Selected architectural European interoperable solution templates in IOP Cartography tool

European Interoperability Architecture (EIA) action of ISA

EIA-Do2.05-v2.00_Selected architectural European interoperable solution templates in IOP Cartography tool

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Introduction
Introduction

Definition

An architectural solution template is a sub-set of the building blocks of the EIRA, which focuses on the most salient building blocks needed to build an interoperable solution addressing a particular interoperability need.

Benefits

• An architectural solution template provides solution architects with a common and unambiguous approach to cope with a specific interoperability challenge.

• A solution architect can easily create a solution architecture by mapping existing solution building blocks (developed in his/her organisation or discovered through the TES Cartography) to an architectural solution template.

• When a user creates an architectural solution template, he/she can recommend specific solution building blocks (e.g. a particular application or data model) for its implementation. This allows a faster implementation of the architectural solution template when it is shared with other parties.

• An architectural solution template can be created within and across the different views of the EIRA. A solution template can then support architects specialised in different architecture domains (organisational/business architecture, application architecture, data/semantic architecture, technology architecture)
Example of architectural solution template application

A new policy is developed at EU level, which requires public administrations to implement a new interoperable IT system in the near future. The implementation of the policy can imply significant changes in the IT landscape of the impacted public administrations.

An architectural solution template, focused on the building blocks needed to implement that specific policy, can provide the involved parties with a common approach to be compliant with the new legal requirement, thus reducing the architecture design effort and maximising the share and re-use of solutions among the involved public administrations.
Approach to create and use an architectural solution template
Creation of an architectural solution template

This flow specifies the step-by-step design process of a new architectural solution template.

**Step 1: Identify needed EIRA BBs**

The user consults the views of the EIRA to define the scope of the architecture to be designed, by identifying the architectural building blocks that are needed to address the interoperability need.

**Step 2: Create blueprint of solution template**

Based on the identified architectural building blocks, the user can design an architectural solution template (e.g. in archimate format). The solution template includes the needed sub-set of architectural building blocks of the EIRA.

**Step 3 (optional): Add Interoperability requirements and solution BBs**

If needed, per each building block, the user adds a set of additional interoperability requirements that are needed to address the specific interoperability need (e.g. specific protocols to be used by an application). Solution building blocks might be recommended for the implementation of the architecture building blocks of the solution template.

**Step 4: Share solution template**

The architectural solution template is shared with the involved stakeholders (e.g. by sharing or uploading the archimate diagram of the solution template).
Usage of an architectural solution template

This flow specifies the step-by-step process for using an existing architectural solution template.

**Step 1: Consultation of the solution template**

The user consults the architectural solution template, via the Cartography tool, related to the particular interoperability need he/she wants to address.

**Step 2: Mapping with existing solutions**

The user maps the solution building blocks of its current IT landscape to the template. For each building block (BB) in the solution template:

- If an existing solution of the user’s IT landscape is compliant with the interoperability requirements of the BB, the user maps the solution with the BB.
- If no existing solutions are compliant with the interoperability requirements of the BB, the user searches in the Cartography for a re-usable solution. If a solution is found, the user maps the discovered solution to the BB.
- If no compliant solutions are found on the Cartography, the user initiates a project to develop a new solution BB compliant with the interoperability requirements. The user maps the solution to be developed to the BB.

**Step 3: Design solution**

The user includes the solution building blocks identified in the previous step (i.e. step 2) in the system’s solution architecture, in order to address initial interoperability need.
Architectural Solution templates

• Administrative Cooperation through Information Exchange
• Interoperable European billing system
• Interoperable European User Authentication system
The three architectural solution templates described in this section have been developed during the current phase of the EIA action. The three architectural solution templates must be considered as a first version, and will be improved in the future.
Architectural Solution template 1: Administrative Cooperation through Information Exchange
Administrative Cooperation through Information Exchange

Goal

This architectural solution template addresses the need of administrative cooperation between two or more European public administrations. The architectural solution template focuses on supporting interoperable information exchange, by highlighting the most relevant building blocks of the EIRA needed to fulfil this need.

Comments

The information exchange mechanism is focused:

• At organisational level, on providers and users of information, on the agreements between parties, and on the supporting business processes;
• At semantic level, on the structure of the data which need to be exchanged;
• At technical level, on the applications needed to transform, translate and exchange data, on the interfaces needed to exchange data, and on the supporting infrastructure and security services.
Organisational View

Organisational Enablers:
- Organisational Policy
- Organisational Procedure
- Organisational Structure

Interoperability Collaboration Agreement

Organisations
- Business
- Public Administration

User
- Citizen

Service Provider

Interoperability Service Agreement

Service Delivery Model

Public Service
- Aggregated Public Service
- Basic Public Service

Business Process

Business Information Exchange
- Business Transaction

Aggregated Public Service

Basic Public Service

Business Information Entity

Organisations
- European
- National
- Sub-National

Public Policy

Service Catalogue

Business Process Model

Business Rule

Public Policy

is a source of

is a source of

consumes

signs

documents

documents

applies to

applies to

accepts

proposes

signs

signs

signs

signs

DO NOT DISTRIBUTE FURTHER
Administrative cooperation, cross-sector and cross-border, is realised by [Organisations] on [EU / national / sub-national level] in the role of Service Providers by supplying information exchange interoperable [Public Services] to [Public Administrations] and/or [Businesses] and/or [Citizens] in the role of users according to a [Service Delivery Model]. Organisations collaborating on the development of the information exchange public service, can sign an [Interoperability Collaboration Agreement]. With the aim of delivering the information exchange public service, the service provider proposes and the user accepts an [interoperability service agreement]. [Service providers] can sign an [Interoperability supplier agreement] to agree on how to deliver the public service to their users.

The delivery of these services is realised through [Business Processes] that contain [Business Information exchange], which enclose [Business Transactions] of defined [Business Information Entities] (i.e. the subject of the information exchange). Business processes and business information entities are subject to [Business Rules].
Semantic View

- Public Policy
- Data Policy
- Security & Privacy Policy
- Licensing & Charging Policy
- Data
- Business Information Entity
- Representation
- Business Rule
- Business Process Model
- Service Catalogue
- Data Entity
- Data Model
- Reference Data
- Identifier Schema
- Controlled Vocabulary
- Code list

Influences: Metadata Management Policy
Applies to: Metadata

Documents: DataSet
DataSet Catalogue
[Data] to be exchanged, which is grouped in [data sets], is represented using a specific [representation] format. [Business rules], applying to data, are also subject to a representation. [Metadata], composed of [Data models] and [Reference data], provide the structure for the exchanged data [representation]. The reference data include [Identifier Schemas] (e.g. structure of the ID of the parties involved in information exchange), [Controlled Vocabularies], and/or [Code lists] (e.g. code lists of EU countries).
An information exchange [Interoperable European System (IES)] implements the information exchange [Public Services]. The IES can be accessed through [Presentation and Access enablers]. The IES is documented through [documentation enablers] and is tested through the use of [test enablers]. Information can be exchanged cross-sector and cross-borders with the support of [mediation enablers]. The system can execute the information exchange business processes through [workflow enablers]. Access control is managed through the services offered by [access management components].
Technical View - Infrastructure

- Interoperable European System
- Public Policy

Digital Services Infrastructure:
- Infrastructure Security Enablers:
  - e-Signing Service
  - e-Signature Validation Service
  - Identity Management Service
  - Trust Management Service
  - e-Payment Service
  - Machine Translation service
- e-Signature Component
- Identity Component
- Identity Management Component
- Trust Management Component
- e-Payment Component
- Machine Translation Component

Hosting and Networking Services Infrastructure:
- Network
- Hosting Facility
  - Secure Access
  - Storage
  - Processing
- Private Hosting Facility
- Public Hosting Facility
- Public Network
- Private Network

- Networking Service
- Hosting Service
An information exchange [Interoperable European System (IES)] can make use of [infrastructure security enablers] to manage the security of the exchanged information (e.g. e-Signature on documents or authentication of the systems/users accessing information) and of [machine translation services] to translate information in an automated way when it is exchanged cross-border.
Architectural Solution template 2: Interoperable European billing system
Interoperable European billing system

Goal

This architectural solution template addresses the interoperability challenges that need to be overcome when implement a billing process (e.g. e-Invoicing) at European level. This architectural solution template highlights the most salient building blocks needed to align the existing solutions or to develop new solutions that enable the implementation of an interoperable cross-border billing process.

Comments

This solution template takes into account:

- At legal level, the relevant EU and national policies/legislation impacting the trans-European billing process
- At organisational level, the billing business processes that are driving the solutions, the parties involved in the billing system and the relevant interoperability agreements
- At semantic level, the structure of the data which needs to be sent (e.g. electronic invoices and electronic receipts
- At technical level, the applications that are needed to exchange and validate information
Public Policy Development Enablers

- Approach
- Mandate

Public Policy Implementation Instruments

- Legal Requirements
  - Binding Instrument
  - Non-binding Instrument

- Legal Constraints
  - Binding Instrument
  - Non-binding Instrument

- Operational Enablers
  - Financial Resource
  - Implementing Guideline

Public Policy Cycle

- Definition of Public Policy Objectives
- Formulation of Public Policy Scenarios
- Impact Assessment
- Public Policy Implementation
- Public Policy Evaluation

Public Policy

- EU level
- National level
- Sub-National level
A [public policy] in the field of e-Procurement or Internal Market, at [EU level, National level or Sub-national level] can have an impact on or mandate the implementation of an Interoperable European billing system. The policy is implemented through policy instruments, which can be [binding / non-binding] [legal requirements or constraints], or operational enablers, in the form of [financial resources] and [implementing guidelines].
[Organisations] on [EU / national / sub-national level] in the role of Service Providers supply interoperable billing [Public Services] to [Public Administrations] and/or [Businesses] and/or [Citizens] in the role of users according to a [Service Delivery Model]. Organisations which are collaborating on the development of the billing system, can sign an [Interoperability Collaboration Agreement]. With the aim of delivering the billing public service, the service provider proposes and the user accepts an [interoperability service agreement]. [Service providers] can sign an [Interoperability supplier agreement] to agree on how to deliver the billing service to their users.

The delivery of these services is realised through billing [Business Processes] that follow a [Business Process Model]. Business processes contain [Business Information exchange], which enclose [Business Transactions] of defined [Business Information Entities] (e.g. invoices). Business processes and business information entities are subject to [Business Rules] originating from the [public policy].
Billing [Data], which is grouped in [data sets], is represented using a specific [representation] format. [Business rules] and billing [business process models] are also subject to a representation. [Metadata], composed of [Data models] and [Reference data], provide the structure for a [representation]. The reference data include [Identifier Schemas] (e.g. structure of the ID of a supplier), [Controlled Vocabularies], and/or [Code lists] (e.g. code lists of EU countries).
A billing [Interoperable European System (IES)] implements the billing [Public Services] and supports or implements one or multiple [Public Policies]. The IES can be accessed by [Users], which can be [humans] or [systems], through [Presentation and Access enablers]. The IES is documented through [documentation enablers] and is tested through the use of [test enablers]. Billing information can be exchanged cross-border with the support of [mediation enablers]. The system can execute the billing business processes through [workflow enablers].

Access control and data security are managed through the services offered by [application security enablers], involving [access management components] and [audit and logging components].
Technical View - Infrastructure

- Interoperable European System
- Public Policy

Digital Services Infrastructure:
- e-Signing Service
- e-Signature Validation Service
- Identity Management Service
- Trust Management Service
- e-Payment Service
- Machine Translation Service

Infrastructure Security Enablers:
- e-Signature Component
- Identity Management Component
- Trust Management Component
- e-Payment Component
- Machine Translation Component

Hosting and Networking Services Infrastructure:
- Networking Service
- Hosting Service

Network:
- Secure Access
- Storage
- Processing

Facilities:
- Private Hosting Facility
- Public Hosting Facility

Public Network
- Private Network
A billing [Interoperable European System (IES)] can make use of [infrastructure security enablers] to manage the security of the exchange billing information (e.g. e-Signature on billing documents).
Architectural Solution template 3: Interoperable European User Authentication system
Interoperable European User Authentication system

Goal

This architectural solution template addresses the interoperability aspects that need to be taken into account when developing an interoperable European User Authentication system. The architectural solution template focuses on the building blocks of the EIRA dealing with security at all interoperability levels.

Comments

This solution template takes into account:

• At legal level, the relevant EU policies that need to be taken in the field of information and systems security;
• At organisational level, the user and providers of the authentication services, and the underlying security processes;
• At semantic level, the format of the information relevant for user authentication (e.g. user credentials);
• At technical level, the applications that are supporting the implementation of the authentication mechanisms, and the network through which authentication data is transported.
A [public policy] in the field of information security, at [EU level, National level or Sub-national level] can have an impact on or mandate the implementation of an Interoperable European User Authentication System. The policy is implemented through policy instruments, which can be [binding / non-binding] [legal requirements or constraints], or operational enablers, in the form of [financial resources] and [implementing guidelines].
Narrative of the Organisational view

[Organisations] on [EU / national / sub-national level] in the role of Service Providers supply interoperable user authentication [Public Services] to [Public Administrations] and/or [Businesses] and/or [Citizens] in the role of users according to a [Service Delivery Model].

The delivery of these services is realised through [Business Processes] (e.g. provisioning, authentication). Business processes contain [Business Information exchange], which enclose [Business Transactions] of defined [Business Information Entities] (e.g. user credentials).
Semantic View

Public Policy influences Data Policy

Security & Privacy Policy

Licensing & Charging Policy

Business Information Entity

Data

Representation

Data Entity

Data Model

Reference Data

Controlled Vocabulary

Identifier Schema

Code list

documents

Metadata

Metadata Management Policy applies to

Business Rule

Service Catalogue

Business Process Model

Service Catalogue

DataSet Catalogue

DataSet
Authentication [Data] is represented using a specific [representation] format. [Data entities] provide the structure for the [representation]. Security data are treated and managed according to specific [Data policies], including [Security and Privacy policies] and [Licensing and Charging Policies].
A user authentication [Interoperable European System (IES)] implements the authentication [Public Service] and supports or implements one or multiple [Public Policies]. The IES can be accessed by [Users], which can be [humans] or [systems], through [Presentation and Access enablers].
A user authentication [Interoperable European System (IES)] uses infrastructure security services like the [identity management service]. It has to ensure secure exchange of information through [public networks] or [private networks].
Implementation in the Cartography tool
The architectural solution templates are integrated as active elements in the graphical user interface of the Cartography tool. The building blocks of the architectural solution template can be used (i.e. clickable) to retrieve additional information on the corresponding solutions and related attributes (e.g. the reusability of the solution). Below an example of the implementation of an architectural solution template in the Cartography tool.
Annex

• Annex 1 - Architectural Solution template 1 example: IMI
• Annex 2 - Architectural Solution template 2 example: e-Prior
• Annex 3 - Architectural Solution template 3 example: ECAS
Annex 1

Architectural Solution template 1:
Administrative Cooperation through Information Exchange

Example: IMI
Why this case?

- The Internal Market Information System (IMI) is one of the TES solutions that is involved in the EIA action, which supports Administrative Cooperation between Member States.
- IMI provides a secure online accessible application which supports the communication of national, regional and local administrations with their equivalent instances in other countries.
Semantic View

Public Policy influences Data Policy

Security & Privacy Policy
Licensing & Charging Policy

Business Information Entity

Notification
Questions and Answers

Data
Representation

Notifications data model
Questions and Answers data models

Professional qualifications, posted workers, services data model

IMI 1.0 Data Model

Metadata

Data Entity
Reference Data

Identifier Schema
Controlled Vocabulary
Code list

XML
XSD

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Technical View - Infrastructure

Digital Services Infrastructure:
- Infrastructure Security Enablers
  - ESSI services
  - IMI Application Components
  - IMI authentication services

Hosting and Networking Services Infrastructure:
- Hosting Facility
  - Secure Access
  - Storage
  - Processing
- Public Network
- Private Network
- Machine Translation Component
- Public Policy

Translation Management Service
Annex 2

Architectural Solution template 2: Interoperable European billing system

Example: e-Prior
Example case – e-Prior

Why this case?

- e-Prior is the e-Procurement system developed by DIGIT to receive electronic invoices by suppliers of the European Commission. It also support e-Ordering, e-Catalogues and e-Requests.
- e-Prior is compliant with the CEN/BII standard, and uses the UBL data model.
- e-Prior provides a supplier portal that is accessible from anywhere through the web. It allows the suppliers to process all electronic service requests (e-Request) and it enables the electronic exchange of invoicing documents (e-Invoicing).
- An open source version of e-PRIOR has been developed by DIGIT, to be downloaded and implemented by Member States’ public administrations.
Technical view – Application

Interoperable European System
- Processing Enablers
  - Presentation and Access Enablers
    - Supplier
      - Supplier’s portal
        - Human Interface
        - Machine to Machine Interface
      - e-Prior services
    - User
      - System
      - Data
  - Data Source Enablers
    - Forms Management Service
      - Forms Management Component
    - Records Management Service
      - Record Management Component
    - Document Management Service
      - Content Management Component
    - Content Management Component
    - Metadata Management Service
      - Metadata Management Component
      - e-Archiving component
    - Administration and Monitoring Service
      - Administration Component
      - Partner Management Component
  - Administration Enablers
    - Data Transformation Service
      - Data Transformation Component
    - Data Validation Service
      - Data Validation Component
    - Data Exchange Component
      - Data Exchange Component
    - Business Process Management Component
      - Business Process Management Component
    - Business Intelligence Component
      - Business Analytics Service
      - Business Reporting Service
    - Business Reporting Service
    - PEPPOL connector
    - Document Management Service
      - Document Management Component
    - Lifecycle Management Service
      - LifeCycle Management Component
    - Partner Management Service
      - Partner Management Component

Electronic invoicing services

Electronic invoicing services

Electronic invoicing services

Rules based on interchange agreements

Rules based on interchange agreements

Rules based on interchange agreements

Commission proposal for a council directive amending Directive 2006/112/EC on the common system of value added tax

Commission proposal for a council directive amending Directive 2006/112/EC on the common system of value added tax

Commission proposal for a council directive amending Directive 2006/112/EC on the common system of value added tax

Interoperable European System
- Processing Enablers
  - Presentation and Access Enablers
    - Supplier
      - Supplier’s portal
        - Human Interface
        - Machine to Machine Interface
      - e-Prior services
    - User
      - System
      - Data
  - Data Source Enablers
    - Forms Management Service
      - Forms Management Component
    - Records Management Service
      - Record Management Component
    - Document Management Service
      - Content Management Component
    - Content Management Component
    - Metadata Management Service
      - Metadata Management Component
      - e-Archiving component
    - Administration and Monitoring Service
      - Administration Component
      - Partner Management Component
  - Administration Enablers
    - Data Transformation Service
      - Data Transformation Component
    - Data Validation Service
      - Data Validation Component
    - Data Exchange Component
      - Data Exchange Component
    - Business Process Management Component
      - Business Process Management Component
    - Business Intelligence Component
      - Business Analytics Service
      - Business Reporting Service
    - Business Reporting Service
    - PEPPOL connector
    - Document Management Service
      - Document Management Component
    - Lifecycle Management Service
      - LifeCycle Management Component
    - Partner Management Service
      - Partner Management Component

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Commission proposal for a council directive amending Directive 2006/112/EC on the common system of value added tax

Interoperable European System
- Processing Enablers
  - Presentation and Access Enablers
    - Supplier
      - Supplier’s portal
        - Human Interface
        - Machine to Machine Interface
      - e-Prior services
    - User
      - System
      - Data
  - Data Source Enablers
    - Forms Management Service
      - Forms Management Component
    - Records Management Service
      - Record Management Component
    - Document Management Service
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Technical View – Infrastructure

Digital Services Infrastructure:
- Interoperable European System
- Public Policy

Infrastructure Security Enablers:
- e-Signing Service
- e-Signature Validation Service
- Identity Management Component
- Trust Management Component
- e-Payment Service
- Machine Translation Component

Hosting and Networking Services Infrastructure:
- Networking Service
- Hosting Service
- Secure Access
- Storage
- Processing
- Private Hosting Facility
- Public Hosting Facility

e-PRIOR built-in authentication mechanisms

Public Policy
Machine Translation service
Identity Management Component
Trust Management Component
-e-Payment Service
Machine Translation Component
Public Network
Private Network
Network
Hosting Facility
-e-Signing Service
-e-Signature Validation Service
Identity Management Component
Trust Management Component
-e-Payment Service
Machine Translation Component
Public Policy

Annex 3

Architectural Solution template 3: Interoperable European User Authentication system

Example: ECAS
Why this case?

- The European Commission Authentication Service (ECAS) is the security gate to enter into the informatic environnement of the Commission. It is the system for logging on to a whole range of web sites and online services run by the Commission. ECAS can be used by the EC staff and by external users that need to access EC applications.
- ECAS is one of the TES system that has been analysed by the TES action of ISA.
- In the future, ECAS will be integrated with STORK (European Commission Authentication Service integrated with Secure idenTity acrOss boRders linKed) to complement the user’s identity with authorisation information assigned by Member States, such as a user position in a public administration on behalf of which the user is entitled to act.
Legal View

Public Policy Cycle
- Definition of Public Policy Objectives
- Formulation of Public Policy Scenarios
- Impact Assessment
- Public Policy Implementation
- Public Policy Evaluation

Public Policy Development Enablers
- Approach
- Mandate

Public Policy Implementation Instruments
- Legal Requirements
  - C(2006) 3602
  - SEC(2001) 924
- Legal Constraints
  - Binding Instrument
  - Non-binding Instrument
- Operational Enablers
  - Financial Resource
  - Implementing Guideline

All public policies
- Public Policy
  - EU level
    - EU level
    - National level
    - Sub-National level
Organisational View

- Organisational Enablers
  - Organisational Policy
  - Organisational Procedure
  - Organisational Structure

- European Commission DGs
- Other European institutions
- Business Process
- User
- Public Service
- Service Provider
- Interoperability
- Service Agreement

- Citizens
- User
- Interoperability Service Agreement
- User account
- Centralised portal
- Authentication
- Authentication of users, Self-registration
- Provision of an Identity management platform
- Aggregated Public Service
- Basic Public Service

- All public policies
- Public Policy
- Business Process Model
- Service Catalogue
- Business Rule

- DIGIT
- European
- National
- Sub-National

- European Commission DGs
- Interoperability Provider Agreement

- European
- National
- Sub-National

-DIGIT
- Interoperability Provider Agreement

-User
- Electronic Signature

- User account
- Business Information Entity
- Business Transaction
- Business Information Exchange
- Service Delivery Model

- Authentication
- User account
- Business Information Entity
- Business Transaction
- Business Information Exchange
- Service Delivery Model
Semantic view

All public policies
- Public Policy
- Data Policy
- Metadata Management Policy

 Regulation (EC) 45/2001
- Security & Privacy Policy
- Licensing & Charging Policy

User account
- Business Information Entity

Data on user credentials
- Representation
- Data Entity
- Data Model
- Reference Data
- Identifier Schema
- Controlled Vocabulary
- Code list

User credentials model
- Business Rule
- Service Catalogue
- Business Process Model

Data set
- Dataset
- Dataset Catalogue

documents

Public Policy influences
ECAS - Open source policy
Technical View - Infrastructure

Technical View - Infrastructure

ECAS
European System

All public policies
Public Policy

Digital Services Infrastructure

Infrastructure Security Enablers

Identity
Trust Management
Compartment

ECAS - Identity management service
Component

e-Signing Service

Machine Translation Service

Public Network
Hosting Facility
Secure Access
Storage
Processing

Private Network
Private Hosting Facility

Internet

sTESTA

Networking Service

Hosting Service

Public Hosting Facility

Public Policy

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ISA FAQ
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