



Roadmaps

The Architecture Roadmap lists individual work packages that will realize the Target Stage Architecture, and lays them out on a timeline to show progression.



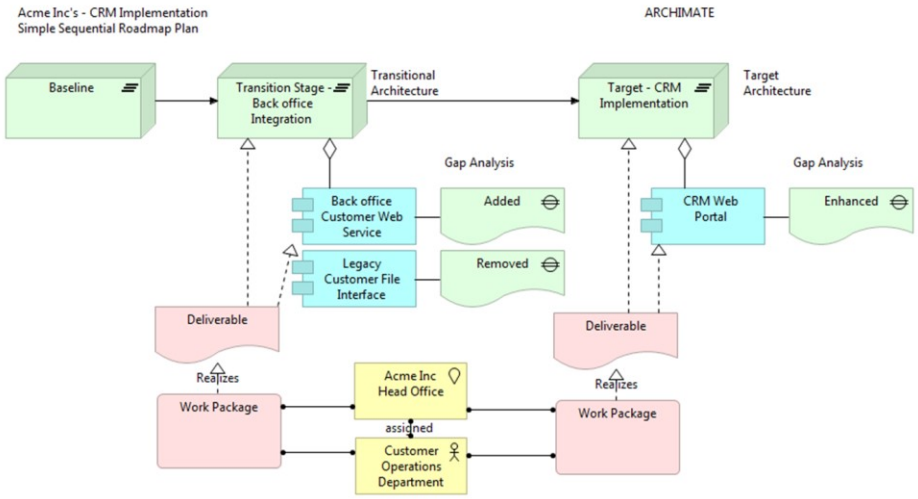
The Roadmap highlights business value at each Transitional Stages, that are identified as intermediate steps. The Architecture Roadmap is incrementally developed.

Architecture Partition

Partitioning of Architectural work to manage complexity for each individual architecture or solution.

Implementation & Migration Viewpoint

Simple Sequential Roadmap showing Transitional States and gaps using Archimate Implementation & Migration Viewpoint.



Enterprise Continuum – A Library

WHAT IS ENTERPRISE CONTINUUM

An Architect's library and aid. Enterprise Continuum runs between the extremes: from Generic to Specific.

FEW GUIDELINES

1. The Architecture Continuum should nearly always be considered before the Solutions Continuum. (i.e. before making own custom engineering)
2. Look for pre-defined reference models that you can re-use wherever they are relevant.
3. Where possible, Solutions should conform to the architecture.
4. A % of Organization's architecture should come from Higher Continuum. Higher % allows more reusability in Building Blocks

OBJECTIVE

The Enterprise Continuum has two objectives:

1. To align solutions with architectures
2. To save time & effort through reuse

TOGAF only provides two pre-defined reference models:

1. the TRM (Foundation)
2. the III-RM (Common Systems)

But there are plenty of other Reference Architectures, e.g. TMFORUM (eTom, TAM, SID), ACORD, MIRA-B

GENERIC <<< More reusability Less reusability >>> SPECIFIC

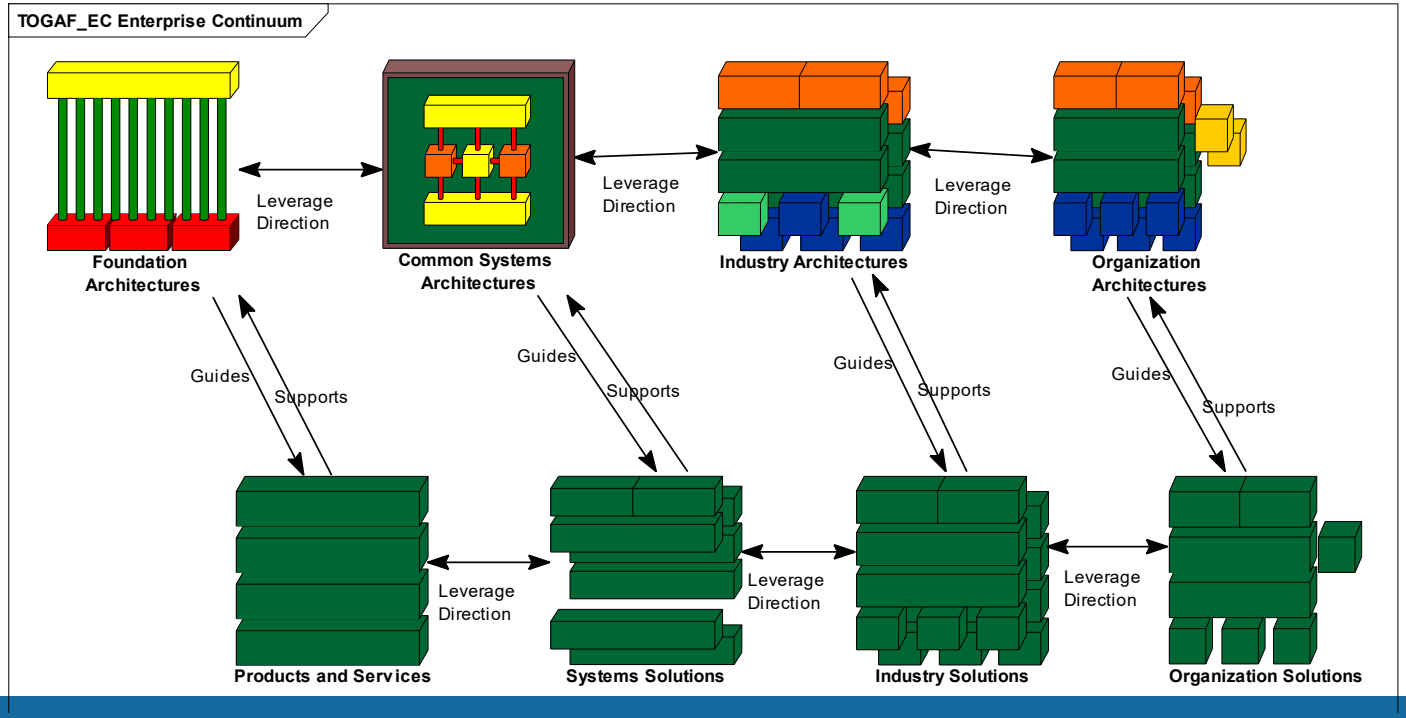
Context & Requirements

Architecture Continuum

Guides & Support

Solutions Continuum

Deployed Solutions



Business Architecture

Key Activities

Organize Requirements & Caps

Gather Business Requirements, Capabilities, Processes, Functions, Services, Products. Identify Business footprint, Locations, Contracts and Service Levels. Identify Org/Actors, Drivers, Goals, Objective, Measures/KPIs.

Develop Architecture

Develop Baseline and Target Business Architecture.

Gap Analysis & Review

Perform Gap Analysis and Conduct Formal Reviews.

Roadmap & Implement

Plan & Prioritize, Publish Business Architecture Roadmap.

Key Deliverables

1 Business Arch Requirements

- *Business Requirements*
- *Technical Requirements*
- *Constraints & Gap Analysis*

2 Business Arch Definition

- *Baseline & Target Architecture*
- *Org Structure, Roles, Locations, Contracts, Catalog/Matrix*
- *Business Processes, Functions, Services, Service Levels*
- *Business roles & skills required*
- *Business Driver, Goal, Objective, Measures/KPIs catalog*
- *Business Data Model*
- *Business Use Cases*
- *Product Lifecycle*
- *Business Footprint*
- *TM Forum eTom Mapping*

3 Roadmap

- *Capability Roadmap & Implementation*

Application Architecture

Key Activities

Organize Requirements & Caps

Gather Application Business Requirements & Capabilities..

Develop Architecture

Develop Baseline and Target Application Architecture.

Gap Analysis & Review

Perform Gap Analysis and Conduct Formal Reviews.

Roadmap & Implement

Plan & Prioritize, Publish Application Architecture Roadmap.

Key Deliverables

1 Application Arch Reqmnts

- *Business Application Requirements*
- *Business Integration Requirements*
- *Constraints & Gap Analysis*

2 Application Arch Definition

- *Baseline & Target Architecture*
- *Application Landscape, Portfolio Catalog*
- *Integration/Interface Catalog*
- *Security Role Matrix*
- *Process/Application Realization*
- *Use cases & Migration Models*
- *TMForum TAM Mapping*

3 Roadmap

- *Application Roadmap & Implementation*

Data Architecture

Key Activities

Organize Requirements
Gather Data Business Requirements & Entities..

Develop Architecture
Develop Baseline and Target Data Architecture.

Gap Analysis & Review
Perform Gap Analysis and Conduct Formal Reviews.

Roadmap & Implement
Plan & Prioritize, Publish Application Data Roadmap.

Key Deliverables

1

Data Arch Requirements
- Business Data Requirements
- Data Integration Requirements
- Constraints & Gap Analysis

2

Data Arch Definition
- Baseline & Target Architecture
- Conceptual/Logical Data Model
- Data Entity Catalogs
- Application/Data Matrix
- Data Dissemination Models
- Security & Migration Models
- Data Management Process & Lifecycle
- TMForum SID mapping

3

Roadmap
- Data Roadmap & Implementation

Technology Architecture

Key Activities

Organize Requirements & SLA

Gather Technology Business Requirements & Service Levels.

Develop Architecture

Develop Baseline and Target Technology Architecture.

Gap Analysis & Review

Perform Gap Analysis and Conduct Formal Reviews.

Roadmap & Implement

Plan & Prioritize, Publish Technology Roadmap.

Key Deliverables

1 Technology Arch Reqmnts

- *Business Technology Requirements*
- *Business Service Level Requirements*
- *Constraints & Gap Analysis*

2 Technology Arch Definition

- *Baseline & Target Architecture*
- *Technology Landscape, Portfolio Catalog*
- *Technology Standards Catalog*
- *Application/Technology matrix*
- *Environment & Locations*
- *Network & Communications*

3 Roadmap

- *Technology Roadmap & Implementation*

ARTIFACTS, MODELING NOTATIONS

ARCHITECTURE

Artefacts

Key Modeling Tools

1 Process & Orchestration

- BPMN (Business Process Model & Notation) for Business Process.
- BPEL (Business Process Execution Language), for process orchestration with Web Services.

2 General Modeling

- Unified Modeling Language (UML), general purpose modeling language

3 Web Services

- WSDL (Web Services Description Language), for Web service definition
- Swagger

4 Data Modeling

- Entity–relationship model (ERD), for conceptual, logical, physical models.
- Unstructured Data modeling with JSON Document Model

Key Artifact Tools

1 Togaf & Archimate

- EA Governance Methodology
- Content Meta Modeling
- Notations & Viewpoints

2 Modeling

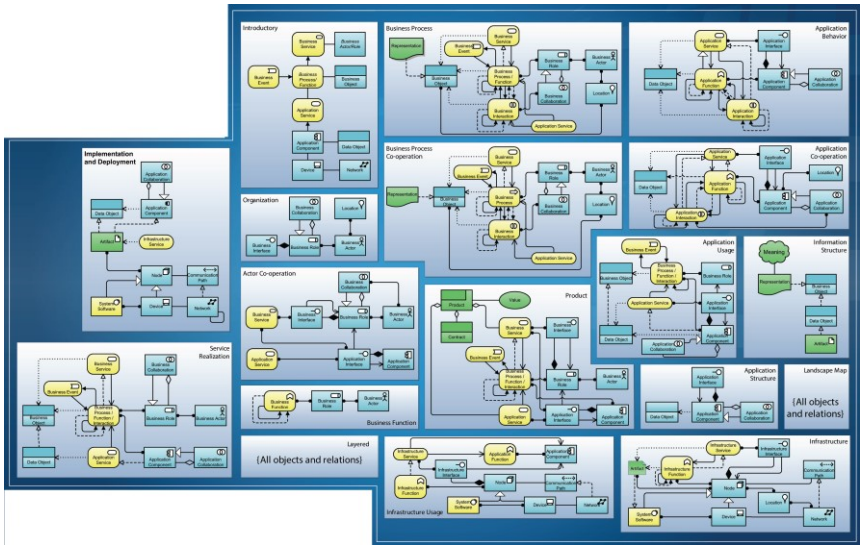
- EA Sparx – EA Modeling Tool & Repository
- ER Studio – Data Modeling
-

3 Other Tools

- MS-Office (Word, XL, PowerPoint)
- Visio
- MS-Project

3 Repositories

- Confluence
- Jira
- Share Point
- Shared Drive

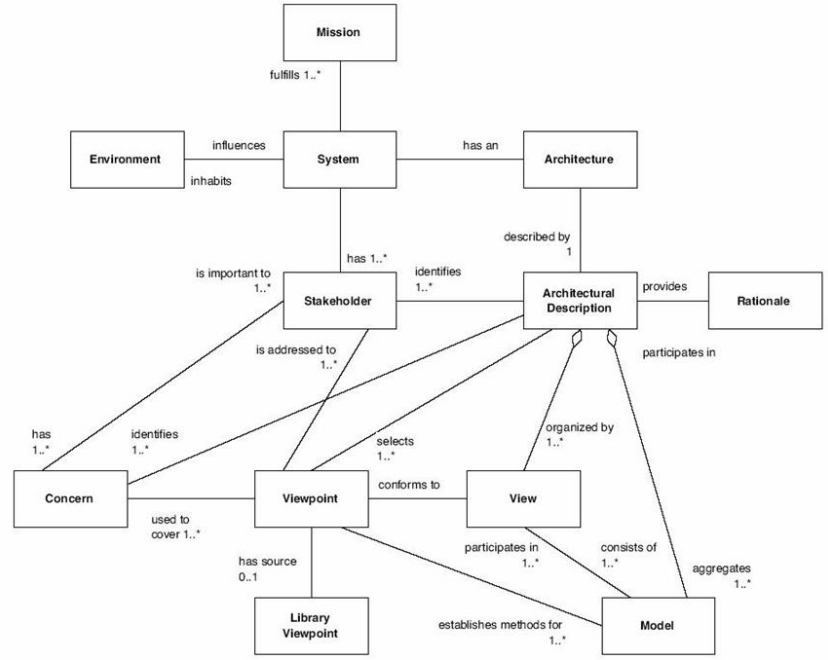


ARCHIMATE as Visual Language

- Provides a uniform representation for diagrams that describe enterprise architectures.
- Provides integrated architectural approach that describes and visualizes the different architecture domains and their underlying relations and dependencies.
- Closely linked with TOGAF Standards and meta models.

Viewpoints

- Viewpoints define abstractions on the set of models representing the enterprise architecture,
- Provides flexible approach to create viewpoints, each aimed at a particular type of stakeholder and addressing a particular set of concerns.
- Provides library of viewpoints

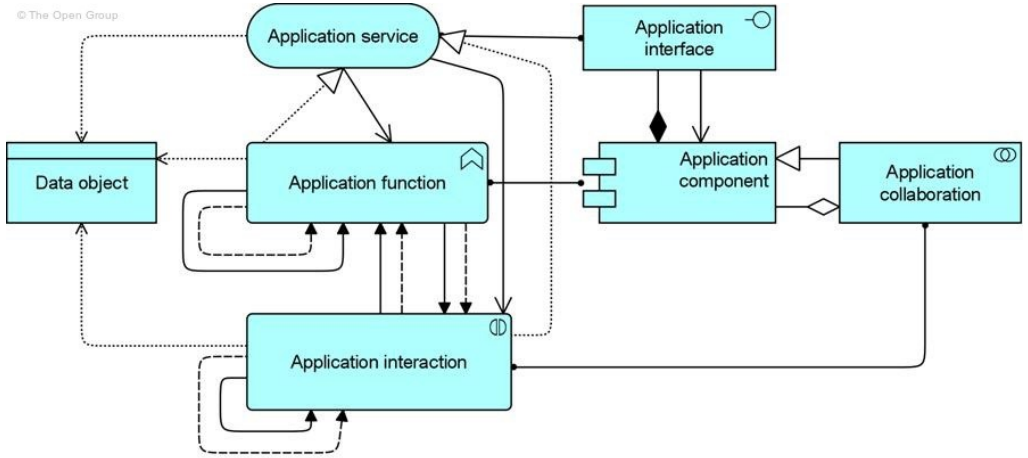


Conceptual Model of Architectural Description

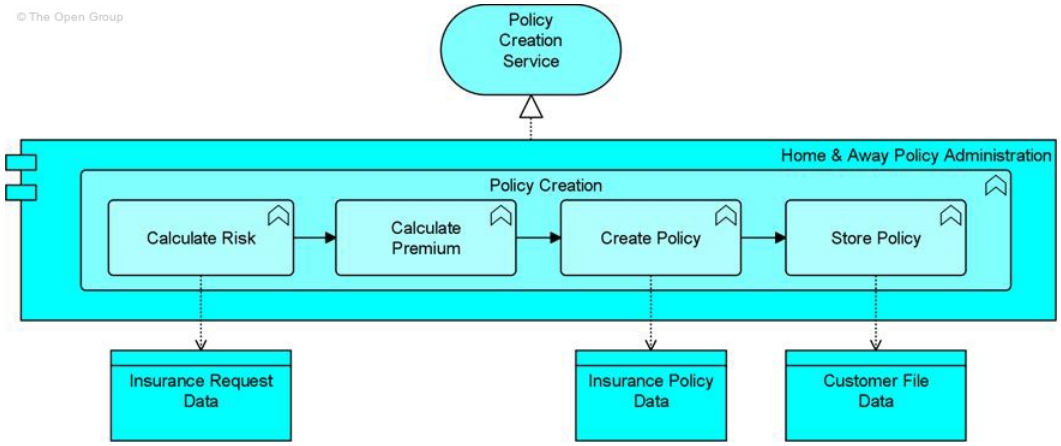
Archimate Standard Viewpoints

- Introductory Viewpoint
- Organization Viewpoint
- Actor Co-operation Viewpoint
- Business Function Viewpoint
- Business Process Viewpoint
- Business Process Co-operation Viewpoint
- Product Viewpoint
- Application Behavior Viewpoint
- Application Co-operation Viewpoint
- Application Structure Viewpoint
- Application Usage Viewpoint
- Infrastructure Viewpoint
- Infrastructure Usage Viewpoint
- Implementation and Deployment Viewpoint
- Information Structure Viewpoint
- Service Realization Viewpoint
- Layered Viewpoint
- Landscape Map Viewpoint

e.g. Application Behavior Viewpoint



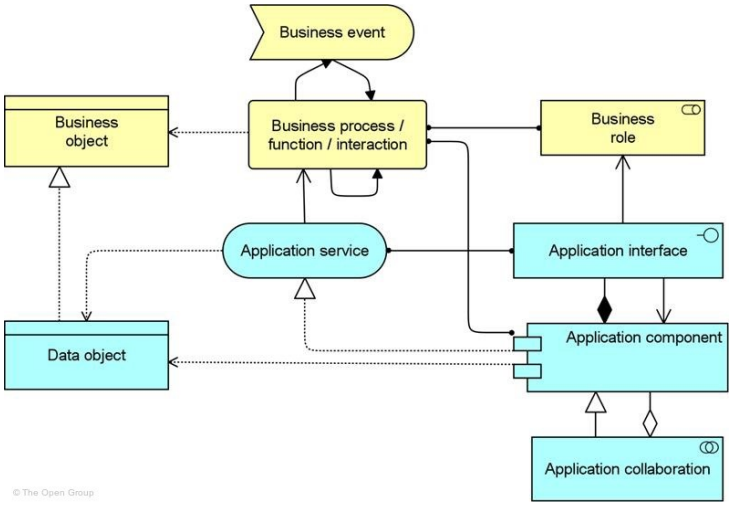
Conceptual & Relationship Metamodel



Example of Application Behavior Viewpoint

Archimate Standard Viewpoints

e.g. Application Usage Viewpoint



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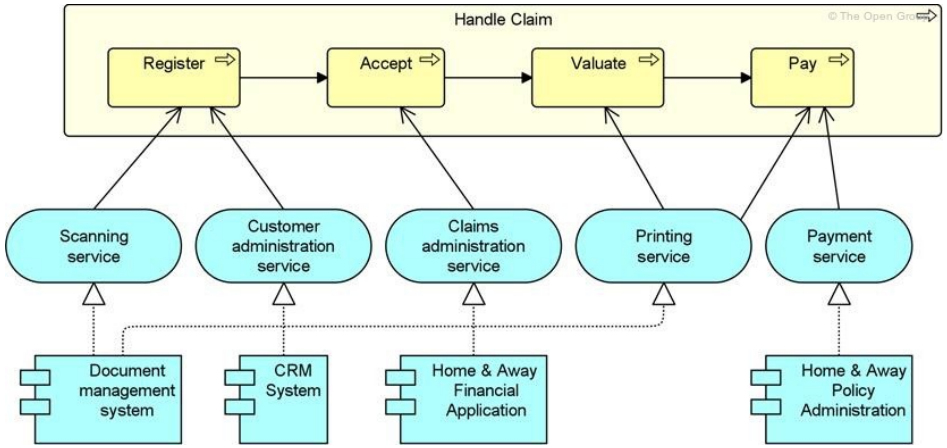
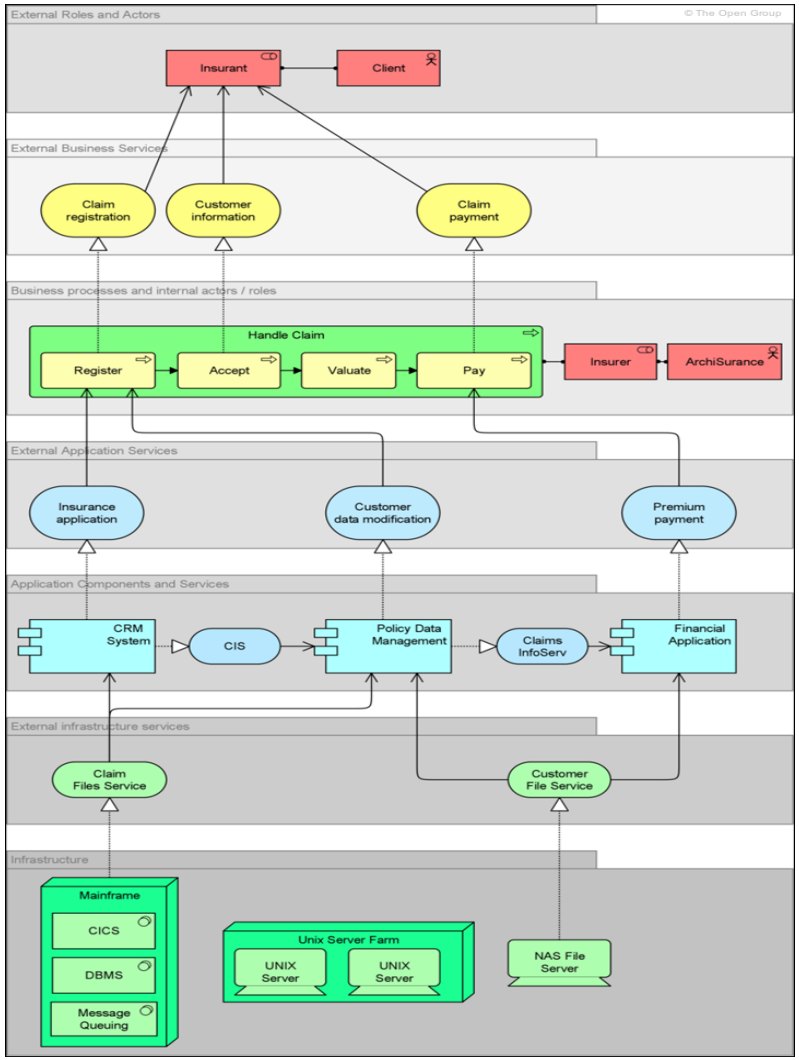


Example of Application Usage Viewpoint

e.g. Layered Viewpoint



SOLUTION ARCHITECTURE

ARCHITECTURE

Solution Architecture

Key Activities

Functional Requirements & Scope
Gather Functional Requirements & Scoping.

Solution Framing
Develop Solution Frame for scoped requirements.

High Level Designs & Review
Develop HLD and Conduct Formal Reviews.

Build & Test
Support Development and Testing Activities.

Implement
Support Implementation Activities.

Key Deliverables

1 Scoping
- *Functional & Scoped Requirements*
- *Use Cases & Business Scenarios*
- *Gap Analysis*

2 Artefacts
- *Data Models & Associated Business Scenarios*
- *Enterprise Application Landscapes*
- *Process Maps (Level C, D, E)*
- *Web Service Catalogue & WSDL*
- *Integration Catalogue & Architecture*
- *Technology / Infra Architecture*

3 Migration
- *Data Migration Architecture*
- *In-transition process & controls*

Artefacts

Key Artefacts

1 Application Landscapes

- Application Inventory
- Detailed Application Architecture & Function/Capability Inventory

2 Data Models

- Customer & Account Hierarchy Models
- Offer & Product Models
- Ordering & Subscription Models
- Service & Provision Models
- Billing & Transaction Models

3 Scenarios & Process

- Use cases & Business Scenarios
- Detailed Process Maps (Level C, D, E)

4 Implementation

- Technology & Infra Architecture
- Detailed Migration Architecture & Plans
- Detailed Implementation & Operational Plans

Key Integration

1 Integration Patterns

- Integration Catalogue & Patterns
- Detailed Integration Artefacts

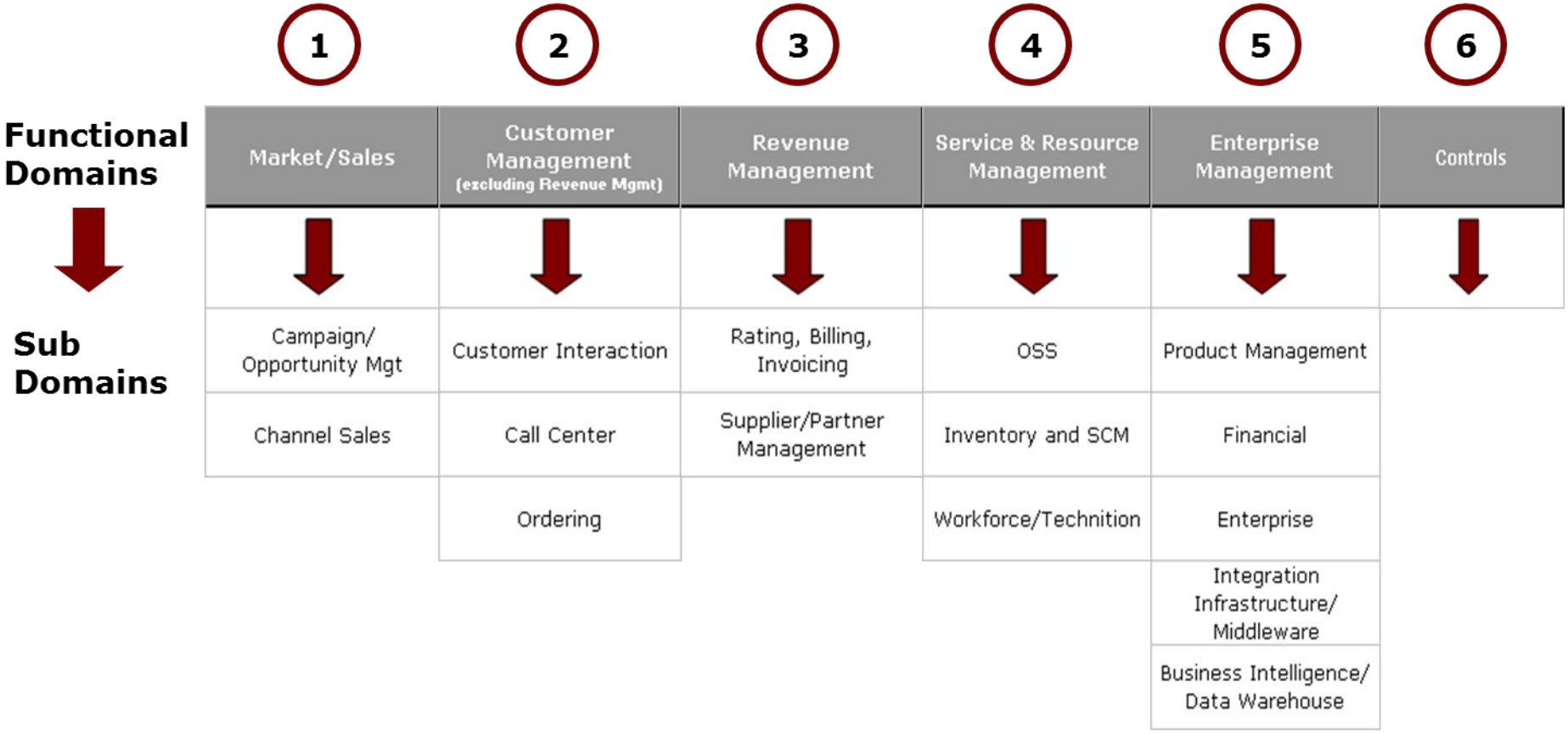
2 Web Services

- Customer, Contact & Account
- Offer & Product, Serviceability/Eligibility
- Ordering , Subscription
- Provisioning
- Number Management, Reserve/Release
- Billing, Payment History
- Payment Methods Registration
- Credit Card Payment/ Tokenization/PCI
- Security & Identification
- Channels & Agents
- Notification (SMS, 2-way, Email, device)
- Warranty & Repair

3 Other Integration

- Process Orchestration BPM/BPEL?
- MDM, Customer, Product, Other
- Bridging (Legacy, Transitional)
- Data Warehousing & Big Data

Solution Framing Functional Domains



PROPOSED INITIAL EA FRAMEWORK GUIDELINES

ARCHITECTURE

PRIORITY ARTIFACTS & CATALOG

PRIORITY CATALOGS

Application Inventory
- AS-IS Application Inventory
- AS-IS Application / Function Inventory
- AS-IS Application / Connections Inventory

Models
- AS-IS Customer Models
- AS-IS Product/Offer Models

Scenarios & Processes
- Use cases & Business Scenarios
- Detailed Process Maps (Level C, D, E)

Implementation
- Technology & Infra Architecture
- Detailed Migration Architecture & Plans
- Detailed Implementation & Operational Plans.

PRIORITY ARTIFACTS

1

Enterprise Architecture
- Integration Catalogue & Patterns
- Detailed Integration ARTIFACTs

2

API/Web Services
- Customer, Contact & Account
- Offer & Product, Serviceability/Eligibility
- Ordering , Subscription
- Provisioning
- Number Management, Reserve/Release
- Billing, Payment History
- Payment Methods Registration
- Credit Card Payment/ Tokenization/PCI
- Security & Identification
- Channels & Agents
- Notification (SMS, 2-way, Email, device)
- Warranty & Repair

3

Other Documents
- Architectural Designs

EA DELIVERABLES CATALOG

EA Guidelines

EA Anchor Decks
- EA Vision & Strategy
- BT Program Strategy & Roadmap

Reference Architecture
- BT Solution Reference Architecture
- Industry Reference Architecture

Architecture Guidelines
- Channels Architecture Guidelines
- Integration Architecture Guidelines
- Security Architecture Guidelines
- Cloud Architecture Guidelines

Business Data Model
- Customer Account Model Guidelines
- Multi-Play Product Model Guidelines.

Building Blocks
- Architecture Building Blocks
- Solution Building Blocks

Repositories

1 Capabilities
- Capabilities Inventory (eTom mapping)
- Requirements Inventory
- Business Scenarios & Use cases
- E2E Business Processes

2 Inventories
- Application Inventory
- Application / Function Inventory
- API/Web Service Inventory
- Technology Inventory

3 Matrices
- Org Chart & RACI
- Locations & Access Control

4 Strategies & End State
- BT Strategy & End State
- Omni-Channel Strategy
- Security Framework Strategy
- Integration Framework Strategy
- Process Orchestration Strategy
- Revenue Management Strategy
- OSS/Provisioning Strategy

TOGAF EA TOOLKIT

EA TOOLKIT

TOGAF EA TOOLS & TECHNIQUES

1. ADM – Architecture Development Method
2. Enterprise continuum

ARCHITECTURE PRINCIPLES
General rules and guidelines, intended to be enduring and seldom amended, that inform and support the way in which an organization sets about fulfilling its Mission.

STAKEHOLDER MANAGEMENT

ARCHITECTURE PATTERNS
A way of putting building blocks into context; e.g. to describe a re-usable solution to a problem. Building blocks are what you use: patterns tell you how you use them, when, why, and trade-offs

BUSINESS SCENARIOS
A way to derive business requirements for architecture and the implied technical requirements

CAPABILITY-BASED PLANNING
Used to manage risk during architecture / business transformation project

GAP ANALYSIS
Widely used. Validate an architecture that is being developed by highlighting shortfall between Baseline and Target Architecture

INTEROPERABILITY REQUIREMENTS
The ability to share information and services. SOA, Loose coupling, security

MIGRATION PLANNING

RISK MANAGEMENT

ASSESSMENTS

Identify and quantify an organization's readiness to undergo change.

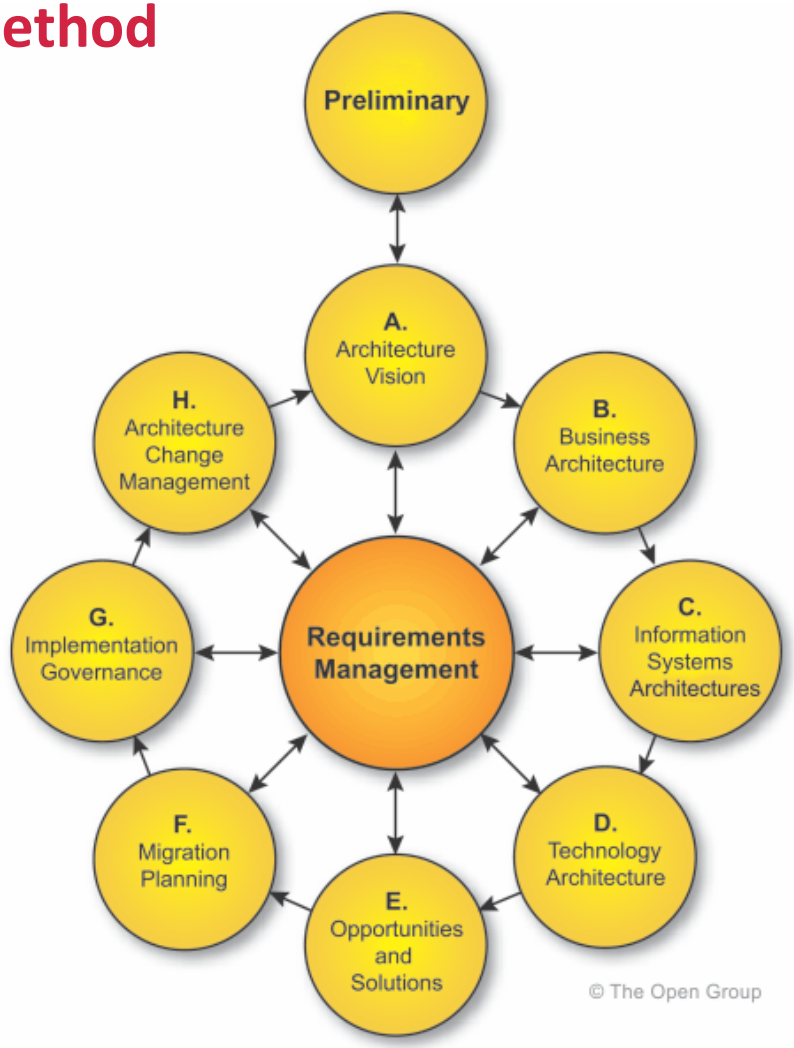
Steps required for the assessment, including determine, present and assess readiness factors, readiness and migration planning, and marketing the implementation plan

Business Transformation readiness Assessment – Maturity Model		
Factor: Need for Enterprise Information Architecture	Class	Organizational Context
	Readiness Factor	YES
Definition	▪ There is recognition by the organization the 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 Level					
1 Not Defined	2 Adhoc	3 Respectable	4 Defined	5 Managed	6 Optimized

Program – ADM Cycle - Document Repository

ADM – Architecture Development Method

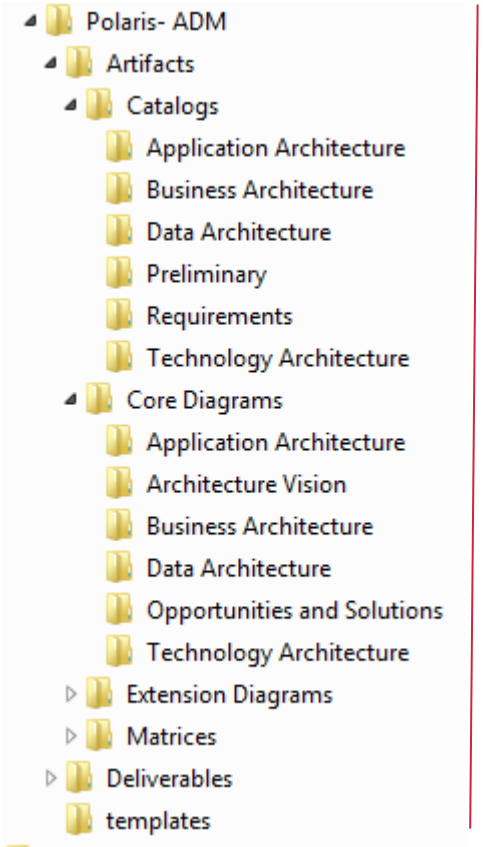


ADM - Document Tree

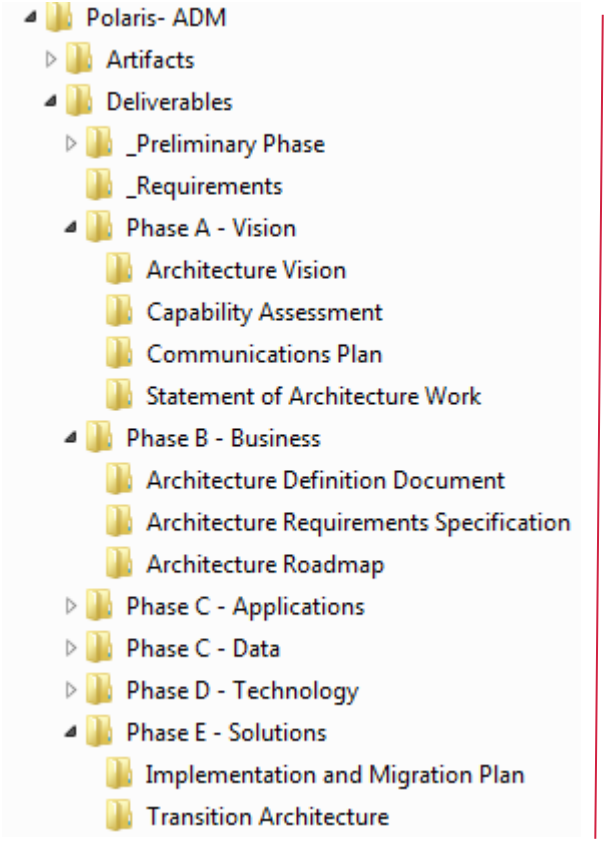
- Polaris- ADM
  - Artifacts
    - Catalogs
    - Core Diagrams
    - Extension Diagrams
    - Matrices
  - Deliverables
    - _Preliminary Phase
    - _Requirements
    - Phase A - Vision
    - Phase B - Business
    - Phase C - Applications
    - Phase C - Data
    - Phase D - Technology
    - Phase E - Solutions
    - Phase F - Migration
    - Phase G - Governance
    - Phase H - Change Mgmt
  - templates

ADM Cycle - Document Repository

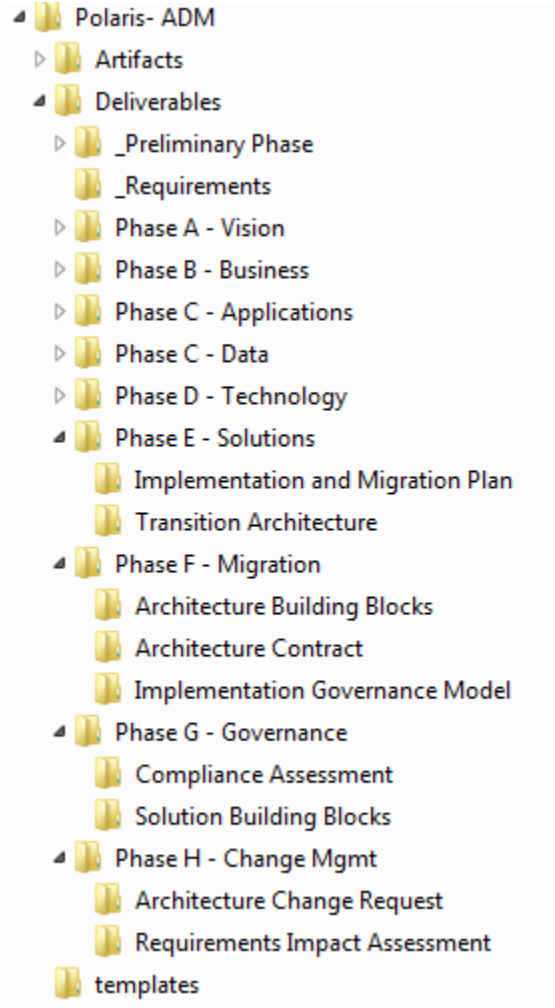
Artifacts



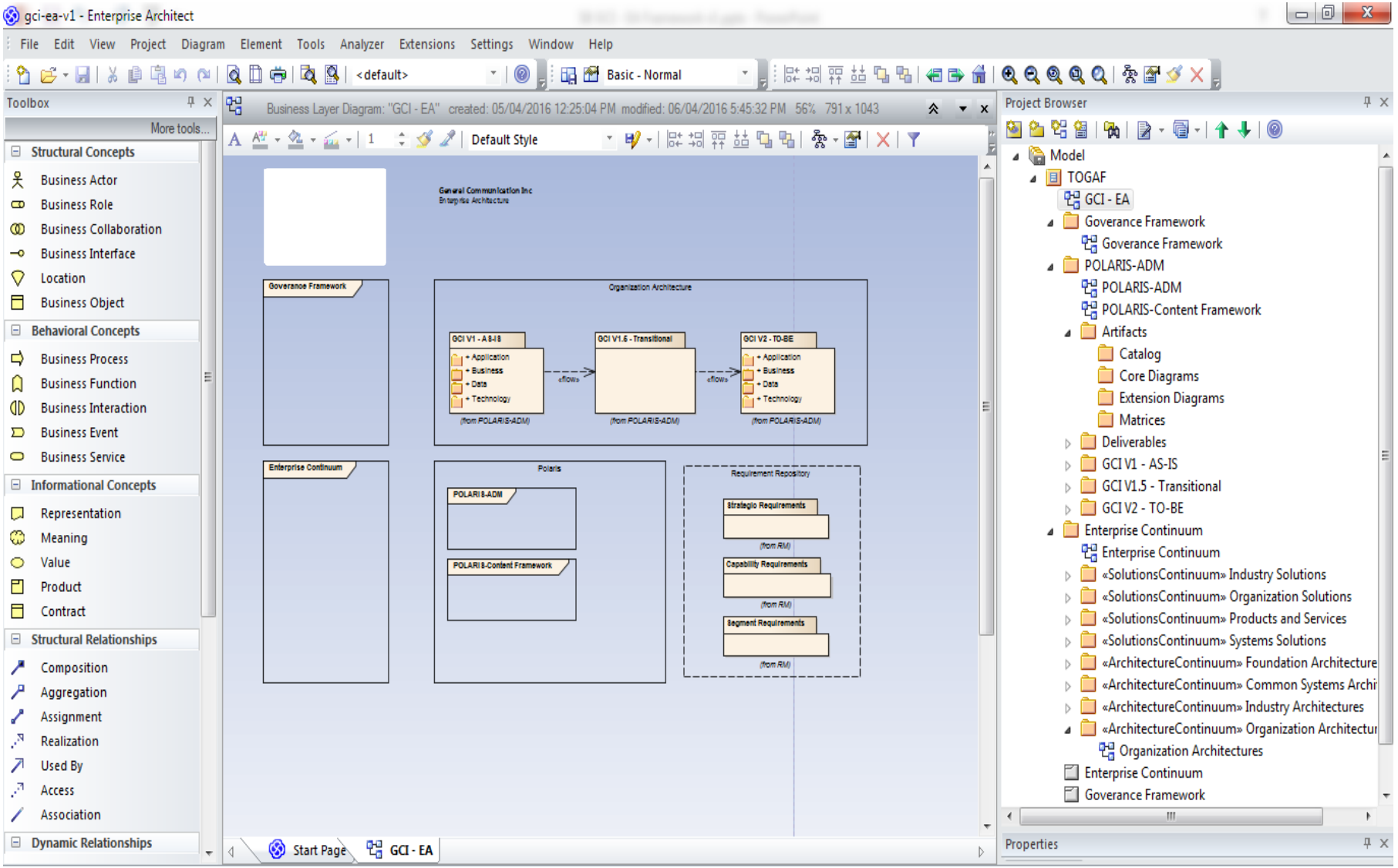
Architecture Documents



Solution & Governance



EA SPARX – Enterprise Architect Design



ENTERPRISE ARCHITECTURE FOR BUSINESS CAPABILITIES

Business Capabilities Architecture

- **Enterprise Architect = The Architecture of Business Capabilities**

  1. Focus on business capabilities that support business strategy,
  2. Delve into the design of those capabilities
  3. An effective way to consider people, process and technology together

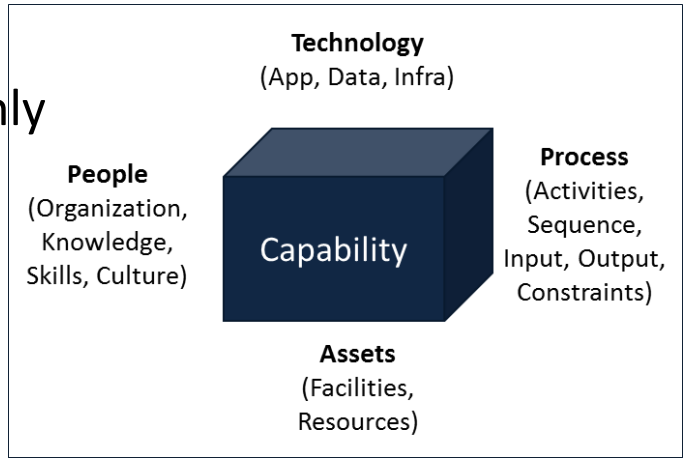
- **Capability vs Process Design**

  1. Process design focuses on activities to produce outcomes. Capability design includes process design, and adds technology to the consideration
  2. Capabilities are not processes--a process delivers a capability using a mixture of people
  3. The focus of capability design is on the outcome and the effective use of resources to produce a differentiating capability or an essential supporting capability

Business Capabilities

- Business capabilities are a combination of business processes, people, technology solutions, and assets aligned by strategic performance objectives

- Business Capability may be
  1. Manual: Inherited in people/process only
  2. Fully Automated: Not too common
  3. Produced by a collaboration between people and technology in technology-enabled processes



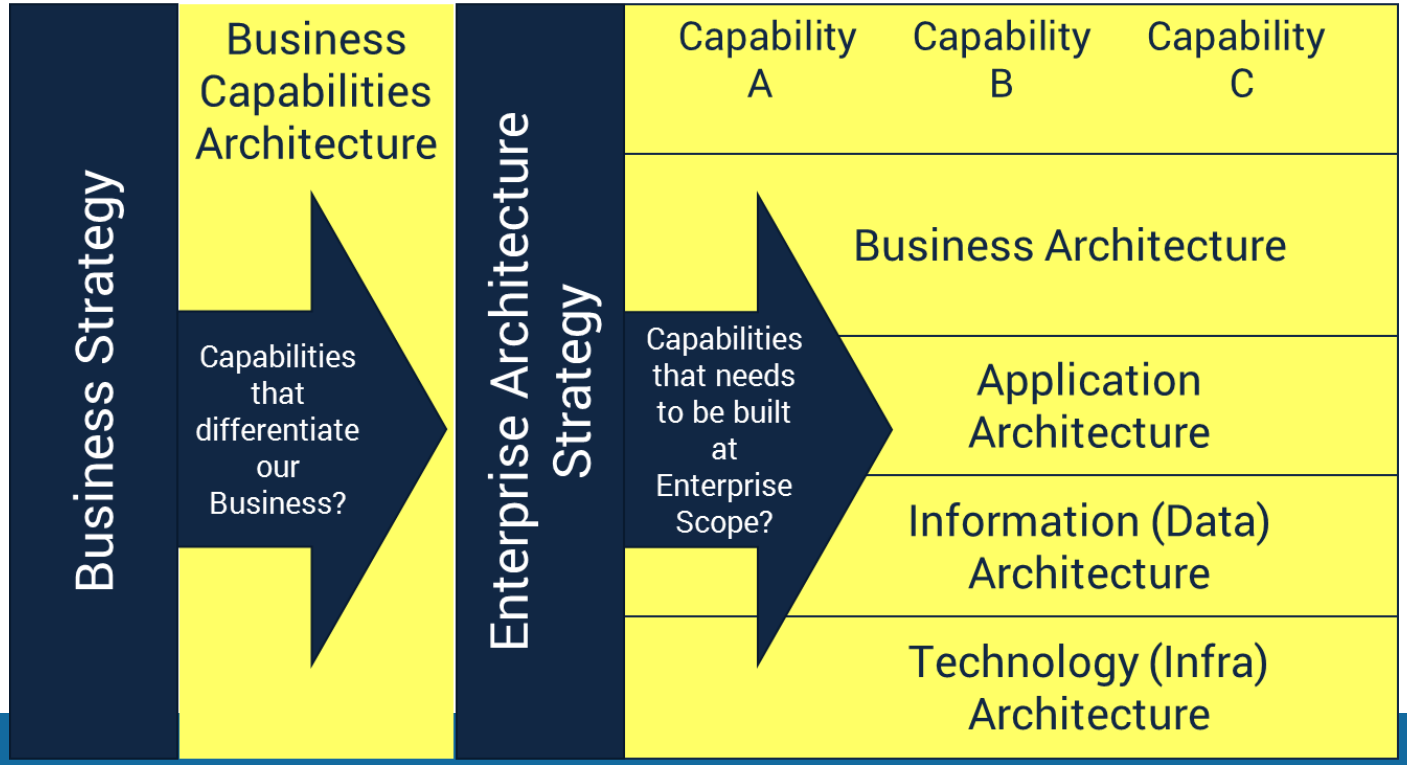
- Capabilities are the building blocks of the enterprise. They relates to each other in building a functional enterprise.

- Each capability holds certain responsibility and interfaces with other capabilities in an enterprise.

Enterprise Architecture

- Business strategy elaborates on the business vision, sets the direction for the business

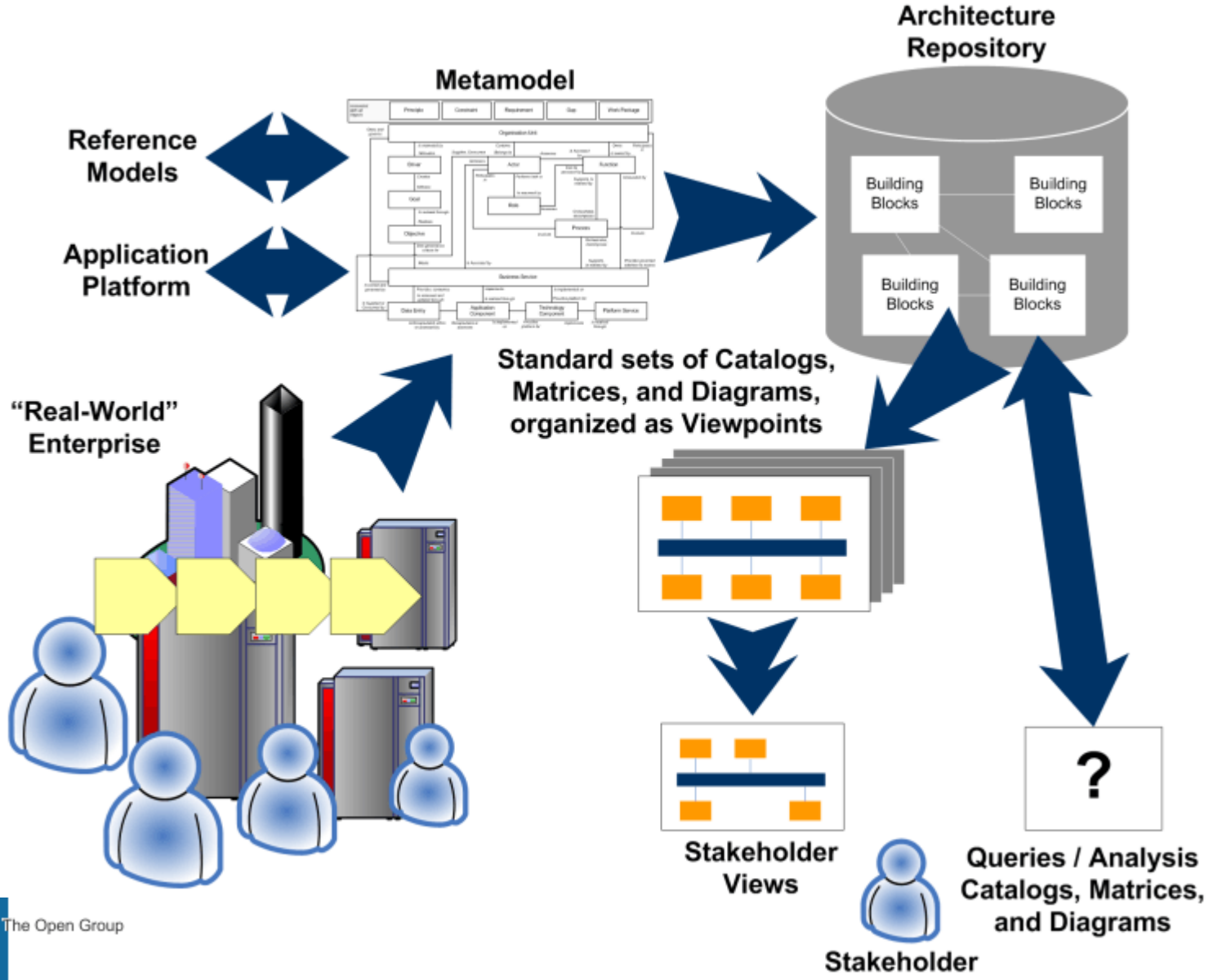
- Enterprise Architecture strategy elaborates the EA vision and refines business strategy objectives, and determines where to focus the attention of the enterprise-scoped, multidisciplinary EA effort



APPENDIX

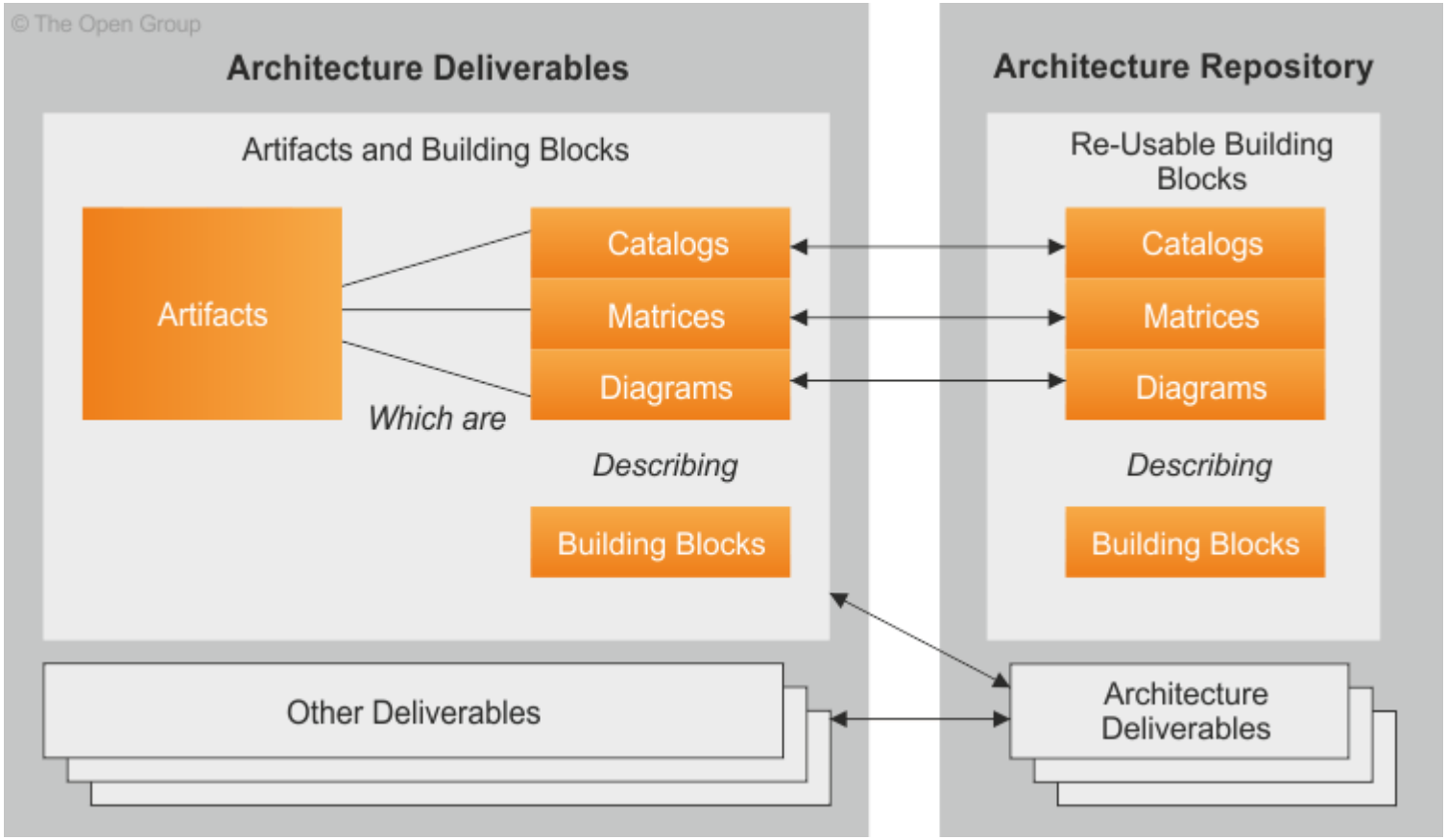
TOGAF – meta models

Interactions between Metamodel, Building Blocks, Diagrams, and Stakeholders



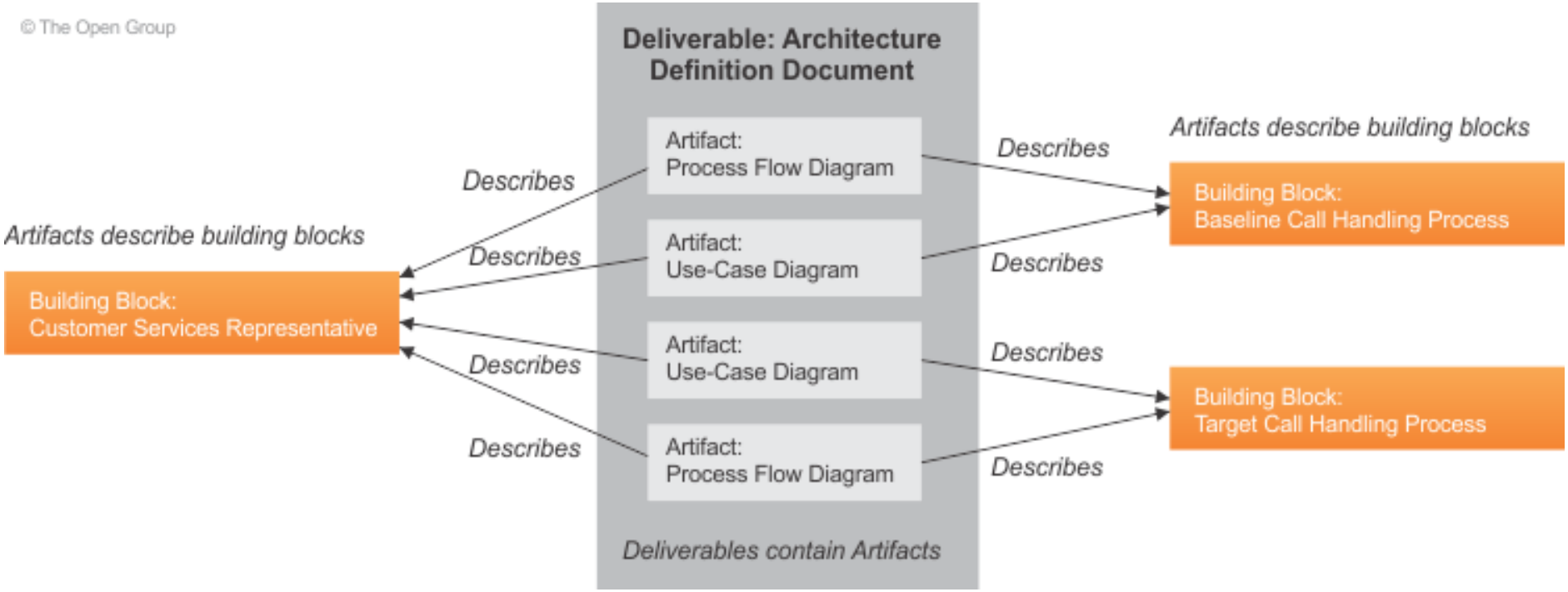
TOGAF – meta models

Relationships between Deliverables, Artifacts, and Building Blocks



TOGAF – meta models

Architecture Definition Document



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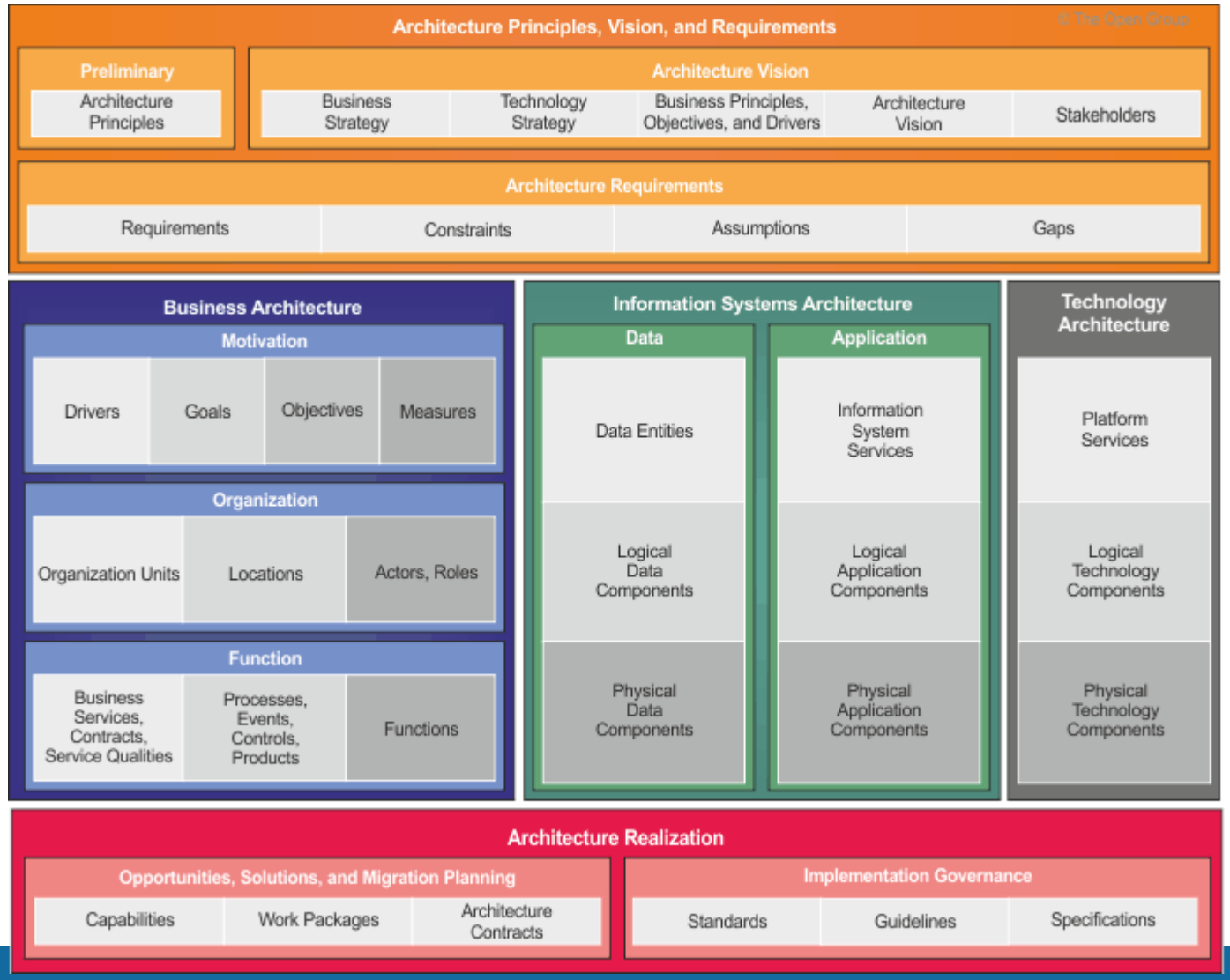
Content Framework



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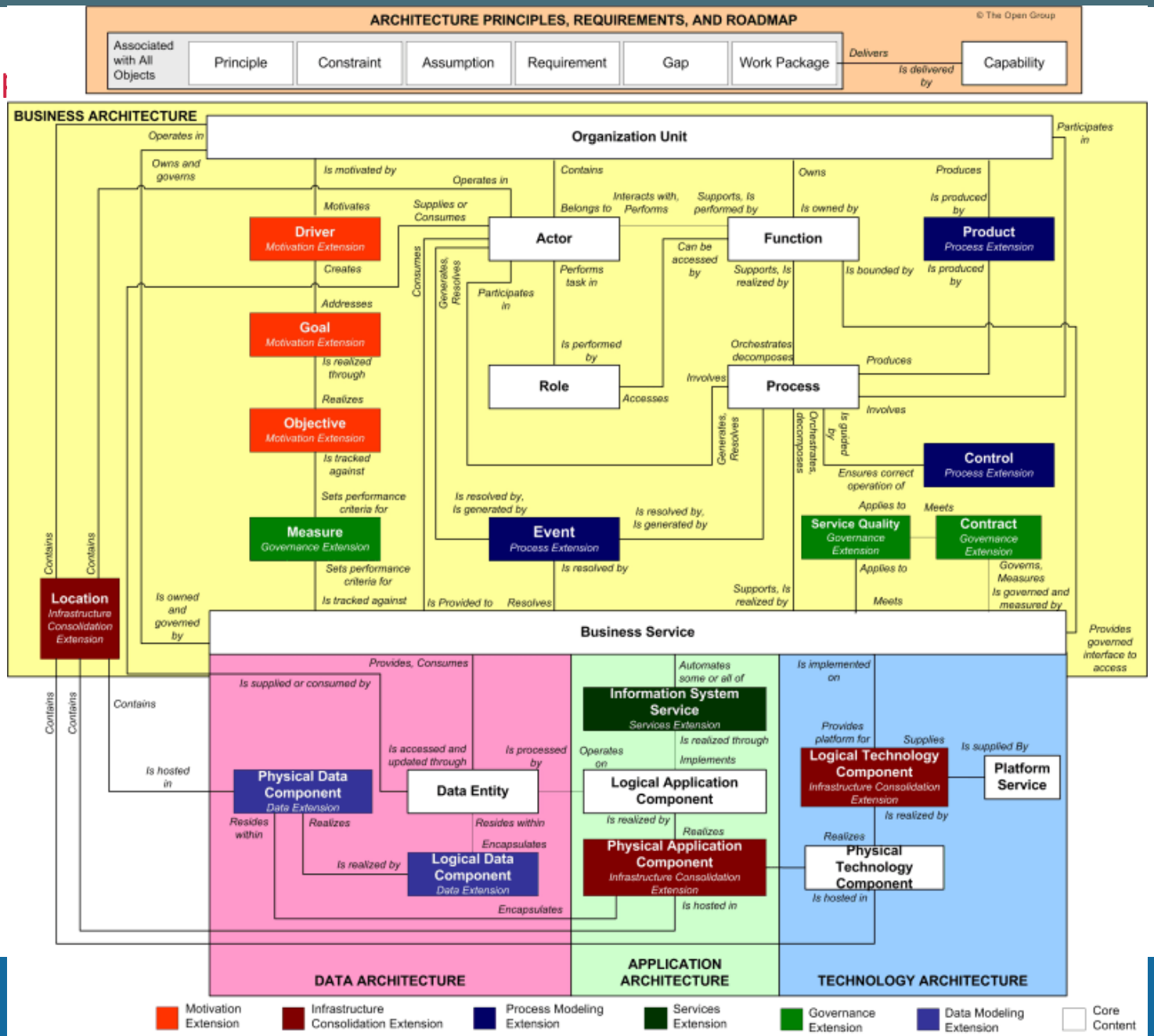
Relationshi



DOCUMENT HISTORY

Version	Date	Author	Commentary
V0.1	1-Apr-2016	Razi Chaudhry	Initial EA Framework Presentation

Font Downloads:

- FontAwesome - https://fortawesome.github.io/Font-Awesome/