
Engineering Management Methods

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# TOGAF methodology with software solutions

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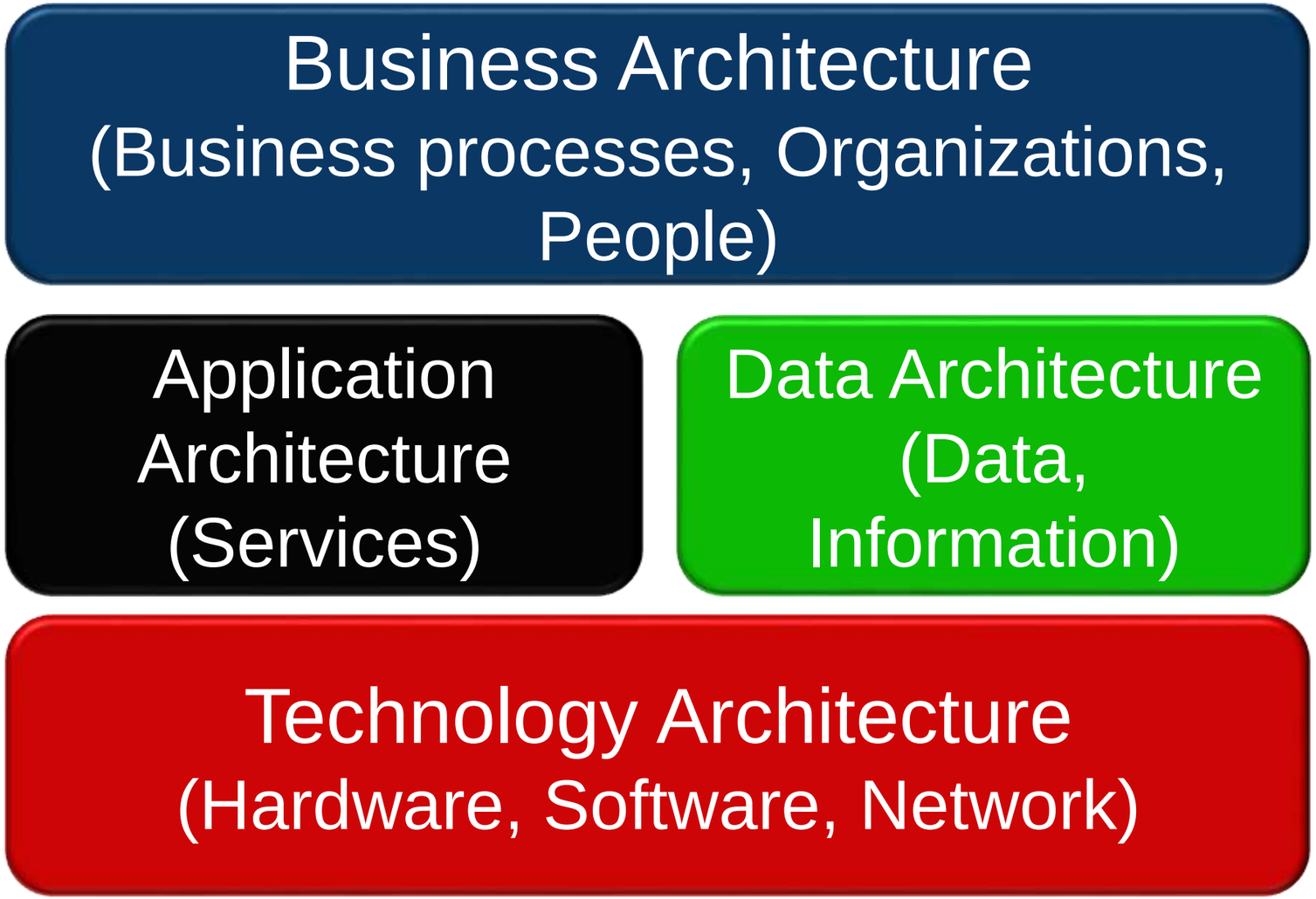
AEA
Magyar Tagozat

# Architecture

**Solution** Architecture

**Enterprise** Architecture

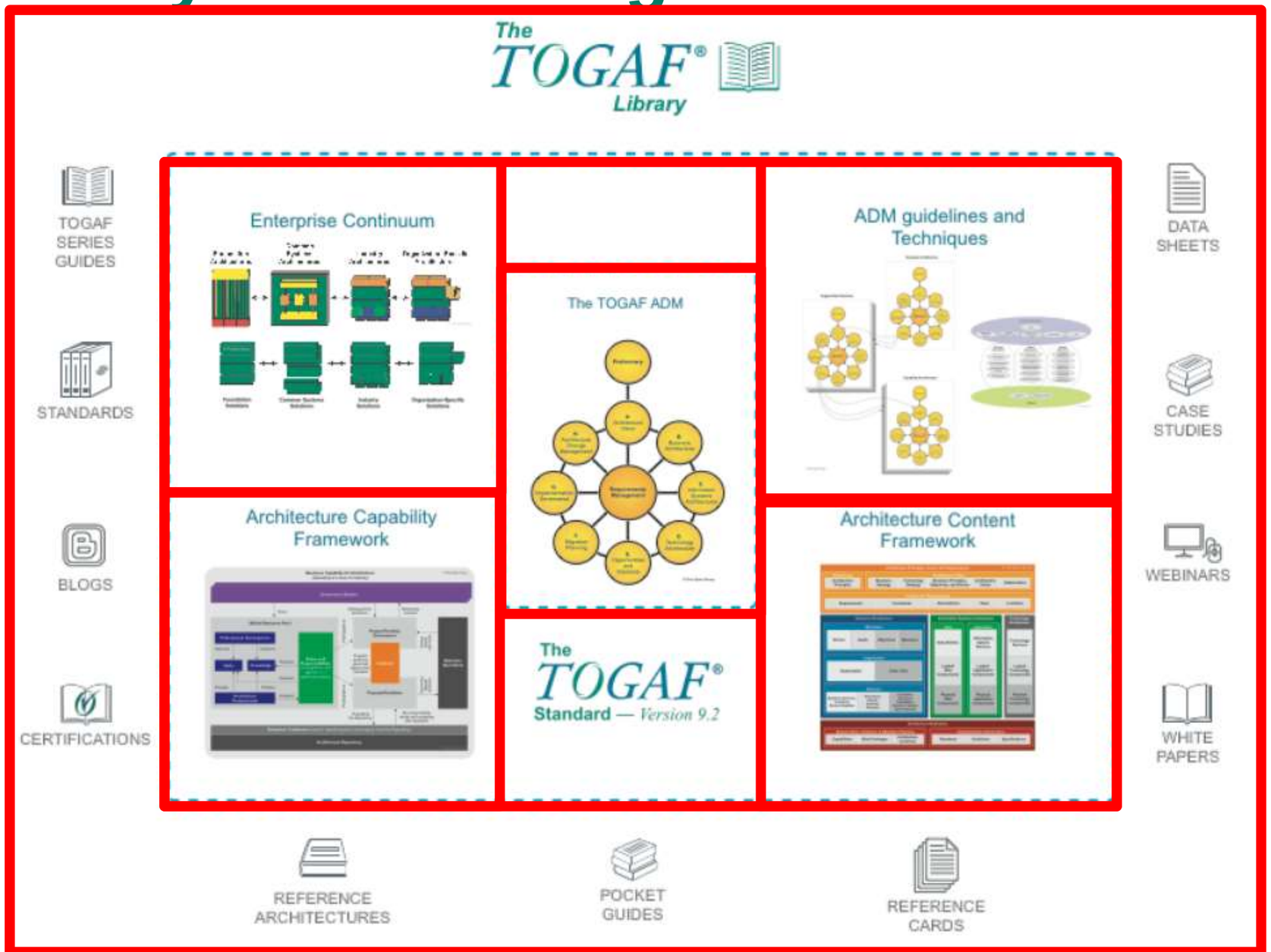
# Architecture domains



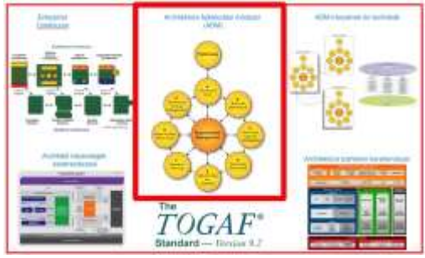
# TOGAF®, an Open Group Standard, is…

- 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

# TOGAF Body of Knowledge



# Enterprise Architecture Development Method (ADM)



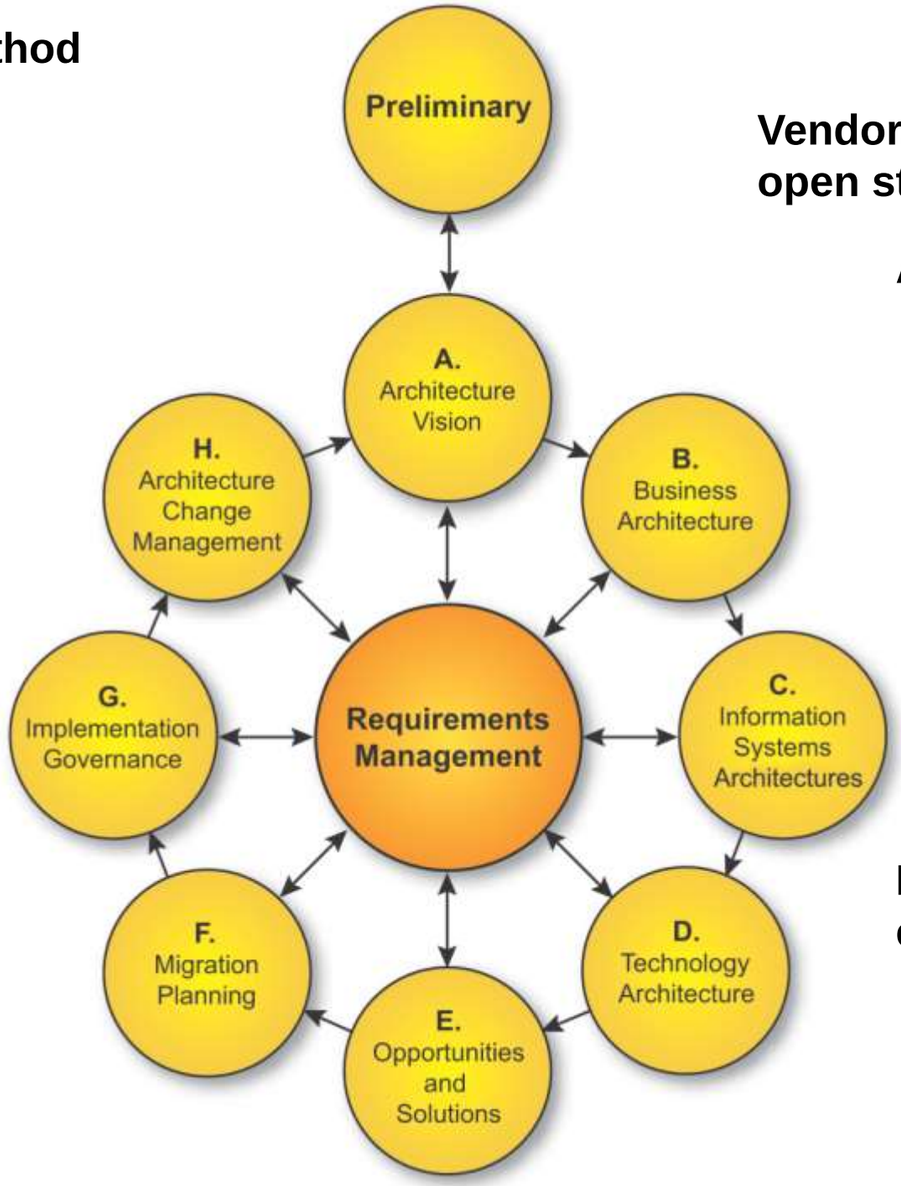

**A comprehensive general method**

**Complementary to, not competing with, other frameworks**

**Widely adopted in the market**

**Tailorable to meet an organization and industry needs**

**Available under a free perpetual license**




**Vendor, tool and technology neutral open standard**

**Avoids re-inventing the wheel**

**Business IT alignment**

**Based in best practices**

**Possible to participate in the evolution of the framework**

**Prepare** the organization for a successful architecture project

Set scope, constraints expectations; create the **Architecture Vision**; validate the business context; create the **Statement of Architecture Work**

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

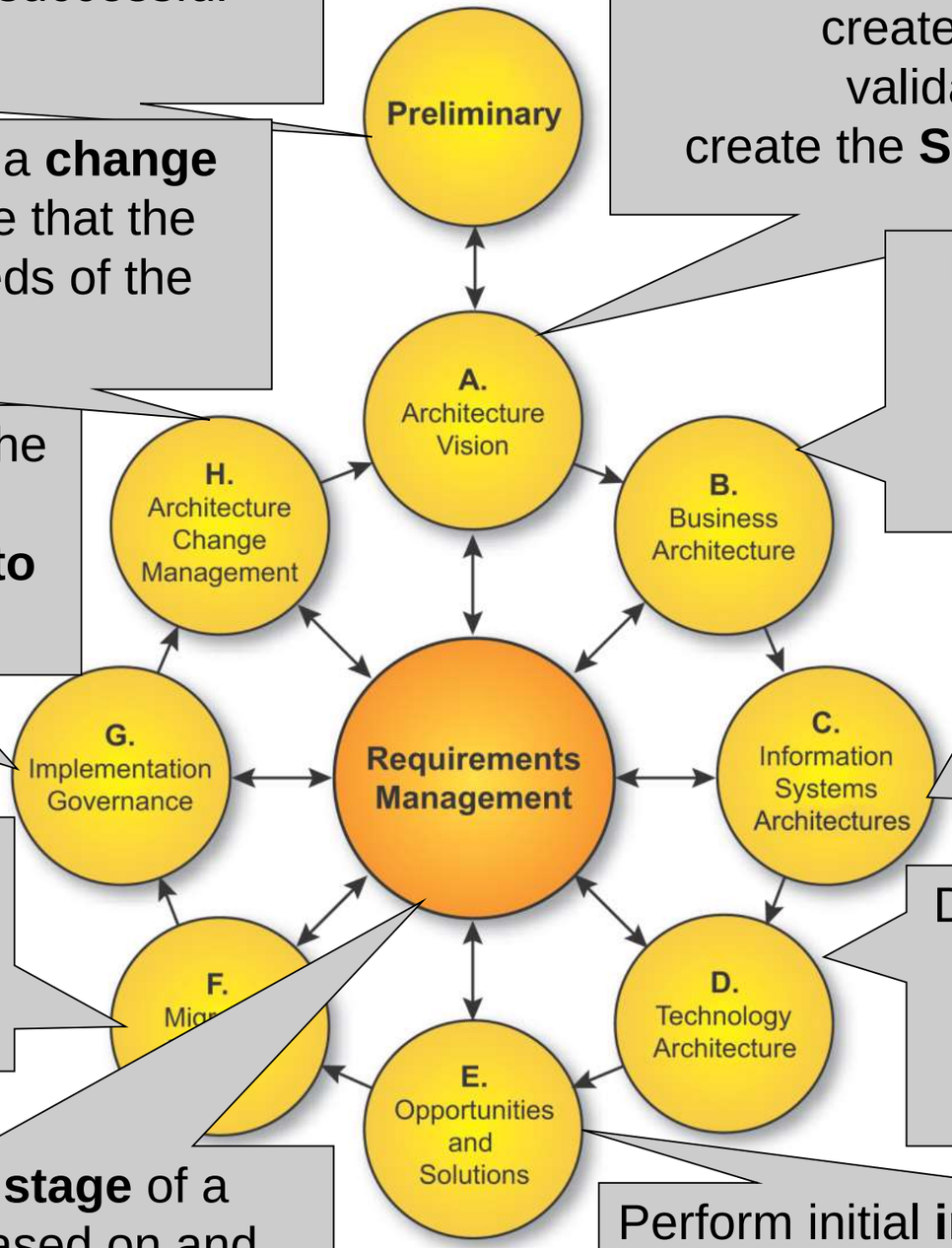
Develop **Business Architecture**
Develop baseline and target architectures and analyze the gaps

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

Develop **Information Systems Architectures**
Develop baseline and target architectures and analyze the gaps

Analyze costs, benefits and risks; develop **detailed Implementation and Migration Plan**

Develop **Technology Architecture**
Develop baseline and target architectures and analyze the gaps




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

Perform initial **implementation planning**; identify major implementation projects



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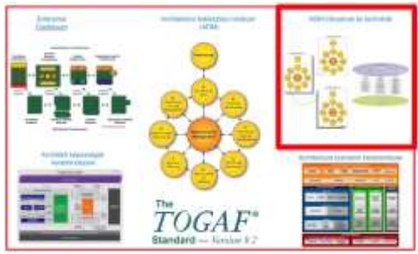
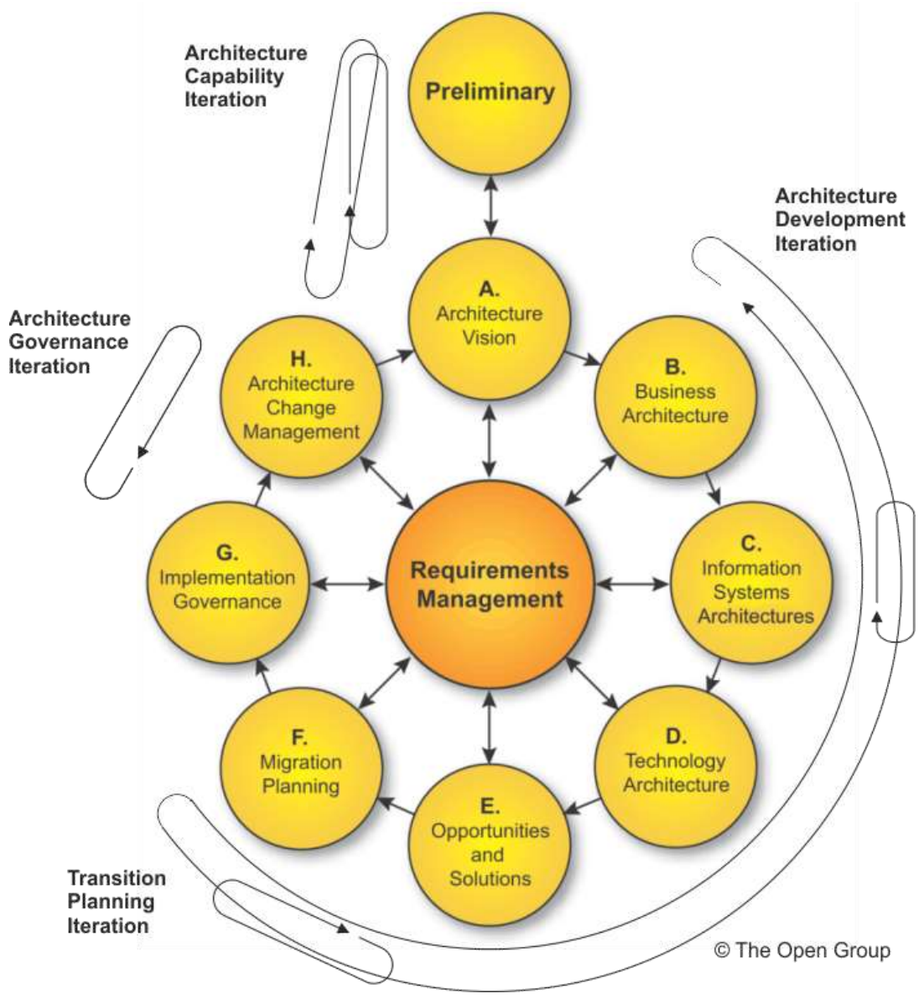
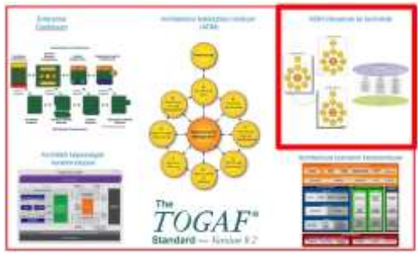
# Applying Iteration to the ADM

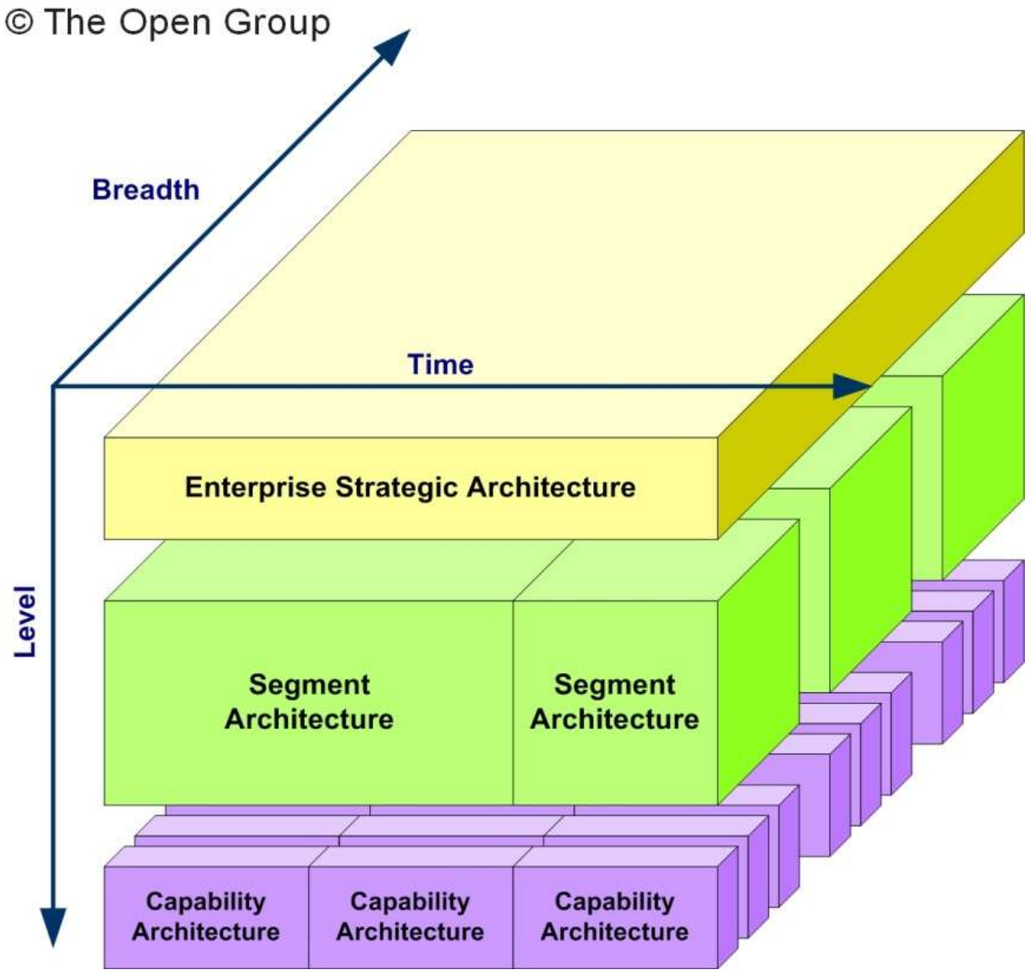


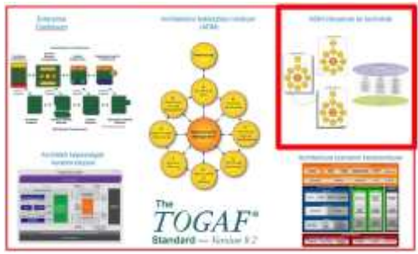

*Example Guideline*

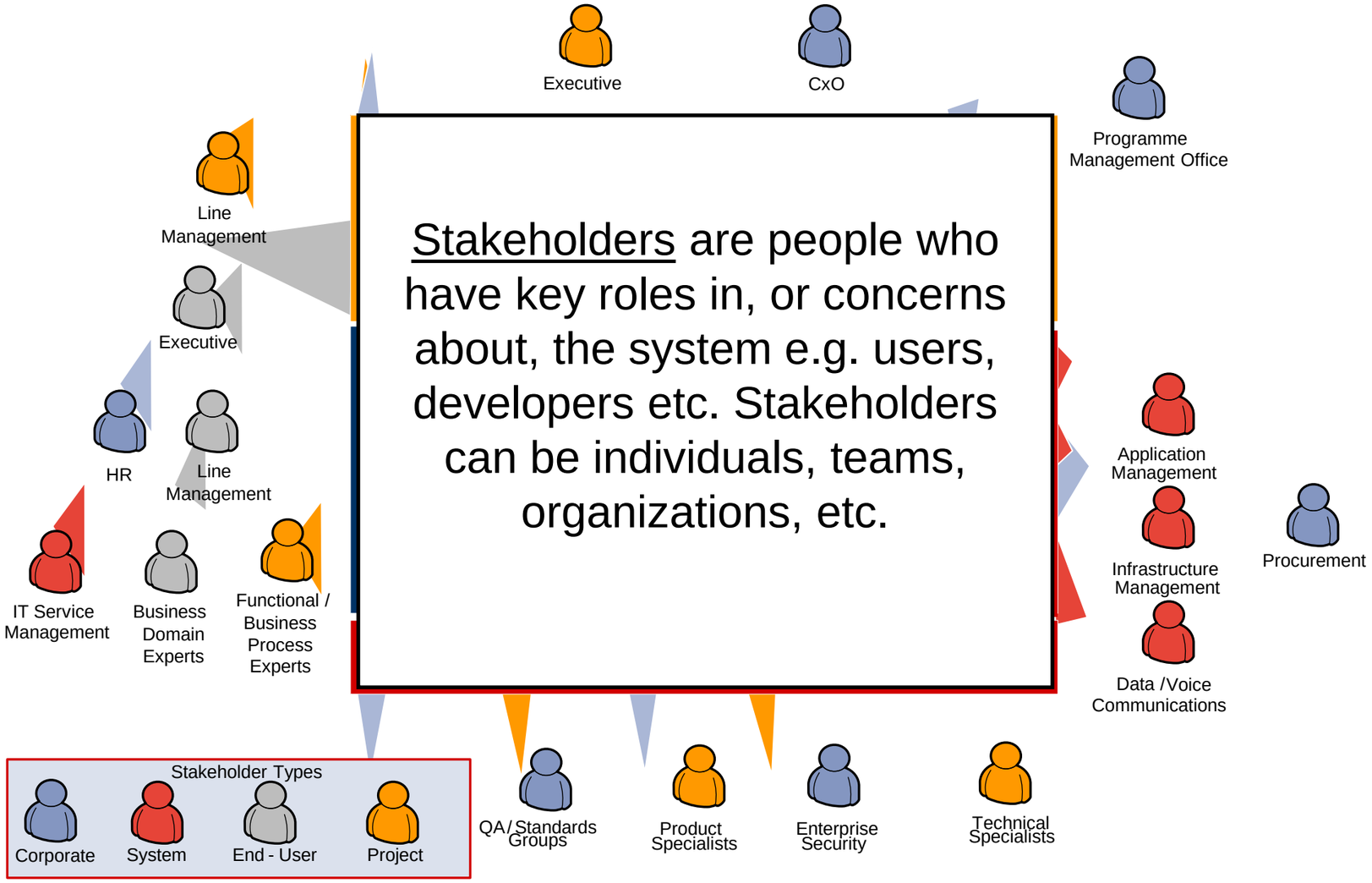
# Applying the ADM
# Across the Architecture Landscape



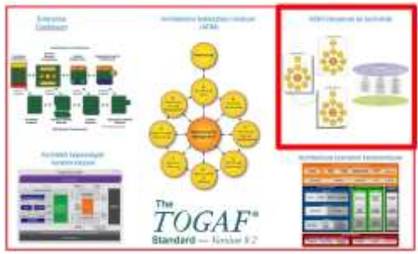



# Stakeholders and their Viewpoints



# Stakeholder Map Matrix

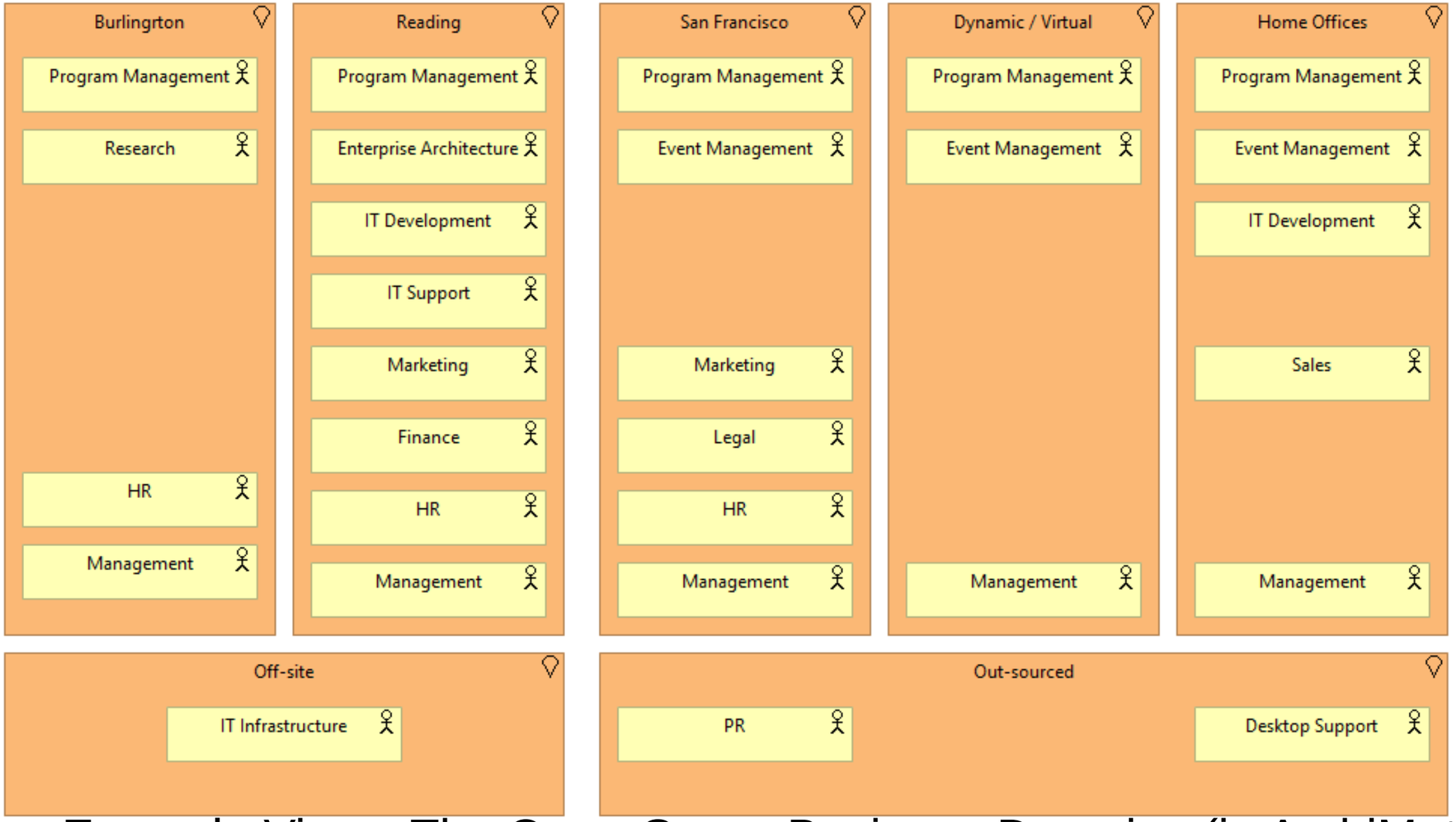



| STAKEHOLDER | KEY CONCERNS | CLASS | VIEWS |
|---|---|---|---|
| CxO<br>– CEO, CFO, CIO, COO | The high level drivers, goals and objectives of the organization, and how these are translated into an effective process and IT architecture to advance the business. | KEEP SATISFIED | Business Footprint diagram<br>Goal/Objective/Service diagram<br>Organization Decomposition diagram |
| Program Management Office<br>– Project Portfolio Managers | Prioritizing, funding and aligning change activity.<br>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<br>Business Footprint diagram<br>Application Communication diagram<br>Functional Decomposition diagram |
| Procurement<br>- 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<br>Technology Standards Catalog |

# 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** | Nested boxes diagram.<br>Outer boxes = locations;<br>Inner boxes = business functions.<br>Semantics of nesting = functions performed in the locations. |

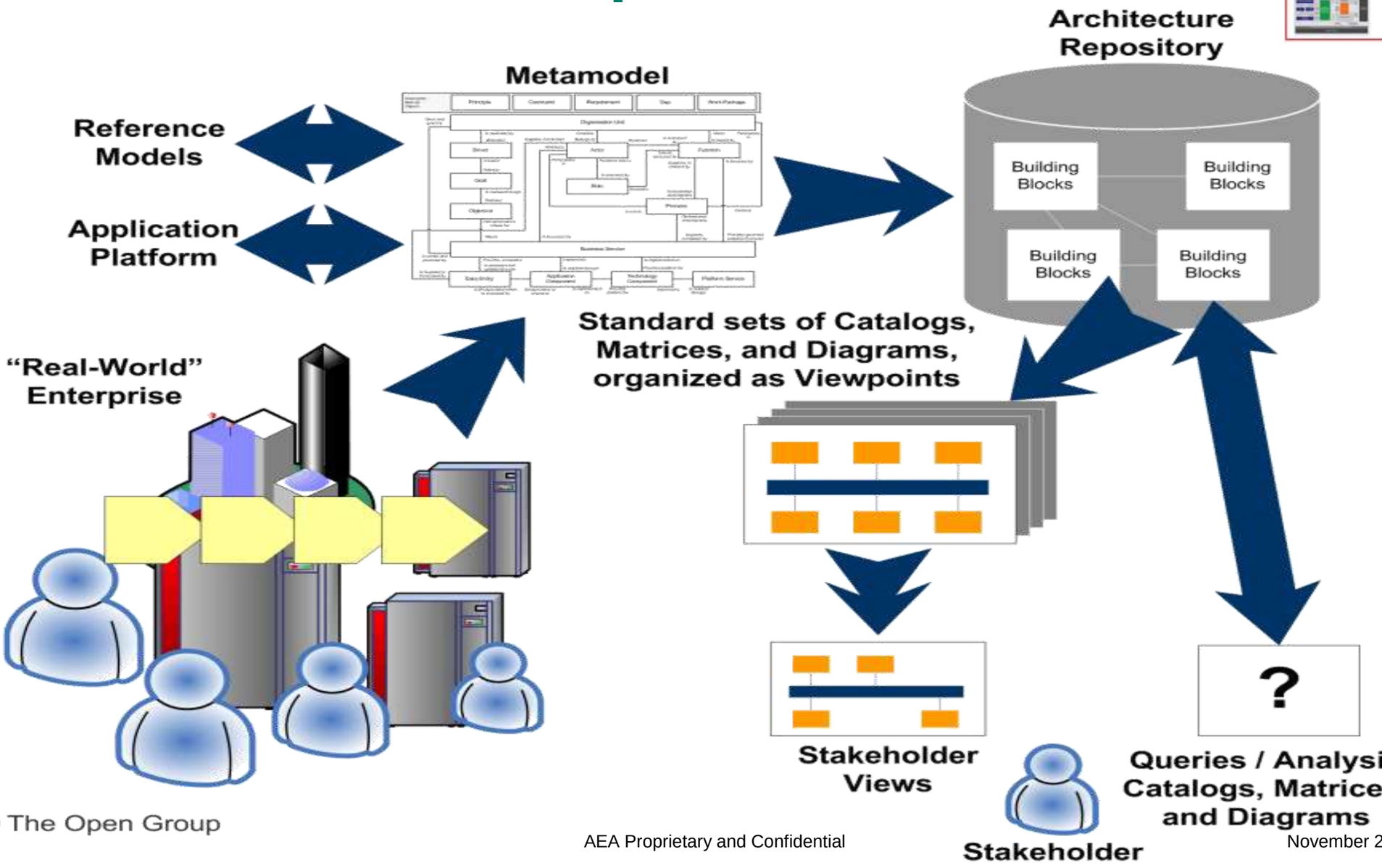
# A Simple Example of a View

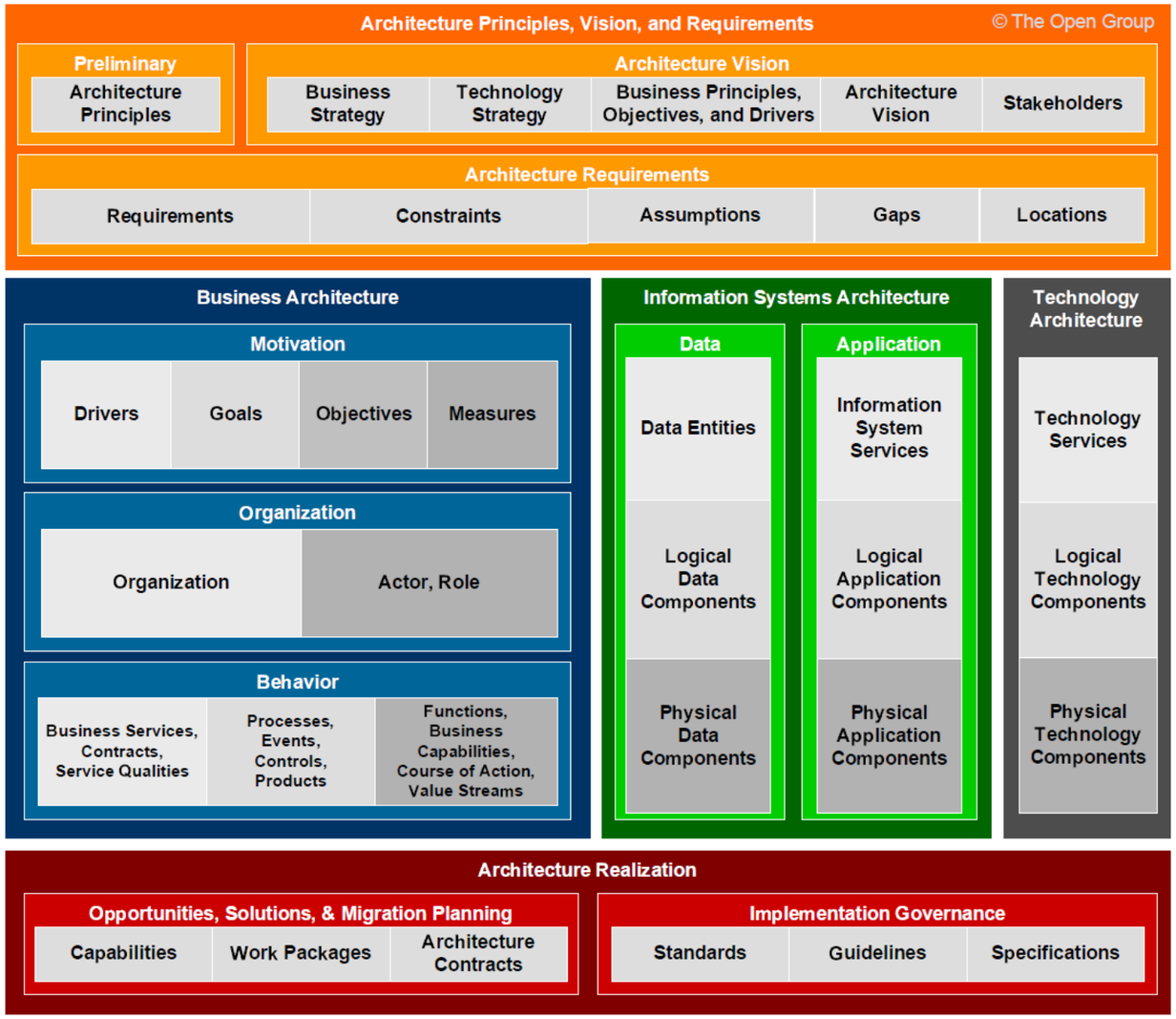

ARCHIMATE®

Example View - The Open Group Business Domains (in ArchiMate)

# Tools can model the Enterprise Architecture

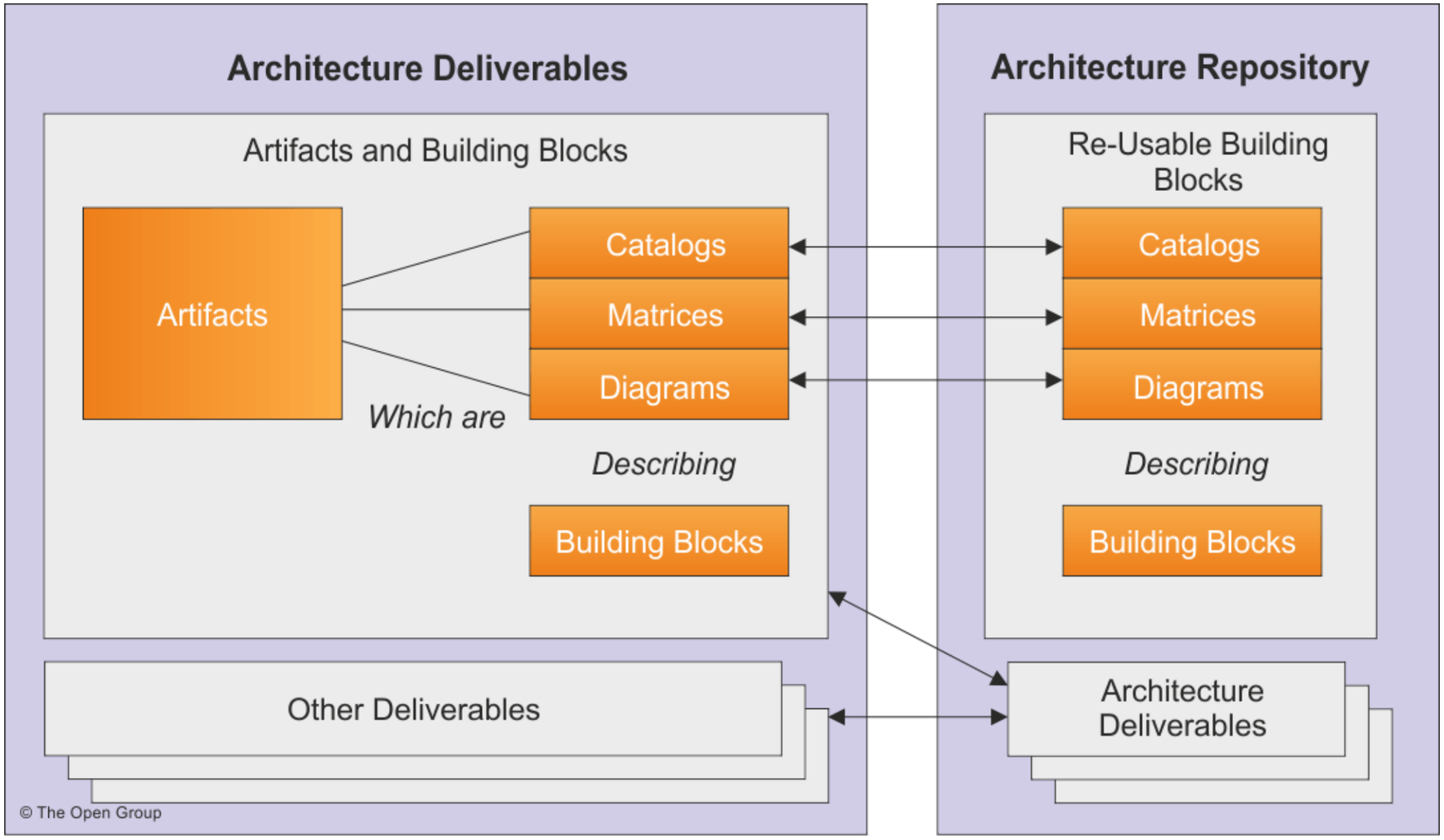
# Architecture Content Framework


- Provides a detailed **model of architectural work products**, including
  - Deliverables, Artifacts, Architecture Building Blocks
- 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**

# Deliverables, Artifacts and Building Blocks

## in the Architecture Content Framework



# TOGAF 9.2 Artifacts

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



Infrastructure Consolidation Extension | Governance Extension | Motivation Extension | Process Modeling Extension | Data Modeling Extension | Services Extension | Core Content

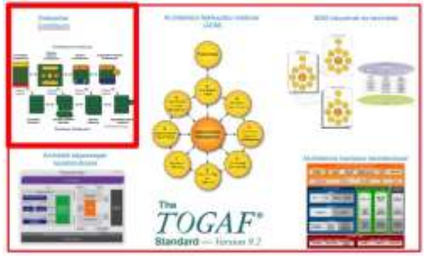
# Architecture Principles

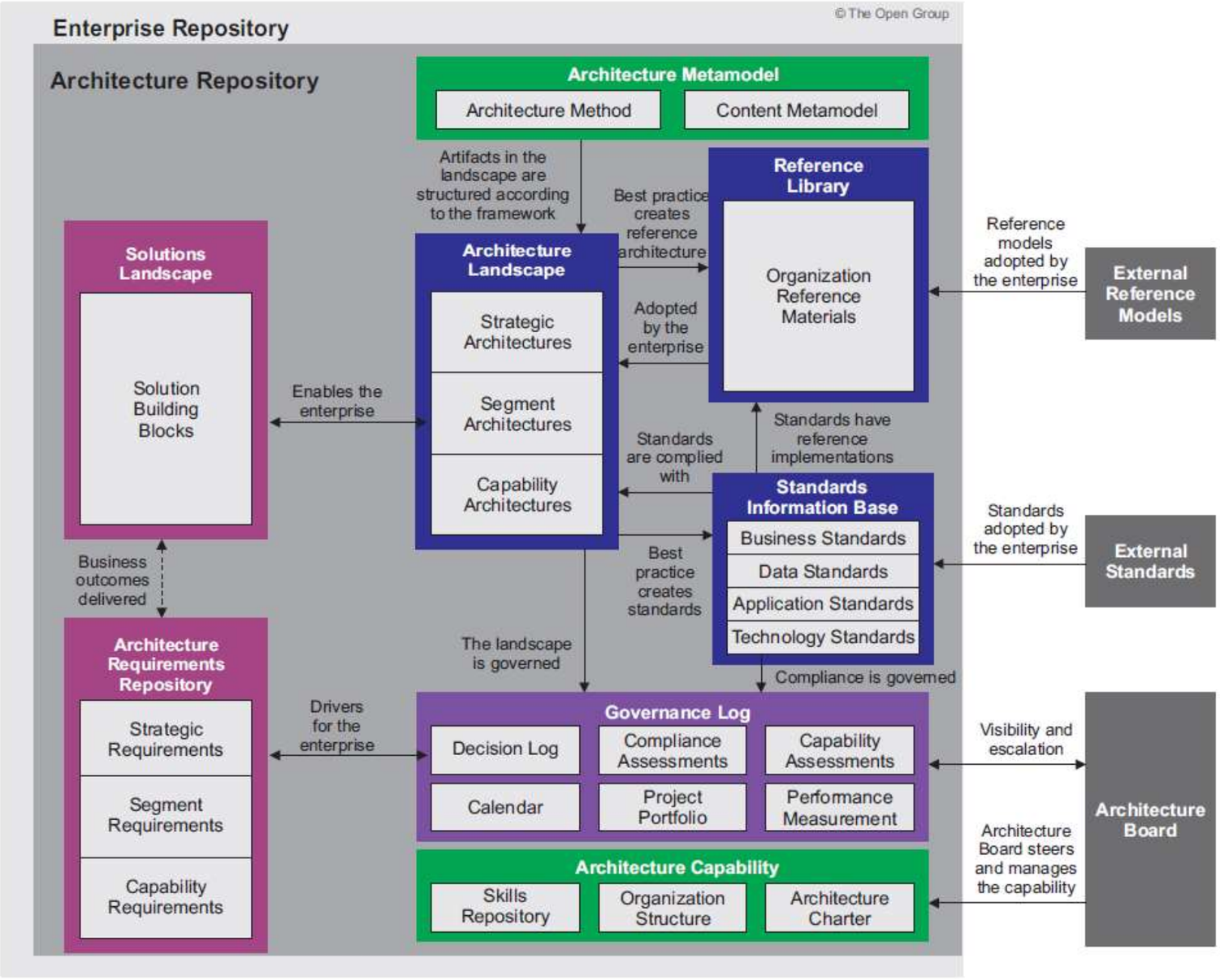

- An initial output of the **Preliminary Phase**
- A set of **general rules** and guidelines for the architecture being developed
- TOGAF contains guidelines for developing principles and a detailed **set of generic principles**
- Principles are generally established in two key domains:
  - **Enterprise**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

# Architecture Principle Template


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

# Architecture Repository (TOGAF 9.2)

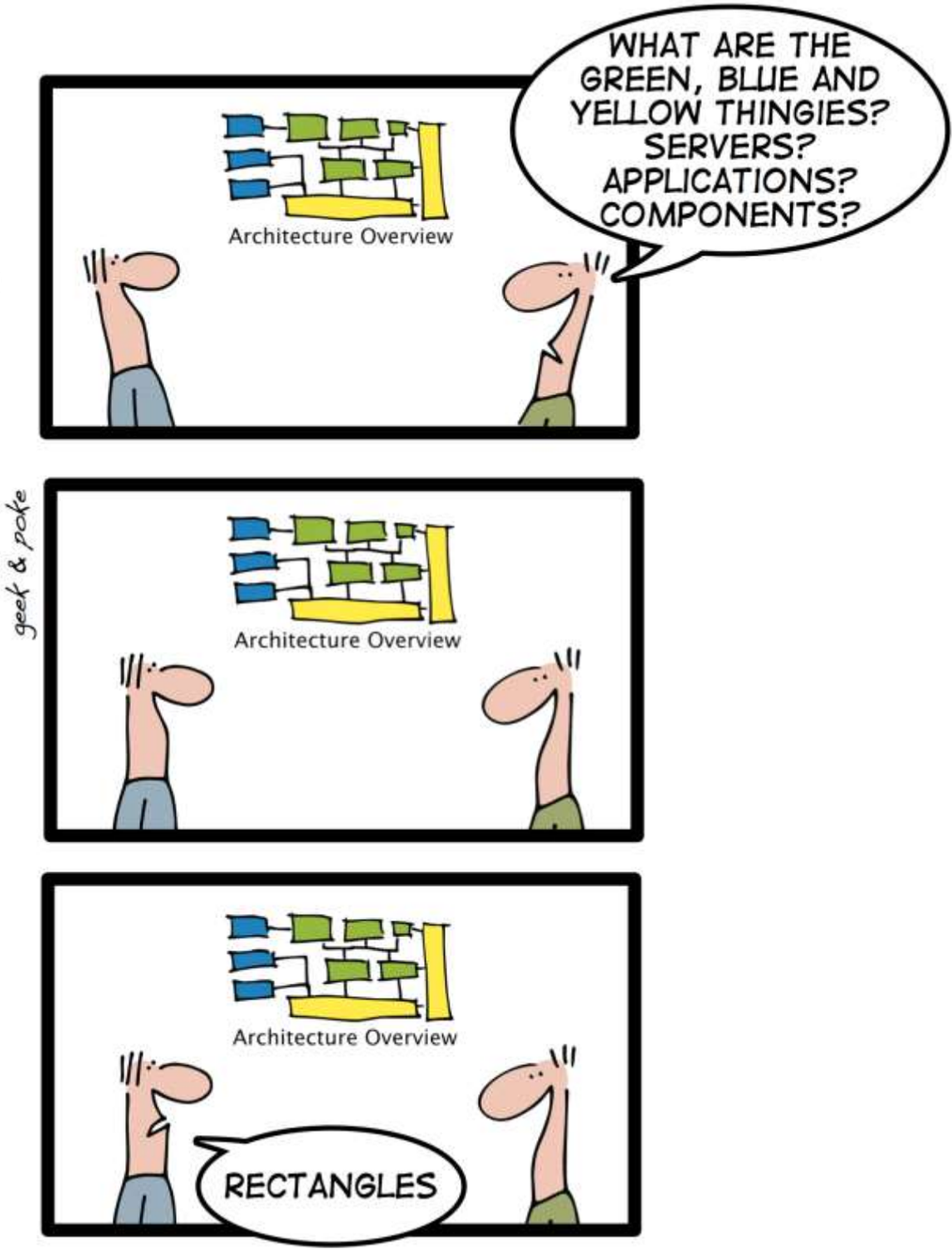




# Common language needed!

- Get away from the "fuzzy pictures" image
- Clear communication
- No ambiguity
- Coherence
- Consistency
- Visualization
- Analysis
- STANDARD

# ArchiMate®

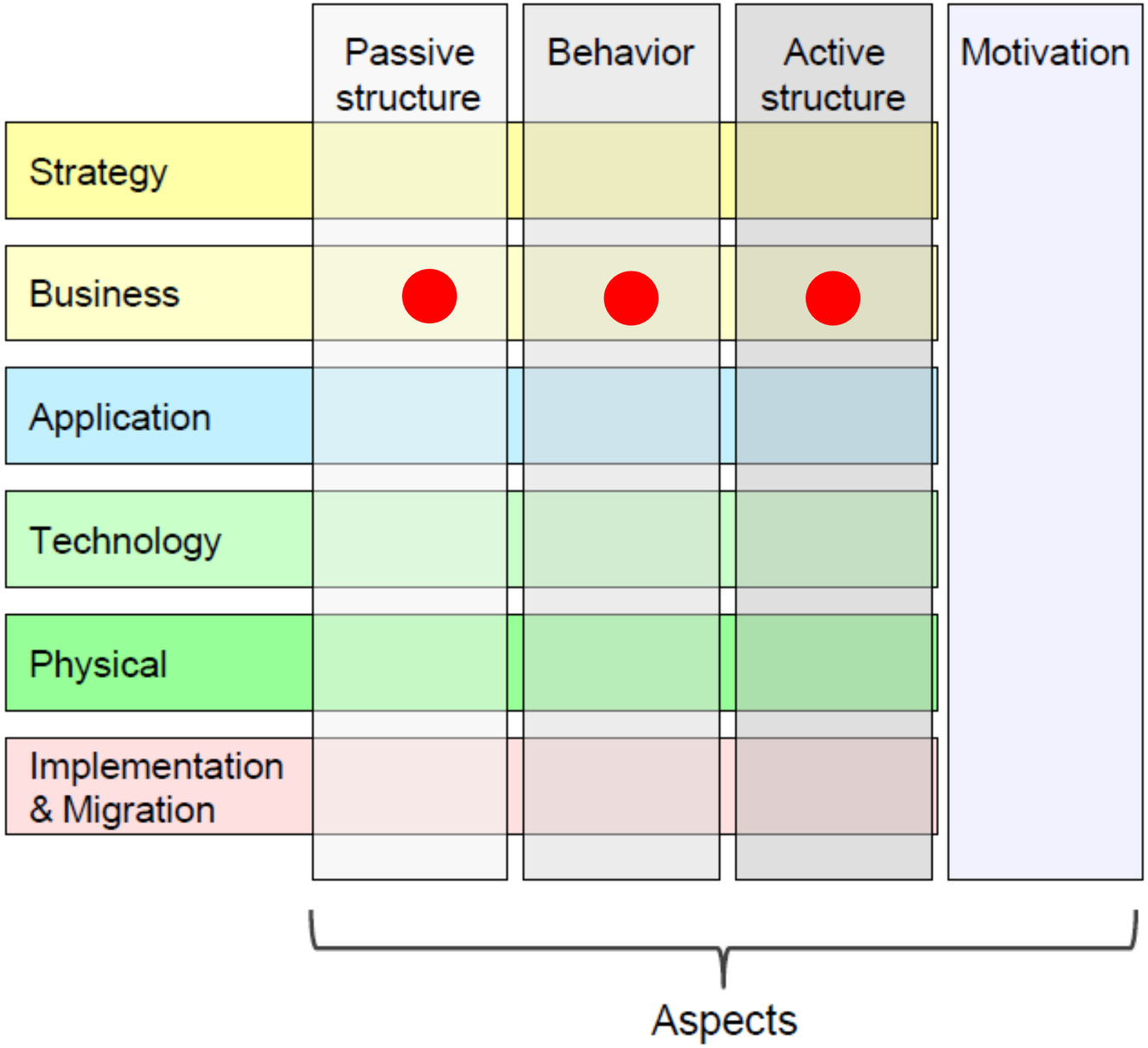


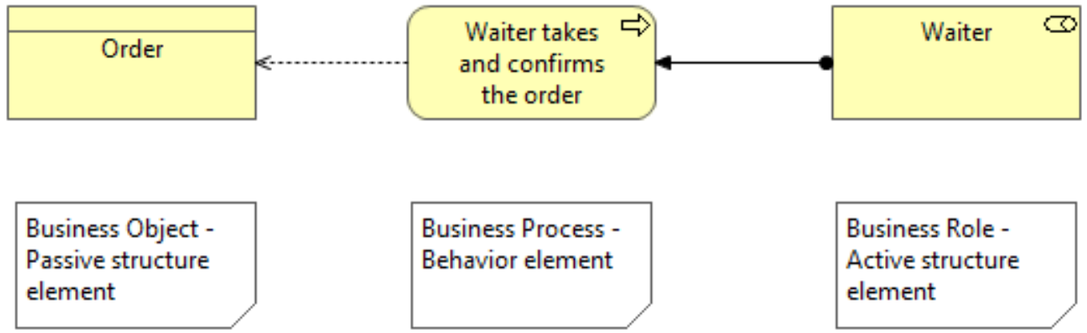
# Benefits of a standard language


ArchiMate®

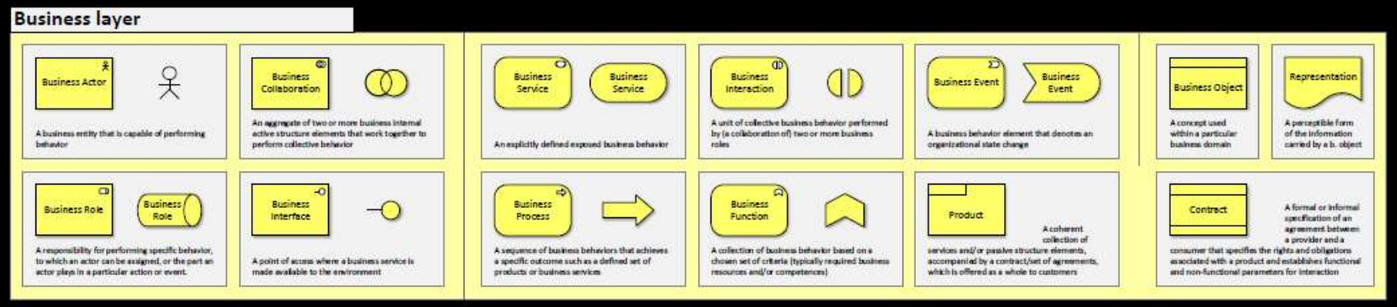
- A Language **to describe Architectures**
- Describes the **business, application, and technology** layers
- With **Relations** between the layers
- **Graphical** language with formal semantics
- Techniques for **Visualizations and Analyses** for different stakeholders
- Open **standard** maintained by The Open Group

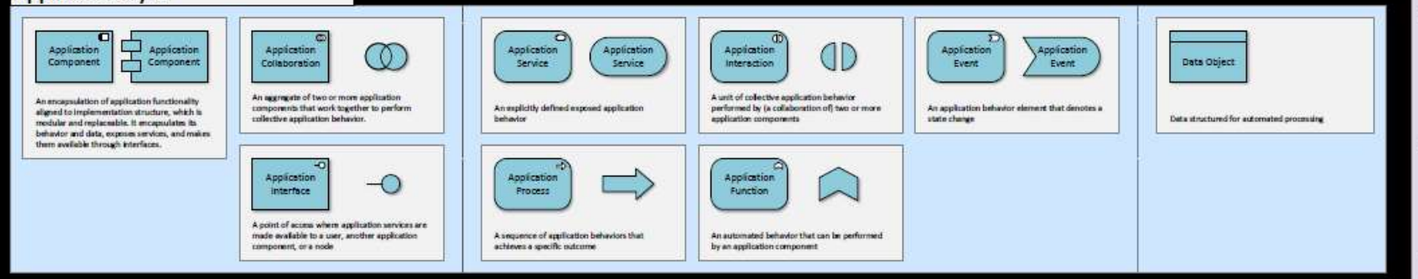
# Full ArchiMate Framework

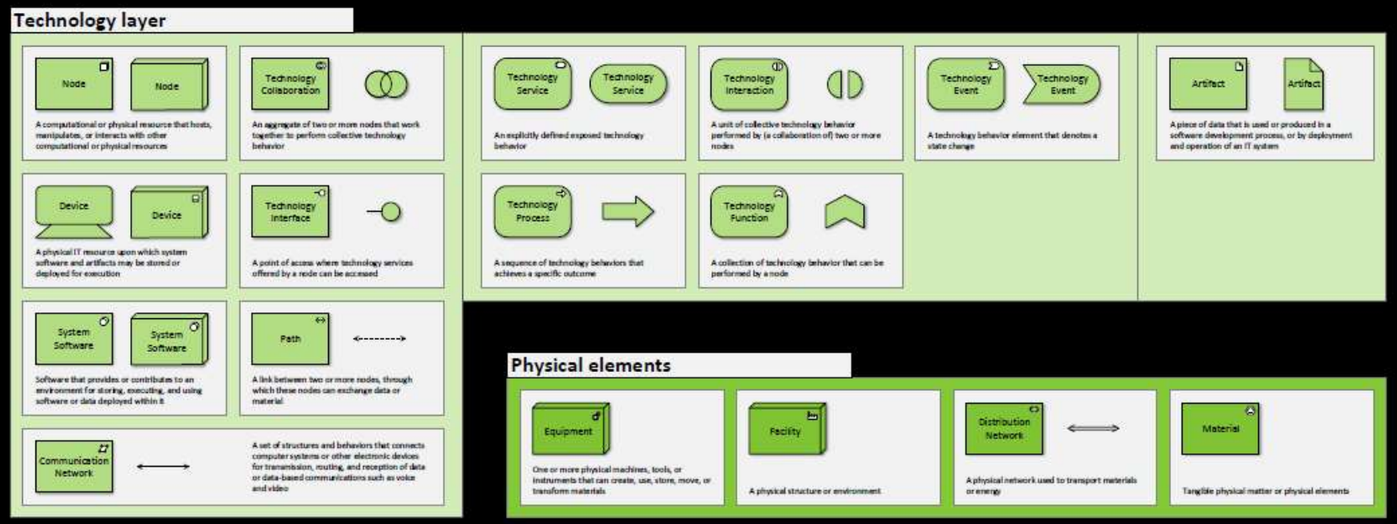


# ArchiMate

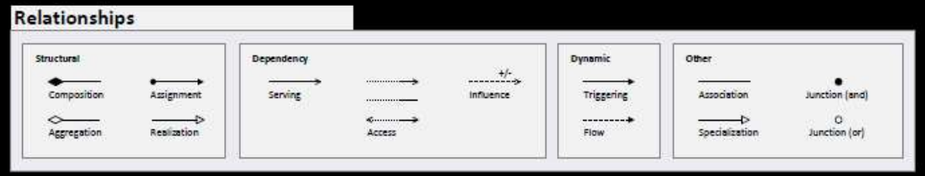


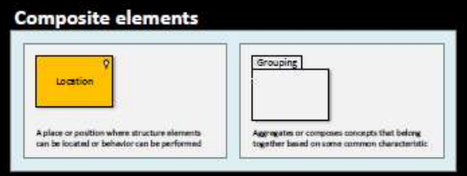



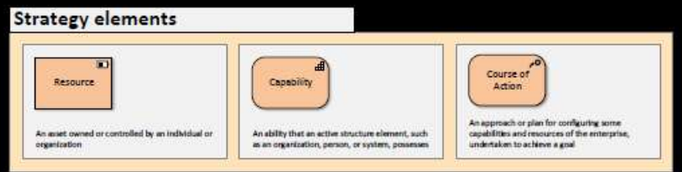



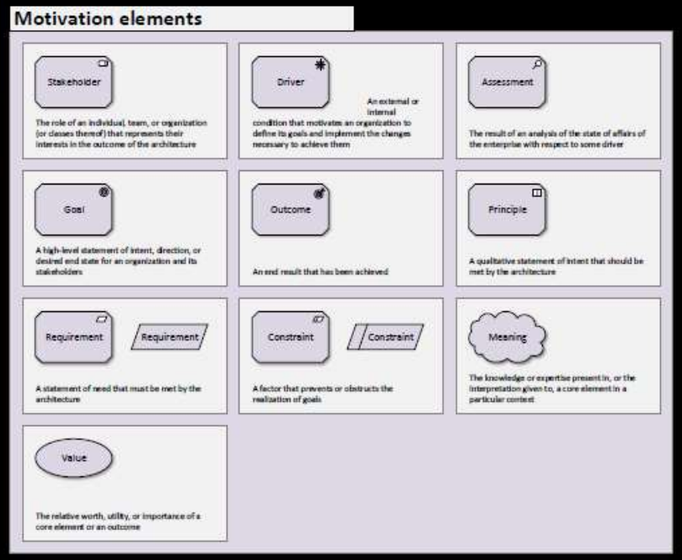


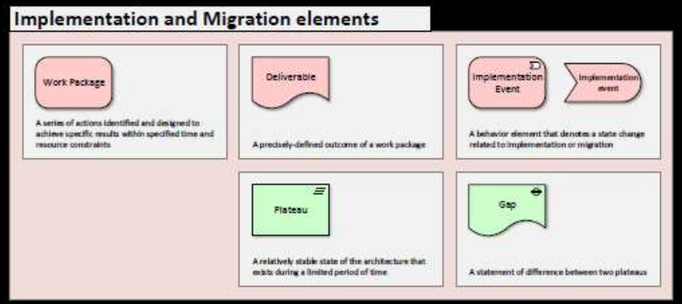




# ArchiMate view example: Coffee Shop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# ArchiMate view example: Coffee Shop

Motivation Aspect:

Deliver service onsite faster than competitors and offer a nicer service

Beat competitors

Improve customer experience onsite

+++

Deliver a high quality product to our customers

Effective delivery of a high quality product

Customer

Right people - efficient process

Effective coffee order delivery onsite capability

High quality coffee production

Right ingredients - recipe-good machines

Strategy Layer

Customer gets into the cafeteria

Waiter takes and confirms the order

Customer pays the order

Customer waits for the delivery

High quality Product delivery

Satisfied customer leaves cafeteria

Customer

Branding and image

Customer delivers the order onsite

Waiter

Effective payment and order applications

Order

Technology platforms

Nice cafeteria environment

High quality coffee machines

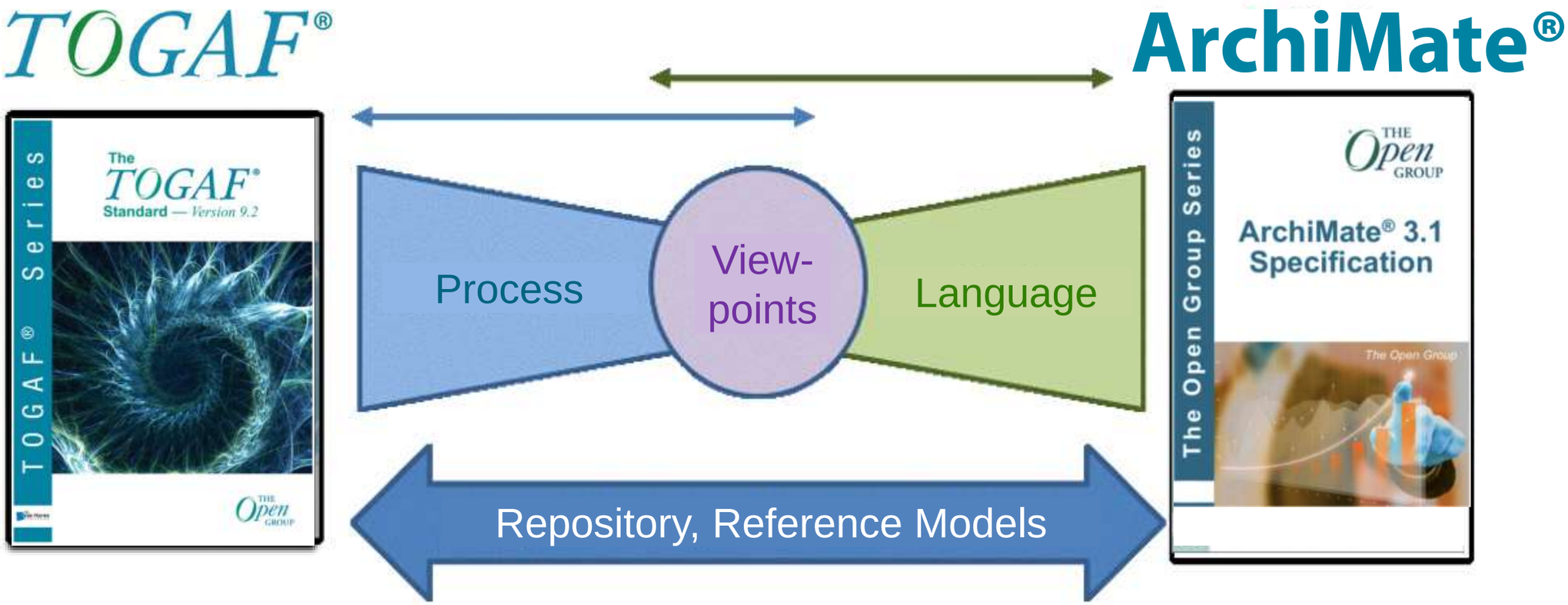
High quality ingredients

Good Coffee

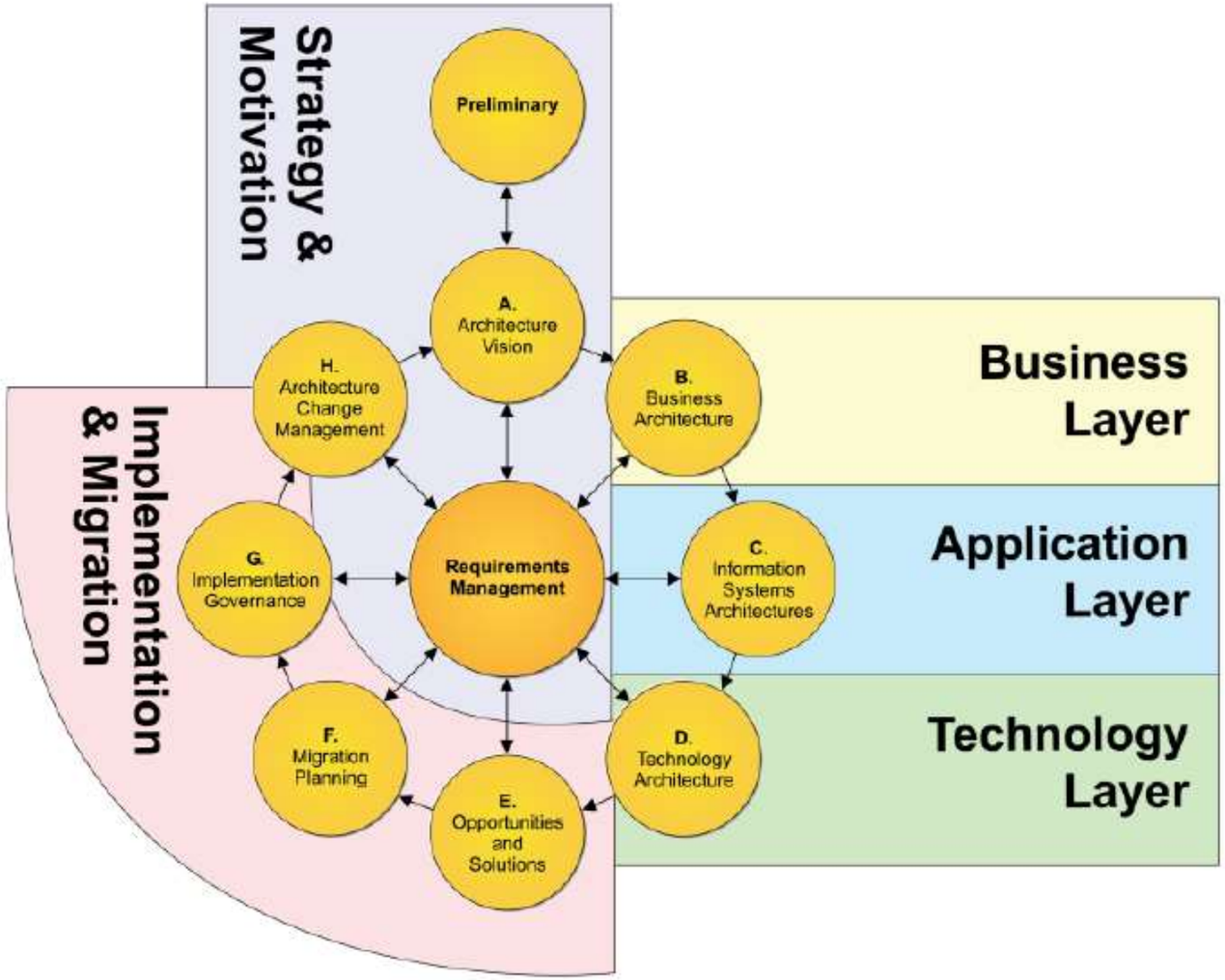
Business Layer

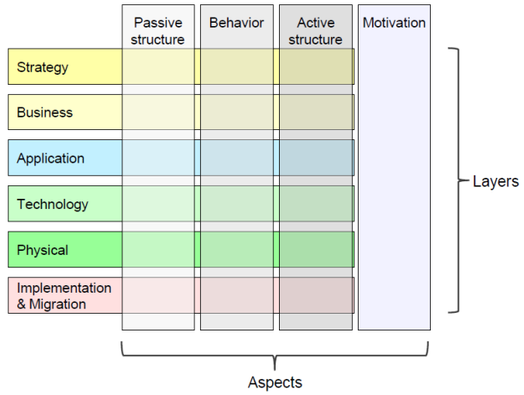
Application, Technology, Physical Layers

# Architecture Framework: background to the language

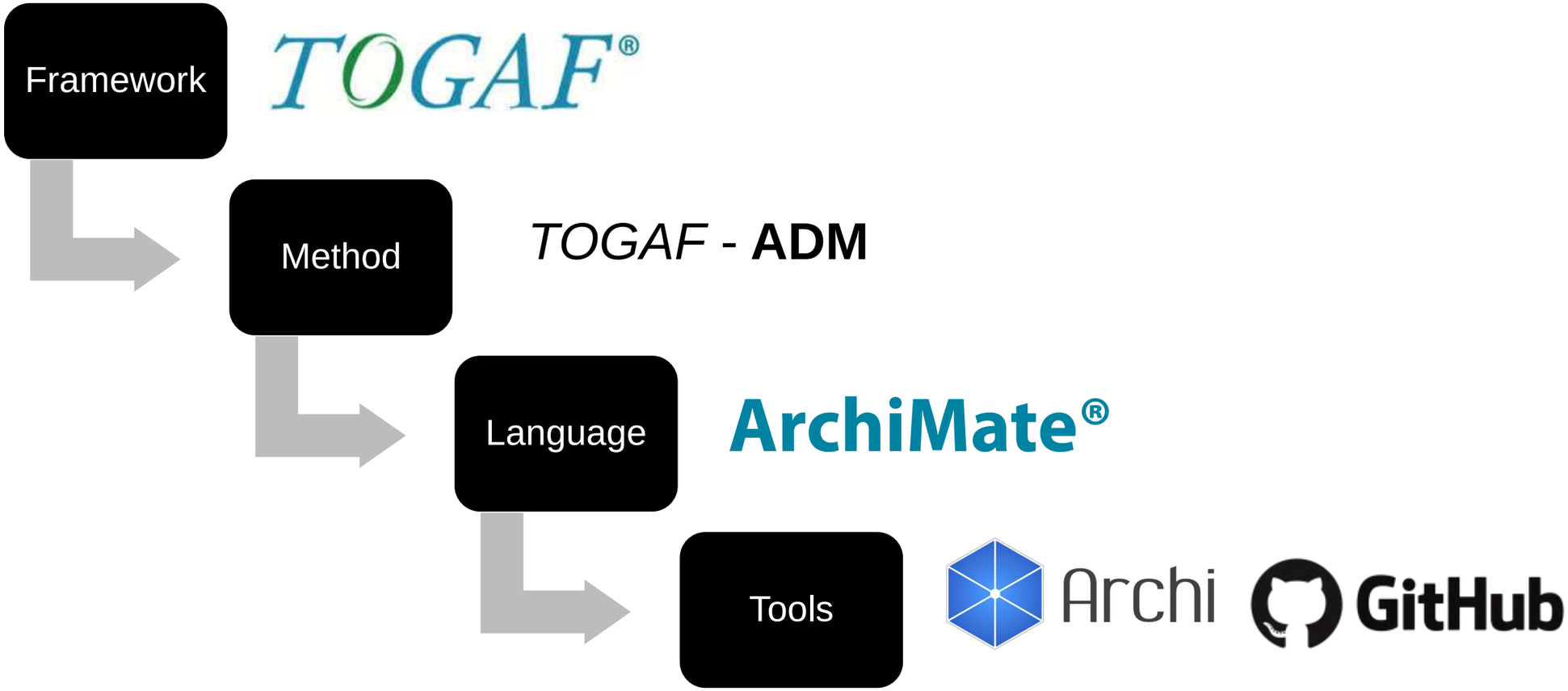


# Correspondence between the ArchiMate Language and the TOGAF ADM

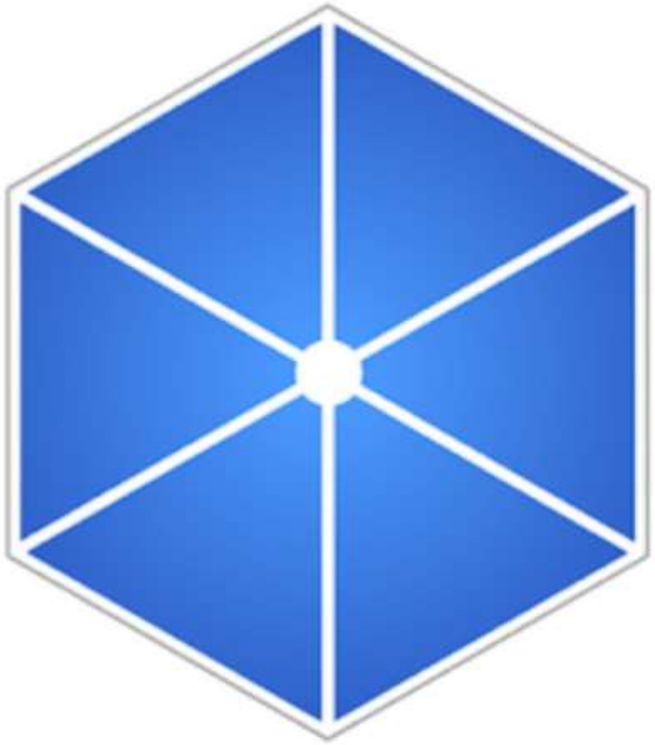


# From framework to tools

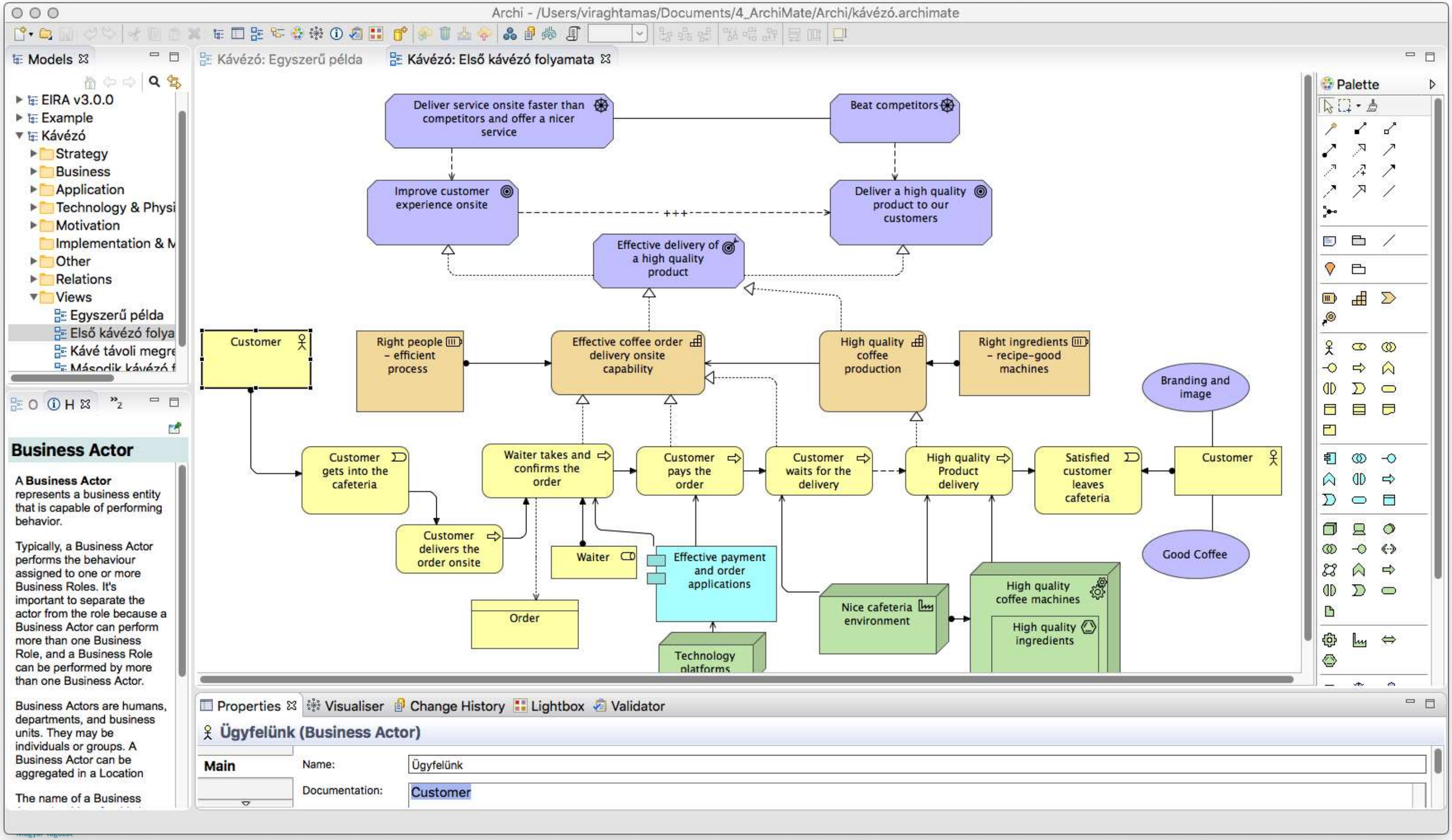


# Client application



Archi

- The Free **ArchiMate Modelling Tool**
- A **free** and open source modelling tool to create **ArchiMate models** and sketches
- Used by thousands of Enterprise Architects throughout the world


Archi - /Users/viraghtamas/Documents/4_ArchiMate/Archi/kávézó.archimate
Models
EIRA v3.0.0
Example
Kávézó
Strategy
Business
Application
Technology & Physi
Motivation
Implementation & M
Other
Relations
Views
Egyszerű példa
Első kávézó folya
Kávé távoli megre
Második kávézó f
Kávézó: Egyszerű példa
Kávézó: Első kávézó folyamata
Deliver service onsite faster than competitors and offer a nicer service
Beat competitors
Improve customer experience onsite
Deliver a high quality product to our customers
Effective delivery of a high quality product
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Right people - efficient process
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Satisfied customer leaves cafeteria
Customer
Customer delivers the order onsite
Waiter
Effective payment and order applications
Good Coffee
Order
Nice cafeteria environment
High quality coffee machines
High quality ingredients
Technology platforms
Palette
Business Actor
A Business Actor represents a business entity that is capable of performing behavior.
Typically, a Business Actor performs the behaviour assigned to one or more Business Roles. It's important to separate the actor from the role because a Business Actor can perform more than one Business Role, and a Business Role can be performed by more than one Business Actor.
Business Actors are humans, departments, and business units. They may be individuals or groups. A Business Actor can be aggregated in a Location
The name of a Business
Properties
Visualiser
Change History
Lightbox
Validator
Ügyfelünk (Business Actor)
Main
Name:
Ügyfelünk
Documentation:
Customer

# Version Control System

**Content:**
**Modifications (by many) – traceability and auditability**

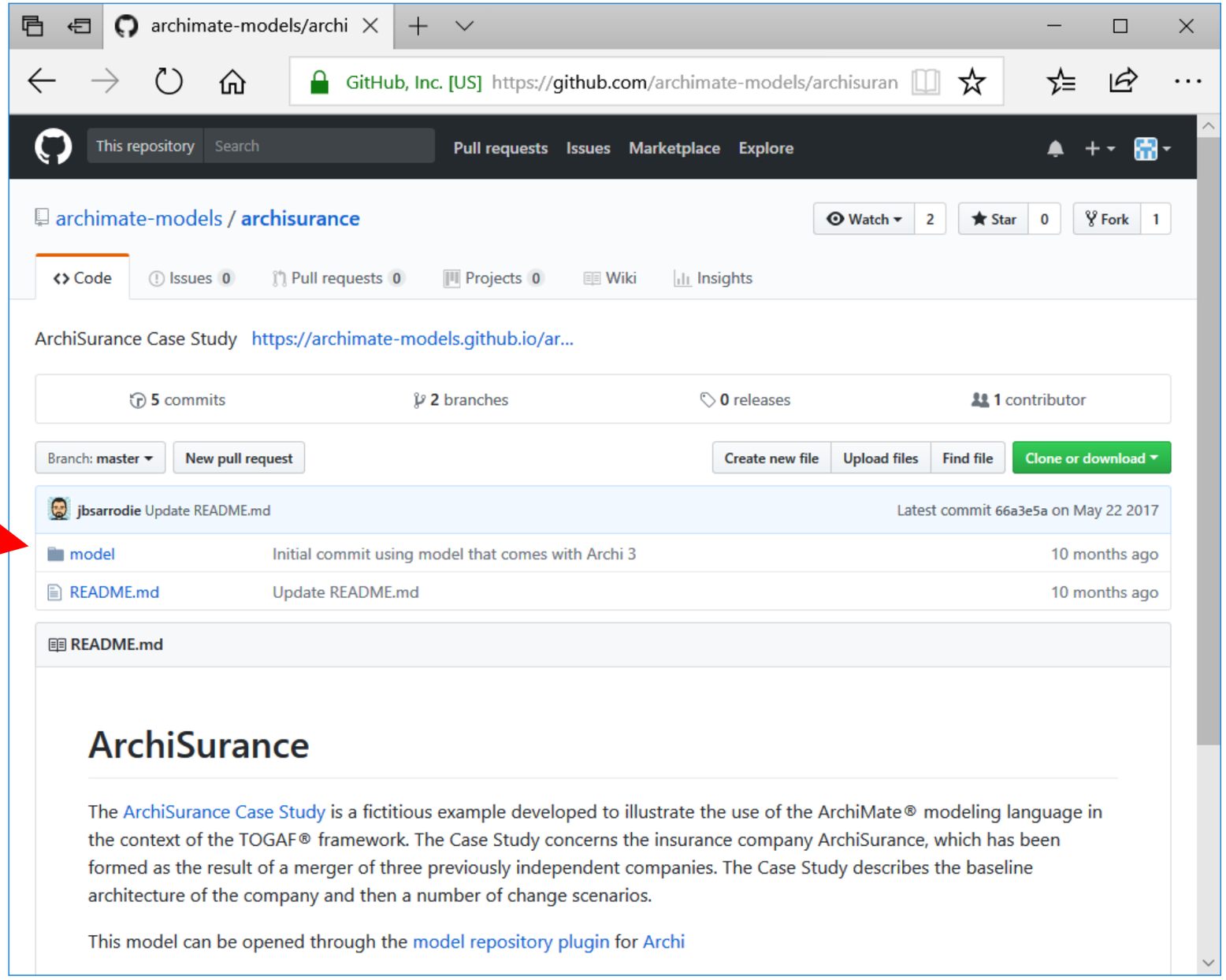
- E.g.: Source code

- **The most popular free-to-use, distributed version control system**
- **Advantages:**
  - Distributed
  - Flexible
  - Easy to use branches
  - Quick
  - Easy to use with other systems

# Git software solution


- **Web-based hosting service for version control using git**
  - offers plans for both private repositories and free accounts
  - Mascot: Octocat
  - www.github.com
- **GitHub Enterprise**
  - Similar to GitHub's public service
  - Designed for use by large-scale enterprise software development teams
  - Hosted behind a corporate firewall

# Example: ArchiSurance - a fictional Insurance company

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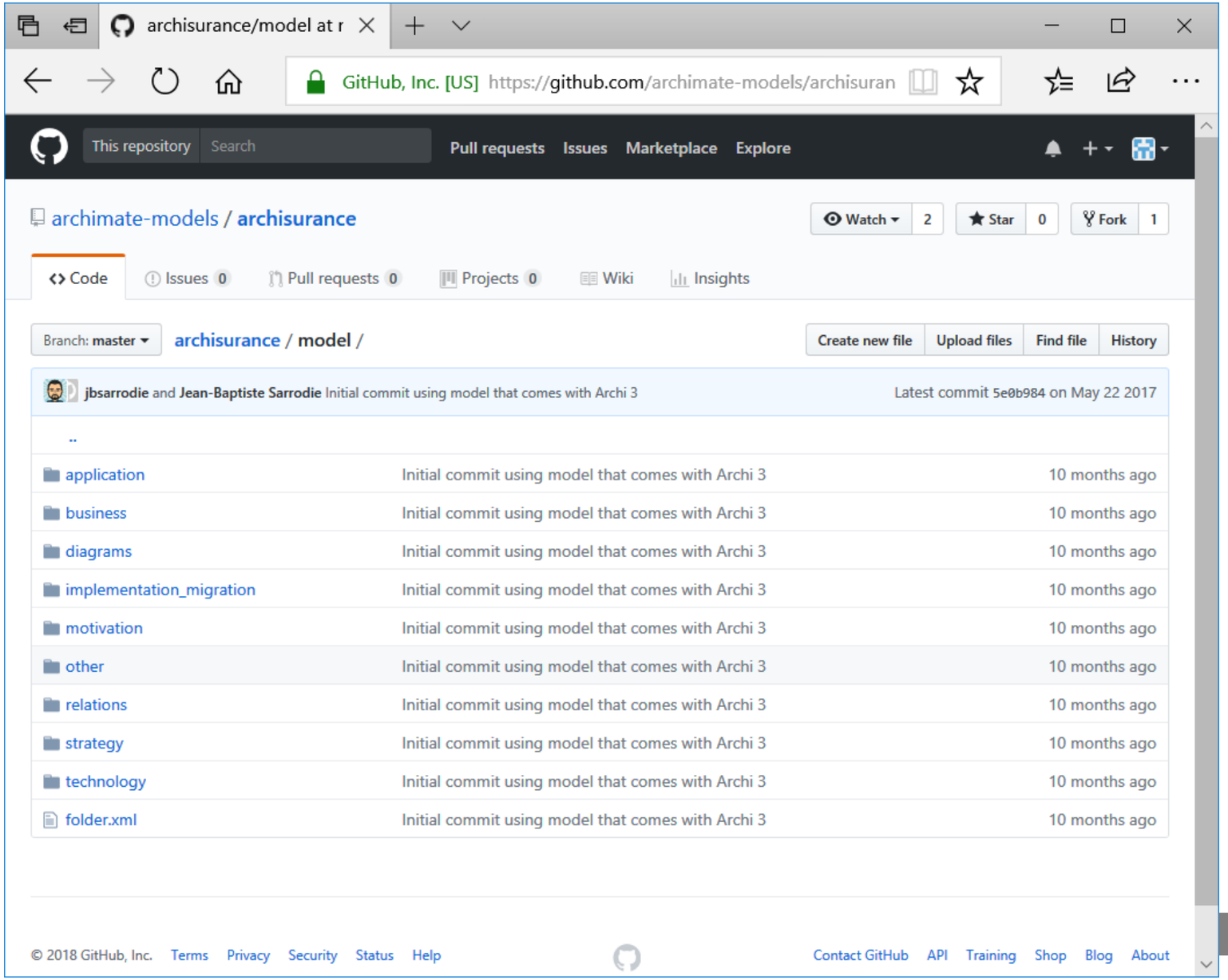
# Example: ArchiSurance - a fictional Insurance company

To enjoy the model's graphical representation we need a client application: **Archi**

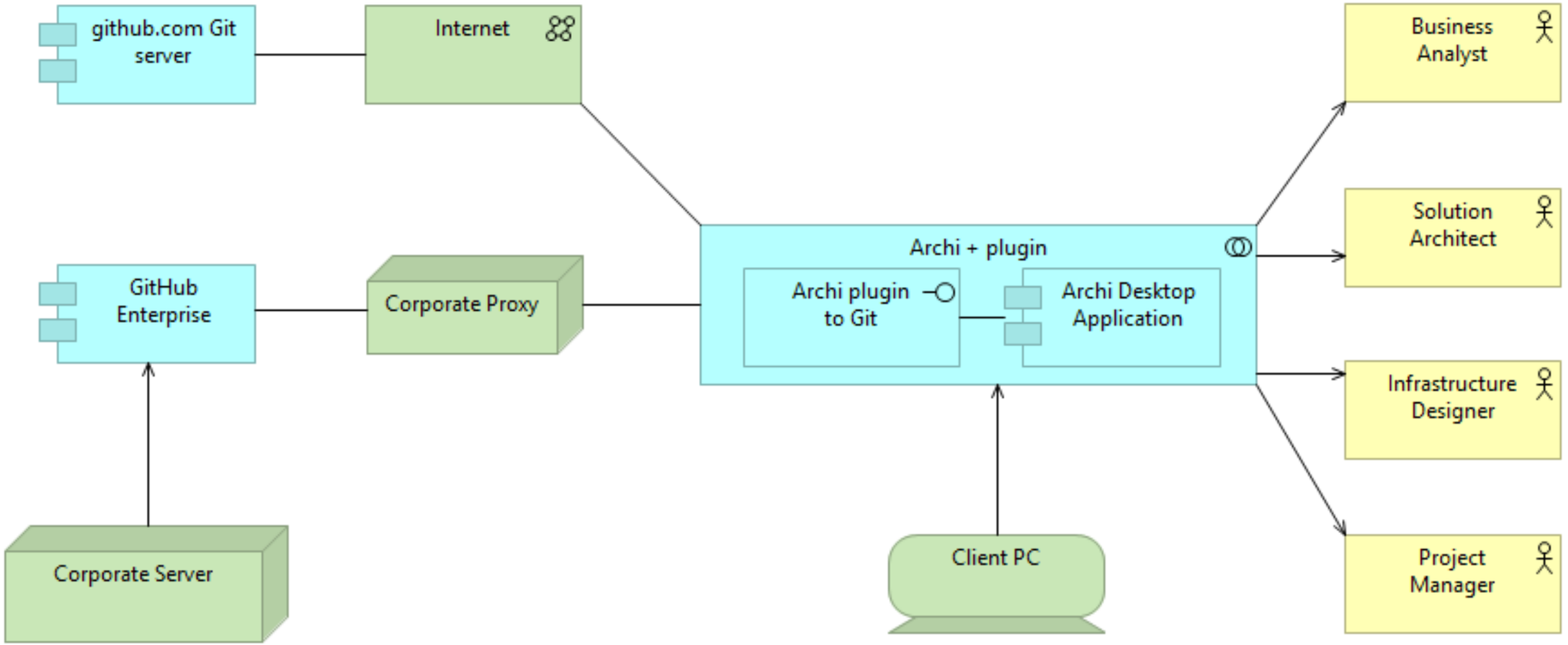



AEA Magyar Tagozat

# Practical steps, example

- Log into https://github.com and remember your GitHub user name (My name is: viraghtamasjozsef)
- Now you can visit all public repositories on the GitHub server.
  E.g. https://github.com/archimate-models/archisurance
- But the architecture model itself is presented here as a collection of XML files in a model subfolder
  and that is not really enjoyable for a human being.
- To see the models as ArchiMate diagrams you need the **Archi tool** installed on your PC together with an **Archi plugin**.
- To install Archi is easy: download from https://www.archimatetool.com/download and start the Windows setup program downloaded.
- Download and install **coArchi – Model Collaboration for Archi** as described here:
  https://www.archimatetool.com/plugins#installing
- You can use Archi *Help/Install Archi Plugin…* menu item.
- After installation it is important to check the Archi *Edit/Preferences/Collaboration/Proxy* check box and provide a **proxy server** depending on your network configuration
- To access the example repository start Archi tool and use *Collaboration / Import remote model to workplace*.
  - URL = https://github.com/archimate-models/archisurance.git
  - User name = your GitHub user name
  - Password = your GitHub password

# Implementation view

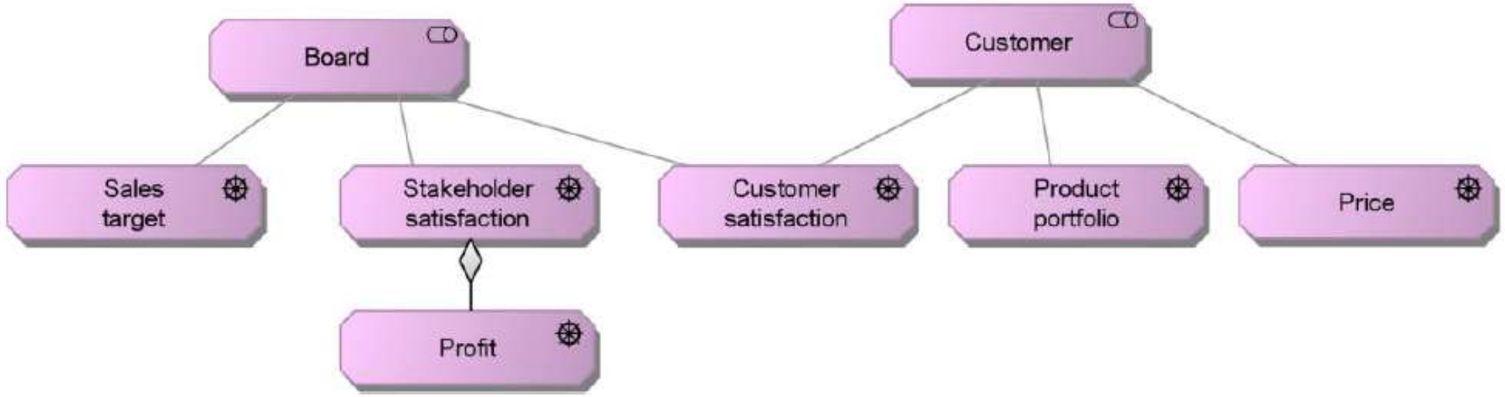


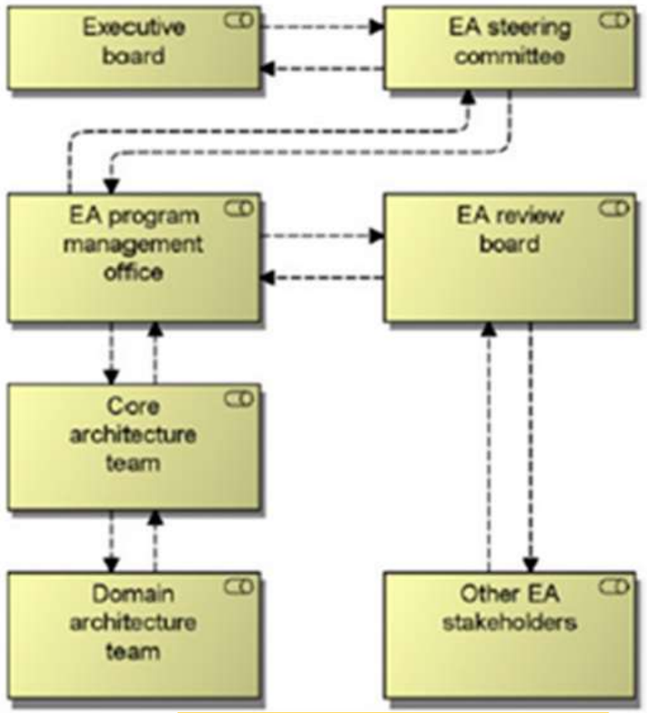
# Benefits of the approach

- One **single plane of discovery** for intellectual property such as architecture model, technical documentation, code, scripts, automated tests
- Maximize **re-use** across teams and accounts
- **Collaborate** beyond team boundaries with a gated, industry standard process
- **Connect** with other teams, colleagues
- Make your **professional profile visible** thanks to your project contributions
- Lend a **helping hand**, resolve issues, answer questions
- Share and **re-use** architecture views, code snippets, single files or quick tutorials with GISTs
- Be proud: **showcase your work** by creating your repositories as public, visible

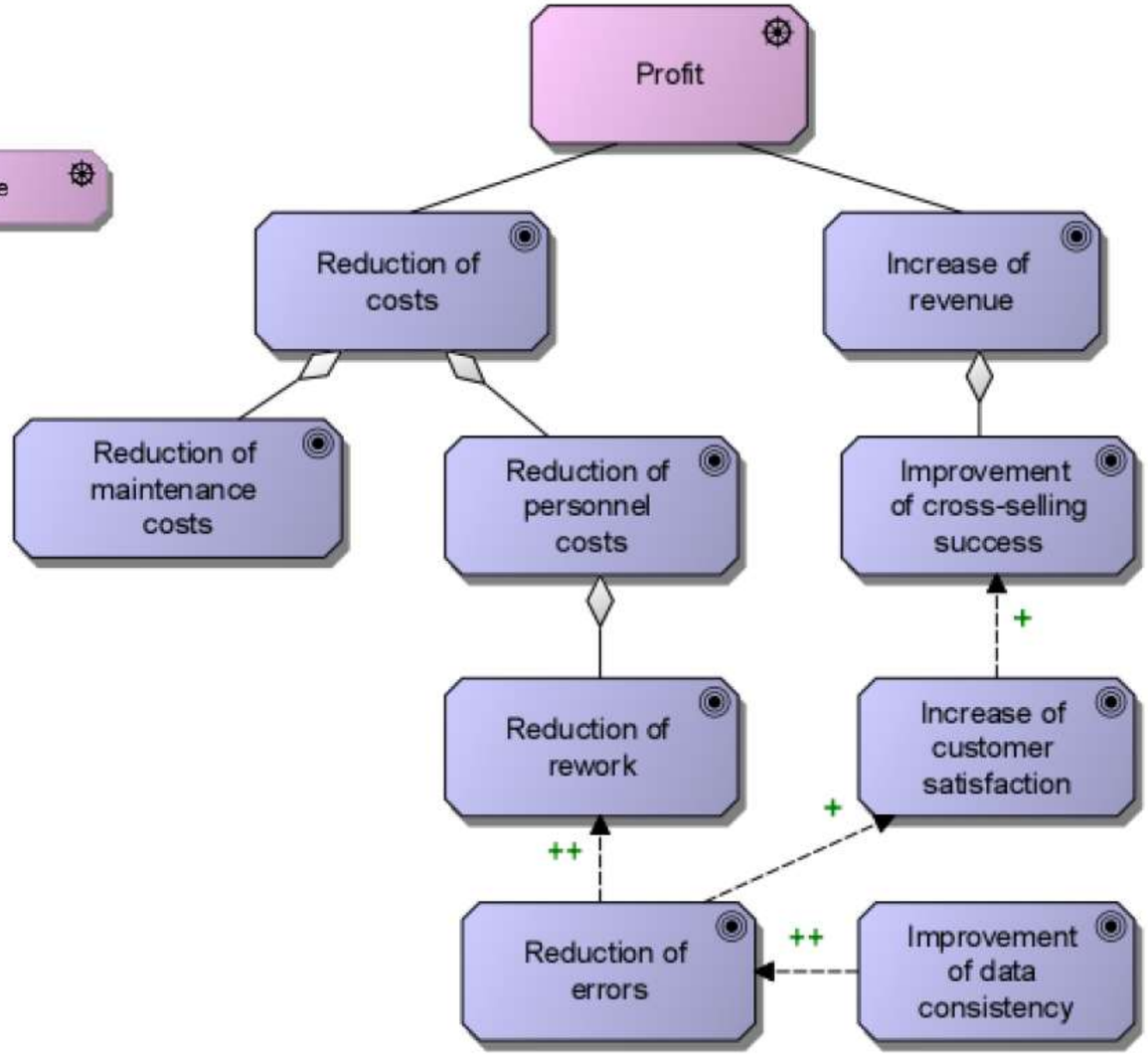
# Example views

Viewpoint: Stakeholder



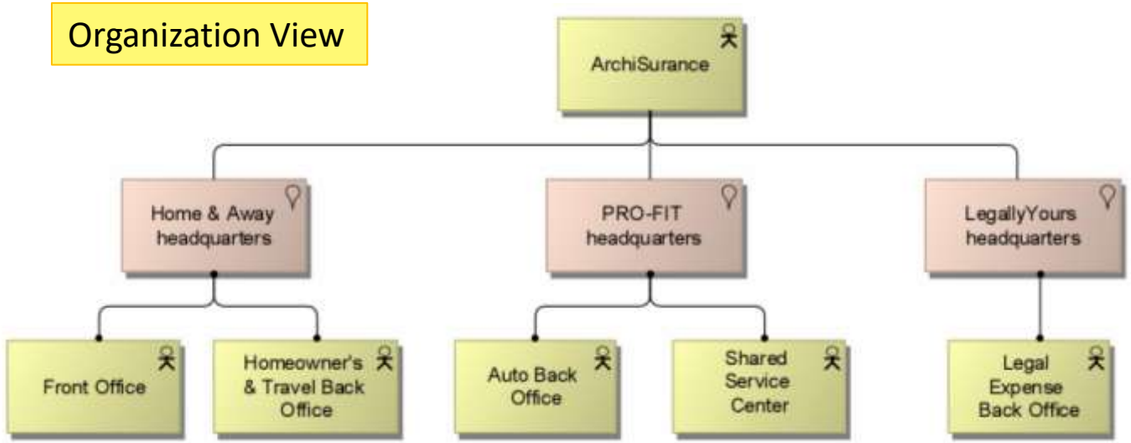

Viewpoint: Organisation

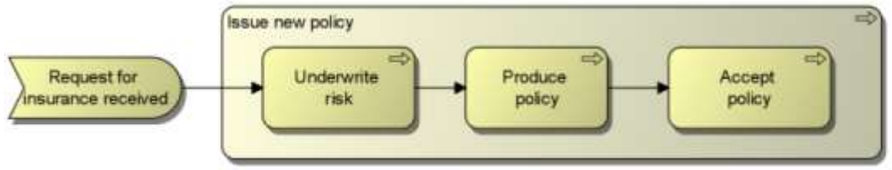



Viewpoint: Motivation

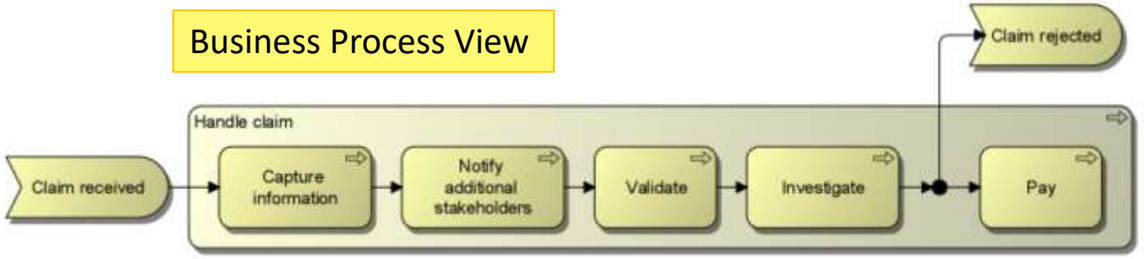
# Business Modeling Examples

Organization View

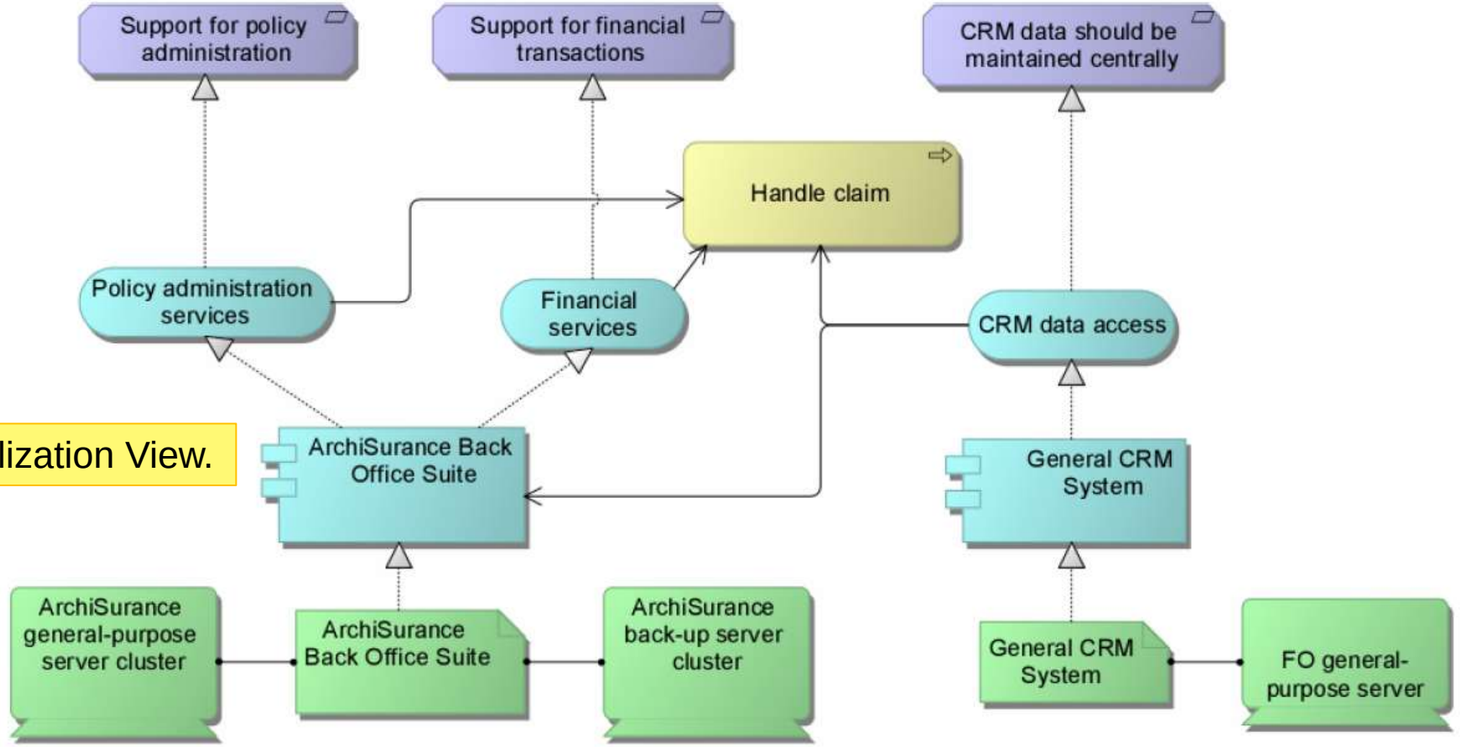



Business Process View

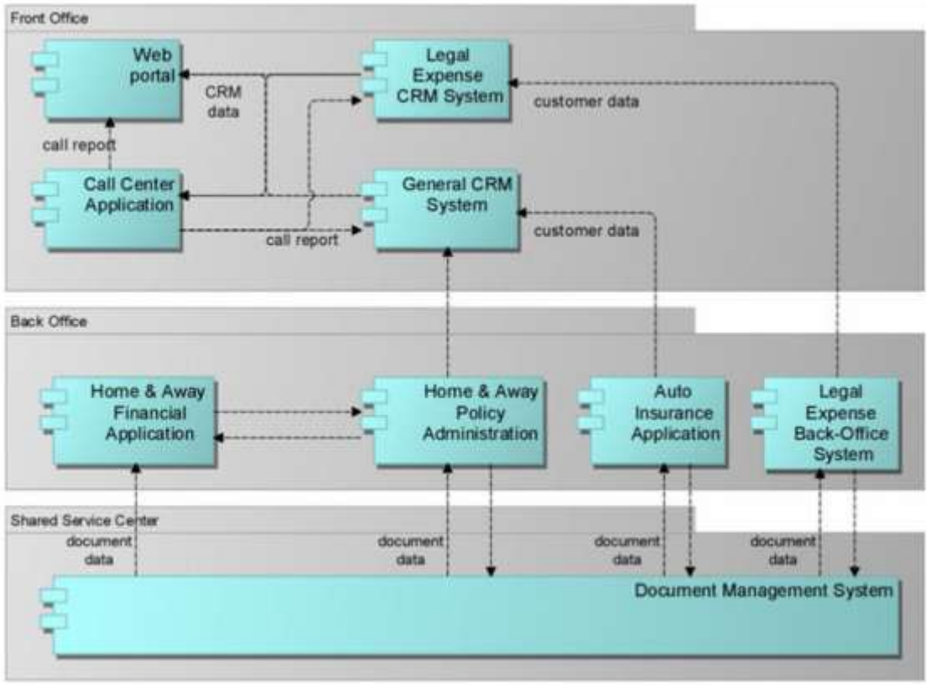



Requirements Realization View.

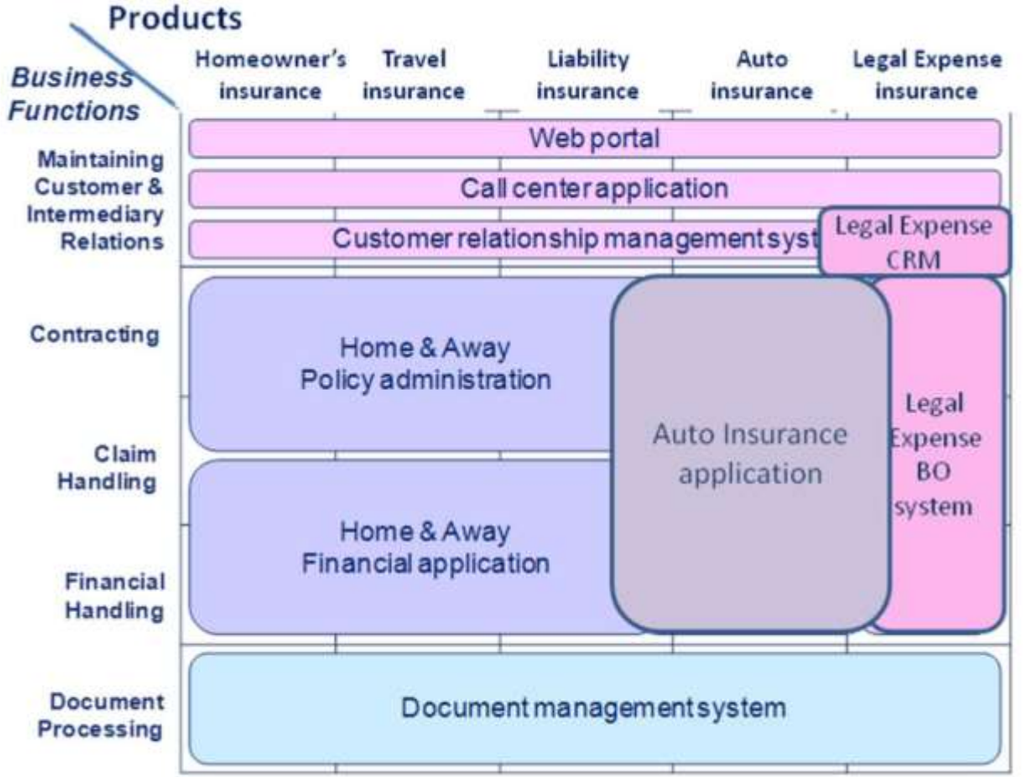


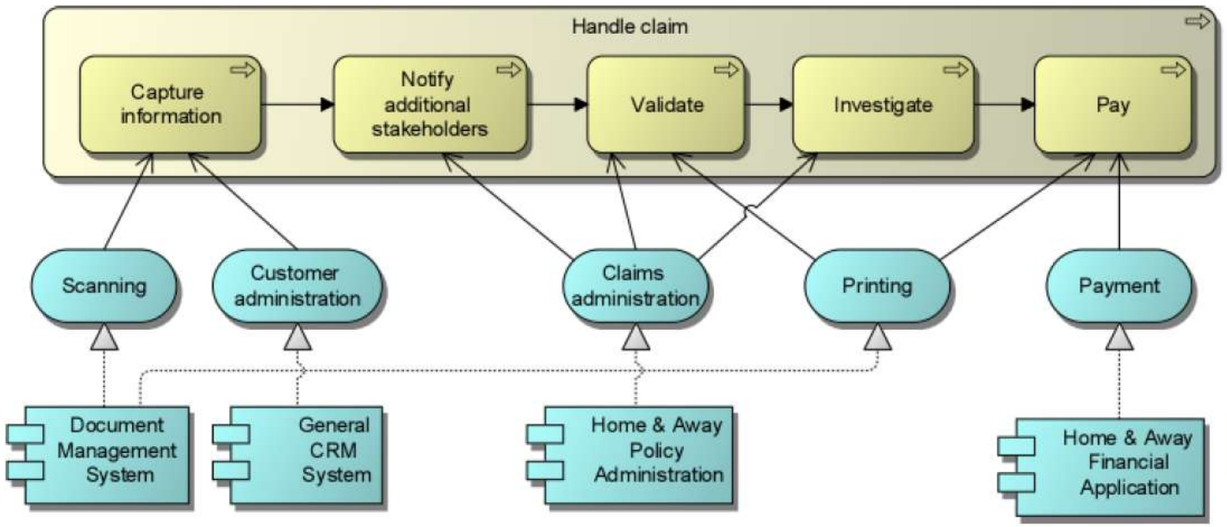
# Application views

Application Co-Operation



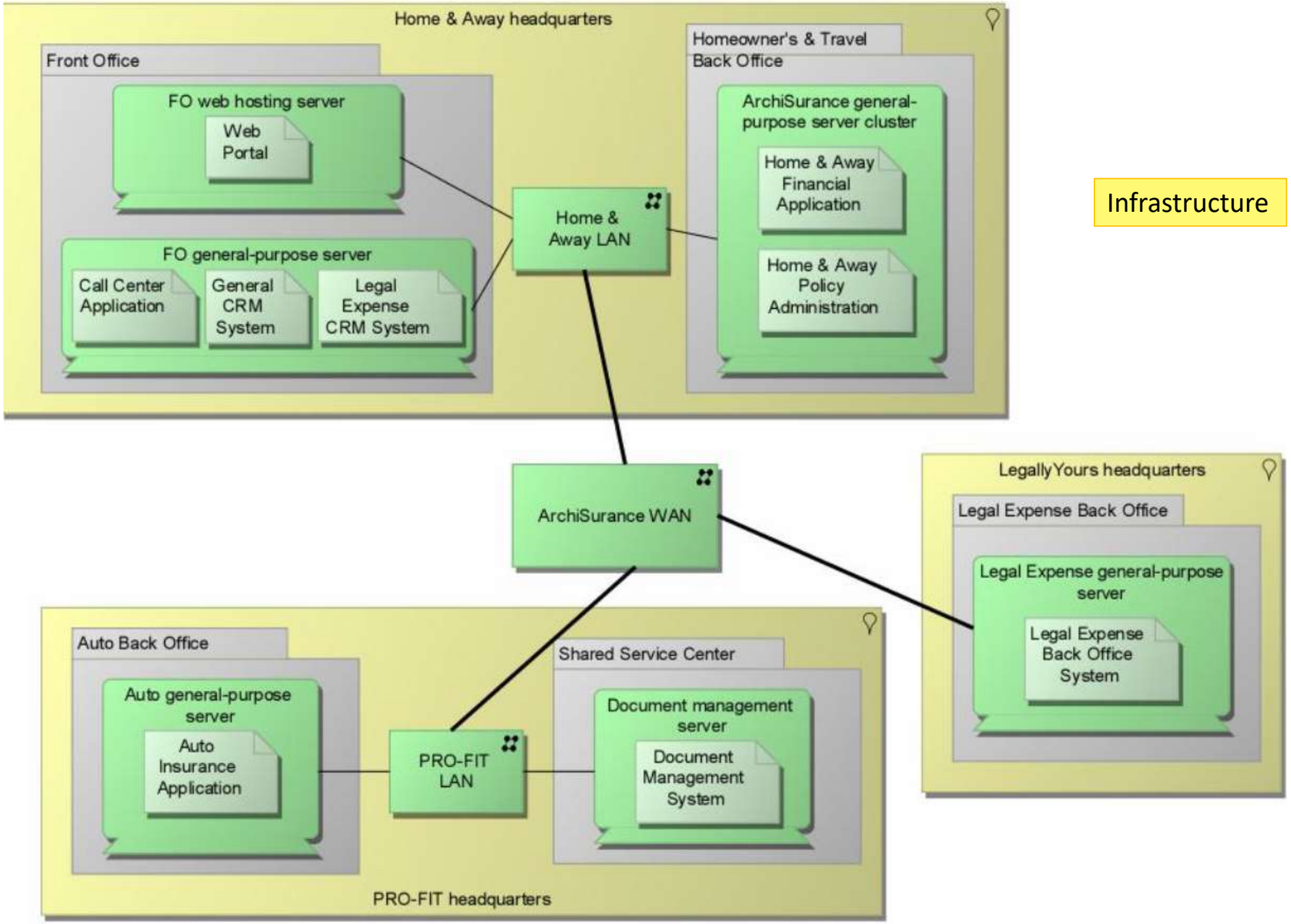

Application Landscape



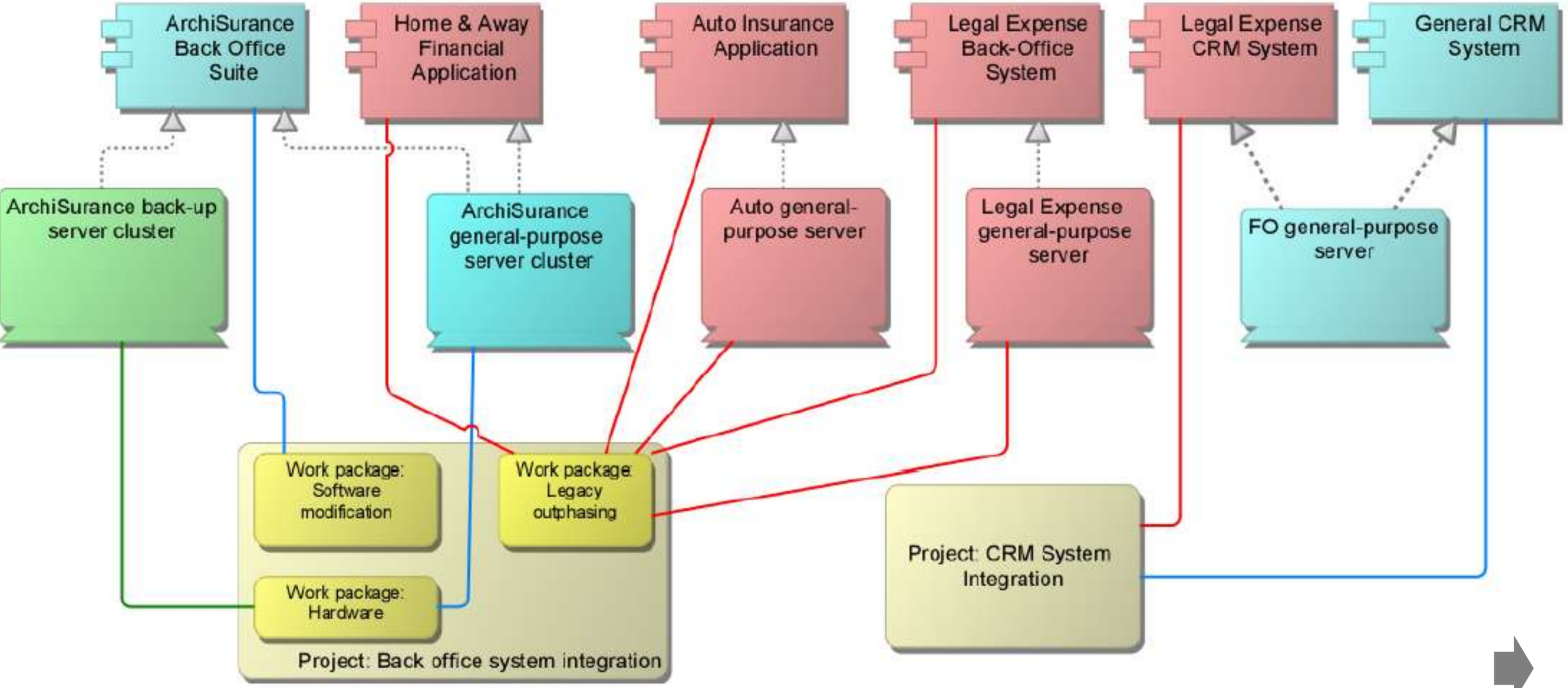

Application Usage

# Technology view




Infrastructure

# Example TOGAF Project Context Diagram

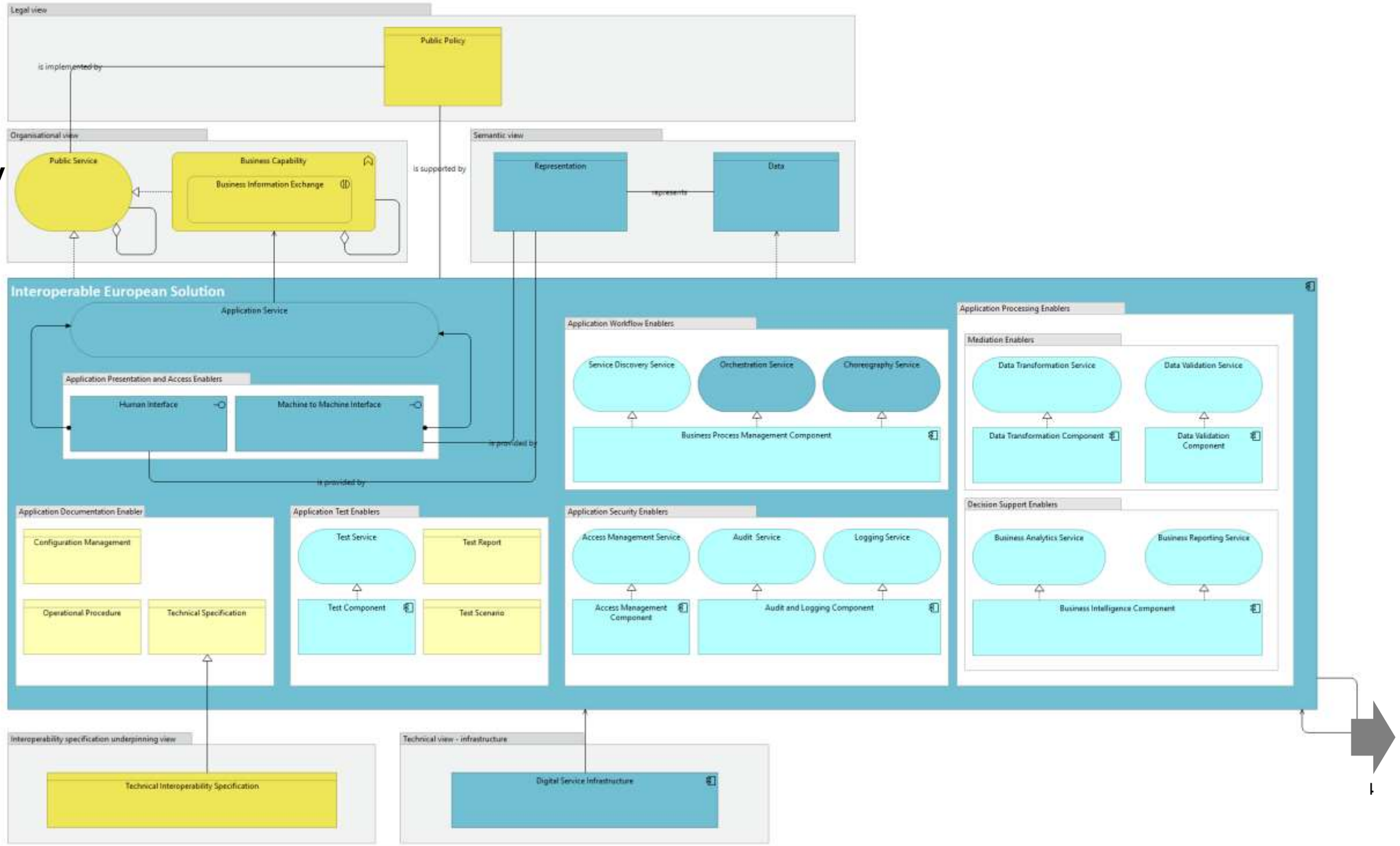



Expressed in ArchiMate ***Implementation and Migration view***

# Example: ArchiMate® in EU

European Interoperability Reference Architecture (EIRA)

from **github.com**

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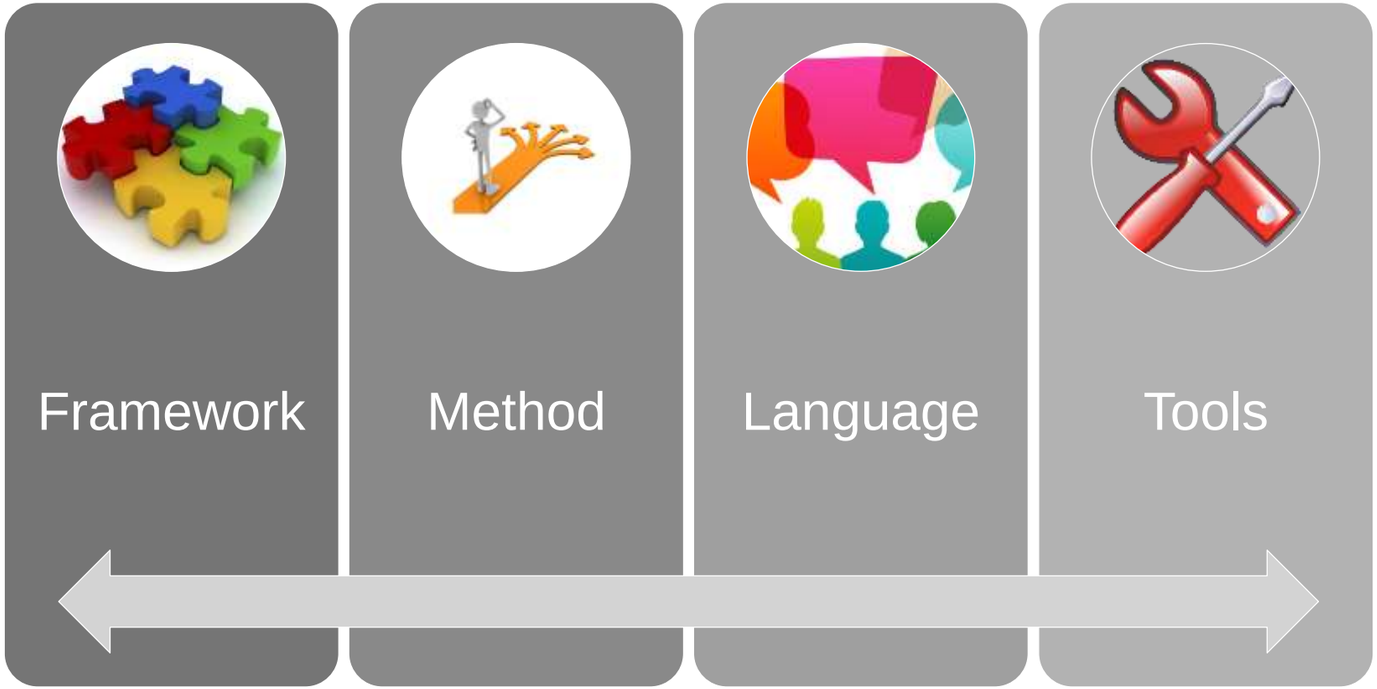
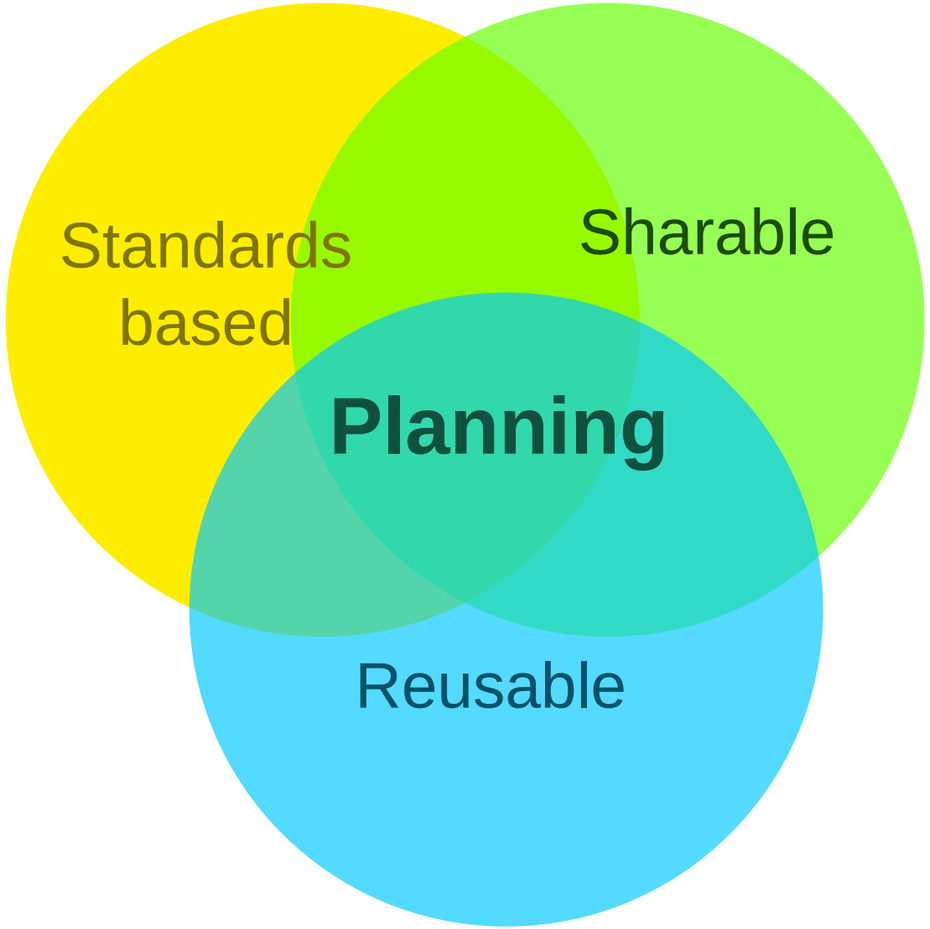
# Summary: End-to-end solution




TOGAF® ADM ArchiMate® Archi GitHub



# Useful links

- GitHub public service: github.com
- Archi download: https://www.archimatetool.com/download
- Archi – GitHub Plugin download: https://www.archimatetool.com/plugins
- ArchiMate: http://www.opengroup.org/subjectareas/enterprise/archimate-overview
- TOGAF®: http://www.opengroup.org/subjectareas/enterprise/togaf
- Official TOGAF documentation: www.opengroup.org/togaf
- The Open Group Standard: The TOGAF® Standard, Version 9.2
  ISBN: 1-947754-11-9, Document Number: C182
- Association of Enterprise Architects, AEA www.aeahungary.org

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The Open Group announced the release of the 10th edition of the TOGAF Standard on 25 April 2022
No trainings, exams, certifications are available for TOGAF 10th edition yet.
Information on additions to the certification portfolio to incorporate the TOGAF Standard, 10th Edition will be announced in the coming months.