Making Industry 4.0 easy with Eclipse BaSyx

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It is not the strongest or the most intelligent who will survive but those who can best manage change.
— Charles Darwin
Service-based Production

Process Steps

Milling \rightarrow Joining \rightarrow Packaging

Service Interface

Device

PLC Behaviour

Device

Device

Device
What is BaSys 4.2?

National Reference Project
- 19 partners, coordinated by Fraunhofer IESE
- Goal: Manufacturer independent interoperability based on Asset Administration Shells
- Runtime: 07/2019 – 06/2022

Open Source
- Eclipse Open-Source Projekt: www.eclipse.org/basyx
BaSys 4.2 Building Blocks

**Virtual Automation Bus**
- End-to-end communication
- Communication spanning different networks and protocols

**Control Components**
- Changeable production

**Asset Administration Shell (Digital Twin)**
- Digital representation of assets
- Independent of manufacturer
- Standardized

**Sub Models**
- Provide information in a structured way
- Topology
- Device Services

- NRTNL (Non Realtime Network Layer)
- RTNL (Realtime Network Layer)
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**Digital representation of assets**

- **Independent of Manufacturer**
  - Standardized Interface

- **For all relevant entities**
  - Product, Devices, Worker
  - Central Industrie 4.0 component
BaSys 4.0 – Changeable Production

- Required services (=Recipe)
- Service Parameters
- Provided Services

- Mapping between recipe and device services
Eclipse BaSyx

Open Source
- Eclipse Open-Source Projekt: www.eclipse.org/basyx
- License: Eclipse Public License 2.0

SDK (Java/C++/C#)
- Asset Administration Shell
- Communication

Off-the-Shelf Komponenten
- Registry
- AAS Server
Asset Administration Shell Infrastructure
Asset Administration Shell Infrastructure

(1) Uploads AAS/Submodel

(2) Registers AAS/Submodels
Artifacts of Eclipse BaSyx

- SwaggerHub: OpenAPI Documentation of all Components
- Maven Central (Java): SDK/Component Jar
- NuGet (C#): SDK
- DockerHub
  - Registry-Image
  - VWS-Server-Image
- Technology Compatibility Kit
  - Registry-TCK
  - AAS-Server-TCK
- Introductory Videos
Tooling – AASX Package Explorer
Summary

- Eclipse BaSyx enables quick start with Asset Administration Shells
- Lots of resources that enable easy start
- Usable in commercial products
- Easy adaptation due to open source