VAT scheme for SME partial solution v.1.0

Suggestions to finalise the solution model and start development

EUROPEAN COMMISSION DIGIT D2

Directorate-General for Informatics (DIGIT)

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Introduction

The **VAT4SME partial solution model** aims to support Member States in building their own national solutions by providing a partial solution IT architecture model which public administrations need to finalize, assuring interoperability between public services.

This document provides a summary diagram from a legal, organisational, semantic, and technical (application and infrastructure) perspective (views/ diagrams) to be implemented in your solution model, as well as implementation guidelines to facilitate understanding and the transposition of the VAT4SME architecture model by national public authorities.

Key concepts

Some general terminology crucial for an overall understanding of the model:

- An **Architecture Building Block (ABB)** is a constituent of the architecture model that describes a single aspect of the overall model. An Architecture Building Block describes generic characteristics and functionalities. Architecture Building Blocks are used to describe reference architectures, solution architecture templates or solution architectures of a specific solution.
- A **Solution Building Block (SBB)** is a candidate solution which conforms to the specification of an Architecture Building Block (ABB).
- **Digital Business Capabilities (DBCs)** are the key skills and capabilities a company or a Government requires to transform itself into a sustainable and successful business by considering digital technology as the enabling component.
- A **Digital Public Service (DPS)** is a service provisioned by or on behalf of a public administration in fulfilment of a public policy goals servicing to users either citizens, businesses or other public administrations. A European public service comprises any public service exposed to a cross-border dimension and supplied by public administrations, either to one another or to businesses and citizens in the Union. Once or more Digital Public Service can realize one Digital Business Capability.

General key ideas

Some general key considerations regarding the model are presented before entering into the detailed views:

- The main task to be conducted is to further develop the **ABBs already identified in the model**. You would need to provide further granularity to the ABBs to define the detailed requirements.
- The current **SBBs** in the model identify services/resources that probably exist in the IT inventory or your national administration or in the European Commission (EC) IT services inventory and can be further reused. The **SBBs** are identified with a stereotype: <<….>>. Some clear exceptions to this rule exist and are addressed in the guidelines.
- **Interoperability** aspects:
  - The model is focused on granting **INTEROPERABILITY** and promotes **technology neutrality**. This means that you are not constrained to using any specific technology, but rather, the partial solution model focuses on achieving interoperability between public services.
  - The model is agnostic to the actual IT systems/methodologies/implementations details. It is recommended to always prioritize interoperability over integration of systems.
  - An example of service interoperability through APIs is depicted in the REST API viewpoint.
  - In order to ensure INTEROPERABILITY, use the advantages the *Key Interoperability Enablers viewpoint* provides to you. It is used as an interoperability components “checklist”.

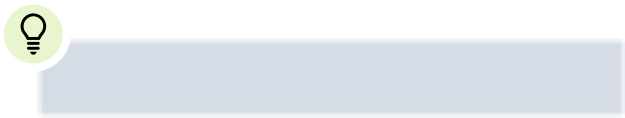
Model views

The VAT4SME model is divided in several views in alignment with the LOST architectural principles. The views of the model are the following:

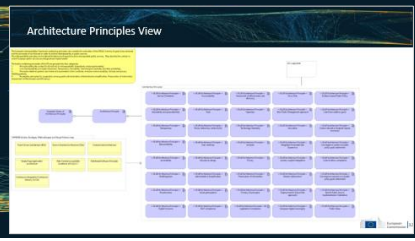
- Architecture Principles View
- Legal View
- Organisational view
- Semantic view
- Technical view – application
- Technical view – infrastructure

The following slides will guide you through each of the model views providing guidance and recommendations on how the model needs to be completed with the orientation that your specific digital public service will have.

For each view, a box with the following shape is provided with considerations on the principles of the model and practical recommendations for the model completion



Architecture Principles view



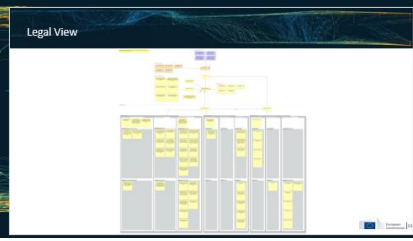
Some general key considerations regarding the Architecture principles view:

- The architecture view sets the Architecture Principles (ELAP) that should be realised to ensure **interoperability** and **EC recommendations**.
- In addition, it offers some advice on development methodologies, technical frameworks and design patterns that can be used to help you to attain your goals in an easier manner (see *VAT4SME Solution Strategies, Methodologies and Design Patterns map* in the model).
- The **<<ELAP:Architecture Principles>>** does not identify an SBB.
- This view looks simple, but it is of **critical importance** in **the success of the implementation of your solution**.

- **The completion of the definition of the Architecture Principles view should be aligned with the following aspects:**
  - Architecture Principles, as presented in the *Architecture Principles view* of the model.
- **The completion of the definition of the Architecture Principles view should focus on:**
  - The identification of the development methodologies that will be used to ensure that the solution will accomplish the Architecture Principles.

European Commission

Legal view

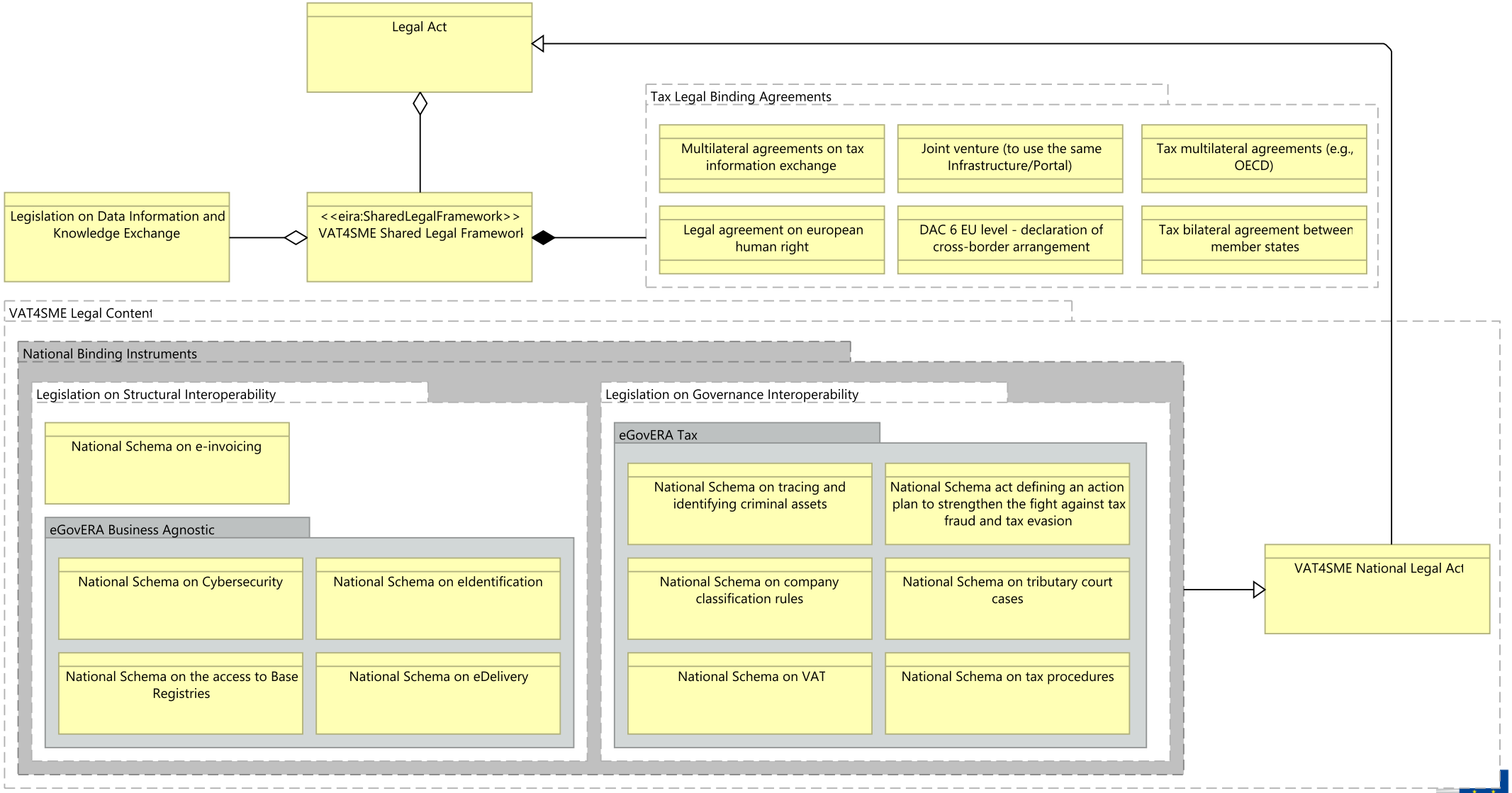


Some general key considerations regarding the Legal view:

- The legal view sets the legal basis that should be met to achieve **legal interoperability** (*VAT4SME Shared Legal Framework*), **objectives** (*VAT4SME Public Policy Objectives)* and **instruments** *(European and National)*.
- The stereotyped binding/non-binding instruments identify existing/specific legislation. You could refer to them as **legal SBBs** to facilitate the understanding.
- The traceability between the legislation and your solution is depicted in the *Motivation viewpoint*, and acts as a mechanism to ensure interoperability.

- **The completion of the definition of the Legal view in the solution model should be compliant with the following regulations:**
  - The stereotyped *Legal Interoperability Binding Agreements*.
  - The stereotyped *European Binding Instruments: VAT4SME European Legal Act*.
  - The stereotyped *European Non-Binding Instruments: VAT4SME European Legal Act.*
- **The completion of the definition of the Legal view in the solution model should focus on:**
  - The gathering and modelling of all the applicable national legislation regarding:
    - The non-stereotyped *National Binding Instruments: VAT4SME National Legal Act.*
    - The non-stereotyped *Tax Legal Binding Agreements.*

Legal view: implementation summary diagram

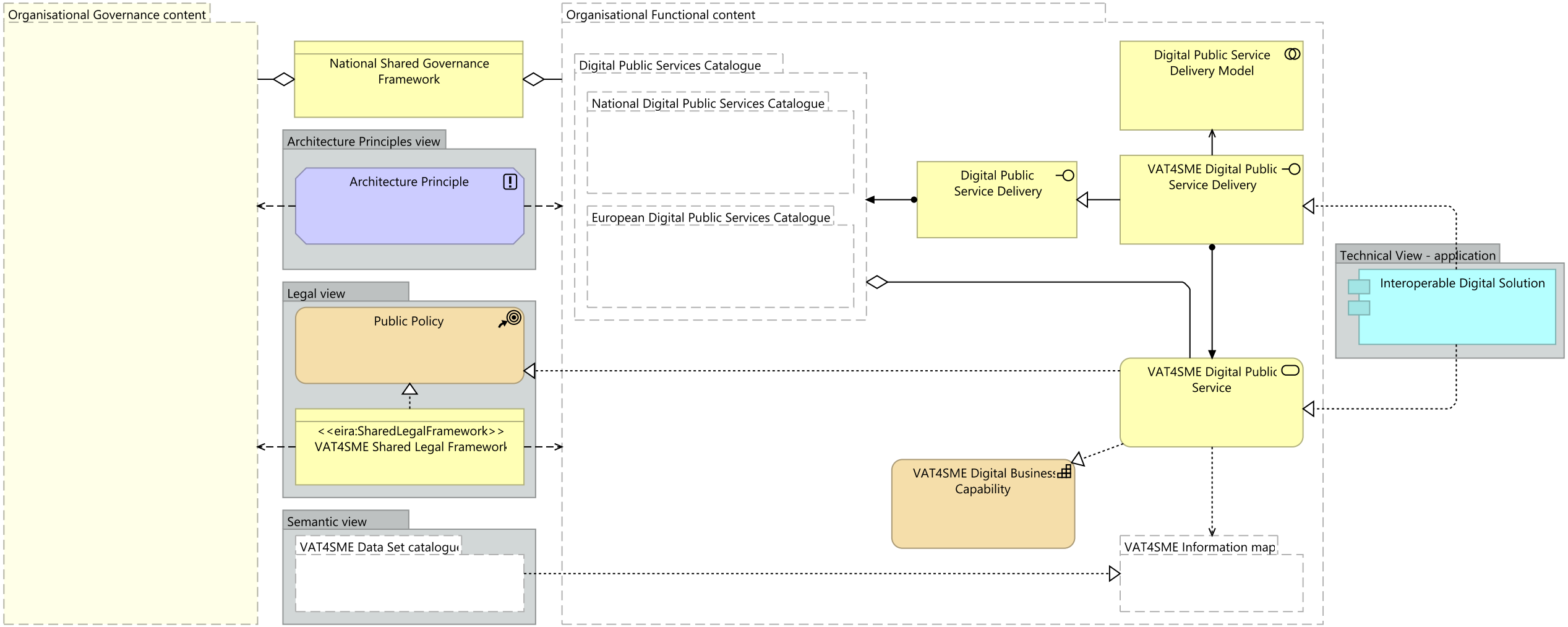


Organisational view

Some general key considerations regarding the Organisational view:

- The organisational view sets the basis that should be accomplished to achieve **organisational interoperability**. The characteristics of the *VAT4SME solutions entails more relevance to the national side: the* ***National Shared Governance Framework****.* This diagram leads you through the model and is organised using stratum/layers and viewpoints.
  - Legal View Content viewpoints.
  - Organisational View Content viewpoints.
  - Motivation viewpoint.
- The general rule: artefacts without stereotypes (ABBs) should be implemented/developed.
- From this diagram, top-level artefacts of your solution can be identified:
  - The **Digital Business Capabilities** (DBCs) your solution will implement (ArchiMate Capability).
  - The **Digital Public Services** (DPSs) your solution will use and develop (ArchiMate Business Service).
  - The **information** your solution will provide, require and manage (ArchiMate Business Object).
  - The **functionalities** your solution will offer (ArchiMate Business Function, Process and Event).
  - The **interfaces** your solution will provide and require (ArchiMate Business Interface).
  - The **governance** elements of your solution (ArchiMate Business Object and Contract).
- Finally, this diagram establishes the connections among the above-mentioned artefacts and the whole set of model elements.

Organisational view: implementation summary diagram



Organisational view: the top-level solution elements

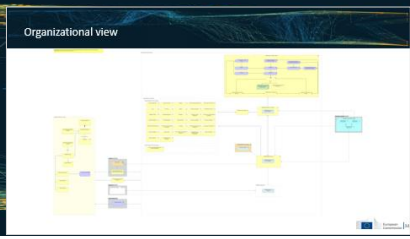
These are the key elements depicted in this view:

- **Organisational Governance content**: contains the governance elements (ABBs) required to manage the solution in different aspects: agreements, risks, data, security, interoperability and privacy.
- **National Shared Governance Framework**: represents the Shared Governance Framework that EIRA defines to ensure interoperability. It is a **conceptual** element that helps to gather related concepts. Therefore, it does not have to be directly implemented.
- **Organisational Functional content**: contains the functional elements (ABBs and SBBs) required to develop the solution. It is built of the following artefacts:
  - **VAT4SME Digital Business Capability Map**: groups the DBCs of the VAT for SME initiative. Your solution should satisfy all of them. The shape in the diagram links you to the Motivation viewpoint where they are described more in detail.
  - **Digital Public Services Catalogue**: puts together the DPSs you should use, not create, in your solution. It is built of two sets of DPSs:
    - **National Digital Public Services Catalogue**: identifies the DPSs, in your IT systems (ABBs), your solution will use. Your solution model should identify the SBBs that realizes these ABBs in your IT services inventory and satisfy the interoperability requirements.
    - **European Digital Public Services Catalogue**: identifies the DPSs, in the EC IT systems (SBBs), your solution will use. As they are SBBs, your solution model should satisfy the interoperability requirements of these SBBs.
  - **Digital Public Service Delivery Model**: your solution should accomplish it to ensure interoperability: it is a key interoperability enabler. This Business Collaboration identifies the agents and roles that play in the solution.

Organisational view: the top-level solution elements

- **VAT4SME Information Base**: contains the information (Business Objects) and the rules (Constraints) your solution should accomplish. The shape in the diagram leads you to the *VAT4SME Information viewpoint* where it is described more in detail. The Data Objects that realise/implement the information, are modelled in the Semantic View: *VAT4SME Data Set catalogue*.
- **VAT4SME Digital Public Service Delivery**: defines the Business Interfaces your solution should model/develop. The shape in the diagram carries you to the *VAT4SME Digital Public Service viewpoint* where it is deeply described.
- **VAT4SME Digital Public Service**: defines the Digital Public Service (Business Service) your solution should model/develop. The shape in the diagram links you to the *VAT4SME Digital Public Service viewpoint,* where an in-depth description is provided.

Organisational view: the top-level solution elements



The completion of the definition of the organisational view in the solution model should be consistent/not conflict with the following aspects:

- Architecture Principles view.
- Legal view.
- Organisational view
  - Interoperability with the *European Digital Public Services Catalogue*.
  - *VAT4SME Digital Business Capability*.
  - *Digital Public Service Delivery Model.*
  - *VAT4SME Digital Public Service Delivery's interfaces*.
  - *VAT4SME Digital Public Service's events and functions*.

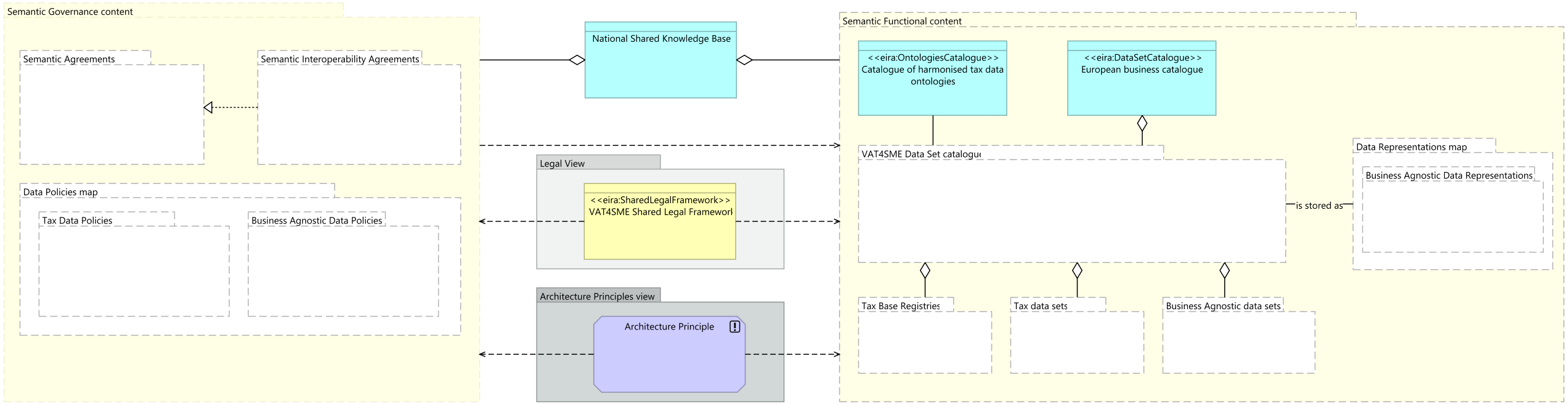
- **The completion of the definition of the organisational view in the solution model should focus on the following:**
  - The SBBs addressing the ABBs in the organisational Governance content.
  - The SBBs addressing the ABBs in the *National Digital Public Service Catalogue.*
    - ATTENTION!! DPSs (Business Services) are being modelled at this stage, **not** Application Services. The technical implementation is not relevant in this phase. This means that a DPS could be implemented by one, two or more Application Services. On the other side, two or more DPSs could be implemented in only one Application Service.
  - The SBBs addressing the ABBs (Business Objects) in the *VAT4SME Information Base*. You should find out where the information is and how to extract it from your IT systems. After that, you should model the rules (Constraints) that apply to each case: the logical data model.

Semantic view

Some general key considerations regarding the Semantic view:

- The semantic view sets the basis that you should accomplish to ensure **knowledge interoperability: information and data**. The characteristics of the *VAT4SME solutions entails more relevance to the national side: the* **National Shared Knowledge Base.**
- The general rule: artefacts without stereotypes (ABBs) should be implemented/developed.
- From this diagram you will identify the data artefacts of your solution:
  - The **Data Policies** your solution should develop and accomplish: *Data Policies map* in the model.
  - The **Semantic and Interoperability Agreements** your solution should develop and implement: *Semantic Agreements and Semantic Interoperability Agreements* in the model.
  - The **VAT4SME Data Set Catalogue** your solution should develop and implement (ArchiMate Data Objects).
    - The **Tax Base Registries** your solution should use derive from eGovERA Tax RA.
    - The **Tax Data Sets** your solution should use derive from eGovERA Tax RA.
    - The **Business Agnostic Data Sets** your solution should use derive from eGovERA Business Agnostic RA.
  - The **Data Representations map** your solution will accomplish in the way of serialize/deserialize data (ArchiMate Representations).
    - The **Business Agnostic Data Representations** your solution should use derive from eGovERA Business Agnostic RA.

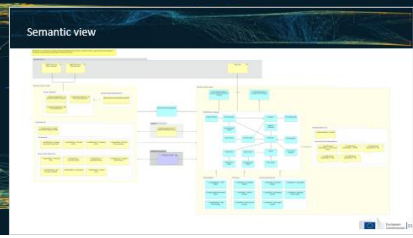
Semantic view: implementation summary diagram



Semantic view: the top-level solution elements

- **Semantic Governance content**: contains the semantic elements (ABBs and SBBs) required to manage your solution in reference to data interoperability.
  - ATTENTION!!! All the SBBs and ABBs in this group should be accomplished and developed. From a solution implementation perspective, they act as ABBs.
- **National Shared Knowledge Base**: represents the Shared Knowledge Base that EIRA defines to ensure interoperability. It is a **conceptual** element that helps to gather related concepts. Therefore, it does not have to be implemented.
- **Semantic Functional content**: contains the functional elements (ABBs and SBBs) required to develop your solution. It is built with the following artefacts:
  - The **VAT4SME Data Set Catalogue** your solution should develop and implement (ArchiMate Data Objects). From this element, with the information in the *VAT4SME Information Base*, you will develop the logical and physical data model of your solution. The ABBs should be created. The SBBs should be found in your data catalogues and used in your solution.
  - The **Data Representations map** contains the data formats your solution will use in the way of serialize/deserialize data.

Semantic view



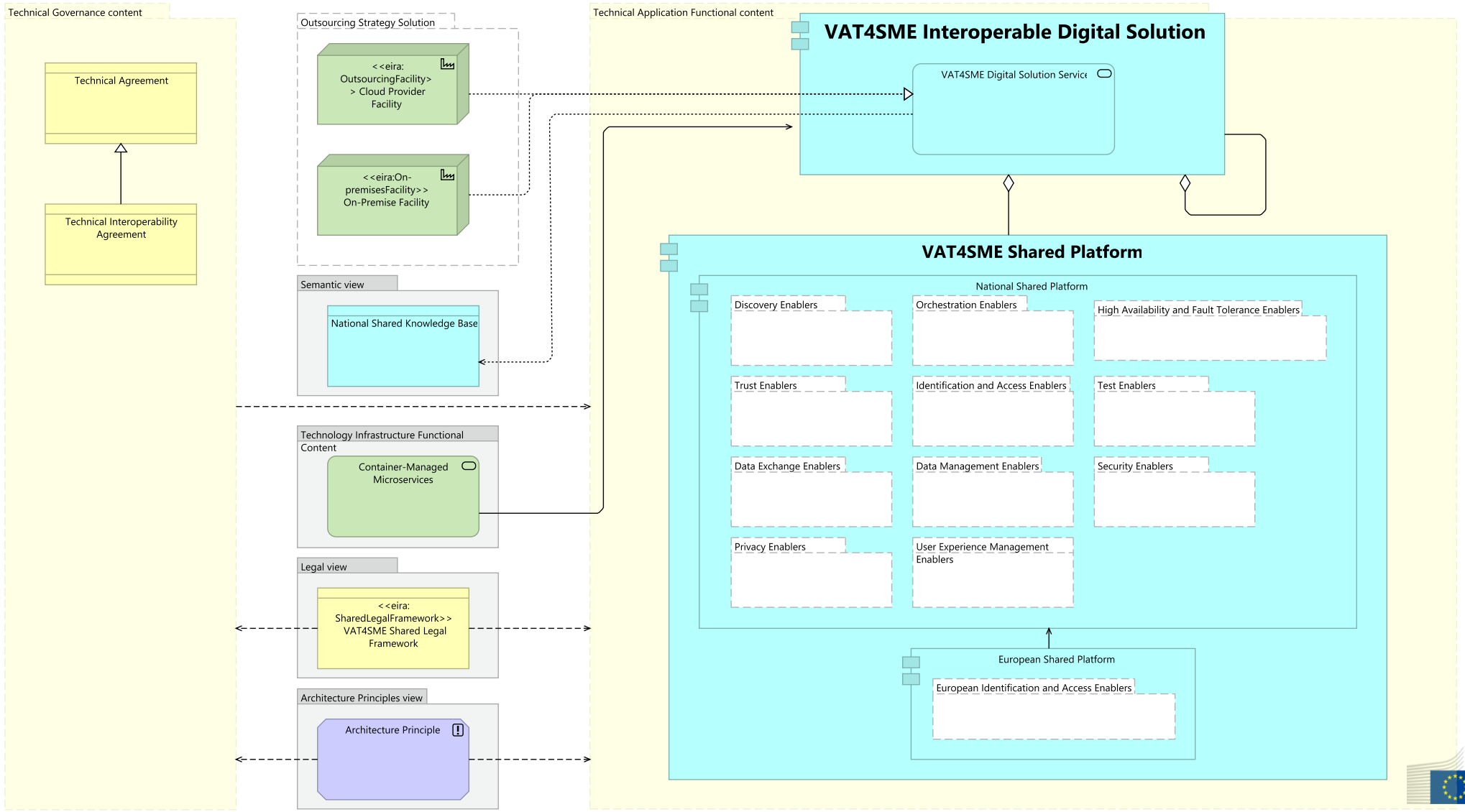
- **The completion of the definition of the Semantic view in the solution model should be consistent/not conflict with the following aspects:**
  - Architecture Principles view.
  - Legal view.
  - *Data Representations map*.
- **The completion of the definition of the Semantic view in the solution model should focus on the following:**
  - The SBBs addressing the ABBs in the Semantic Governance content.
  - The SBBs, from your IT datasets, addressing the ABBs in the VAT4SME Data Set *Catalogue*. You should find out where the information is in your specific IT systems and how to retrieve it. After that, you should model the rules (Constraints) that apply to each case: the logical data model.

Technical view - application

Some general key considerations regarding the Technical application view:

- The technical view – application sets the basis that you should accomplish to achieve **application interoperability**.
- The general rule: artefacts without stereotypes (ABBs) should implemented/ developed
- From this diagram you will identify the top-level artefacts of your solution:
  - The **Technical Interoperability Agreements** your solution will develop (ArchiMate Contract).
  - The **Outsourcing Strategy Solution** your solution will choose and develop (ArchiMate Facility).
  - The **VAT4SME Interoperable Digital Solution** your solution will develop to create the final Digital Public Service (ArchiMate Application Component) for *VAT for SME* initiative.
  - The **VAT4SME Shared Platform** puts together the digital public services (ArchiMate Application Service) you should use, not create, in your solution. It is built of two sets:
    - **National Shared Platform**: identifies the services, in your IT systems (ABBs), your solution should use. Your solution model should identify the SBBs that realizes these ABBs in your IT services inventory and satisfy the interoperability requirements.
    - **European Shared Platform**: identifies the services, in the EC IT systems (SBBs), your solution should use. As they are SBBs, your solution model should satisfy the interoperability requirements of these SBBs.

Technical view - application



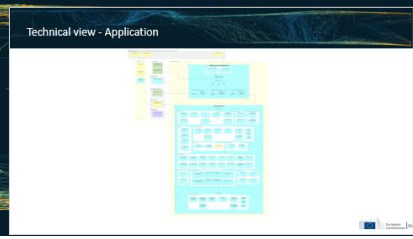
Technical view - application

- **Technical Governance content**: contains the technical elements (ABBs) required to manage your solution in reference to technical interoperability agreements.
- **Technical Application Functional content**: contains the application elements (ABBs and SBBs) required to develop your solution. It is composed of the following artefacts:
  - **VAT4SME Interoperable Digital Solution**: this element groups developments made by your solution to create the final Digital Public Service for the *VAT for SME* initiative. This element comprises the interfaces that your solution should implement to be interoperable, as well as the services that will realise the VAT4SME capabilities.
  - **VAT4SME Shared Platform**: puts together the services that should be used (not created) in your solution. It is built by two sets of services:
    - **National Shared Platform**: identifies the services, in your IT systems (ABBs), your solution will use. Your solution model should identify the SBBs that realize these ABBs in your IT services inventory, and that will satisfy the interoperability requirements.
      - ATTENTION!! If your IT environment is organised in different way to what is shown in the model, your solution should be adapted to model the services following the organisation of your IT systems.
    - **European Digital Public Services Catalogue**: identifies the services, in the EC IT systems (SBBs) that your solution should use. Since they are SBBs, your solution model should fulfil the interoperability requirements of those SBBs.

Technical view - application

- **Outsourcing Strategy Solution**: defines the type of facilities (On-Premise, Cloud, Hybrid, etc.) where solutions could be deployed/operated from. The model supports more than one type of facility. Solutions can be developed using one or more types of facilities.
- **Technology Infrastructure Functional Content**: defines the type of infrastructure paradigm that solutions should fulfil : container-managed. This element is an ABB, and, consequently, you can choose the most appropriate product for your IT facilities: ECS, AKS, Kubernetes, Docker Swarm, OpenShift, etc.

Technical view - application



- **The completion of the definition of the Technical view - application in the solution model should be consistent/not conflict with the following aspects:**
  - Architecture Principles view.
  - Legal view.
  - Organisational view.
  - Semantic view.
  - Outsourcing Strategy Solution.
  - Technology Infrastructure Functional Content.
- **The completion of the definition of the Technical view - application in the solution model should focus on the following:**
  - The SBBs addressing the ABBs in the Technical Governance content.
    - The VAT4SME GraphQL Schema definition should be modelled/developed in your solution. It defines what your services offer and require for interoperate.
  - The SBBs addressing the ABBs in the VAT4SME Interoperable Digital Solution. They are the application components (software) of your solution.
  - The SBBs addressing the ABBs the National Shared Platform. Your solution model should identify the SBBs that realize these ABBs in your IT services inventory and satisfy the interoperability requirements.
    - ATTENTION!!! Maybe, your IT environment is not organized in the same way that we show in the model. Your solution should model the services following the organization of your IT systems.
  - The SBBs in the European Shared Platform. Your solution model should satisfy the interoperability requirements of these SBBs.

Technical view - infrastructure

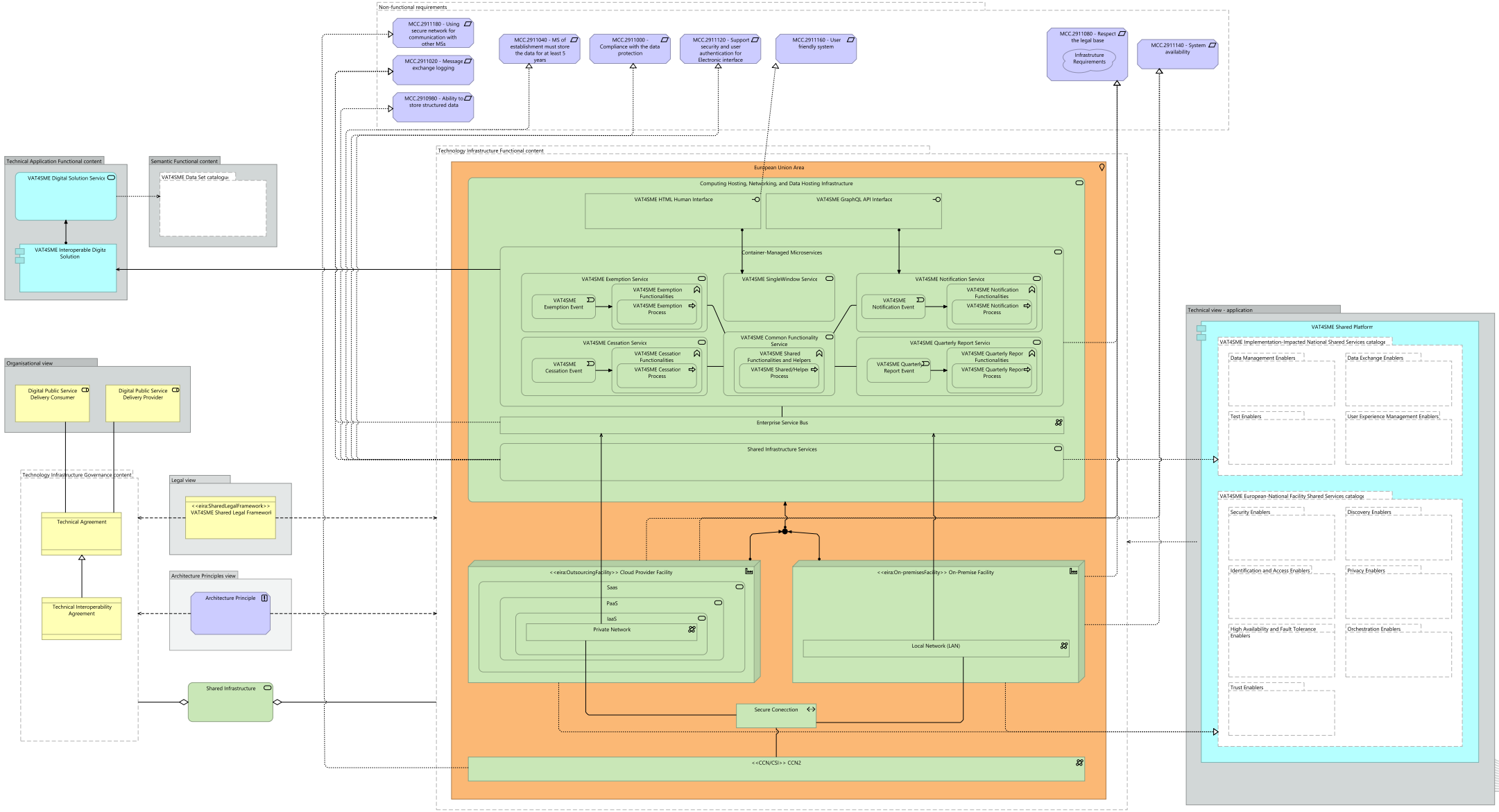
Some general key considerations regarding the Technical infrastructure view:

- The technical view – infrastructure sets the basis that you should accomplish to ensure **infrastructure interoperability**.
- The general rule: you should implement/develop the artefacts without stereotypes (ABBs).
- From this view, you will identify the top-level artefacts of your solution infrastructure:
  - The **Technical Interoperability Agreements** your solution will develop (ArchiMate Contract).
  - The **Non-functional requirements** your solution should attain (ArchiMate Requirement).
  - The **VAT4SME Shared Platform** your solution should host/accomplish (ArchiMate Application Component).
  - The **Technology Infrastructure Functional content** your solution will develop to create the solution infrastructure for the *VAT for SME* initiative.
    - The **European Union Area** (ArchiMate Location) where your facility should be located.
    - The **Container-Managed Microservices** (ArchiMate Technology Service) defines the microservices approach of your solution and the deployment requirement of a container-management technical service in your infrastructure.
    - The **Enterprise Service Bus** (ArchiMate Communication Network) that your solution will use to implement a loosely-coupled Event Driven Architecture (EDA). It will manage the technical events (messages) described in the model and which your solution requires. As it is defined in the model, this component won't be used outside of your facility.
    - The **Shared Infrastructure Services** (ArchiMate Technology Service) put together the common technical services your facility should provide to your solution: databases (Data Management Enablers), testing (Test Enablers), etc. These services are described in **VAT4SME Implementation-Impacted National Shared Services catalogue.**

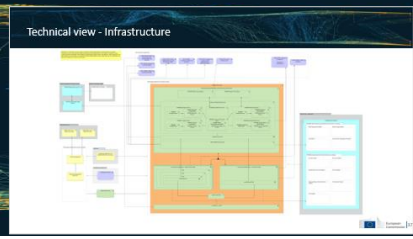
Technical view - infrastructure

- Once the facility that fits best your IT solution has been determined (**Cloud Provider Facility** and **On-Premise Facility** (ArchiMate Facility), the characteristics that the facility should attain are consolidated in the **VAT4SME European-National Facility Shared Services** catalogue.
- Your solution should use the **CCN2** wide area network to interact/interoperate with users (citizens, companies, MS and the EC).

Technical view - infrastructure



Technical view - infrastructure

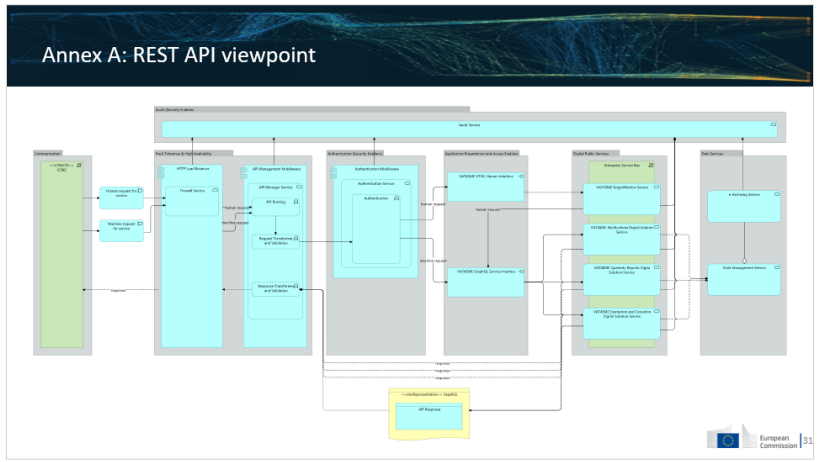


- **The completion of the definition of the Technical view - infrastructure in the solution model should be consistent/not conflict with the following aspects:**
  - Architecture Principles view.
  - Legal view.
  - Organisational view.
  - Semantic view.
  - Technical view - application.
  - CCN2 requirements to be used by your solution.
- **The completion of the definition of the Technical view - infrastructure in the solution model should focus on the following:**
  - The SBBs addressing the ABBs in the Technical Infrastructure Governance content.
  - The SBBs addressing the ABBs in the *Computing Hosting, Networking, and Data Hosting Infrastructure*. They are the components (software) of your solution.
  - The facility (ABBs) in the *European Union Area*. Your solution model should model/define the SBBs that build your IT facility.
  - The SBBs in the European Shared Platform. Your solution model should satisfy the interoperability requirements of these SBBs.

Final notes

Interoperability is the one of the main goals that can be achieved following the guidelines described in this document. Additionally, there are some viewpoints, included in the model, that need to be taken into consideration:

- Use the advantages the *Key Interoperability Enablers viewpoint* provides to ensure interoperability . Usually, the viewpoint is used as an interoperability components “checklist”.
- An example of service interoperability through APIs is depicted in the REST API viewpoint, as shown in the example below.



The benefits of modelling

Using the modelling methodology during a solution definition model grants several benefits:

- It follows a well-known methodology: **Model Driven Architecture**.
- It is **Digital Service** oriented.
- It can be used to build an IT knowledge repository.
- It covers the needs of different roles involved in solution implementation: **project manager** (WBS, risks assessment, budget planning), **software engineer** (components, functionalities, messages), **data engineer** (logical data model), etc.
    - It offers a bridge for knowledge sharing between the different actors
- Aligns and leverages the perspectives of different roles': legal, business, technical, and infrastructure.
- It grants **modelling consistency** to ensure the viability of the solution.
- It reduces documentation in terms of volume and effort.
- Automatic documentation/information generation processes can be followed: scripts and plugins.
- It allows for impact assessments to be conducted regarding changes to the model.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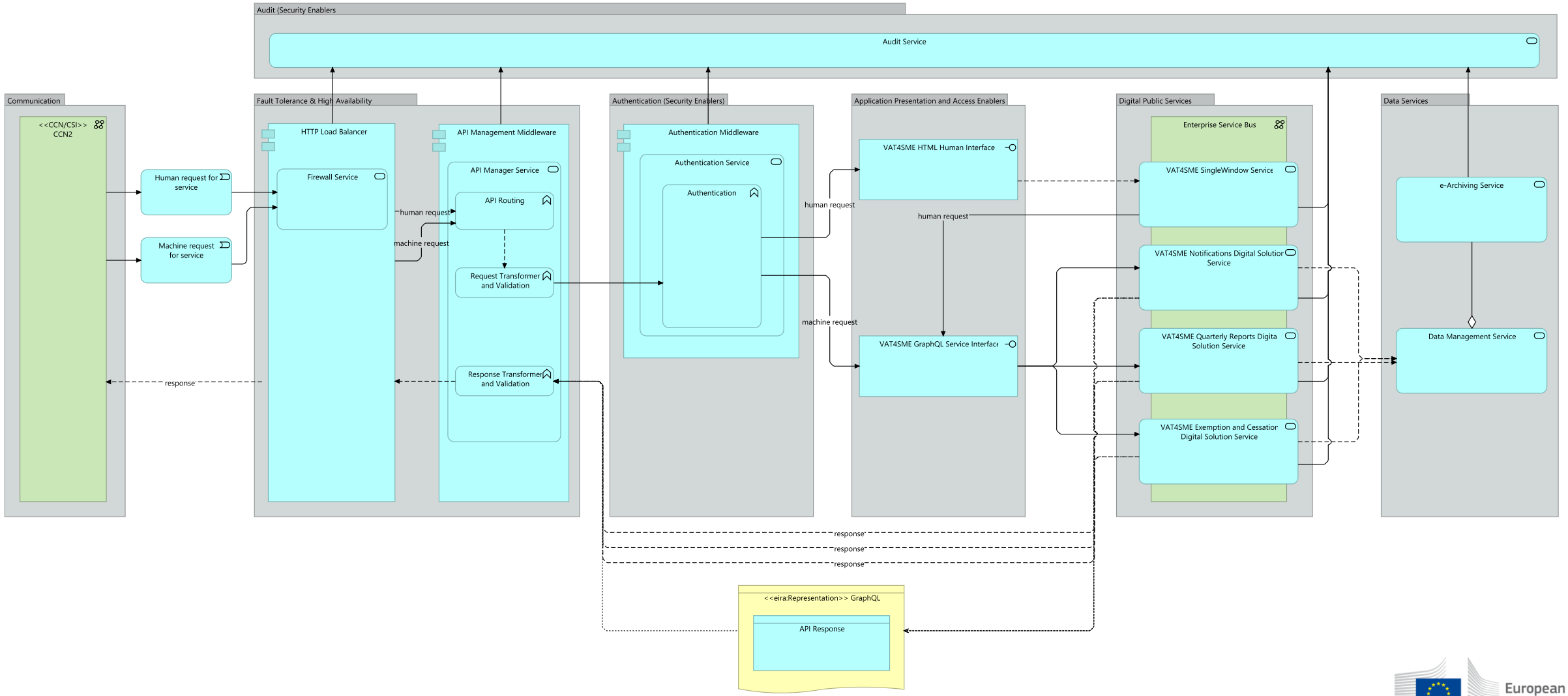
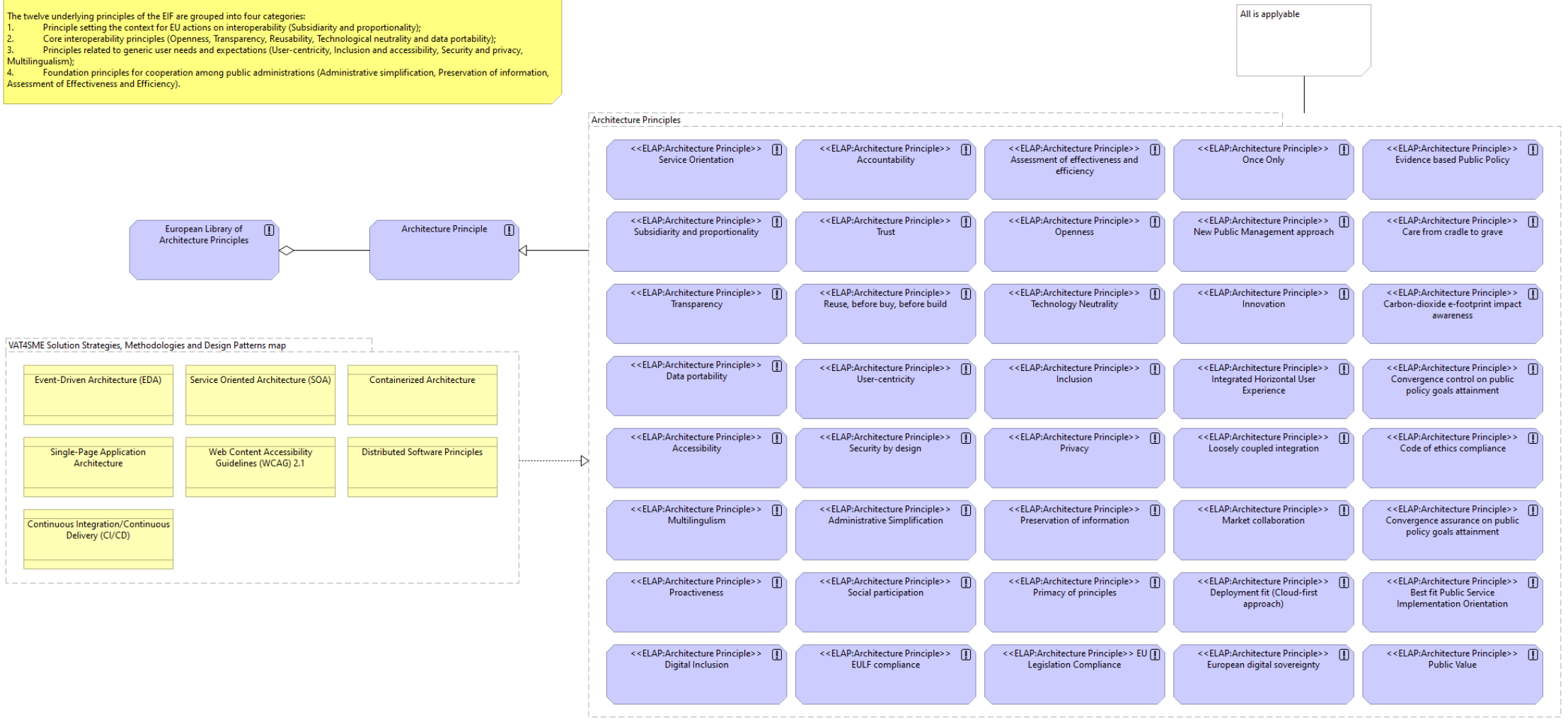
Annex A: REST API viewpoint



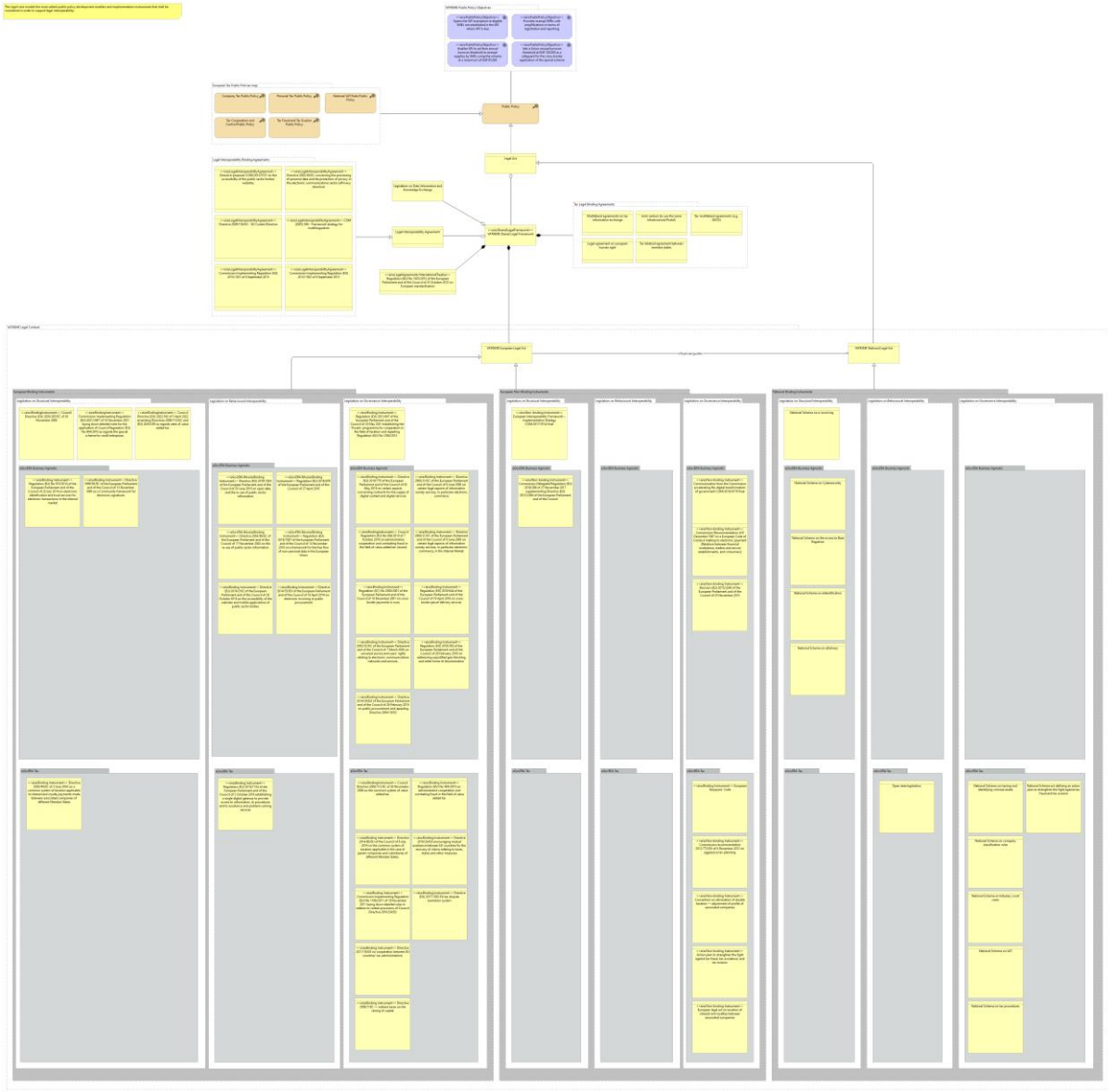
Architecture Principles View

The European Interoperability Framework underlying principles view models the motivation of the EIRA© in terms of goals to be achieved and the principles to be followed in order to achieve interoperability in public services.
The interoperability principles are fundamental behavioural aspects to drive interoperable public services. They describe the context in which European public services are designed and implemented.

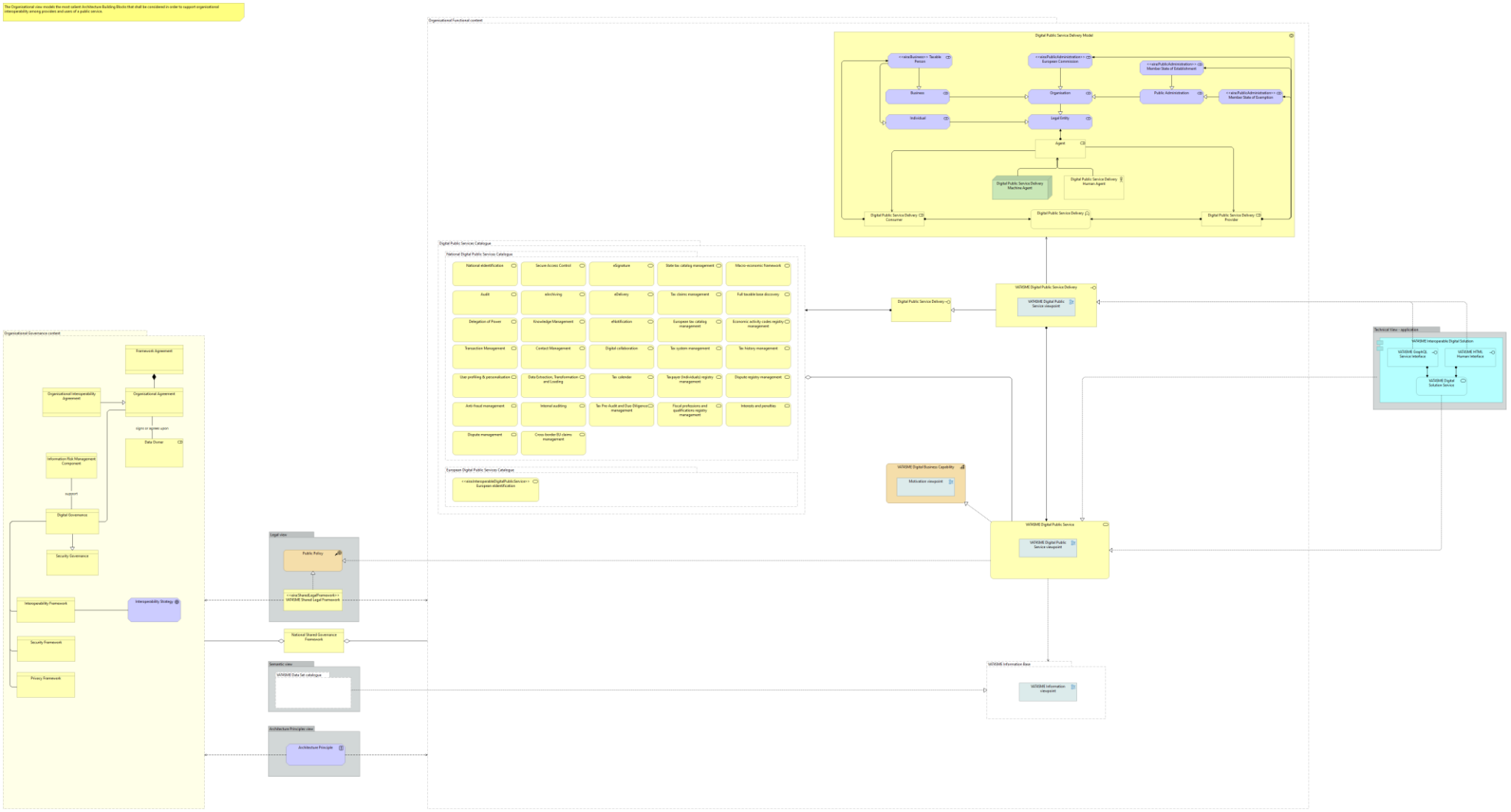
The twelve underlying principles of the EIF are grouped into four categories:
1. Principle setting the context for EU actions on interoperability (Subsidiarity and proportionality);
2. Core interoperability principles (Openness, Transparency, Reusability, Technological neutrality and data portability);
3. Principles related to generic user needs and expectations (User-centricity, Inclusion and accessibility, Security and privacy, Multilingualism);
4. Foundation principles for cooperation among public administrations (Administrative simplification, Preservation of information, Assessment of Effectiveness and Efficiency).



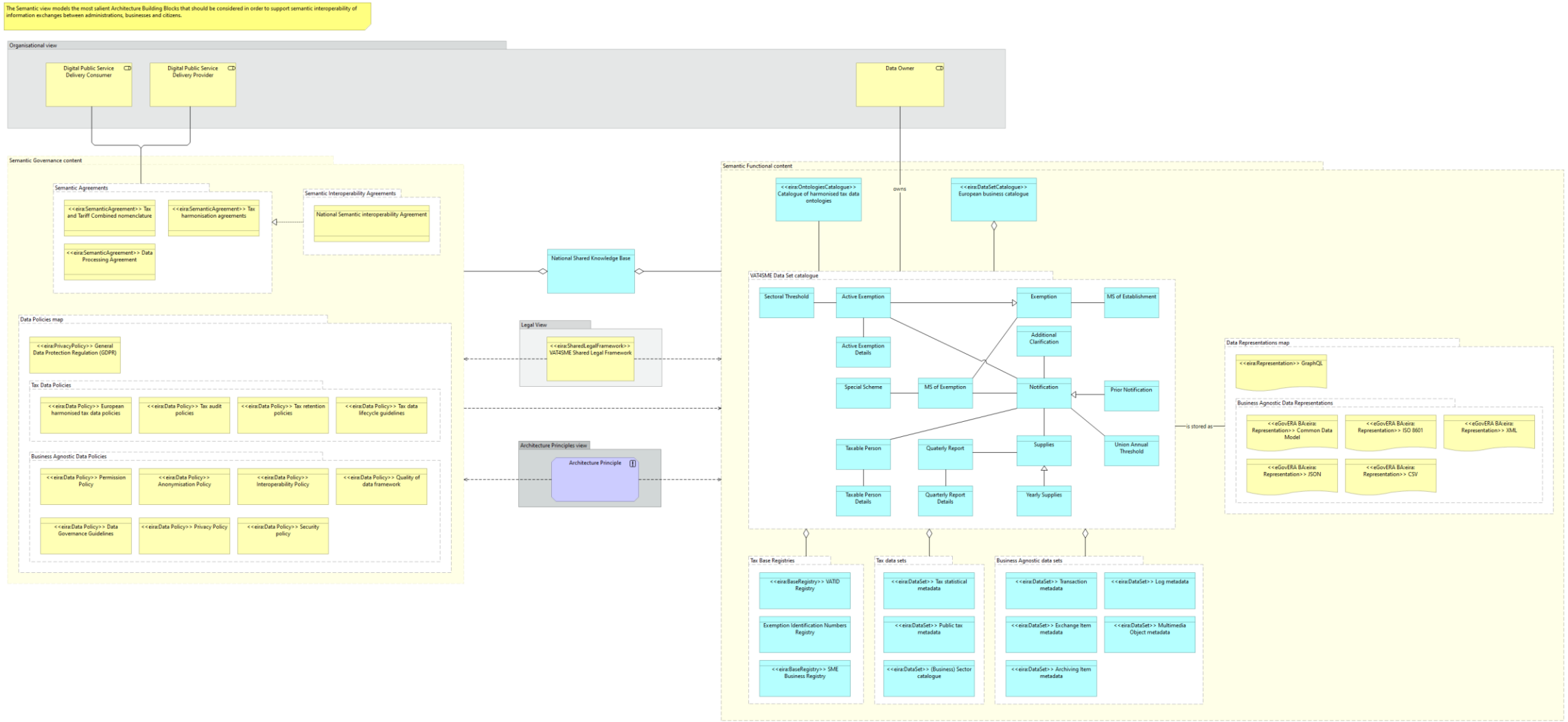
Legal View



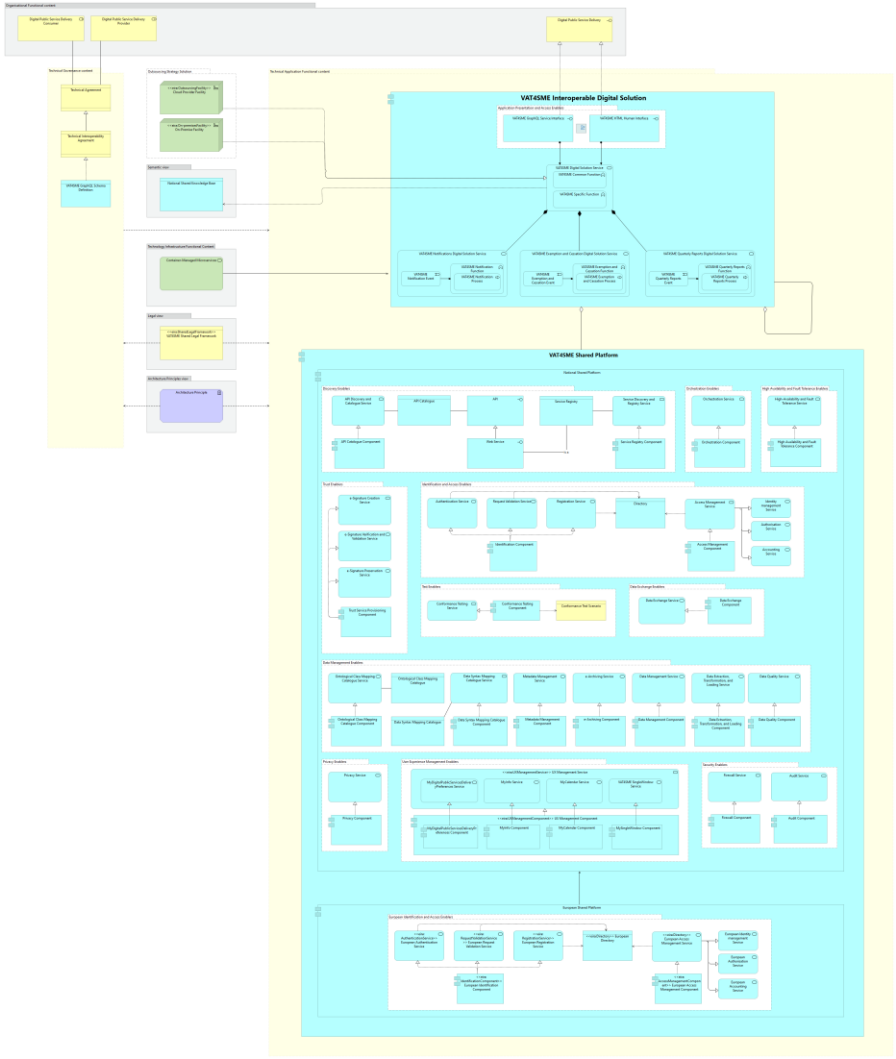
Organizational view



Semantic view



Technical view - Application



Technical view - Infrastructure