

# CATENA-X STANDARD



## CX - 0053 BPN Discovery Service APIs v1.0.1

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## ABOUT THIS DOCUMENT & MOTIVATION

Catena-X is the first open and collaborative data ecosystem. The goal is to provide an environment for the creation, operation, and joint use of end-to-end data chains along the entire automotive value chain. All partners are on an equal ground, have sovereign control over their data and no lock-in effects occur. This situation provides a sustainable solution for the digitalization of supply chains, especially for medium-sized and small companies, and supports the cooperation and collaboration of market participants and competitors.

The ever-growing Catena-X ecosystem will enable enormous amounts of data to be integrated and collaboratively harnessed. To ensure that these complex data volumes can be sent, received, and processed smoothly across all stages of the value chain, one language for all players: common standards. The standards of the Catena-X data ecosystem define how the exchange of data and information in our network works. They are the basis for ensuring that the technologies, components, and processes used are developed and operated according to uniform rules.

Common standards create added value for all partners: Within our network, data flows more smoothly through interfaces. In addition, we avoid cumbersome individual IT solutions for sharing data with other partners. In the field of international standardization, Catena-X follows the proven international standardization institutions: ISO/IEC/ITU and GEN-CENELC/ETSI.

For users and data providers, implementation of standards will reduce the costs that would arise from adapting different systems. In addition, no important data is lost. On the contrary, it even becomes easier to collect data across companies. For operators and developers, standards will create a framework that provides reliable orientation and planning security.

The following document describes one of the standards used in the Catena-X ecosystem and the requirements needed to implement it. Here, it serves as main resource to illustrate the following data model. It contains information starting from the format of the model, up to the conceptual and physical model. The standardisation of the data model will enable faster information sharing and homogeneity throughout the entire Catena-X ecosystem.

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## ABSTRACT

The EDC discovery service as defined in CX-0001 supports to find EDC endpoints of participants of the data space via Business Partner Numbers (BPN). In some use cases the BPN needed to access an EDC data asset is not known. This means that all EDCs in the data space need to be accessed to find a specific EDC asset under consideration. This broadcasting has very low performance and produces a high access load to the EDCs.

BPN discovery services help to restrict the number of EDCs to be accessed. Prerequisite is that the business application has some other identifying information and a corresponding BPN discovery service supports the search for the BPN for this kind of identifying information.

## 1. INTRODUCTION

### 1.1 AUDIENCE & SCOPE

*This section is non-normative*

This standard is relevant for a • Business Application Provider • Enablement Service Provider • Core Service Provider

The standard is relevant for the roles in the following cases: • Business Application Provider who does not know the BPN of the data asset under consideration, but needs to know it, e.g. to discover available EDC connectors • Enablement Service Provider who wants to provide BPN discovery services • Core Service Provider who wants to provide the Discovery Finder service

### 1.2 CONTEXT

*This section is non-normative*

The EDC discovery service as defined in CX-0001 supports to find EDC endpoints of participants of the data space via BPNs, CX-0010. In some use cases the BPN is not known at the start of the process. This means that all EDCs in the data space need to be accessed to find a specific EDC data asset under consideration. This broadcasting has very low performance and produces a high access load on the EDCs.

BPN discovery services help to restrict the number of EDCs to be accessed. Prerequisite is that the business application provider or data consumer has some additional information, e.g. the Original Equipment Number.

### 1.3 ARCHITECTURE OVERVIEW

*This section is non-normative*

Figure 1 gives a rough overview of the architecture. A Data Consuming Application uses the discovery services to find the Eclipse Dataspace Connector (EDC), CX-0018, that most probably provides the data needed. The starting point for most applications to find data is a corresponding lookup in the Digital Twin Registry CX-0002. Based on specific asset IDs the Digital Twin Registry enables the lookup of digital twins and the endpoints to the data they provide. In this architecture the Digital Twin Registry is decentralized and is accessed via the EDC of the data provider. This means that the data consuming application needs to know the endpoint of this EDC.

The lookup of EDC endpoints is done via the BPN using the EDC Discovery service CX-0001. Depending on the context the BPN might not be known for a product under consideration. In this case BPN Discovery services can be used. Since there might be more than one BPN Discovery Service a Discovery Finder service enables the lookup of the suitable BPN Discovery services.

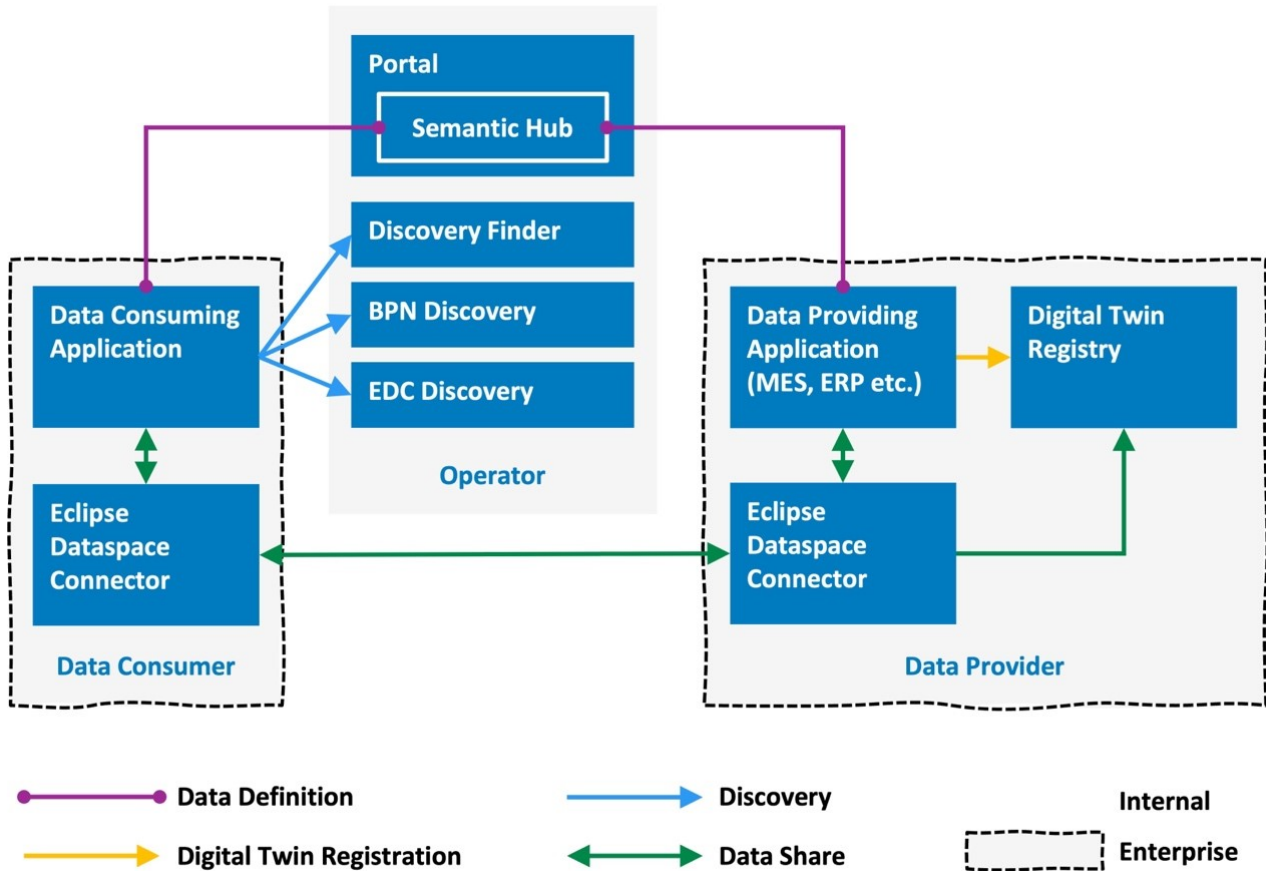


Figure 1 Discovery Services in the Catena-X Architecture

## 1.4 CONFORMANCE

As well as sections marked as non-normative, all authoring guidelines, diagrams, examples, and notes in this specification are non-normative. Everything else in this specification is normative.

The key words MAY, MUST, MUST NOT, OPTIONAL, RECOMMENDED, REQUIRED, SHOULD and SHOULD NOT in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

## 1.5 PROOF OF CONFORMITY

*This section is non-normative*

All participants and their solutions will need to prove, that they are conform with the Catena-X standards. To validate that the standards are applied correctly, Catena-X employs Conformity Assessment Bodies (CABs). Please refer to: [\[LINK Conformity Assessment\]](#) for the process of conformity assessment and certification.

The central operating company MUST provide the central Discovery Finder service conformant to the API specified in this standard.

Any operating company MAY provide BPN Discovery services conformant to the API specified in this standard.

The central operating company MUST ensure that there is at least one BPN Discovery service provided per demand of a KIT. The BPN Discovery API as specified in the standard is generic. Which keys MUST be supported is specified in the corresponding use case specific standards.

## 1.6 EXAMPLES

For examples see the different payload examples in the API normative parts.

## 1.7 TERMINOLOGY

*This section is non-normative*

Business Partner Number (BPN) A BPN is the unique identifier of a partner within Catena-x.

Additional terminology used in this standard can be looked up in the glossary on the association homepage.

## 2. DISCOVERY FINDER API

*This section is normative*

### 2.1 PRECONDITIONS AND DEPENDENCIES

This service is a prerequisite to find the available BPN Discovery Services.

### 2.2 API SPECIFICATION

#### 2.2.1 API Endpoints & resources

The following API endpoints MUST be implemented:

##### **POST {discoverFinder}/api/administration/connectors/discovery**

Purpose: Define the endpoint to BPN discovery services and the EDC discovery service.

Request body: Create new endpoint for bpn discovery service / edc discovery service. The type is unique. This service is allowed to administrators only.

```
{
  "type": "oen",
  "description": "Service to discover BPN to a particular OEN",
  "discoveryEndpoint": "http://...",
  "documentation": "http://.../swagger/index.html"
}
```

Response structure:

```
[
  "message": "discovery service for oen successfully created.",
]
```

```
"type": "oen",
"resourceId": "ec6f407b-4296-418c-9e4e-fb739fe72a67"
]
```

#### **DELETE {discoverFinder}/api/administration/connectors/discovery/{resourceId}**

Purpose: Delete the endpoint to BPN discovery services and the EDC discovery service.

Request body: Delete the endpoint for bpn discovery service / edc discovery service based on resourceId. This service is allowed to administrators only.

Response structure:

```
http status: 200
{
  "message": "discovery service for oen successfully deleted."
}
http status: 400
{
  "message": "resourceId 1ca6f9b5-8e1d-422a-8541-9bb2cf5fe485 not found."
}
```

#### **POST {discoverFinder}/api/administration/connectors/discovery/search**

Purpose: Find the endpoints to BPN discovery services and the EDC discovery service.

Request body: The request body is expecting a list of types (e.g. oen, bpid, etc.) to return available discovery endpoints.

```
{
  "types": ["oen", "bpid", "bpn"]
}
To request all available discovery services:
{
  "types": []
}
```

Response structure:

```
{
  "endpoints": [
    {
      "type": "oen",
      "description": "Service to discover BPN to a particular OEN",
      "discoveryEndpoint": "http://...",
      "documentation": "http://.../swagger/index.html",
      "resourceId": "ec6f407b-4296-418c-9e4e-fb739fe72a67"
    },
    {
      "type": "bpid",
      "description": "Service to discover BPN to a particular Battery Pass ID",
      "discoveryEndpoint": "http://...",
      "documentation": "http://.../swagger/index.html",
    }
  ]
}
```

```

    "resourceId": "08702529-3714-4c4f-b022-346b9b4fbbe2"
  },
  {
    "type": "bpn",
    "description": "Service to discover EDC to a particular BPN",
    "discoveryEndpoint": "http://...",
    "documentation": "http://.../swagger/index.html",
    "resourceId": "316417cd-0fb5-4daf-8dfa-8f68125923f1"
  }
]
}

{
  "endpoints": [
    {
      "type": "oen",
      "description": "Service to discover BPN to a particular OEN",
      "discoveryEndpoint": "http://...",
      "documentation": "http://.../swagger/index.html",
      "resourceId": "ec6f407b-4296-418c-9e4e-fb739fe72a67"
    },
    {
      "type": "bpid",
      "description": "Service to discover BPN to a particular Battery Pass ID",
      "discoveryEndpoint": "http://...",
      "documentation": "http://.../swagger/index.html",
      "resourceId": "08702529-3714-4c4f-b022-346b9b4fbbe2"
    },
    {
      "type": "vin",
      "description": "Discovery of VIN to BPN",
      "discoveryEndpoint": "http://...",
      "documentation": "http://.../swagger/index.html",
      "resourceId": "316417cd-0fb5-4daf-8dfa-8f68125923f1"
    },
    ... all other types, which are registered in the discovery finder ...
  ]
}
}

```

## 2.2.2 Available Data Types

The API MUST use JSON as the payload transported via HTTP.

## 2.2.3 EDC Data Asset Structure



As the services specified by this standard run without shielding by an EDC, definition of a Data Asset Structure is obsolete.

## 2.2.4 Error Handling

See API Endpoints & resources for the http response codes that MUST be defined for HTTP POST endpoints.

# 3. BPN DISCOVERY API

*This section is normative*

## 3.1 PRECONDITIONS AND DEPENDENCIES

A Discovery Finder service is a prerequisite to find the available BPN Discovery Services.

## 3.2 API SPECIFICATION

### 3.2.1 API Endpoints & Resources

The following API endpoints MUST be implemented:

#### **POST /api/administration/connectors/bpnDiscovery/batch**

Purpose: Create new numbers (e.g., OEN, batteryID, etc.) corresponding to BPN endpoints as batch.

Request body: The request body is expecting a list of key (type, e.g. OEN, batteryID, etc.) - value (explicit number) pairs where this service will respond with success/error message on persistence of this key-value-pairs.

The BPN is hand-over by the authentication/authorization (→ token). Only the owner of a BPN can link any number (e.g. OEN, batteryID, etc.) to his BPN.

```
[
  {
    "type": "oen",
    "key": "oen-123"
  },
  {
    "type": "oen",
    "key": "oen-4444"
  },
  {
    "type": "bpid",
    "key": "bpid-123"
  }
]
```

Response structure:

```
[
  {
```

```
"message": "oen successfully created.",
"key": "oen-123",
"status": 200
},
{
"message": "oen already exists created.",
"key": "oen-4444",
"status": 400
},
{
"message": "bpid successfully created.",
"key": "bpid-123",
"status": 200
}
]
```

### **POST /api/administration/connectors/bpnDiscovery**

Purpose: Create new numbers (e.g. OEN, batteryID, etc.) corresponding to BPN endpoints as single entry.

Request body: The request body is expecting a key (type, e.g. OEN, batteryID, etc.) - value (explicit number) pair, where this service will respond with success/error message on persistence of this key-value-pair.

The BPN is hand-over by the authentication/authorization (→ token). Only the owner of a BPN can link any number (e.g. OEN, batteryID, etc.) to his BPN.

```
{
  "type": "oen",
  "key": "oen-123"
}
```

Response structure:

```
{
  "message": "oen successfully created.",
  "key": "oen-123"
}
```

### **DELETE /api/administration/connectors/bpnDiscovery/{resourceId}**

Purpose: Delete numbers (e.g. OEN, batteryID, etc.) corresponding to BPN endpoints as single entry.

Request body: The request body is expecting a key (type, e.g. OEN, batteryID, etc.) - value (explicit number) pair, where this service will respond with success/error message on delete of this key-value-pair.

The BPN is hand-over by the authentication/authorization (→ token). Only the owner of a BPN can delete any number (e.g. OEN, batteryID, etc.) to his BPN. The resourceId needs to be caught by search POST /api/administration/connectors/bpnDiscovery/search

Response structure:

```
http status: 200
{
```

```
    "message": "oen successfully deleted."
  }

  http status: 400
  {
    "message": "resourceId 1ca6f9b5-8e1d-422a-8541-9bb2cf5fe485 not found."
  }
}
```

### POST /api/administration/connectors/bpnDiscovery/search

Purpose: Find BPN endpoints corresponding to numbers (e.g. OEN, batteryID, etc.)

Request body: The request body is expecting a list of key (type, e.g. OEN, batteryID, etc.) - value (explicit number) pairs, where this service will respond with the corresponding BPN. Please add minimum one key-value pair.

```
{
  "searchFilter": [
    {
      "type": "oen",
      "keys": ["oen-1243", "oen-11"]
    },
    {
      "types": "bpid",
      "keys": ["bpid-1243", "oen-11"]
    }
  ]
}
```

Response structure:

```
{
  "bpns": [
    {
      "type": "oen",
      "key": "oen-1243",
      "value": "bpn-123",
      "resourceId": "1ca6f9b5-8e1d-422a-8541-9bb2cf5fe485"
    },
    {
      "type": "oen",
      "key": "oen-11",
      "value": "bpn-123",
      "resourceId": "972262d7-7e05-4578-936f-de236d7feb94"
    },
    {
      "type": "bpid",
      "key": "bpid-1243",
      "value": "bpn-444",
      "resourceId": "1b754aeb-c753-4adf-ae6d-52842f5a38b7"
    },
    {

```

```
    "type": "bpid",
    "key": "oen-11",
    "value": "bpn-444",
    "resourceId": "e43f9cf8-f0d4-4c51-b7fe-b68ea4aeea7c"
  }
]
```

### 3.2.2 Available Data Types

The API MUST use JSON as the payload transported via HTTP.

### 3.2.3 Error Handling

See API Endpoints & resources for the http response codes that MUST be defined for HTTP POST endpoints.

## 4. REFERENCES

### 4.1 NORMATIVE REFERENCES

CX-0001 EDC Discovery API

CX-0002 Digital Twins in Catena-X

CX-0010 Business Partner Number (BPN)

CX-0012 Business Partner Data Pool

CX-0018 Eclipse Data Space Connector

[OpMo] Catena-X Operating Model. Whitepaper. Release V2 – 21.11.2022 Catena-X Operating Model 2.0. Catena-X e.V.. Download from: <https://catena-x.net/en/catena-x-einfuehren-umsetzen/how-to-operate-catena-x>

### 4.2 NON-NORMATIVE REFERENCES

*This section is non-normative*

No non-normative references.

### 4.3 REFERENCE IMPLEMENTATIONS

*This section is non-normative*

No reference implementation available so far.