

Simulating OPC UA Information Models

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13.11.2018

OPC Day Finland 2018



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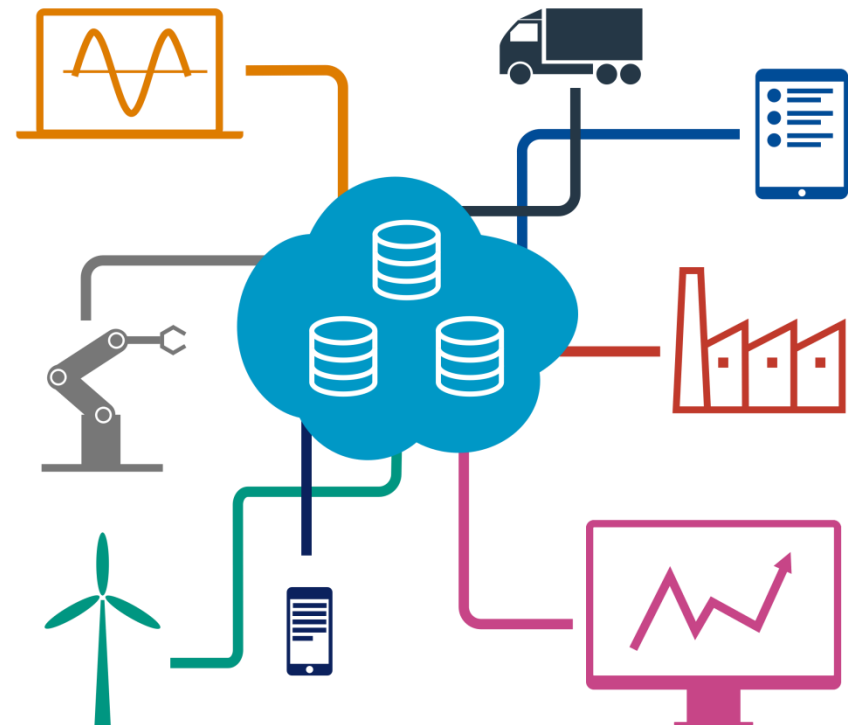
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The Industrial Internet / IoT

Prosys OPC UA software products offer multiplatform capabilities, making them ideal building blocks of any networked system

- OPC UA connectivity
- Sensor data
- Smart devices
- Big data
- Analytics
- Optimization
- Automation



Prosys OPC UA Multiplatform Products



OPC UA
Java SDK



OPC UA
Client



OPC UA
Historian



OPC UA
Client for Android



OPC UA
Modbus Server



OPC UA
Simulation Server



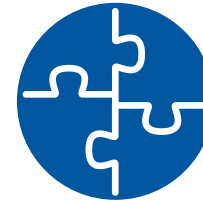
Professional Services



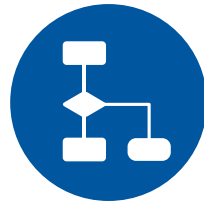
QuickStart



Training & Workshops



System Integration



Design & Development



Product Certification



Consulting



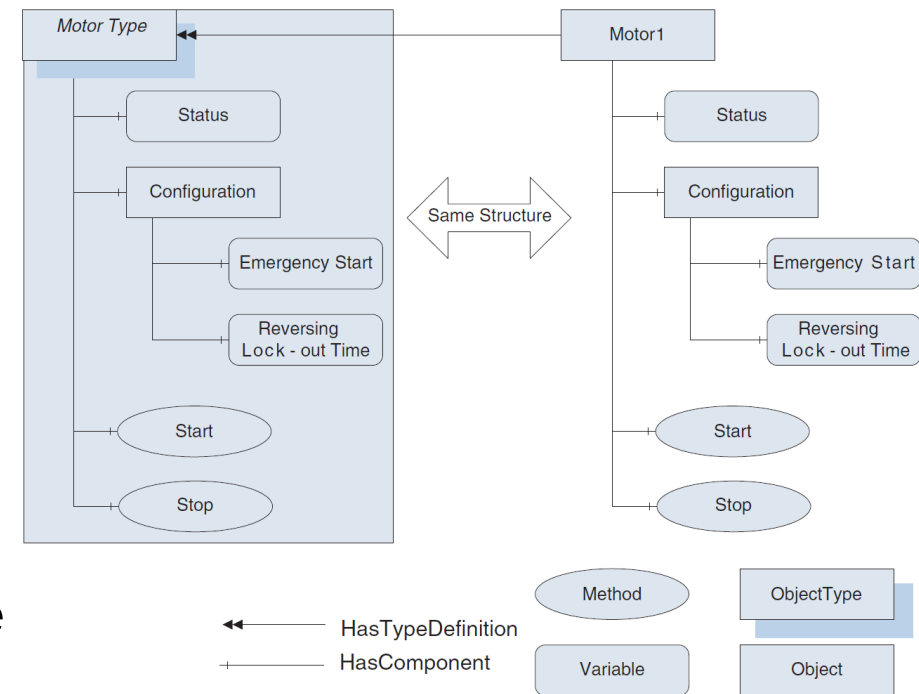
OPC UA Workshop

- One, two or three days of training
- Covers the basics of OPC UA for experts and software developers



OPC UA Address Space Model

- Server Address Space consists of Nodes
 - Types
 - Objects
- Nodes are connected with References
- Types are abstract presentations of Objects
 - Define a structure
 - Objects follow the same structure



OPC UA Information Models

- Presentations of Semantic Models (=Types)
 - Use the concepts of the OPC UA Address Space Model
- OPC UA Standard Model
 - Base model
- Companion Models
 - Domain specific models: PLCopen, ISA-95, PackML, etc.
- Custom Models
 - Vendor specific models



Prosys OPC UA Simulation Server

- OPC UA Server with Graphical UI
- Developed using Prosys OPC UA Java SDK
- Test tool for offline client development
- Simulation of simple data

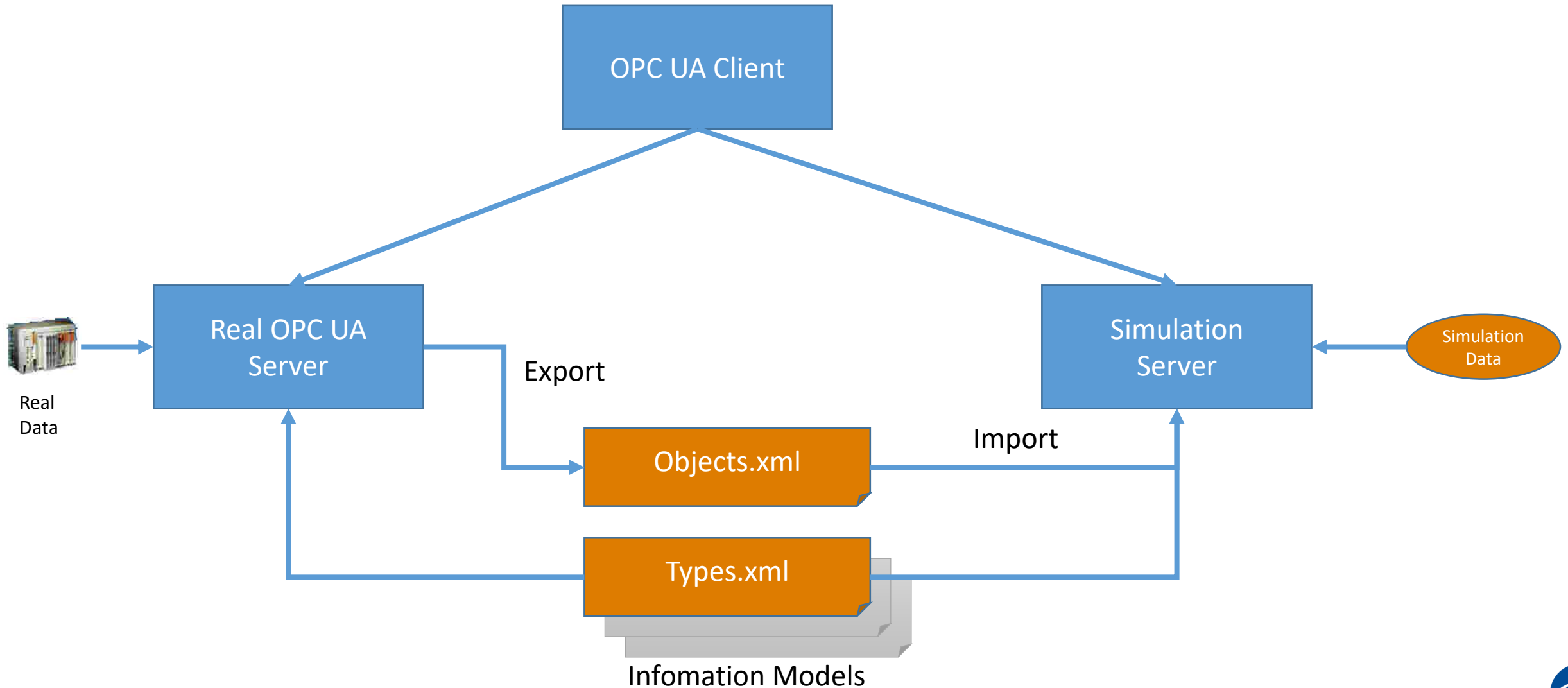


Objective

- Realistic reflection of a real production server
 - Support Information Models (Types)
 - Customized Address Space Structure (Objects)
 - Simulate Data in Objects

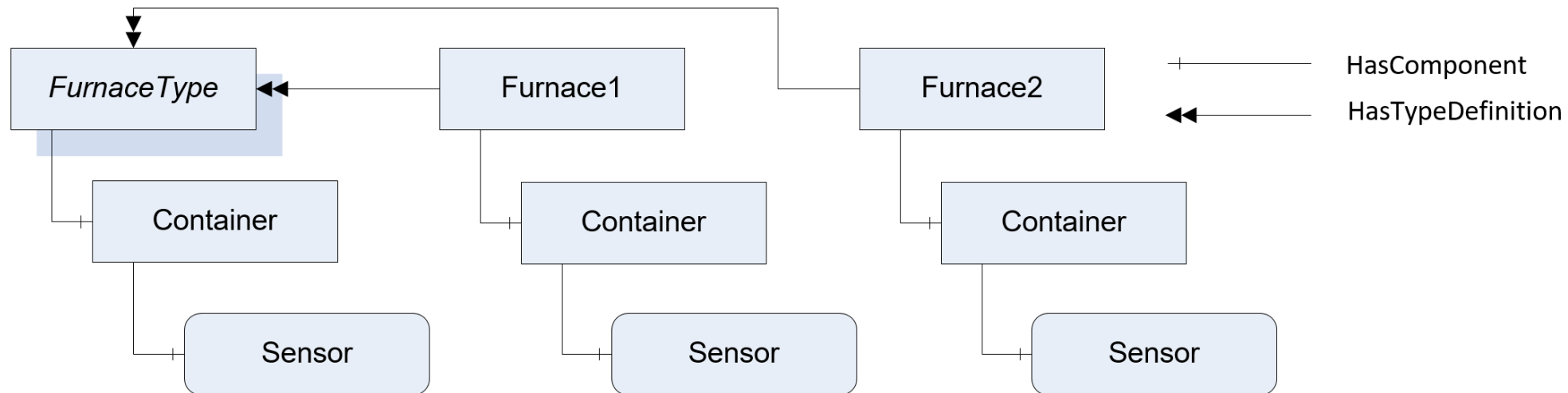


Objective: Simulate Any OPC UA Server



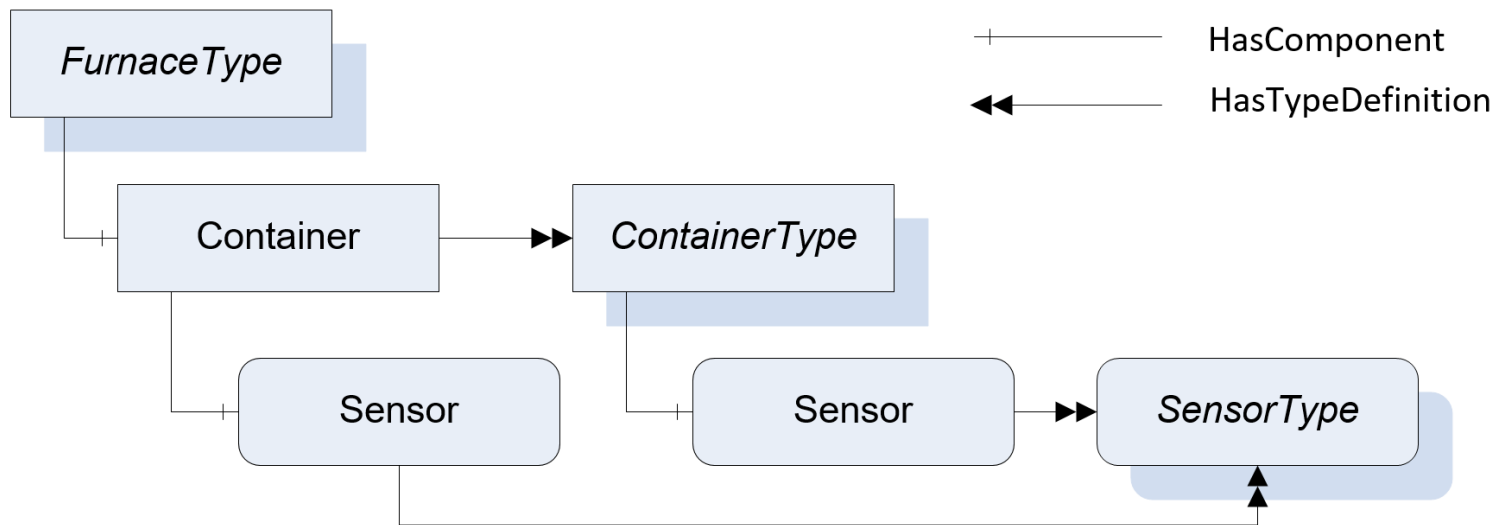
Configuring simulation signals

- Configuring Types
 - Base configuration for all Objects of specific types
 - Simulating instances using TypeDefinition configurations
- Configuring Objects
 - Overriding type configurations



Advanced configuration of signals

- Type configurations can be utilized recursively
- More options for type-based simulation
- Configuration of the most specific TypeDefinition of an instance dominates



Simulation Server in practice

Prosys OPC UA Simulation Server

Help

Status Endpoints Users Sessions Certificates Connection Log Address Space Simulation Debug Log Req/Res Log

Run Simulation Interval (ms): 1000 Simulation Time: 05.11.2018 16:44:50.000

Node	Value	Signal Type	Visualize	DataType
▼ BaseObjectType			<input type="checkbox"/>	
▶ AggregateConfigurationType			<input type="checkbox"/>	
▶ AggregateFunctionType			<input type="checkbox"/>	
▶ BaseConditionClassType			<input type="checkbox"/>	
▶ BaseEventType			<input type="checkbox"/>	
▶ CertificateGroupType			<input type="checkbox"/>	
▶ CertificateType			<input type="checkbox"/>	
▶ DataTypeEncodingType			<input type="checkbox"/>	
▶ DataTypeSystemType			<input type="checkbox"/>	
▶ FileType			<input type="checkbox"/>	
▶ FolderType			<input type="checkbox"/>	
▼ FurnaceType			<input type="checkbox"/>	
▼ Container	null		<input type="checkbox"/>	Double
▼ Sensor	0.0	Counter	<input type="checkbox"/>	Double

150
100
50
0
16:41:30 EET

Show Legend Animated Symbols Show data for last (seconds) 60

Running vnull



Simulation Server in practice

The screenshot shows the Prosys OPC UA Simulation Server interface. At the top, there are tabs for Help, Status, Endpoints, Users, Sessions, Certificates, Connection Log, Address Space, Simulation, Debug Log, and Req/Res Log. Below the tabs, there is a 'Run Simulation' checkbox which is checked, an 'Interval (ms)' field set to 1000, and a 'Simulation Time' field showing 05.11.2018 16:47:12.000.

Node	Value	Signal Type	Visualize	DataType
Objects			<input type="checkbox"/>	
Furnace1			<input type="checkbox"/>	
Container	null		<input type="checkbox"/>	Double
Sensor	57.0	Counter	<input type="checkbox"/>	Double
Furnace2			<input type="checkbox"/>	
Container	null		<input type="checkbox"/>	Double
Sensor	57.0	Counter	<input type="checkbox"/>	Double
MyBigNodeManager			<input type="checkbox"/>	
MyObjects			<input type="checkbox"/>	
NonUaNodeComplianceTest			<input type="checkbox"/>	
Server			<input type="checkbox"/>	
Simulation			<input type="checkbox"/>	
StaticData			<input type="checkbox"/>	

Below the table is a graph area with a vertical axis ranging from 0 to 125. The current time is 16:41:30 EET. At the bottom, there are checkboxes for 'Show Legend', 'Animated', and 'Symbols', and a 'Show data for last (seconds)' field set to 60. The status bar at the bottom left says 'Running' and the bottom right says 'vnull'.



Conclusions

- Simulating a real production server in a test environment
 - Custom Information Models
 - Complex simulated data
 - Flexible configuration of simulation signals
- Future development
 - More accurate simulation models
 - Simulation not restricted to Node values



Questions?

