December 8, 2021 | 4:15 – 6 pm CET

Workshop: Implementing IDS Connectors - First Step Towards Data Sovereignty

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December
7 to 9, 2021

2nd Data Sharing Winter School

Next mobility – smart data sharing to move goods and people

Co-organizers:

Co-hosts:

Agenda

INTERNATIONAL DATA SPACES ASSOCIATION

What is this Workshop all about?

- 16:15 Project Overview + Q&A
- 16:45 Introduction to Samples (Sample 1)
- 17:00 Working Phase (Samples 2 + 3)
- 17:30 Guided Walkthrough (Sample 4)
- 17:45 Questions
- 18:00 End

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Eclipse Dataspace Connector

Project Overview · Julia Pampus

Background

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Dataspace Connector

- IDS Connector reference implementation developed by Fraunhofer ISST
- Open-source project supported by IDSA
- Used in various projects (research and industry) and use cases
  - » Mobility Data Space: data sharing community to build future of mobility
  - » Catena-X Automotive Network: alliance for secure and standardized data exchange along the automotive value chain

Motivation

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New Challenges

- Different architectures and implementations for data space services
  - » Organizations participate in various data spaces
  - » Connection and interoperability with multiple data spaces
  - » Identity across multiple jurisdictions
- Catena-X, MDS, and other initiatives present new data sharing challenges
  - » Support for data flow and transfer protocols to handle diverse data types
    - » Push, Streaming, Large Volumes, Realtime
  - » Cataloging across many providers
  - » Policy management that traverses multiple infrastructure layers
  - » Need for extensibility and modularity to accommodate diverse needs and use cases

Open Source Project

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Goals

- Framework to address key data sharing use cases
  - » Architecture and project for many interested parties to collaborate on
  - » Provide platform to implement new ideas and use cases
  - » Help evolve IDS and GAIA-X
- Data exchange endpoint in a federated data system, or Dataspace
- Focus on data transfer (**sharing**) and policy management (**sovereignty**)
- Open source project
  - » Eclipse Foundation
  - » Joining knowledge, people, and code bases
  - » Based on Dataspace Connector (Fraunhofer) and Data Appliance GX (Microsoft)

Contributors

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Initial Committers

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Alexandru Danciu
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Florian Seidel
Amazon AWS

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Werner Jost
Deutsche Telekom AG

Franco Wolf
ZF Friedrichshafen AG

Jim Marino
Microsoft

Features

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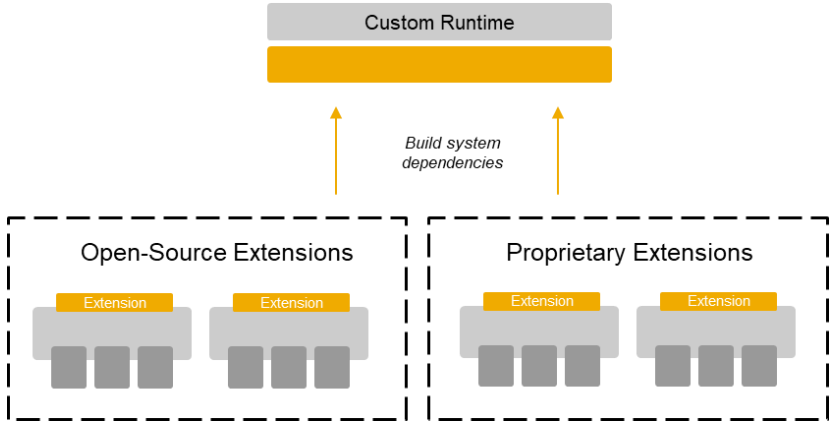
Key Design Principles and Features

- Based on a simple modularity system
- Separate control and data planes
- System is asynchronous and highly available
- Transfer processes are fully auditable
- Eliminate single points of failure
- Cloud aware policy enforcement and projection
- System security

The EDC …

… is modular and extensible



- Java-based Gradle multi-module project
- Modules are assembled into a runtime
- Data cataloging handled by external system
  - » e.g., Apache Atlas
  - » Modularity allows this to be substituted
- Data transfer and storage performed out of band
  - » Modularity allows this to be substituted or augmented
    - » Ability to add multiple transfer mechanisms to support diverse data types
  - » Solves key aspects of how to handle streaming, large data transfer, and hyper scaling

The EDC …

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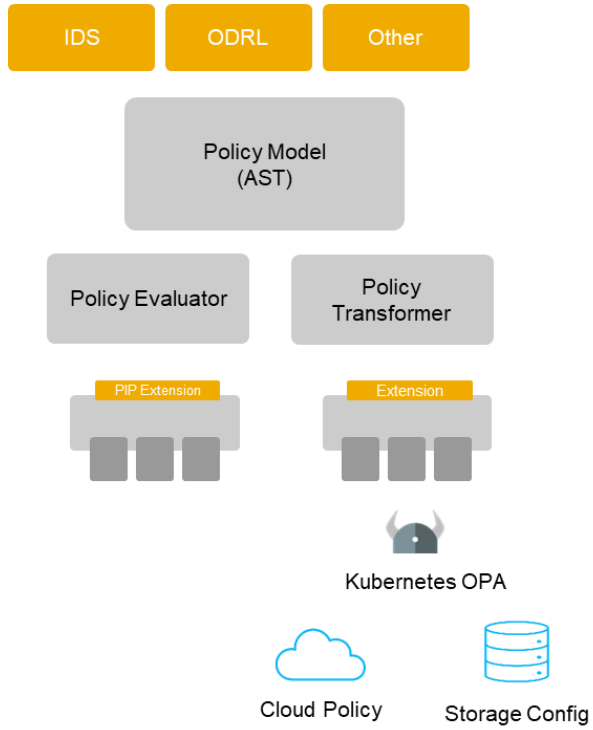
… is a coordinator

- Processes are modeled as persistent state machines
  - » Nearly symmetric on the consumer and provider connector
  - » Includes states for initiation, receipt, resource provisioning, transfer, and termination
    - » State transitions happen asynchronously after a defined task is completed
    - » Tasks must be idempotent for reliability
  - » Processes are persisted to a store
    - » Highly available database with geographic fail over, or a simple in-memory map
- Provides a foundation for full observability and data audit
  - » Metadata about each state is recorded
  - » Observability by correlating the process id with separate telemetry data

The EDC …

… provides cloud-aware policy enforcement



- Policy engine that is cloud aware
  - » Not limited to the connector
  - » Can be embedded in other processes
- Horizontal and vertical enforcement
- Parses policy syntax into an internal Policy Model AST
- Evaluators and transformers to enforce policy
  - » Evaluators can make policy decisions, e.g. is a connector authorized
  - » Transformers can create and deploy policy to different levels (OPA, storage, etc.)

Status-Quo and Roadmap

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Latest Changes

- Official Eclipse project since June 2021
  - » Initial contribution has been made, checked and approved by Eclipse Foundation
- Current results
  - » Provide assets (IDS compliant self-description and contract offers)
  - » OAuth2 and SSI authentication
  - » Data flow, transfer and resource provision
  - » Policy negotiation (IDS messaging protocol) and contract-aware data transfer
  - » Provide samples for different use cases
  - » Release of EDC v0.0.1-SNAPSHOT (maven artifacts)
- Q1/2022: 3rd EDC Hackathon

Key Takeaways

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The EDC …

- … is **completely FOSS** supported by various companies.
- … has clear and **accepted governance** structure & community processes.
- … is **more than connecting a database**.
- … manages **data transfer and flow** including **management of contracts and policies** in **cloud-native** environments.
- … follows a **modular system** to serve as facilitator.

We have a good foundation already present on **GitHub**. There is still work to do. We **welcome everyone** to drive the idea and grow the community!

Contact Information

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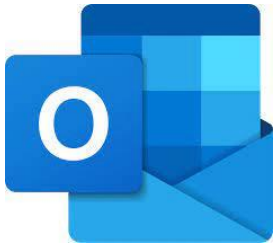
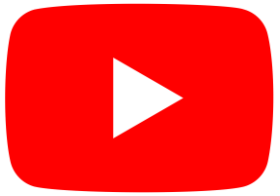
Important Links





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Eclipse Dataspace Connector

Hands-on · Ronja Quensel

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Any Questions?

Share Your Comments & Thoughts

Contact

Thank You For Your Attention!

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