D5.6 Final release of DE4A common components

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List of Acronyms

Abbreviation / acronym	Description
API	Application Programming Interface
AS4	Applicability Statement 4
ATU	Administrative Territorial Unit
CEF	Connecting Europe Facility
DC	Data Consumer
DE	Data Evaluator
DE4A	Digital Europe for All
DNS	Domain Name System
DO	Data Owner
DP	Data Provider
DR	Data Requestor
DT	Data Transferor
Dx.y	Deliverable number y, belonging to WP number x
EC	European Commission
ESL	Exchange Service Locator
IAL	Issuing Authority Locator
IEM	Information Exchange Model
IDK	Information Desk
IM	Intermediation (pattern)
ITx	Iteration (1 or 2)
MOR	Multilingual Ontology Repository
REST	Representational State Transfer
SML	Service Metadata Locator
SMP	Service Metadata Publisher
TOOP	The Once-Only Principle project
USI	User-Supported Intermediation (pattern)
WP	Work Package
XML	Extensible Markup Language

Executive Summary

This deliverable describes the common components developed by WP5 in the project: the common libraries, the DE4A Connector, the DE4A Directory, the Central Issuing Authority Locator and the DE4A Playground.

The de4a-commons library contains reusable DE4A components that realise three main functionalities: a client to send messages to the DE4A Kafka Server, a set of marshallers for reading and writing DE4A Core XML Schemas in an easy way, and a Java API for all the XML schemas and their corresponding Java domain objects of the Canonical Evidence Types defined in the project.

The DE4A Connector is a technical proxy that allows the final participants (Data Evaluators – DE and Data Owners - DO) to send requests for evidence or responses to other final participants over an eDelivery communication environment. To do so, the DE4A Connector integrates a phase4 Access Point, which is an implementation of the eDelivery Access Point.

In addition, to handle the message exchange process, the DE4A Connector is responsible for obtaining the message routing information, by exchanging information with external components such as the Central IAL, the SML/DNS and the SMPs.

The DE4A Connector provides a common interface to DEs and DOs, making the complexity of the system transparent to the final participants and integration easier. The DE4A Connector can take the role of either a Data Requestor or a Data Transferor, and supports the message exchange based on the Intermediation, User-Supported Intermediation, Subscription and Notification and Lookup patterns. It is also conformant with the error handling specification defined in DE4A.

The security of the DE4A Connector mainly relies on the use of eDelivery certificates for the signing and encryption of exchange messages, assuring authenticity, integrity, and confidentiality.

The DE4A Directory is a centralised component that collects and stores the information of all participants from all SMPs in the network and provide different query interfaces and a management interface. Its main purpose is to provide the collected information to the Central IAL created at the top of the Directory. The Central IAL, in turn, implements the Issuing Authority Locator functionality defined by WP3. It also stores the files of the MOR content and provides an API to retrieve them.

The DE4A Playground is a set of predefined and pre-deployed components taken from the list of components mentioned above. It simulates a real scenario where users can request data (evidence) about a subject (citizen or company). Thus, it allows testing the performance of the DE4A Connector by using mocked components and fake data. Additionally, it allows DE4A pilot participants to deploy their own infrastructure in an orderly manner.

The DE4A Playground is composed of two DE4A Connectors, taking the role of a DR and a DT, a Shared SMP, a Central IAL and a Kafka Server. Two fake final participants have been created: the DemoUI (a DE) and the Mocked DO (a DO). Those two fake final participants allow users to send messages to each other based on the interaction patterns supported by the DE4A Connector, using the sample datasets created for this purpose.

The chapters of this report explain each of these components in more detail.

1 Introduction

1.1 Purpose of the document

The present document is written in the context of DE4A work package **"WP5 Common Component Design & Development"** and under the task **"T5.3 Construction of Common Products and Components & Change Management"**.

The scope of WP5 is the design and development of all new common software components required for the pilot implementations, according to the outputs of "WP2 Architecture vision and framework" and "WP3 Semantic Interoperability Solutions" on architecture and semantic components, respectively.

Task T5.3 builds high quality and optimized common services and components from scratch or by adapting building blocks included in the solution toolbox identified by WP2. The aim is to build components that enable and ease the evidence interchange, the integration with infrastructure components at MS level and the integration, function, and acceptance testing.

Therefore, this deliverable D5.6 describes the common components developed by WP5: the common libraries, the DE4A Connector, the DE4A Directory and the Central IAL. It also describes the DE4A Playground, a set of predefined and pre-deployed components designed to help pilot partners to onboard the DE4A network. These components are described mainly from the functional and non-functional point of view, avoiding repeating information about their interfaces, which was described in deliverable D5.4 [13].

This deliverable D5.6 is related to the following DE4A deliverables:

- D2.5 Project Start Architectures (PSA), second iteration
- D3.6 Semantic Toolkit, Final version
- D4.1 Studying abroad - Use cases definition & requirements
- D4.5 Doing Business Abroad - Use cases definition & requirements
- D4.9 Moving Abroad - Use cases definition & requirements
- D5.2 Final inventory of features for products/components
- D5.4 Final release of DE4A Common Components

1.2 Structure of the document

This document is divided into five main sections plus two annexes:

- Chapter 2 describes the de4a-commons library
- Chapter 3 provides details on the main common component: DE4A Connector
- Chapter 4 reports the DE4A Directory
- Chapter 5 contains the description of the Central IAL design
- Chapter 6 describes the DE4A Playground
- Annex I contains the Sample datasets of the Mocked DO
- Annex II describes the Shared SMP testing endpoints configuration

2 de4a-commons library

The de4a-commons project is located on GitHub at https://github.com/de4a-eu/de4a-commons and contains reusable DE4A components that are unrelated to the Connector itself. The library requires Java 1.8 as the minimum version and builds with Apache Maven 3. The released versions of the library are both available on GitHub releases as well as on Maven Central with the group ID “eu.de4a”.

The three submodules of de4a-commons are:

- de4a-kafka-client
- de4a-core-schemas
- de4a-canonical-evidences

All the submodules are described below in subchapters.

This library was redesigned between Iteration 1 and Iteration 2, so that the core schemas and the canonical evidence types are clearly separated from each other.

2.1 de4a-kafka-client submodule

This is a Java API to easily post a message to the DE4A Kafka Server, so that it appears on the shared tracker. This server is mainly a debugging support functionality based on the Apache Kafka technology. The server logs events to simplify the cross-border debugging of evidence exchanges in the absence of a standardised administration GUI.

By default, to access a Kafka Service a TCP connection is required, as this is the most efficient way of communicating. As direct TCP connections are usually prohibited from governmental applications, an additional module was installed on the Kafka server, that allows to send HTTP requests to it. That additional layer reduced the maximum throughput of client and server, but that was irrelevant for us.

The main part of this submodule is configuration code as well as the differentiation between TCP sending and HTTP sending.

2.2 de4a-core-schemas submodule

This submodule defines a Java API with the marshallers for reading and writing DE4A Core XML Schemas in an easy way. All the Core XML Schemas are converted into Java domain objects using the JAXB technology. With an additional abstraction layer the reading and writing of XML objects ensuring consistency to the XML Schema is achieved. The XML objects in this submodule can work with any canonical evidence types as long as they are XML based. This includes canonical evidence types that are currently non-existing.

The idea of separating the Core XML Schemas from the Canonical Evidence Types was, on the one hand, to guarantee a clear separation of concerns and, from a practical point of view, also to ensure a clean management of dependencies between these components.

2.3 de4a-canonical-evidences submodule

This submodule contains a Java API for all the XML schemas and their corresponding Java domain objects. The domain objects were again created using JAXB and can be used very similarly to the de4a-core-schemas submodule. All the existing canonical evidence types and events are grouped by project pilot area so that the assignment is clear. The underlying concept can also be applied for other types of canonical evidence that are unknown at the time of creation of the library.

3 DE4A Connector

3.1 Introduction

The DE4A Connector is a technical proxy that allows the final participants (DE and DO) to send requests for evidence or responses to other final participants over an eDelivery network (see chapter 6.6). In addition, to handle the message exchange process, the Connector is responsible for obtaining the message routing information, by exchanging information with external components such as the Central IAL, the SML/DNS and the SMP [13].

To do so, it provides a common interface to DEs and DOs, making the complexity of the system transparent to the final participants and integration easier.

The Connector component provides the AS4 Gateway functionality, so it can assume both the role of Data Requestor and Data Transferor. This approach makes the Connector a stand-alone web application that can be deployed on any suitable application server.

The security and integrity of messages, as well as the unique identification of the participants involved, are the cornerstones of the Connector component.

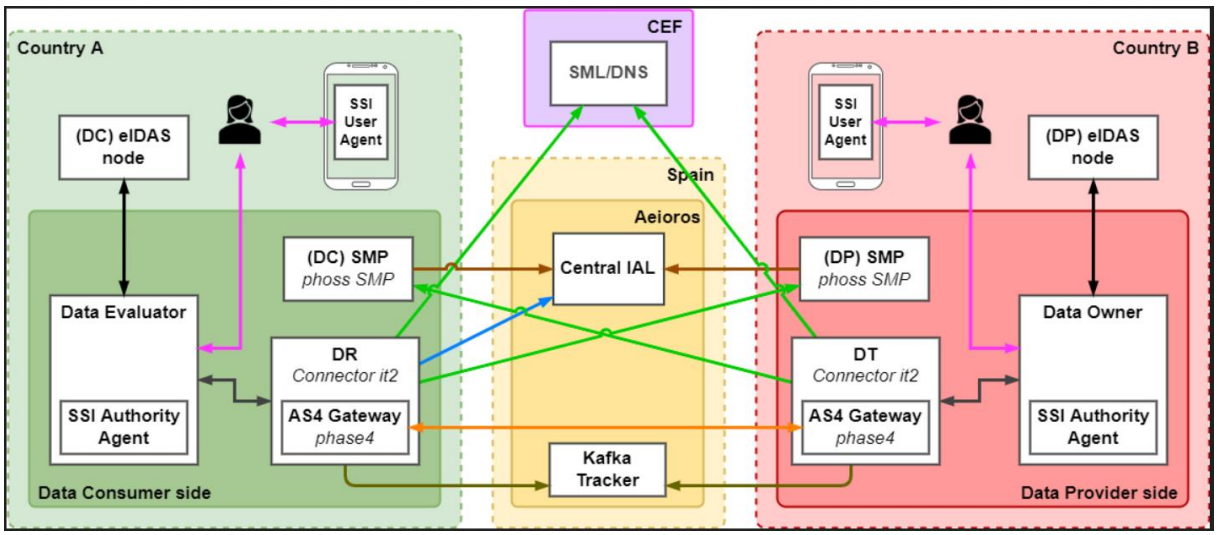

Figure 1: Conceptual schema of the target DE4A system for the second iteration

3.2 Functionalities provided

The main purpose of the DE4A Connector is sending and receiving evidence requests and their responses. The message exchange process is described in the DE4A deliverables D2.4 Project Start Architecture [25] and D5.3 Initial technical design of interfaces [26].

3.2.1 Routing information lookup

The DE4A Connector is responsible for obtaining the Data Provider information from the Central IAL. The Central IAL collects information from all the SMPs deployed at each partner infrastructure and offers it in a centralised way through the REST API `/service/ial/`. When queried about a Canonical Item (Evidence or Event Catalogue) and a country, it returns the identifier of the Data Owner to request that Canonical Item from in that country. Therefore, through this functionality, the DE4A

Connector allows DE4A participants to access the Issuing Authority Locator (IAL) semantic tool [13], implemented through the Central IAL.

The IAL helps Data Consumers (DC) to find out the issuing authority within a particular country either to obtain a Canonical Evidence Type or to subscribe to a Canonical Event Catalogue and know the characteristics of the evidence or subscription provision, respectively.

To identify the corresponding issuing authority by the DC, this functionality requires the following preconditions:

- The user has asked the DC that the evidence or the event must be provided by another country.
- DC knows which Canonical Evidence Type or Canonical Event Catalogue corresponds to the evidence or event specified by the user. Domestic Evidence and events are nationally matched with Canonical Evidence Type and Canonical Event Catalogues.
- Every issuing authority registered in the IAL publishes its evidence and subscription provisions, i.e., there is a service to provide a Canonical Evidence Type or a Canonical Event Catalogue.
- Each Canonical Evidence Type and Event Catalogue is only provided by one competent authority within an Administrative Territorial Unit.

There are several possible options with their respective flows:

- **Provisions (Flow A, Main Flow):** DC queries the Central IAL about the issuing authorities for one or a list of Canonical Evidence Types and/or Canonical Event Catalogues (at least one). The Central IAL will provide two possible outcomes.
  - Success: list of provisions that complies with the query, grouped by Canonical Evidence Type or Event Catalogue, country code and Administrative Territorial Unit Level.
  - Error Not Found: there is no issuing authority to provide the specified list.
- **Provisions at an Administrative Territorial Unit (Flow B, subcase of Flow A):** DC queries the Central IAL about the issuing authority at an Administrative Territorial Unit for one or a list of Canonical Evidence Types or Canonical Event Catalogues. IDK will provide the same possible outcomes than Flow A.

3.2.2 Dynamic discovery of services

For the Connector to be able to send a message to the corresponding endpoint, the eDelivery dynamic discovery mode of operation is used. This operation mode is based on the use of the components of the eDelivery infrastructure: SML/DNS and SMPs. Through this functionality, the DE4A Connector implements the DE4A Evidence Service Locator (ESL) [3] semantic tool.

The main elements stored in the SML/DNS and SMPs for this purpose are the following:

- Participant Identifier: The Data Owner/Data Evaluator identifier who is publishing its AS4 communication point (or the Connector linked to it).
- Document Type Identifier: Canonical Evidence Type or Canonical Event Catalogue identifier.
- Process Identifier: Orchestration type: request, response or notification.
- AS4 endpoint: AS4 service endpoint URL.
- Certificate: The public X.509 certificate of the AS4 endpoint, used to encrypt the transmitted data for this specific receiver.

The information described above is managed by the SML/DNS and SMP components and is used by the Connector when working with the phase4 implementation of AS4.

Focusing on the SML/DNS/SMP data retrieval, the process will take place according to the following features:

- TLS v1.2 or higher communication is mandatory.

- Response signature validation is mandatory.
- The communication between SMP and SML requires the usage of a client certificate.

The service metadata lookup will be performed as a step prior to the AS4 message exchange. Therefore, the receiver's participant ID and other related information must be known by the DE4A Connector in advance.

3.2.3 Supported interaction patterns

Interaction patterns define the flow of data through the Connector and the intercommunication between the different components. Each pattern exchanges certain types of messages, and the incoming/outgoing information will depend on the processes occurring in the external components.

The Connector currently supports four interaction patterns: Intermediation (IM), User-Supported intermediation (USI), Subscription and Notification (S&N) and Lookup (LU) patterns [13].

Most of the specific behaviour of each interaction pattern is independent of the Connector itself, as the Connector component is just designed to exchange messages and the main differences between the patterns take place in the external components such as the Data Evaluator and the Data Owner.

Additionally, the DE4A Connector offers a backwards compatibility feature for the former synchronous IM pattern implementation. The DE4A Connector can handle first iteration structure messages, transform them into the second iteration structure to be internally exchanged with another DE4A Connector and transform back to the original structure to be delivered to the DO. The communication between final participants (DE or DO) and Connectors is synchronous, as it was during the first iteration.

3.2.4 Connector roles

A DE4A Connector instance can play two different roles:

- Data Requestor (DR): the entity receiving requests from a DE. It handles the message and delivers it to any DT. It also handles the evidence responses from a DT and delivers them back to a DE.
- Data Transferor (DT): the entity that receives requests from any DR and delivers them to a DO. It also handles the evidence responses from a DO and delivers them back to a DR.

No configuration is needed to differentiate the roles, it only depends on the usage, i.e., the behaviour will be according to the messages sent. Moreover, in a functional scenario, the SMP data will determine which Connector is playing the DR or DT role.

3.2.5 Supported AS4 implementations

The message exchange is built on the AS4 protocol [19], which is an open standard for secure, payload-agnostic document exchange via web technology. Secure document exchange is governed by WS-Security aspects, including XML Encryption and XML Digital Signatures. There are different implementations of AS4, but the Connector currently implements phase4.

The main features of phase4 are as follow:

- It is a generic AS4 solution.
- It can be integrated in basically any application server.
- It can be used with other Dynamic Discovery solutions.
- It supports a high degree of customization.
- It is not limited to the Digital Europe (formerly CEF) profile.
- It is an embeddable library for maximum performance.

The Connector implements phase4 as a gateway to perform the AS4 message exchange. All necessary configuration parameters are provided by the properties file of the Connector.

phase4 is an Open-Source solution hosted on GitHub and published under the Apache 2.0 license. Its configuration properties and other settings are described in the respective Wiki [18].

3.2.6 Error handling

Since the Connector performs multiple communications between different external components and some data and structure validations are performed, the Connector needs to monitor all failure points and be able to identify them in order to build the corresponding messages and warnings to inform each external component. When an error happens, the corresponding component creates an error message with the information about the error to be sent back to the entity that sent the failed message.

The logging error follows a standard structure to identify the component and the step of any error that may occur. When a communication between components is done, logging messages are generated indicating origin and destination for this communication [13].

3.2.7 Kafka messages

Within the data flow and message exchange, there are many key points where it is important to know how the data is being managed, as well as identifying intermediate errors and unhandled system states. In this respect, the Connector can send messages to a Kafka server to track the data flow and trace the state of the system at certain points.

This feature has advantages from a technical and business point of view, as the Connector performs the message exchange transparently to the other components.

The messages sent to the Kafka server are based on the set of log and error messages defined for DE4A [13]. Additional messages can also be found like start and shutdown of components and other relevant information when obtaining endpoints addresses from centralised components.

The transmission of the messages to the Kafka server is done using the de4a-kafka-client library as described in section 2.1.

3.2.8 Data management

The DE4A Connector can take the DE4A roles of DR and DT. This means that a Connector might provide service to multiple DEs and DOs at the same time. Therefore, the DE4A Connector needs to store the base endpoint (without path name) of each DE and DO it is providing service. Each record is identified by the participant ID of the DEs and DOs, so that when a message arrives to the DE4A Connector, whose recipient is identified by the participant ID, the DE4A Connector can forward the message to the corresponding endpoint service. This information is configured in the `de-do.json` file (see section 3.5.3 for more information).

3.3 Security

The message exchange performed by the Connector has been conceived to ensure different security aspects as:

- Authenticity: ensures the identity of the participant entities and any common component involved in the message exchange. It is achieved through the participant identifiers definition and especially the usage of X.509 certificates to verify electronic signatures, as required by the eDelivery [13] specification.

- Integrity: refers to the accuracy and completeness of data. Security controls focused on integrity are used to prevent data from being modified or misused by an unauthorized party, provided by the WS-security and XML message signature that are part of the AS4 transport protocol.
- Confidentiality: data confidentiality at message level is be achieved by taking advantage of WS-Security encryption feature in User messages. This message encryption is performed with shared symmetric keys: the sender encrypts the message and it can only be decrypted by the recipient who also owns the key to encrypt or decrypt. Those keys should be configured for usage by the AS4 gateway. Additional to the payload being encrypted in the AS4 message, the whole transmission must also be encrypted on the network level using TLS. The AS4 certificate used for encryption and the TLS certificate must be different.

3.3.1 Communications

The Connector creates a secure context to establish in/outgoing connections with external components.

The main elements for such communication securitisations are:

- Private key: the private part of the private-public key pair is used in the message exchange between your server and the connecting clients. This private key must be configured in the Connector properties in order to create the secure context as well in the web server, in the case of reverse proxy or any similar structure. The keys configured on each component are generated under the DE4A management.
- Trust store: used for the storage of certificates and keys from the trusted Certificate Authority (CA), which is used in the verification of the certificate provided by the server in an SSL connection. The Connector provides a default trust store which allows to trust on certificates generated under the main DE4A CA.

HTTP Proxy mode

Sometimes, the environments have certain communication structure where the outgoing connections must be performed through an HTTP proxy server. The Connector provides this functionality and proper configuration to perform the communications via an HTTP proxy server. This affects the access to all external components like IAL, SMP, foreign Connectors and the Kafka server.

3.3.2 Message cryptographic protection

The Connector message exchange can be separated into:

REST APIs messages

Once the TLS connection is established, all the data exchanged through it, will be encrypted on transport level based on the TLS context configuration settled, either managed by a reverse proxy on the server environment or configuring the proper application properties. No additional payload encryption is applied.

AS4 messages

phase4 access point internally encrypts the message according to the eDelivery profile, using the specific AS4 key store configuration only used for this purpose. Additionally, the cross-gateways communications are encrypted using TLS.

3.3.3 Message validation

Message validation is performed at different stages of the Connector data flow, from message structure compliance to content integrity.

XML Schema validation

All the messages produced and consumed by the Connector are validated against an XML Schema once they are received or sent out. This validation is done by the object conversion library that keeps the XML schema model including all the XML structure and content constraints.

Signature validation

As well as the XML Schema validation, the Connector performs signature validations to ensure the content and reliability on certain phases of the message exchange process:

- The response of an SMP querying
- In the SMP data exchange a message signature validation is being performed to verify the content integrity. This validation consists of verifying the embedded signature on the message against the trusted CA configured in the Connector for that purpose.

The signature of incoming AS4 messages is verified against the central AS4 Gateway CA globally used in DE4A project, internally validated by the implementation libraries that handle the reception and delivery.

3.4 Technology used

3.4.1 Description of the technology stack used to create the DE4A Connector

Table 1 shows a list of software components used in the DE4A Connector implementation, which therefore are dependencies of the DE4A Connector.

Table 1: Dependency list for DE4A Connector implementation

Dependent name	Version	License
Bouncy Castle	1.72	MIT
Apache commons-codec	1.15	Apache 2.0
Cryptacular	1.2.4	Apache 2.0 / LPGL 3.0
DNSJava	3.5.1	BSD
ExpiringMap	0.5.10	Apache 2.0
Apache HttpClient	5.1.3	Apache 2.0
Jackson	2.13.4	Apache 2.0
Jakarta Activation API	1.2.2	BSD / EPL 2.0
Jakarta Mail	1.6.7	EPL 2.0 / GPL 2.0 with Classpath Exception
Jakarta WS	2.3.3	BSD / EPL 2.0
Jakarta JAXB	2.3.3	BSD / EPL 2.0
Jasypt	1.9.3	Apache 2.0
Servlet API	3.1.0	CDDL / GPL 2.0 with Classpath Exception
SLF4J	1.7.36	MIT
Joda Time	2.10.10	Apache 2.0
Findbugs JSR 305	3.0.2	Apache 2.0
JSTL	1.2	CDDL / GPL 2.0 with Classpath Exception
Apache Kafka Client	3.1.2	Apache 2.0
Log4J	2.19.0	Apache 2.0

Dependent name	Version	License
peppol-commons	8.8.2	Apache 2.0
phase4	1.4.2	Apache 2.0
ph-commons	10.2.2	Apache 2.0
ph-css	6.5.0	Apache 2.0
ph-web	9.7.2	Apache 2.0
phive	7.2.4	Apache 2.0
ph-masterdata	6.2.4	Apache 2.0
ph-schedule	4.2.0	Apache 2.0
ph-oton	8.4.3	Apache 2.0
ph-regrep	1.2.0	Apache 2.0
ph-schematron	6.3.4	Apache 2.0
ph-xsds	2.6.0	Apache 2.0
ph-ubl	6.7.0	Apache 2.0
Saxon-HE	11.4	MPL 2.0
SchXslt	1.9.4	MIT
Snake YAML	1.30	Apache 2.0
Spring	5.3.24	Apache 2.0
Spring Boot	2.7.6	Apache 2.0
Spring Web Services	3.1.4	Apache 2.0
Tomcat	9.0.69	Apache 2.0
Bean Validation API	2.0.1	Apache 2.0
XmlResolver	4.4.3	Apache 2.0
Apache WSS4J	2.4.1	Apache 2.0
Apache Santuario (xmlsec)	2.3.1	Apache 2.0

3.4.2 System core architecture

The Connector works as standalone application that runs different web services according to the RESTful API architecture principles. The application is built with the following tools:

- Spring Framework version 5.x.
- Java 11
- Apache HTTP Client 5.1.x

In addition to the core architecture, the XML Schemas defined to model the exchanged information, data constraints, interfaces, etc. are also important. All this is part of the Connector core through the de4a-commons library, which contains the above-mentioned model as well as utilities and conversion tools.

- Author: DE4A (WP5)
- Repository: https://github.com/de4a-eu/de4a-commons

3.4.3 Third party libraries

As part of the libraries used by the Connector, some are related with the core features and represent a starting point for the functionalities provided by the Connector.

3.4.3.1 TOOP Connector

The TOOP Connector is a set of shared utility functions used in the Connector to perform common tasks that are required for a safe and interoperable data exchange. In the initial iteration the latest version of the TOOP Connector technical components were reused mainly for the usage of the built-in phase4 AS4 Gateway. Other elements of the TOOP Connector are ignored.

- Author: TOOP Project
- Repository: https://github.com/de4a-wp5/toop-Connector-ng

3.4.3.2 ph-oton libraries

Set of Java libraries to build Java web applications. Some of them are required by phase4 and therefore transitive dependencies.

- Author: Philip Helger (phax)
- Repository: https://github.com/phax/ph-oton

3.4.3.3 Peppol commons libraries

They include the SMP client library used by the Access Points to retrieve service metadata. This library supports the Peppol SMP specification, the OASIS BDXR SMP v1 and OASIS BDXR SMP v2 specification. This project uses Apache HTTP client to perform the REST lookups on foreign SMPs. The SMP client also performs the signature validation.

- Author: Philip Helger (phax)
- Repository: https://github.com/phax/peppol-commons

3.4.4 Data management

To manage the model and the data stored by the Connector the following technologies are used:

- **JPA:** The Java Persistence API is a specification of Java. It is used to persist data between Java object and relational database. JPA acts as a bridge between object-oriented domain models and relational database systems. As JPA is just a specification, it does not perform any operation by itself.
- **Hibernate:** An object–relational mapping tool for the Java programming language. It provides a framework for mapping an object-oriented domain model to a relational database. Hibernate handles object–relational impedance mismatch problems by replacing direct, persistent database accesses with high-level object handling functions.

3.4.5 Utilities libraries

The project uses several libraries and utilities to process and transform the data. They can be divided according to their nature:

- **Commercial libraries:** To perform common and non-business operations on web and data exchange projects, the De4a Connector does not use any commercial libraries as it is published as an Open-Source project. All the used libraries are embedded in the Java development kit.
- **In-house solutions:** The Connector project includes some utilities that allow the data processing and internal tools to perform all the Connector tasks. Those utilities are within the Connector project as a module called *de4a-commons*.

3.5 Installation and configuration guide

3.5.1 Installation

A prerequisite to build the Connector is to have Java 11 and Apache Maven 3.6 or later installed.

You should be able to compile entire packages from the parent POM file:

```
mvn clean install
```

It is also possible to compile each package separately by browsing to the folder and running the command above.

3.5.1.1 Package

The compilation process will package the project into a `.war` file located on `/target/` path, which should be deployable on any application server.

Latest release version is also available at GitHub of WP5 [16].

Before deploying, there are 2 files that need to be configured:

- `application.properties`, which contains the general configuration for DE4A Connector.
- `de-do.json`, which contains the routing information for DE and DO endpoints.

3.5.2 application.properties file

Former `application.properties` and `phase4.properties` files from iteration 1 have been merged into `application.properties` file for the second iteration version of the DE4A Connector.

There are properties listed below that are not present in the `application.properties` file. They can be modified depending on your environment requirements. If no custom value is present, a default value will be used.

3.5.2.1 General

It contains the following properties:

- `global.debug` = `false` (boolean) - enable development debug functionality
- `global.production` = `false` (boolean) - enable production mode (performance optimizations, less checks)
- `global.instancename` = `de4a-connector-global` (string) - this is only used as the log prefix if the tracker is used
- `http.tls.trustall` = `true` (boolean) - use this to disable the hostname and trusted certificate check for SSL/TLS connections. Defaults to `false`. Using true just for testing purposes, not recommended for production.
- `http.proxy.enabled` (boolean) - is an HTTP proxy needed? Defaults to `false`.
- `http.proxy.address` (string) - the URL of the proxy server (including the scheme) (e.g. `http://proxy.local`)
- `http.proxy.port` (int) - the port to access the HTTP proxy server (e.g. `8080`)
- `http.proxy.non-proxy` (string) - a list of hosts that should not be proxied. Use the pipe character as the separator for multiple entries (as in `localhost|127.0.0.1`).
- `http.connection-timeout` (int) - the HTTP connection timeout in milliseconds.
- `http.read-timeout` (int) - the HTTP read/socket timeout in milliseconds.
- `de4a.tracker.enabled` (boolean) - enable or disable the remote tracker. Defaults to `false`.
- `de4a.tracker.viahttp` (boolean) - `true` if the tracker should use http for transmission, `false` if it should use TCP. The default is TCP (aka `false`). When using an HTTP proxy, this should be set to `true`, as most HTTP proxies don't let plain TCP traffic through.
- `de4a.tracker.url.tcp` (string) - the TCP URL where the tracker is collecting data elements.
- `de4a.tracker.url.http` (string) - the HTTP/HTTPS URL where the tracker is collecting data elements.

- `de4a.tracker.topic` (string) - the tracker topic (left pane).
- `de4a.ial.url` (string) - the HTTP/HTTPS URL where the IAL is waiting for queries.
- `de4a.me.implementation` (string) - the AS4 Gateway to use. Must be set. Currently supported values are:
  - `phase4` for using phase4 - requires the subproject `dcng-phase4` on the class path
  - `holodeck` for using Holodeck - requires the subproject `dcng-holodeck` on the class path
- `de4a.me.incoming.url` (string) - the external URL to which incoming, validated documents, received via AS4, should be forwarded to.
- `de4a.webapp.status.enabled` (boolean) - `true` if the `/status` API is enabled and may return details, `false` if not. Defaults to `true`.
- `de4a.webapp.data.path` (string) - The storage path for file etc. inside the Connector.
- `de4a.smp.http.useglobalsettings` = `true` (boolean) - `true` to use the global configuration items or `false` to use the custom ones from "smp client configuration". Defaults to `true`.
- `de4a.smp.usedns` = `true` (boolean) - use the SML system to dynamically discover partner systems? This should only be `false` for testing purposes. In production this should always be true.
- `de4a.smp.static.endpointurl` (string) - the absolute URL of the AS4 endpoint URL. This is only evaluated if `de4a.smp.usedns` is `false`.
- `de4a.smp.static.certificate` (string) - the PEM encoded X509 certificate of the AS4 gateway. This is only evaluated if `de4a.smp.usedns` is `false`.
- `de4a.smp.static.smpurl` (string) - the absolute URL of the SMP to use. This is only evaluated if `de4a.smp.usedns` is `false`.
- `de4a.smp.sml.id` (string) - the ID of a predefined SML configuration to be used. This can effectively be `digitprod` (CEF SML) or `digittest` (CEF SMK). The recommended value for this property is `digittest`. This is the preferred way to specify the SML. This is only evaluated if `de4a.smp.usedns` is `true`.
- `de4a.smp.sml.name` = `SML DE4A` (string) - internal name of the SML. Defaults to `DE4A SML`. This is only evaluated if `de4a.smp.usedns` is `true` and if `de4a.smp.sml.id` is not valid. Caution: don't use it, except you know what you are doing.
- `de4a.smp.sml.dnszone` = `de4a.edelivery.tech.ec.europa.eu.` (string) - the DNS zone of the SML. This is only evaluated if `de4a.smp.usedns` is `true` and if `de4a.smp.sml.id` is not valid. Caution: don't use it, except you know what you are doing.
- `de4a.smp.sml.serviceurl` = `https://edelivery.tech.ec.europa.eu/edelivery-sml` (string) - the management service URL of the SML. This is only evaluated if `de4a.smp.usedns` is `true` and if `de4a.smp.sml.id` is not valid. Caution: don't use it, except you know what you are doing.
- `de4a.smp.sml.clientcert` = `true` (boolean) - is a client certificate need when talking to this SML. This is only evaluated if `de4a.smp.usedns` is `true` and if `de4a.smp.sml.id` is not valid. Caution: don't use it, except you know what you are doing.
- Additionally, the configuration items of the SMP client should be configured. The complete description can be found at GitHub repository [17]. The main items are as follows:
  - `smpclient.truststore.type` = `jks` (string): the type of key store to be used (either `JKS`, `PKCS12` or `BCFKS` - case insensitive). Defaults to `JKS`.
  - `smpclient.truststore.path` = `truststore/de4a-truststore-smp-v4-pw-de4a.jks` (string): the location of the trust store (of the specified type) to be used.
  - `smpclient.truststore.password` = `****` (string): the password to access the trust store.

3.5.2.2 Kafka logging

To enable Kafka logging, `de4a.kafka.enabled` must be set to true.

 # Kafka settings

- `de4a.kafka.enabled = true`
- `de4a.kafka.url = de4a.simplegob.com:9092`

3.5.2.3 phase4 specific

Similar to `phase4.properties` file from iteration 1:

- `phase4.datapath` = `temp/phase4` (string) - The base path where phase4 should store data to. This property is only used if `de4a.webapp.data.path` is not used (which only has effect in `dcng-webapp-*`).
- `phase4.debug.http` = `true` (boolean) - `true` if AS4 HTTP debugging should be enabled. Recommended to be `false`. Switch the debug level of the used SLF4J Logger to "debug" for a more verbose output. This configuration item is only evaluated once on startup.
- `phase4.debug.incoming` = `true` (boolean) - `true` to debug log certain details of incoming AS4 messages. This configuration item is evaluated for each incoming message.
- `phase4.dump.incoming.path` = `temp/phase4` (string) - The absolute path on disk where incoming messages should be dumped to. If the value of this property is null or an empty String no dumping happens. This configuration item only evaluated once on startup.
- `phase4.dump.outgoing.path` = `temp/phase4` (string) - The absolute path on disk where outgoing messages should be dumped to. If the value of this property is null or an empty String no dumping happens. This configuration item only evaluated once on startup.
- `phase4.send.fromparty.id` (string) - The `From/PartyId` value for receiving party id. This value must be set and should be the CN part of the sender's X.509 AS4 certificate.
- `phase4.send.fromparty.id.type` (string) - The `From/PartyId/@type` for sending party id. Defaults to `ignore-me` because it must be set but we don't care.
- `phase4.send.toparty.id.type` (string) - The `To/PartyId/@type` for receiving party id. Defaults to `ignore-me` because it must be set but we don't care.
- *# AS4 keystore for signing/decrypting*
- `phase4.keystore.type = JKS`(string) - the type of the keystore (either `JKS`, `PKCS12` or `BCFKS` - case insensitive) - defaults to `JKS`.
- `phase4.keystore.path = /path/to/jks_file/as4_keystore.jks` (string) - the path to the keystore (can be classpath relative or an absolute file)
- `phase4.keystore.password = ***` (string) - the password to access the key store
- `phase4.keystore.key-alias = your-alias` (string) – the alias into the key store that contains the entry with the private key
- `phase4.keystore.key-password = ***` (string) – the password to access the private key inside the key store. Based on the key store type, this may be different to the main key store password.
- `phase4.truststore.type` (string) - the type of the trust store (either `JKS`, `PKCS12` or `BCFKS` - case insensitive) - defaults to `JKS`.
- `phase4.truststore.path` (string) - the path to the trust store (can be classpath relative or an absolute file)
- `phase4.truststore.password` (string) - the password to access the trust store

3.5.2.4 Backwards compatibility

For participants using the iteration 1 DE and DO components, it will be necessary to configure this property:

- `legacy.do.url` = `https://localhost:8080/requestExtractEvidenceIM` - Only necessary for Connector DT using backwards compatibility. It will contain the DO IM request endpoint.

3.5.2.5 Connector identifier

In order to identify the connector that is performing an operation in the component itself and Kafka logs, a Connector ID must be configured.

- `de4a.connector.id` = `SGAD-ES` - Connector identifier (Acronym of the participant's name + '-' + Two-letter country code)

3.5.3 Endpoints configuration

The file `de-do.json` contains all the information to communicate the Connector with DE/DO. This file is replacing old `import.sql` from iteration 1. It is intended to let the Connector know both Data Owner and Data Evaluator endpoints addresses.

The JSON file should only contain the information to communicate with your own DE or DO instance.

- When the Connector is acting as a Data Requestor (Data Evaluator side), it will be needed to address DE endpoints.
- When the Connector is acting as a Data Transferor (Data Owner side), it will be needed to address DO endpoints.

In any case, it should be noted that a Connector can take the role of DR and DT at the same time, thus being necessary to populate the `de-do.json` file with information from both DEs and DOs.

3.5.3.1 Data Requestor

```
"dataEvaluators": {
  "iso6523-actorid-upis::9999:at000000271-mock-it2": {
    "response": "https://de4a.simplegob.com/demoui-it2/api/de-inbound/",
    "subscription_resp": "https://de4a.simplegob.com/demoui-it2/api/de-inbound/",
    "redirect": "https://de4a.simplegob.com/demoui-it2/api/de-redirect/",
    "notification": "https://de4a.simplegob.com/demoui-it2/api/de-inbound/"
  },
```

Figure 2: Data Evaluator configuration sample from `de-do.json` file

The information configured under `dataEvaluators` is used by the Connector-DR to know the endpoints where the responses must be sent in each case.

- `dataEvaluators.redirect` is used by the Connector-DR to receive the `RedirectUserType` [13] response to redirect the user to the Data Owner to accept/reject the evidence (USI Pattern).
- `dataEvaluators.response` is used by the Connector-DR when the evidence is accepted by the user and must be redirected to the Data Evaluator (USI/IM Patterns).
- `dataEvaluators.response` and `dataEvaluators.subscription_resp` will be used by the subscription/notification pattern.

3.5.3.2 Data Transferor

```
"dataOwners": {
  "iso6523-actorid-upis::9999:at000000271-mock-it2": {
    "im": "https://pre-smp-dr-de4a.redsara.es/de4a-mock-connector/requestExtractEvidenceIM",
    "usi": "https://pre-smp-dr-de4a.redsara.es/de4a-mock-connector/do1/usi/extractevidence",
    "lu": "https://pre-smp-dr-de4a.redsara.es/de4a-mock-connector/dataOwner/in/lu/",
    "sn": "https://pre-smp-dr-de4a.redsara.es/de4a-mock-connector/dataOwner/in/sn/"
  },
```

Figure 3: Data Owner configuration sample from `de-do.json` file

The information configured under `DataOwners` is used by the Connector-DT to know the endpoints to the respective Data Owner (or Mocked DO).

As you can see in the image, each endpoint corresponds to a URL depending on the pattern.

3.5.4 Starting up the Connector

Once you have all configuration parameters well configured (if not, check the logs to find out the problem), it is time to deploy the component into an applications server. Once you have deployed the `war` file or the docker image, there are several checks to ensure that the deployment was successful:

- DE4A Connector index page will be at root path: `http://host:port/`
  E.g.: UM Connector
- The Connector will be able to process requests through the following interfaces:
  - `/request/im` - As DR, it takes an IM request (`RequestExtractMultiEvidenceIMType`) and sends it via AS4 to DT. It returns a generic synchronous response (`ResponseErrorType`).
  - `/request/usi` - As DR, it takes a USI request (`RequestExtractMultiEvidenceUSIType`) and sends it via AS4 to DT. It returns a generic synchronous response (`ResponseErrorType`).
  - `/request/lu` - As DR, it takes a USI request (`RequestExtractMultiEvidenceLUType`) and sends it via AS4 to DT. It returns a generic synchronous response (`ResponseErrorType`).
  - `/request/subscription` - As DR, it takes a USI request (`RequestEventSubscriptionType`) and sends it via AS4 to DT. It returns a generic synchronous response (ResponseErrorType).
  - `/requestTransferEvidenceIM` - This is the backwards compatibility layer for Iteration 1. As DR, it takes an Iteration 1 IM request (`RequestTransferEvidenceUSIIMDRType`) and sends it with AS4 to DT. It waits synchronously until the DR receives a matching response from DT. It returns an Iteration 1 IM response (ResponseTransferEvidenceType). It times out after 60 seconds.

4 DE4A Directory

The purpose of the DE4A Directory is to collect all Business Cards of all Participants from all SMPs [13] in the network and provide different query interfaces and a management interface. It offers a GUI for searching by humans and as well a REST API for automated querying. Further details, including the API details and Business Cards definition, can be found in the official Peppol Directory specification [24].

The DE4A Directory is deployed as a single, centralised instance. The reason to have this centralised is the speed of execution and the technical feasibility. If this wouldn't be centralised, each query would need to be run against all known SMPs and aggregated afterwards. The execution time would be at least as slow as the execution time of the slowest of the queried SMPs.

The following figure depicts the flow of the communication. The left side of the image focuses on the filling of the Directory, whereas the right part focuses on the querying and searching.

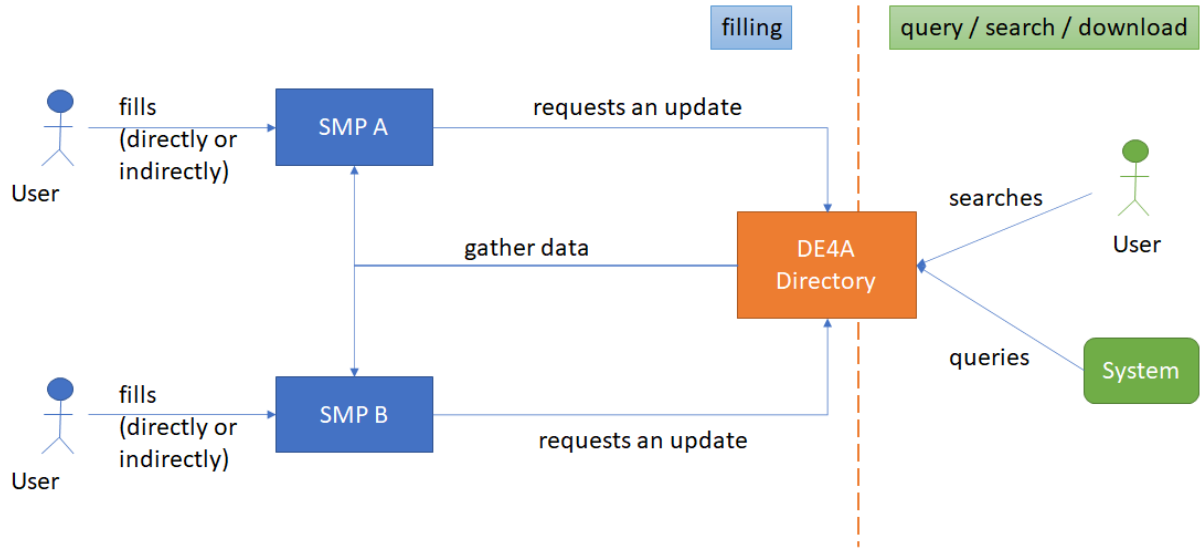

Figure 4: Directory big picture

The Directory is NOT involved in the core eDelivery message exchange. It is only used to determine the Participant Identifier of the DO based on parameters such as document type and the ATU. Once the Participant Identifier was found the regular eDelivery message exchange can begin.

Technically the DE4A Directory stores all searchable data in a local Apache Lucene [11] Index which offers great indexation and search speed. The access to the Directory is primarily via an HTTP interface invoked solely by the IAL service[13].

In DE4A the Directory is mainly an "in-between" service between the different SMPs and the IAL service. Its user interface just comes in handy to check if registrations and business cards are correctly indexed, but for production exchanges only its APIs are of relevance.

The current URL, hosted by Aeioros, is https://de4a.simplegob.com/directory/ - it is running an instance of the Open-Source phoss Directory branded for DE4A. Each SMP must use its SMP certificate as a client certificate when communicating with the DE4A Directory.

5 Central IAL design

The Central IAL is the component created by WP5 to implement the Issuing Authority Locator functionality defined by WP3 [3].

This chapter describes the big picture of the IAL implementation, based on Business Cards provided in a decentralised way through the DE4A Directory.

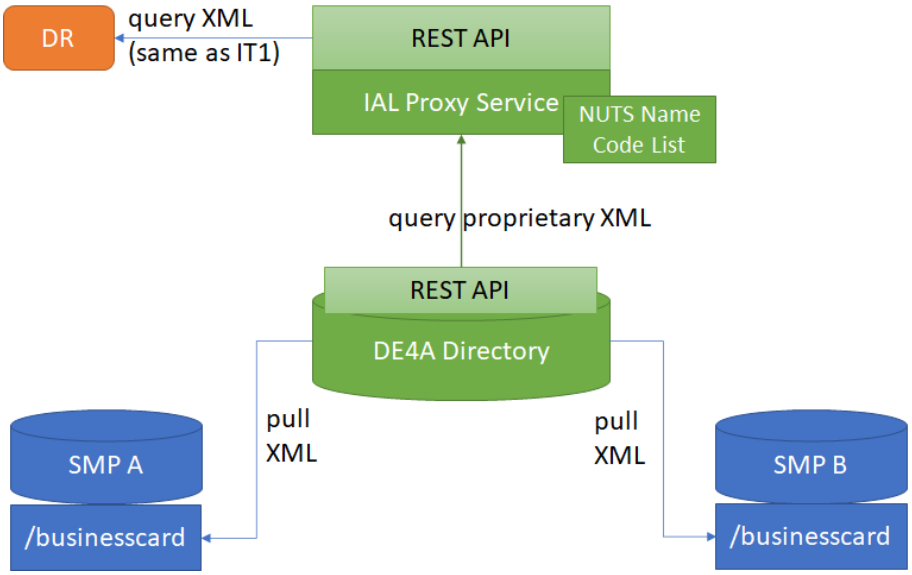

Figure 5: System overview

The above figure shows the relationships of the different components. The blue SMP instances are already existing and are representing pilot partners SMP instances. These SMPs need to provide Business Cards to a centralised Directory. This Directory is an existing piece of software (based on the original Peppol Directory) which offers a standardized REST API for querying. This REST API will be used by the IAL Proxy Service, which in turn offers the public API as described in chapter to any DR.

The benefit of this setup is, that pilots can maintain the data decentralised in their SMPs. This data is automatically copied (replicated) into the central Directory where a complete index of all Business Cards from all SMPs is available for centralised querying. The Directory offers only a read-only API to non-SMPs, so there can never be a data update from the Directory to an SMP.

The information related to the API of the Central IAL and how it works is available in the DE4A WP5 deliverable D5.4 [13].

6 DE4A Playground

6.1 Introduction

The DE4A Playground is a set of predefined and pre-deployed components to be used as is. The DE4A Playground was designed to help pilot partners to onboard the DE4A network. It is essentially a temporary infrastructure with two purposes:

- It simulates a real scenario where users can request data (evidence) about a subject (citizen or company). Thus, it allows testing the performance of the DE4A Connector by using mocked components and fake data.
- It allows DE4A pilot participants to deploy their own infrastructure in an orderly manner. A three-stage process was set out for the pilot participants to deploy their software components: first their own developed entities (DE/DO), secondly the DE4A Connector, and finally the SMP of the eDelivery infrastructure. At the end of each stage, the pilot partner can test their deployment by making used of the rest of the Playground components.

Figure 6 shows a quick introduction to the main structure and list of components involved:

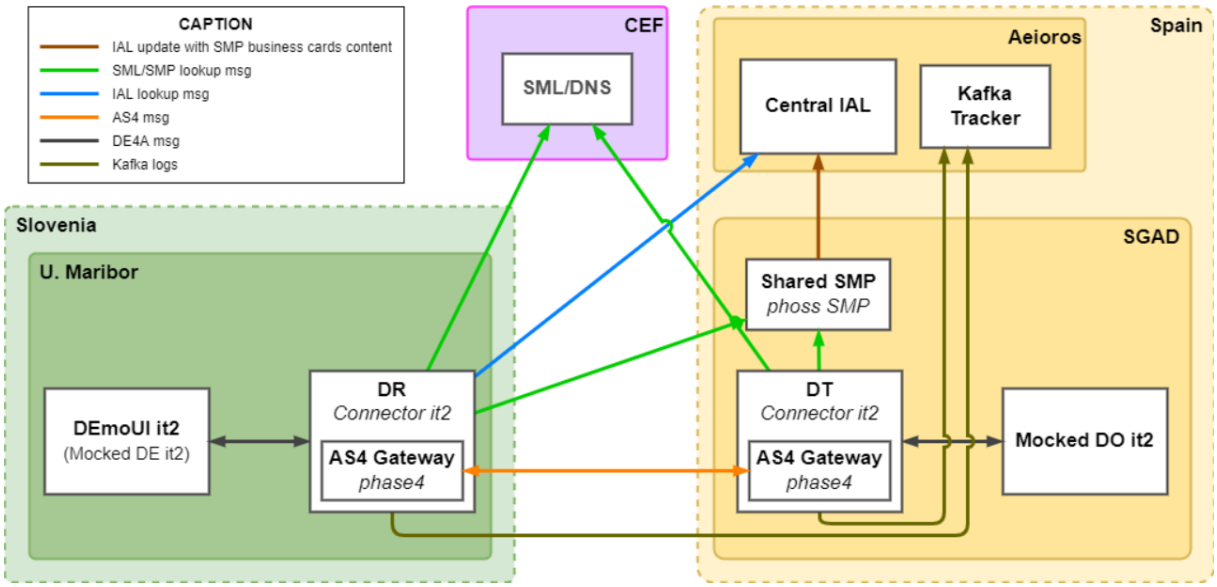

Figure 6: Playground components

6.2 Mocked Data Evaluator (DemoUI)

The Mocked DE, also known as WP5 DemoUI, is a utility component for pilot partners to help in taking the role of a Data Evaluator but also provide functionality that is generically helpful. The DemoUI takes the role of C1 in the 4-corner model and can communicate with any C2 DE4A Connector for data exchange.

The source code is contained in the public GitHub repository at https://github.com/de4a-eu/wp5-demo-ui.

It builds on the components of de4a-commons elaborated in section 2.

6.2.1 Functionality overview

The functionality of the DemoUI is diverse and quickly elaborated below:

- Sending different requests to C2. For each request, the Connector target URL can be provided.
  - Sending Intermediation Pattern (IM) requests. This was only used by the Doing Business Abroad pilot.
    - Send an IM request with guided parameter selection. This functionality includes a query to the UAL to determine all receivers that support the retrieval of the underlying document type. Internally, the IM request XML is created and finally displayed to the user. The response is retrieved asynchronously.
    - Send an IM request with a prebuild XML request – this is called the "Expert mode".
    - Send an IM first Iteration request. This works very similar to the previous expert mode, just that it expects a different XML schema and that the message response is retrieved synchronously (or runs in a timeout in which case the message is lost).
  - Sending User Supported IM (USI) requests. That was used by the Studying Abroad and the Moving Abroad pilot.
    - Send a USI request with guided parameter selection. This functionality includes a query to the UAL to determine all receivers that support the retrieval of the underlying document type. Internally, the USI request XML is created and finally displayed to the user. The response – the redirect URL – is retrieved asynchronously.
    - Send a USI request with a prebuild XML request – this is called the "Expert mode".
  - Sending Subscription & Notification related messages. That was only used by the Doing Business Abroad pilot.
    - Send a Subscription request with a prebuild XML request – again the Expert mode.
    - Send a Notification request with a prebuild XML request. This is usually functionality of a DO but was added to the DemoUI for the sake of simplicity.
  - Send a USI Deregistration request especially for Luxembourg. This is also functionality that belongs to a DO side but was added here for pilots to have a single place of contact. Compared to the regular USI request this one expects a different response on a protocol level.
- Receive responses from the DT and DO via the C2 Connector (DR). As the responses come in asynchronously, the respective URL of the DemoUI must be configured in the C2 Connector in the respective `de-do.json` file. *Note:* for some responses the DemoUI must be configured as DE and for some as DO.
  - Check for received evidence – this is particularly the case for IM and USI requests.
  - Check for received events – this is needed to check if notifications were received. This is the counterpart functionality of "Sending a Notification request" mentioned above.
  - Check for received subscription confirmation – this is needed to see if the subscription request mentioned above was successful or not.
  - Check for received redirects – this is needed to display the redirect URLs required by the USI exchange for remote preview.
- Supporting actions
  - Creating a random message – allows to create XML schema compliant DE4A Core XML documents as well as random pieces of canonical evidence for the different supported pilot document types. The values of these random messages do not fulfill any semantic requirements and are only meant to act as an example XML message.
  - Send Message is another functionality about sending. It is even more generic then the "Expert mode" sending explained above, as it lets you perform sending of requests for which no predefined Canonical Evidence Type is yet predefined.

- Validate Messages – this is another helpful functionality that lets you validate XL messages according to the defined XML schemas, prior to sending. It validates against the DE4A Core XML Schemas and, if necessary, also against the XML schemas of the canonical evidence types if needed.

A description on code level of this component is not deemed to be of relevance, as no long-term sustainability of this component is foreseen.

6.2.2 User Interface

The user interface of the DemoUI is built on top of the Bootstrap 4 framework to provide a mobile-friendly and easy to use interface. Figure 7 shows the main UI elements of the DemoUI: the header with a short description what this is, followed by breadcrumbs below. The main content area is separated into a menu part on the left and a content area on the right side. At the bottom of each page is a static footer that also includes the build time of the DemoUI so that it is easy to check, what version is deployed.

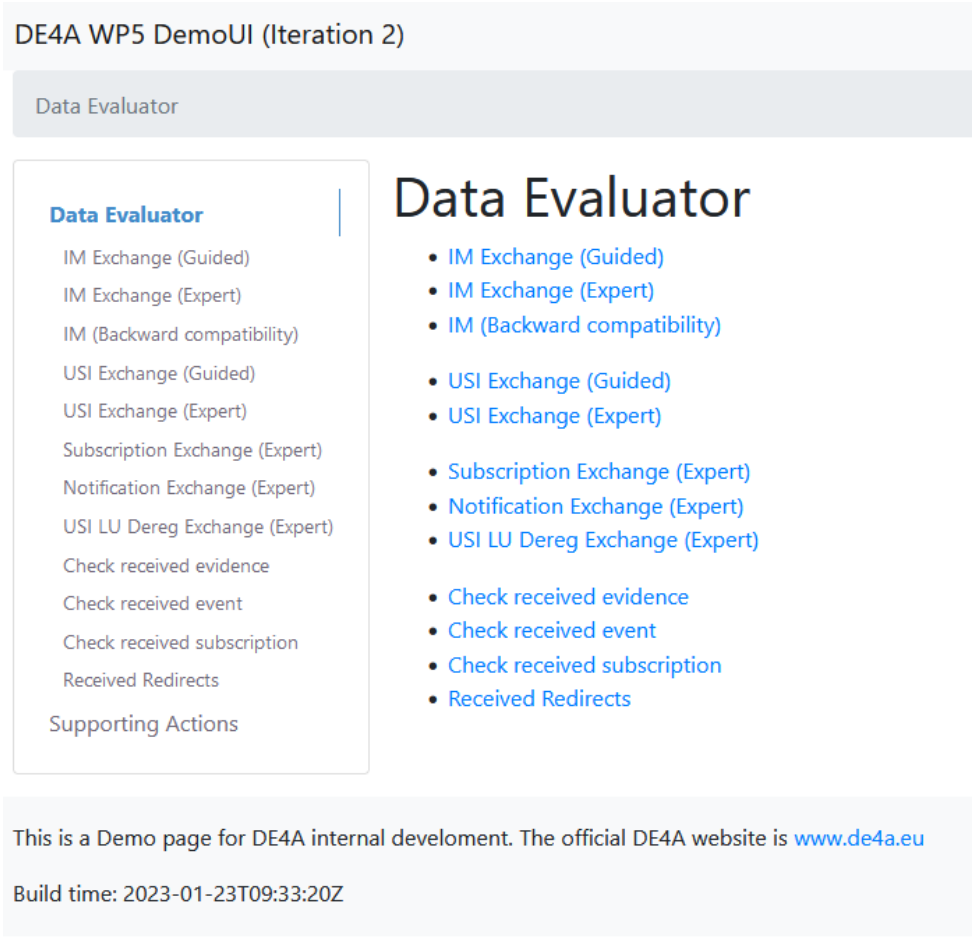

Figure 7: Overview of the DemoUI functionality

Figure 8 shows the "IM Exchange (Expert)" page as an example. The relevant parts of the page have red boxes and include these elements:

1. The target URL of the Connector to which the request should be send. By default, the URL is based on a configuration property and targets the DE4A Connector implementation interface.

2. The main payload is a random message that fulfils the XML schema requirements for IM messages. Of course, the main payload can be edited or fully replaced with some predefined XML messages.
3. The button “Other message” can be used to create a new random message and place it inside the payload area. The main purpose is to create a matching request that fulfils certain requirements (like using a natural person or a legal person) for detailed editing.
4. The “Send IM request” button will take the payload, validate it against the correct XML schema and then do an HTTP POST request to the URL defined in the “Target URL” element.

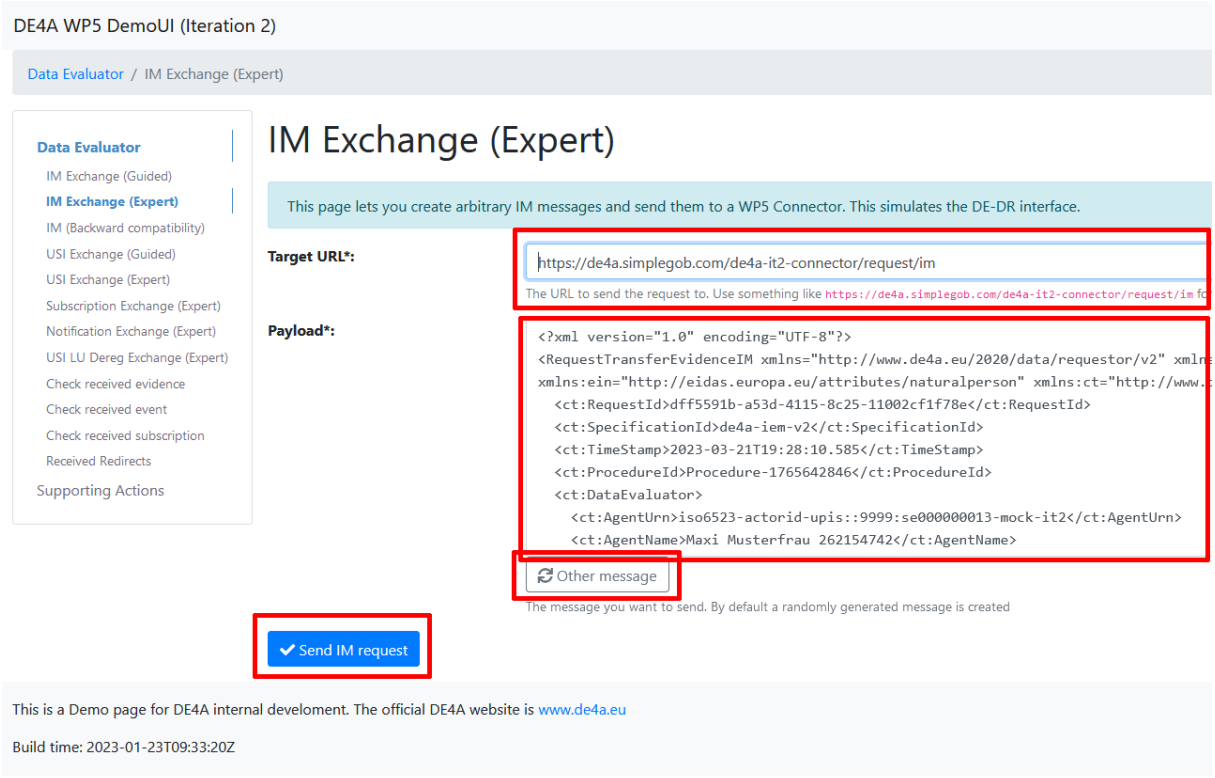

Figure 8: DemoUI IM Exchange (Expert) page example

Finally, Figure 9 shows an example how the same page looks like, when the screen resolution is close to the one of a mobile phone:

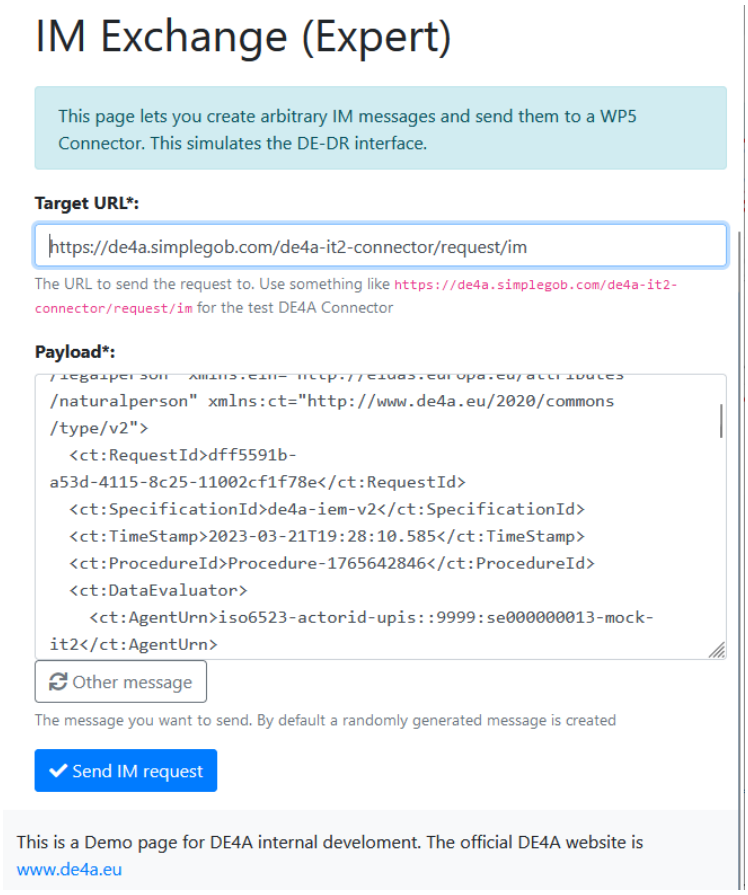

Figure 9: DemoUI IM Exchange (Expert) page in mobile friendly view

6.2.3 Technology used for the implementation

The DemoUI application is a Java application that can be built using Apache Maven. The user interface was created using the Bootstrap 4 framework from https://getbootstrap.com/docs/4.6/ which was encapsulated in a Java library called "ph-oton" from https://github.com/phax/ph-oton to create server-side UIs with Java. As the application is very data driven and server-side checks are a must, it was decided to make all the validations on server side only. As this heavily reduces the size of JavaScript components to load, the page feels pretty quick and is in general very efficient.

For the validation steps the de4a-commons library as described in section 2 was used. For the IAL querying, the IAL API library from https://github.com/de4a-eu/ial-service was used. For HTTP request sending, Apache HttpClient 5.x was used.

Note: the application was developed and tested under Windows but happily runs on other operating systems like Linux as well.

6.2.4 Deployment and configuration

The deployment of the DemoUI is very simple, as it builds to a default Java web application that can be deployed in any common application server like Apache Tomcat or Jetty. It does not require a database or any other general purpose backend component, except the ones noted above.

The configuration of the DemoUI happens primarily via the configuration file called `application.properties`. This file can contain the following properties:

- `global.debug` (Boolean) – Defines if some global debug checks should be enabled or not. The main purpose for this flag is to support developers. In deployed versions, this property should always be `false`.
- `global.production` (Boolean) – Defines is the current deployment is a production one or not. This general-purpose flag can e.g. be used to determine if emails should be send out or if operations should be notified in case of an error. While developing, this flag should always be `false`.
- `webapp.datapath` (File path) – Defines a local directory where certain runtime data like statistics and internal errors should be stored. It is recommended, that this is an absolute directory. If the provided path is relative (not starting with a slash), it is relative to the working directory of the application server for this particular application.
- `webapp.checkfileaccess` (Boolean) – Defines whether the content of the `webapp.datapath` defined directory is checked on application startup for readability for the current OS user. It is recommended to set this property to `true` when run on Linux based operating systems.
- `webapp.publicurl` (URL) – Defines the public HTTP URL under which this service is available from the outside. This is used to create constant response URLs.
- `webapp.dr.baseurl` (URL) – Defines the base URL for the Connector to be used in the UI pages as target URLs.
- `webapp.de.pid` (String) – Defines the Participant ID to be used by default inside the random messages. As this Participant ID needs to be registered in an SMP to receive responses, it cannot just be a random ID. Value of the Participant ID usually starts with `iso6523-actorid-upis::9999:`.
- `http.tls.trustall` (Boolean) – Enables or disables the hostname checks and certificate chain of trust verification for all outbound TLS connections. For security reasons this should be set to `false`.
- `de4a.kafka.enabled` (Boolean) – Enable or disable the usage of the Kafka server for tracking messages from the DemoUI. The default value is `false`.
- `de4a.kafka.url` (String) – The hostname and port of the Kafka server to be used. For the DE4A projects that should always be `de4a.simplegob.com:9092` (without a leading protocol!). *Note:* the usage of Kafka over HTTP is currently not possible.
- `de4a.ial.url` (URL) – Holds the base URL for IAL querying. For the DE4A project that should always be `https://de4a.simplegob.com/ial`.

However, the configuration settings don't necessarily only reside into the file, they can also be passed as environment variables or as Java system properties. The effective resolution logic is described in the Wiki page of ph-config (https://github.com/phax/ph-commons/wiki/ph-config) being responsible for the property resolution.

6.3 Mocked Data Owner

The Mocked Data Owner is deployed as a standalone software component. It provides test evidence based on example IDs of different DOs.

For the USI pattern, the Mocked Data Owner supports a preview functionality where the user must give their explicit consent to send the evidence back to the DE. Together with the DE it provides the user interfaces that make possible the complete end-to-end message exchange.

Its codebase can be found in GitHub [14] and the related deployed instance at https://pre-smp-dr-de4a.redsara.es/de4a-mock-Connector/do1/preview/index.

6.3.1 Functionality overview

The Mocked Data Owner can handle all the messaging for each interaction pattern supported by the DE4A Connector. To do so, it offers different endpoints. When a request is received in the Data Owner, it is processed and a response is sent. It also has a set of sample data to simulate the response of a real Data Owner. The two message structures for iteration 1 and iteration 2 are included.

6.3.2 User Interface

- Evidence preview selection

Allow the user to select the evidence to preview by request ID.

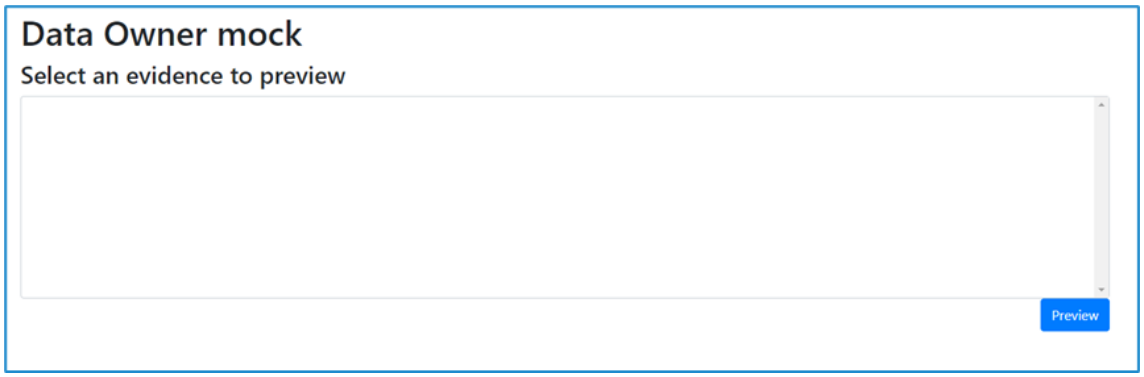

Figure 10: Evidence preview selection

- Evidence preview

Allow the user to preview the selected evidence.

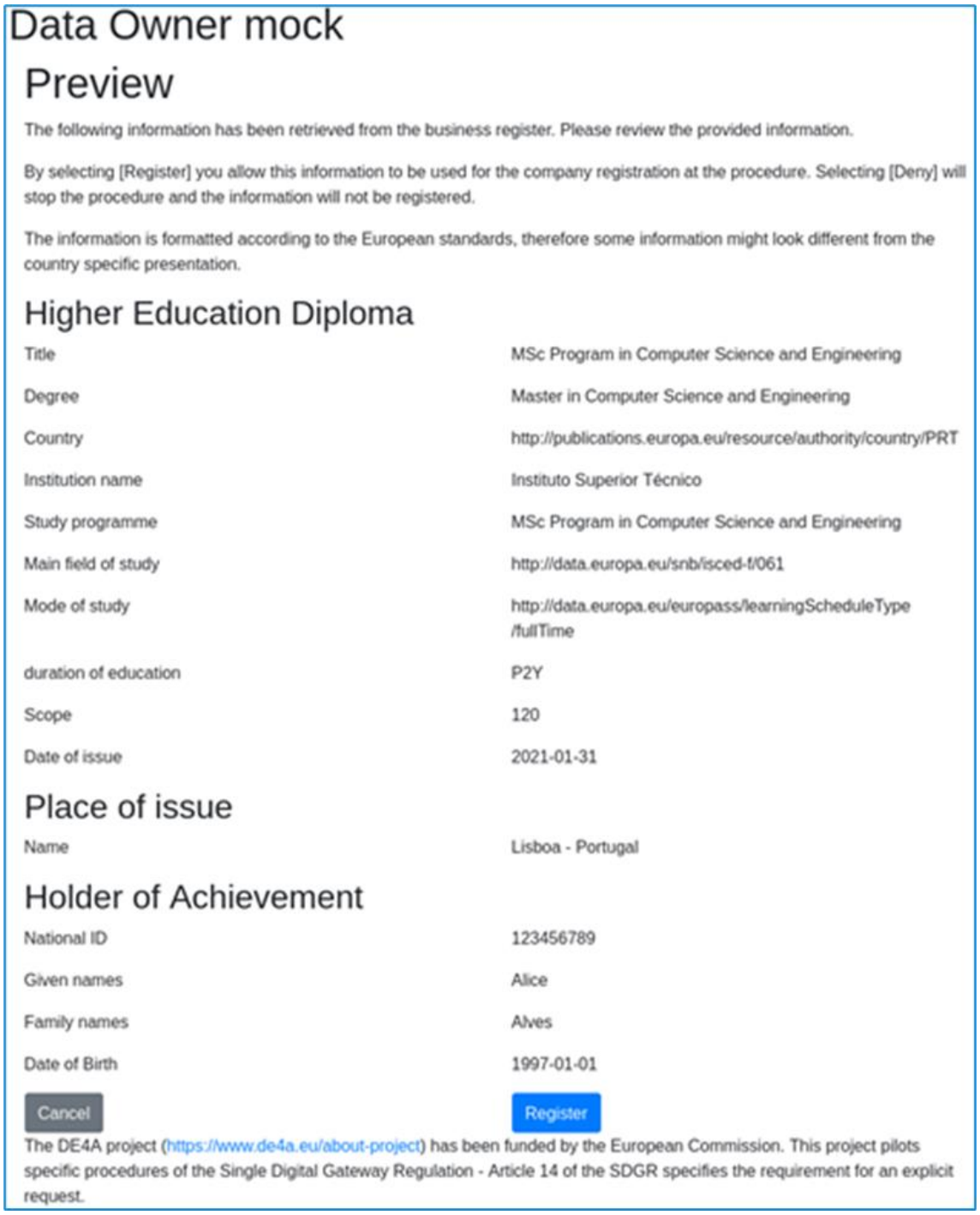

Figure 11: Evidence preview

6.3.3 Technology used for the implementation

The Mocked DO uses (like the DE) the de4a-commons library for handling all the XML related things.

The Mocked DO is deployed as a stand-alone Java 11 application using the Spring Boot framework. The frontend web application needed for the preview functionality is a React.js application bundled by webpack and served by the Spring boot backend.

6.3.4 Deployment and configuration

The Mocked DO functionality is performed by an instance of the de4a-Connector-mock project. The application allows to configure different parameters related to each role that the mock could assume. In this case, the DO related ones will be listed:

- Endpoints configuration

```
mock.do.endpoint.im=/requestExtractEvidenceIM
mock.do.endpoint.usi=/requestExtractEvidenceUSI
```

- USI pattern configuration

```
#The url to where the mock is deployed.
# Currently only used to generate the redirect url for the do preview
mock.baseurl=https://pre-smp-dr-de4a.redsara.es/de4a-mock-Connector/

#the base of the path to the preview pages
mock.do.preview.endpoint.base=/preview/

#path to the preview index page, append to the base path to get the full
path
mock.do.preview.endpoint.index=index

#paths to the preview websocket endpoints, append to the base path to get
the full path
mock.do.preview.endpoint.websocket.socket=ws/socket
mock.do.preview.endpoint.websocket.mess=ws/messages

#paths to the preview rest server endpoints, append to the base path to get
the full path
mock.do.preview.evidence.requestId.all.endpoint=request/all
mock.do.preview.evidence.redirecturl.endpoint=redirecturl/{requestId}
mock.do.preview.evidence.get.endpoint=request/{requestId}
mock.do.preview.evidence.accept.endpoint=request/{requestId}/accept
mock.do.preview.evidence.reject.endpoint=request{requestId}/reject
mock.do.preview.evidence.error.endpoint=request{requestId}/error

#path to send the dt to send the request from the do
mock.do.preview.dt.url=http://localhost:31036/de4a-
Connector/requestTransferEvidenceUSIDT
```

6.3.5 Available sample datasets

Sample datasets are available in the DE4A Playground environment to ease the integration process between real and test components.

The complete list of the sample data sets used in the Playground is available in Annex I.

6.4 Data Requestor

There are two DE4A Connectors deployed as a part of the Playground infrastructure. The Connector acting as DR is deployed on the University of Maribor servers and accessible at https://de4a-Connector.informatika.uni-mb.si/.

6.4.1 Deployment and configuration

The DR of the Playground is deployed mainly with default settings and uses the built in phase4 as AS4 gateway. The only local configurations needed are the certificates used by the AS4 gateway, the URL of the local DE/DO and the Kafka logging specifics. The routing information is fetched from the Central IAL and SMP. The AS4 certificates for the Playground are all signed by CommisSign-2, which is the latest Certificate Authority of the European Commission.

6.4.1.1 Point to TLS configuration

The DR runs behind a reverse proxy like Nginx that terminates the SSL/TLS connection. The certificate is a Let us Encrypt certificate that is kept up to date with Certbot. The DR has been configured to allow connectivity to the DT, by having a compatible certificate expedited by the Certificate Authority.

6.4.1.2 Kafka client configuration

The DR is configured to send logs to the Kafka server directly, not using the http proxy. It is set to de4a-um-si to distinguish it on the Package Tracker.

6.5 Data Transferor

The Connector acting as DT is deployed on the SGAD servers and accessible at https://pre-as4gw-dt-de4a.redsara.es/de4a-Connector/.

6.5.1 Deployment and configuration

The DT of the Playground is deployed mainly with default settings. The only local configurations needed are the certificates used by the AS4 gateway, the URL of the local DE/DO and the Kafka logging specifics. The routing information is fetched from the Central IAL and SMP. The AS4 certificates for the Playground are all signed by the DE4A CA CommisSign-2.

6.5.1.1 Point to HTTP Proxy

Due to the outgoing communication infrastructure, the Connector DT needs to establish the outgoing connections via proxy, for that purpose a proper configuration is provided by the Connector, to create the HTTP connections invoking a proxy server located at the SGAD (ES Government) systems. To perform that functionality, the following properties are configured:

```
http.proxy.enabled=true
http.proxy.address=proxy.redsara.es
http.proxy.port=8080
http.proxy.non-proxy=localhost|*.redsara.es
```

6.5.1.2 Point to TLS configuration

To create the SSL context for secure connections, the Connector provides the appropriate parameters, which are properly configured on the deployed Connector instance to perform the connections though a secure tunnel, using a certificate expedited by the corresponding CA of the country.

```
ssl.context.enabled=true
ssl.keystore.type= PKCS12
ssl.keystore.path= ../../
ssl.keystore.password= *****
ssl.truststore.path= ./../..
ssl.truststore.password= ******
```

6.5.1.3 Kafka client configuration

In the Data Transferor instance, a Kafka producer is configured via proxy, which mean that the messages must be sent through the HTTP protocol instead of the TCP as usually.

The HTTP protocol allows to establish a proxy communication with the Kafka server, which gets the proxy configuration from the parameters described above. Also, there are specific Kafka parameters on the configuration:

```
de4a.kafka.enabled=true
de4a.kafka.http.enabled=true
de4a.kafka.url= https://de4a.simplegob.com/kafkak-rest/
de4a.kafka.topic=de4a-es-sgad
```

All messages sent by the Kafka Client can be viewed by anyone who goes to the Package Tracker URL https://de4a.simplegob.com/package-tracker/#!detail.

6.6 eDelivery

6.6.1 SML

The SML is described in the DE4A Deliverable D5.4 [13]. No specific configuration has been needed to use the SML in the context of the DE4A project.

6.6.2 Shared SMP

The Shared SMP is populated with the routing information of the sample datasets of the fake participants stored in the Mocked DO. This SMP is shared by SGAD. It is deployed on SGAD premises (Spain).

6.6.2.1 Deployment and configuration

The SMP is described in the DE4A Deliverable 5.4 document [13]. No specific configuration has been needed to use the SMP in the context of the DE4A project.

6.6.2.1.1. Point to TLS configuration

phoss SMP does not have an HTTPS mode built in but relies on the deployment server to handle SSL/TLS. In the backend at SGAD, the phoss SMP runs in an application server behind an Apache reverse proxy that handles all the SSL/TLS encryption for all requests.

6.6.2.2 Content for DE4A

The Shared SMP [13] contains the configuration for the testing use cases in Annex I. Different participants, acting as a DE or DO, are configured to enroute messaging between components in a test scenario.

Table 2: Fake participant identifiers for the Playground environment

Participant ID
iso6523-actorid-upis::9920:esq6250003h-mock-it2
iso6523-actorid-upis::9999:at000000271-mock-it2
iso6523-actorid-upis::9999:esq6250003h-mock-it2
iso6523-actorid-upis::9999:ess2833002e-mock-it2
iso6523-actorid-upis::9999:lu000000025-mock-it2

Participant ID
iso6523-actorid-upis::9999:nl000000024-mock-it2
iso6523-actorid-upis::9999:nl990000106-mock-it2
iso6523-actorid-upis::9999:pt000000026-mock-it2
iso6523-actorid-upis::9999:pt990000101-mock-it2
iso6523-actorid-upis::9999:ro000000006-mock-it2
iso6523-actorid-upis::9999:se000000013-mock-it2
iso6523-actorid-upis::9999:si000000016-mock-it2
iso6523-actorid-upis::9999:si000000018-mock-it2

Each participant identifier has the information to attend requests or responses based on a Canonical Evidence Type. Request configuration contains the URL of a Connector DT and response configuration contains the URL of a Connector DR.

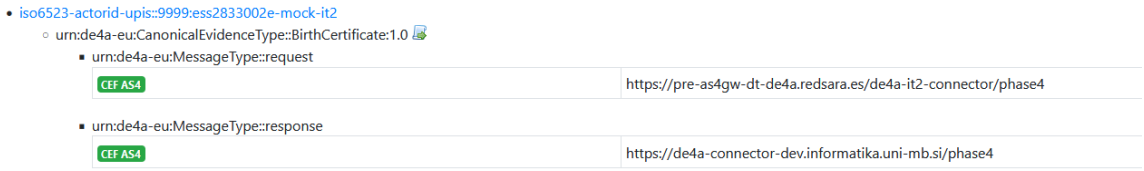

Figure 12: Shared SMP configuration example for request and response

Annex II. contains the complete list of registries used in the Shared SMP to properly route the messages to request and response about the sample datasets of the Playground.

6.6.3 phase4 AS4 Gateway

phase4 AS4 Gateway's detailed information can be found in DE4A Deliverable 5.4 [13]. No specific configuration has been needed to use the phase4 AS4 Gateway in the context of the DE4A project.

6.7 Kafka server

The Kafka Server detailed information can be found in Deliverable 5.4 [13].

6.7.1 Deployment and configuration

The Kafka instance and other services are deployed behind a Nginx reverse proxy and SSL/TLS terminator in Docker containers. For the DE4A project, the setup uses ZooKeeper as the coordinator, Kafka as the broker of messages and the Package Tracker as a web service configured to consume and display any messages received by the Kafka broker. The Package Tracker can only display "live" i.e., any messages received in the past will never be displayed. Figure 13 shows a screenshot from the real system currently running:

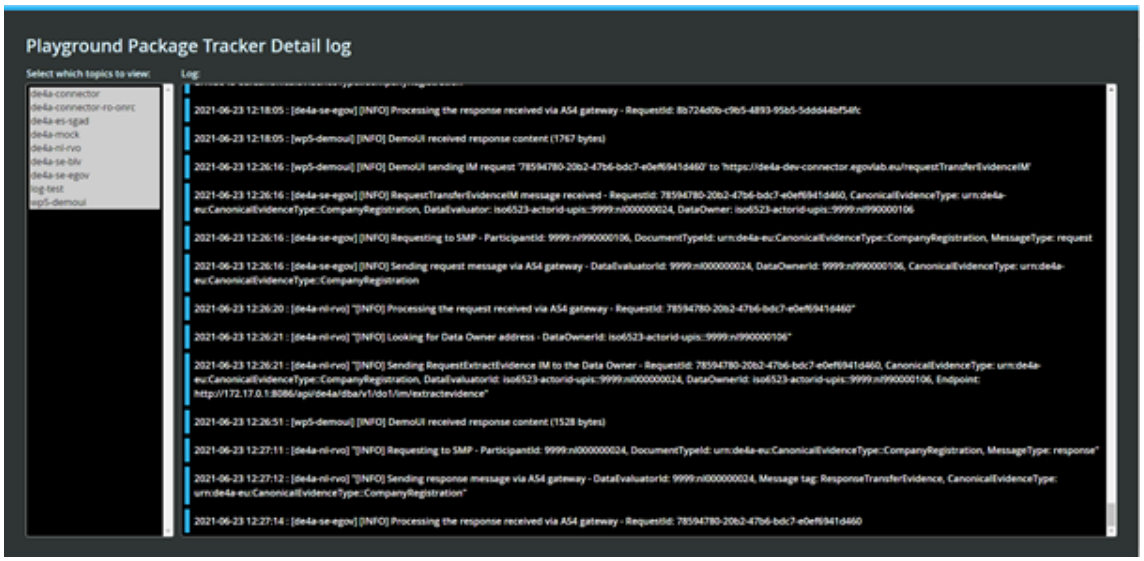

Figure 13: Playground Package Tracker detail log

The Kafka instance is configured to accept new topics automatically to reduce manual handling of new services/pilots/partners getting involved and/or deployed within the DE4A project.

6.7.2 Usage of a REST API for receiving messages from a Connector through a proxy

By default, the Kafka instance at SGAD servers only communicates via the TCP protocol which created problems for SGAD. Their service runs behind a proxy server which only allows outbound HTTP(S) traffic. The resolution to this problem was to set up an additional REST interface to Kafka on SGAD backend, so that the messages can also be transmitted via the HTTP protocol.

7 Conclusions

The common components presented in this deliverable are the result of the joint effort of the technical workpackages of the project:

- "WP2 Architecture vision and framework", which provided the reference architecture with the base specification of the interaction patterns.
- "WP3 "Semantic Interoperability Solutions", which defined semantic toolkit: the Information Desk, a conceptual, semantic component composed in turn of three functionalities: Issuing Authority Locator, Evidence Service Locator and Multilingual Ontology Repository; the Information Exchange Model, the data model to support the exchange of messages between entities; and the Canonical Evidence Types.
- "WP4 Cross-border Pilots for citizens and business", which slighted adapted the reference architecture for each pilot into the solution architectures to ease WP5 work.
- "WP5 Common Component design & development", which took all previous work, deepened the level of detail of the designs and implemented the corresponding components.

One of the biggest challenges of this amount of work has been the effort in communication and coordination that has been necessary, especially if we consider that the work has been done by people from different teams from different organisations and countries.

Now, these common components are the building blocks for the partners participating in the pilots of WP4. They have the common components available, along with the corresponding documentation to deploy and configure them properly. WP5 will continue to support them in their deployments and developments, as one of the final responsibilities of WP5.

The packaging of the common components and their licences will be described in deliverable "D5.9 Final packaging of DE4A components" (not available at the time of writing this deliverable).

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Annexes

Annex I. Sample datasets of the Mocked DO

Table 3: Higher Education Diploma IT1

			Data Evaluator				Data Owner			Data Subject Person					
#	**Automatic response**	**Delay (sec)**	**Country**	**Agent Name**	**Agent URN**	**Canonical Evidence Type Id**	**Country**	**Agent Name**	**Agent URN**	**Country**	**Person Identifier (eIDAS)**	**First Name**	**Family Name**	**Date of Birth**	**Canonical evidence 20-04-2021**
1	N	-	SI	(JSI) Institut Jozef Stefan	iso6523-actorid-upis::9999:si000000018	*HigherEducationDiploma	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/SI/53377873W	Francisco José	Aragó Monzonís	1984-07-24	xml file
2	Y	0	PT	Portuguese IST, University of Lisbon	iso6523-actorid-upis::9999:pt990000101	*HigherEducationDiploma	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/PT/53377873WA	Francisco Joséa	Aragó Monzonísa	1984-07-25	xml file
3	Y	5	SI	(MIZS) Ministrstvo za Izobrazevanje, Znanost in Sport(Ministry of Education, Science and Sport)	iso6523-actorid-upis::9999:si000000016	*HigherEducationDiploma	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/SI/53377873WB	Francisco Joséb	Aragó Monzonísb	1984-07-26	xml file
4	Y	40	PT	Portuguese IST, University of Lisbon	iso6523-actorid-upis::9999:pt990000101	*HigherEducationDiploma	ES	(MPTFP-SGAD) Secretaría General de	iso6523-actorid-upis::9999:ess2833002e	ES	ES/PT/53377873WC	Francisco Joséc	Aragó Monzonísc	1984-07-27	xml file

			Data Evaluator				Data Owner			Data Subject Person					
								Administración Digital							
5	Y	240	SI	(JSI) Institut Jozef Stefan	iso6523-actorid-upis::9999:si000000018	*HigherEducationDiploma	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/SI/53377873WD	Francisco Joséd	Aragó Monzonísd	1984-07-28	xml file
6	N	-	ES	(UJI) Universitat Jaume I de Castellón	iso6523-actorid-upis::9999:esq6250003h	*HigherEducationDiploma	PT	Portuguese IST, University of Lisbon	iso6523-actorid-upis::9999:pt990000101	PT	PT/ES/123456789	Alice	Alves	1997-01-01	xml file
7	Y	0	SI	(JSI) Institut Jozef Stefan	iso6523-actorid-upis::9999:si000000018	*HigherEducationDiploma	PT	Portuguese IST, University of Lisbon	iso6523-actorid-upis::9999:pt990000101	PT	PT/SI/123456789A	Alicea	Alvesa	1997-01-02	xml file
8	Y	10	ES	(UJI) Universitat Jaume I de Castellón	iso6523-actorid-upis::9999:esq6250003h	*HigherEducationDiploma	PT	Portuguese IST, University of Lisbon	iso6523-actorid-upis::9999:pt990000101	PT	PT/ES/123456789B	Aliceb	Alvesb	1997-01-03	xml file
9	Y	80	SI	(MIZS) Ministrstvo za Izobrazevanje, Znanost in Sport(Ministry of Education, Science and Sport)	iso6523-actorid-upis::9999:si000000016	*HigherEducationDiploma	PT	Portuguese IST, University of Lisbon	iso6523-actorid-upis::9999:pt990000101	PT	PT/SI/123456789C	Alicec	Alvesc	1997-01-04	xml file
10	Y	480	ES	(UJI) Universitat Jaume I de Castellón	iso6523-actorid-upis::9999:esq6250003h	*HigherEducationDiploma	PT	Portuguese IST, University of Lisbon	iso6523-actorid-upis::9999:pt990000101	PT	PT/ES/123456789D	Aliced	Alvesd	1997-01-05	xml file

			Data Evaluator				Data Owner			Data Subject Person					
11	N	-	PT	Portuguese IST, University of Lisbon	iso6523-actorid-upis::9999:pt990000101	*HigherEducationDiploma	SI	(MIZS) Ministrstvo za Izobrazevanje, Znanost in Sport(Ministry of Education, Science and Sport)	iso6523-actorid-upis::9999:si000000016	SI	SI/PT/123456	Marjeta	Maček	1999-09-16	xml file
12	Y	0	ES	(UJI) Universitat Jaume I de Castellón	iso6523-actorid-upis::9999:esq6250003h	*HigherEducationDiploma	SI	(MIZS) Ministrstvo za Izobrazevanje, Znanost in Sport(Ministry of Education, Science and Sport)	iso6523-actorid-upis::9999:si000000016	SI	SI/ES/123456A	Marjetaa	Mačeka	1999-09-17	xml file
13	Y	20	PT	Portuguese IST, University of Lisbon	iso6523-actorid-upis::9999:pt990000101	*HigherEducationDiploma	SI	(MIZS) Ministrstvo za Izobrazevanje, Znanost in Sport(Ministry of Education, Science and Sport)	iso6523-actorid-upis::9999:si000000016	SI	SI/PT/123456B	Marjetab	Mačekb	1999-09-18	xml file
14	Y	160	ES	(UJI) Universitat Jaume I de Castellón	iso6523-actorid-upis::9999:esq6250003h	*HigherEducationDiploma	SI	(MIZS) Ministrstvo za Izobrazevanje, Znanost in Sport(Ministry of Education, Science and Sport)	iso6523-actorid-upis::9999:si000000016	SI	SI/ES/123456C	Marjetad	Mačekc	1999-09-19	xml file
15	Y	960	PT	Portuguese IST, University of Lisbon	iso6523-actorid-upis::9999:pt990000101	*HigherEducationDiploma	SI	(MIZS) Ministrstvo za Izobrazevanje, Znanost in Sport(Ministry	iso6523-actorid-upis::9999:si000000016	SI	SI/PT/123456D	Marjetac	Mačekd	1999-09-20	xml file

			Data Evaluator				Data Owner			Data Subject Person					
								of Education, Science and Sport)							

Table 4: Higher Education Diploma IT2

			Data Evaluator				Data Owner			Data Subject Person					
#	**Automatic response**	**Delay (sec)**	**Country**	**Agent Name**	**Agent URN**	**Canonical Evidence Type Id**	**Country**	**Agent Name**	**Agent URN**	**Country**	**Person Identifier (eIDAS)**	**First Name**	**Family Name**	**Date of Birth**	**Canonical evidence 20-04-2021**
1	N	-	SI	(JSI) Institut Jozef Stefan	iso6523-actorid-upis::9999:si000000018	*HigherEducationDiploma	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	53377873W	Usuario	Prueba	1970-01-01	xml file

Table 5: Secondary Education Diploma IT2

			Data Evaluator				Data Owner			Data Subject Person					
#	**Automatic response**	**Delay (sec)**	**Country**	**Agent Name**	**Agent URN**	**Canonical Evidence Type Id**	**Country**	**Agent Name**	**Agent URN**	**Country**	**Person Identifier (eIDAS)**	**First Name**	**Family Name**	**Date of Birth**	**Canonical evidence 20-04-2021**
1	N	-	SI	(JSI) Institut Jozef Stefan	iso6523-actorid-upis::9999:si000000018	*SecondaryEducationDiploma	ES	(UJI) Universitat Jaume I de Castellón	iso6523-actorid-upis::9999:esq6250003h	ES	53377873W	Usuario	Prueba	1970-01-01	xml file

Table 6: Large Family Evidence IT2

			Data Evaluator				Data Owner			Data Subject Person					
#	Automatic response	Delay (sec)	Country	Agent Name	Agent URN	Canonical Evidence Type Id	Country	Agent Name	Agent URN	Country	Person Identifier (eIDAS)	First Name	Family Name	Date of Birth	Canonical evidence 20-04-2021
1	N	-	SI	(JSI) Institut Jozef Stefan	iso6523-actorid-upis::9999:si000000018	*LargeFamilyEvidence	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	53377873W	Juan	Español Madrileño	1972-04-18	xml file

Table 7: Disability Evidence IT2

			Data Evaluator				Data Owner			Data Subject Person					
#	Automatic response	Delay (sec)	Country	Agent Name	Agent URN	Canonical Evidence Type Id	Country	Agent Name	Agent URN	Country	Person Identifier (eIDAS)	First Name	Family Name	Date of Birth	Canonical evidence 20-04-2021
1	N	-	SI	(JSI) Institut Jozef Stefan	iso6523-actorid-upis::9999:si000000018	*DisabilityEvidence	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	53377873W	Juan	Español Madrileño	1972-04-18	xml file

Table 8: Company Registration IT1

	Data Evaluator		Data Owner		Data Subject Company			Data Evaluator		Data Owner	
#	Country	Agent Name	Agent URN	Canonical Evidence Type Id	Country	Agent Name	#	Country	Agent Name	Agent URN	Canonical Evidence Type Id
1	NL	(RVO) Rijksdienst voor Ondernemend Nederland (Netherlands Enterprise Agency)	iso6523-actorid-upis::9999:nl000000024	*CompanyRegistration	AT	(BMDW) Bundesministerium Fuer Digitalisierung Und Wirtschaftsstandort	1	NL	(RVO) Rijksdienst voor Ondernemend Nederland (Netherlands Enterprise Agency)	iso6523-actorid-upis::9999:nl000000024	*CompanyRegistration
2	SE	(BVE) BOLAGSVERKET (Companies Registration Office)	iso6523-actorid-upis::9999:se000000013	*CompanyRegistration	AT	(BMDW) Bundesministerium Fuer Digitalisierung Und Wirtschaftsstandort	2	SE	(BVE) BOLAGSVERKET (Companies Registration Office)	iso6523-actorid-upis::9999:se000000013	*CompanyRegistration
3	RO	(ORNC) Oficiul National B22 Al Registrului Comertului	iso6523-actorid-upis::9999:ro000000006	*CompanyRegistration	AT	(BMDW) Bundesministerium Fuer Digitalisierung Und Wirtschaftsstandort	3	RO	(ORNC) Oficiul National B22 Al Registrului Comertului	iso6523-actorid-upis::9999:ro000000006	*CompanyRegistration
4	AT	(BMDW) Bundesministerium Fuer Digitalisierung Und Wirtschaftsstandort	iso6523-actorid-upis::9999:at000000271	*CompanyRegistration	NL	(KVK) Chamber of Commerce of Netherlands	4	AT	(BMDW) Bundesministerium Fuer Digitalisierung Und Wirtschaftsstandort	iso6523-actorid-upis::9999:at000000271	*CompanyRegistration
5	SE	(BVE) BOLAGSVERKET (Companies Registration Office)	iso6523-actorid-upis::9999:se000000013	*CompanyRegistration	NL	(KVK) Chamber of Commerce of Netherlands	5	SE	(BVE) BOLAGSVERKET (Companies Registration Office)	iso6523-actorid-upis::9999:se000000013	*CompanyRegistration
6	RO	(ORNC) Oficiul National B22 Al Registrului Comertului	iso6523-actorid-upis::9999:ro000000006	*CompanyRegistration	NL	(KVK) Chamber of Commerce of Netherlands	6	RO	(ORNC) Oficiul National B22 Al Registrului Comertului	iso6523-actorid-upis::9999:ro000000006	*CompanyRegistration

	Data Evaluator		Data Owner		Data Subject Company			Data Evaluator		Data Owner	
7	AT	(BMDW) Bundesministerium Fuer Digitalisierung Und Wirtschaftsstandort	iso6523-actorid-upis::9999:at000000271	*CompanyRegistration	SE	(BVE) BOLAGSVERKET (Companies Registration Office)	7	AT	(BMDW) Bundesministerium Fuer Digitalisierung Und Wirtschaftsstandort	iso6523-actorid-upis::9999:at000000271	*CompanyRegistration
8	NL	(RVO) Rijksdienst voor Ondernemend Nederland (Netherlands Enterprise Agency)	iso6523-actorid-upis::9999:nl000000024	*CompanyRegistration	SE	(BVE) BOLAGSVERKET (Companies Registration Office)	8	NL	(RVO) Rijksdienst voor Ondernemend Nederland (Netherlands Enterprise Agency)	iso6523-actorid-upis::9999:nl000000024	*CompanyRegistration
9	RO	(ORNC) Oficiul National B22 Al Registrului Comertului	iso6523-actorid-upis::9999:ro000000006	*CompanyRegistration	SE	(BVE) BOLAGSVERKET (Companies Registration Office)	9	RO	(ORNC) Oficiul National B22 Al Registrului Comertului	iso6523-actorid-upis::9999:ro000000006	*CompanyRegistration
10	AT	(BMDW) Bundesministerium Fuer Digitalisierung Und Wirtschaftsstandort	iso6523-actorid-upis::9999:at000000271	*CompanyRegistration	RO	(ORNC) Oficiul National B22 Al Registrului Comertului	10	AT	(BMDW) Bundesministerium Fuer Digitalisierung Und Wirtschaftsstandort	iso6523-actorid-upis::9999:at000000271	*CompanyRegistration
11	NL	(RVO) Rijksdienst voor Ondernemend Nederland (Netherlands Enterprise Agency)	iso6523-actorid-upis::9999:nl000000024	*CompanyRegistration	RO	(ORNC) Oficiul National B22 Al Registrului Comertului	11	NL	(RVO) Rijksdienst voor Ondernemend Nederland (Netherlands Enterprise Agency)	iso6523-actorid-upis::9999:nl000000024	*CompanyRegistration
12	SE	(BVE) BOLAGSVERKET (Companies Registration Office)	iso6523-actorid-upis::9999:se000000013	*CompanyRegistration	RO	(ORNC) Oficiul National B22 Al Registrului Comertului	12	SE	(BVE) BOLAGSVERKET (Companies Registration Office)	iso6523-actorid-upis::9999:se000000013	*CompanyRegistration

*SMP format = urn:de4a-eu:CanonicalEvidenceType::CompanyRegistration:1.0

Table 9: Subscription and Notification IT2

Canonical Catalogue of Events	#	Canonical Event
Business events	1	Company ended its operations
	2	Company changed its legal form
	3	Company merger or takeover
	4	Company moved to another location
	5	Company administration changed
	6	Company registration evidence has changed

Table 10: Domicile Registration IT1

			Data Evaluator				Data Owner			Data Subject Person					
#	Automatic response	Delay (sec)	Country	Agent Name	Agent URN	Canonical Evidence Type Id	Country	Agent Name	Agent URN	Country	Person Identifier (eIDAS)	First Name	Family Name	Date of Birth	Canonical evidence 20-04-2021
1	N	-	LU	(CTIE) Centre des Technologies de l'Information de l'Etat (State Information Technology Center)	iso6523-actorid-upis::9999:lu000000025	*DomicileRegistrationEvidence	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/LU/99999142H	Nombre	ApellidoPrimero ApellidoSegundo	2000-01-01	xml file
2	Y	0	PT	(AMA IP) Agencia para a Modernizacao Administra	iso6523-actorid-upis::9999:pt000000026	*DomicileRegistrationEvidence	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/PT/99999142HA	Nombrea	ApellidoPrimeroa ApellidoSegundoa	2000-01-02	xml file

			Data Evaluator				Data Owner			Data Subject Person					
				tiva IP (Administration Modernization Agency)											
3	Y	5	LU	(CTIE) Centre des Technologies de l'Information de l'Etat (State Information Technology Center)	iso6523-actorid-upis::9999:lu000000025	*DomicileRegistrationEvidence	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/LU/99999142HB	Nombreb	ApellidoPrimerob ApellidoSegundob	2000-01-03	xml file
4	Y	40	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt000000026	*DomicileRegistrationEvidence	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/PT/99999142HC	Nombrec	ApellidoPrimeroc ApellidoSegundoc	2000-01-04	xml file
5	Y	240	LU	(CTIE) Centre des Technologies de l'Information de l'Etat	iso6523-actorid-upis::9999:lu000000025	*DomicileRegistrationEvidence	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/LU/99999142HD	Nombred	ApellidoPrimerod ApellidoSegundod	2000-01-05	xml file

			Data Evaluator				Data Owner			Data Subject Person					
				(State Information Technology Center)											
6	N	-	LU	(CTIE) Centre des Technologies de l'Information de l'Etat (State Information Technology Center)	iso6523-actorid-upis::9999:lu000000025	*DomicileRegistrationEvidence	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt0000000026	PT	PT/LU/12345678	Panagiótis	Karakolis Karakolis	1980-12-17	xml file
7	Y	0	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	*DomicileRegistrationEvidence	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt0000000026	PT	PT/ES/12345678A	Panagiótisa	Karakolisa Karakolisa	1980-12-18	xml file
8	Y	10	LU	(CTIE) Centre des Technologies de l'Information de l'Etat (State Information Technology Center)	iso6523-actorid-upis::9999:lu000000025	*DomicileRegistrationEvidence	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt0000000026	PT	PT/LU/12345678B	Panagiótisb	Karakolisb Karakolisb	1980-12-19	xml file

			Data Evaluator				Data Owner			Data Subject Person					
9	Y	80	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	*DomicileRegistrationEvidence	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt000000026	PT	PT/ES/12345678C	Panagiótisc	Karakolisc Karakolisc	1980-12-20	xml file
10	Y	480	LU	(CTIE) Centre des Technologies de l'Information de l'Etat (State Information Technology Center)	iso6523-actorid-upis::9999:lu000000025	*DomicileRegistrationEvidence	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt000000026	PT	PT/LU/12345678D	Panagiótisd	Karakolisd Karakolisd	1980-12-21	xml file

*SMP format = urn:de4a-eu:CanonicalEvidenceType::DomicileRegistrationEvidence:1.0

Table 11: Birth Evidence IT1

			Data Evaluator				Data Owner			Data Subject Person					
#	**Automatic response**	**Delay (sec)**	**Country**	**Agent Name**	**Agent URN**	**Canonical Evidence Type Id**	**Country**	**Agent Name**	**Agent URN**	**Country**	**Person Identifier (eIDAS)**	**First Name**	**Family Name**	**Date of Birth**	**Canonical evidence 20-04-2021**
1	N	-	LU	(CTIE) Centre des Technologies de l'Information de l'Etat (State Information	iso6523-actorid-upis::9999:lu000000025	*BirthEvidence	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/LU/99999142H	Nombre	ApellidoPrimero ApellidoSegundo	2000-01-01	xml file

			Data Evaluator				Data Owner			Data Subject Person					
				Technology Center)											
2	Y	0	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt000000026	*BirthEvidence	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/PT/99999142HA	Nombrea	ApellidoPrimeroa ApellidoSegundoa	2000-01-02	xml file
3	Y	5	LU	(CTIE) Centre des Technologies de l'Information de l'Etat (State Information Technology Center)	iso6523-actorid-upis::9999:lu000000025	*BirthEvidence	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/LU/99999142HB	Nombreb	ApellidoPrimerob ApellidoSegundob	2000-01-03	xml file
4	Y	40	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt000000026	*BirthEvidence	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/PT/99999142HC	Nombrec	ApellidoPrimeroc ApellidoSegundoc	2000-01-04	xml file
5	Y	240	LU	(CTIE) Centre des Technologies de l'Information de l'Etat (State Information	iso6523-actorid-upis::9999:lu000000025	*BirthEvidence	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/LU/99999142HD	Nombred	ApellidoPrimerod ApellidoSegundod	2000-01-05	xml file

			Data Evaluator				Data Owner			Data Subject Person					
				Technology Center)											
6	N	-	LU	(CTIE) Centre des Technologies de l'Information de l'Etat (State Information Technology Center)	iso6523-actorid-upis::9999:lu000000025	*BirthEvidence	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt000000026	PT	PT/LU/12345678	Panagiótis Manouíl	Karakolis Karakolis	2010-12-17	xml file
7	Y	0	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	*BirthEvidence	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt000000026	PT	PT/ES/12345678A	Panagiótisa Manouíla	Karakolisa Karakolisa	2010-12-18	xml file
8	Y	10	LU	(CTIE) Centre des Technologies de l'Information de l'Etat (State Information Technology Center)	iso6523-actorid-upis::9999:lu000000025	*BirthEvidence	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt000000026	PT	PT/LU/12345678B	Panagiótisb Manouílb	Karakolisb Karakolisb	2010-12-19	xml file
9	Y	80	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	*BirthEvidence	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt000000026	PT	PT/ES/12345678C	Panagiótisc Manouílc	Karakolisc Karakolisc	2010-12-20	xml file

			Data Evaluator				Data Owner			Data Subject Person					
10	Y	480	LU	(CTIE) Centre des Technologies de l'Information de l'Etat (State Information Technology Center)	iso6523-actorid-upis::9999:lu000000025	*BirthEvidence	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt000000026	PT	PT/LU/12345678D	Panagiótisd Manouíld	Karakolisd Karakolisd	2010-12-21	xml file

*SMP format = urn:de4a-eu:CanonicalEvidenceType::BirthEvidence:1.0

Table 12: Marriage Evidence IT1

			Data Evaluator				Data Owner			Data Subject Person					
#	**Automatic response**	**Delay (sec)**	**Country**	**Agent Name**	**Agent URN**	**Canonical Evidence Type Id**	**Country**	**Agent Name**	**Agent URN**	**Country**	**Person Identifier (eIDAS)**	**First Name**	**Family Name**	**Date of Birth**	**Canonical evidence 20-04-2021**
1	N	-	LU	(CTIE) Centre des Technologies de l'Information de l'Etat (State Information Technology Center)	iso6523-actorid-upis::9999:lu000000025	*MarriageEvidence	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/LU/99999142H	Nombre	ApellidoPrimero ApellidoSegundo	2000-01-01	xml file
2	Y	0	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt000000026	*MarriageEvidence	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/PT/99999142HA	Nombrea	ApellidoPrimeroa ApellidoSegundoa	2000-01-02	xml file

			Data Evaluator				Data Owner			Data Subject Person					
3	Y	5	LU	(CTIE) Centre des Technologies de l'Information de l'Etat (State Information Technology Center)	iso6523-actorid-upis::9999:lu000000025	*MarriageEvidence	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/LU/99999142HB	Nombreb	ApellidoPrimerob ApellidoSegundob	2000-01-03	xml file
4	Y	40	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt000000026	*MarriageEvidence	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/PT/99999142HC	Nombrec	ApellidoPrimeroc ApellidoSegundoc	2000-01-04	xml file
5	Y	240	LU	(CTIE) Centre des Technologies de l'Information de l'Etat (State Information Technology Center)	iso6523-actorid-upis::9999:lu000000025	*MarriageEvidence	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	ES	ES/LU/99999142HD	Nombred	ApellidoPrimerod ApellidoSegundod	2000-01-05	xml file
6	N	-	LU	(CTIE) Centre des Technologies de l'Information de l'Etat (State Information Technology Center)	iso6523-actorid-upis::9999:lu000000025	*MarriageEvidence	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt000000026	PT	PT/LU/12345678	Stavros	Karakolis	1987-12-17	xml file
7	Y	0	ES	(MPTFP-SGAD) Secretaría General de	iso6523-actorid-upis::9999:ess2833002e	*MarriageEvidence	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP	iso6523-actorid-upis::9999:pt000000026	PT	PT/ES/12345678A	Stavrosa	Karakolisa	1987-12-18	xml file

			Data Evaluator				Data Owner		Data Subject Person					
				Administración Digital				(Administration Modernization Agency)						
8	Y	10	LU	(CTIE) Centre des Technologies de l'Information de l'Etat (State Information Technology Center)	iso6523-actorid-upis::9999:lu000000025	*MarriageEvidence	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt000000026	PT	PT/LU/12345678B	Stavrosb	Karakolisb	1987-12-19	xml file
9	Y	80	ES	(MPTFP-SGAD) Secretaría General de Administración Digital	iso6523-actorid-upis::9999:ess2833002e	*MarriageEvidence	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt000000026	PT	PT/ES/12345678C	Stavrosc	Karakolisc	1987-12-20	xml file
10	Y	480	LU	(CTIE) Centre des Technologies de l'Information de l'Etat (State Information Technology Center)	iso6523-actorid-upis::9999:lu000000025	*MarriageEvidence	PT	(AMA IP) Agencia para a Modernizacao Administrativa IP (Administration Modernization Agency)	iso6523-actorid-upis::9999:pt000000026	PT	PT/LU/12345678D	Stavrosd	Karakolisd	1987-12-21	xml file

*SMP format = urn:de4a-eu:CanonicalEvidenceType::MarriageEvidence:1.0

Annex II. Shared SMP testing endpoints configuration

Table 13 shows the SMP testing configuration. Column Document Type ID stands for Canonical Evidence Type ID in DE4A project. Column Process Type stands for Message Type in DE4A Project.

Table 13: Shared SMP testing endpoints configuration

Document Type ID	Participant identifier	Process Type	Transport Profile	Connector URL
DomicileRegistrationEvidence:1.0	iso6523-actorid-upis::9999:ess2833002e-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
DomicileRegistrationEvidence:1.0	iso6523-actorid-upis::9999:pt000000026-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
DomicileDeregistrationEvidence:1.0	iso6523-actorid-upis::9999:pt000000026-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
DomicileRegistrationEvidence:1.0	iso6523-actorid-upis::9999:ess2833002e-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
DomicileRegistrationEvidence:1.0	iso6523-actorid-upis::9999:pt000000026-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
DomicileRegistrationEvidence:1.0	iso6523-actorid-upis::9999:lu000000025-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
BirthEvidence:1.0	iso6523-actorid-upis::9999:ess2833002e-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
BirthEvidence:1.0	iso6523-actorid-upis::9999:pt000000026-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
BirthEvidence:1.0	iso6523-actorid-upis::9999:ess2833002e-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
BirthEvidence:1.0	iso6523-actorid-upis::9999:pt000000026-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
BirthEvidence:1.0	iso6523-actorid-upis::9999:lu000000025-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
MarriageEvidence:1.0	iso6523-actorid-upis::9999:ess2833002e-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
MarriageEvidence:1.0	iso6523-actorid-upis::9999:pt000000026-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
MarriageEvidence:1.0	iso6523-actorid-upis::9999:ess2833002e-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
MarriageEvidence:1.0	iso6523-actorid-upis::9999:pt000000026-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
MarriageEvidence:1.0	iso6523-actorid-upis::9999:lu000000025-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
HigherEducationDiploma:1.0	iso6523-actorid-upis::9999:ess2833002e-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
HigherEducationDiploma:1.0	iso6523-actorid-upis::9999:pt990000101-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
HigherEducationDiploma:1.0	iso6523-actorid-upis::9999:si000000016-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
HigherEducationDiploma:1.0	iso6523-actorid-upis::9999:si000000018-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
HigherEducationDiploma:1.0	iso6523-actorid-upis::9999:pt990000101-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4

Document Type ID	Participant identifier	Process Type	Transport Profile	Connector URL
HigherEducationDiploma:1.0	iso6523-actorid-upis::9999:si000000016-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
HigherEducationDiploma:1.0	iso6523-actorid-upis::9920:esq6250003h-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
HigherEducationDiploma:2.0	iso6523-actorid-upis::9999:ess2833002e-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
HigherEducationDiploma:2.0	iso6523-actorid-upis::9999:si000000018-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
LargeFamilyEvidence:1.0	iso6523-actorid-upis::9999:ess2833002e-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
LargeFamilyEvidence:1.0	iso6523-actorid-upis::9999:si000000018-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
DisabilityEvidence:1.0	iso6523-actorid-upis::9999:ess2833002e-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
DisabilityEvidence:1.0	iso6523-actorid-upis::9999:si000000018-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
SecondaryEducationDiploma:1.0	iso6523-actorid-upis::9999:ess2833002e-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
SecondaryEducationDiploma:1.0	iso6523-actorid-upis::9999:si000000018-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
CompanyRegistration:1.0	iso6523-actorid-upis::9999:at000000271-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
CompanyRegistration:1.0	iso6523-actorid-upis::9999:nl990000106-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
CompanyRegistration:1.0	iso6523-actorid-upis::9999:se000000013-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
CompanyRegistration:1.0	iso6523-actorid-upis::9999:ro000000006-mock-it2	Request	CEF AS4	https://pre-as4gw-dt-de4a.redsara.es/de4a-it2-connector/phase4
CompanyRegistration:1.0	iso6523-actorid-upis::9999:nl000000024-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
CompanyRegistration:1.0	iso6523-actorid-upis::9999:se000000013-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
CompanyRegistration:1.0	iso6523-actorid-upis::9999:ro000000006-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4
CompanyRegistration:1.0	iso6523-actorid-upis::9999:at000000271-mock-it2	Response	CEF AS4	https://de4a-connector-dev.informatika.uni-mb.si/phase4