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The Glue for Seamless
Automation Engineering

Application Recommendation Automation Project Configuration

Exchange of ECAD Data between EPLAN P8 and Siemens TIA Portal

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Motivation

Architecture

Demonstration

Further Activities



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Motivation

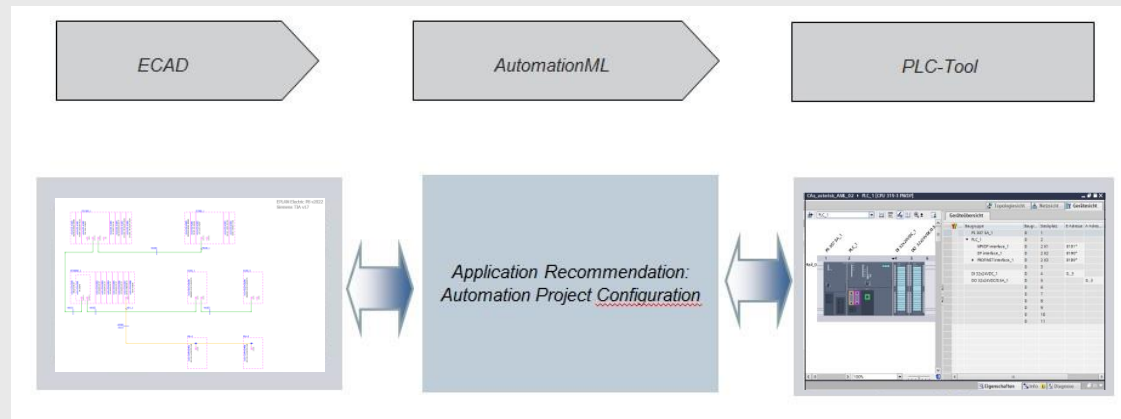
Architecture

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ECAD and PLC-Tools

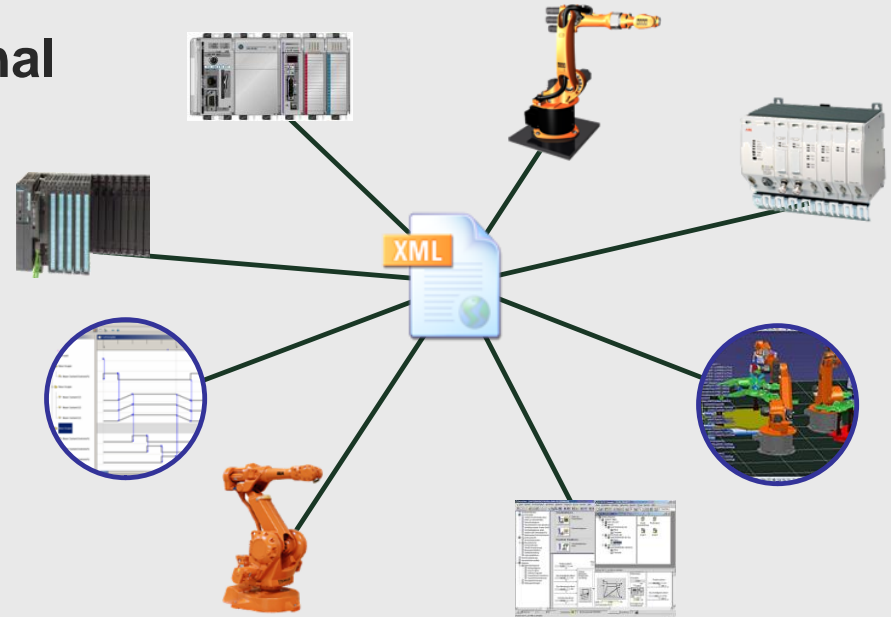
- **ECAD tools and PLC tools have different views of automation system information**
 - ECAD tools handle detailed physical information of devices applied within automation systems
 - PLC tools use a logical compilation of the automation devices
- ➔ A recommendation shall define the data exchange between ECAD and PLC-Tools



Aims of AutomationML

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- AutomationML is a XML based data format.
- AutomationML is an international standard and available free of fee (IEC 62714)
- AutomationML allows consistent data exchange along different tool chains.
- AutomationML now allows consistent data exchange between different ECAD and PLC manufacturers.



**AR APC: Application Recommendation
Automation Project Configuration**



SIEMENS

User benefit

- Type data in only one time!
 - Efficiency > Short time to market 🕒
 - Accurate information > Avoiding mistakes €
 - Automated communication > Integrated workflow 🕒 €
 - Fast & detailed information > Change management 🕒 €



Save 🕒 & € with this concept!



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- **AutomationML Objects are defined in RoleClassLibraries**
 - AutomationMLBaseRoleClassLib
 - Group, Facet, Port, Ressource, Product, Process, Structure, PropertySet
 - CommunicationRoleClassLib
 - Physical and Logical Devices and Connections
- **AutomationProjectConfigurationRoleClassLib**
 - Devices and DeviceItems
 - Tags, TagTables and TagFolders
 - Subnets, Nodes, IoSystems, CommunicationPorts
 - ...



All these roles are derived from the
AutomationMLBaseRoleClassLib and
CommunicationRoleClassLib

- **PLC-specific interfaces of the different PLC and ECAD manufacturers must be decoupled**
 - Independence of further development of PLC- and ECAD-Tools
 - Openess for future PLC modules
- **Using a neutral model allows**
 - Definition of PLC-Tool independent roles in AutomationML
 - Definition of PLC-specific Classes for different ECAD- and PLC-Tools / vendors in AutomationML.
 - Definition of PLC-specific InterfaceClasses in AutomationML

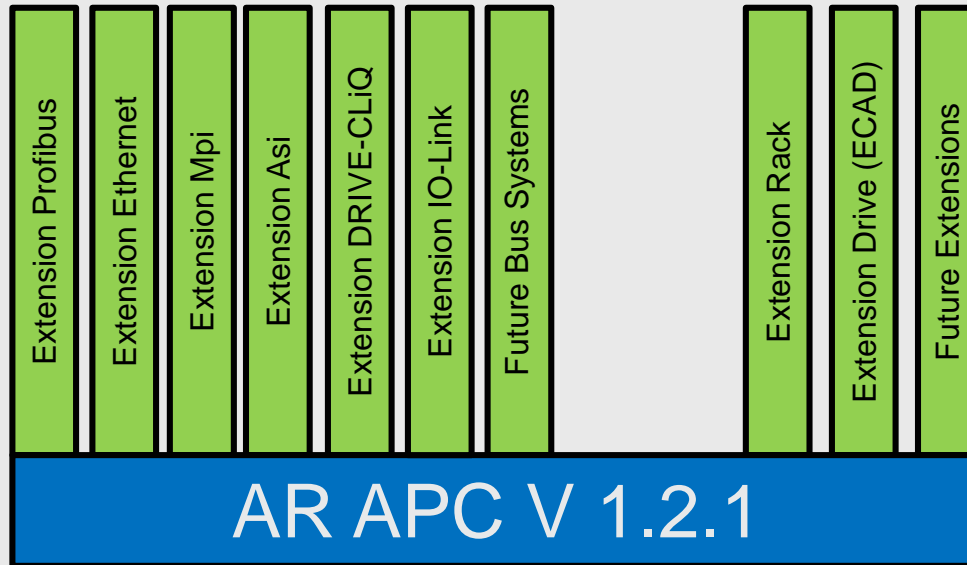


Mapping was defined for data exchange between tools

- **Consideration of already existing formats of PLC manufacturers leads to these objects (abstract):**
 - **Device**
 - collection in which the individual HW objects like racks are brought together
 - **DeviceItem**
 - is aggregated by a Device and represents an object class for HW modules and submodules (CPU, I/O module, etc.)
 - **Tag**
 - represents the symbolic name of an I/O data
 - **Channel**
 - is part of an IO module and represents the process interface (e.g. digital or analogue input/output)
 - **Node**
 - specifies all the interface related networking information of a network node. (e.g. logical address, subnet mask)

...Please refer to AR APC for more details, attributes and the UML-model

AR APC – Document Structure



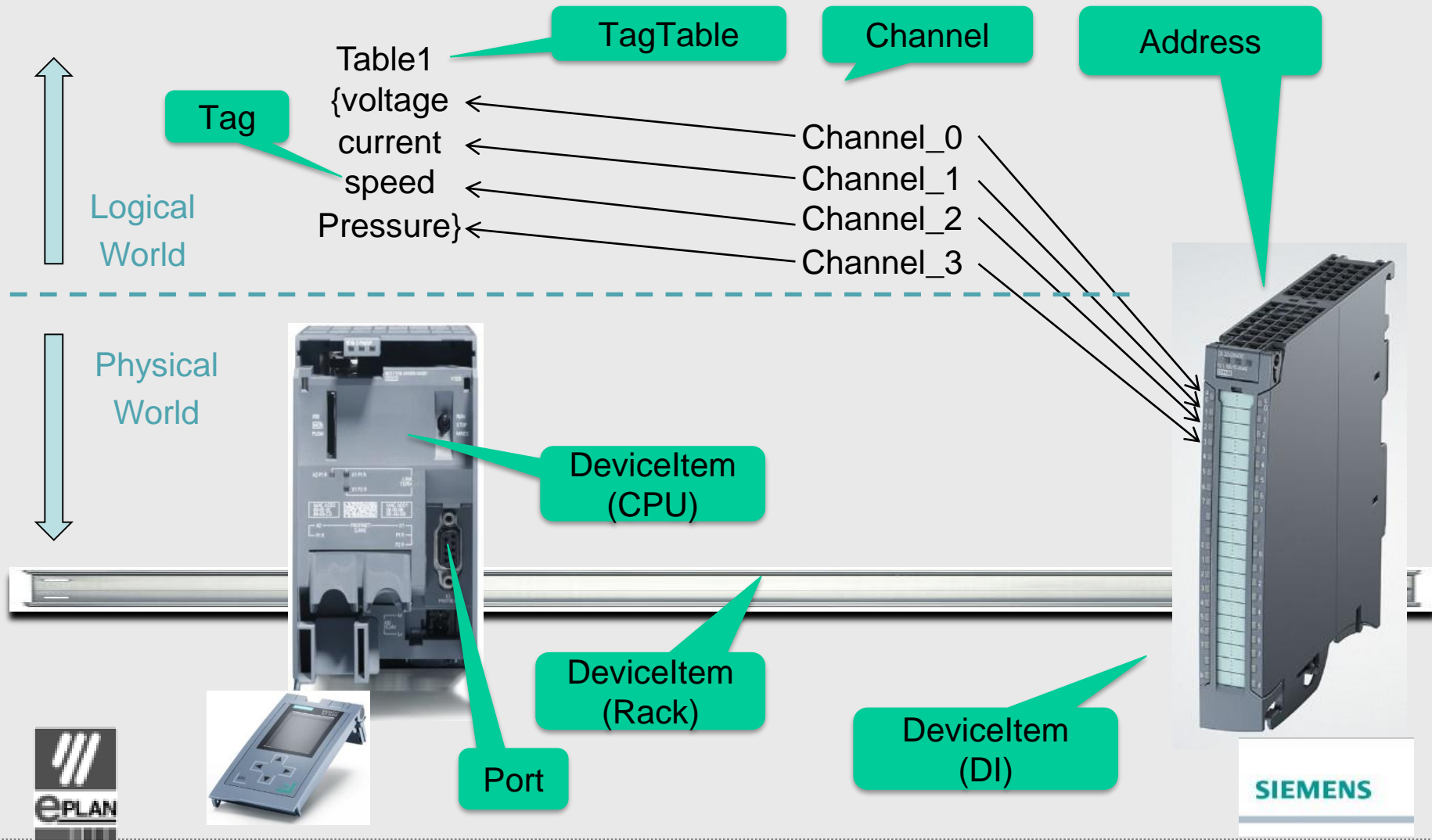
■ Document Structure

- AR APC* defines the basic architecture
- ARE* APCs define specific extensions for bus systems and new HW components
- This modular document structure allows dynamic development of new extensions

*AR: Application Recommendation

*ARE: Application Recommendation Extension

AR APC Objects in a Nutshell





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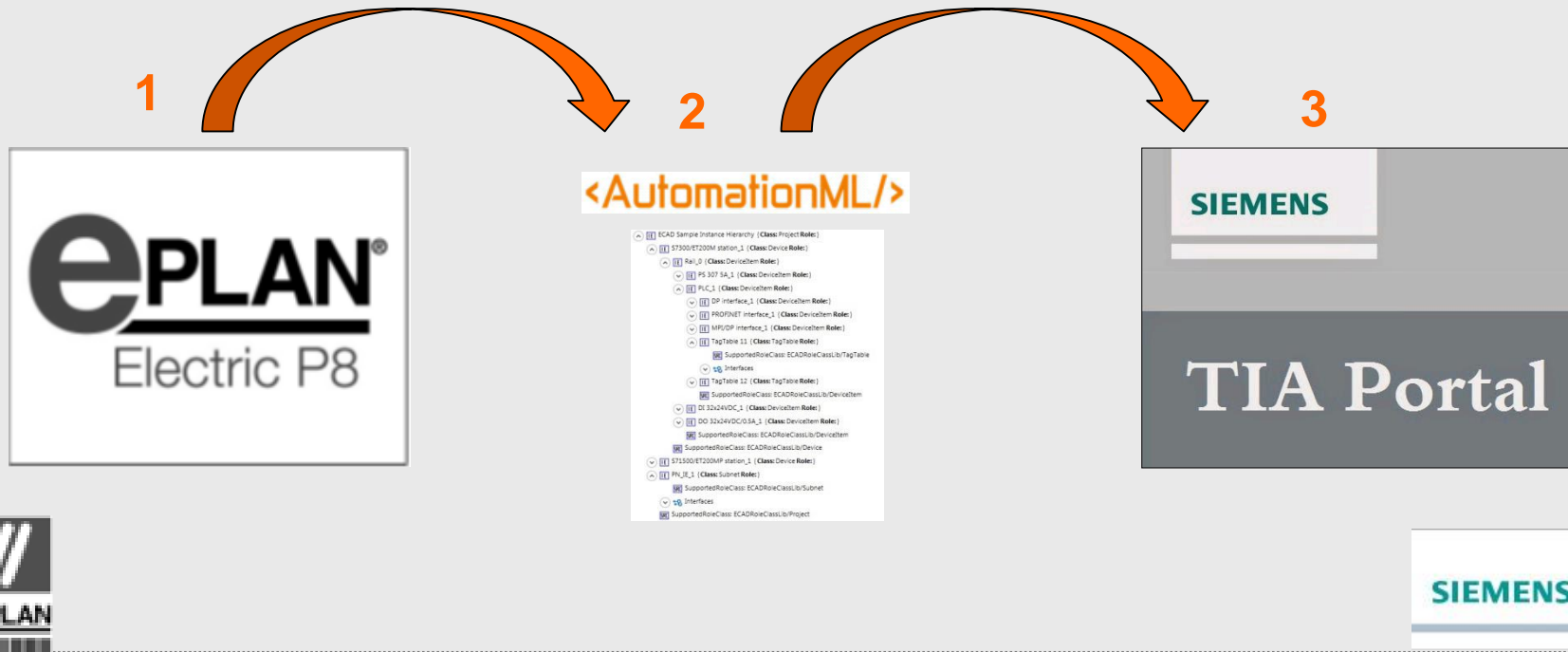
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AR APC Demonstration

- **Live Demo in EPLAN Electric P8 and Siemens TIA-Portal**
 1. Edit an EPLAN Electric P8 Project
 2. Export EPLAN Electric P8 to AutomationML and show AutomationML-File
 3. Import AutomationML File into Siemens TIA-Portal and show result



AR APC Demonstration Video & further links

- **Available Videos**

- Dataexchange between EPLAN and SIEMENS

<https://www.youtube.com/watch?v=jON8eY8e62A>

- **Further links**

- AutomationML-Homepage (<https://www.automationml.org>)

- AR APC-Documentation

(<https://www.automationml.org/download-archive/>)

or direct:

(https://www.automationml.org/wp-content/uploads/2021/08/AR-APC-1_2_1.zip)



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Further Activities

- **Extension of functionality**
 - Integration of new HW components and extensions
 - Expanding current format with new objects and attributes

Who is using this format?

- **PLC-vendors using this format**
 - Siemens (TIA Selection Tool & TIA Portal V14 SP1 and upwards)
 - Mitsubishi (iQ Works 2.46Y and upwards)
 - Rockwell (Rockwell Automation Studio 5000)
 - Phoenix Contact (PLCnext Engineer 2019)
 - Beckhoff (TwinCAT 3)
 - and others...

- **ECAD-vendors using this format**
 - EPLAN (EPLAN Electric P8 V2.7 and upwards)
 - and others...

The background of the top banner features a blue-tinted image of industrial automation. On the left, a robotic arm is visible. In the center, there's a car body. On the right, a control panel with a screen and buttons is shown.

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Thank you for your Attention

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