Catena-X

THE FIRST OPEN AND COLLABORATIVE DATA ECOSYSTEM

Lead User Integration Scope & Requirements

Enable the EDC

LEAD USER INTEGRATION

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1. CATENA-X - GENERAL INFORMATION

1.1 Introduction

Catena-X is a data ecosystem whose added value derives from providing end-to-end data chains along the automotive industry and from making the data exchange between market participants sovereign, secure and simple.

The involvement of Lead Users is therefore a major step in demonstrating the practicability of the results developed in the Catena-X project.

Find more information at the Catena-X website:
https://catena-x.net/en/

1.2 Motivation

The current challenge is to ensure the creation of the prerequisites of the data ecosystem as well as the actual development/programming and operation of the ecosystem in a coordinated approach.

Necessary components for building the data ecosystem and data exchange are developed in the Catena-X community. Adaptation in the value chain largely depends on whether the components and the connection process meet the needs of all partners. The task is to capture the requirements of all partners in the value chain and to design the solutions according to the situation.

2. LEAD USER INTEGRATION

2.1 Goal

Lead User integration focuses on hands-on testing of the Eclipse Data Space Connector (EDC) for end users. The EDC is the gateway component to Catena-X. The goal is to equip the Lead User with a running EDC and thereby identify challenges and needs in lessons learned, for example, to make routines such as the on-boarding process and other Catena-X activities as lean and efficient as possible.

Find more information on Lead User integration:
https://catena-x.net/en/catena-x-introduce-implement/lead-user-connection

2.2 Benefits

As part of the Lead User integration, we are looking for small and medium-sized enterprises (SME) that we will support and guide during the practical connection to the Catena-X technology. Together with our IT Enabler, we design the technical implementation of the EDC in a secure test environment tailored to your company.

- Participate as one of the first companies in Catena-X.
- Get first practical trials with Catena-X technology.
- Consider individual circumstances at SME, tier-n.
- Get a review of your IT environment for using the EDC.
- Get technical support for your IT staff (EDC vs. data, cloud services, etc.).
- After implementation, there is an opportunity to participate in Catena-X productive environment.
- Implementation in 4-8 weeks, 1 h/week workload for your staff (depending on your architecture and individual requirements).

3. DETAILED PROCESS

Testing of the technical Catena-X on-boarding with the gateway component EDC

3.1 Scope

As part of the connection process, there is an intense dialog between Lead Users and the so-called IT Enabler. Find more information on the involved roles in chapter 4. The infrastructures and interfaces of the Lead Users are identified and specified, requirements are documented, and the technology implementation is guided or carried out so that Lead Users can successfully exchange data based on the Catena-X technology. The IT Enabler supports the connection process on a technical level. In this context, *support* means that the IT Enabler provides the Lead User company with guidance, e. g. with an IT consultant who is remotely connected to an employee of the Lead User company. The IT Enabler helps with development, setup, operation, integration, and usage of the connector technology. This can include a step-by-step explanation how to set up the EDC or provision of running connectors.

The goal of the Lead User integration process (LUIP) for the Lead User company is to have a functional EDC in a test environment and to be able to exchange test data with the EDC of the IT Enabler as shown in Figure 3.

3.2 Process

The Lead User integration process consists of defined steps to meet the Lead User's requirements:

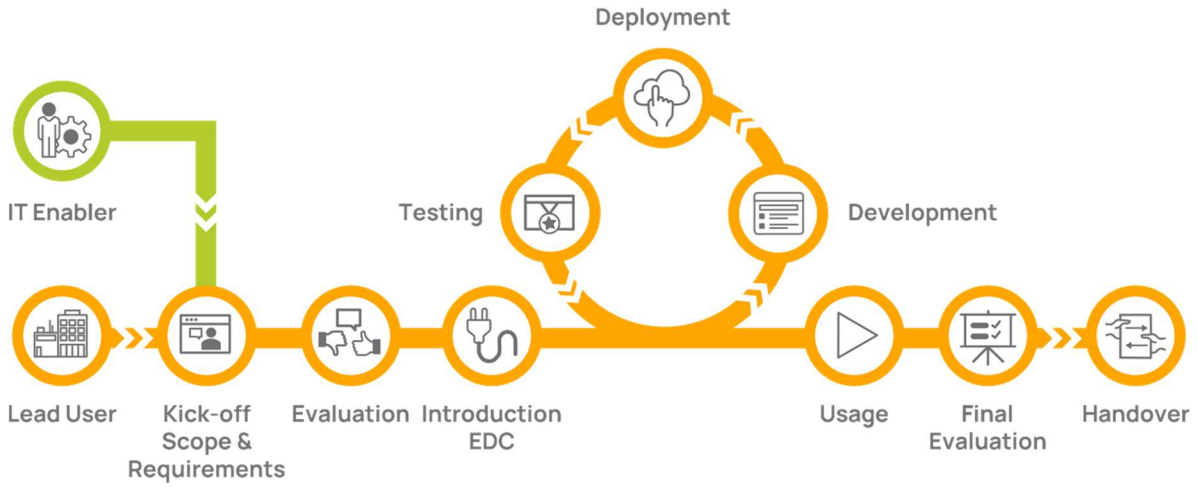

Figure 1: Lead User integration process

3.2.1 Kick-off Scope and Requirements

Scope	Description
Content	• Recap Catena-X DLR • Intro LUIP & Benefits • Scope & contents of the LUIP • Definition of contact person • Deriving follow-up process and determination of required people with the appropriate skills • IT interviews • Process of LUIP Q&A
Required participants	• IT consultant (IT Enabler) • Catena-X team • Management/decision makers in the companies (Lead User) • IT (Lead User)
Duration	1-2 sessions
Additional description	After the acquisition by the Catena-X team, the kick-off meeting with the IT Enabler takes place as well as first in-depth interviews on the IT infrastructure and the goals of the company with Catena-X. The aim is to understand the overall IT landscape of the company and the systems relevant for the connection, further narrowing down the scope of individual systems that are to be connected.
Outcome	At the end of the meeting, the potential Lead User should be able to decide if they want to participate in the Lead User integration and what resources/employees they need to do so.

3.2.2 Evaluation

Scope	Description
Content	• Evaluation of all known information to date • Finding an individual solution approach • Decision on further procedure • Discussion of the next steps (technical/organisational)
Required participants	• IT consultant (IT Enabler) • Decision makers (Lead User)
Duration	1 session
Outcome	At the end of the meeting, it should be determined if the potential Lead User wants to perform the Lead User integration process and they should be able to define an implementation team that can perform the technical implementation together with the IT Enabler.

3.2.3 Introduction EDC

Scope	Description
Content	• Data spaces • Role of EDC in Catena-X • Overall architecture of EDC • Deployment scenarios • Optional: (second) evaluation of capacity/IT
Required participants	• IT strategy/cloud implementation (Lead User) • IT implementation team (Lead User)
Typical duration	1 session (depending on IT skills)

3.2.4 Development

Scope	Description
Content	The following tasks will be performed by the IT employee (Lead User) under the direction of the IT Enabler: • GitHub code • Coding (compile Java, build docker images, build NPM packages) • Build configurations (credentials, EDC) • Setup of test data environment These steps can be taken over by IT Enabler in case of provision of connectors.
Required participants	• IT employee (Lead User) • IT consultant (IT Enabler)
Duration	1-2 sessions

3.2.5 Deployment

Scope	Description
Content	Necessary resources are created on cloud environment (e. g. Azure): • Push docker images (to container registries) • Create storage • Create vault (e. g. Azure vault) • Create and configure container instances (hostname, ports, volumes) Different cloud environments are available. The best experiences so far have been made with Azure environments. These steps can be taken over by IT Enabler in case of provision of connectors.
Required participants	• IT employee (Lead User) • IT consultant (IT Enabler)
Duration	1-2 sessions

3.2.6 Testing

Scope	Description
Content	In these steps, (test) systems of the Lead User are integrated and test data is sent between the EDC of the Lead User and the EDC of the IT Enabler to test the functionality of the EDC. At the end, the Lead User has access to a running connector. **IMPORTANT:** Synthetic data (single string, empty sample file) can be used as test data. It is not necessary to use "real" data! The whole test process takes place in a closed test environment. A connection to the production environment is not required.
Required participants	• IT employee (Lead User) • IT consultant (IT Enabler)
Duration	1 session

3.2.7 Usage

Scope	Description
Content	The Lead User is trained in usage of connector technology and can use the connector for data exchange in the test environment. This enables gathering experience, e. g. as preparation for use cases or for integration of various data sources and environments.
Required participants	• IT employee (Lead User) • IT consultant (IT Enabler)
Duration	variable

3.2.8 Final Evaluation

Scope	Description
Content	• Feedback questionnaire (sent ahead of the meeting) • Discussion of the questionnaire
Required participants	• Lead User's parties involved in each process
Duration	1 session
Additional information	Used for the summary of all lessons learned and best practices. This serves as the basis for the concept of operations and the handbook. Optionally, the Lead User can be involved in the production of success story marketing material such as videos.

3.2.9 Handover (optional)

Scope	Description
Content	Voluntarily according to interests: • Reference to current information events, deep dives, see also https://catena-x.net/en/news-dates • Customer panel (separate CX team) • Handover for use cases in the productive environment • Success stories (video) • Statements, comments (Catena-X web site)
Required participants	• Interested persons at the companies • Lead User team reference to contact persons

4. ROLES AND RESPONSIBILITIES

4.1 Lead User

A Lead User is a potential participant from the mid-market to join the Catena-X ecosystem in the future operating environment. This can usually be part of an industrial value chain and is set up as an SME or tier-n. In the Lead User integration process, the Lead User takes the role of a Catena-X participant and tests the EDC needed for later Catena-X applications.

Several parties are involved at the Lead User side:

Figure 2: Involved roles of the Lead User in the LUIP

4.1.1 Management

- Decision makers with authority to commit resources to the LUIP
- Insights on Catena-X strategy of specific company

4.1.2 IT implementation team

- Capabilities/competencies to implement EDC
- Knowledge e. g. on
  - Cloud technologies (e. g. Azure)
  - Containerisation/docker images, NPM packages
  - Java compilation
  - GitHub
  - Open-source software
- Authorisation/access to cloud infrastructures of Lead User (e. g. test environments)
- Capacity (time, resources) to conduct EDC implementation

4.1.3 Business team (optional)

- Insights/responsibility for use cases of Catena-X

4.2 Catena-X team

The Catena-X team consists of the consortium partners who have agreed on this work package according to the project description. Their tasks are to achieve the goals, milestones, coordination, and communication with the Catena-X development consortium.

DLR is the lead for the work package. Other consortium partners are also participating.

4.3 IT Enabler

The IT Enabler is a subcontracted project partner who supports the Lead User integration with his know-how. His task is the testing of the EDC with Lead Users. He also takes on an advisory role and supports the Lead Users throughout the entire connection process.

5. IDEAL PRECONDITIONS & TYPICAL TEST SCENARIO

5.1 Ideal preconditions

The LUIP can be performed with companies of different preconditions. Ideally, the Lead User is prepared with the following aspects:

- Technical preparation of infrastructure (tools, servers, infrastructure access, test data)
- IT strategy known (e. g. architectural principles, typical roll-out strategies)
- Management decision/champion for Catena-X testing
- Dedicated Catena-X team defined
- Resource commitment (capabilities and competencies)

These conditions are ideal and not mandatory.

5.2 Typical test scenario

Within the LUIP a test setup is created for the Lead User to gain experience with the EDC. Find more details on EDC in Chapter 6. Figure 3 shows the typical test scenario:

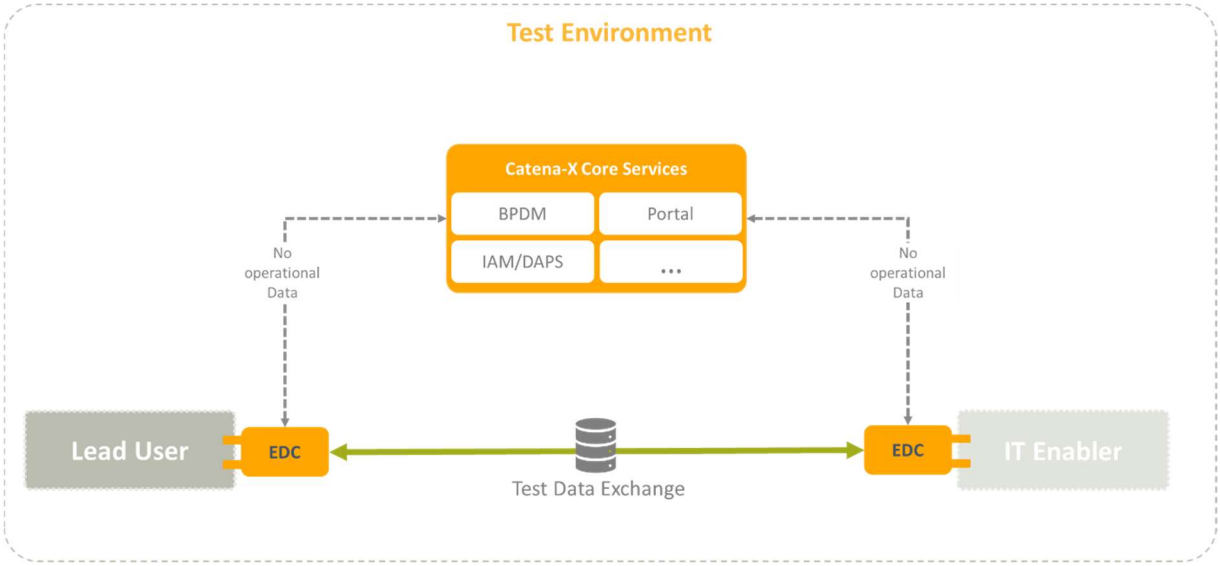

Figure 3: Typical test scenario within the Lead User integration process

The test scenario consists of two EDCs and the core services. The core services and one EDC are provided by the IT Enabler in the test scenario. The Lead User has a self-operated EDC, or a second connector provided by the IT Enabler. Test data is sent to test the functionality of the EDC and to get familiar with it. These can be synthetic data (single string, empty sample file).

IMPORTANT: A connection to a system from the productive back-end IT of the Lead User is *not necessary* and *not part of the LUIP* ! This can be done in a further step after consultation with the Catena-X team.

6. OVERVIEW EDC

Trust, interoperability, and data sovereignty, these are the objectives and values for secure and sustainable peer-to-peer data exchange between organisations and companies. Data sovereignty is at the core: Whoever makes data available retains control and decides individually who is involved in the data exchange, how, when, where, and under what conditions.

The EDC is the gateway component for Catena-X participation as it implements a framework agreement for sovereign, cross-organisational data exchange. The International Data Spaces (IDS) standard and relevant principles in connection with Gaia-X are implemented. The connector is designed to be extensible to support alternative protocols, to be integrated into different ecosystems and use cases.

The objective is to set-up a decentralised software component on the part of each respective partner, which bundles the skills required to participate in a data space and enables peer-to-peer connections between participants. The connector enables data sovereignty of the independent companies. The functionality required for this is developed and bundled in the open-source project Eclipse Dataspace Components, to which the Catena-X partners contribute as part of the Eclipse Foundation.

The EDC is used to sovereignly exchange data between companies and to fulfil their Catena-X use cases. It is the backbone for each data exchange via Catena-X. Figure 4 shows the role of the EDC.

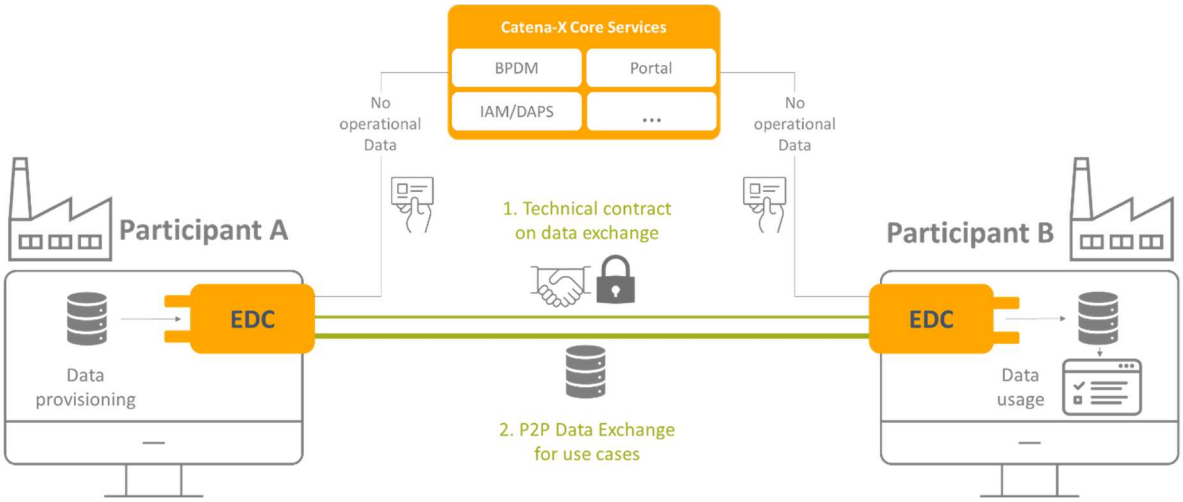

Figure 4: Role of EDC in data spaces at Catena-X

In Catena-X EDCs are connected to core services. They cover core network functions such as authentication and identity management. Connectors only exchange non-operational data with the core services. The exchange of operational data takes place between the two connectors. Each data exchange happens based on predefined usage conditions which are to be accepted and signed in a technical contract between the two connectors to establish the actual exchange.

The range of integration layers and extensions for further use cases is constantly growing.

Find more information on the EDC at:
https://catena-x.net/en/offers/edc-the-central-component
https://eclipse-tractusx.github.io/docs/category/connector-kit

7. APPENDIX

7.1 List of figures

7.2 List of abbreviations

CX	Catena-X
DLR	Deutsches Zentrum für Luft- und Raumfahrt (German Aerospace Center)
EDC	Eclipse Data Space Connector
IDS	International Data Spaces
IT	Information Technology
LUIP	Lead User Integration Process
NPM	Node Package Manager
OEM	Original Equipment Manufacturer
Q&A	Questions and Answers
SME	Small and medium-sized enterprise
Tier-n	Company with an upstream position equal or bigger than one in the value chain (counting from OEM)

7.3 Bibliography

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7.4 Contributing authors/companies

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