

NTT DATA

Eclipse Tractus-X Research Report

September 30, 2024

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Innovation Technology Department,
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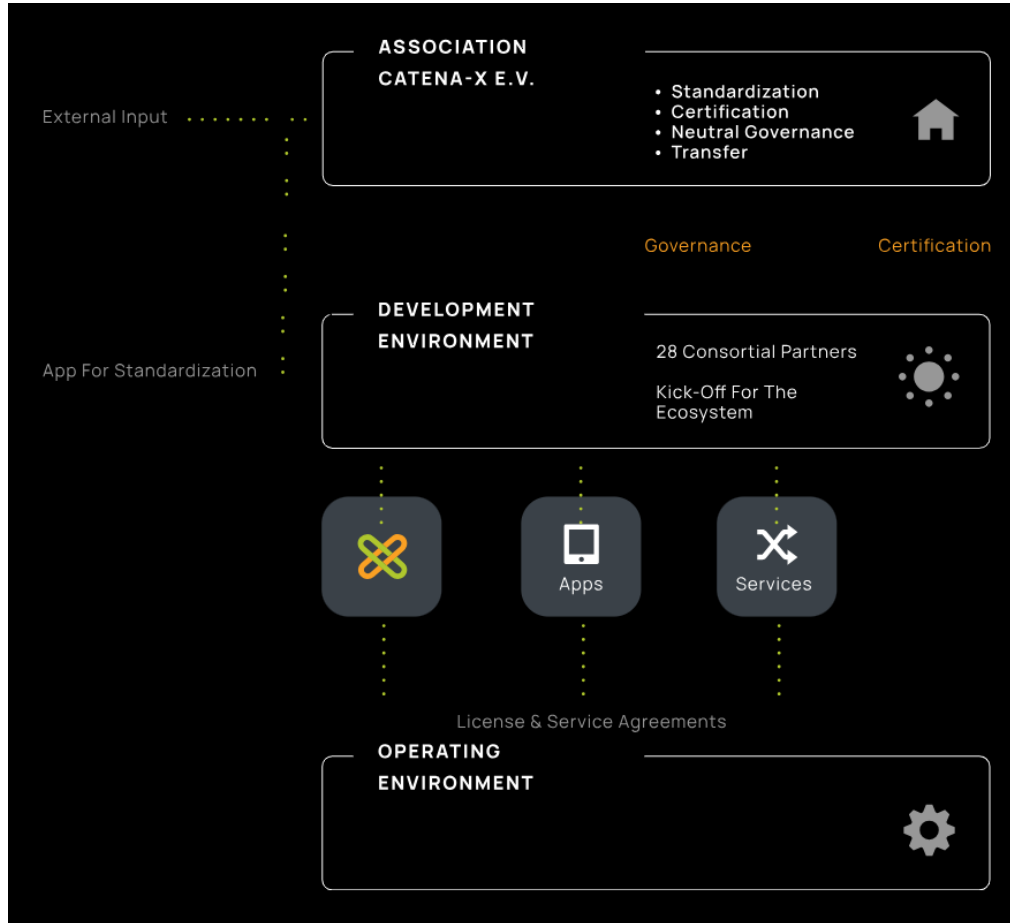
Research Background and Objectives

Research Background and Objectives

- Catena-X, a non-profit organization founded by the German automotive industry, has released the OSS (Open Source Software) called Tractus-X to connect connectors or various applications to the network to encourage active participation in the inter-company data exchange system led by Catena-X. In addition, Cofinity-X was established as a joint venture in February 2024 to promote the development and deployment of various solutions based on Tractus-X.
- In this report, we present the results of our research of major source code repositories based on the following 2 perspectives on software assets released as Tractus-X. The information is current as of July 29, 2024.
 - What features are implemented?
 - Development Overview

Relationship between Catena-X's 3 Elements and Tractus-X

- According to [About Tractus-X | Eclipse Tractus-X \(eclipse-tractusx.github.io\)](https://eclipse-tractusx.github.io/aboutus), Tractus-X project is the official open-source project to the Catena-X ecosystem
- Catena-X consists of 3 elements, and Tractus-X provides the relevant artifacts and SW codes for connecting to these elements



Association Catena-X E.V.:

Standardization, Certification, Governance and Tractus-X Management

Development Environment:

Initial reference implementation of core and enabling services
(Reference implementations are maintained in the Tractus-X repository)

Operating Environment:

Providers* are free to modify and use the open source reference implementation

*) Examples of different providers and their provided services:

- Core service providers (e.g. marketplace)
- Enablement Service Provider (e.g. EDC)
- Business Application Provider (e.g. Traceability), etc.

(Citation) <https://eclipse-tractusx.github.io/aboutus>

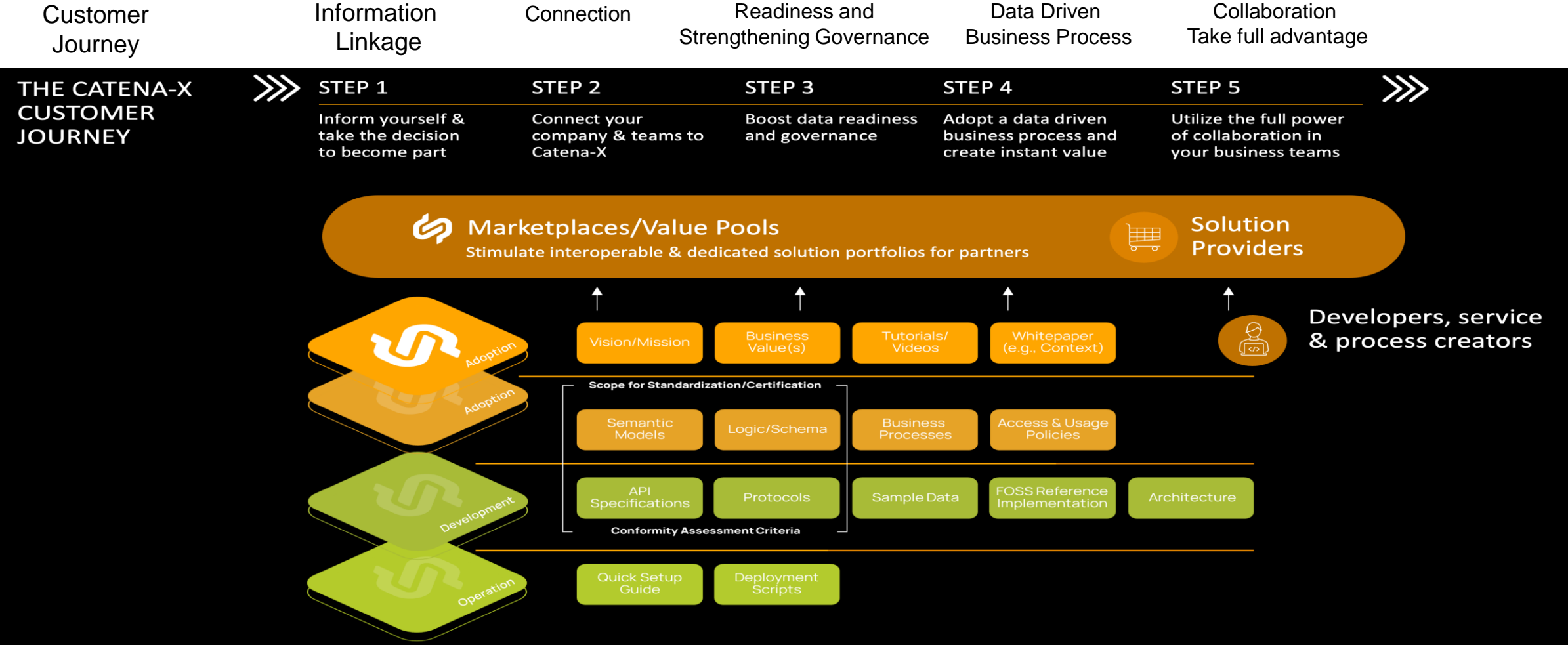


02

Overview of Tractus-X

Catena-X Ecosystem and Its Kit-Based Customer Journey

Based on a model where solution providers create solutions through a marketplace, a flow is defined in which data-driven business begins at the "beginning of information collaboration" stage and progresses through inter-company collaboration



Services and Kits

According to [About Tractus-X | Eclipse Tractus-X \(eclipse-tractusx.github.io\)](https://eclipse-tractusx.github.io),

Tractus-X provides reference implementations of Services and Kits.

The reference implementation is provided under the Apache 2.0 license. However, since it is a "reference implementation", it is not usually available for commercial use without modification.

The following services are defined for [sites in CX Operation Model v2.1](#) and [Tractus-X](#).

- Core Service: Materials mainly for core service providers
 - e.g.) Portal, Marketplace, IdP, DAPS, ...
- Onboarding Service: Onboarding and offboarding for data space participants
 - Registration, Connection GXDCH; Tractus-X provides the functionality through the Core Service portal
- Enablement Service: Materials that provide a standardized connection method to connect the data space
 - e.g.) Connector, Digital Twin
- Kit: Materials mainly for solution providers
 - e.g.) Business Partner Kit , Data Chain Kit , Connector Kit , Traceability, ...

Projects developed by Gaia-X and IDSA are also included in Tractus-X.

[Reference] Catena-X Operating System

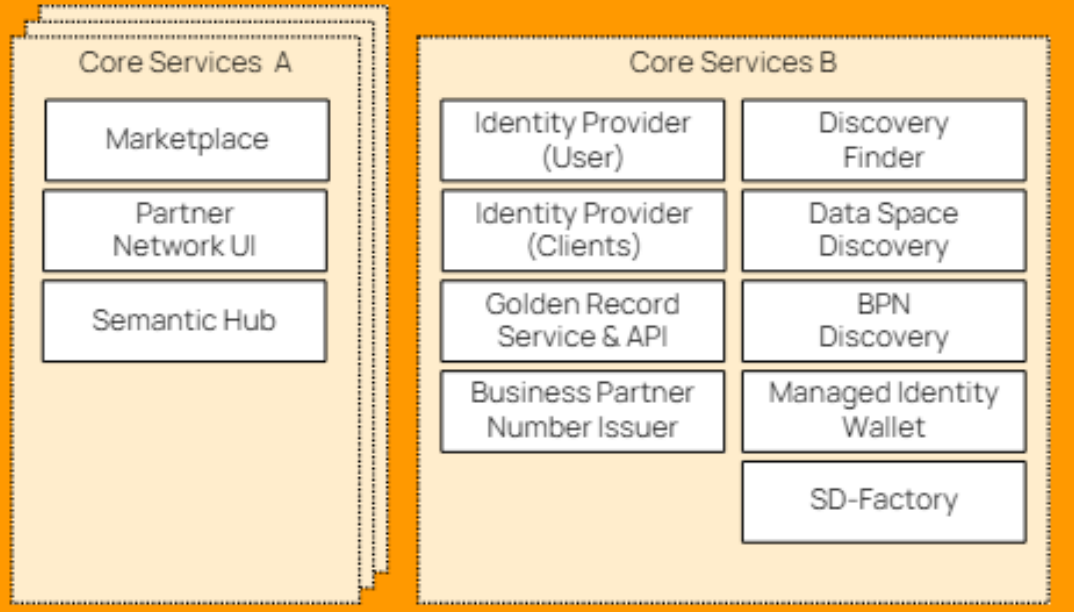
Use Cases



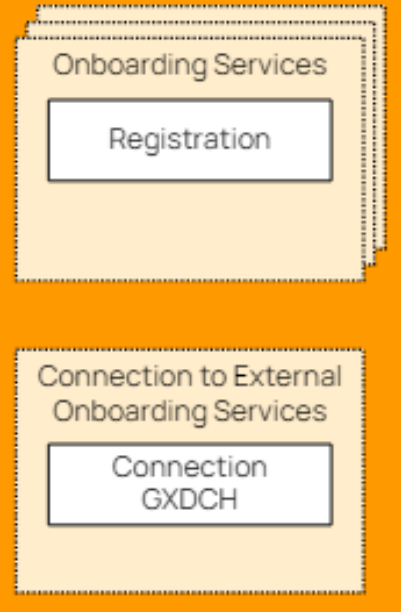
Catena-X Operating System (cxOS)

KITs

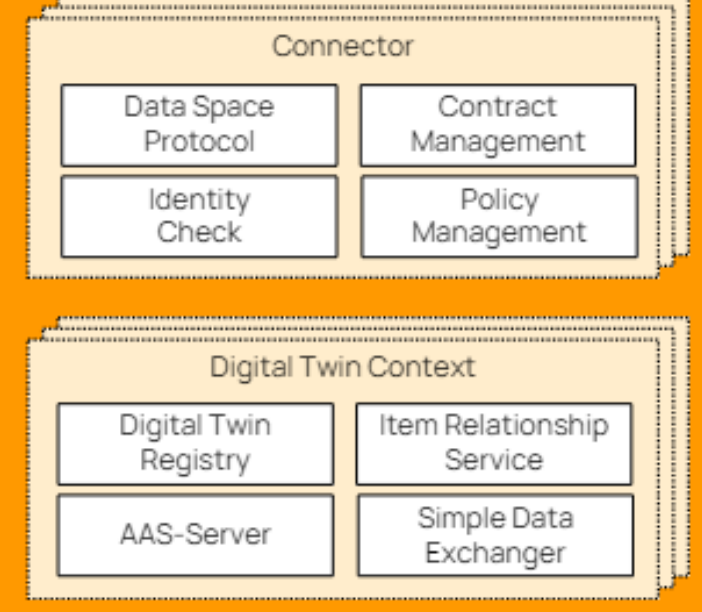
Core Services



Onboarding Services



Enablement Services



Source: [CX Operating Modelv2.1 final.pdf \(catena-x.net\)](#)

[Reference] Catena-X Service Structure

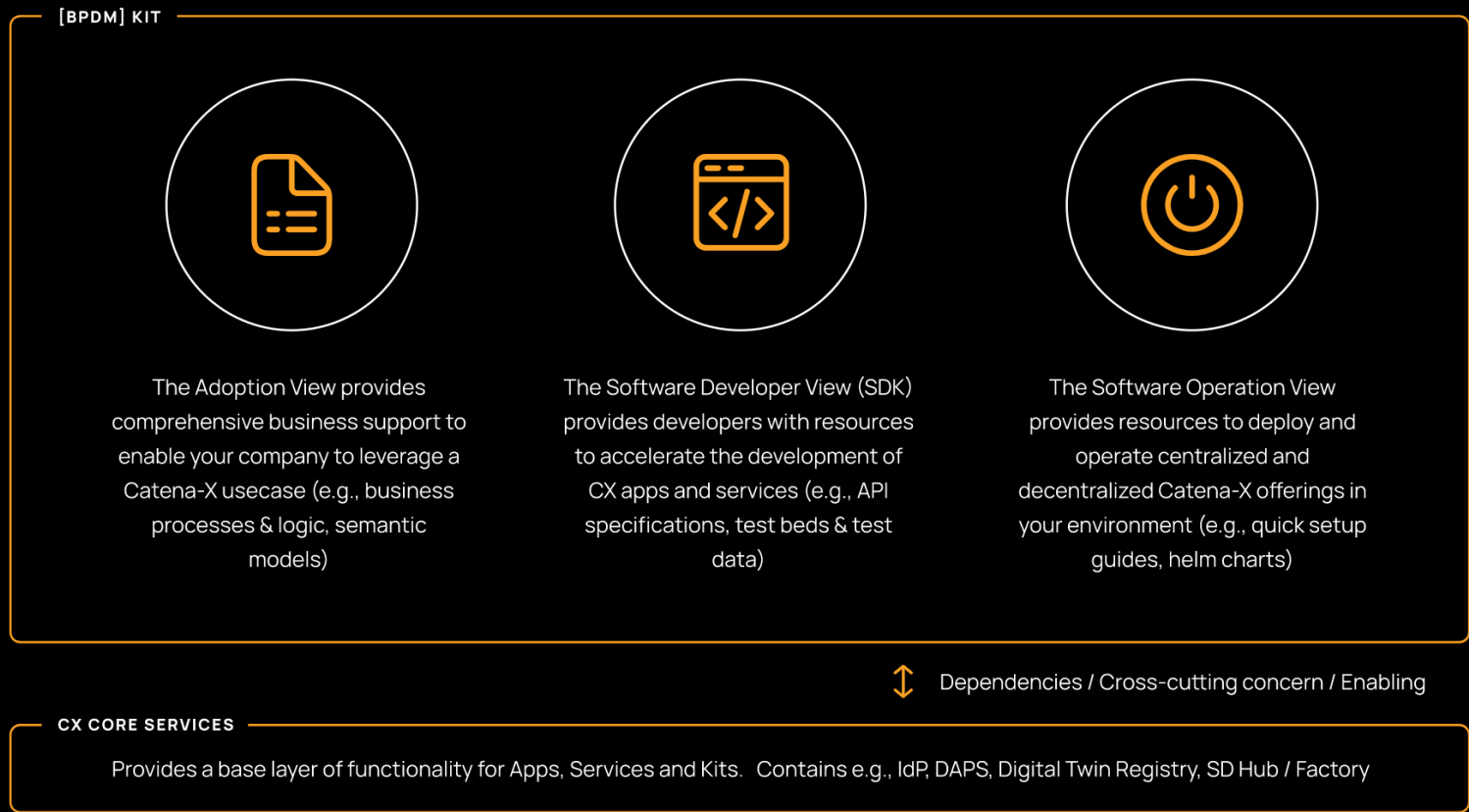
| Modular System Catena-X Certification | | | | | | | | | | | | | | | | | |
|---------------------------------------|--|-----------------------|--|--------------|-----------------|-----|-------------|----------|------|--------------------|-----|------|-------|-----------------------|-----------------------------------|-----------------------------|--|
| Data Provider & Consumer | Enablement Service Provider | | Business Application Provider ² | | | | | | | | | | | Core Service Provider | Value Added Services ¹ | Onboarding Service Provider | |
| Connector | Connector As a Service | Digital Twin Registry | Quality | Traceability | Behavioral Twin | PCF | Circularity | Eco Pass | MaaS | Modular Production | DCM | OSIM | PURIS | Core Services | Value Added Services ¹ | Onboarding Service Provider | |
| | | | | | | | | | | | | | | | | | |
| | Connector: Every Solution must be enabled to use an EDC or have an integrated EDC | | | | | | | | | | | | | | | | |
| | Provider Base | | Semantic: Digital Twin or Agents | | | | | | | | | | | | | | |

¹ Can only be provided in combination with certified Core Services
² Business Application Provider has to perform an interoperability check

Source: CATENA-X RELEASE DAY (2024/3/15), https://catena-x.net/fileadmin/user_upload/05_Aktuelles_und_Termine/2024_03_15_Catena-X_Release_Day/Catena-X_Release_Day_2024_03_15.pdf

3 Views of the Kit

The Kit is organized in 3 Views (3 aspects), that provide materials and know-how for users, developers, and operators involved with Catena-X respectively.



Adoption View:
Support for leveraging use cases

Software Developer View:
Development support

Software Operation View:
Support for deploy and operate

(Citation) <https://eclipse-tractusx.github.io/developer>

[Reference] List of Kits (<https://eclipse-tractusx.github.io/>)




Agents Kit
 Scalable & Efficient
 Semantic Dataspace Federation
 Generate Knowledge from Data



Health Indicator (HI)
 Provide and get the health condition of technical systems.




Remaining Useful Life (RuL)
 Set up services for prosuming RuL-information for vehicles/components by using digital behavioral twins.




Business Partner Kit
 Get high-quality data business partner data records including the unique identifier.

MaaS KIT
 This is a preview for the manufacturing as a service kit. This will be published soon.




Modular Production
 There will be more Kits coming in the next months. Stay tuned.




Online Simulation
 Gain increased supply chain transparency through collaborative simulation across all stakeholders.




PCF
 Product-specific CO2 footprint.




Certificate Management
 Provide and consume certificate data based on the Business Partner KIT




Circularity
 There will be more Kits coming in the next months. Stay tuned.




Connector Kit
 The EDC as a connector implements a framework agreement for sovereign, cross-organizational data exchange.




Data Chain Kit
 Data Chain Kit is made for apps and services to access connected data distributed between organizations.



Quality
 Quality KIT enables data provider and consumer to exchange and analyse existing data across company boundaries.




Traceability
 Trace parts and materials across the entire value chain to enable data driven use cases over all n-tier levels



Demand and Capacity Management Kit
 Quick build of solutions for companies of any size to engage a collaborative capacity management.



Digital Twin
 Digital Twins enable data-level interoperability - even between parties previously unknown to each other.



Eco Pass
 Leverage the transparency of digital product passports to strengthen sustainability & compliance.



ESS
 Environmental and Social Standards Incident Management Kit

Kit Example (1/2)

The official website also presents a preview of the kits, and the lineup shows that the company intends to cover a wide range of use cases related to the manufacturing supply and value chain. Some kits are used alone, while others use other kits

For example, the Traceability Kit is said to be implemented using the Connector Kit

| Kit Name | Status | Summary |
|--|----------------|---|
| Business Partner Kit | Released | Provide a business partner data set. Manage golden records including BPN |
| Data Chain Kit | Released | Implement business logic along distributed data chains, such as aggregating certificates along the value chain |
| Connector Kit | Released | Provide EDC-based connectors |
| Traceability Kit | Released | Create digital twins of the components and the vehicles Create logical links to subcomponents (BoM) |
| DCM (Demand and Capacity Management) Kit | Preview(0.2.0) | Avoid production bottlenecks and facilitate collaboration across the automotive supply chain Material demand and capacity data can be generated and used Sovereignly |
| MaaS (Manufacturing-as-a-Service) Kit | Preview(0.1.0) | Provide an interoperable federated network for matching manufacturing supply and demand |
| OSim (Online Simulation) Kit | Released | Achieve collaborative simulation. Integrate factory simulation with external logic |
| PURIS (Predictive unit real-time information system) Kit | Preview | Prevent potential supply shortages. Enable coordination of available inventory, customer stock updates, customer demand, and order completion status |
| MP (Modular Production) Kit | Preview(0.1.0) | Support one-off production at the price of series production Automate the orchestration of production resources and planning of production processes |
| Agent Kit | Not listed | The agent, implemented as an extension to the EDC, can transfer and execute business logic that processes and analyzes the data held by each company Not in list Agents Kit Tractus-X Agents Kit (catenax-ng.github.io) |

*Based on <https://eclipse-tractusx.github.io/developer>

Kit Examples (2/2)

| Kit Name | Status | Summary |
|--|------------------|--|
| Health Indicator | Preview (0.1.1) | Conduct regular functional checks during planning, design, implementation, use, and operation as part of operational and management quality control |
| Remaining Useful Life | Preview (0.1.1) | Support the development and operation of remaining useful life services and applications in planning, design, build, use and operation |
| Certificate Management | Preview (0.1.0) | Standardized API and data models simplify the certificate management and increase data accuracy |
| Circularity | Preview (0.2.0) | Enable stakeholders to transition to a circular economy by providing frameworks, guidelines, and best practices to strengthen sustainability credentials, enable data-driven decision-making, and foster collaboration and innovation in the automotive industry |
| Digital Twin | Released (1.2.0) | Track parts and materials throughout the value chain to enable data-driven use cases across all n-layer levels without compromising data sovereignty |
| Eco Pass | Released (1.0.0) | Provide a digital product passport that digitally captures specific information about a physical product in a standardized exchange format, making the captured information interoperable |
| ESS (Environmental and Social Standards) | Preview (0.1.0) | Support inter-company ESS incident management with appropriate processes |
| PCF (Product Carbon Footprint) | Released (1.0.0) | Calculate and exchange PCF (CO2 emissions) data in a standardized format for various stakeholders |
| Quality | Released (1.2.0) | Provide the necessary standards, aspect models, technical data pipeline specifications, and business logic to establish a sovereign exchange of quality-related data along the OEM layer chain |

Recent Releases Overview

| Version | Summary |
|---------|--|
| 24.05 | <p>Updated Multi OpCo solution, full implementation of Industry Core KIT, improved Self Sovereign Identity concept</p> <p>The usability of KIT has been improved based on feedback, and Tractus-X is the overall</p> |
| 24.03 | <p>New Kits include company certificate management, data governance, manufacturing as a service, and environmental & social standards (ESS)</p> <p>Industry Core provides an integrated layer that connects the foundation and use cases of an industry-agnostic data space</p> <p>Create digital twins of parts, materials, and vehicles for the automotive industry and link them to direct business partners</p> |
| 23.12 | <p>Catena-X Operating System (cxOS): Significantly improved performance, ease of deployment, and test automation for core and enablement services</p> <p>Realize the vision of the multi-operator scenario by fully enabling the Onboarding Service Provider role, which allows different firms to run the registration process now</p> <p>5 new Use Case KITs and a Knowledge Agent KIT address issues such as demand and capacity management, circular economy, etc.</p> <p>The Knowledge Agent KIT provides new processes (compute) which already implemented in the Remaining Useful Life KIT to approach data</p> |
| 23.09 | <p>6 new KITs introduce exciting new products and standards for solution and data providers to create a multi-vendor ecosystem of applications and services</p> <p>Improved governance framework for database operations with Catena-X Automotive Network e.V.</p> |

SIGs (Special Interest Groups)

Eclipse Tractus-X consists of various common topic across applications, products, and KITs, and hosts other supporting repositories. The following repositories focus on these common topics.

Special Interest Groups, or SIGs for short, **discuss cross-cutting issues that affect the project as a whole.**

| SIGs | Description |
|--------------|--|
| SIG Infra | <ul style="list-style-type: none">• Discusses about improving the development experience in Eclipse Tractus-X by addressing a variety of automation topics• Provides guidance on how to work with Helm support a comprehensive Chart testing and e2e testing approach based on Helm testing |
| SIG Security | <ul style="list-style-type: none">• Defines security best practices for Eclipse Tractus-X• Provides guidance on security-related topics and incidents |
| SIG Release | <ul style="list-style-type: none">• Plans the Tractus-X release and product roadmap and defines the release process |



03

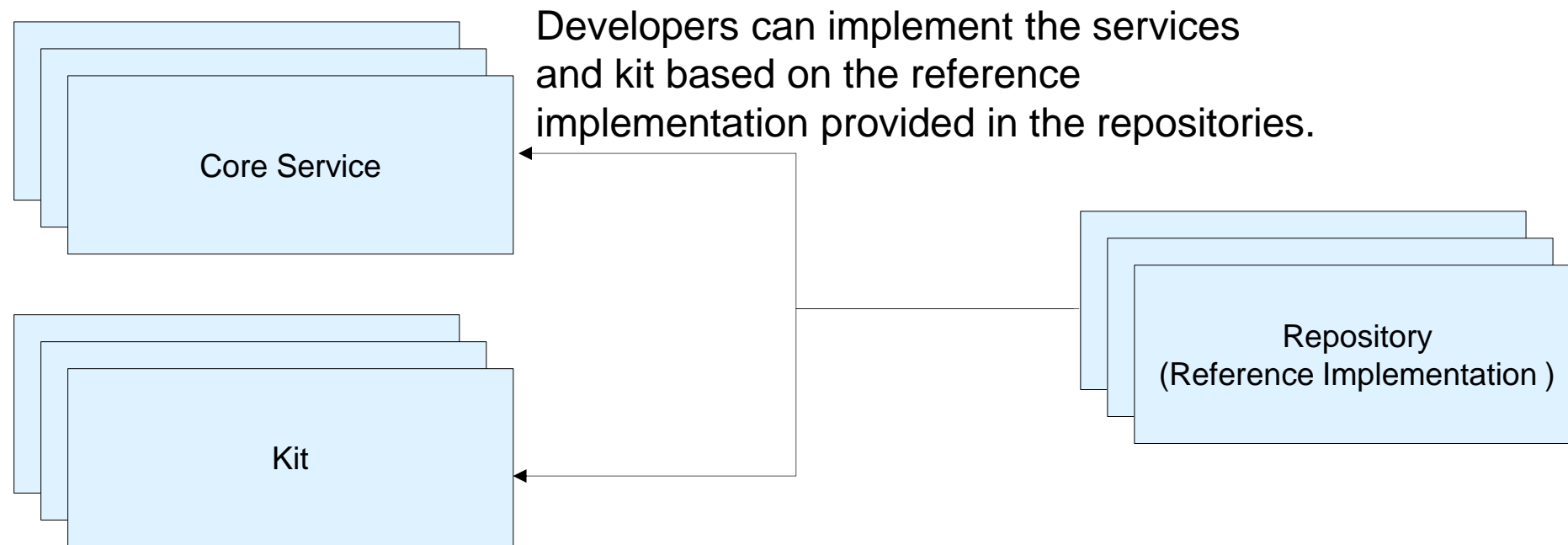
Repository Configuration for Tractus-X

Tractus-X repository basic configuration

Tractus-X is based on elements called Core Service and Kit, but as of May 2023, the relationship between these components(Core Services and Kits) and the repositories has not been comprehensively shown*.

*) [Eclipse Tractus-X's Community \(eclipse-tractusx.github.io\)](https://eclipse-tractusx.github.io) had only described about the relationship of few repositories to the corresponding Kits.

In this research report, the following system is assumed, and some repositories are organized by inferring their relationship with Core Service and Kit.



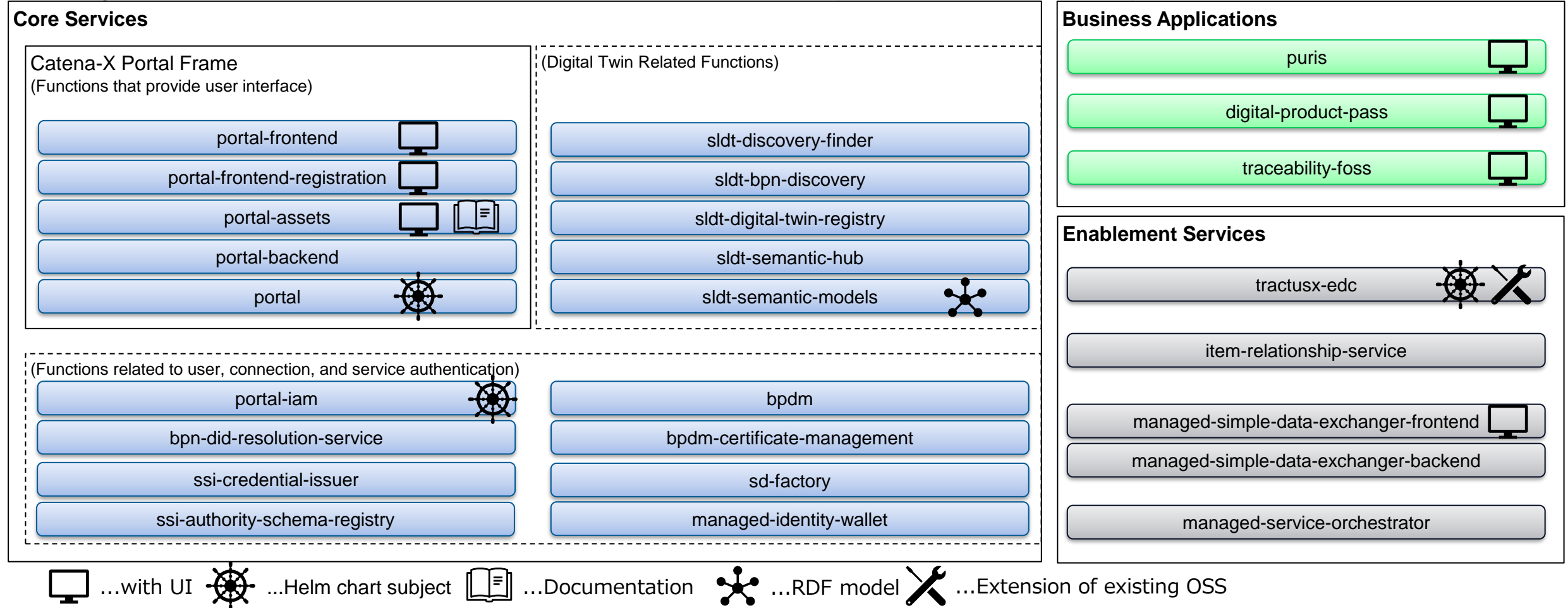
Classification of the 3 areas of the Catena-X data space and the Tractus-X repository

The components of the Catena-X Data Space can be broadly categorized into 3 areas*:

- **"Core Services"** which provide the ecosystem's basic functions;
- **"Enablement Services"** which allow participants to exchange and receive data;
- **"Business Applications"** which solve specific business problems

*) From [Catena-X Operating Model Whitepaper Release V2 - 21.11.2024](#)

The diagram shows and divides the software components, provided by the Tractus-X repository, into 3 areas.





04

Main Repository Details

Major Repository Selection and Content Layout

Among the repositories as of June 6, 2024, we selected and examined the core repositories that make up Core Service and Kit .

The content of each research result

1. managed-service-orchestrator

Update
6/20, 2024

Abstract

| | | |
|-------------------------|------------------|------|
| Version (release date) | 1.5.5(2024/5/13) | |
| Initial Commitment Date | 2022/8/30 | |
| Language | Java | SQL |
| Scale (KStep) | 4.41 | 0.93 |

| | |
|---|---|
| Major companies involved in development | T-Systems, Mercedes-Benz |
| Total Commitments | 727 |
| Number of commits in the last 3 months | 42 |
| Correspondence repository for catena-ng | catena-ng/tx-managed-service-orchestrator |

A summary of the repository's external characteristics. Understanding development activity and the main organizations involved.

Note that the number of commits is a reference value, and that the detailed dates examined is different for each repository.

Summary

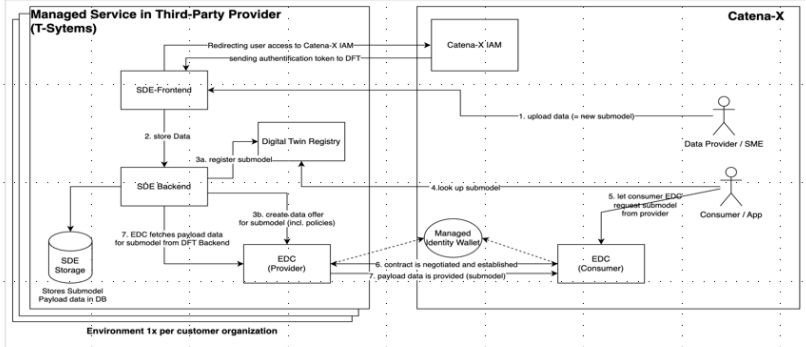
Provide tools for third parties (CaaS providers) to deploy EDC and SDE (Simple Data Exchanger) for Catena-X users (tenants) in their own environment and automatically register the necessary information in the Digital Twin Registry and Managed Identity Wallet

A rough summary of features from the repository's documentation and implementation, based on the repository's functionality, etc.

Feature

- As shown in the diagram in <https://github.com/eclipse-tractusx/managed-service-orchestrator/blob/v1.5.4/docs/images/pic0.svg> this function mainly performs the following 2 processes

- Receive submodels of the data provided by the Data Provider, register them in the Digital Twin Registry, and make them available for reference by consumers
- Create an EDC corresponding to the Provider, register its authentication information in the Managed Identity Wallet operated by Catena-X, and enable communication with the EDC on the consumer side



A summary of the features in accordance with the main purpose of the repository.

1. managed-service-orchestrator

Abstract

Update
6/20, 2024

| | | |
|-------------------------|------------------|------|
| Version (release date) | 1.5.5(2024/5/13) | |
| Initial Commitment Date | 2022/8/30 | |
| Language | Java | SQL |
| Scale (KStep) | 4.41 | 0.93 |

| | |
|--|--|
| Major companies involved in development | T-Systems, Mercedes-Benz |
| Total Commitments | 727 |
| Number of commits in the last 3 months | 42 |
| Correspondence repository for catenax-ng | catenax-ng/tx-managed-service-orchestrator |

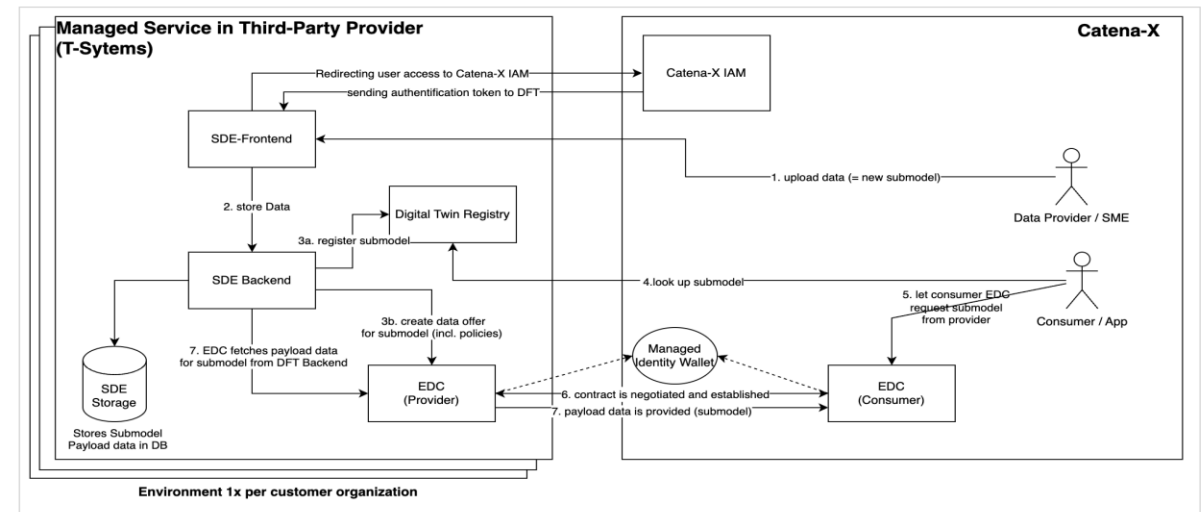
Summary

Provide tools for third parties (CaaS providers) to deploy EDC and SDE (Simple Data Exchanger) for Catena-X users (tenants) in their own environment and automatically register the necessary information in the Digital Twin Registry and Managed Identity Wallet

Feature

- As shown in the diagram in <https://github.com/eclipse-tractusx/managed-service-orchestrator/blob/v1.5.4/docs/images/pic0.svg> this function mainly performs the following 2 processes

- Receive submodels of the data provided by the Data Provider, register them in the Digital Twin Registry, and make them available for reference by consumers
- Create an EDC corresponding to the Provider, register its authentication information in the Managed Identity Wallet operated by Catena-X, and enable communication with the EDC on the consumer side



2. bpdm

Update
6/20, 2024

Abstract

| | | | | | |
|-------------------------|-------------------|------|------|--|---|
| Version (release date) | 5.0.1 (2024/3/12) | | | Major companies involved in development | eXXcellent, Mercedes-Benz, Daimler |
| Initial Commitment Date | 2021/12/20 | | | Total Commitments | 2,245 |
| Language | Kotlin | JSON | YAML | Number of commits in the last 3 months | 215 |
| Scale (KStep) | 24.2 | 26.9 | 10.1 | Correspondence repository for catenax-ng | catenax-ng/tx-bpdm |

Summary

- "bpdm" stands for Business Partner Data Management and provides the ability to register, update, and search for information on companies participating in the Catena-X network

Feature

- The 2 main services are BPDM Pool and BPDM Gate
 - The Pool is a service that manages a single source of truth for a company's information, and exists only once in the Catena-X network
 - On the other hand, a Gate exists for each Catena-X participating company and serves as a window for that company to register and update its information and to search for information on other companies
- Bridge Dummy was introduced in v4.0.0, and Orchestrator in v4.1.0 as a service to synchronize data between Pool and Gate. The former will be removed in v6.0.0 as the latter is more sophisticated
 - Orchestrator provides a more advanced mechanism for inter-service coordination, and a reference implementation of a service called Cleaning Service Dummy that uses this mechanism to keep the state of the Golden Record current and correct is also provided
- Both services are implemented in Spring Boot

3. managed-simple-data-exchanger-backend

Update
6/20, 2024

Abstract

| | | | |
|-------------------------|------------------|--|--|
| Version (release date) | 2.3.6 (2024/3/6) | Major companies involved in development | BMW, T-Systems |
| Initial Commitment Date | 2022/2/16 | Total Commitments | 2,185 |
| Language | Java | Number of commits in the last 3 months | 161 |
| scale | 23.54KStep | Correspondence repository for catenax-ng | catenax-ng/tx-managed-simple-data-exchanger-backend |

Summary

Provides [REST API](#) to upload/download simple CSV and JSON data using EDC and Digital Twin Registry

Feature

- DFT is an abbreviation for the former name (Data Format Transformer), now renamed "Simple Data Exchanger" (SDE)
- Implemented [REST API](#) using Spring Boot
- PostgreSQL is used for data persistence
- Handles data [expressed as a submodel](#) of [SAMM](#) (Semantic Aspect Meta Model)
- Uploaded data is registered in the [Digital Twin Registry](#)
- Documentation that allows the user to see the image and [architecture of the](#) functionality exists only on the managed-simple-data-exchanger-frontend side

4. managed-simple-data-exchanger-frontend

Update
6/20, 2024

Abstract

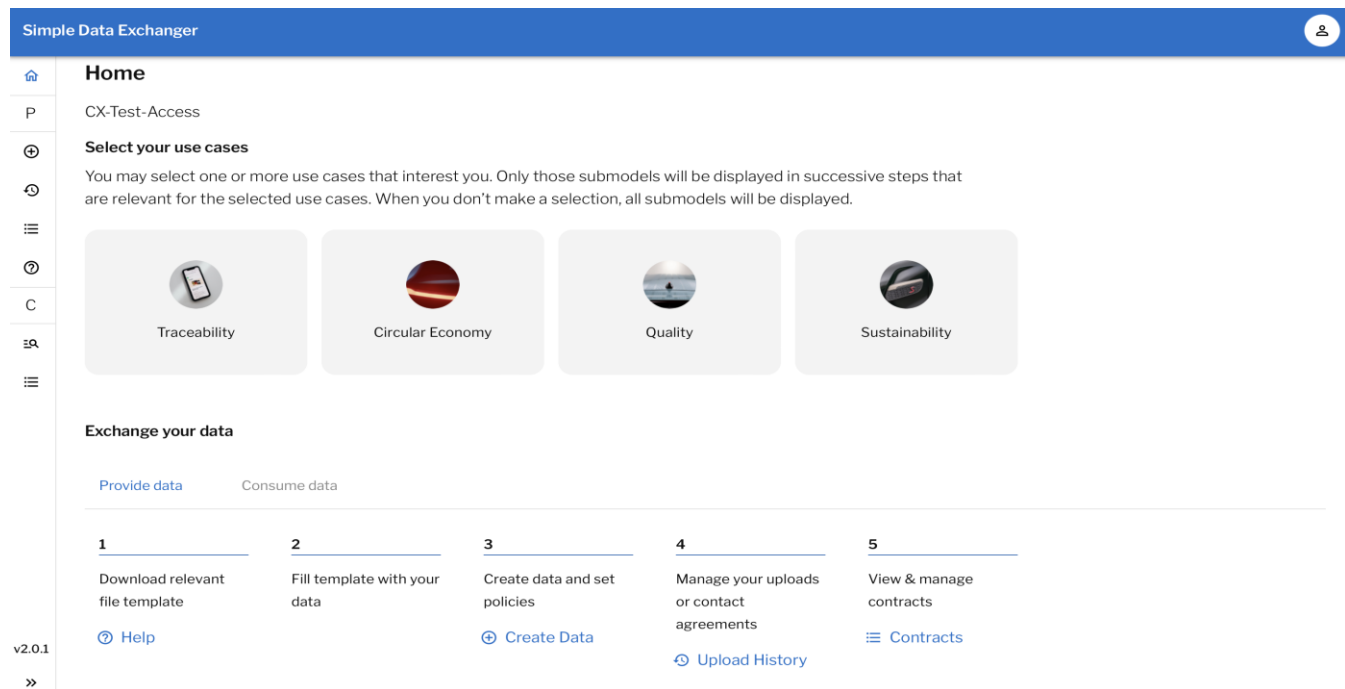
| | | | |
|-------------------------|--------------------|--|---|
| Version (release date) | 2.3.6 (2024/03/08) | Major companies involved in development | T-Systems |
| Initial Commitment Date | 2022/04/12 | Total Commitments | 1,152 |
| Language | TypeScript | Number of commits in the last 3 months | 130 |
| scale | 5.1KStep | Correspondence repository for catenax-ng | catenax-ng/tx-managed-simple-data-exchanger-frontend |

Summary

Provides a front end to upload/download simple CSV and JSON data using EDC and Digital Twin Registry

Feature

- Frontend implemented in React+TypeScript
- Screen images can be found in [the User Guide](#).



5. digital-product-pass

Update
6/20, 2024

Abstract

| | | | | |
|-------------------------|--------------------|----------|--|---|
| Version (release date) | 2.2.0 (2024/03/27) | | Major companies involved in development | CGI Inc., BASF SE, BMW AG, Henkel AG & Co. KGaA |
| Initial Commitment Date | 2022/07/14 | | Total Commitments | 2,584 |
| Language | Java | Vue.js | Number of commits in the last 3 months | 398 |
| scale | 14.73KStep | 6.1KStep | Correspondence repository for catenax-ng | catenax-ng/tx-digital-product-pass |

Summary

Web application to access Battery Passport data

Feature

- Consists of a frontend using Vue.js and a backend using Spring Boot
- [Depends on bpdm](#) and [sldt-digital-twin-registry](#)
- The backend [works](#) with EDC's consumer connector to retrieve data
- [The REST API provided by the backend is](#) relatively simple

6. item-relationship-service

Update
6/20, 2024

Abstract

| | | | |
|-------------------------|-------------------|------|------|
| Version (release date) | 7.1.0 (2024/05/6) | | |
| Initial Commitment Date | 2022/03/10 | | |
| Language | JSON | YAML | Java |
| Scale (KStep) | 459 | 19.5 | 29.6 |

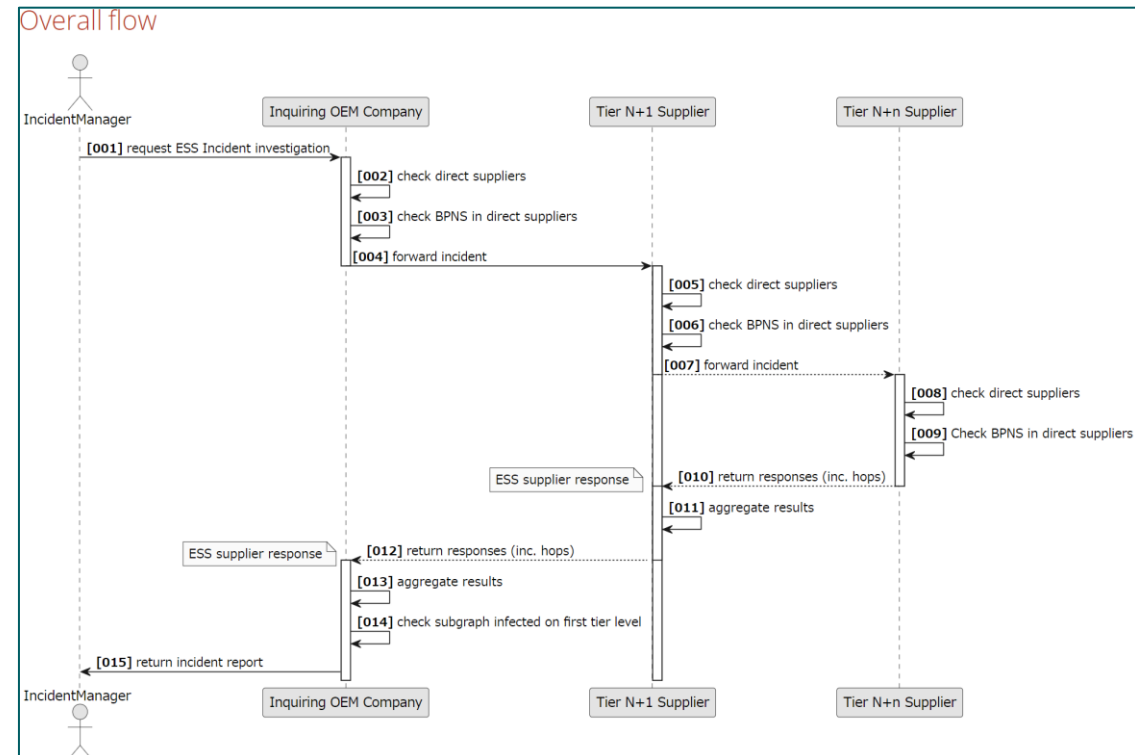
| | |
|--|---|
| Major companies involved in development | doubleSlash, ISTOS, QualityMinds, BMW |
| Total Commitments | 6,979 |
| Number of commits in the last 3 months | 918 |
| Correspondence repository for catenax-ng | catenax-ng/tx-item-relationship-service |

Summary

An application that can collect and visualize how far along the supply chain the manufacturing of a product has progressed according to the BOM hierarchy, and operates as a data consumer

Feature

- As linked from README.md, the prebuilt documentation is available at <https://eclipse-tractusx.github.io/item-relationship-service/docs/>
- As explained in the whitebox architecture, information on products is collected and aggregated by recursively tracing the hierarchical structure between parts from OEM to Tier-N (see figure on the right)
- It works by relying on services such as EDC (general communication via connectors), Portal/IdP (authentication), BPDM (retrieval of company information), Semantic Hub/DTR (model information retrieval and validation), and MIW (authority checking)



7. managed-identity-wallets

Update
6/20, 2024

Abstract

| | | | | |
|-------------------------|--------------------|------|--|--|
| Version (release date) | 0.4.0 (2024/02/09) | | Major companies involved in development | 51nodes, Porsche Digital, Mercedes-Benz, Volkswagen |
| Initial Commitment Date | 2023/05/10 | | Total Commitments | 1573 |
| Language | Java | JSON | Number of commits in the last 3 months | 12 |
| Scale (KStep) | 6.9 | 11.0 | Correspondence repository for catenax-ng | catenax-ng/tx-managed-identity-wallets |

Summary

To realize the GAIA-X concept of data sovereignty, in particular SSI (Self-sovereign identity), the service manages the DID (Decentralized Identifier) of the legal entity to which the BNPL is assigned, the associated DID document, Verifiable Credentials, and Verifiable Presentations

Feature

- Follow the steps described at <https://github.com/eclipse-tractusx/managed-identity-wallet/blob/v0.4.0/INSTALL.md> to start PostgreSQL and Keycloak, which are required to run the service, to easily try out the Web APIs in a local environment

The following API is available

- Search for Wallet, DID, and DID document using BPN as key, and retrieve associated VC
- VC issuance and verification
- Create and verify VP from VC

8. portal-assets

Update
6/20, 2024

Abstract

| | | | | |
|-------------------------|--------------------|---|--|--|
| Version (release date) | 1.8.0 (2024/03/05) | Major companies involved in development | BMW | |
| Initial Commitment Date | 11/22/2022 | Total Commitments | 1215 | |
| Language | JSON | Markdown | Number of commits in the last 3 months | 70 |
| scale | 7.9KStep | 17.0KStep | Correspondence repository for catenax-ng | catenax-ng/tx-portal-assets |

Summary Catena-X Portal (user UI) help files and developer documentation

Feature

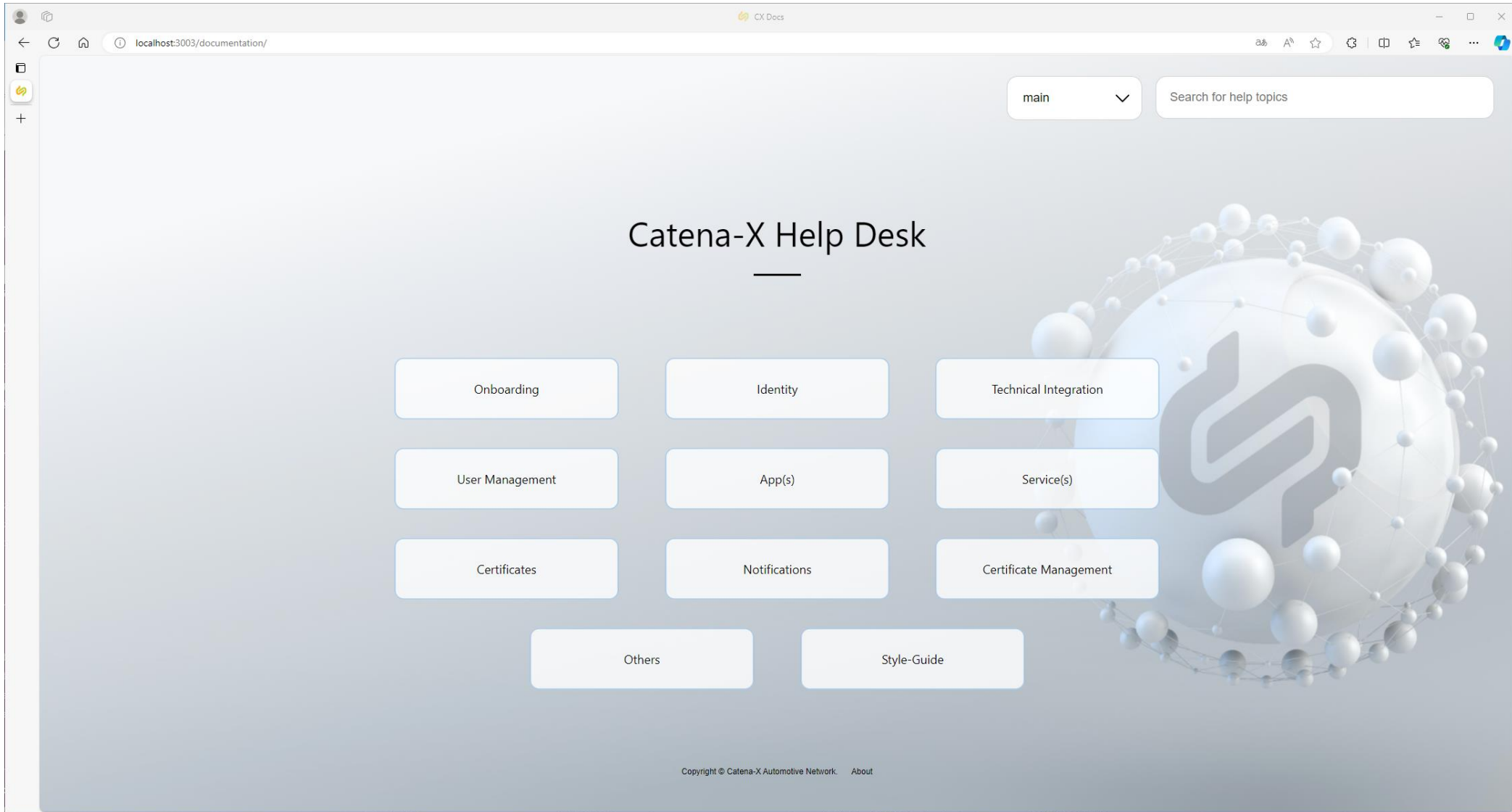
The table of contents for the CX Portal Help files is shown below. There are duplicate numbers, they are shown as they appear in the repository directory structure

| | | |
|----|------------------------|--|
| 01 | Onboarding | Registration of participating companies The process is Registration Invite, Registration, and Registration Approval |
| 02 | Identity | Types of identities and Wallet managed in the Catena-X data space |
| 02 | Technical Integration | Register connectors and manage IdP |
| 03 | User Management | User management Account creation, password reset, role assignment, BPN assignment, "Technical User" creation, etc. |
| 04 | App(s) | The app marketplace, the app release process, approvals, and subscriptions |
| 05 | Service(s) | The service marketplace, the service release process, approvals, and subscriptions |
| 06 | Certificates | Registration and approval of use case participation certificates for participating companies |
| 06 | Notifications | The notification screen |
| 08 | Certificate Management | Upload certificates required for audits, purchasing, etc. |
| 09 | Others | The app and service setup process, etc. |

Catena-X Help Desk

Open to the public

The top screen of the help file. The "Style Guide" in the lower right is a template for the page layout



Onboarding

Participating companies register. CX Admin sends invitation emails to participating companies, and the person in charge of the participating company logs in to the portal and registers their company information and roles

The screenshot shows a web browser window displaying the 'Onboarding' documentation page for Catena-X. The browser address bar shows 'localhost:3003/documentation/?path=user%2F01.+Onboarding'. The page has a sidebar on the left with the Catena-X logo and a navigation menu. The main content area is titled 'Onboarding' and includes a breadcrumb trail '> Home > Onboarding'. The text explains that the onboarding process is split into two sections: Registration and Technical Onboarding. A flowchart below details the 12 steps of the registration process:

- 1. CX Admin is inviting a new company by sending an email invitation.
- 2. Click on the link in the invitation e-mail to access the registration form (Who: invite).
- 3. Login to the registration form.
- 4. Insert company data.
- 5. Select company role inside the CX Network.
- 6. Company application request approved by CX (Validation by CX).
- 7. Validate your data & submit.
- 8. Upload your HRA Doc.
- 9. Agree to terms & conditional frame contract.
- 10. Welcome email with technical integration information (EDC, IdP, etc.).
- 11. Login to the CX portal.
- 12. Create technical user with which you will connect to the Catena-X dataspace (e.g. Twin registry).
- 13. Register your connector.
- 14. Congratulations you can now participate in the dataspace; invite company users, configure your company needs and explore the marketplaces.

Below the flowchart, the text reads: 'Read more details in the following sections:' followed by a list of links: Registration Invite, Registration, Registration Approval, and Onboarding Service Provider. At the bottom of the page, there is a 'NOTICE' section.

Technical Integration

Register user authority connectors and manage IdP

The screenshot shows a web browser window displaying the Catena-X documentation for Technical Integration. The browser address bar shows the URL: localhost:3003/documentation/?path=user%2F02.+Technical+Integration. The page features a navigation menu on the left with sections for Connector Registration, Identity Provider Management, and CX Membership. The main content area includes a breadcrumb trail (Home > Technical Integration), a search bar, and a detailed introduction to technical integration functionalities. A NOTICE section at the bottom provides licensing information under Apache-2.0.

main Search for help topics

Catena-X
Automotive Network

[Technical Integration](#)

Connector Registration

- Summary
- Connector Overview
- Connector Registration
- SelfDescription Retrigger
- Delete Connector
- OpenAPI
- FAQ
- Policy Management

Identity Provider Management

- Summary
- Company IdPs
- Configure Company IdP
- User Migration
- Identity Provider Deletion
- Disable Identity Provider
- FAQ

CX Membership

- Open API

» Home » [Technical Integration](#)

Technical Integration

The technical integration covers functionalities such as the connector registration of a company, as well as identity provider connections. Mainly those functionalities are managed by IT Managers of a company. Learn how to configure the technical integration items in the Catena-X Portal. Read more details in the following sections:

- Connector Registration
- Identity Provider Management

NOTICE

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- SPDX-License-Identifier: Apache-2.0
- SPDX-FileCopyrightText: 2021-2023 Contributors to the Eclipse Foundation
- Source URL: <https://github.com/eclipse-tractusx/portal-assets>

User Management

"Technical User" is the user authority for connecting to the backend

The screenshot shows a web browser window displaying the Catena-X User Management documentation. The browser's address bar shows the URL: localhost:3003/documentation/?path=user%2F03.+User+Management. The page features a navigation sidebar on the left with the Catena-X logo and a list of links under 'User Management', 'User Account', 'Modify User Account', and 'Technical User'. The main content area has a breadcrumb trail 'Home > User Management', a search bar, and a title 'User Management'. The text explains that user accounts are basic entities for accessing resources and lists links for 'User Account', 'Edit User Account', 'Technical User', and 'App Access Management'. A 'NOTICE' section at the bottom states the work is licensed under Apache-2.0 and provides the source URL: https://github.com/eclipse-tractusx/portal-assets.

Docs - User Management

localhost:3003/documentation/?path=user%2F03.+User+Management

main

Search for help topics

Catena-X
Automotive Network

User Management

User Account

- Summary
- User Account
- Create new user account (single)
- Create new user account (bulk)
- FAQ

Modify User Account

- Summary
- Password Reset
- User Permissions
- Manage user assigned BPN
- Suspend User
- Delete User

Technical User

- Technical User Overview
- Create Technical User
- Delete Technical User
- FAQ
- Reset Credentials

> Home > [User Management](#)

User Management

User accounts are the basic entities to access resources in Catena-X. Learn how to manage different kinds of user accounts in the Catena-X Portal. Read more details in the following sections:

- User Account
- Edit User Account
- Technical User
- App Access Management

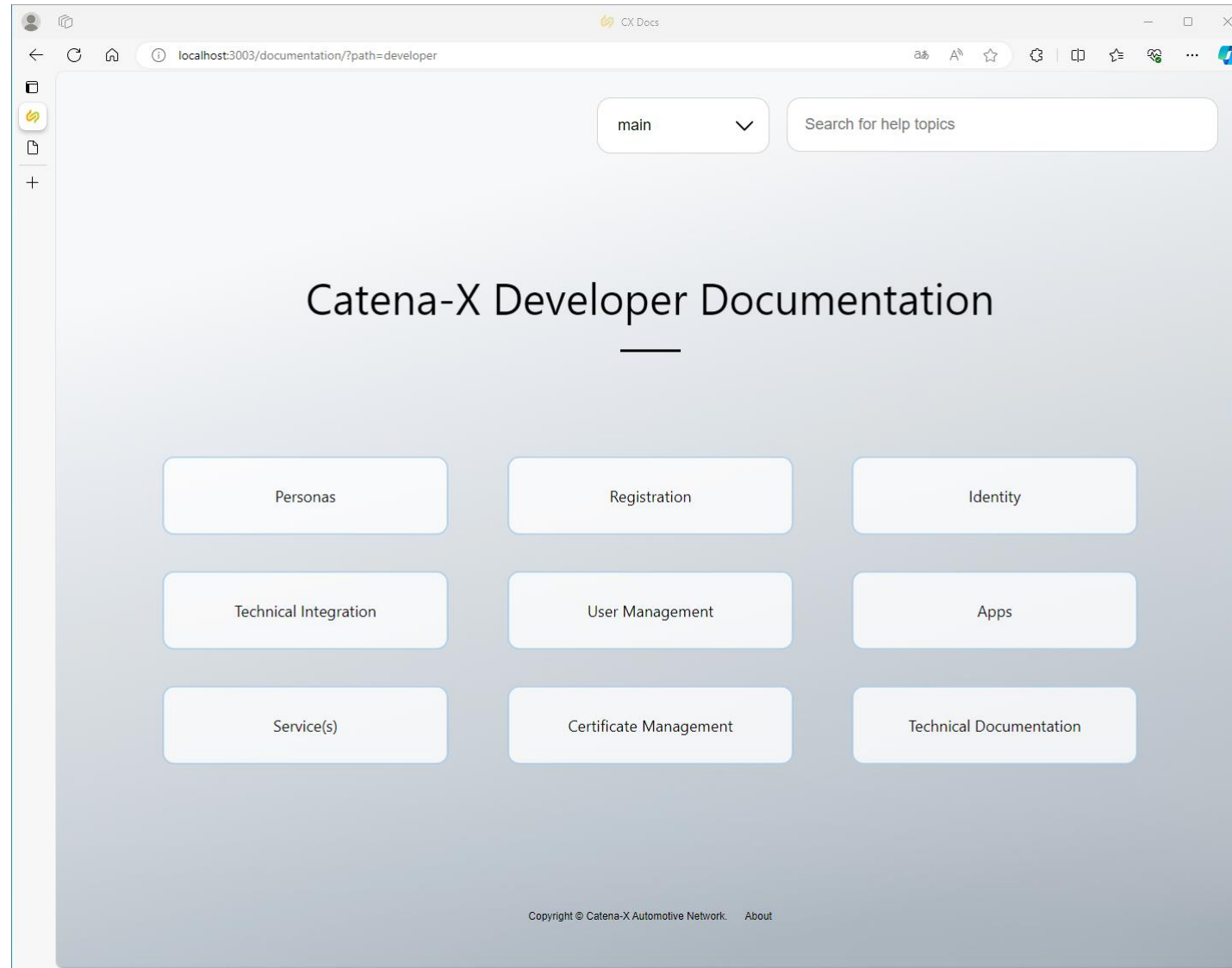
NOTICE

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- SPDX-License-Identifier: Apache-2.0
- SPDX-FileCopyrightText: 2021-2023 Contributors to the Eclipse Foundation
- Source URL: <https://github.com/eclipse-tractusx/portal-assets>

Catena-X Developer Documentation

Top page of developer documentation



9. portal-backend

Update
6/20, 2024

Abstract

| | | | | |
|-------------------------|--------------------|-----------|--|---|
| Version (release date) | 1.8.0 (2024/03/05) | | Major companies involved in development | BMW, T-Systems |
| Initial Commitment Date | March 28, 2022 | | Total Commitments | 4,290 |
| Language | C# | JSON | Number of commits in the last 3 months | 124 |
| scale | 234.5KStep | 26.0KStep | Correspondence repository for catenax-ng | catenax-ng/tx-portal-backend |

Summary

Backend part of Catena-X Portal

Feature

ASP.NET Core and Entity Framework are used as frameworks

The implemented ASP.NET Core applications are shown in the table below

| AssemblyName | Contents |
|--|------------------------------------|
| Org.Eclipse.TractusX.Portal.Backend.Registration.Service | Participating company registration |
| Org.Eclipse.TractusX.Portal.Backend.Administration.Service | User management |
| Org.Eclipse.TractusX.Portal.Backend.Apps.Service | App marketplace |
| Org.Eclipse.TractusX.Portal.Backend.Services | Service marketplace |
| Org.Eclipse.TractusX.Portal.Backend.Notifications.Service | User notification |

10. portal

Update
6/20, 2024

Abstract

| | |
|-------------------------|-------------------|
| Version (release date) | 1.8.0 (2024/03/8) |
| Initial Commitment Date | 11/30/2022 |
| Language | YAML |
| scale | 6.8KStep |

| | |
|--|--|
| Major companies involved in development | BMW |
| Total Commitments | 2641 |
| Number of commits in the last 3 months | 565 |
| Correspondence repository for catenax-ng | catenax-ng/tx-portal-cd |

Summary

Helm chart for deploying the front and back end of Catena-X Portal

Feature

- The chart is identical to the one registered in the [Helm repository of Tractus-X](#).
- There are 4 deployment targets: portal-frontend, portal-frontend-registration, portal-assets, and portal-backend
- Charts for deploying to the local environment are also included

11. portal-frontend

Update
6/20, 2024

Abstract

| | | | | |
|-------------------------|--------------------|----------|--|--|
| Version (release date) | 1.8.0 (2024/03/05) | | Major companies involved in development | BMW, Mercedes-Benz, Ray Sono |
| Initial Commitment Date | 2022/03/17 | | Total Commitments | 4,738 |
| Language | TypeScript | JSON | Number of commits in the last 3 months | 169 |
| scale | 51.1KStep | 6.6KStep | Correspondence repository for catenax-ng | catenax-ng/tx-portal-frontend |

Summary

Frontend part of Catena-X Portal

Feature

- Web application using React as a framework
- The following 7 addresses need to be set as environment variables at runtime
 - PORTAL_ASSETS_URL
 - PORTAL_BACKEND_URL
 - CENTRALIDP_URL
 - SSI_CREDENTIAL_URL
 - BPDM_API_URL
 - SEMANTICS_URL
 - MANAGED_IDENTITY_WALLETS_NEW_URL

12. portal-frontend-registration

Update
6/20, 2024

Abstract

| | |
|-------------------------|--------------------|
| Version (release date) | 1.6.0 (2024/03/05) |
| Initial Commitment Date | 2022/04/05 |
| Language | TypeScript |
| scale | 4.5KStep |

| | |
|--|--|
| Major companies involved in development | BMW |
| Total Commitments | 856 |
| Number of commits in the last 3 months | 57 |
| Correspondence repository for catenax-ng | catenax-ng/tx-portal-frontend-registration |

Summary

The part of the Catena-X Portal frontend related to user registration

Feature

- Web application using React as a framework
- The following 3 addresses need to be set as environment variables at runtime
 - PORTAL_ASSETS_URL
 - PORTAL_BACKEND_URL
 - CENTRALIDP_URL

13. portal-iam

Update
6/20, 2024

Abstract

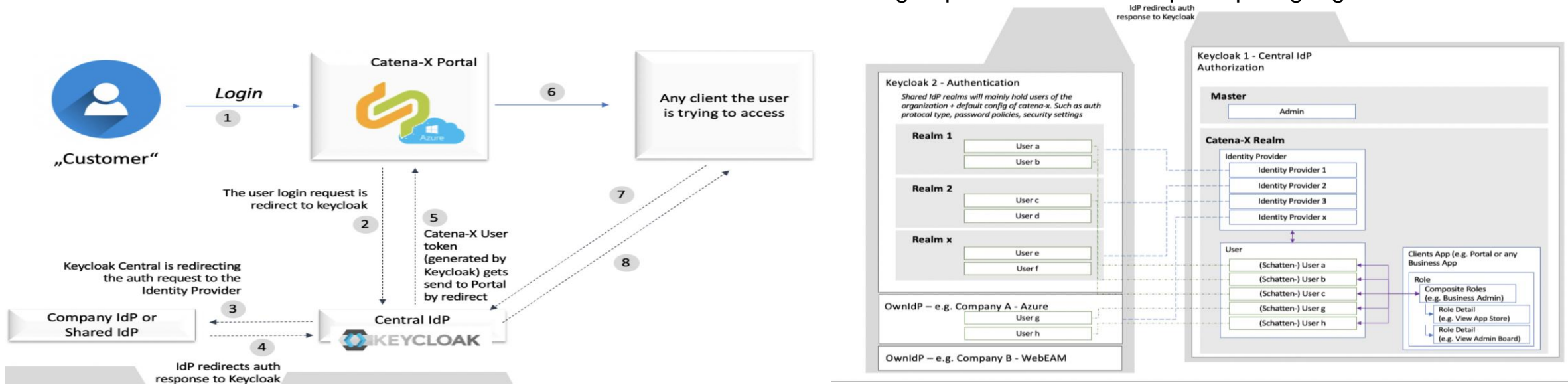
| | | | | |
|-------------------------|--------------------|----------|--|---|
| Version (release date) | 2.1.0 (2024/03/05) | | Major companies involved in development | BMW |
| Initial Commitment Date | 11/30/2022 | | Total Commitments | 226 |
| Language | JSON | YAML | Number of commits in the last 3 months | 64 |
| scale | 243.9KStep | 3.0KStep | Correspondence repository for catenax-ng | catenax-ng/tx-portal-iam |

Summary

Helm chart and configuration file to deploy Keycloak for Catena-X Portal

Feature

There is a "Central IdP" with a realm for Catena-X Portal and a "Shared IdP" with a group of realms for each participating organization



The portal front end accesses the Central IdP
Authentication requests are redirected to the Shared IdP

The 2 IdPs (Keycloak) are in a federation relationship

14. puris

Update
6/20, 2024

Abstract

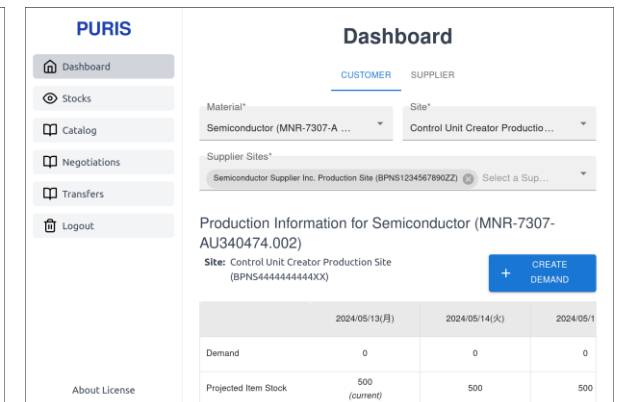
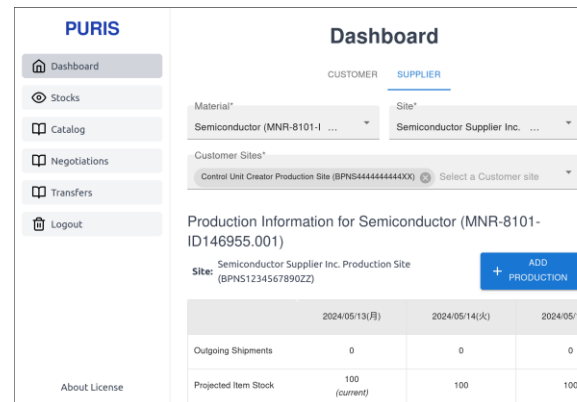
| | | | |
|-------------------------|--------------------|--|---|
| Version (release date) | 1.0.0 (2024/02/28) | Major companies involved in development | Fraunhofer |
| Initial Commitment Date | Jul. 12, 2023 | Total Commitments | 1064 |
| Language | Java | Number of commits in the last 3 months | 337 |
| Scale (KStep) | 9.4 | Correspondence repository for catenax-ng | catenax-ng/tx-puris-backend |

Summary

- Predictive Unit Real-Time Information Service: A component that propagates information to data space participants when the supply-demand relationship in particular part of the supply chain changes, enabling them to adjust inventory and production plans
- Consists of a frontend implemented in Vue.js and a backend implemented in Spring Boot

Feature

- Follow the steps described at <https://github.com/eclipse-tractusx/puris/blob/1.0.0/local/INSTALL.md>, easily try the application in a local environment
- Dependent services such as EDC, PostgreSQL, Keycloak, MIW (Managed Identity Wallet), and DTR (Digital Twin Registry) can also be launched by Docker Compose
- Customer and Supplier screens can be used on a trial basis



15. sd-factory

Update
6/20, 2024

Abstract

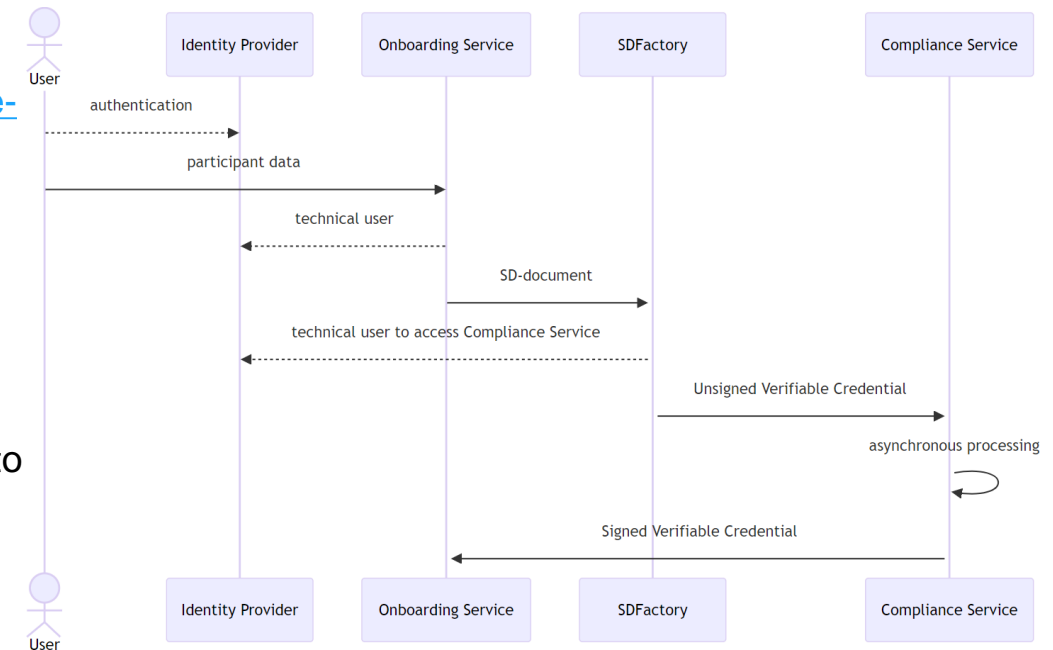
| | | | | |
|-------------------------|---------------------|------|--|---|
| Version (release date) | 2.1.12 (2024/05/14) | | Major companies involved in development | T-Systems, Mercedes-Benz |
| Initial Commitment Date | January 24, 2024 | | Total Commitments | 949 |
| Language | YAML | Java | Number of commits in the last 3 months | 32 |
| Scale (KStep) | 2.1 | 1.0 | Correspondence repository for catenax-ng | catenax-ng/tx-sd-factory |

Summary

When a user joins a data space, they enter their information into the Onboarding Service, and the Self Description (SD) document is created. It converts the Self Description (SD) document into a Verifiable Credential (VC) and passes it to the Compliance Service for review and signature

Feature

- As shown in the sequence diagram (right) posted on <https://github.com/eclipse-tractusx/sd-factory/tree/v2.1.11#solution-strategy> , it works in conjunction with IdP, Onboarding Service (Portal), and Compliance Service, etc.
- There are 2 types of SD that can be registered at this time: LegalParticipant (Information on legal entity) and ServiceOffering (information on services provided)
- When converting SD documents to VC, the format can be selected according to the Compliance Service.
Currently, [Catena-X format](#) and [GAIA-X format](#) are supported



16. sldt-bpn-discovery

Update
6/20, 2024

Abstract

| | | | |
|-------------------------|--------------------|--|-------|
| Version (release date) | 0.2.6 (10/11/2023) | Major companies involved in development | Bosch |
| Initial Commitment Date | Mar. 14, 2023 | Total Commitments | 194 |
| Language | Java | Number of commits in the last 3 months | 50 |
| scale | 2.05KStep | Correspondence repository for catenax-ng | n/a |

Summary

Provide REST API that maps BPN (Business Partner Number) endpoints to various resource ID

Feature

- Provides a mechanism for [acquiring decentrally managed BPNs](#)
- Uses Spring Boot and PostgreSQL (or H2)
- The current implementation is simply storing/referring key and value pairs in RDB with Spring Data JDBC

17. sldt-digital-twin-registry

Update
6/20, 2024

Abstract

| | | | |
|-------------------------|----------------------|--|-------|
| Version (release date) | v0.3.23 (11/01/2024) | Major companies involved in development | Bosch |
| Initial Commitment Date | May 25, 2022 | Total Commitments | 194 |
| Language | Java | Number of commits in the last 3 months | 50 |
| scale | 9.8KStep | Correspondence repository for catenax-ng | n/a |

Summary

Provide [REST API](#) to register/reference AAS descriptor with ID as a key

Feature

- [assetId and AAS descriptor are registered by the provider and referenced by the consumer.](#)
- Data for the submodel is obtained by accessing the [endpoints stored within the AAS descriptor.](#)
 - In the example in the document, the endpoint is EDC (connector), but it is not a fixed protocol
- Using Spring Boot and PostgreSQL (or H2)
- Simple implementation of storing/referencing key and value pairs in RDB with Spring Data JDBC

Remarks:

The following Bosch repository is also under development, and merge requests are periodically made to the eclipse-tractusx repository. Since the branch name of the merged eclipse-tractusx side is "release", it appears that the code developed in the bosch repository is merged into contractusx when it is ready for release to some extent.

- Bosch repository: <https://github.com/bci-oss/sldt-digital-twin-registry/>

18. sldt-discovery-finder

Update
6/20, 2024

Abstract

| | | | |
|-------------------------|---------------------|--|-------|
| Version (release date) | v0.2.7 (2024/01/09) | Major companies involved in development | Bosch |
| Initial Commitment Date | Mar. 14, 2023 | Total Commitments | 194 |
| Language | Java | Number of commits in the last 3 months | 35 |
| scale | 1.1KStep | Correspondence repository for catenax-ng | n/a |

Summary

Provides [REST API](#) to retrieve endpoints for [sldt-bpn-discovery \(BPN Discovery Service\)](#).

Feature

- The current implementation is simply to store/reference the type and endpoint correspondence in RDB with Spring Data JPA

19. sldt-semantic-hub

Update
6/20, 2024

Abstract

| | | | |
|-------------------------|---------------------|--|-------|
| Version (release date) | 0.2.16 (2024/01/12) | Major companies involved in development | Bosch |
| Initial Commitment Date | May 25, 2022 | Total Commitments | 474 |
| Language | Java | Number of commits in the last 3 months | 31 |
| scale | 3.39KStep | Correspondence repository for catenax-ng | n/a |

Summary

Provides [REST API for](#) registering/referencing aspect models described in Turtle and searching by SPARQL queries

Feature

- Implementation with Spring Boot
- Apache Jena Fuseki is used for RDF persistence
- [Perform content validation at the time of data registration](#)
- See sldt-semantic-models in the next section for data models

20. sldt-semantic-models

Update
6/20, 2024

Abstract

| | | | |
|-------------------------|---------------------|--|--------------------------------|
| Version (release date) | v23.12 (01/18/2024) | Major companies involved in development | T-Systems, BASF SE, Bosch, SAP |
| Initial Commitment Date | 2022/07/04 | Total Commitments | 1949 |
| Language | Turtle. | Number of commits in the last 3 months | 790 |
| scale | 57.5KStep | Correspondence repository for catenax-ng | n/a |

Summary

Meta model description based on [SAMM \(Semantic Aspect Meta Model\)](#)

Feature

- BAMB, which appears in the document, is the old name for SAMM and means the same thing
- It is written in Turtle(.ttl), one of the RDF notations
- Generate JSON and YAML (for use with OpenAPI) from .ttl using the [SAMM CLI](#) provided by [the ESMF SDK](#).
- The process for [developing and registering models](#) is defined

21. traceability-foss

Update
6/20, 2024

Abstract

| | | | | |
|-------------------------|---------------------|------------|--|--|
| Version (release date) | 10.8.4 (2024/04/17) | | Major companies involved in development | BMW, ZF Friedrichshafen |
| Initial Commitment Date | 2022/05/05 | | Total Commitments | 7244 |
| Language | Java | TypeScript | Number of commits in the last 3 months | 1476 |
| scale | 28.76KStep | 20.98KStep | Correspondence repository for catenax-ng | catenax-ng/tx-traceability-foss |

Summary

Web application to link parts traceability information across the supply chain

Feature

- Consists of backend using Spring Boot and Angular+TypeScript frontend
 - The backend code, which was separated in a separate repository (traceability-foss-backend), has been integrated
- Depends on item-relationship-service (IRS) and sldt-digital-twin-registry (Digital Twin Registry).
- The following 2 types of [back-end REST APIs are](#) the main ones
 - Manage information on your products/parts:assets
 - Request parts information for suppliers:investigation
- The frontend [provides dashboards and other visual displays of data that](#) can be obtained through the backend API
 - Investigation requests can also be made from the parts information screen

21. traceability-foss UI overview

The Dashboard provides access to manufacturing and supply chain status

The screenshot shows the TRACE-X dashboard interface. A red box highlights the navigation menu at the top, which includes the following items:

- Dashboard (with a blue square icon)
- Parts (with a wrench icon)
- Other parts (with a truck icon)
- Quality investigation (with a speech bubble icon)
- About (with an information icon)

Callouts point to these items with the following descriptions:

- "List of custom parts and batches" points to the **Parts** menu item.
- "List of supplied parts or batches" points to the **Other parts** menu item.
- "Inbox and Outgoing Notifications" points to the **Quality investigation** menu item.
- "Part and batch information. Understand what is happening in the supply chain" points to the **Dashboard** menu item.

Additional UI elements include:

- The **TRACE-X** logo in the top left.
- A **Help** button (with a question mark icon) and a user profile icon (with a person icon) in the top right.
- A red arrow pointing to the user profile icon.
- A breadcrumb trail: **Home > Home**.
- The main heading: **Dashboard**.
- Three summary cards at the bottom:
 - TOTAL OF PARTS**: 101 (with a truck icon)
 - TOTAL OF OTHER PARTS**: 29 (with a truck icon)
 - TOTAL OF OPEN INVESTIGATIONS**: 2 (with a magnifying glass icon)

(Citation) [Users Manual \(catenax-ng.github.io\)](https://catenax-ng.github.io)

21. traceability-foss UI overview

The Parts Details page provides access to information on manufactured parts and batches registered in the Digital Twin Registry

The screenshot displays the TRACE-X interface. On the left, a sidebar menu includes 'Dashboard', 'Parts', and 'Other parts'. The main area is titled 'MY PARTS' and shows a list of parts with columns for ID and other details. A callout box on the left explains that this list shows manufactured parts and batches, and that detailed information is available in the Digital Twin Registry when a part is selected.

The detailed view on the right is titled 'Part details' and provides 'Detailed information about your selected part'. It is divided into four sections:

- Overview:** Name: Transmission, Production date: 2/4/2022, Quality type: Ok, Serial number: NO-010409927582042864953638.
- Relations:** A diagram showing 'Part Relation' connected to 'Sensor' and 'Engineeri...'.
- Manufacturer Information:** Manufacturer: 10222E8-43, Part number: 10222E8-43, Serial number: NO-010409927582042864953638, Batch number: -, Van: -.
- Customer Information:** Name at customer: -, Customer part ID: 10222E8-43.

(Citation) [Users Manual \(catenax-ng.github.io\)](https://catenax-ng.github.io)

21. traceability-foss UI overview

The Parts Details page provides access to supplier part and batch information registered in the Digital Twin Registry
Tracability aspect model AssemblyPartRelation is also included

The screenshot displays the TRACE-X interface. On the left is a navigation sidebar with 'Other parts' selected. The main content area is titled 'OTHER PARTS' and shows a list of parts under 'Supplier Parts' and 'Customer Parts'. A detailed view for a selected part is shown on the right, titled 'Part details'.

Part details (Detailed information about your selected part)

Overview

- Name: Engineering Plastics
- Production date: 2/4/2022
- Quality type: ✔ Ok ✎
- Serial number: NO-875847047953455121009254

Manufacturer data

- Manufacturer: N-Tier A
- Part number: 88198Z6-30
- Serial number: NO-875847047953455121009254
- Batch number: NO-875847047953455121009254
- Van: --

Manufacturer Information ID, etc.

Customer data

- Name at customer: Engineering Plastics
- Customer part ID: 88198Z6-30

(Citation) [Users Manual \(catenax-ng.github.io\)](https://catenax-ng.github.io)

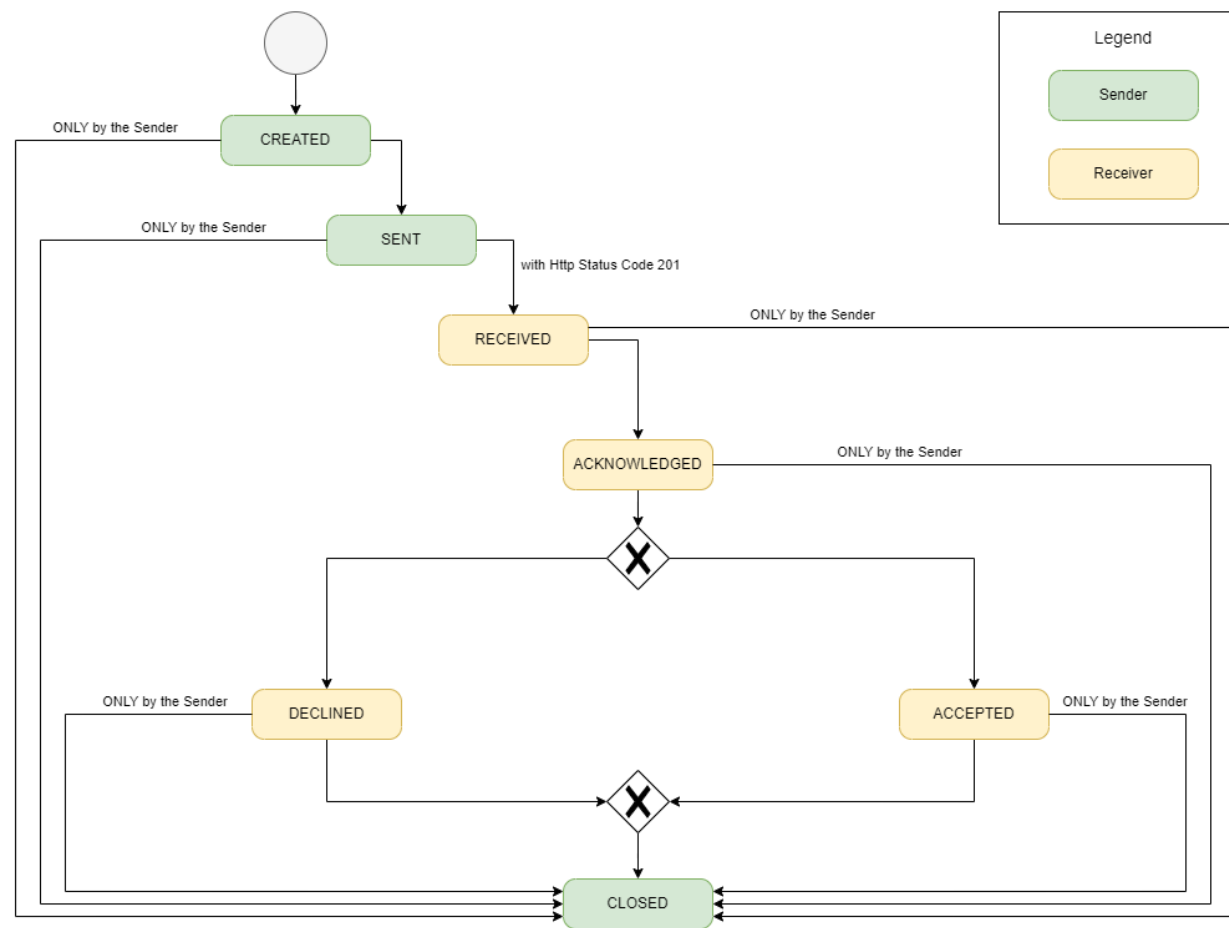
21. traceability-foss UI overview

By viewing the notification, you can also check the status

Quality investigation status

Following status for a quality investigation (notification) are possible.

| Status | Description |
|--------------|---|
| Queued | A quality investigation that was created by a user but not yet send to the receiver. |
| Requested | Created quality investigation that is already sent to the receiver. |
| Cancelled | Created quality investigation that is not yet send to the receiver and got cancelled on sender side before doing so. It is no longer valid / necessary. |
| Received | Received notification from a sender which needs to be investigated. |
| Acknowledged | The receiver acknowledged to work on the received inquiry. |
| Accepted | The receiver accepted the inquiry. Issue on part/batch detected. |
| Declined | The receiver declined the inquiry. No issue on part/batch detected. |
| Closed | The sender closed the quality investigation and no further handling with it is possible. |



(Citation) [Users Manual \(catenax-ng.github.io\)](https://catenax-ng.github.io)

22. tractusx-edc

Update
6/20, 2024

Abstract

| | | | | |
|-------------------------|--------------------|----------|--|--|
| Version (release date) | 0.7.1 (2024/05/06) | | Major companies involved in development | BMW, Mercedes-Benz, ZF Friedrichshafen |
| Initial Commitment Date | March 29, 2022 | | Total Commitments | 905 |
| Language | Java | YAML | Number of commits in the last 3 months | 203 |
| scale | 14.8KStep | 5.4KStep | Correspondence repository for catenax-ng | catenax-ng/tx-tractusx-edc , catenax-ng/product-edc (old repository) |

Summary

Unique enhancements to EDC Connector, and Helm chart for deploying Connector in Catena-X recommended configuration

Feature

| Extension Name | Summary | Extension Name | Summary |
|--|--|---------------------------------------|---|
| BusinessPartnerValidationExtension | Policy allows control via BPN | DimStsConfigurationExtension | Provide DIM client configuration values |
| BusinessPartnerNumberValidationExtension | BPN itself determines constraints (to be discontinued) | DimOauthClientExtension | Obtain an access token to the DIM |
| BusinessPartnerGroupApiExtension | Constraints are determined by whether the BPN belongs to a group | DimSecureTokenServiceExtension | Obtain token from the DIM Wallet |
| TokenRefreshHandlerExtension | Refresh the EDR token | BdrsClientMapperExtension | Map remote message BPN to DID |
| DataPlaneSelectorConfigurationServiceExtension | Register a data plane instance with the data plane selector | BdrsClientExtension | BPN/DID Resolution Service Client |
| DataPlaneProxyConsumerApiExtension | Enable data collection using asset ID instead of EDR | EdrCacheApiExtension | Provide EDR API v2 |
| latpDefaultScopeExtension | Apply default scope to policy evaluation. | LocalCallbackExtension | Automatically start transfer after negotiation is completed |
| latpScopeExtractorExtension | Extract the scope defined in the policy | CxPolicyExtension | Provide Catena-X specific policy and constraint functions |
| latpIdentityExtension | Retrieve attributes from the membership VC | AbstractPostgresqlMigrationExtension | DB schema migration |
| | | TxDataFlowPropertiesProviderExtension | Assign the DID as message property |
| | | ProvisionAdditionalHeadersExtension | Contract agreement ID is given as a request header to the backend service |

23. bpdm-certificate-management

Abstract

| | | | |
|-------------------------|------------------|--|----|
| Version (release date) | 1.0.0(1/29/2024) | Major companies involved in development | - |
| Initial Commitment Date | 10/23/2023 | Total Commitments | 98 |
| Language | Kotlin | Number of commits in the last 3 months | 55 |
| scale | 1.7KStep | Correspondence repository for catenax-ng | |

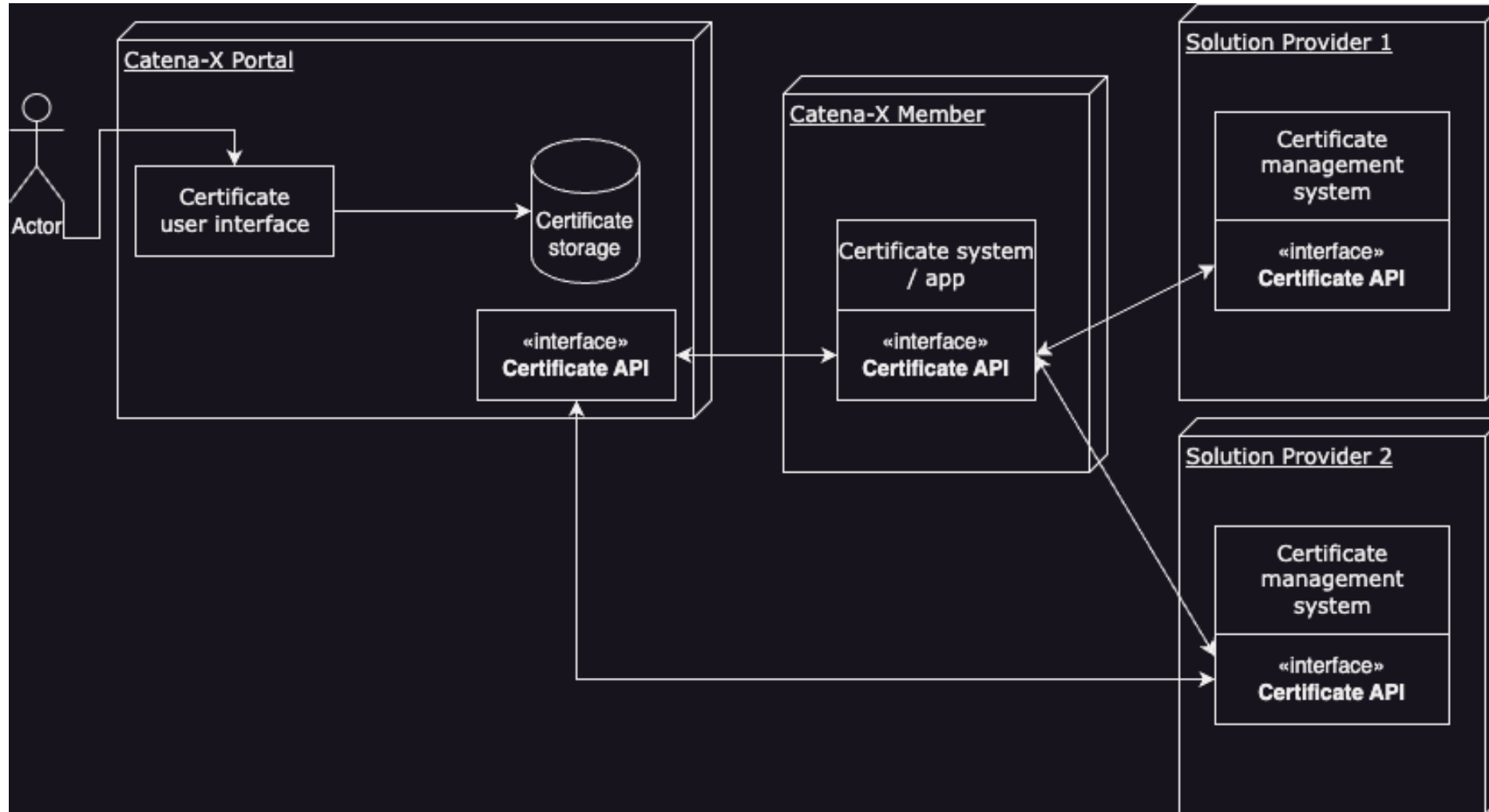
Summary

Make it easy to provision and replace corporate certificates

Feature

- Provide a standardized API and data model to easily manage certificates and improve data accuracy
- Solution Providers/Application Providers will be able to validate and manage enterprise certificates using a standardized API and data model, making this information easily accessible to partners and customers in the data space
- Data Subscribers/Providers can offer and use corporate certificates through various solution providers using a standardized API and data model; peer-to-peer exchange of corporate certificates between partners via EDC is possible

23. bpdm-certificate-management



24. bpn-did-resolution-service

Update
6/20, 2024

Abstract

| | | | |
|-------------------------|----------|--|----------------|
| Version (release date) | n/a | Major companies involved in development | BEARDYINC E.U. |
| Initial Commitment Date | 2024/3/8 | Total Commitments | 43 |
| Language | Java | Number of commits in the last 3 months | 43 |
| scale | 2KStep | Correspondence repository for catenax-ng | n/a |

summary

Resolves Business Partner Numbers (BPN) and associated DIDs. Implemented as an extension to EDC Core Runtime

Feature

- Provides a directory of BPN (Business Partner Numbers) and DIDs associated with BPN
- The directory is used by agents participating in the data space to resolve BPN DID
- The directory is designed to accept requests and cache them locally via the RESTful HTTPS API
- When requesting a directory, the client must provide JWT containing MembershipCredential for authentication
- Provided as an extension to EDC core runtime
- Documentation is still in the early stages of development and little is available

25. policy-hub

Update
6/20, 2024

Abstract

| | | | |
|-------------------------|------------|--|------------------------------------|
| Version (release date) | n/a | Major companies involved in development | BMW, Digital Native Solutions GmbH |
| Initial Commitment Date | 10/23/2023 | Total Commitments | 64 |
| Language | C# | Number of commits in the last 3 months | 58 |
| scale | 3.1KStep | Correspondence repository for catenax-ng | |

summary

Provide a centralized, read-only API to receive policy-related information for the Catena-X network

Feature

- Policy Hub provides data providers, consumers, and application providers retrieve the current CX's existing policies, their attributes, and statements of policy keys and structure via Single Point of truth. In addition, users receive a complete policy template (based on Catena-X data space rules) that can be used for stored enterprise rules
- Provide a Read Only API
- OIDC is used for authentication and authorization
- It was stated that there were no plans to implement a UI at the time of the survey

26. policy-hub Architecture



27. ssi-authority-schema-registry

Updated
7/17, 2024

Abstract

| | | | |
|-------------------------|-----------|--|----------------------------------|
| Version (release date) | n/a | Major companies involved in development | BMW |
| Initial Commitment Date | 1/29/2024 | Total Commitments | 17 |
| Language | C# | Number of commits in the last 3 months | 11 |
| scale | 2.1KStep | Correspondence repository for catenax-ng | tx-ssi-authority-schema-registry |

Summary

Provides information about available credentials and their issuing authorities. It also validates the credential scheme

Feature

- ID Agency Management
 - It is the source of information used to verify the legitimacy of the ID issuer
 - Maintain a list of approved and trusted identity issuing authorities that can issue Verifiable Credential
 - The above will ensure the credibility and reliability of the entire SSI ecosystem
- Authentication Information Schema Management
 - Stores the standardized schema of the Verifiable Credential
 - Provides a central repository of approved credential schemas for use by issuers and verifiers
- Discovery and Integration
 - The registry acts as a directory, allowing participants to discover approved identity agencies and credential schemas

28. ssi-credential-issuer

Update
6/20, 2024

Abstract

| | | | |
|-------------------------|-----------|--|--------------------------|
| Version (release date) | 1.0.0 | Major companies involved in development | BMW |
| Initial Commitment Date | 1/29/2024 | Total Commitments | 39 |
| Language | C# | Number of commits in the last 3 months | 39 |
| scale | 13KStep | Correspondence repository for catenax-ng | tx-ssi-credential-issuer |

summary

Issue SSI credential

Feature

- SSI credential issuer is designed to manage digital credentials and handle tasks such as credential creation, revocation, and automatic expiration for both issuers and holders
- The application facilitates communication with the Wallet and manages the credential
- The current development plan does not include the implementation of a user interface. The user interface is being implemented in the portal project
- There are 3 types of credentials that can be issued: FrameworkCredential, MembershipCredential, and BpnCredential
- The actual VC creation and signing process is handled by an external Wallet service

29. tutorial-resources

Update
6/20, 2024

Abstract

| | | | |
|-------------------------|--------------|--|-----|
| Version (release date) | n/a | Major companies involved in development | - |
| Initial Commitment Date | Aug. 4, 2023 | Total Commitments | 169 |
| Language | - | Number of commits in the last 3 months | 30 |
| scale | -KStep | Correspondence repository for catenax-ng | n/a |

Summary

Tutorials on creating Tractus-X Connector and Data Space

Feature

1. Tractus-X Tutorial:

- Provides guidance on how to deploy the Tractus-X Connector and how to create your own data space
- A minimal environment called MXD (Minimum Tractus-X Dataspace) can be set up to test policy settings, file transfers, etc.
S3 (minio) and Azure Blob Storage (azurite) can be used for file transfer
- Data is not persistent and will not work properly after restarting the cluster instance is restarted

2. EDC Policy Playground:

You can try the Tractus-X EDC policy

3. The file transfer (copy) operation is performed in a push type (the data plane holding the data that received the transfer request copies the file)

29. tutorial-resources

MXD (Minium Tractus-X Dataspace)

Tutorial on creating a minimum original data space. The following tutorials are available

1. Build a dataspace with participants Alice and Bob in a local environment (Docker dnd)
2. Asset access control
3. Set group policies for business partner
4. File transfer
 1. Azure Blob (azurite) to Azure Blob transfer
 2. Azure Blob to S3 (minio) transfer
 3. S3 to S3 transfer
 4. S3 to Azure Blob transfer
5. Simple negotiation and transfer using EDR API
6. Add new participants
7. Deploy MXD to a remote cluster (AWS, GCP)

EDC Policy Playground

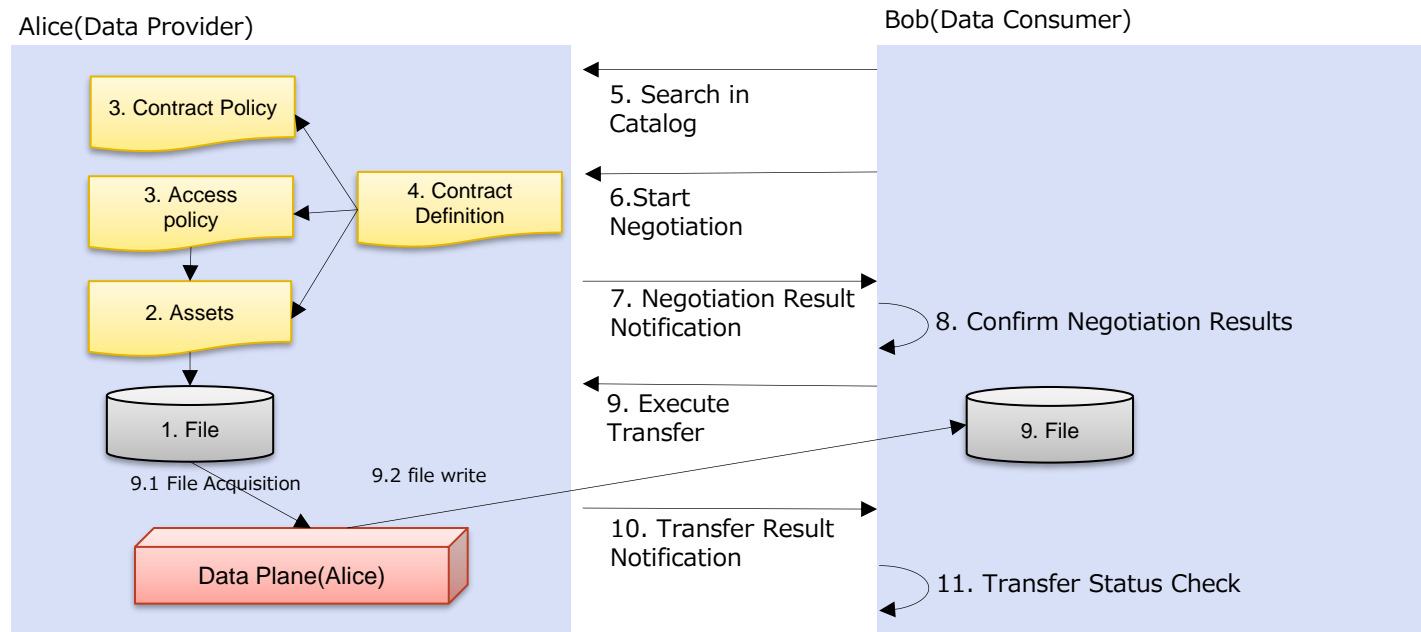
Provides an environment to test EDC policies

There are 2 versions: a locally built version and a website version that you can try out right away

29. tutorial-resources file copy scenario

The following is a conceptual diagram of the flow of the Tutorial process: Bob requests and copies a file to Alice
Since this is a Push type, the file copy is performed on the Data Plane on the Provider side

1. Uploading files (Alice)
2. Creating assets (Alice)
3. Creating a policy (Alice)
 1. Creating access policies
 2. Creating contract policies
4. Create contract definition (Alice)
 - From access and contract policies
5. Search the catalog (Bob)
6. Negotiation begins (Bob)
7. Negotiation result notification (Alice)
8. Confirmation negotiation results (Bob)
9. Execute transfer (Bob)
10. Transfer result notification (Alice)
11. Transfer status check (Bob)
12. Confirmation transferred files (Bob)



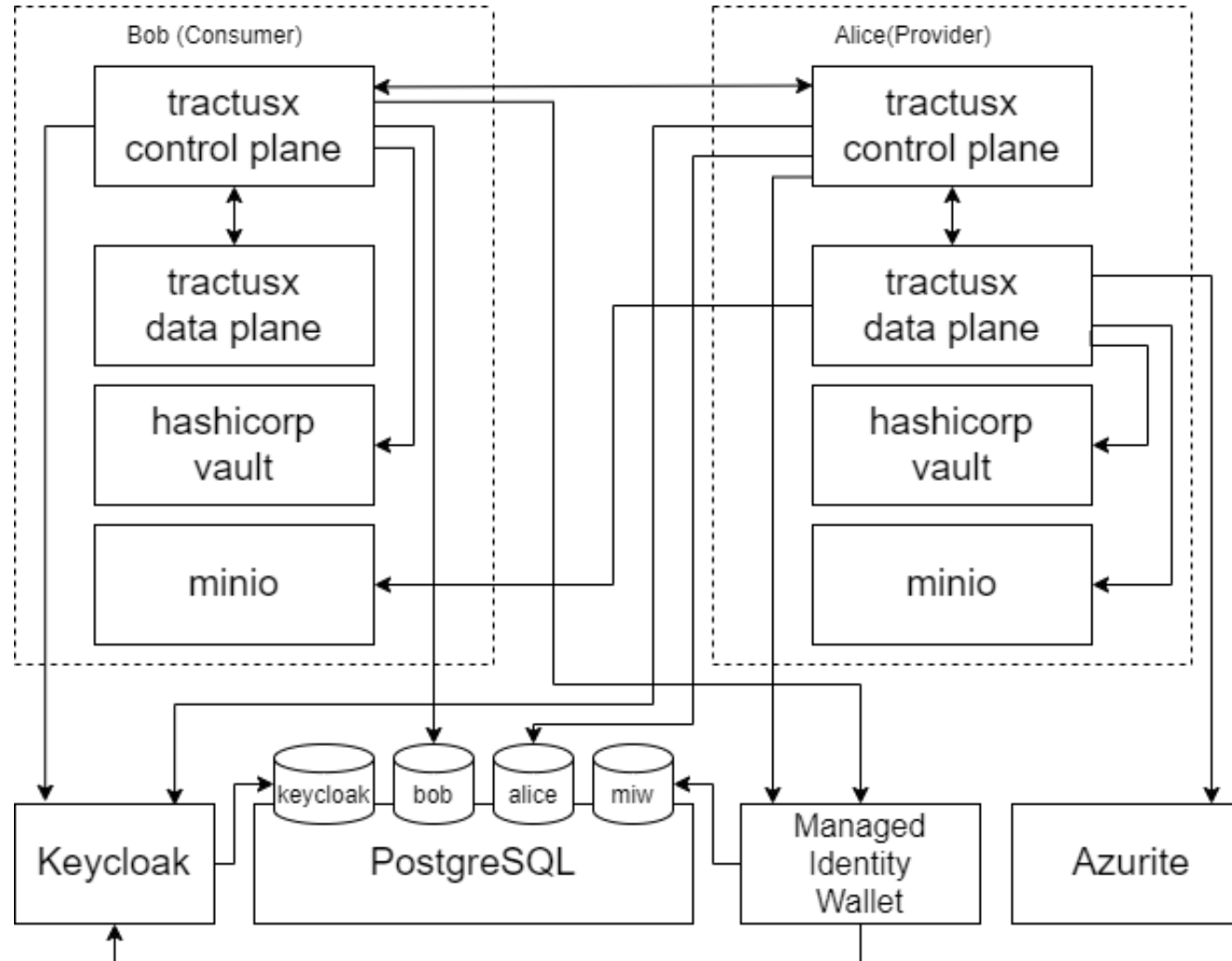
- Assets: Define uploaded files as assets
- Access Policy: Define access policies for Bob
- Contract Policy: Define a policy that allows BPN credentials (VC) that are active
- Contract Definition: Define contracts that apply access and contract policies to assets
- Catalog Search: Retrieve catalog (list of assets)
- Negotiation: Confirm that the sender's (Bob) conditions are acceptable to the recipient (Alice)

*the executor specified in parentheses

The file copy tutorial has 2 scenarios, Azure (shared storage model) and Minio (individual user with storage model), both of which use push data transfer, where the party receiving the transfer request performs the file copy process. At this point, the credentials to access the file are received from the transfer requester (Bob)

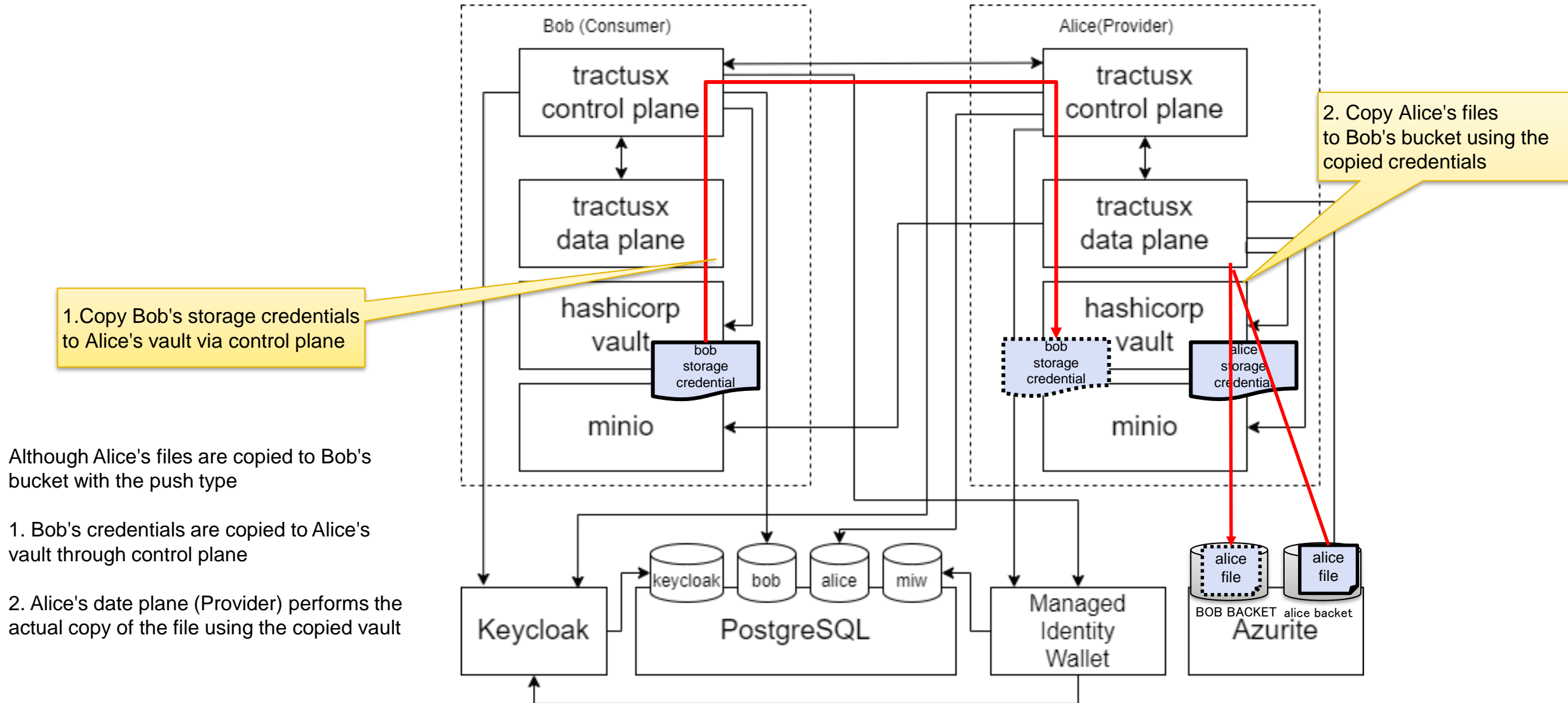
29. tutorial-resources MXD configuration diagram and communication path

The system configuration (container configuration) of MXD in Tutorial and the communication path in the "4. file transfer" scenario are described (In file transfer scenarios, communication paths not used (ex. minio access from Bob-side components are not shown))



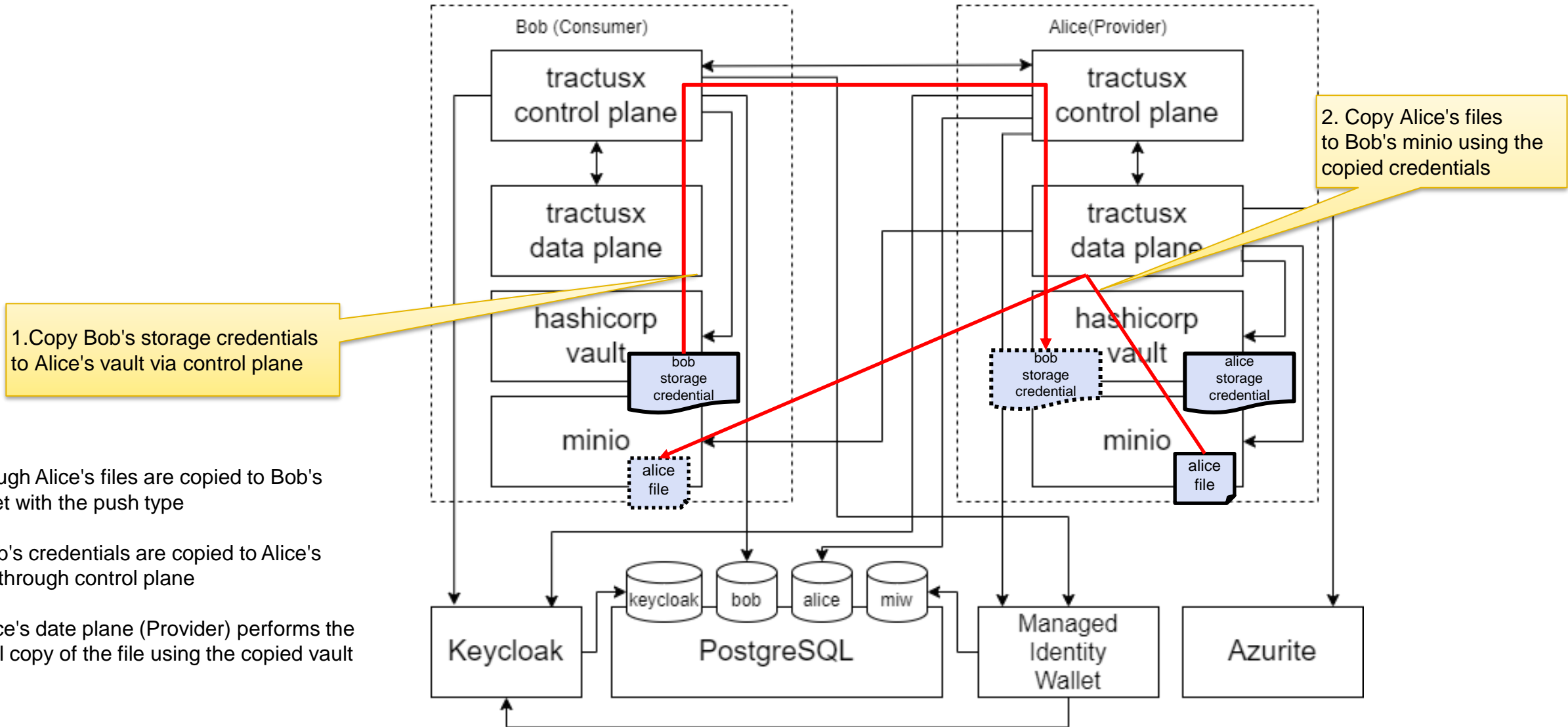
29. Behavior when transferring tutorial-resources file (Azurite)

Describe the copy behavior during file transfer when using Azurite



29. Behavior when transferring tutorial-resources file (minio)

Describe the copy behavior during file transfer when using minio



1. Copy Bob's storage credentials to Alice's vault via control plane

2. Copy Alice's files to Bob's minio using the copied credentials

Although Alice's files are copied to Bob's bucket with the push type

1. Bob's credentials are copied to Alice's vault through control plane

2. Alice's data plane (Provider) performs the actual copy of the file using the copied vault

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Glossary

The following are the most important terms and abbreviations used in this document

| Term | | Explanation |
|------|------------------------------|---|
| BPN | Business Partner Number | A globally unique identifier assigned to a legal entity participating in the Catena-X network |
| EDC | Eclipse Dataspace Components | An open-source project to build a data space around connectors or their development artifacts |
| SSI | Self-Sovereign Identity | Self-sovereign identity. The user manages his own attribute information, not the IdP, and the certifier determines the success or failure of the authentication based on whether the issuer of the presented attribute information is trustworthy. The underlying mechanism is the DID |
| DID | Decentralized Identifiers | A distributed digital identifier that refers to an arbitrary object (person, organization, thing, data model, abstract entity, etc.) |
| SD | Self-Description | Machine-readable metadata that participants in the data space can present to other participants about themselves and the services they provide |
| BOM | Bill of Materials | Bill of Materials. A list that summarizes information such as product names, model names, and quantities of the parts that make up a product |
| AAS | Asset Administration Shell | A standardized format for digitally representing physical entities (assets) such as facilities and equipment. One of the implementation forms of the digital twin |
| SAMM | Semantic Aspect Meta Model | A standardized meta-model for defining digital twin aspects (properties, operations, and events) |
| MIW | Managed Identity Wallet | Custodial wallet, or simply wallet when the context is clear From the concept of SSI, the wallet is supposed to be prepared and managed by each company or individual However, it is difficult to prepare the software and operation management system for this purpose in the current situation, so a service that manages DID/VC on behalf of companies and individuals is called a "managed identity wallet" |
| VC | Verifiable Credentials | Abbreviation for Verifiable Credentials. Verifiable certificates take the form of key-value type attribute information associated with a DID. The certificate is digitally signed by the issuer of the attribute information (the issuer), and its authenticity can be verified with a public key |
| SLDT | Semantic Layer/Digital Twins | Abbreviation for Semantic Layer/Digital Twins. Used as a prefix for related repositories |

A low-angle photograph of a modern city skyline with several tall skyscrapers. The sky is a clear, deep blue. In the foreground, there are some trees and a street with a few vehicles. The text 'NTT Data' is overlaid in the center in a white, bold, sans-serif font.

NTT Data