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REST API Pilot: Implementation Overview

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1 Introduction

The main objective of the pilot is to create sample implementations of REST APIs conformant to the ISA² IPS REST API Profile both to provide a reference for future implementations and to validate the profile's fitness for purpose. As such, the aim was to pilot all three sections of the profile: the API Core Profile, the API Documentation and the Messaging API Specification. The integration between the National Broker and DSD registry uses the Messaging API Specification, while the integration between National Broker and the UI Client uses the API Core Profile. Both APIs are documented using the API Documentation.

1.1 Purpose of the document

This document provides an overview of the technical implementation of the pilot. It describes the components that were developed, along with insight into their logical design.

The implementation serves as proof of concept of the use case scenarios and can be used as an example for other projects based on the ISA² IPS REST API Profile.

As part of the pilot, a generic framework for using the Messaging API Specification was developed. Before the framework can be used for production purposes, additional quality and reliability assurance work must be carried out.

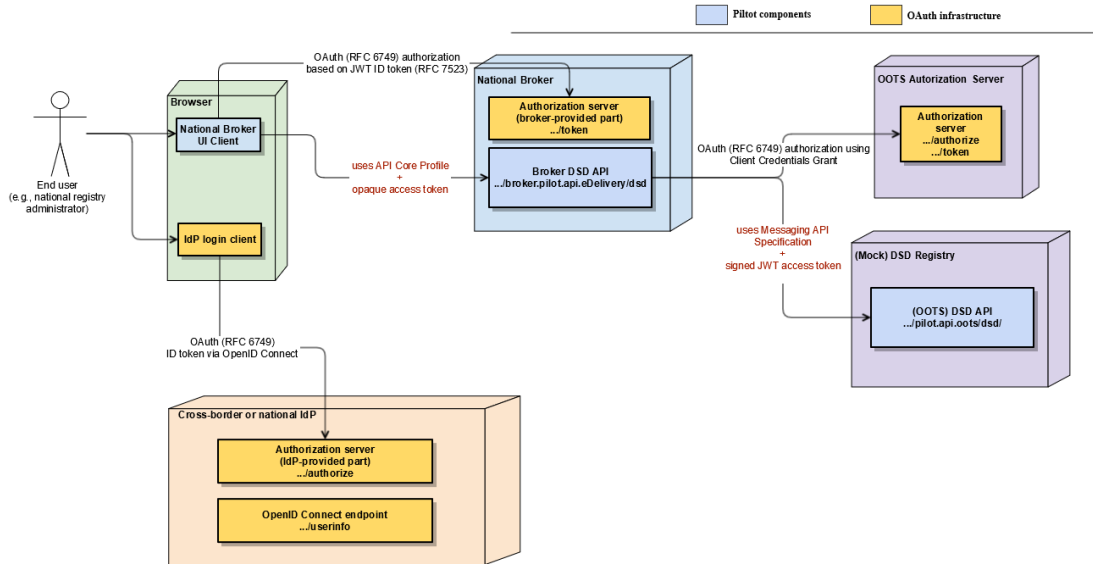
1.2 Limitations

As the actual business functionality is only relevant to the extent that it supports the main objective presented above, most such functionality is either mocked or provided in a simplified way. This allowed focusing the effort on the use of as many of the specifics of the ISA² IPS REST API Profile as possible in the REST APIs that were developed.

Because the profile is using the latest version of the OpenAPI specification (version 3.1), one of the challenges was to implement features only introduced in this version because at the time the pilot was implemented there were no Java frameworks that would support OpenAPI v3.1.

2 Use case implementation

The detailed Software Functional Specification for REST API Pilot is provided at [link here](#). The component diagram contained therein is reproduced here for reference:



2.1 Implementation of "National registry administrator is authenticated before being authorised to update the DSD registry"

For the first leg of the authentication & authorization process, **between the National Broker UI Client and the National Broker**, the REST API Pilot uses [Auth0](#) as the Identity Provider (IdP). OAuth Authorization Code with PKCE flow is used for authorization.

Auth0 details for the pilot
Tenant: national-broker-poc
Domain: national-broker-poc.eu.auth0.com
Application: NationalBroker-UI-Client

For the second leg of the authentication & authorization process, **between the National Broker and the DSD registry**, the [Okta](#) authorization server is used as an external authorization server.

Okta was chosen over Auth0 to demonstrate a segregated IdP / external authorization server setup and also because Auth0 did not fully allow the implementation of the Client Credentials flow for an external API endpoint.

OKTA details for the pilot
Domain: dev-24443841.okta.com

OKTA details for the pilot

Applications: [National-Broker](#) (Client ID: 0oat23m60pvuxHNMT5d6)

APIs: [DSD-MOCK-API-Authorization \(https://dev-24443841.okta.com/oauth2/aus1096gcr9r537Ut5d7\)](https://dev-24443841.okta.com/oauth2/aus1096gcr9r537Ut5d7)

Metadata URI: <https://dev-24443841.okta.com/oauth2/aus1096gcr9r537Ut5d7/.well-known/oauth-authorization-server>

2.1.1 Pre-requisites: Admin configuration in Auth0 and Okta

2.1.1.1 Configure Auth0 Tenant

A tenant in [Auth0](#) identifies a group of users connected to a specific instance of an application. In the context of the REST API Pilot, each instance of the National Broker should be identified separately as an Auth0 tenant.

After creating an account in [Auth0](#), create a tenant and choose the relevant option. Subscription and payments related to [Auth0](#) and customised services provided thereof are out of scope of this document.

The screenshot shows the 'New Tenant' configuration form in Auth0. It includes the following fields and options:

- Tenant Domain ***: A text input field containing 'national-broker' and a dropdown menu showing '.eu.auth0.com'.
- Region ***: A selection of four regions: Australia, Europe (selected), Japan, and US.
- Environment Tag ***: A selection of three environment tags: Development, Staging, and Production (selected).

Buttons for 'Cancel' and 'Create' are located at the bottom right of the form.

In order to authenticate users of the NationalBroker-UI-Client and associate the necessary authorizations, an instance of the NationalBroker-UI-Client needs to be configured as a single page application.

The major configuration settings to be considered are provided below:

Configuration Setting	Configuration Value
Application Type	Single Page Application
Allowed Callback URLs	<the endpoints of the NationalBroker instance that will be used for token exchange. Reverse proxy URLs can also be provided. This URL will be included in the audience field of the token request>
Allowed Logout URLs	<the endpoints to redirect to after user logout from Auth0. Reverse proxy URLs can also be provided>
Allowed Origins (CORS)	<the endpoints of NationalBroker-UI-Client from which redirection will be initiated to the Auth0 authentication page>

Configuration Setting	Configuration Value
Advanced Settings → Grant Type	Authorization Code

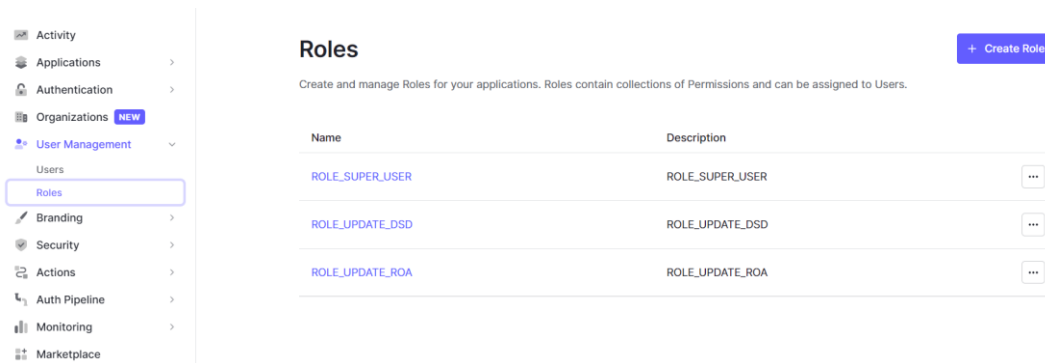
The public certificates to be included in the truststore of the NationalBroker can be downloaded from **Advanced Settings** → **Certificates**. This certificate is needed for the NationalBroker to validate the JWT Access Token issued by [Auth0](#).

Here is an example of a working configuration:

The screenshot displays the configuration interface for the 'NationalBroker-UI-Client' application. The left sidebar contains navigation options such as Activity, Applications, API, Organization, User Management, Security, Actions, Auth Pipeline, Monitoring, Marketplace, Extensions, and Settings. The main content area is divided into several sections:

- Basic Information:** Fields for Name (NationalBroker-UI-Client), Domain (nationalbroker.gov.au.auath01.com), Client ID (8474500M3J04U47N9F7E230SL), and Client Secret (masked). A description field is also present.
- Application Properties:** Application Logo (NationalBroker-UI-Client), Application Type (Single Page Application), and Token Endpoint Authentication Method (None).
- Application Uris:** Application Logo URI, Allowed Callback URLs (e.g., https://nationalbroker.gov.au/888/nationalbroker/authorize, https://gateway-identity-westernuniversitycloudapp.acorn.com:8083), Allowed Logout URLs, and Allowed Origins (e.g., https://gateway-identity-westernuniversitycloudapp.acorn.com:8083/nationalbroker/). Each URL field includes explanatory text about its purpose and usage.
- ID Token:** ID Token Expiration (3000 seconds).
- Refresh Tokens Rotation:** Rotation (disabled), Renew Interval (8 seconds).
- Refresh Token Expiration:** Absolute Expiration (disabled), Renew Interval (8 seconds).
- Refresh Token Expiration:** Absolute Expiration (disabled), Absolute Lifetime (30000 seconds), Inactivity Expiration (disabled), and Inactivity Lifetime (120000 seconds).
- Advanced Settings:** Application Metadata, Device Settings, OAuth, Grant Types (selected: Authorization Code, Refresh Token, Client Credentials, Password), and Endpoints. A warning message states: 'Using Password or MFA grant types with public applications is not recommended. To use the Client Credentials grant type you have to set a Token Endpoint Auth Method other than "none". See the documentation for more information.' Below this, checkboxes for 'implicit', 'MFA', and 'Password OIP' are visible.

The required user roles have to be configured under **User Management** → **Roles**:



The screenshot shows a user management interface. On the left is a sidebar menu with categories: Activity, Applications, Authentication, Organizations (marked NEW), User Management (expanded), Users, Roles (highlighted), Branding, Security, Actions, Auth Pipeline, Monitoring, and Marketplace. The main content area is titled 'Roles' and includes a '+ Create Role' button. Below the title is a table with columns 'Name' and 'Description'. The table lists three roles: ROLE_SUPER_USER, ROLE_UPDATE_DSD, and ROLE_UPDATE_ROA, each with a three-dot menu icon to its right.

Name	Description
ROLE_SUPER_USER	ROLE_SUPER_USER
ROLE_UPDATE_DSD	ROLE_UPDATE_DSD
ROLE_UPDATE_ROA	ROLE_UPDATE_ROA

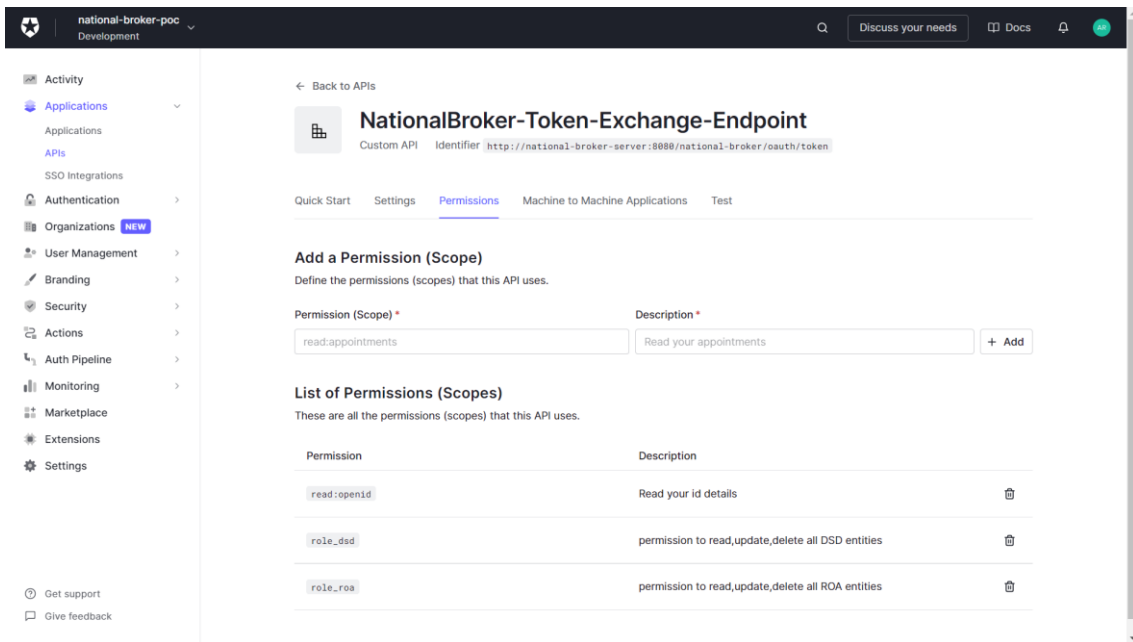
In order for [Auth0](#) to accept the token exchange endpoint of the NationalBroker as an intended audience, the endpoint should be configured as an API under **Applications** → **APIs**. Here is an example of a working configuration:

The screenshot shows the configuration page for the **NationalBroker-Token-Exchange-Endpoint** in a development environment. The page is organized into several sections:

- General Settings:**
 - Id:** 60d061baa3e04a003f58305d
 - Name:** NationalBroker-Token-Exchange-Endpoint
 - Identifier:** http://national-broker-server:8080/national-broker/oauth/token
- Token Settings:**
 - Token Expiration (Seconds):** 86400
 - Token Expiration For Browser Flows (Seconds):** 7200
 - Signing Algorithm:** RS256
- RBAC Settings:**
 - Enable RBAC:** Disabled
 - Add Permissions in the Access Token:** Disabled
- Access Settings:**
 - Allow Skipping User Consent:** Enabled
 - Allow Offline Access:** Disabled

A **Save** button is located at the bottom of the configuration form.

The required role permissions then need to be configured in the **Permissions** tab:

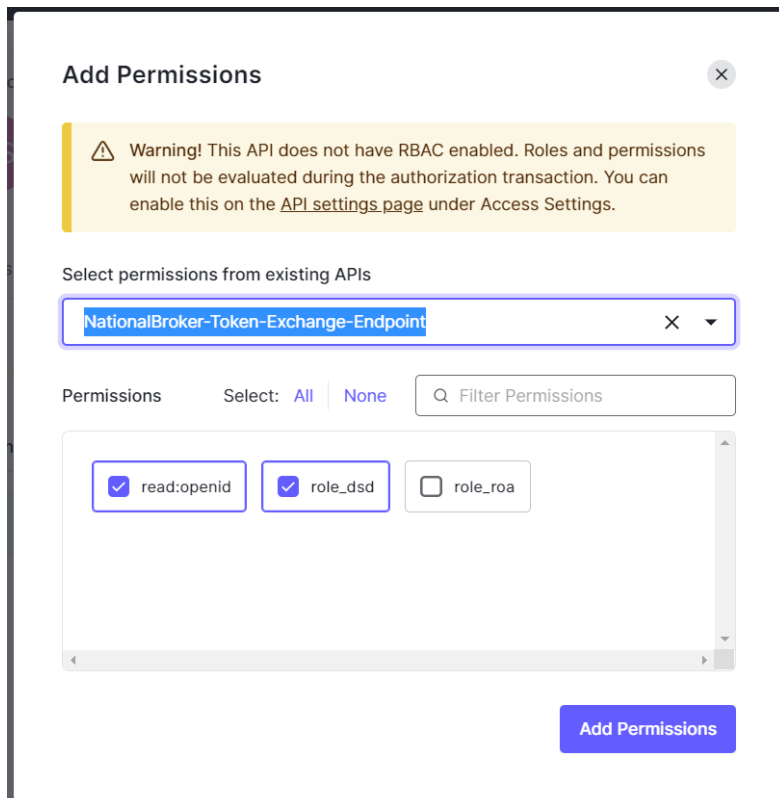


2.1.1.2 Configure user in Auth0 tenant

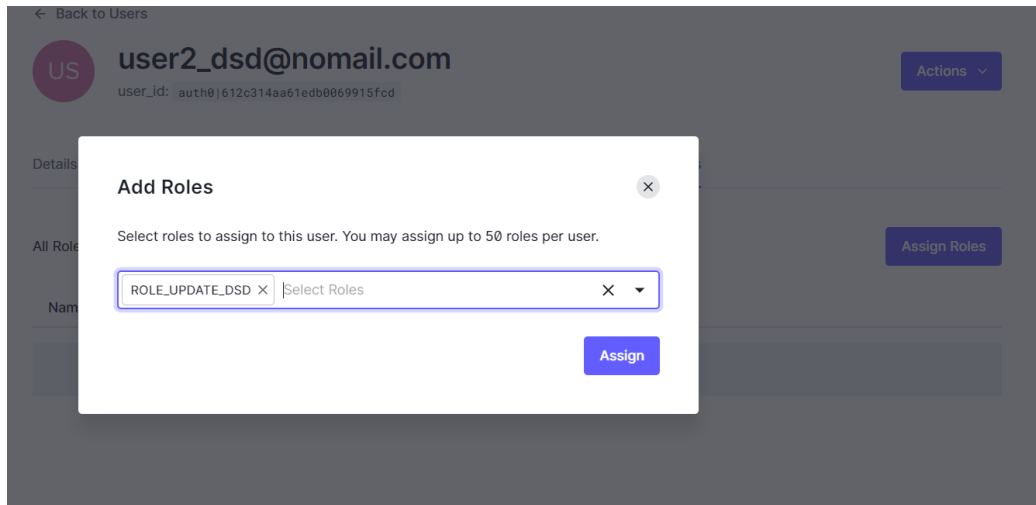
A default user has been configured in [Auth0](#) for use in the Demo installation.

The following are the steps to configure a new user as part of a tenant:

1. Switch to the national broker tenant in [Auth0](#) and go to link **User Management** → **Users** . Create new user and provide mail (as login – username) and password.
2. Open the user details and go to **Permissions** tab. Click assign permission and select API for National Broker Token Exchange endpoint with permissions: **openid** and **role_dsd**:



- In user details go to the **Roles** tab, click **Assign Roles** and select **ROLE_UPDATE_DSD**:



- In National Broker database table – **NB_USER**, add the user details with the unique user id from the IdP and add linked entry in **NB_USER_ROLE** table.

The screenshot shows the user details page for 'user2_dsd@nomail.com'. The 'Details' tab is active, showing user information such as Name, Email, Signed Up, Primary Identity Provider, Latest Login, Accounts Associated, and Browser.

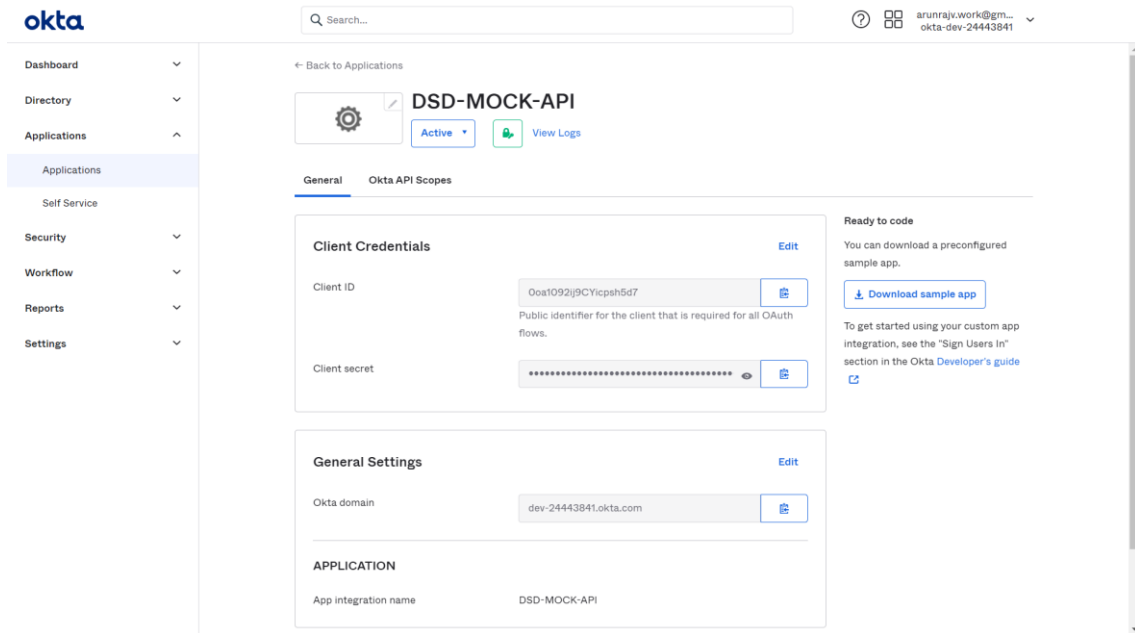
Name	Email	Signed Up
user2_dsd@nomail.com	user2_dsd@nomail.com (pending)	August 30th 2021, 4:03:31 AM
Edit	Edit	
Primary Identity Provider	Latest Login	Accounts Associated
Database	Never	None
Browser		
Other 0.0.0 / Other 0.0.0		

- The ID Token from [Auth0](#) can be exchanged to an access token issued from the National Broker using the token exchange endpoint – <http://national-broker-server:8080/national-broker/oauth/token>. The token obtained from this token exchange endpoint is used further in the National Broker API as Bearer token authorization.

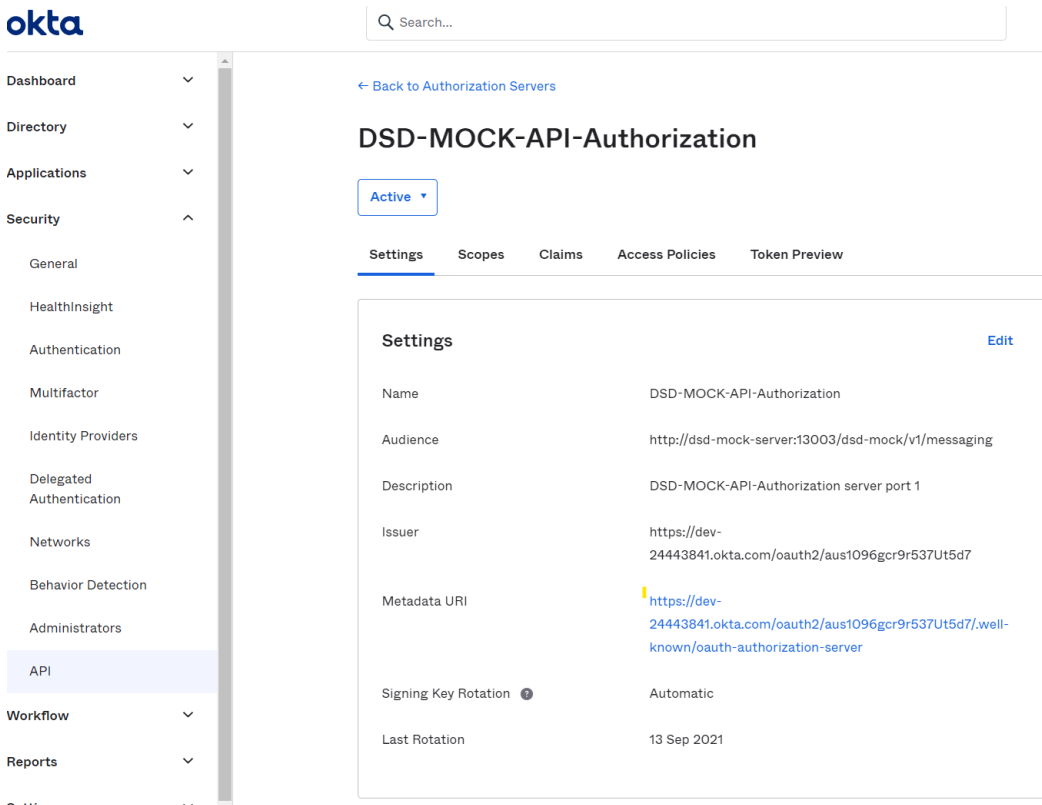
2.1.1.3 Configure Okta Tenant

For DSD mock endpoints to be accepted as an intended audience in the access token issued by [Okta](#), the DSD mock first needs to be registered in [Okta](#) as a recognized API.

Inside **Applications** → **Create App Integration**, select **API Services**. Typically only one instance of DSD is required:



To use custom OAuth scopes along with the client credentials authorization flow, a custom authorization server needs to be created. Under **Security** → **API**, click on **Add Authorization Server**. Provide the messaging endpoint of DSD as the **Audience**:



In the **Scopes** tab, add the **ROLE_DSD** scope as shown below:

[← Back to Authorization Servers](#)

DSD-MOCK-API-Authorization

[Help](#)

Active ▾

Settings **Scopes** Claims Access Policies Token Preview

+ Add Scope						
Name	Display Name	Description	User Consent	Block Services	Default Scope	Metadata Publish
ROLE_DSD	ROLE_DSD	ROLE_DSD	No	No	No	Yes ✎ ✕
openid	openid	Signals that a request is an OpenID request.	No	No	No	Yes ✎
profile	View your profile information.	The exact data varies based on what profile information you have provided, such as:	No	No	No	Yes ✎

The supported OAuth flows and the token lifetime can be configured using **Access Policies**:

Settings **Scopes** Claims **Access Policies** Token Preview

Add New Access Policy

⋮ 1 Assign ROLE_DSD

Active ▾ ✎ Edit ✕ Delete

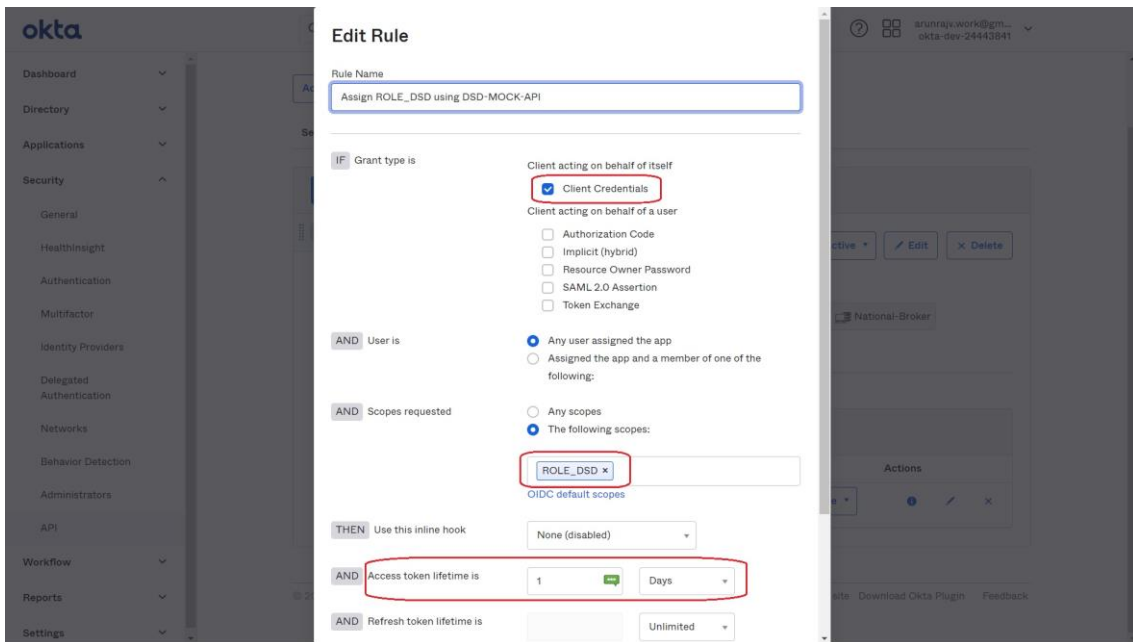
Description: Assign ROLE_DSD

Assigned to clients: DSD-MOCK-API National-Broker

Add Rule

Priority	Rule Name	Scopes	Status	Actions
⋮ 1	Assign ROLE_DSD using DSD-MOCK-API	1	Active ▾	ℹ ✎ ✕

The demo application does not implement a token refresh function, so it is recommended to set the token lifetime to a sufficiently long duration:



Every new instance of a National Broker should be configured separately as an application in the Okta authorization server for client credentials authorization. Under **Applications** → **Create App Integration**, select **Sign-in method** : **OIDC - OpenID Connect** and **Application type** : **Web Application**:



- Dashboard ▼
- Directory ▼
- Applications ▲
- Applications
- Self Service
- Security ▼
- Workflow ▼
- Reports ▼
- Settings ▼

← Back to Applications

National-Broker

Active
View Logs

General
Sign On
Assignments
Okta API Scopes

Client Credentials Edit

Client ID

Public identifier for the client that is required for all OAuth flows.

Client secret

Secret used by the client to exchange an authorization code for a token. This must be kept confidential! Do not include it in apps which cannot keep it secret, such as those running on a client.

General Settings Edit

Okta domain

APPLICATION

App integration name National-Broker

Application type Web

Grant type

Client acting on behalf of itself

Client Credentials

Client acting on behalf of a user

Authorization Code

Refresh Token

Implicit (hybrid)

USER CONSENT

User consent Require consent

Terms of Service URI ?

Policy URI ?

Logo URI ?

LOGIN

Sign-in redirect URIs ?

Allow wildcard * in login URI redirect.

`http://national-broker-server:13003/national-broker/oauth/token`

`http://national-broker-server:8080/national-broker/oauth/token`

Sign-out redirect URIs ?

`http://national-broker-server:13003/national-broker/logout`

Login initiated by App Only

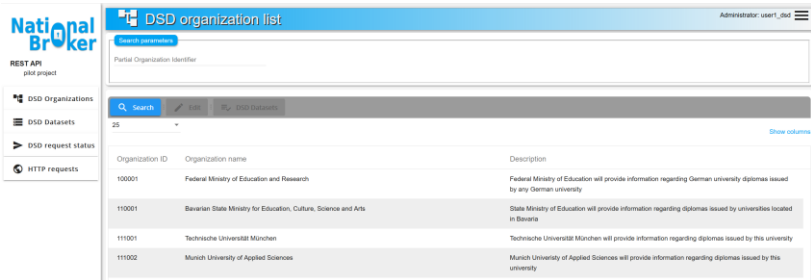
Initiate login URI ?

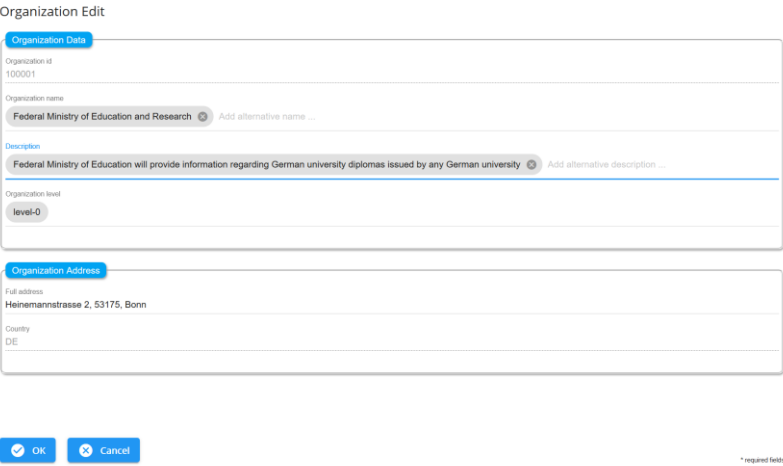
The new National Broker can then authenticate itself in Okta using the Client Credentials flow.

2.1.2 Use case implementation

Done	Implementation Comment
UC 01.01 National registry administrator accesses the login page	
✓	
UC 01.02 National registry administrator is redirected to login when accessing the UI application	
✓	
UC 01.03 National registry administrator is not asked to login if there is already a valid browser session	
✓	<p>National Broker comment:</p> <p>For ease of use of the pilot demo, OAuth Authorization is disabled by default. See configuration properties of National Broker and DSD (sections 4.1 & 4.2). OAuth authorization has to be enabled or disabled together for both DSD and National Broker.</p>

2.2 Implementation of "National registry administrator uses the UI to update the DSD registry"

Done	Implementation comment
UC 02.01 National registry administrator selects the organisation (s)he will be updating among the organisations (s)he is entitled to edit	
✓	<p>The DSD landing page is "DSD Organizations":</p>  <p>The DSD landing page shows all organisations the user is entitled to edit.</p> <p>Example REST API call to retrieve the list of organisations from the National Broker for the user with id 'ADMIN_USER':</p> <p>http://.../national-broker/dsd/v1/users/ADMIN_USER/organizations?offset=0&limit=25&sort=%2Bidentifier&q=</p>

D o n e	<p>Implementation comment</p> <p>eyJxdWVyeUlkjoidXJuOnRvb3A6ZHnkOmVieG1sLXJlZ3JlbTpxdWVyaWVzOkJ5T3JnYW5pemF0aW9uSWRBbmROYW1lIn0=</p> <p>UC 02.02 National registry administrator creates a request to update the organisation's name or address in the DSD registry</p> <p>✔ Double clicking on an organisation (or selecting it and clicking the "Edit" button) opens the "Organization Edit" dialog where the organisation name (<i>prefLabel</i>), description (<i>altLabel</i>) and full address can be modified:</p>  <p>✔ As the National Broker implements the API Core Profile of the ISA² IPS REST API Profile, instead of the query format proposed in the DSD specifications («server base url»/rest/search?queryId={the query id}&{param-name}={param-value}*), it follows instead the recommended syntax described in section "Pagination and Query Parameters" of the profile. An example of this syntax is:</p> <p>https://gateway-edelivery.westeurope.cloudapp.azure.com:883/demo/national-broker/dsd/v1/users/ADMIN_USER/organizations?offset=0&limit=25&sort=%2Bidentifier&q=eyJxdWVyeUlkjoidXJuOnRvb3A6ZHnkOmVieG1sLXJlZ3JlbTpxdWVyaWVzOkJ5T3JnYW5pemF0aW9uSWRBbmROYW1lIn0=</p> <p>The query (q=) is base64 encoded because an URL encoded query was blocked by Web Application Firewall deployed in test environment. For reference, the query in the above example decodes to {"queryId":"urn:toop:dsd:ebxml-regrem:queries:ByOrganizationIdAndName"}.</p> <p>Contrary to the National Broker, the DSD mock follows the Messaging API specification of the ISA² IPS REST API Profile. As such, in its case the query is transmitted as part of a payload in an organization query message, reusing the same naming convention as above:</p>
------------------	---

D
o
n
e

```
{
  "queryId": "urn:toop:dsd:ebxml-regrem:queries:ByOrganizationIdAndName"
  "country": "BE",
  "name": "Company name",
  "limit": 100,
  "offset": 5,
  "sort": "+name,-country"
}
```

Code Block 1 Json request example

✓ The status of each DSD request is shown in the page "DSD request status":

Entity type	Service	Action	Request id	Request On	Response id	Update Confirmed On	Username	Status
OrganizationRO	organization	update	88a2c61-189f-4334-8750-856835683aa3	19/10/2021 14:36:30	e3916a8b-5d4c-4491-baa0-0115142a14bd	19/10/2021 14:37:15	ADMIN_USER	Completed
OrganizationRO	organization	update	8ac6a61-6645-4401-afba-56130268114e	19/10/2021 14:36:00	cc082454-4880-46a7-e330a4e4520af8b8	19/10/2021 14:36:15	ADMIN_USER	Completed
OrganizationRO	organization	update	0c3095d4-1985-4676-5a23-ab78da83967	19/10/2021 14:35:32	1d7f8a10-6d3b-8469-8648-4db80a8a465	19/10/2021 14:36:15	ADMIN_USER	Completed
OrganizationRO	organization	update	11ab693-8149-4585-4ac7c1-2444336324c0	19/10/2021 14:34:11	376384ec-8988-447c-838a-6c729211988	19/10/2021 14:34:16	ADMIN_USER	Completed
OrganizationRO	organization	update	a972cc07-0111-4411-2-4036-d90ae46979	19/10/2021 14:33:05	4d00002-765b-4604-8047-bc485e958a5	19/10/2021 14:34:15	ADMIN_USER	Completed
OrganizationRO	organization	update	37af6e0b-f7b-4870-8f8b-5ac82b440eb8	19/10/2021 14:33:33	2ce6317e-a555-4a85-be88-0a339419a8a	19/10/2021 14:34:15	ADMIN_USER	Completed

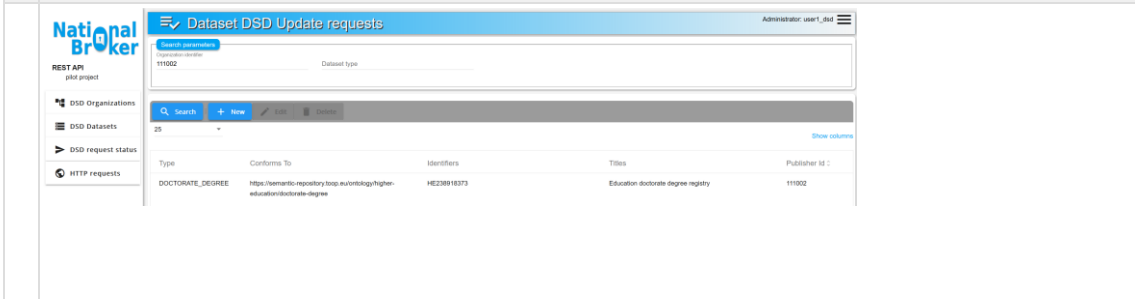
UC 02.03 National registry administrator searches and selects a DSD dataset that is linked to any of the organisations (s)he is entitled to edit

✓ By selecting the organisation and clicking the "DSD Datasets" button as shown in the image below:

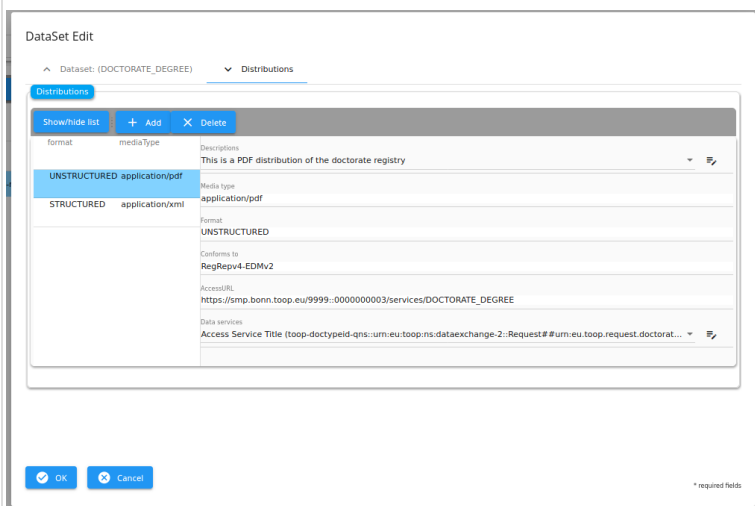
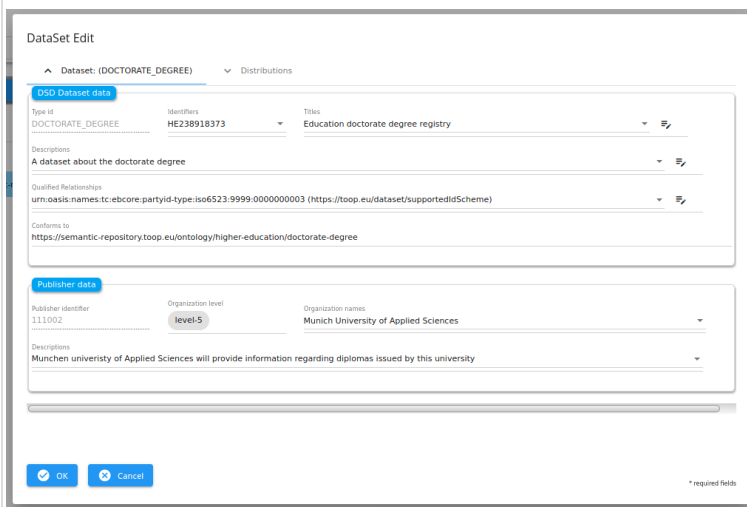
Organization ID	Organization name	Description
10001	Federal Ministry of Education and Research	Federal Ministry of Education will provide information regarding German university diplomas issued by any German university
110001	Bavarian State Ministry for Education, Culture, Science and Arts	State Ministry of Education will provide information regarding diplomas issued by universities located in Bavaria
111001	Technische Universität München	Technische Universität München will provide information regarding diplomas issued by this university
111002	Munich University of Applied Sciences	Munich University of Applied Sciences will provide information regarding diplomas issued by this university

a DSD Dataset page is shown with a pre-set organisation identifier filled in in the search filter. The page shows only the datasets linked to the selected organisation (*publisher*):

Done Implementation comment



✔ Double clicking on a dataset (or selecting it and clicking the "Edit" button) opens the "DataSet Edit" dialog where the dataset details are shown:



UC 02.04 National registry administrator creates a request to update a dataset record in the DSD registry

✔ In the "DataSet Edit" dialog shown in UC 02.03 most details about a dataset can be edited. Editing the identifier(s) of a dataset is disabled. Upon completion, the user can submit the update request.

D o n e

Implementation comment

The update request status can be consulted on the page "DSD request status":

Entity type	Service	Action	Request Id	Request On	Response Id	Update Confirmed On	Username	Status
OrganizationRO	organization	update	88a2f46c-1895-4336-870a-89a819a52a2e3	19/10/2021 14:36:30	e383a485-5a45-4955-ba6d-0111142a1c0d4	19/10/2021 14:37:15	ADMIN_USER	Completed
OrganizationRO	organization	update	8e6e4a81-0565-44d3-e1be-591382a071e6d	19/10/2021 14:36:00	cc082454-4680-46a7-e35a-8a252a5f8b88	19/10/2021 14:36:15	ADMIN_USER	Completed
OrganizationRO	organization	update	0c3688b4-1895-4c75-4e23-a078d5a39887	19/10/2021 14:35:52	1c770a10-e905-46a9-8a88-4cb80a85485	19/10/2021 14:36:15	ADMIN_USER	Completed
OrganizationRO	organization	update	11a4e903-8168-4585-5a3c-e94439a623e0d	19/10/2021 14:34:11	378384ec-8588-447c-b58a-4c737213988	19/10/2021 14:34:18	ADMIN_USER	Completed
OrganizationRO	organization	update	a972cc07-0111-4d21-3-4936-d94ba646079	19/10/2021 14:33:55	4a895a62-718b-494c-a957-1a4a85a998a5	19/10/2021 14:34:15	ADMIN_USER	Completed
OrganizationRO	organization	update	37af8e6b-176-4975-385b-5a52a443ec8	19/10/2021 14:33:33	2ae5317e-e555-4a85-9a69-0a330a16a78e	19/10/2021 14:34:15	ADMIN_USER	Completed

UC 02.05 National registry administrator creates a request to create a dataset record in the DSD registry

- ✓ A new dataset can be created from the "DSD Datasets" page by clicking the "New" button. The dataset identifier cannot be set in the dialog; a UUID will be assigned by the DSD registry when it creates the record.

DataSet Edit

Dataset: (4827002f5b96-464a-a9e4-402ec45f5134) Distributions

DSD Dataset data

Type id: 4827002f5b96-464a-a9e4-df0cc42b87-1f73-451b-82... Dataset title

Dataset description

Qualified Relationships: urn: oasis:names:tc:ebcore:partyid:type:iso6523:9999:0000000005 (https://toop.eu/dataset/supportedIdScheme)

Conforms to: https://semantic-repository.toop.eu/ontology

Publisher data

Publisher identifier: 1111002 Organization level: level-5 Organization name: Munich University of Applied Sciences

Descriptions: Munchen university of Applied Sciences will provide information regarding diplomas issued by this university

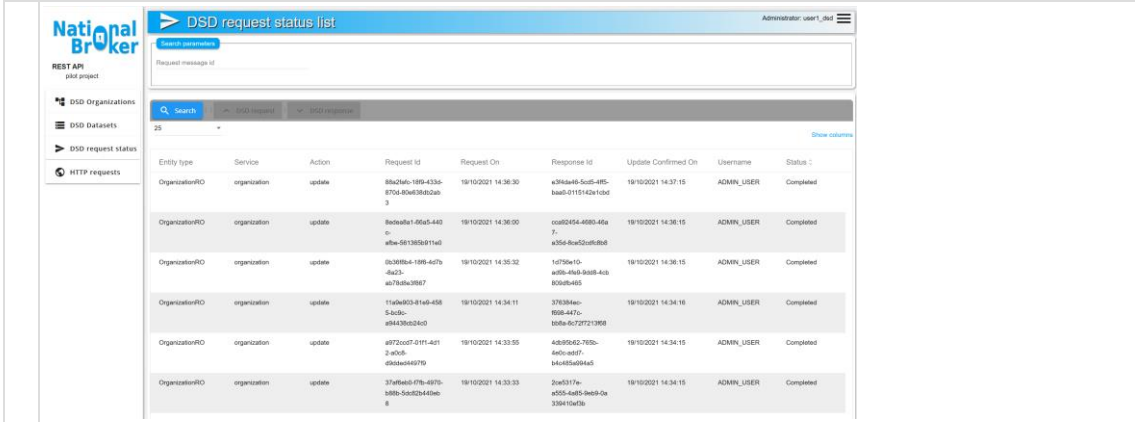
OK Cancel * required fields

The updated dataset is shown in the UI after it is successfully created in the DSD component. The "DSD Datasets" page must be refreshed to see the updated dataset.

UC 02.06 National registry administrator consults the results of the requests (s)he created to manage the data in the DSD registry

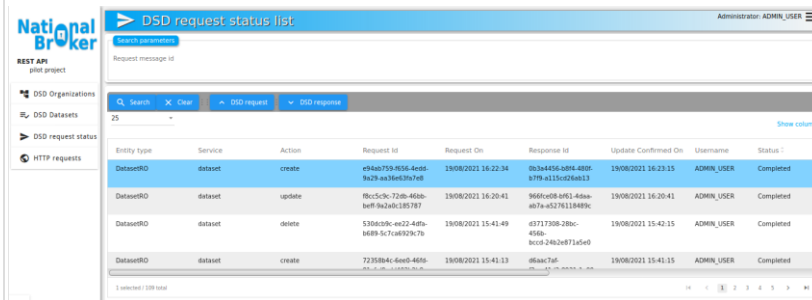
- ✓ The update request status can be consulted on the page "DSD request status":

D
o
n
e
Implementation comment

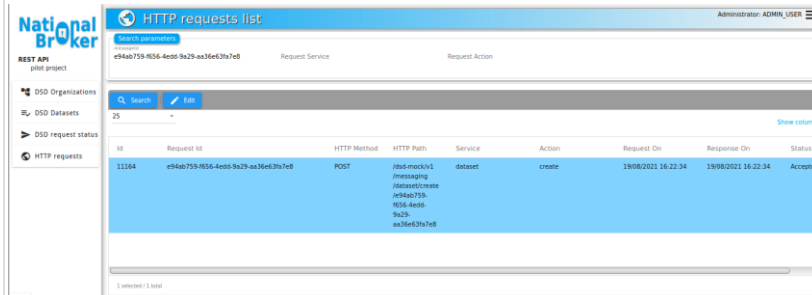


The DSD request statuses are Pending, Completed and Rejected.

- ✓ If a row is selected in the DSD request status list, the "DSD request" and "DSD response" buttons are enabled:



When the aforementioned buttons are clicked, the application navigates to the "HTTP requests" page with pre-set messageid filter for the HTTP request:



Double clicking on a HTTP request (or selecting it and clicking the "Edit" button) opens the "DSD Request details" dialog where the HTTP request/response details are shown:

3 Component implementation overview

This section presents the technical implementation details of the DSD mock and National Broker components.

3.1 DSD mock

The component DSD mock implements two DSD specific interfaces for managing:

- DSD Organization entities: <https://github.com/isa2-api4ips/rest-api-oop-pilot/blob/main/dsd-mock/src/main/java/eu/europa/ec/isa2/oop/restapi/docsapi/DSDOrganizationApi.java>
- DSD Dataset entities: <https://github.com/isa2-api4ips/rest-api-oop-pilot/blob/main/dsd-mock/src/main/java/eu/europa/ec/isa2/oop/restapi/docsapi/DSDDatasetApi.java>

Both interfaces are using the Messaging API pilot annotations defined in the module **isa2-messaging-profile-impl**: <https://github.com/isa2-api4ips/rest-api-oop-pilot/tree/main/isa2-messaging-profile-impl/src/main/java/eu/europa/ec/isa2/restapi/profile/annotation>

The annotations and the implementation in the module **isa2-messaging-profile-impl** take care of all Messaging API-related objects (parameters, headers, mime responses, etc.) and the security aspects. They are also defining the OpenAPI document that conforms to the API Documentation specifications. The OpenAPI documents are generated and deployed at build time into the "national broker" project. The national broker project uses the swagger generator to generate a "client" for invoking the DSD mock services and RESTful web server for Webhook operations.

An example of the generated DSDOrganizationApi.json OpenAPI document is here:

<https://github.com/isa2-api4ips/rest-api-oop-pilot/blob/main/national-broker/src/main/openapi/DSDOrganizationApi.json>

3.1.1 Generating the Messaging API OpenAPI document

Parsing and building the OpenAPI document from the annotations is handled by the class [MessagingReader.java](#). The purpose of the class [OpenApiWriter.java](#) is to serialize OpenAPI documents at build time. Below is an example of the project's maven ant plugin configuration that invokes this process.

Example of dsd-mock/pom.xml plugin for OpenAPI generation from the DSD annotated REST API endpoints:


```

    <plugin>
      <artifactId>maven-antrun-plugin</artifactId>
      <executions>
        <!-- "ant/run" to generate open api document for the
national broker -->
        <execution>
          <id>generate-open-api</id>
          <phase>process-classes</phase>
          <goals>
            <goal>run</goal>
          </goals>
          <configuration>
            <target>
              <!--ANT Task definition
Class generates OpenApi document. The
OpenApi documents are used by the national-broker
for generating "Client" code for national-
broker -> DSD mock integration
hibernate database dialects
1. Parameter: comma separated
2. script version
3. export scripts.
4. reference type. One of the values
INLINE, DOCUMENT_COMPONENTS, MESSAGING_API_COMPONENTS,
MESSAGING_API_OBJECT;
5. The Url of published Messaging API
parameter and schema definitions for the reference type: MESSAGING_API,
MESSAGING_API_OBJECT;
-->
              <java
classname="eu.europa.ec.isa2.restapi.profile.generator.OpenApiWriter"
fork="true" failonerror="true">
                <arg
value="eu.europa.ec.isa2.oop.restapi.docsapi.DSDDatasetApi,
eu.europa.ec.isa2.oop.restapi.docsapi.DSDOrganizationApi" />
                <arg
value="${project.basedir}/../national-broker/src/main/openapi/" />
                <!-- Because in subproject national-
broker -> io.swagger.codegen.v3:swagger-codegen-maven-plugin:3.0.26
does not work with version 3.1.0
change version to 3.0.99 for the client generation -->
                <arg value="3.0.99" />
                <!-- During the pilot implementation
io.swagger.codegen.v3:swagger-codegen-maven-plugin:3.0.26
did not parse OK the mode
MESSAGING_API_COMPONENTS
-->
                <arg value="MESSAGING_API_OBJECT" />
                <arg
value="https://raw.githubusercontent.com/jrihtarsic/OpenApiTest/main/profi
le/specifications/core-api" />
                <!-- document version API -->
                <arg value="v1" />
                <!-- properties file -->
                <arg
value="${project.basedir}/src/main/resources/dsd.properties" />
                <!-- reference to the passed-in
classpath reference -->
                <classpath
refid="maven.compile.classpath" />
              </java>
            </target>
          </configuration>
        </execution>
      </executions>

```

```
</plugin>
```

Code Block 2 Messaging OpenAPI document generation

The Messaging API OpenAPI document generator can be parametrized to produce the OpenAPI document that refers to common, pre-defined objects in one of the following ways:

- **INLINE** - definitions are generated inline where they are used.
- **DOCUMENT_COMPONENTS** - definitions are generated in the document components `#/components/(schema|parameters|headers)`.
- **MESSAGING_API_COMPONENTS** - definitions are referenced to the published Messaging API document.
- **MESSAGING_API_OBJECT** - definitions are referenced to the published JSON file for each object.

3.1.2 Runtime Messaging API framework

At runtime the messaging interfaces are handled by [MessageServiceHandlerController.java](#). The class takes care of all Messaging API headers, parameters and JAdES signatures, mime/multipart wrapping of requests and responses, etc. The purpose of [MessageServiceHandlerController.java](#) is to implement all generic Messaging API methods in one place and enable developers to focus mainly to the business aspects of the code when using the Messaging API specification. The security, message payload wrapping, signal generation is handled by framework.

3.1.3 Message JAdES signature

For generating and validating the JAdES signature, the Digital Signature Service (DSS) library version 5.8 offered by the CEF eSignature building block is used. The Messaging API writer is implemented in the package [/europa/ec/isa2/restapi/jws](#).

To allow the verification and inspection of message signatures, the UI Client and National Broker have built-in functionality to store all the request/responses between National Broker and DSD mock. With tools available in the "HTTP requests" page of the demo, signatures can be exported and validated.


```

    <plugin>
      <groupId>io.swagger.codegen.v3</groupId>
      <artifactId>swagger-codegen-maven-plugin</artifactId>
      <executions>
        <execution>
          <id>DSDDatasetApi</id>
          <goals>
            <goal>generate</goal>
          </goals>
          <configuration>
            <inputSpec>${project.basedir}/src/main/openapi/
DSDDatasetApi.json</inputSpec>
            <language>java</language>
            <modelPackage>eu.europa.eu.dsd.messaging.gen.da
taset.model</modelPackage>
            <apiPackage>eu.europa.eu.dsd.messaging.gen.data
set.api</apiPackage>
            <invokerPackage>eu.europa.eu.dsd.messaging.gen.
dataset.invoker</invokerPackage>
            <generateApiTests>>false</generateApiTests>
            <generateApiDocumentation>>false</generateApiDoc
umentation>
            <output>${project.build.directory}/generated-
sources</output>
            <configOptions>
              <groupId>${project.groupId}</groupId>
              <artifactId>${project.artifactId}</artifact
Id>
              <artifactVersion>${project.version}</artifa
ctVersion>
              <library>resttemplate</library>
              <java8>>true</java8>
              <dateLibrary>java8</dateLibrary>
              <licenseName>Apache 2.0</licenseName>
              <licenseUrl>https://www.apache.org/licenses
/LICENSE-2.0</licenseUrl>
            </configOptions>
          </configuration>
        </execution>
        <execution>
          <id>DSDDatasetApiServer</id>
          <goals>
            <goal>generate</goal>
          </goals>
          <configuration>
            <inputSpec>${project.basedir}/src/main/openapi/
DSDDatasetApi-server.json</inputSpec>
            <language>spring</language>
            <library>spring-mvc</library>
            <modelPackage>eu.europa.eu.dsd.messaging.gen.se
rver.dataset.model</modelPackage>
            <apiPackage>eu.europa.eu.dsd.messaging.gen.serv
er.dataset.api</apiPackage>
            <invokerPackage>eu.europa.eu.dsd.messaging.gen.
server.dataset.invoker</invokerPackage>
            <generateApiTests>>false</generateApiTests>
            <generateApiDocumentation>>false</generateApiDoc
umentation>
            <output>${project.build.directory}/generated-
sources</output>
            <configOptions>
              <groupId>${project.groupId}</groupId>
              <artifactId>${project.artifactId}</artifact
Id>

```

```

ctVersion>
                                <artifactVersion>${project.version}</artifa
                                <java8>true</java8>
                                <dateLibrary>java8</dateLibrary>
                                <licenseName>Apache 2.0</licenseName>
                                <licenseUrl>https://www.apache.org/licenses
/LICENSE-2.0</licenseUrl>
                                <interfaceOnly>true</interfaceOnly>
                                </configOptions>
                                </configuration>
                                </execution>
                                </executions>
</plugin>

```

Code Block 3 Messaging OpenAPI server and client Java code generation

3.2.2 Messaging Multipart

The Messaging API Specification of the ISA² IPS REST API Profile defines that all message payloads must be wrapped in S/MIME multipart. To read and verify the JSON Web Signature of the payload for incoming messages and to package and sign outgoing messages the [MultipartMimeDsDConverter.java](#) is registered to the REST API template [DSDRestTemplate.java](#).

3.2.3 UI Client integration

For the UI Client integration, the National Broker uses the following REST API interfaces:

- [DatasetLCMController.java](#): The DSD proxy services for managing DSD dataset entities.
- [OrganizationLCMController.java](#): The DSD proxy services for managing DSD organization entities.
- [OrganizationController.java](#): The local National Broker services.

The National Broker OpenAPI uses regular Swagger annotations. For handling digest calculation and JSON Web Signatures the objects `javax.servlet.http.HttpServletResponse` and `javax.servlet.http.HttpServletRequest` are used.

4 Messaging API Message Exchange Patterns

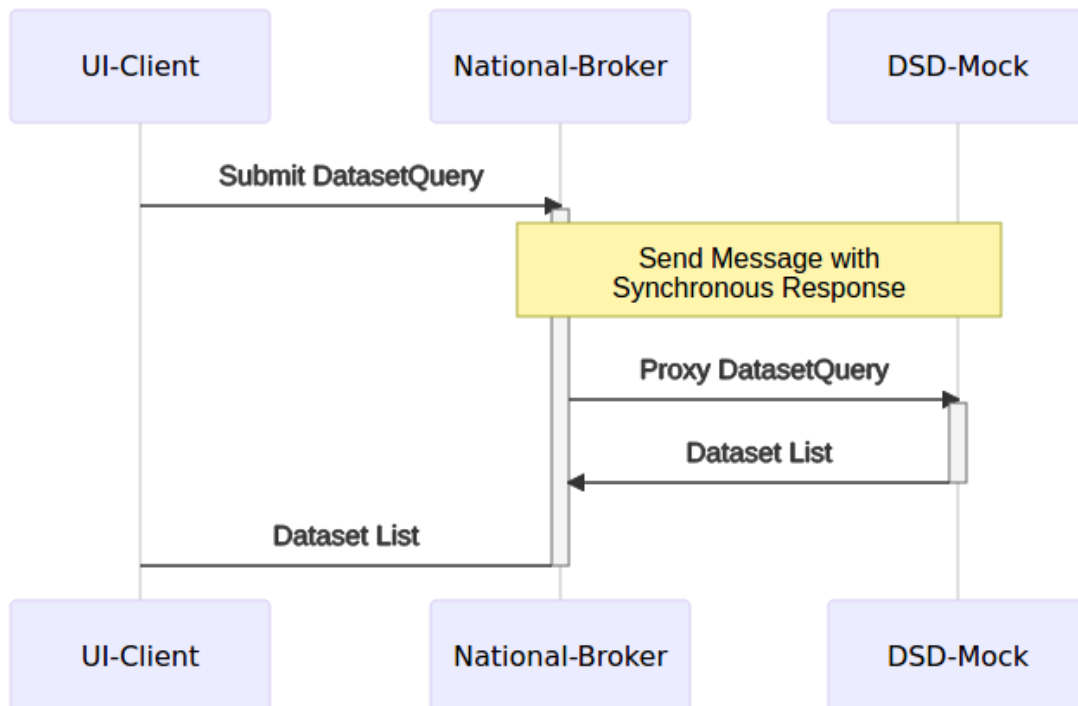
The Messaging API Specification of the ISA² IPS REST API Profile specifies seven types of the Message Exchange Patterns (for details, please consult the ISA² IPS REST API Profile):

- Send Message with No Response – Push
- Send Message with No Response – Pull
- Send Message with Synchronous Response
- Send Message with Asynchronous Response – Push and Pull
- Send Message with Asynchronous Response – Push and Webhook Pull
- Send Message with Asynchronous Response – Push and Webhook Push
- Send Message with Asynchronous Response – Pull and Push

For the integration between the National Broker and the DSD mock, five of the seven message exchange patterns were implemented. The Send Message with No Response – Push, Send Message with No Response – Pull were implemented as part of the "Send Message with Asynchronous Response – Push and Webhook Pull implementation".

4.1 Send Message with Synchronous Response

This pattern is implemented in support of the query to list/filter Datasets in the "DSD Datasets" page. The implementation follows the sequence diagram depicted below:



The National Broker submits a request such as:


```
"queryId" : "urn:toop:dsd:ebxml-regrem:queries:ByDatasetTypeAndLocation"  
}  
-----_Part_4_84951238.1629796827083--
```

Code Block 4 DSD query request

And obtains a synchronous response such as:


```

    "publisher" : {
      "status" : 0,
      "index" : 0,
      "identifier" : "100001",
      "prefLabels" : [ "Federal Ministry of Education and
Research@en", "Bundesministerium für Bildung und Forschung@de" ],
      "altLabels" : [ "Federal Ministry of Education, will provide
information regarding German university diplomas issues by any German
university@en", "Bundesbildungsministerium, informiert von allen deutschen
Hochschulen zu Fragen des deutschen Hochschulabschlusses@de" ],
      "classifications" : [ "level-0" ],
      "address" : {
        "adminUnitLevel" : "DE",
        "fullAddress" : "Heinemannstrasse 2, 53175, Bonn"
      }
    },
    "qualifiedRelationships" : [ {
      "relation" : "urn:oasis:names:tc:ebcore:partyid-
type:iso6523:9999:0000000004",
      "hadRole" : "https://toop.eu/dataset/supportedIdScheme"
    } ],
    "distributions" : [ {
      "descriptions" : [ "This is a XML distribution of the registry" ],
      "conformsTo" : "RegRepv4-EDMv2",
      "format" : "STRUCTURED",
      "mediaType" : "application/xml",
      "accessURL" : "https://smp.bonn.toop.eu/9999::0000000003/services/ST
ATE_MINISTRY",
      "dataServices" : [ {
        "identifier" : "toop-doctypeid-qns::urn:eu:toop:ns:dataexchange-
2::Request#urn:eu.toop.request.state-ministry::2.0",
        "conformsTo" : "",
        "title" : "Access Service Title",
        "endpointURL" : "https://smp.bonn.toop.eu/9999::0000000005/service
s/state-ministry?type=xml"
      } ]
    } ]
  } ],
  "count" : 1,
  "page" : 0,
  "pageSize" : 25
}
-----=_Part_5_373156628.1629796827184--

```

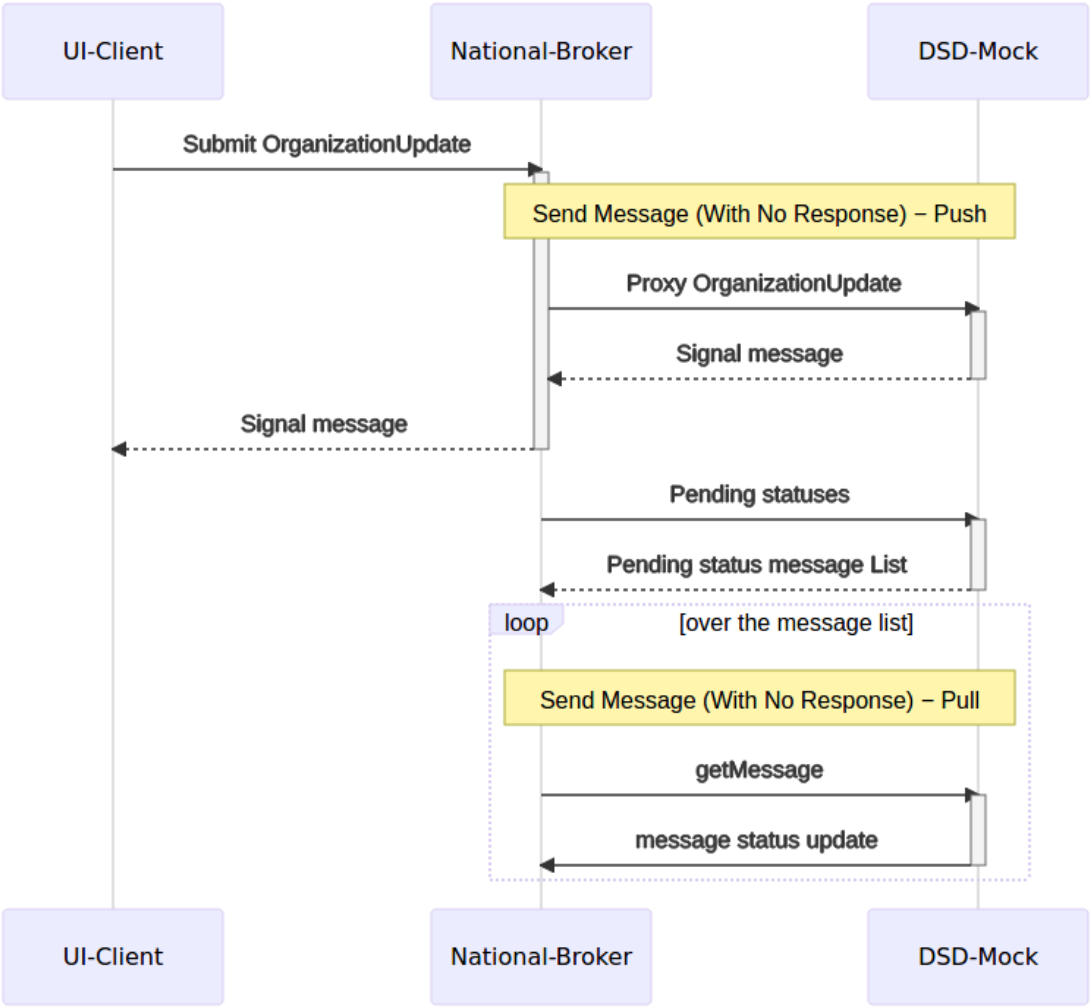
Code Block 5 DSD query response

4.2 Send Message with Asynchronous Response – Push and Pull

This message exchange pattern combines the "Send Message With No Response – Push" and "Send Message With No Response – Pull" patterns. The pattern supports the implementation of the following features:

- Updating the Organization data
- Adding a new Dataset
- Removing an existing Dataset

The implementation follows the sequence diagram depicted below:



The National Broker submits an update Organization request such as:

```

(Request-Target): post /dsd-
mock/v1/messaging/organization/update/8bb10f70-4b4e-49b0-b518-5e55be99fb30
Accept: application/json
Content-Length: 2121
Content-Type: multipart/mixed; boundary="----
=_Part_6_1679160894.1629797724963"
Digest: SHA-256=iUBobBzJN6dfoFj00jYaywhiR8huse2HlQX+PCoD27M=
Edel-Message-Sig:
eyJhbGciOiJFUzI1NiIsImtpZCI6Ikk1FOHdTcVJTTUVZeEN6QUpCZ05WQkFZVEFrVlZNUTR3RE
FZRFRZRUUtFd1ZFU1VkslZERW5NQ1VHQTFVRUF4TWVWR1Z6ZENCRLf5QnBib1JsY20xbFpHbGhk
R1VnU1h0emRXVnlJREF4QWdFSiIsIng1dCNTMjU2IjoicVlDUWZoMDFUNlk1UWdXaDFVenFoMW
x4WHVfeHEtQ2x0R0dKdzJpTnhtQSIIsIng1YyI6WyJNSU1CbHpDQ0FUMmdBd0lCQWdJQkNUQUtC
Z2dxaGtqT1BRUURBakJHTVFzd0NRWURWUVFHRXdKRlZURU9NQXdhQTFVRUNoTUZSRWxIU1ZReE
p6QWxCZ05WQkFNVEhsUmXjM1FnU1VNZ2FXNTBaWEp0WldScFlYUmXJRWx6YzNwBGNpQXNVEF1
RncweU1UQTNNRGN3TURBd01EQmFGdzB5T1RBM01Ewx1NelU1TlRsYU1GZ3hDekFKQmdOVkJBWV
RBalZWTVE0d0RBWURWUVFLRXdWRVNVZEpWREVMtUIwR0ExVUVDeE1XVW1WemRDQkJVRWtnVUds
c2IzUWdjSep2Yw1WamRERV1NQ1lHQTFVRUF4TVBUBUYwYVc5dVlXd3RRBkp2YTJWU1GWXdfQV
lIS29aSXpqMENBUVlGSzRFRUFBb0RRZ0FFTUZVbkNheU9TaEI4dVp6SzyvRwh3Q0VWRXJ3TF1C
d2tyQ1NiR2tyR2ZYZWhSbVIwY2VUNmQrNXJGR25QZXdQ2FpV010QkUzY1BTZWNzZhdBYjErYn
FNTk1Bc3dDUVlEVlIwVEJBSXdBREFLQmdncWhrak9QUVFEQWdOSUFEQkZBaUJ1TUEyWlF5WFpu
eUhgQ3d5U1ZPcFlTNEFxeUE1PeitJMXVcCaHpGK3Q1R0dnSwhBSjQwdVdERDRtQ0NudWprdtQ2aX
ZDLzZwZUtyNkcwOE1za29XaFY4amdlyJdLCJ0eXAIoiJqb3N1IiwiYjY0IjpmYWxzZSwic2ln
VCI6IjIwMjEtMDgtMjRUMDk6MzU6MjRaIiwic2lnRCI6eyJtSWQiOiJodHRwOi8vdXJpLmV0c2
kub3JnLzE5MTgyL0h0dHBIZWFkZXJzIiwicGFycyI6WyJjb250ZW50LXR5cGUlLCJjb250ZW50
LWxlbmdd0aCIsImRpZ2VzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2
ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzd
1zZW5kZXIiLCJmaW5hbClyZW5kZXIiLCJkaW5kZXIiLCJkaW5kZXIiLCJkaW5kZXIiLCJkaW5kZXIi
ImI2NCIsInNpZ1ZlIiwicm9vdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6
OP8YfV1NONN96IdTnkNj1MYoFUie_DZDuk6EBm5P6CnwedNLhwg
Final-Recipient: 0088:123456789:test
Host: localhost:8080
Original-Sender: ADMIN_USER
Timestamp: 2021-08-24T11:35:24.955+02:00
User-Agent: NationalBroker

-----_Part_6_1679160894.1629797724963
Content-Type: application/json
Edel-Payload-Sig:
eyJhbGciOiJFUzI1NiIsImtpZCI6Ikk1FOHdTcVJTTUVZeEN6QUpCZ05WQkFZVEFrVlZNUTR3RE
FZRFRZRUUtFd1ZFU1VkslZERW5NQ1VHQTFVRUF4TWVWR1Z6ZENCRLf5QnBib1JsY20xbFpHbGhk
R1VnU1h0emRXVnlJREF4QWdFSiIsIng1dCNTMjU2IjoicVlDUWZoMDFUNlk1UWdXaDFVenFoMW
x4WHVfeHEtQ2x0R0dKdzJpTnhtQSIIsIng1YyI6WyJNSU1CbHpDQ0FUMmdBd0lCQWdJQkNUQUtC
Z2dxaGtqT1BRUURBakJHTVFzd0NRWURWUVFHRXdKRlZURU9NQXdhQTFVRUNoTUZSRWxIU1ZReE
p6QWxCZ05WQkFNVEhsUmXjM1FnU1VNZ2FXNTBaWEp0WldScFlYUmXJRWx6YzNwBGNpQXNVEF1
RncweU1UQTNNRGN3TURBd01EQmFGdzB5T1RBM01Ewx1NelU1TlRsYU1GZ3hDekFKQmdOVkJBWV
RBalZWTVE0d0RBWURWUVFLRXdWRVNVZEpWREVMtUIwR0ExVUVDeE1XVW1WemRDQkJVRWtnVUds
c2IzUWdjSep2Yw1WamRERV1NQ1lHQTFVRUF4TVBUBUYwYVc5dVlXd3RRBkp2YTJWU1GWXdfQV
lIS29aSXpqMENBUVlGSzRFRUFBb0RRZ0FFTUZVbkNheU9TaEI4dVp6SzyvRwh3Q0VWRXJ3TF1C
d2tyQ1NiR2tyR2ZYZWhSbVIwY2VUNmQrNXJGR25QZXdQ2FpV010QkUzY1BTZWNzZhdBYjErYn
FNTk1Bc3dDUVlEVlIwVEJBSXdBREFLQmdncWhrak9QUVFEQWdOSUFEQkZBaUJ1TUEyWlF5WFpu
eUhgQ3d5U1ZPcFlTNEFxeUE1PeitJMXVcCaHpGK3Q1R0dnSwhBSjQwdVdERDRtQ0NudWprdtQ2aX
ZDLzZwZUtyNkcwOE1za29XaFY4amdlyJdLCJ0eXAIoiJqb3N1IiwiYjY0IjpmYWxzZSwic2ln
VCI6IjIwMjEtMDgtMjRUMDk6MzU6MjRaIiwic2lnRCI6eyJtSWQiOiJodHRwOi8vdXJpLmV0c2
kub3JnLzE5MTgyL0h0dHBIZWFkZXJzIiwicGFycyI6WyJjb250ZW50LXR5cGUlLCJjb250ZW50
LWxlbmdd0aCIsImRpZ2VzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2
ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzd
Y29udGvudC10eXBlIiwicm9vdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6
Iiwicm9vdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2ZVZzdCI6ImR2
n89az9FV56A4uUx51_25L0V06d3kPK6-0TQ
Content-Disposition: name="eu.europa.ec.isa2.restapi.jws.JsonDssDocument";
filename="eu.europa.ec.isa2.restapi.jws.JsonDssDocument.json"
Digest: SHA-256=Y+Q09FTX4y9q00+NbtBMQV4JjoabmQQzAZMiBlpM/fY=
Content-Length: 393

{
  "status" : 0,
  "index" : 0,
  "identifier" : "111002",
  "prefLabels" : [ "Munich University of Applied Sciences" ],

```

```

"altLabels" : [ "Munchen univeristy of Applied Sciences will provide
information regarding diplomas issued by this university" ],
"classifications" : [ "level-5" ],
"address" : {
  "adminUnitLevel" : "DE",
  "fullAddress" : "Lothstrasse 34, 80335 Munchen"
}
}
-----_Part_6_1679160894.1629797724963--

```

Code Block 6 Update Organization request

And obtains a response containing a Signal such as:

```

Connection: keep-alive
Content-Disposition: name="eu.europa.ec.isa2.restapi.jws.JsonDssDocument";
filename="eu.europa.ec.isa2.restapi.jws.JsonDssDocument.json"
Content-Length: 507
Content-Type: application/json
Date: Tue, 24 Aug 2021 09:35:25 GMT
Digest: SHA-256=/hdtbMe28ovP/TPFMKBuW8ah9P8gKIitLY+Ubo21sCyk=
Edel-Message-Sig:
eyJhbGciOiJFUzI1NiIsImtpZCI6Ikk1FOhdTcVJTTUVZeEN6QUpCZ05WQkFZVEFrVlZNUTR3RE
FZRFZRUUtdFd1ZFU1VkslZERW5NQ1VHQTFVRUF4TWVWR1Z6ZENCRLf5QnBib1JsY20xbFpHbGhk
R1VnU1h0emRXVnlJREF4QWdFSSIsIng1dCNTMjU2Ijoid2FKX0pvd0Y1R2RyV2xpbUJTC3N1VV
9Ca3BldGxoV2dXRWNWFJiTUdMWSIsIng1YyI6WyJNSU1CanpDQ0FUYWdBd0lCQWdJQkNEQUtC
Z2dxaGtqT1BRUURBakJHTVFzd0NRWURWUWFHRXdkRlZURU9NQXdhQTFVRUNoTUZSRWxIUlZReE
p6QWxCZ05WQkFNVEhsUmXjM1FnU1VNZ2FXNTBaWEp0WldScFlYUmxJRWx6YzNWbGNpQXdNVEF1
RncweU1UQTNNRGN3TURBd01EQmFGdzB5TWpBM01EwX1NelU1TlRsYU1GRXhDekFKQmdOVkJBWV
RBalZWTVE0d0RBWURWUWFLRXdWRVNVZEpWREVMtUIwR0ExVUVDeE1XVW1WemRDQkJVRWtnVUds
c2IzUWdjSep2YW1WamRERVJNQThHQTFVRUF4TU1SRk5FTTUFxUFEwc3dWakFRQmdjcWhrak9QUU
lCQmdVcmduUFDZ05DQUFUOHpJcE12MVBYU2c4dDNamjZBN1FBS29oOVd5ZW84ZDc3WjliTDJa
RnBaTDVHVXZHN0xwaXV0M3ZrbjFomGowT1FlenFQSmFwRnlvQThYc3N4MWZKQW93MHdDekFKQm
dOVkhSTUVBakFBTUfvr0NDcUdTtTQ5QkFNQ0EwY0FNRVFDsUg0cjh3bTdRSWl1STA3M0VyNUh2
MUNLY09DOUsvR0NFU1BFSVhOK1R3RVRBaUJES2FyTStsMGdKQkJOsjJnNnlaMme5ZU9LZhdPK2
VGRlFaclZSNzlc1ZBPT0iXSwidHlwIjoiam9zZSIsImI2NCi6ZmFsc2UsInNpZ1QiOiIyMDIx
LTA4LTI0VDA5OjM1OjI1WiIsInNpZ0QiOmsibUlkiIjoiaHR0cDovL3VyaS5ldHNpLm9yZy8xOT
E4Mi9IdHRwSGVhZGVycyIsInBhcnMiOlsiY29udGVudC1kaXNwb3NpdGlvbiIsImNvb3R1bnQt
dHlwZSIsImNvb3R1bnQtYm9keSB3R0IiwizGlnZXN0I119LCJjcm10IjpbImI2NCIsInNpZ1QiLC
JzaWdEIl19..J-4XcYzBTbsAe28rIdIKwXyPnieC7-32POYQbmir2ixGDjT-
Qdm527tn0Kk02scHiipeoY6LtQrqG-2AASsOZA
Timestamp: 2021-08-24T11:35:25.194
Vary: Access-Control-Request-Headers

{
  "title" : "Message Accepted",
  "type" : "https://joinup.ec.europa.eu/collection/api4dt/solution/.../mes
saging/signal/message-accepted",
  "status" : 202,
  "detail" : "Sent when the message is properly validated. It may include
a status monitor that can provide the user with an estimate of when the
request will be fulfilled (see [RFC7231])",
  "instance" : "/v1/messaging/organization/update/8bb10f70-4b4e-49b0-b518-
5e55be99fb30",
  "digest" : "SHA-256=iUBobBzJN6df0Fj00jYaywhiR8huse2HlQX+PCoD27M="
}

```

Code Block 7 Update Organization response containing a Signal

The National Broker then requests the list of pending message responses:

```
(Request-Target): get /dsd-mock/v1/messaging/organization/status
Accept: application/json
Content-Length: 0
Content-Type: application/json
Host: localhost:8080
Request-Target-PRIVATE: get /dsd-mock/v1/messaging/organization/status
User-Agent: NationalBroker
```

Code Block 8 List Pending Message Responses request

And receives it:

```
Connection: keep-alive
Content-Disposition: name="eu.europa.ec.isa2.restapi.jws.JsonDssDocument";
filename="eu.europa.ec.isa2.restapi.jws.JsonDssDocument.json"
Content-Length: 273
Content-Type: application/json
Date: Tue, 24 Aug 2021 09:36:15 GMT
Digest: SHA-256=DmEl6rZ8slE0mGK+MwaR6uCkt+69wnzw5cmLdXjytGo=
Edel-Message-Sig:
eyJhbGciOiJFUzI1NiIsImtpZCI6Ikk1FOHdTcVJJTUUVZeEN6QUpCZ05WQkFZVEFrVlZlNUtR3RE
FZRFRZRUUtFd1ZFU1VkslZERW5NQ1VHQTFVRFU4TlVWR1Z6ZENCrlF5QnBib1JsY20xbFpHbGhk
R1VnU1h0emRXVnlJREF4QWdFSSIsIng1dCNTMjU2Ijoid2FKX0pvd0Y1R2RyV2xpbUJtc3N1VV
9Ca3BldGxoV2dXRWNWFJiTUdMWSIsIng1YyI6WyJNSU1CanpDQ0FUYWdBd0lCQWdJQkNEQUtC
Z2dxaGtqT1BRUURBakJHTVfZd0NRWURWUVFHRXdKRlZURU9NQXdhQTFVRFUNoTUZSRWxIU1ZReE
p6QWxCZ05WQkFNVehsUmXjM1FnU1VNZ2FXNTBaWEp0WldScF1YUmXJRWx6YzNwbnGNpQXdNVEFl
RncweU1UQTNNRGN3TURBd01EQmFGdzB5TWpBM01EWX1NelU1TlRsYU1GRXhDekFKQmdOVkJBWV
RBa1ZWTVE0d0RBWURWUVFLRXdWRVNVZEpWREVMtUIWR0ExVUVDeE1XVW1WemRDQkJRVRWtnVUds
c2IzUWdjSEp2YW1WamRERVJNQThHQTFVRFU4TU1SRk5FTFUXUFEwc3dWakFRQmdjcWhrak9QUU
lCQmdVcmdRUUFDZ05DQUFUOHpJcE12MVBYU2c4dDNAMjZBN1FBS29oOVD5ZW84ZDc3WjliTDJa
RnBaTDVHVXZHN0xwaXV0M3ZrbjFoMGowT1FlenFQSmFwRnlvQThYc3N4MWZKQW93MHdDekFKQm
dOVkhSTUVBakFBTUFvR0NDcUdTTQ5QkFNQ0EwY0FNRFVFSUg0cjh3bTdRSW1lSTA3M0VyNUh2
MUNLY09DOUsvR0NFU1BFSVhOK1R3RVRBaUES2FyTStsMGdKQkJOsjJnNnlaMmE5ZU9LZHdpK2
VGRlFac1ZSNzlc1ZBPT0iXSwidHlwIjoiam9zZSIsImI2NCI6ZmFsc2UsInNpZ1QiOiIyMDIx
LTA4LTI0VDA5OjM2OjE1WiIsInNpZ0QiOmsibUlkIjoiaHR0cDovL3VyaS5ldHNpLm9yZy8xOT
E4Mi9IdHRwSGVhZGVycyIsInBhcniMiOlsiY29udGVudC1kaXNwb3NpdGlvbiIsImNvbnRlbnQt
dHlwZSIsImNvbnRlbnQtYm9keSBvZ3R0IiwiaXNjaXZlbnR0IiwiaXNjaXZlbnR0IiwiaXNjaXZlbnR0
JzaWdEIl19..WfnTDmRwBWIUSuY6EwP7IwrTkqU1uwvQjTkYRWcegeJ4vFt5VyntX7O6uY64rQ
eFBRZYFaGQjPwI7pyJ_hxeVQ
Timestamp: 2021-08-24T11:36:15.045
Vary: Access-Control-Request-Headers

{
  "messageReferenceList" : [ {
    "messageId" : "00f229f9-c9ee-43a7-93a5-07c50c525182",
    "service" : "organization",
    "action" : "status",
    "href" : "/v1/messaging/organization/status/00f229f9-c9ee-43a7-93a5-
07c50c525182"
  } ],
  "limit" : -1,
  "offset" : 0
}
```

Code Block 9 List Pending Message Responses response

It then requests the specific message response:

```
(Request-Target): get /dsd-mock/v1/messaging/organization/status/00f229f9-  
c9ee-43a7-93a5-07c50c525182  
Accept: application/problem+json  
Content-Length: 0  
Content-Type: application/json  
Host: localhost:8080  
Request-Target-PRIVATE: get /dsd-  
mock/v1/messaging/organization/status/00f229f9-c9ee-43a7-93a5-07c50c525182  
User-Agent: NationalBroker
```

Code Block 10 Get Message Response request

And receives it:


```

Connection: keep-alive
Content-Length: 2290
Content-Type: multipart/mixed; boundary="----
_Part_8_817383638.1629797835044"
Date: Tue, 24 Aug 2021 09:37:15 GMT
Digest: SHA-256=rzvLHz2Db6c68x3GWe0JDTvPXyi25lUuSj9yoLIqfOs=
Edel-Message-Sig:
eyJhbGciOiJFUzI1NiIsImtpZCI6Ikk1FOHdTcVJJTUUVZeEN6QUpcZ05WQkFZVEFrVlZlNUTR3RE
FZRFZRUUtdFd1ZFU1VkslZERW5NQ1VHQTFVFRUF4TWVWR1Z6ZENCrlF5QnBib1JsY20xbFpHbGhk
R1VnU1h0emRXVnIjREF4QWdFSSIsIng1dCNTMjU2Ijoid2FKX0pvd0Y1R2RyV2xpbUJtc3N1VV
9Ca3BldGxoV2dXRWNWFJiUdMWSIsIng1YyI6WyJNSUlCanpDQ0FUYWdBd0lCQWdJQkNEQUtC
Z2dxaGtqT1BRUURBakJHTVFzd0NRWURWUVFHRXdKRlZURU9NQXdhQTFVRUNoTUZSRWxIU1ZReE
p6QWxCZ05WQkFNVEhsUmXjM1FnU1VNZ2FXNTBaWEp0WldScFlYUmXJRWx6YzNWbGNpQXNVEFl
RncweU1UQTNNRGN3TURBd01EQmFGdzB5TWpBM01EWX1Ne1U1TlRsYU1GRXhDekFKQmdOVkJBWV
RBalZWTVE0d0RBWURWUVFLRXdWRVNVZEpWREVMtUIwR0ExVUVDeE1XVW1WemRDQkJVRWtnVUds
c2IzUWdjSep2YW1WamRERVJNQThHQTFVFRUF4TU1SRk5FTFUXFEw3dWakFRQmdjcWhrak9QUU
lCQmdVcmdRUUFDZ05DQUFUOHpJcE12MVBYU2c4dDNaMjZBN1FBS29oOVd5ZW84ZDc3Wj1iTDJa
RnBaTDVHVXZHN0xwaXV0M3ZrbjFomGowT1FlenFQSmFwRnlvQThYc3N4MWZKQW93MHdDekFKQm
dOVkhSTUVBakFBTUFvR0NDcUdTTQ5QkFNQ0EwY0FNRVFDUg0cjh3bTdRSW11STA3M0VyNUh2
MUNLY09DOUsvR0NFU1BFSVhOK1R3RVRBaUJES2FyTStsMGdKQkJO5SjJnNlaMmE5ZU9LZhdP2
VGRlFaclZSNzlc1ZBPT0iXSwidHlwIjoiam9zZSIsImI2NCi6ZmFsc2UsInNpZ1QiOiIyMDIx
LTA4LTI0VDA5OjM3OjE1WiIsInNpZ0QiOmsibUlkiJoiaHR0cDovL3VyaS5ldHNpLm9yZy8xOT
E4Mi9IdHRwSGVhZGVycyIsInBhcniOlisiY29udGVudC10eXBlIiw1Y29udGVudC1sZW5ndGgi
LCJkaWdlc3QiXX0sImNyaXQiOlisiYjY0Iiwic2lnVCI6ZmFsc2UsInNpZ0QiXX0..0nIusPUVgIGERhG8E
nXlqOLXH1BL--U_iibkxPmGig88x-srNYOUMRqwuS4R6dmOtCdxNOY30YyznSJ4bOnyw
Vary: Access-Control-Request-Headers

-----_Part_8_817383638.1629797835044
Content-Type: application/json
Edel-Payload-Sig:
eyJhbGciOiJFUzI1NiIsImtpZCI6Ikk1FOHdTcVJJTUUVZeEN6QUpcZ05WQkFZVEFrVlZlNUTR3RE
FZRFZRUUtdFd1ZFU1VkslZERW5NQ1VHQTFVFRUF4TWVWR1Z6ZENCrlF5QnBib1JsY20xbFpHbGhk
R1VnU1h0emRXVnIjREF4QWdFSSIsIng1dCNTMjU2Ijoid2FKX0pvd0Y1R2RyV2xpbUJtc3N1VV
9Ca3BldGxoV2dXRWNWFJiUdMWSIsIng1YyI6WyJNSUlCanpDQ0FUYWdBd0lCQWdJQkNEQUtC
Z2dxaGtqT1BRUURBakJHTVFzd0NRWURWUVFHRXdKRlZURU9NQXdhQTFVRUNoTUZSRWxIU1ZReE
p6QWxCZ05WQkFNVEhsUmXjM1FnU1VNZ2FXNTBaWEp0WldScFlYUmXJRWx6YzNWbGNpQXNVEFl
RncweU1UQTNNRGN3TURBd01EQmFGdzB5TWpBM01EWX1Ne1U1TlRsYU1GRXhDekFKQmdOVkJBWV
RBalZWTVE0d0RBWURWUVFLRXdWRVNVZEpWREVMtUIwR0ExVUVDeE1XVW1WemRDQkJVRWtnVUds
c2IzUWdjSep2YW1WamRERVJNQThHQTFVFRUF4TU1SRk5FTFUXFEw3dWakFRQmdjcWhrak9QUU
lCQmdVcmdRUUFDZ05DQUFUOHpJcE12MVBYU2c4dDNaMjZBN1FBS29oOVd5ZW84ZDc3Wj1iTDJa
RnBaTDVHVXZHN0xwaXV0M3ZrbjFomGowT1FlenFQSmFwRnlvQThYc3N4MWZKQW93MHdDekFKQm
dOVkhSTUVBakFBTUFvR0NDcUdTTQ5QkFNQ0EwY0FNRVFDUg0cjh3bTdRSW11STA3M0VyNUh2
MUNLY09DOUsvR0NFU1BFSVhOK1R3RVRBaUJES2FyTStsMGdKQkJO5SjJnNlaMmE5ZU9LZhdP2
VGRlFaclZSNzlc1ZBPT0iXSwidHlwIjoiam9zZSIsImI2NCi6ZmFsc2UsInNpZ1QiOiIyMDIx
LTA4LTI0VDA5OjM3OjE1WiIsInNpZ0QiOmsibUlkiJoiaHR0cDovL3VyaS5ldHNpLm9yZy8xOT
E4Mi9IdHRwSGVhZGVycyIsInBhcniOlisiY29udGVudC1kaXNwb3NpdGlubiIsImNvbniRlbnQt
dHlwZSIsImNvbniRlbnQtbGVuZ3R0Iiw1Y29udGVudC1sZW5ndGgiLCJkaWdlc3QiXX0..xWSSgdYfgfm3RfsW1Nq-
KcSMCPG63XwdCxctR7jZCOWe41VeGyMr0JkoohhhMroTJldn09sKvi2hqc1NB19PbA
Content-Disposition: name="eu.europa.ec.isa2.restapi.jws.JsonDssDocument";
filename="eu.europa.ec.isa2.restapi.jws.JsonDssDocument.json"
Digest: SHA-256=thm0v2e0iEPYrMby3cThS4R1XdHzAiHT1RCVtUokd5U=
Content-Length: 575

{
  "description" : "Organization was successfully updated!",
  "refMessage" : "8bb10f70-4b4e-49b0-b518-5e55be99fb30",
  "status" : "Completed",
  "object" : {
    "status" : 0,
    "index" : 0,
    "identifier" : "111002",
    "prefLabels" : [ "Munich University of Applied Sciences" ],
    "altLabels" : [ "Munich univeristy of Applied Sciences will provide
information regarding diplomas issued by this university" ],
    "classifications" : [ "level-5" ],

```



```

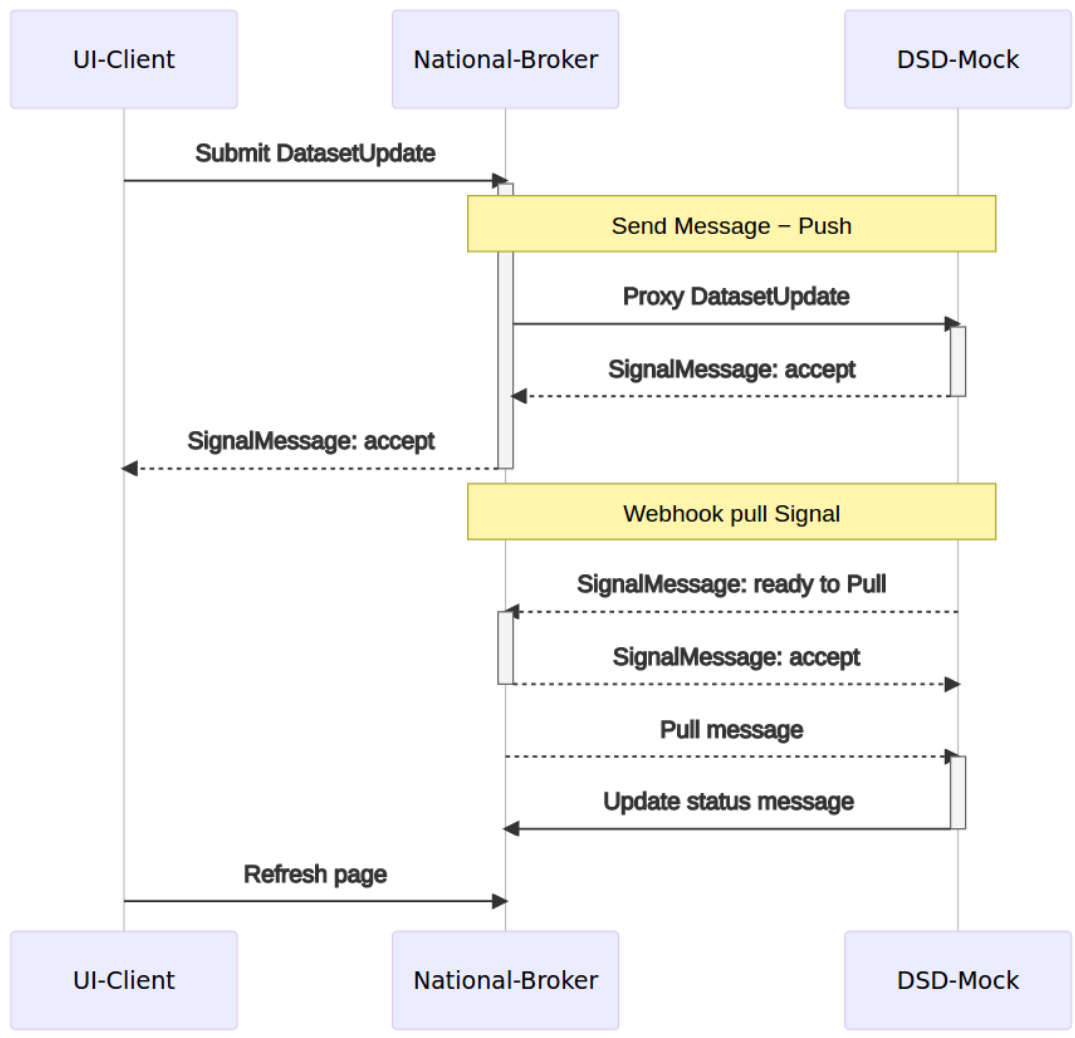
    "address" : {
      "adminUnitLevel" : "DE",
      "fullAddress" : "Lothstrasse 34, 80335 Munchen"
    }
  }
}
-----=_Part_8_817383638.1629797835044--

```

Code Block 11 Get Message Response response

4.3 Send Message with Asynchronous Response – Push and Webhook Pull

The pattern supports the implementation of the update Dataset functionality. The implementation follows the sequence diagram depicted below:



The National Broker submits an update Dataset request such as:

```

(Request-Target): post /dsd-mock/v1/messaging/dataset/update/3995bf3d-
978f-4150-9dae-c95562f30c3e
Accept: application/json
Content-Length: 3537
Content-Type: multipart/mixed; boundary="----
=_Part_25_743865690.1629798721562"
Digest: SHA-256=Fn65k0uoB78OQykmVLg3Hkj1XgyKwwvFbd7CRPLF42U=
Edel-Message-Sig:
eyJhbGciOiJFUzI1NiIsImtpZCI6IklFOHdTcVJTTUVZeEN6QUpcZ05WQkFZVEFrVlZNUTR3RE
FZRFZRUUtFd1ZFU1VkslZERW5NQ1VHQTFVRUF4TWVWR1Z6ZENCRLf5QnBib1JsY20xbFpHbGhk
R1VnU1h0emRXVnlJREF4QWdFSiIsIng1dCNTMjU2IjoicVlDUWZoMDFUNlklUWdXaDFVenFoMW
x4WHVfeHEtQ2x0R0dKdzJpTnhtQSIIsIng1YyI6WyJNSU1CbHpDQ0FUMmdBd0lCQWdJQkNUQUtC
Z2dxaGtqT1BRUURBakJHTVfZd0NRWURWUVFHRXdKRlZURU9NQXdhQTFVRUNoTUZSRWxIUlZReE
p6QWxCZ05WQkFNVEhsUmXjM1FnU1VNZ2FXNTBaWEp0WldScFlYUmXJRWx6YzNWbGNpQXdNVEFl
RncweU1UQTNNRGN3TURBd01EQmFGdzB5T1RBM01EWX1NelU1TlRsYU1GZ3hDekFKQmdOVkJBWV
RBalZWTVE0d0RBWURWUVFLRXdWRVNVZEpWREVMtUIwR0ExVUVDeE1XVWlWemRDQkJVRWtnVUds
c2IzUWdjSep2Yw1WamRERVlNQ1lHQTFVRUF4TVBUbUYwYVc5dVlXd3RRbkp2YTJWeU1GWXdFQV
lIS29aSXpqMENBUVlGSzRFRUFBb0RRZ0FFTUZVbkNheU9TaEI4dVp6SzYvRWh3Q0VWRXJ3TF1C
d2tyQ1NiR2tyR2ZYZWhSbVIwY2VUNmQrNXJGR25QZXdQ2FpV010QkUzY1BTZWNZzHdBYjErYn
FNTk1Bc3dDUVlEVlIwVEJBSXdBREFlQmdncWhrak9QUVFEQWdOSUFEQkZBaUJ1TUEyWlF5WFpu
eUhqQ3d5U1ZPcFlTNEFxeUE1PeitJMXVCAHpGK3Q1R0dnSWhBSjQWdVdERDRtQ0NudWprdtQ2aX
ZDLzZwZUtyNkcwOE1za29XaFY4amdlyJdLCJ0eXAIoiJqb3N1IiwiYjY0IjpmYWxzZSwic2ln
VCI6IjIwMjEtMDgtMjRUMDk6NTI6MDFaIiwic2lnRCI6eyJtSWQiOiJodHRwOi8vdXJpLmV0c2
kub3JnLzE5MTgyL0h0dHBIZWFkZXJzIiwicGFycyI6WyJjb250ZW50LXR5cGUlLCJjb250ZW50
LWxlbmdd0aCIsImRpZ2VzdCIiIiwicGFycyI6WyJjb250ZW50LWxlbmdd0aCIsImRpZ2VzdCIi
InNpZ25hbC13ZWJ0b29rIiwidGltZXN0YWI1l19LCJjcm10IjpbImI2NCIsInNpZ1QiLCJzaWdeI
l19..QnhK
DQ8ICpo2QVu2r4kQ4eQasW_KzG0lnwU6GY6QVUj2bWWBBcIYvRluicMX3lPwJ_bc2D9OGKZowA
G3Lve4jg
Final-Recipient: 0088:123456789:test
Host: localhost:8080
Original-Sender: ADMIN_USER
Signal-Webhook: http://localhost:8080/national-broker
Timestamp: 2021-08-24T11:52:01.553+02:00
User-Agent: Java-SDK

-----=_Part_25_743865690.1629798721562
Content-Type: application/json
Edel-Payload-Sig:
eyJhbGciOiJFUzI1NiIsImtpZCI6IklFOHdTcVJTTUVZeEN6QUpcZ05WQkFZVEFrVlZNUTR3RE
FZRFZRUUtFd1ZFU1VkslZERW5NQ1VHQTFVRUF4TWVWR1Z6ZENCRLf5QnBib1JsY20xbFpHbGhk
R1VnU1h0emRXVnlJREF4QWdFSiIsIng1dCNTMjU2IjoicVlDUWZoMDFUNlklUWdXaDFVenFoMW
x4WHVfeHEtQ2x0R0dKdzJpTnhtQSIIsIng1YyI6WyJNSU1CbHpDQ0FUMmdBd0lCQWdJQkNUQUtC
Z2dxaGtqT1BRUURBakJHTVfZd0NRWURWUVFHRXdKRlZURU9NQXdhQTFVRUNoTUZSRWxIUlZReE
p6QWxCZ05WQkFNVEhsUmXjM1FnU1VNZ2FXNTBaWEp0WldScFlYUmXJRWx6YzNWbGNpQXdNVEFl
RncweU1UQTNNRGN3TURBd01EQmFGdzB5T1RBM01EWX1NelU1TlRsYU1GZ3hDekFKQmdOVkJBWV
RBalZWTVE0d0RBWURWUVFLRXdWRVNVZEpWREVMtUIwR0ExVUVDeE1XVWlWemRDQkJVRWtnVUds
c2IzUWdjSep2Yw1WamRERVlNQ1lHQTFVRUF4TVBUbUYwYVc5dVlXd3RRbkp2YTJWeU1GWXdFQV
lIS29aSXpqMENBUVlGSzRFRUFBb0RRZ0FFTUZVbkNheU9TaEI4dVp6SzYvRWh3Q0VWRXJ3TF1C
d2tyQ1NiR2tyR2ZYZWhSbVIwY2VUNmQrNXJGR25QZXdQ2FpV010QkUzY1BTZWNZzHdBYjErYn
FNTk1Bc3dDUVlEVlIwVEJBSXdBREFlQmdncWhrak9QUVFEQWdOSUFEQkZBaUJ1TUEyWlF5WFpu
eUhqQ3d5U1ZPcFlTNEFxeUE1PeitJMXVCAHpGK3Q1R0dnSWhBSjQWdVdERDRtQ0NudWprdtQ2aX
ZDLzZwZUtyNkcwOE1za29XaFY4amdlyJdLCJ0eXAIoiJqb3N1IiwiYjY0IjpmYWxzZSwic2ln
VCI6IjIwMjEtMDgtMjRUMDk6NTI6MDFaIiwic2lnRCI6eyJtSWQiOiJodHRwOi8vdXJpLmV0c2
kub3JnLzE5MTgyL0h0dHBIZWFkZXJzIiwicGFycyI6WyJjb250ZW50LWxlbmdd0aCIsImRpZ2V
zdCIiInNpZ25hbC13ZWJ0b29rIiwidGltZXN0YWI1l19LCJjcm10IjpbImI2NCIsInNpZ1QiLC
JzaWdeI119..XK6Q2avyWBkIQvMX5s13cYekPa0_AqPOhchplrU97DgYBmr5iB
eEMG7vwHs5jBRkmyxhTnsb2czCnykAnVBBA
Content-Disposition: name="eu.europa.ec.isa2.restapi.jws.JsonDssDocument";
filename="eu.europa.ec.isa2.restapi.jws.JsonDssDocument.json"
Digest: SHA-256=30t/cWiZ0lSjqzplC1B4LW+2L6WcP56TaxaycFYZ/kk=
Content-Length: 1808

{
  "status" : 0,
  "index" : 0,

```

```

    "type" : "STATE_MINISTRY",
    "conformsTo" : "https://semantic-repository.toop.eu/ontology/higher-
education/state-ministry",
    "identifiers" : [ "DE000001000" ],
    "titles" : [ "Registry of the State Ministries responsible for higher
education" ],
    "descriptions" : [ "A dataset about the state Ministries responsible for
higher education" ],
    "publisher" : {
      "status" : 0,
      "index" : 0,
      "identifier" : "100001",
      "prefLabels" : [ "Federal Ministry of Education and
Research@en", "Bundesministerium für Bildung und Forschung@de" ],
      "altLabels" : [ "Federal Ministry of Education, will provide
information regarding German university diplomas issues by any German
university@en", "Bundesbildungsministerium, informiert von allen deutschen
Hochschulen zu Fragen des deutschen Hochschulabschlusses@de" ],
      "classifications" : [ "level-0" ],
      "address" : {
        "adminUnitLevel" : "DE",
        "fullAddress" : "Heinemannstrasse 2, 53175, Bonn"
      }
    },
    "qualifiedRelationships" : [ {
      "relation" : "urn:oasis:names:tc:ebcore:partyid-
type:iso6523:9999:0000000004",
      "hadRole" : "https://toop.eu/dataset/supportedIdScheme"
    } ],
    "distributions" : [ {
      "descriptions" : [ "This is a XML distribution of the registry" ],
      "conformsTo" : "RegRepv4-EDMv2",
      "format" : "STRUCTURED",
      "mediaType" : "application/xml",
      "accessURL" : "https://smp.bonn.toop.eu/9999::0000000003/services/STAT
E_MINISTRY",
      "dataServices" : [ {
        "identifier" : "toop-doctypeid-qns::urn:eu:toop:ns:dataexchange-
2::Request#urn:eu.toop.request.state-ministry::2.0",
        "conformsTo" : "",
        "title" : "Access Service Title",
        "endpointURL" : "https://smp.bonn.toop.eu/9999::0000000005/services/
state-ministry?type=xml"
      } ]
    } ]
  }
}
-----_Part_25_743865690.1629798721562--

```

Code Block 12 Update Dataset request

And obtains a response containing a Signal such as:

```

Connection: keep-alive
Content-Disposition: name="eu.europa.ec.isa2.restapi.jws.JsonDssDocument";
filename="eu.europa.ec.isa2.restapi.jws.JsonDssDocument.json"
Content-Length: 502
Content-Type: application/json
Date: Tue, 24 Aug 2021 09:52:02 GMT
Digest: SHA-256=qZRZkd80qQMyLYL9w5K2hQqldqeJBNUl83v6fNrQ3VI=
Edel-Message-Sig:
eyJhbGciOiJFUzI1NiIsImtpZCI6IklFOHdTcVJTTUVZeEN6QUUpCZ05WQkFZVEFrVlZNUTR3RE
FZRFRZRUUtFd1ZFU1VkslZERW5NQ1VHQTFVRUF4TWVWR1Z6ZENCRLf5QnBib1JsY20xbFpHbGhk
R1VnU1h0emRXVnlJREF4QWdFSSIsIng1dCNTMjU2Ijoid2FKX0pvd0Y1R2RyV2xpbUJTC3N1VV
9Ca3BlDGxoV2dXRWNNWFJiTUdMWSIsIng1YyI6WyJNSU1CanpDQ0FUYWdBd0lCQWdJQkNEQUtC
Z2dxaGtqT1BRUURBakJHTVfzd0NRWURWUVFHRXdKRlZURU9NQXdhQTFVRUNoTUZSRWxIUlZReE
p6QWxCZ05WQkFNVEhsUmXjM1FnU1VNz2FXNTBaWEp0WldScFlYUmXJRWx6YzNwBGNpQXNVEF1
RncweU1UQTNNRGN3TURBd01EQmFGdzB5TWpBM01Ewx1NelU1TlRsYU1GRXhDekFKQmdOVkJBWV
RBalZWTVE0d0RBWURWUVFLRXdWRVNVZEpWREVMtUIwR0ExVUVDeE1XVW1WemRDQkJVRWtnVUds
c2IzUWdjSEp2YW1WamRERVJNQThHQTFVRUF4TU1SRk5FTFUXUFEwc3dWakFRQmdjcWhrak9QUU
lCQmdVcmduUFDZ05DQUFUOHpJcE12MVBYU2c4dDNAMjZBN1FBS29oOVd5ZW84ZDc3WjliTDJa
RnBaTDVHVXZHN0xwXV0M3ZrbjFomGowT1FlenFQSmFwRnlvQThYc3N4MWZKQW93MHdDekFKQm
dOVkhSTUVBakFBTUFvR0NDcUdTQTQ5QkFNQ0EwY0FNRVFDUg0cjh3bTdRSW11STA3M0VyNUh2
MUNLY09DOUsvR0NFU1BFSVhOK1R3RVRBaUJES2FyTStsMGdKQkJO5jJnNnlaMme5ZU9LZhdPK2
VGRlFac1ZSNzlc1ZBPT0iXSwidHlwIjoiam9zZSIsImI2NCi6ZmFsc2UsInNpZ1QiOiIyMDIx
LTA4LTI0VDA5OjUyOjAyWiIsInNpZ0QiOmsibUlkiIjoiaHR0cDovL3VyaS5ldHNpLm9yZy8xOT
E4Mi9IdHRwSGVhZGVycyIsInBhcniMiOlsiY29udGVudC1kaXNwb3NpdGlvbiIsImNvbniRlbnQt
dHlwZSIsImNvbniRlbnQtbnQtbGVuZ3RoIiwizGlnZXN0I119LCJjcm10IjpbImI2NCIsInNpZ1QiLC
JzaWdEIl19..rPsGuIbjeSum8z02E_wQvwlpDFkjdJFAoTm_9YcK72jMdAeOVnY7dDb1BIxLZ5
iNSQi5_axf-A0RBLnE2ZQdSw
Timestamp: 2021-08-24T11:52:02.123
Vary: Access-Control-Request-Headers

{
  "title" : "Message Accepted",
  "type" : "https://joinup.ec.europa.eu/collection/api4dt/solution/.../mes
saging/signal/message-accepted",
  "status" : 202,
  "detail" : "Sent when the message is properly validated. It may include
a status monitor that can provide the user with an estimate of when the
request will be fulfilled (see [RFC7231])",
  "instance" : "/v1/messaging/dataset/update/3995bf3d-978f-4150-9dae-
c95562f30c3e",
  "digest" : "SHA-256=Fn65k0uoB780QykmVLg3Hkj1XgyKwvwFbd7CRPLF42U="
}

```

Code Block 13 Update Dataset response containing a Signal

The DSD mock then submits a Signal to the Signal-Webhook URL provided in the initial request:


```

Connection: keep-alive
Content-Disposition: name="eu.europa.ec.isa2.restapi.jws.JsonDssDocument";
filename="eu.europa.ec.isa2.restapi.jws.JsonDssDocument.json"
Content-Length: 502
Content-Type: application/json
Date: Tue, 24 Aug 2021 09:58:30 GMT
Digest: SHA-256=ibV2Xzx3eAifMS9+sTHhAyGXVWuf3HusKyz3iqO9Wl0=
Edel-Message-Sig:
eyJhbGciOiJFUzI1NiIsImtpZCI6IklFOHdTcVJTTUVZeEN6QUpcZ05WQkFZVEFrVlZNUTR3RE
FZRFRZRUUtFd1ZFU1VkSlZERW5NQ1VHQTFVRUF4TWVWR1Z6ZENCRLF5QnBib1JsY20xbFpHbGhk
R1VnU1h0emRXVnlJREF4QWdFSSIsIng1dCNTMjU2Ijoid2FKX0pvd0Y1R2RyV2xpbUJTC3N1VV
9Ca3BldGxoV2dXRWNWFJiTUdMWSIsIng1YyI6WyJNSU1CanpDQ0FUYWdBd0lCQWdJQkNEQUtC
Z2dxaGtqT1BRUURBakJHTVfzd0NRWURWUVFHRXdKRlZURU9NQXdhQTFVRUNoTUZSRWxIUlZReE
p6QWxCZ05WQkFNVEhsUmXjMlFnU1VNZ2FXNTBaWEp0WldScFlYUmxJRWx6YzZnNWbGNpQXNVEF1
RncweU1UQTNNRGN3TURBd01EQmFGdzB5TWpBM01EWX1NelU1TlRsYU1GRXhDekFKQmdOVkJBWV
RBalZWTVE0d0RBWURWUVFLRXdWRVNVZEpWREVmTUIwR0ExVUVDeE1XVW1WemRDQkJRWRtnVUds
c2IzUWdjSEp2YW1WamRERVJNQThHQTFVRUF4TU1SRk5FTTFUxUFUw3dWakFRQmdjcWhrak9QUU
lCQmdVcmduUFDZ05DQUFUOHpJcE12MVBYU2c4dDNamjZBN1FBS29oOVd5ZW84ZDc3WjliTDJa
RnBaTDVHVXZHN0xwXV0M3ZrbjF0MGowT1FlenFQSmFwRnlvQThYc3N4MWZKQW93MHdDekFKQm
dOVkhSTUVBakFBTUFvR0NDcUdTTTQ5QkFNQ0EwY0FNRVFDUg0cjh3bTdR5W11STA3M0VYNUh2
MUNLY09DOUsvR0NFU1BFSVhOK1R3RVRBaUJES2FyTStsMGdKQkJO5jJnNnlaMmE5ZU9LZhdPK2
VGRlFac1ZSNzlc1ZBPT0iXSwidHlwIjoiam9zZSIsImI2NCI6ZmFsc2UsInNpZlQiOiIyMDIx
LTA4LTI0VDA5OjU4OjMwWiIsInNpZ0QiOmsibUlkiIjoiaHR0cDovL3VyaS5ldHNpLm9yZy8xOT
E4Mi9IdHRwSGVhZGVycyIsInBhcniOlsiY29udGVudC1kaXNwb3NpdGlubiIsImNvbniRlbnQt
dHlwZSIsImNvbniRlbnQtbgVuZ3RoIiwizGlnZXN0Il19LCJjcml0IjpbImI2NCIsInNpZlQiLC
JzaWdEIl19..GeEsjJMbkf_oc9kE03XFGUAB0yGrHlfoGp0mKC2W037Fhj29KmdvcHxpDmJMbe
FseNNdsGGQisX-b88LhBTvcw
Timestamp: 2021-08-24T11:58:30.286
Vary: Access-Control-Request-Headers

{
  "title" : "Message Accepted",
  "type" : "https://joinup.ec.europa.eu/collection/api4dt/solution/.../mes
saging/signal/message-accepted",
  "status" : 202,
  "detail" : "Sent when the message is properly validated. It may include
a status monitor that can provide the user with an estimate of when the
request will be fulfilled (see [RFC7231])",
  "instance" : "/dsd-mock/v1/messaging-webhook/e48e8723-7e7b-4243-a454-
e513718f10df/response/signal",
  "digest" : "SHA-256=A5ANUmL6mqHxI/x3p8j4hEgBQoXrWhTh8jyikx8mKjg="
}

```

Code Block 15 Webhook Signal response

Following the receipt of the Signal, the National Broker can send the request to obtain the message response:

```

(Request-Target): get /dsd-mock/v1/messaging/dataset/status/632c8d81-da89-
41a9-9c8a-869fa21f9326
Accept: application/problem+json
Content-Length: 0
Content-Type: application/json
Host: localhost:8080
Request-Target-PRIVATE: get /dsd-
mock/v1/messaging/dataset/status/632c8d81-da89-41a9-9c8a-869fa21f9326
User-Agent: Java-SDK

```

Code Block 16 Get Message Response request

And receives it:

```

Connection: keep-alive
Content-Length: 3753
Content-Type: multipart/mixed; boundary="----
_Part_3_347952431.1629799110033"
Date: Tue, 24 Aug 2021 09:58:30 GMT
Digest: SHA-256=P+Nq6bXNTzVJaNRXQ+rAKAX3Fg/N6SFkBcmKrS5OFXg=
Edel-Message-Sig:
eyJhbGciOiJFUzI1NiIsImtpZCI6Ikk1FOHdTcVJTTUVZeEN6QUpCZ05WQkFZVEFrVlZNUTR3RE
FZRFZRUUtdFd1ZFU1VkslZERW5NQ1VHQTFVURUF4TWVWR1Z6ZENC1F5QnBib1JsY20xbFpHbGhk
R1VnU1h0emRXVnlJREF4QWdFSSIsIng1dCNTMjU2Ijoid2FKX0pvd0Y1R2RyV2xpbUJtC3N1VV
9Ca3BldGxoV2dXRWNWFJiTUdMWSIsIng1YyI6WyJNSU1CanpDQ0FUYWdBd0lCQWdJQkNEQUtC
Z2dxaGtqT1BRUURBakJHTVFzd0NRWURWUVFHRXdkRlZURU9NQXdhQTFVURNoTUZSRWxIU1ZReE
p6QWxCZ05WQkFNVEhsUmXjM1FnU1VNZ2FXNTBaWEp0WldScFlYUmXJRWx6YzNWbGNpQXNVEF1
RncweU1UQTNNRGN3TURBd01EQmFGdzB5TWpBM01Ewx1NelU1TlRsYU1GRXhDekFKQmdOVkJBWV
RBalZWTVE0d0RBWURWUVFLRXdWRVNVZEpwREVmTUIwR0ExVUVDeE1XVW1WemRDQkJVRWtnVUds
c2IzUWdjSep2Yw1WamRERVJNQThHQTFVURUF4TU1SRk5FTFUXUFEwc3dWakFRQmdjcWhrak9QUU
lCQmdVcmdRUUFDZ05DQUFUOHpJcE12MVBYU2c4dDNamjZBN1FBS29oOVd5ZW84ZDc3Wj1iTDJa
RnBaTDVHVXZHN0xwaXV0M3ZrbjFomGowT1FlenFQSmFwRnlvQThYc3N4MWZKQW93MHdDekFKQm
dOVkhSTUVBakFBTUfVr0NDcUdTTQ5QkFNQ0EwY0FNRVFDUg0cjh3bTdRSW11STA3M0VyNUh2
MUNLY09DOUsvR0NFU1BFSVhOK1R3RVRBaUJES2FyTStsMGdKQkJOsjJnNnLaMme5ZU9LZHdpK2
VGRlFaclZSNzlc1ZBPT0iXSwidHlwIjoiam9zZSIsImI2NCi6ZmFsc2UsInNpZ1QiOiIyMDIx
LTA4LTI0VDA5OjU4OjMwWiIsInNpZ0QiOmsibUlkiIjoiaHR0cDovL3VyaS5ldHNpLm9yZy8xOT
E4Mi9IdHRwSGVhZGVycyIsInBhcnMiOlsiY29udGVudC10eXBlIiw1Y29udGVudC1sZW5ndGgi
LCJkaWdlc3QiXX0sImNyaXQiOlsiYjY0Iiwic2lnVCI6ZmFsc2UsInNpZ0QiXX0..-
ui3HNJN49mx5YvhzLO_eBHPs_XBJuE9_Si095JFHTfX6pWi0YyEiMd61yozuOTMBSMrfNxBXB
z6bNx0wIt4w
Vary: Access-Control-Request-Headers

```

```

-----=_Part_3_347952431.1629799110033
Content-Type: application/json
Edel-Payload-Sig:
eyJhbGciOiJFUzI1NiIsImtpZCI6Ikk1FOHdTcVJTTUVZeEN6QUpCZ05WQkFZVEFrVlZNUTR3RE
FZRFZRUUtdFd1ZFU1VkslZERW5NQ1VHQTFVURUF4TWVWR1Z6ZENC1F5QnBib1JsY20xbFpHbGhk
R1VnU1h0emRXVnlJREF4QWdFSSIsIng1dCNTMjU2Ijoid2FKX0pvd0Y1R2RyV2xpbUJtC3N1VV
9Ca3BldGxoV2dXRWNWFJiTUdMWSIsIng1YyI6WyJNSU1CanpDQ0FUYWdBd0lCQWdJQkNEQUtC
Z2dxaGtqT1BRUURBakJHTVFzd0NRWURWUVFHRXdkRlZURU9NQXdhQTFVURNoTUZSRWxIU1ZReE
p6QWxCZ05WQkFNVEhsUmXjM1FnU1VNZ2FXNTBaWEp0WldScFlYUmXJRWx6YzNWbGNpQXNVEF1
RncweU1UQTNNRGN3TURBd01EQmFGdzB5TWpBM01Ewx1NelU1TlRsYU1GRXhDekFKQmdOVkJBWV
RBalZWTVE0d0RBWURWUVFLRXdWRVNVZEpwREVmTUIwR0ExVUVDeE1XVW1WemRDQkJVRWtnVUds
c2IzUWdjSep2Yw1WamRERVJNQThHQTFVURUF4TU1SRk5FTFUXUFEwc3dWakFRQmdjcWhrak9QUU
lCQmdVcmdRUUFDZ05DQUFUOHpJcE12MVBYU2c4dDNamjZBN1FBS29oOVd5ZW84ZDc3Wj1iTDJa
RnBaTDVHVXZHN0xwaXV0M3ZrbjFomGowT1FlenFQSmFwRnlvQThYc3N4MWZKQW93MHdDekFKQm
dOVkhSTUVBakFBTUfVr0NDcUdTTQ5QkFNQ0EwY0FNRVFDUg0cjh3bTdRSW11STA3M0VyNUh2
MUNLY09DOUsvR0NFU1BFSVhOK1R3RVRBaUJES2FyTStsMGdKQkJOsjJnNnLaMme5ZU9LZHdpK2
VGRlFaclZSNzlc1ZBPT0iXSwidHlwIjoiam9zZSIsImI2NCi6ZmFsc2UsInNpZ1QiOiIyMDIx
LTA4LTI0VDA5OjU4OjMwWiIsInNpZ0QiOmsibUlkiIjoiaHR0cDovL3VyaS5ldHNpLm9yZy8xOT
E4Mi9IdHRwSGVhZGVycyIsInBhcnMiOlsiY29udGVudC1kaXNwb3NpdGlvbiIsImNvb3RlbnQt
dHlwZSIsImNvb3RlbnQtY29udGVudC1sZW5ndGgiLCJkaWdlc3QiXX0sImNyaXQiOlsiYjY0Iiwic2lnVCI6ZmFsc2Us
InNpZ0QiXX0..URtiOeK8qtaYlaAJk0NAotKB0rOt73dBZfhXN7Co8Qj6x006irI2G5V2pn0F4G
SWEjEwH2ly8f0Ajn4eTeaNdw
Content-Disposition: name="eu.europa.ec.isa2.restapi.jws.JsonDssDocument";
filename="eu.europa.ec.isa2.restapi.jws.JsonDssDocument.json"
Digest: SHA-256=DeNcU8gSGBcGLXOc+BbXkKH9d95SGvbYNSkFNsflZ3I=
Content-Length: 2037

```

```

{
  "description" : "Dataset was successfully updated!",
  "refMessage" : "0abb6e35-b90b-4c8f-bca6-03812efcc593",
  "status" : "Completed",
  "object" : {
    "status" : 0,
    "index" : 0,
    "type" : "STATE_MINISTRY",
    "conformsTo" : "https://semantic-repository.toop.eu/ontology/higher-education/state-ministry",
    "identifiers" : [ "DE000001000" ],

```



```

    "titles" : [ "Registry of the State Ministries responsible for higher
education" ],
    "descriptions" : [ "A dataset about the state Ministries responsible
for higher education" ],
    "publisher" : {
      "status" : 0,
      "index" : 0,
      "identifier" : "100001",
      "prefLabels" : [ "Federal Ministry of Education and
Research@en", "Bundesministerium für Bildung und Forschung@de" ],
      "altLabels" : [ "Federal Ministry of Education, will provide
information regarding German university diplomas issues by any German
university@en", "Bundesbildungsministerium, informiert von allen deutschen
Hochschulen zu Fragen des deutschen Hochschulabschlusses@de" ],
      "classifications" : [ "level-0" ],
      "address" : {
        "adminUnitLevel" : "DE",
        "fullAddress" : "Heinemannstrasse 2, 53175, Bonn"
      }
    },
    "qualifiedRelationships" : [ {
      "relation" : "urn:oasis:names:tc:ebcore:partyid-
type:iso6523:9999:0000000004",
      "hadRole" : "https://toop.eu/dataset/supportedIdScheme"
    } ],
    "distributions" : [ {
      "descriptions" : [ "This is a XML distribution of the registry" ],
      "conformsTo" : "RegRepv4-EDMv2",
      "format" : "STRUCTURED",
      "mediaType" : "application/xml",
      "accessURL" : "https://smp.bonn.toop.eu/9999::0000000003/services/ST
ATE_MINISTRY",
      "dataServices" : [ {
        "identifier" : "toop-doctypeid-qns::urn:eu:toop:ns:dataexchange-
2::Request#urn:eu.toop.request.state-ministry::2.0",
        "conformsTo" : "",
        "title" : "Access Service Title",
        "endpointURL" : "https://smp.bonn.toop.eu/9999::0000000005/service
s/state-ministry?type=xml"
      } ]
    } ]
  }
}
-----=_Part_3_347952431.1629799110033--

```

Code Block 17 Get Message Response response

5 Contact information

For any questions regarding this document please contact EC-EDELIVERY-SUPPORT@ec.europa.eu.