OPC Unified Architecture

OPC UA for Devices (Part 100)
FDI (Field Device Integration) – Initially called ECT (EDD Cooperation Team)
- Addresses Field Devices in Process Automation (Profibus, Profinet, FF, HART)
- FDI Packages from Device Vendors with Device Descriptions (EDDs)
- FDI Server manages Field Devices from many vendors
- OPC UA as base for Information Model

OPC UA for Devices (DI – Device Integration) (v1.01)
- Common Features for Device Modelling (not FDI Specific)
- Can be base for any Specification dealing with Devices

FDI
- OPC UA for Analyzer Devices (ADI)
- OPC UA for IEC 61131-3 (PLCOpen)
- OPC UA for AutoID Devices
- OPC UA for Tobacco Machines

EUROMAP (Injection Moulding Machines)
- Commercial Kitchen Devices (HKI)
- FDT
- CSP+
- BACnet
- Robotics
- MTConnect
- OPC UA for IO-Link

Version 1.02 in development
What is addressed by OPC UA for Devices (v1.01)?

- Device Identification (name plate)
- Device Health
- Parameter and Command Organization
- Device Support Information
- Online / Offline Handling
- Network Topology
- Locking
- Block-based / Modular Devices
Use Cases for OPC UA for Devices

Devices can provide an integrated OPC UA server for

- Configuration
- Diagnostic
- Access to online data, events and state machines
- Online access to device information – no consistency problems

Engineering system can provide OPC UA server to configure all devices of a plant – also for offline configuration

- Standard entry-point (DeviceSet): Find all devices of server

Features / advantages for all use cases

- Defined way to structure and expose information
- Self-describing model
- Client can browse the model and adapt access based on the knowledge about the model

Generic configuration, diagnostic and asset management clients can be used to configure and maintain the device
Standardized View on Device Data

Generic View

OPC UA for Devices View

Devices

Properties

Grouping

Parameters

Grouping of Parameters

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Device / Machine Identification

> **DeviceType** defines properties for name plate
  > SerialNumber
  > Manufacturer
  > Model
  > DeviceRevision
  > SoftwareRevision
  > HardwareRevision
  > RevisionCounter
  > DeviceClass

> **Can be extended**

> **Version 1.02 might extend list with**
  > CustomerName
  > ArticleNumber
  > ReferenceDesignation (Location)

Examples from
- HKI
- AutoID
- EUROMAP 77
Parameter and Command Organization

Grouping Elements (can be nested)

FunctionalGroupType: ProcessData
- Temperature
- TemperatureSetpoint
- ChangeSetpoint

FunctionalGroupType: Configuration
- RunState
- Start
- Stop

TemperateControllerType: Device1

BaseObjectType: ParameterSet

BaseObjectType: MethodSet

Flat list of all parameters

Flat list of all commands

Commands and parameters can be referenced by several grouping elements

Pros
- Suitable for managing list of unique parameters

Cons
- Not object-oriented
- Managing components having same parameters (see Blocks and Modular Devices)

=> Can but does not have to be used
What will be addressed in Version 1.02?

<table>
<thead>
<tr>
<th>Harmonizing usage of several Information Models based on OPC UA for Devices</th>
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<tbody>
<tr>
<td>Firmware Update</td>
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<tr>
<td>Extensions to Identification</td>
</tr>
<tr>
<td>• Article Number, Location Information, Customer Name, …</td>
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<tr>
<td>Standardized Grouping</td>
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<tr>
<td>• Configuration, Tuning, Maintenance, Diagnostics, Statistics, …</td>
</tr>
<tr>
<td>Ethernet Network Configuration -&gt; Will go to Part 5</td>
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<tr>
<td>Usage of new Interface concept (will be defined in base spec)</td>
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<tr>
<td>• Health, Identification, Device Support Information (Documentation, etc.)</td>
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<tr>
<td>Potentially (probably in later versions)</td>
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<tr>
<td>• Initial Device Setup (incl. device identification and security)</td>
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<tr>
<td>• Physical Network and Logical Network representation</td>
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<td>• Alarm Handling</td>
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<tr>
<td>• Black-box Backup and Restore of Device Configuration</td>
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</tbody>
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Conclusion

OPC UA for Devices provides standardized

- Device Identification (new as Interface)
- Device Health (new as Interface)
- Device Support Information (new as Interface)
- List-oriented Parameter management
- Locking (AddIn)
- Offline / Online Data Transfer (AddIn)
- Block-oriented / Modular Devices
- Topology Management

Companion Specs can pick and choose

- Use things that make sense
- Do not use things not needed (e.g. Topology Management)
- Derive from Base Types or use AddIns / Interfaces