



A Language Built in its Native Architecture Framework

The Labnaf Architecture Framework

THE FUTURE GROUP

DUTCH ENTERPRISE ARCHITECT USER CONFERENCE

27 & 28 SEPTEMBER

EExpertise
make you model

A yellow square containing a blue stylized logo that resembles a double-headed arrow or a path.

Dé maat in ondernemen

What is it?



Merged Standards & Best Practices



One Strategy & Architecture Process



One Modeling Language



One Tool & One Repository



Extensive On-line Documentation

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Career Summary

- YPTO (Railroad) - BE
- Brussels Airlines - BE
- Deutsche Bank – UK
- Deutsche Bank – BE
- Microsoft/Unisys Alliance – USA
- Unisys - BE
- Comedia – BE
- Ariane II - BE
- SWIFT - BE
- Borland – USA
- CPU2I - FR
- UCB - BE

Expertise Summary

Enabling

- Language Engineering
- Method Engineering
- Tool Engineering
- Modeling Coach

Applying

- Strategy
- Enterprise Architecture
- Solution Architecture
- Analysis, Design & Implementation
- Pharmaceutical, Cinema, Legal, Banking, Transportation...

Agenda

1. Transformation Challenges

2. Architecture Framework Overview

4. Architecture Tools & Repository



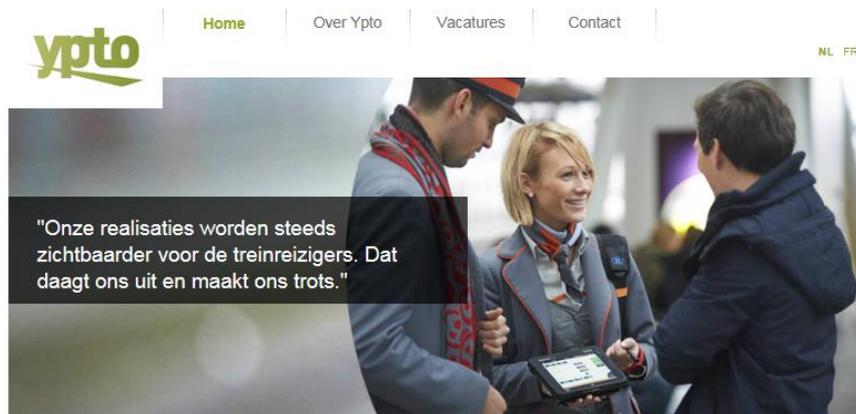
Is 100% owned by



Belgian Railways



Delivers IT Services for



2016*	Millions
Income	€ 2 371
Total balance	€ 11 975
Investments	€ 702



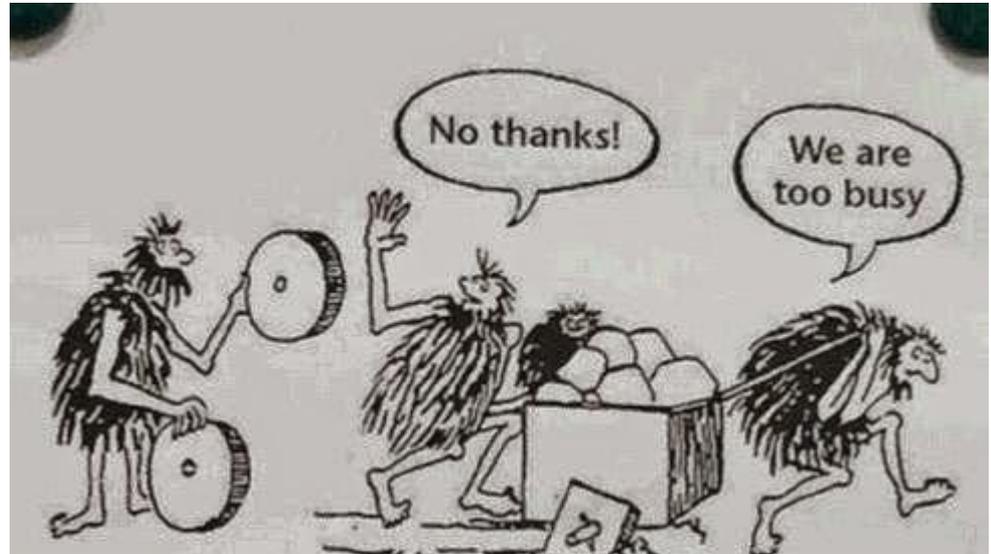
YPTO's burning platform



We believe that we can NOT fix on time and on budget the current way of working.

We do not have the skills (soft & hard) to support such changes.

For sure, we have to reduce the IT TCO, right now !



We expect a reduction of the IT budget in the coming years.

We must increase our IT productivity.

We must build a SNCB network (with or without Infrabel) by 2021.

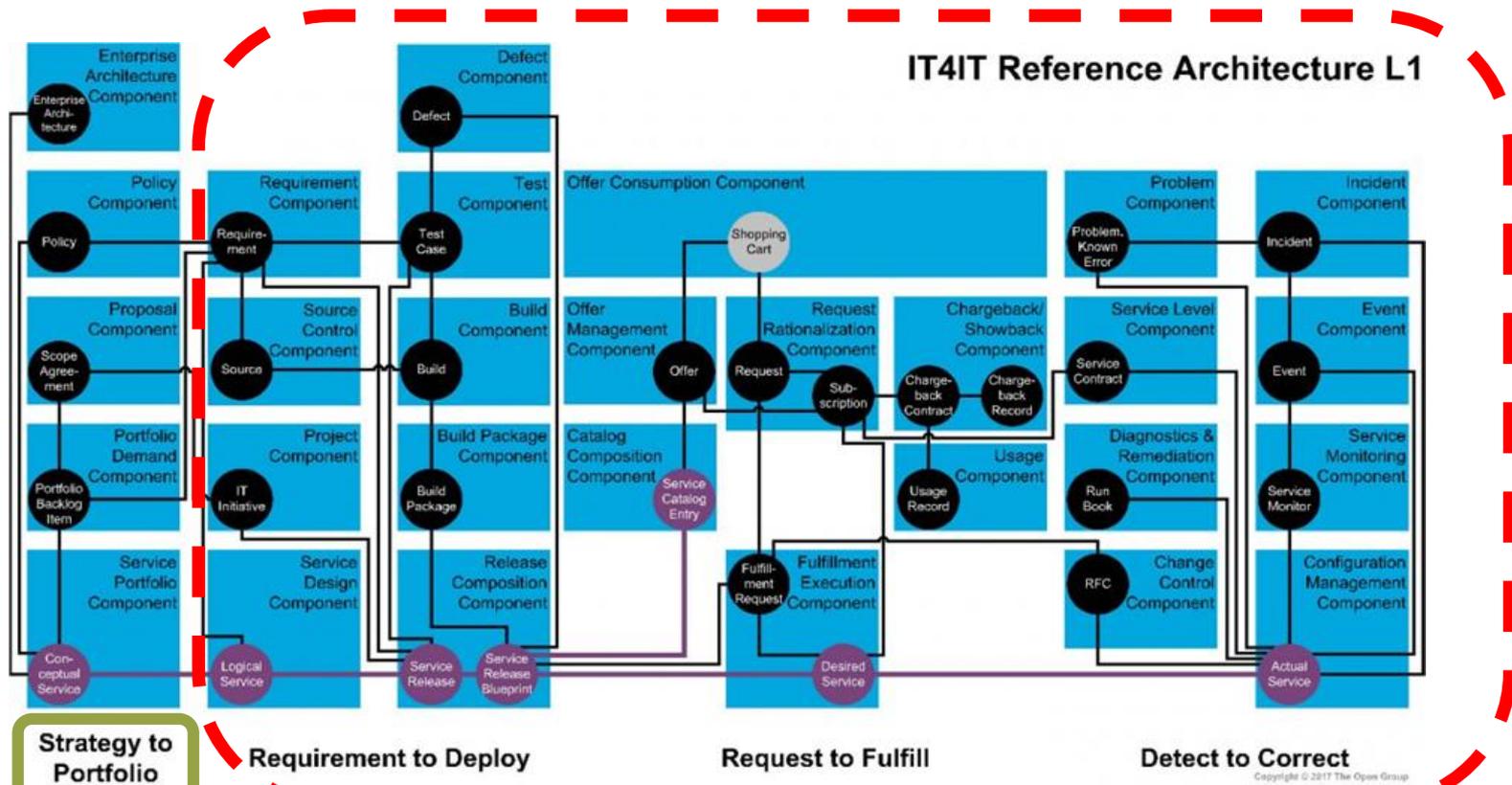
We must close 2 data centres by 2020.

...
...
...
...



Outsourcing of SNCB's business of IT

Starting in October 2018



Strategy to Portfolio

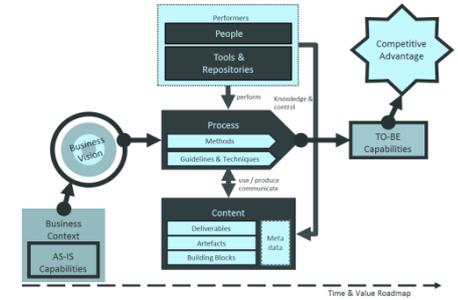


- Finance & Assets
- Sourcing & Vendor
- Intelligence & Reporting
- Resource & Project
- Governance, Risk & Compliance

- **Scope of the outsourcing**
- Period of 5 years + 1 +1.
- (This is a summary view !)



YPTO (SNCB's IT) decided to create its Architecture Framework based on industry standards



Key aims

- Architecture Modeling & Portfolio Management
- Enterprise visibility and traceability
- Productivity and consistency
- Ease architecture planning and communication

Decision to adopt

- TOGAF, SAFe, Archimate, BPMN and UML

TOGAF, SAFe, ArchiMate, BPMN, ...

All are great and very useful but...

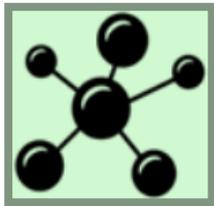
- Not integrated
- Not actionable as a whole (disconnected sets)
- Redundant semantics & terms (Data Object, Role, Process...)
- Not embedded in our way of working

YPTO's conclusion

- Adopting each and every standard is not ideal
- Need a **single integrated company standard** to bring productivity, consistency and cross-discipline collaboration

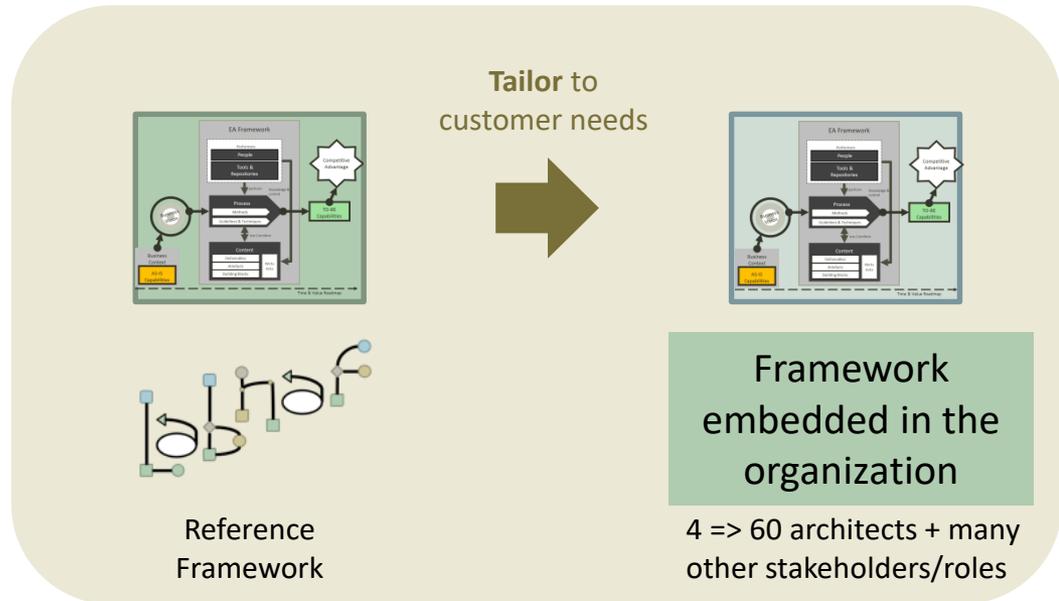
⇒ SNCB decided to go for a **single integrated framework** that is inspired by market standards and to **embed** it into the business of IT

Tailoring a framework inspired by market standards



Reference Systems
Semantics
Automation By Nature

Use for
normalizing
semantics



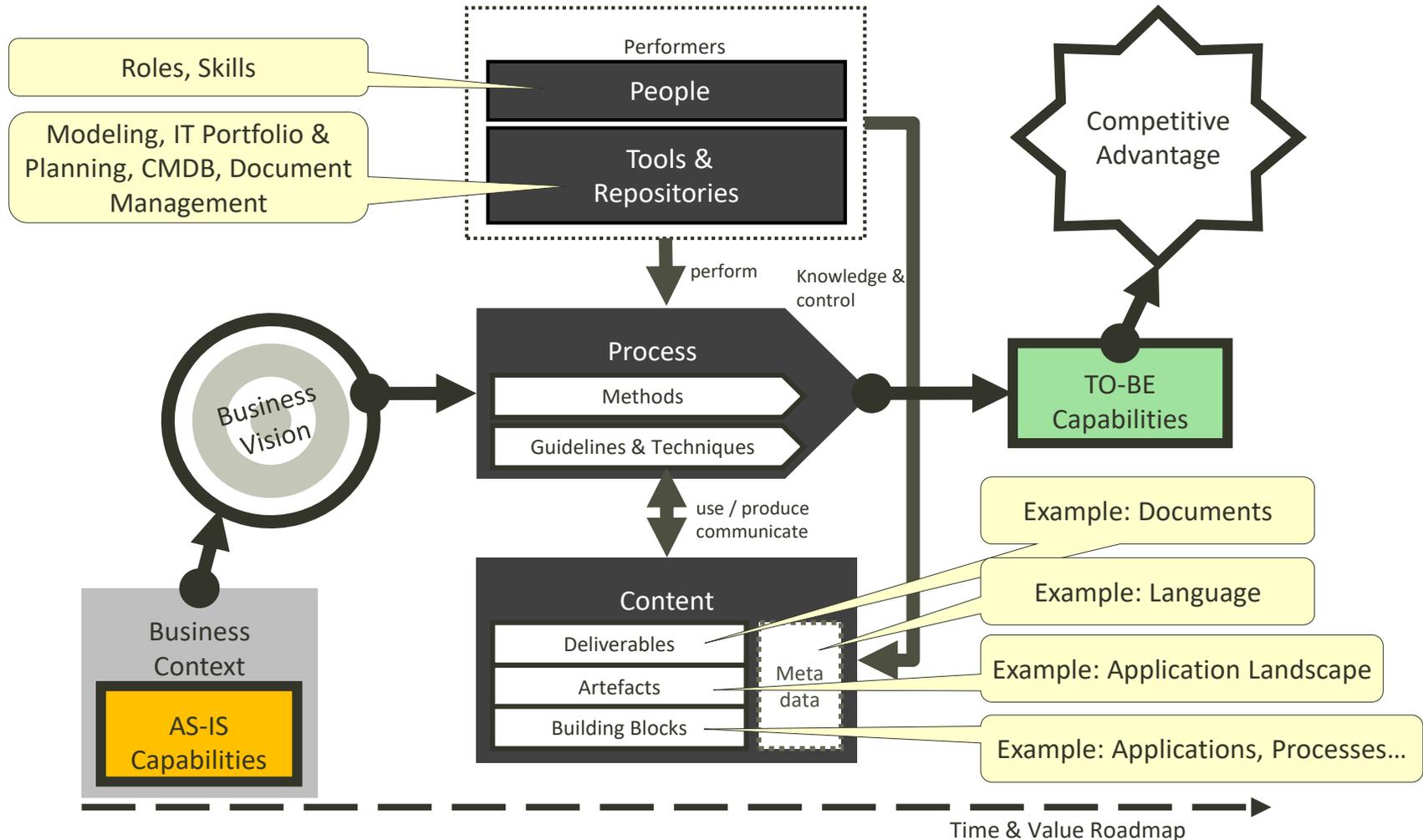
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All In One Architecture Framework



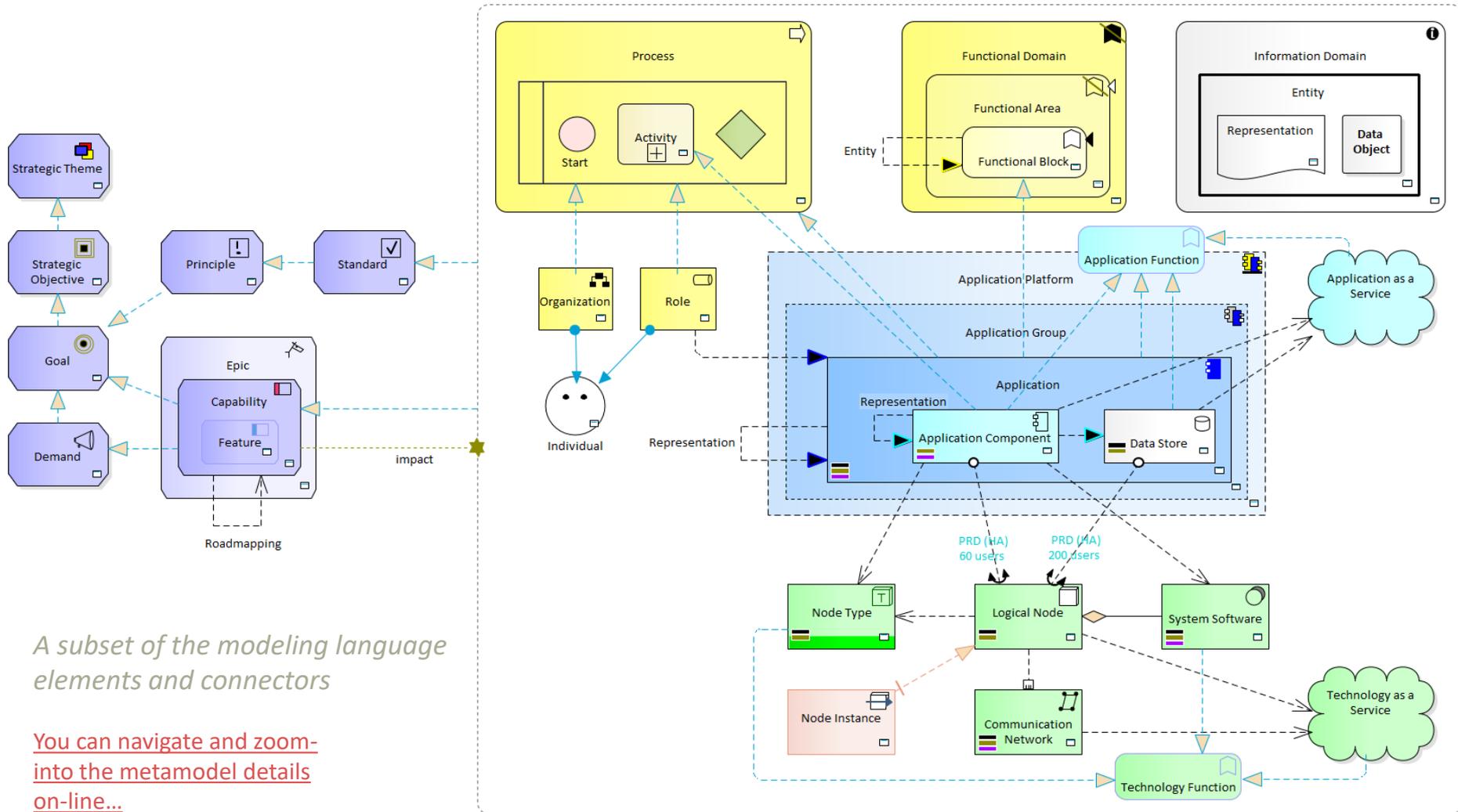
Integrated

Merged Standards & Best Practices



Links: [TOGAF](#), [SAFe](#), [Gartner EA Stage Planning](#), [ISO/IEC/IEEE 42010](#), [Archimate](#), [BPMN](#), [UML](#), [PESTEL Analysis](#), [Porter's Five Forces Analysis](#), [Balanced Score Cards](#), [Strategy Map](#), [Business Model Generation](#)

One Common Language Eases Collaboration Between Many Different Roles



Viewpoints and Views (ISO/IEC/IEEE 42010)

The purpose of viewpoints and views:

1. Enable humans to comprehend complex systems
2. Separate concerns
3. Organize the elements of the problem and the solution around domains of expertise

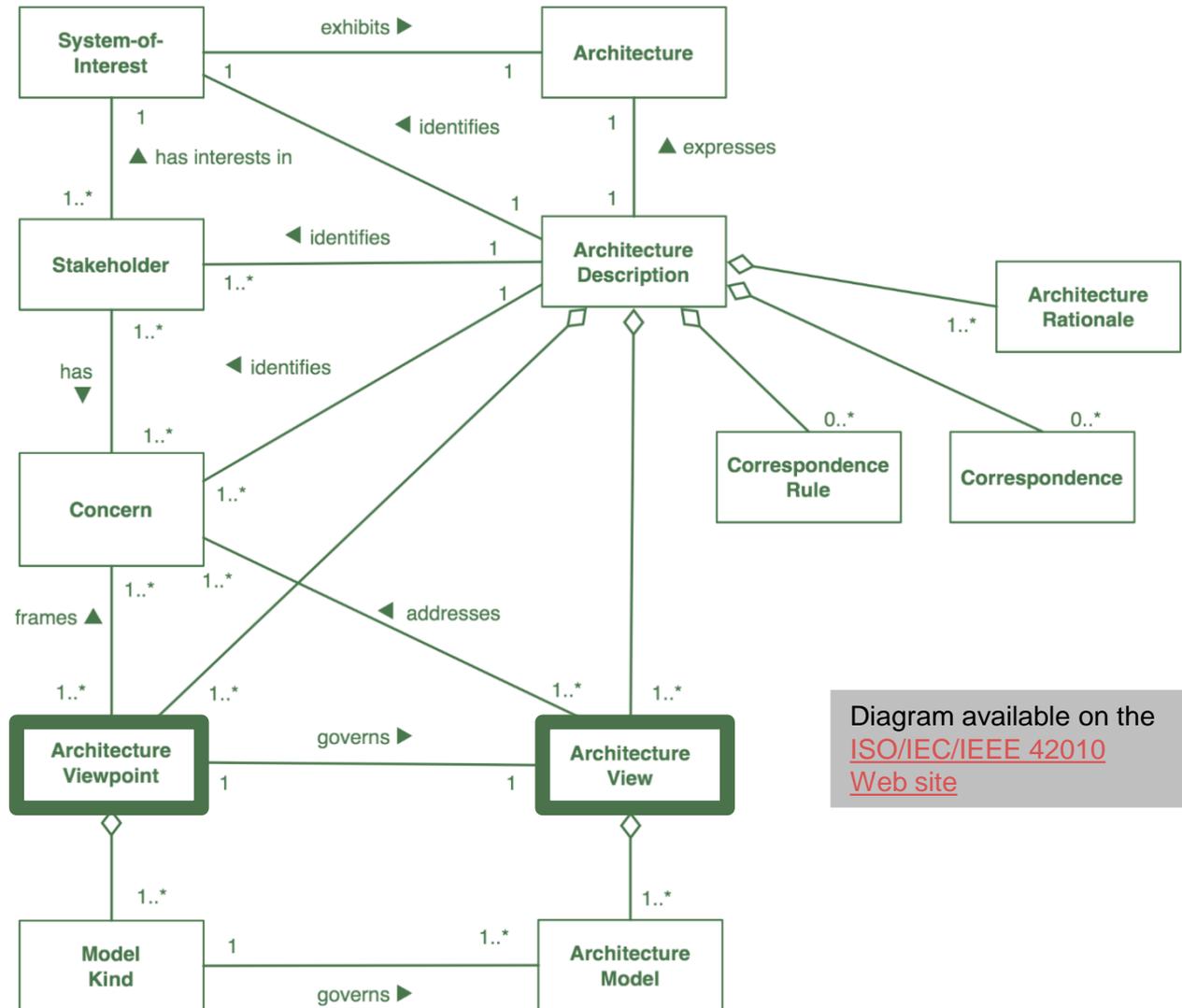
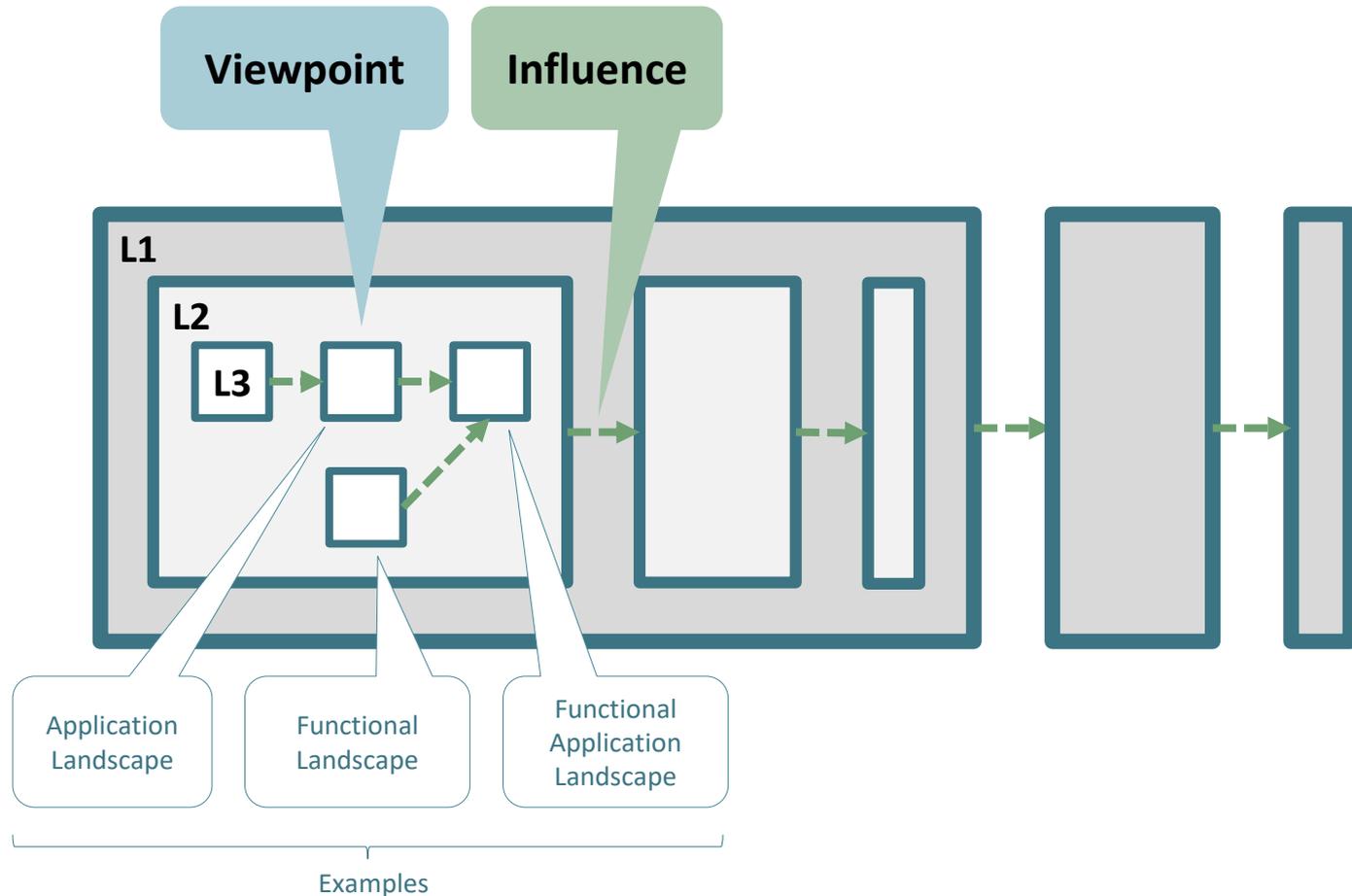
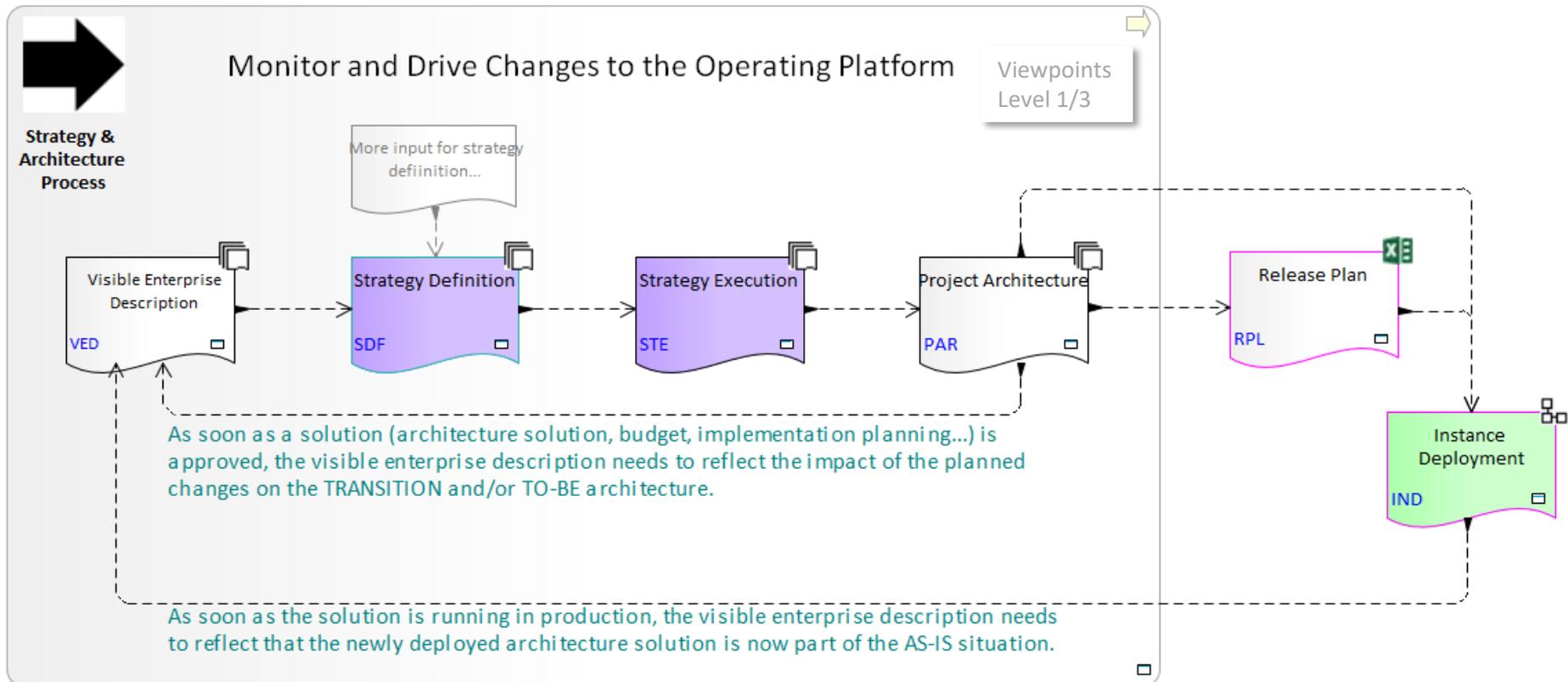


Diagram available on the [ISO/IEC/IEEE 42010 Web site](http://www.iso.org/iso/iec/ieee_42010)

The Framework is mainly organized as hierarchies and flows of viewpoints

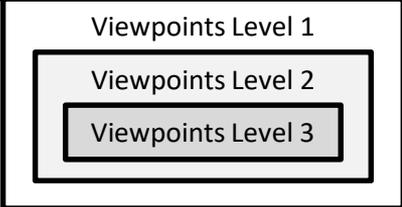


The Strategy & Architecture Process is Expressed as a Flow of Viewpoints



[You can navigate and zoom into the viewpoints on-line...](#)

Standard Catalogs & Level 3 Viewpoints (diagram types)



See also: [Vertical View](#)

Catalogs				
Vision	Business	Information	Application	Technology
<ul style="list-style-type: none"> Corporate Vision Domain-Specific Vision Principles Standards 	<ul style="list-style-type: none"> Business Functions Organizations Processes Roles Individuals Locations Access Points 	<ul style="list-style-type: none"> Information Objects Contracts 	<ul style="list-style-type: none"> Application Functions Applications as a Service Applications Shared Data Stores 	<ul style="list-style-type: none"> Interface Protocols Technology as a Service System Software Node Types Logical Nodes (Shared) Node Instances Communication Networks

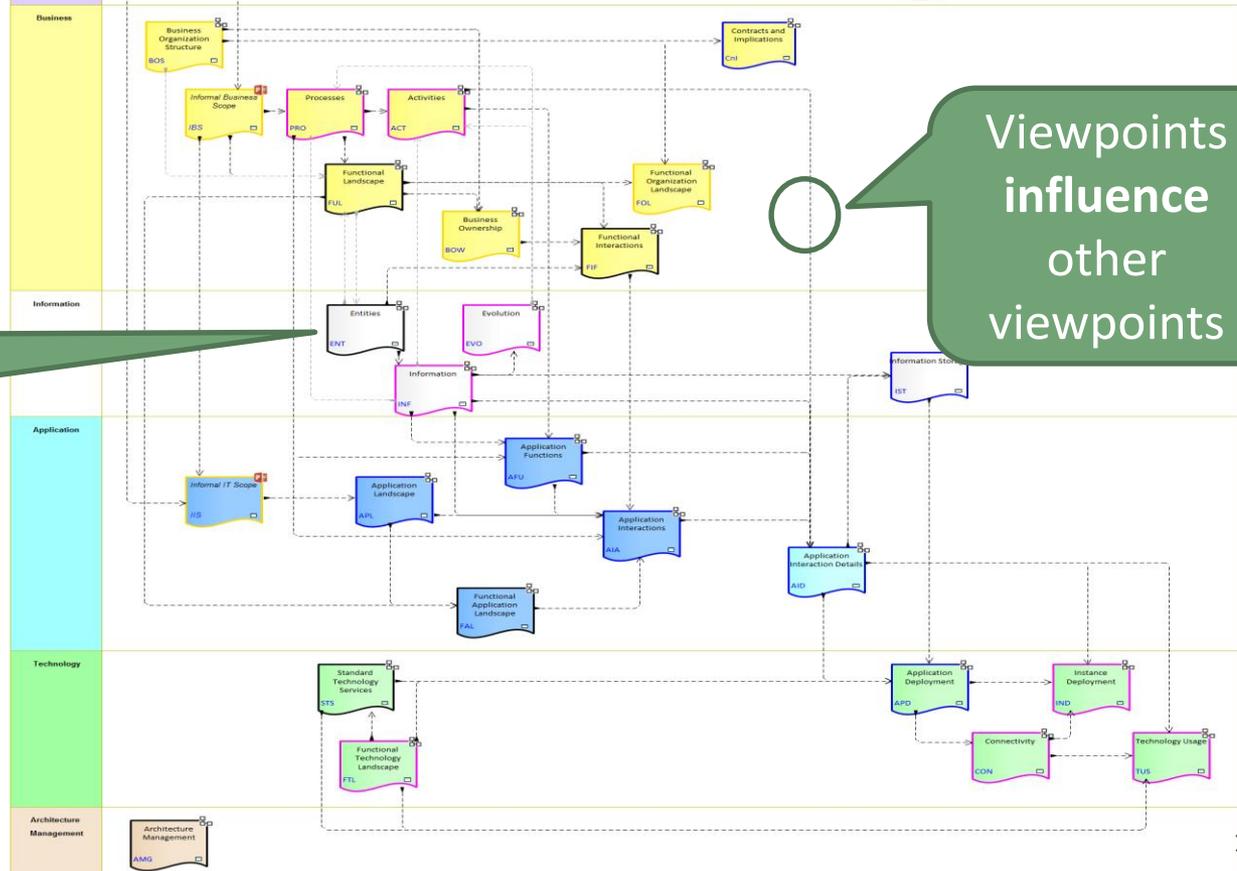
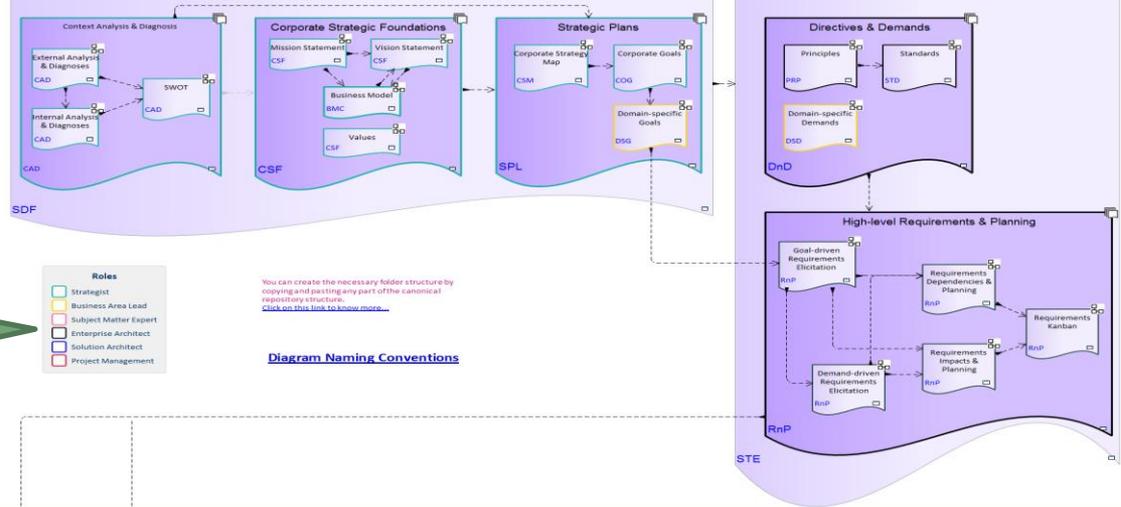
Architecture Management Viewpoint	Level 3 Viewpoints	Diagram Naming Conventions	L3 Viewpoint Relationships	
Vision	Business	Information	Application	Technology
Viewpoints	Viewpoints	Viewpoints	Viewpoints	Viewpoints
External Analysis & Diagnoses	Business Organization Structure	Entities	Informal IT Scope	Standard Technology Services
Internal Analysis & Diagnoses	Informal Business Scope	Information	Application Landscape	Application Deployment
SWOT	Processes	Evolution	Functional Application Landscape	Connectivity
Mission Statement	Activities	Information Storage	Application Functions	Instance Deployment
Vision Statement	Functional Landscape		Application Interactions	Technology Usage
Business Model	Business Ownership		Application Interaction Details	
Values	Functional Interactions			
Corporate Strategy Map	Functional Organization Landscape			
Corporate Goals	Contracts and Implications			
Domain-specific Goals				
Domain-specific Demands				
Principles				
Standards				
Goal-driven Requirements Elicitation				
Demand-driven Requirements Elicitation				
Requirements Dependencies & Planning				
Requirements Impacts & Planning				
Requirements Kanban				

Viewpoints Level 3/3

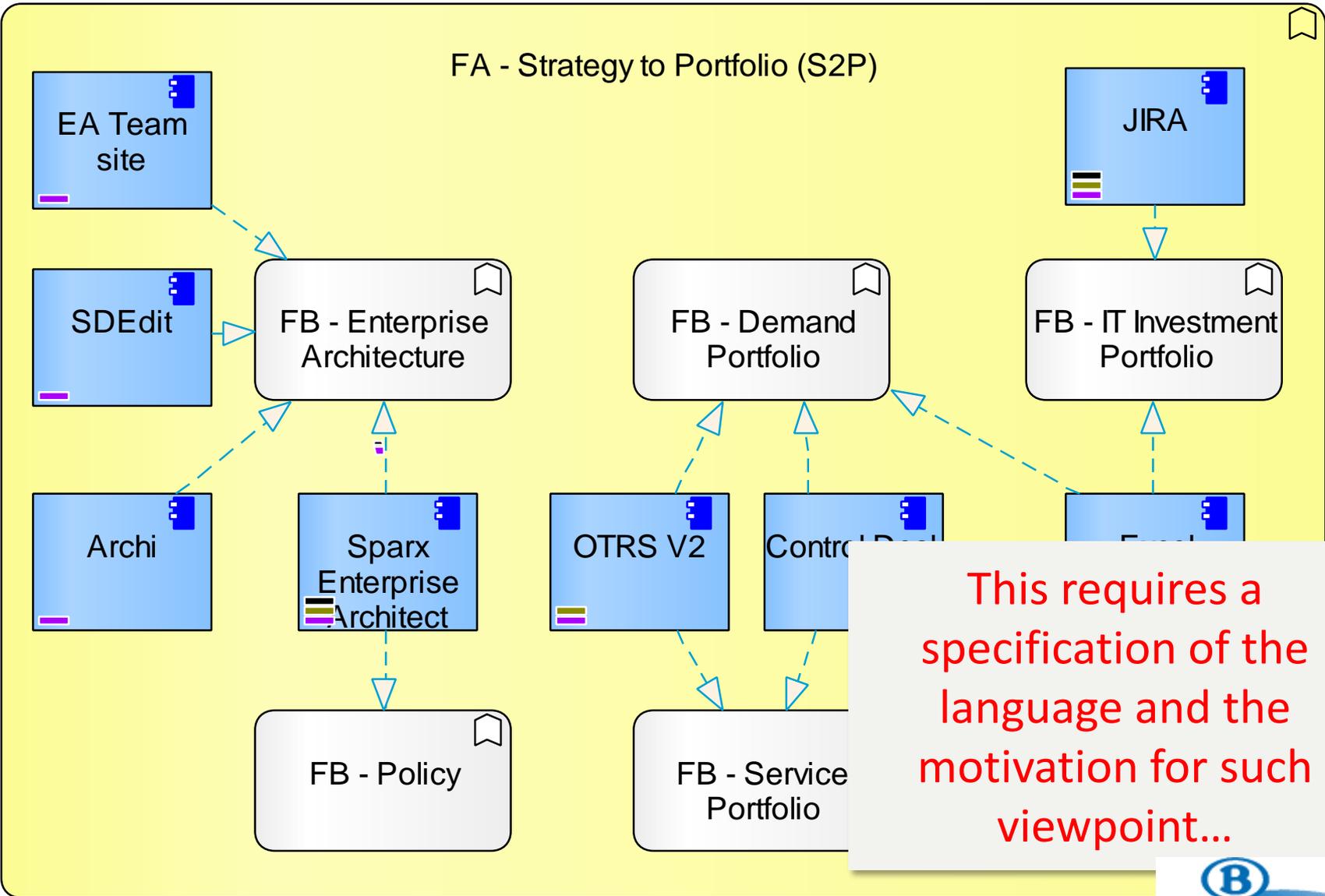
Roles responsible to deliver the views

A pre-defined viewpoint

Viewpoints influence other viewpoints



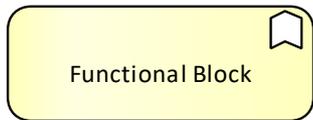
Sample "Functional Application Landscape" View



This requires a specification of the language and the motivation for such viewpoint...



Prescriptive language for “Functional Application Landscape” views



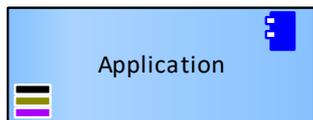
A Functional Block is a level 3 business function that belongs to some functional area.

The granularity and scope of a Functional Block is defined by identifying

- some homogenous set of information that the Functional Block is mastering
- a group of activities that fulfill the purpose of the functional block, that belong to some processes of same nature and that produce and use the information mastered by that Functional Block

A business function is a behavior element that groups behavior based on a chosen set of criteria e.g. required business resources and/or skills, competencies, knowledge, etc.

Inspired by Archimate



An application

- Is a self-contained unit of functionality as perceived by end-users
- Can be clearly mapped to some functional blocks
- Has its own specific set of application attribute values
- Is used by and billable to one or several Organizations
- Is owned by a single Organization
- Can be part of an Application Platform or an Application Group
- Encapsulates Applications Components and Application Interfaces
- Can exist at one or many specific points in time called "plateaus". Possible plateaus are AS-IS, TRANSITION and TO-BE.

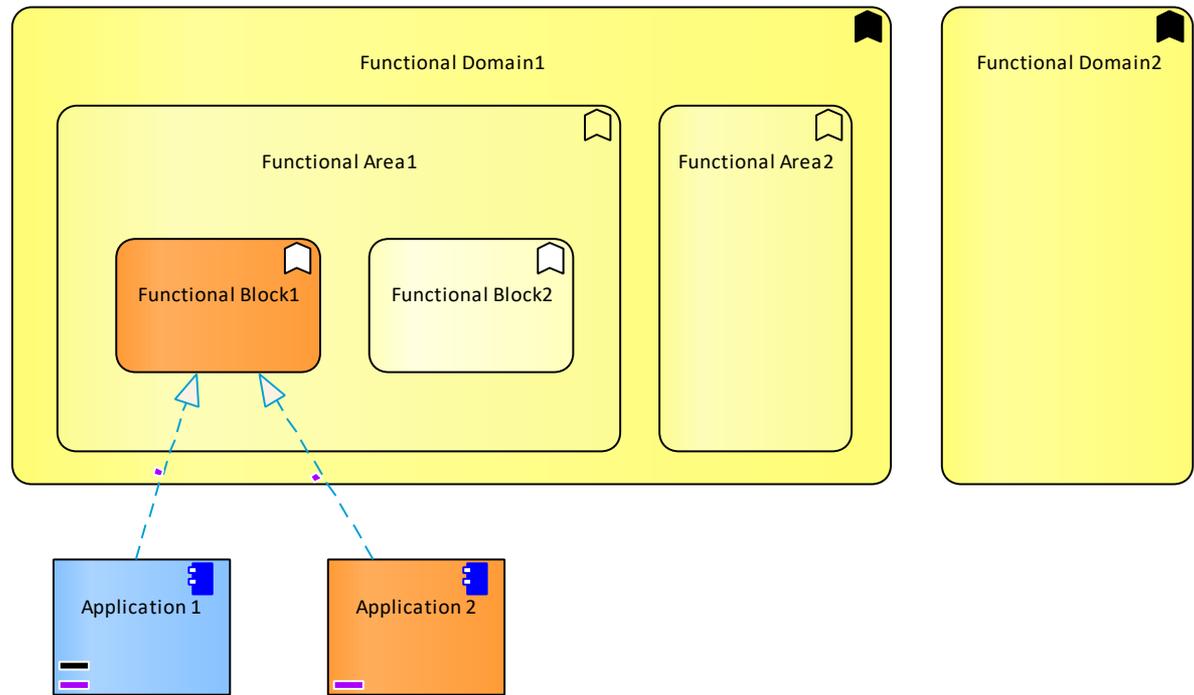
The name of an application component should preferably be a noun.



A **Realization** relationship indicates which concrete entities (“how”) realize which abstract entities (“what”). The realization relationship is used in a business operational sense (e.g., a role realizes a swim-lane of activities), but also in an IT context (e.g., an application realizes a functional block).

Inspired by UML & Archimate

Motivation for creating “Functional Application Landscape” views



This answers the following questions

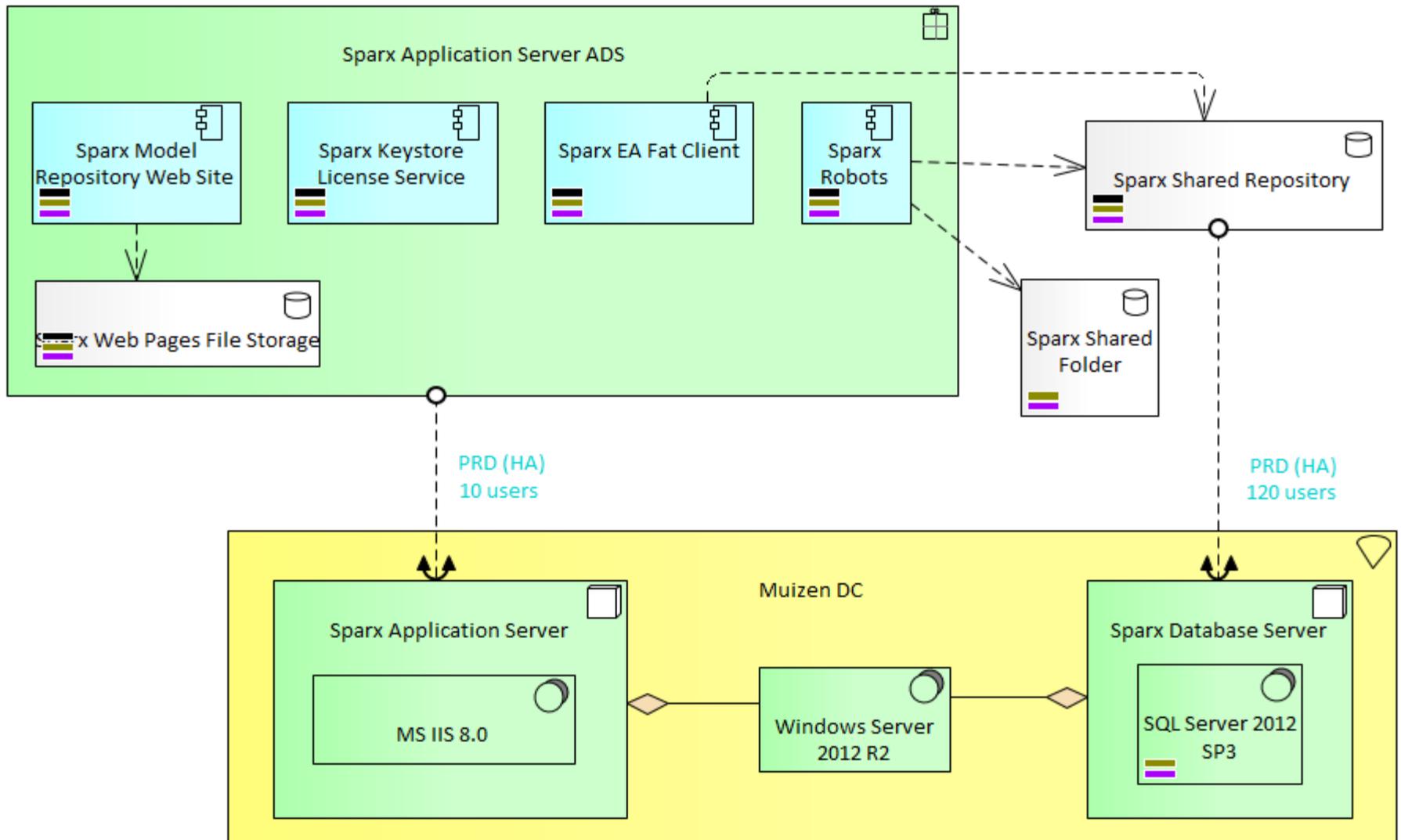
When used as part of the **Visible Enterprise Description**

- Which **applications** support which **functional blocks**?

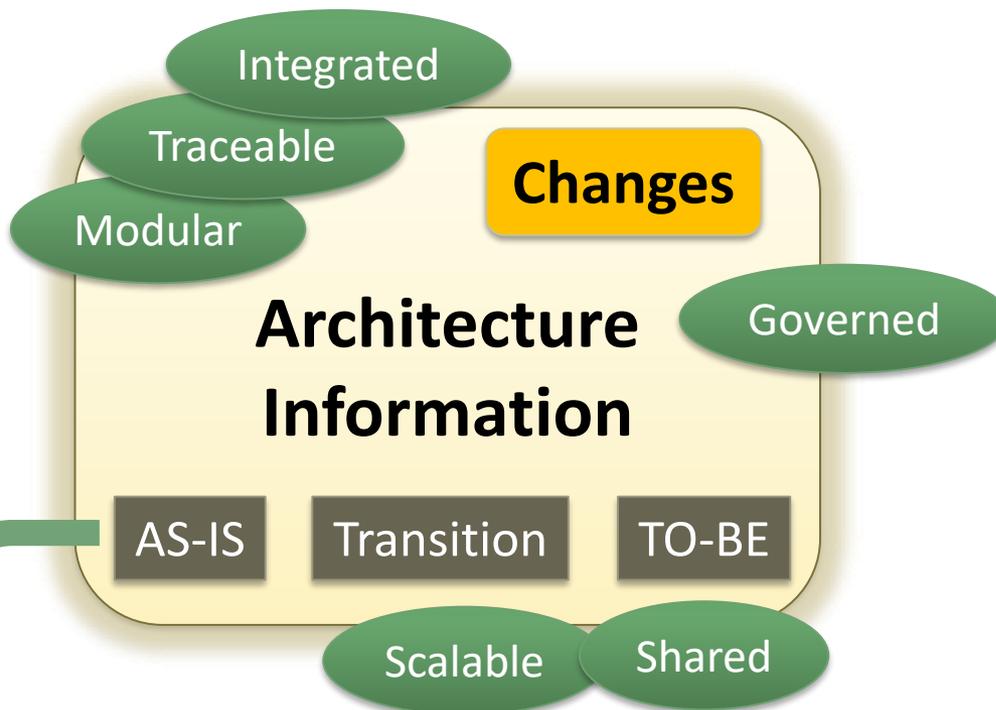
When used as part of a **Project Architecture**

- Which **applications** are/will automate the **functional blocks** inside the scope of this project?

Sample "Application Deployment" View



Architecture building blocks are organized in the repository following a **prescribed tree structure**



- ▷ ! Summary Views
 - ▷ ! Vision
 - ▷ ! Business
 - ▷ ! Information
 - ▷ ! Application
 - ▷ ! Application Functions
 - ▷ ! Applications
 - ▷ ! Application Platform1
 - ! APL - Application Platform1
 - ▷ ! Application Group1
 - ! AIA - Application Group1
 - ! APL - Application Group1
 - ▷ ! Application1
 - ! BOW - Application1
 - ! APL - Application1
 - ! AID - Application1
 - ! IST - Application1
 - ! APD - Application1
 - ! IND - Application1
 - ! Application Deployment Set1
 - ! Instance Deployment Set1
 - ! Application1 Database Node
 - ! Application1 Node
 - ! Application Component1
 - ! Application Component2
 - ! Data Store1
 - ! Application2
 - ! Shared Application Component2
 - ! Shared Data Store2
 - ! Application Group2
 - ! Shared Application Component1
 - ! Shared Data Store1
- ▷ ! Shared Data Stores
- ▷ ! Technology
- ▷ ! Analysis
- ! Design
- ! Projects

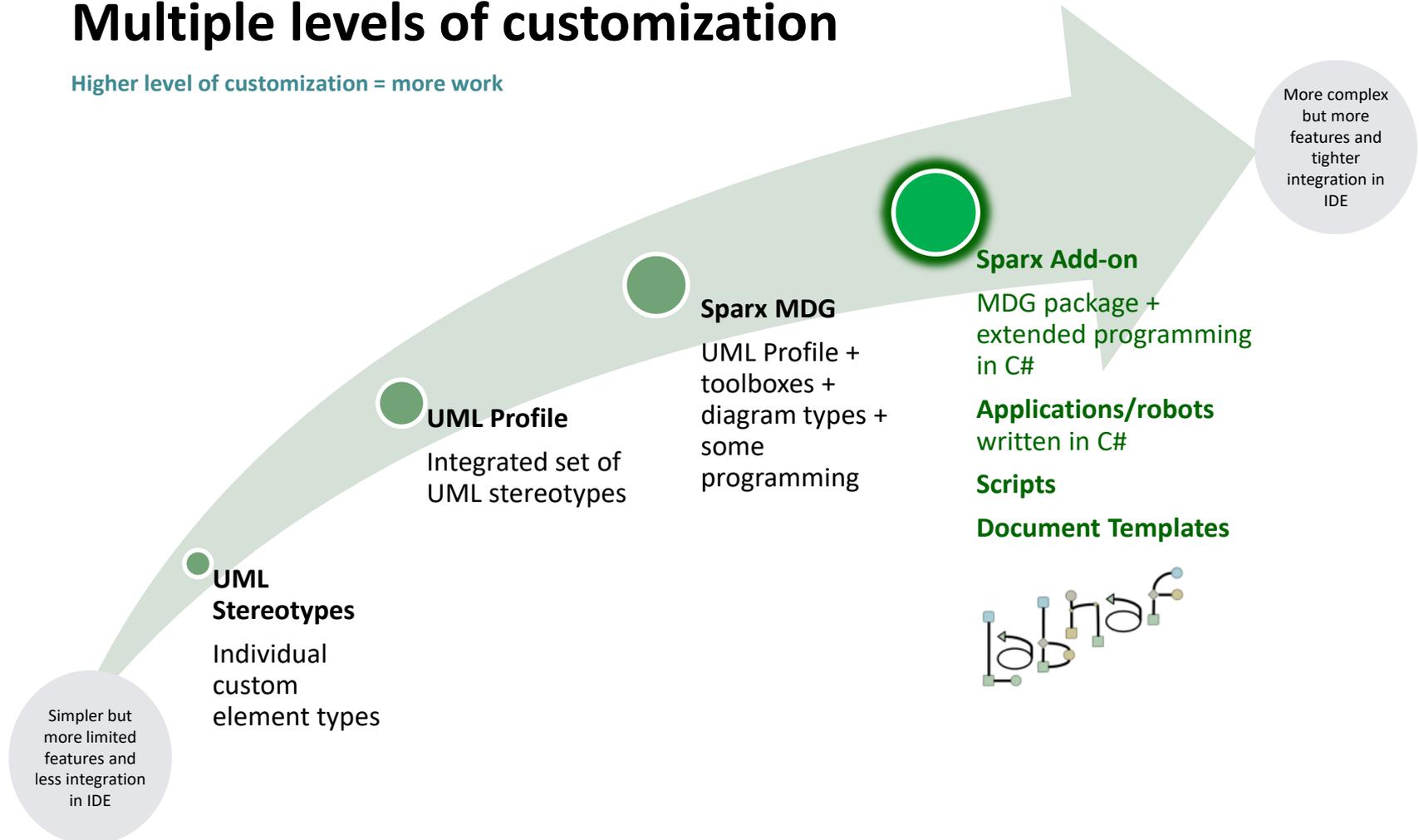
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1. Transformation Challenges
2. Architecture Framework Overview
3. Architecture Design & Modeling
4. Architecture Tools & Repository

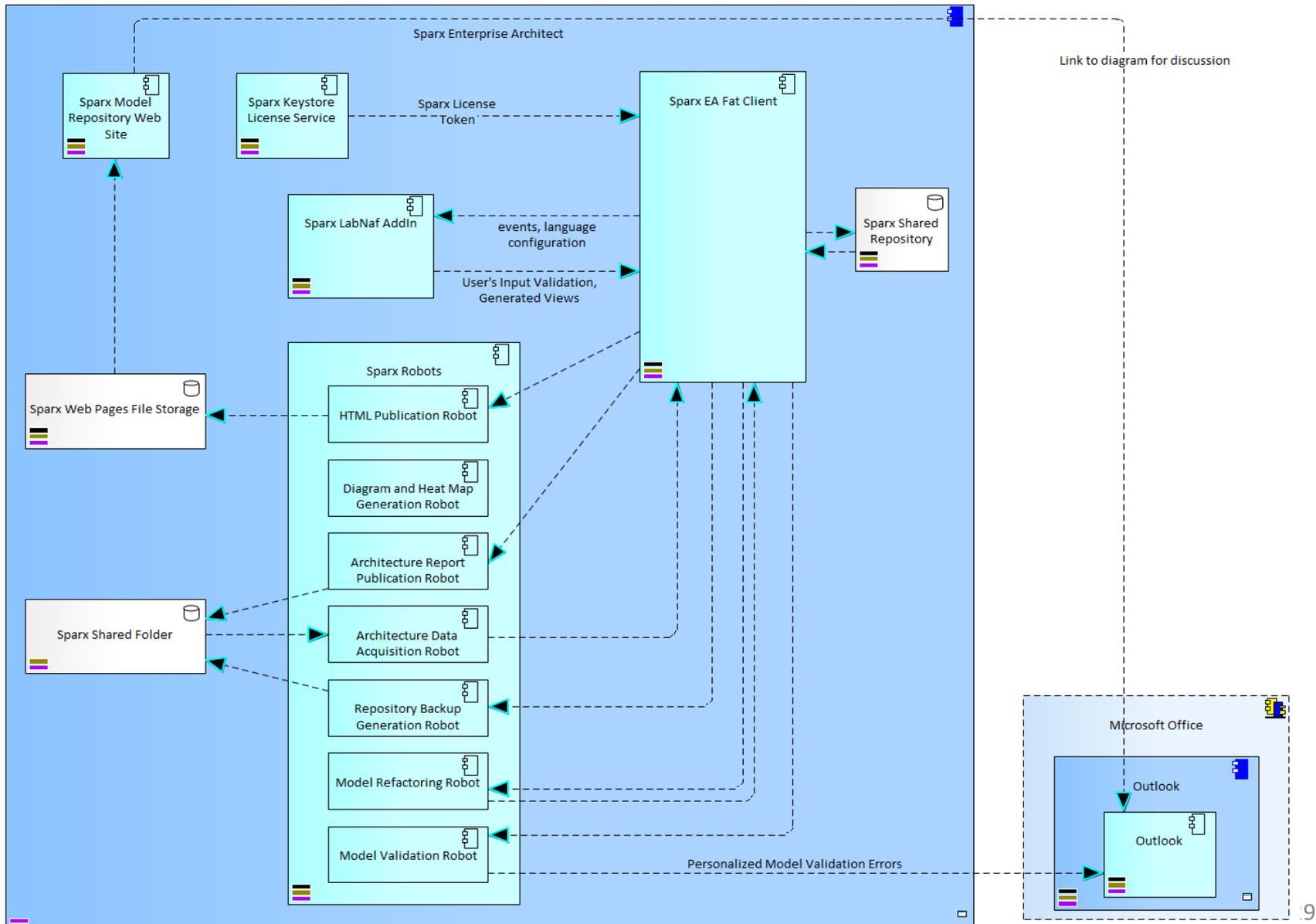
Sparx Software Development Kit (SDK)

Multiple levels of customization

Higher level of customization = more work



Sparx in the Application Portfolio



Each type of architecture view has its toolbox with element and connector types

Elements & Connectors

- Some come from standards
- Some were adapted
- Some are proprietary

Examples

Activities

- Activity
- Gateway
- Intermediate Event
- End Event
- Role
- Start Event
- Swimlane
- Data Object
- Representation
- Application Function
- Application Component
- Location

Activities Connectors

- Activity Trigger
- Realizes
- Access

Application Deployment

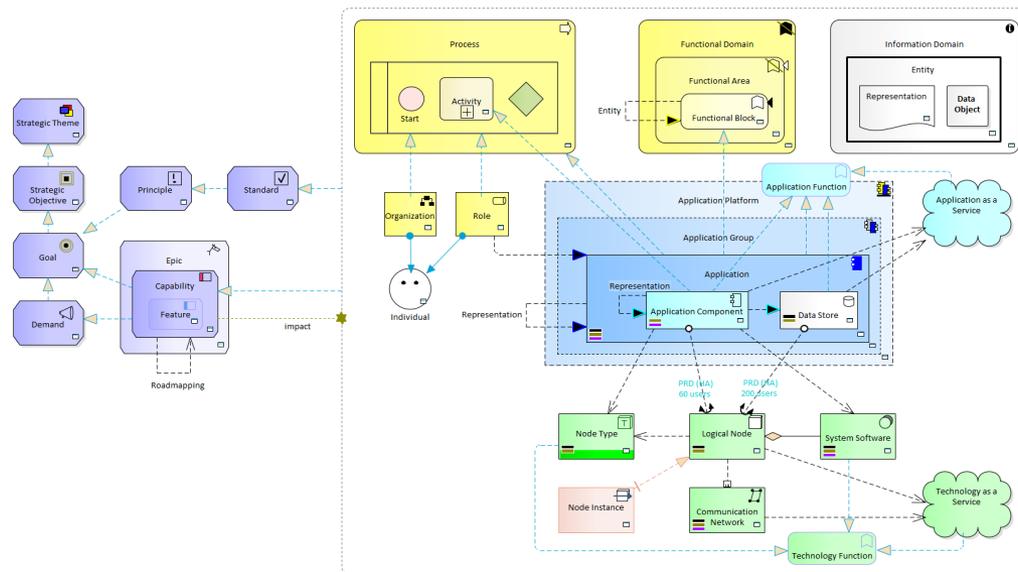
- Application as a Service
- Technology as a Service
- Application Deployment Set
- Application Component
- Data Store
- Logical Node
- System Software
- Location

Application Deployment Connectors

- Is deployed on
- Is part of
- Realizes
- Is dependent on
- Flow allowed by firewall

We use verbs instead of nouns to indicate the meaning of the connector's directions

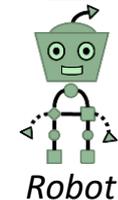
The Language Metamodel is used both for documentation & automatic model validation



While Modeling

Existing Invalid Connectors

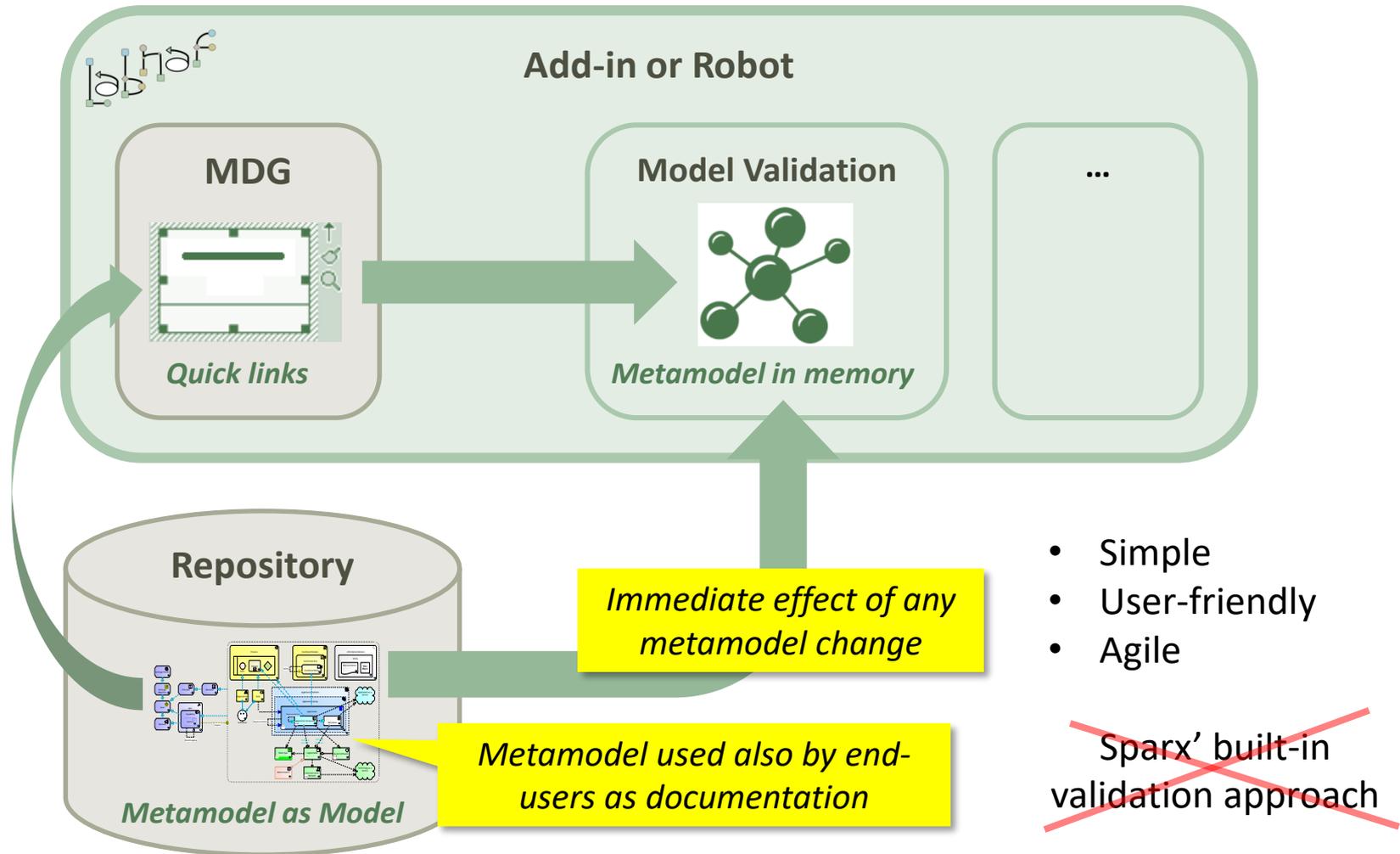
Prevent creation of invalid connectors



Robot

Send Error Emails to Relevant Recipients

The metamodel used for validation is loaded either from quick links or from the repository



Many key diagrams are generated every night following diagram templates

The screenshot displays a domain diagram for 'Sales'. It is organized into hierarchical sections: B2B Sales, B2C Sales, B2I Sales, and Sales Channel. Each section contains specific business functions, some of which are color-coded (yellow, grey, or teal) and include small icons (like a red dashed line or a yellow arrow) indicating their status. To the right of the diagram is a 'List of applications supporting the domain' table, which lists application names such as 'Ares', 'Athena Cash Desk', and 'Customer Mobile Application'. Further right is a 'Legend for Business Functions' table that explains the color coding and icons used in the diagram. Below the legend is a 'Nb of Applications / Business function' legend with a color key (pink for 0, grey for 1, yellow for 2 or more). At the bottom right, there is a link to 'List of other Functional Domain diagram(s) as hyperlink(s)' with a small icon and the text 'EUI_Sales'.

Sales

B2B Sales

- B2B Indirect Sales

B2C Sales

- B2C Order Management
- B2C Pricing Management
- B2C Self-Service Channel

B2I Sales

- Bulk Distribution
- Face-to-Face Distribution

Sales Channel

List of applications supporting the domain.

'Application Name'
Ares
Athena Cash Desk
Customer Mobile Application
Demeter
Hera
Janus
Jupiter Cash Desk
LOGIN B2B
Neptune
Venus Cash Desk
Zeus Common Pricing

Legend for Business Functions

Differentiator = ?	
= Y	
= N	

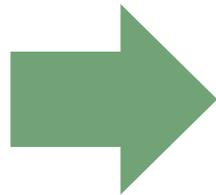
Externalized = Y	Entirely externalized
= P	Partially externalized
= N	Not externalized (default)

Nb of Applications / Business function

- 0
- 1
- 2 or more

List of other Functional Domain diagram(s) as hyperlink(s)

[EUI_Sales](#)



- Time Savings
- Cost savings
- Diagram completeness
- Consistent diagram layout

Generated Application Portfolio Reports

Recently Created Applications

Application Portfolio Reports

List of Applications and Components in Excel (Nightly Generated)

Applications and Relationships
 All applications with all attributes including cross-references to organizations using the applications and to functional domains
 Audience: Project Managers, Architects

Application List for Release Management
 All applications with only the attributes needed for Release Management.
 Audience: IT Operations

Application Components
 All application components along with their parent application.
 Audience: Project Managers, Architects

Functional Coverage and Heatmaps (Dynamic Diagrams)

3 types of generated diagrams:

- 1) **Functional domain overview diagram** including
 - A heat map illustrating, for each functional area in the functional domain, which functional block is supported by 0, 1 or more than 1 applications
 - A list of all applications supporting the functional domains
- 2) **Functional area overview diagram** including
 - A heat map illustrating which functional block is supported by which applications
- 3) **Functional block overview diagram** including
 - A heat map illustrating which applications are supported by that functional block

Audience: Business Area Leads, Project Managers, Architects

Categorized Applications

Top Applications
 Dynamic chart illustrating most important applications.
 Audience: IT Management, Project Managers, Architects

Critical Applications (to be reviewed)
 Dynamic lists of applications that are critical for business operations
 Audience: IT Management, Project Managers, Architects, Business Area Leads

Criticality Applications by OS (to be reviewed)
 Applications using outdated OS
 Audience: IT Management, Project Managers, Architects, IT Operations

C# applications and components
 Lists of applications and components developed in C#
 Audience: IT Management, Project Managers, Architects

C++ applications and components
 Lists of applications and components developed in C#
 Audience: IT Management, Project Managers, Architects

Quality of Application Information (Completion Rates)

Q - Application and Component Interaction Flows
 Dynamic list showing the completion rates of application interaction (AIA) and application interaction details (AID) diagrams

Q - Application Contact Information
 Dynamic lists and charts illustrating the completion rate of some specific application attribute values.
 Audience: IT Management, Project Managers, Architects

Q - Application Properties @ IT Organizations
 Dynamic lists showing the completion rates of application contact information completeness per IT organization

Q - Application Properties @ BAs - Business Area's
 Dynamic lists showing the completion rates of application contact information completeness per Business Area

Q - Application Properties @ TCCs - Technology Competence Centers
 Dynamic lists showing the completion rates of application contact information completeness per Technology Competence Center

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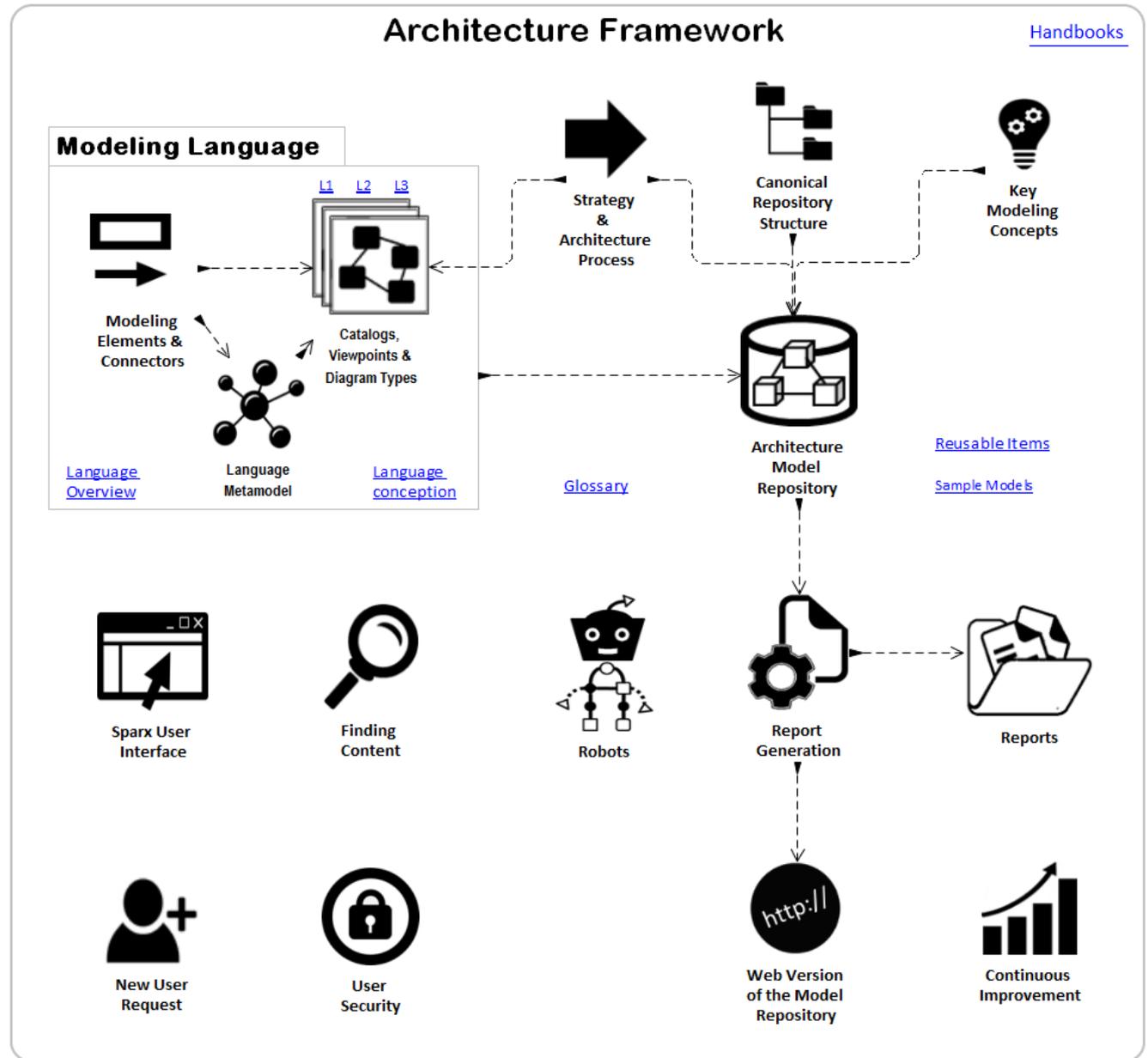
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www.labnaf.one

Generated Guidance Web Site

Public version:

www.labnaf.one/guidance



Summary



We play many different roles, but...

We speak the same language

We share the same information in the same repository

We follow the same process and we use the same tool

We collaborate effectively

For further information ...

Detailed documentation is available here:

www.Labnaf.one

Thank you!

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