



From theory to practice: Usage of companion specification in PLC

Christian Hock SIEMENS Ingenuity for life

It's all about data, but with OPC UA ...





OPC UA Informationsmodel





OPC UA Informationsmodel





OPC UA Informationsmodel – Create Instances



ProductionEquipmentType



One or multiple Instances of Type ProductionEquipmentType



Instance

OPC UA Informationsmodel – Mapping with PLC Data



Siemens OPC UA Modeling Editor - SiOME = SIEMENS

SiOME - OPC UA Modeling Editor Ingenuity for Life offline 🛨 🛨 🖬 💽 🛹 Show all Information model TIA Portal Attributes × ▼ OPC Root ns=1:i=1035 OPC Day.ap15 1 (connected) Nodeld NUMERIC ▼ OP¢ Objects ▼ ___ PLC_1 identifierType -▼ OP¢ Audi WerkSpec PLC tags 1035 **→** value 🔻 🧯 ProductionEqui 1: Audi WerkSpec 🔻 🔙 Program blocks namespace -DeviceManual (String) "ProductionEquipment"."DeviceManual" Production Data Object **→** NodeClass ProductionEquipmer DeviceRevision (String) "ProductionEquipment"."DeviceRevision" BrowseName 1:ProductionEquipment "ProductionEquipment"."Diagnostics" ProductionEquipment 1: Audi WerkSpec Diagnostics (1:typeDiagnostics) namespaceIndex -▶ =♦ GetStatus "GetStatus DB".Method 💷 DeviceManual (WString) ProductionEquipment name HardwareRevision (String) "ProductionEquipment"."HardwareRevision" ProductionEquipment DeviceRevision (WString) DisplavName \checkmark "ProductionEquipment"."IMVersion" IMVersion (1:typeVersionDataType Diagnostics ("typeDiagnostics") ProductionEquipment text ItemDesignation (String) "ProductionEquipment"."ItemDesignation" HardwareRevision (WString) locale ~ 💷 Manufacturer (String) IMVersion ("typeVersionDataType" ÷ Description null Model (String) ÷ ItemDesignation (WString) text PowerSupply (Number) → □ Manufacturer (WString) locale RevisionCounter (Int32) "ProductionEquipment", "RevisionCounter" 📶 Model (WString) WriteMask 0 SerialNumber (String) "ProductionEquipment"."SerialNumber" RevisionCounter (DInt) UserWriteMask 0 SerialNumberController (String) "ProductionEquipment"."SerialNumberControll SerialNumber (WString) RolePermissions SerialNumberHW (String) "ProductionEquipment", "SerialNumberHW SerialNumberController (WString) EventNotifier 0 "ProductionEquipment"."SoftwareRevision SoftwareRevision (String) → SerialNumberHW (WString) SoftwareRevision (WString) Server OPC Types VW BDE DBs OP¢ DataTypes DB BDE Maschine -OPC EventTypes Identifikation ("typ BDE Maschinen Identifikation") 4 ObjectTypes -DB_BDE_Maschinenzustand 🔻 🧊 BaseObjectType Koordinierung ("typ_BDE_Koordinierung") AggregateConfigurationType ÷ Status (USInt) Zeitstempel (LDT) I 4 III + - -Logging O Error -- X References Namespaces DPC UA Modeling Editor Project $\overline{}$ Type Defined References Namespaces ReferenceType NodeClass Name TypeDefinition ModellingRule DataType O: http://opcfoundation.org/UA/ Variable DeviceManual BaseDataVariableType String + HasComponent Mandaton I: Audi WerkSpec \checkmark HasComponent Variable DeviceRevision BaseDataVariableType Mandatory String + 1:typeDiagnostics HasComponent Variable Diagnostics 1:typeDiagnostics Mandatory String HardwareRevision BaseDataVariableType \checkmark HasComponent Variable Mandatory (+1:typeVersionDataType 1:typeVersionDataType HasComponent Variable IMVersion Mandatory String \checkmark Variable ItemDesignation BaseDataVariableType Mandatory HasComponent BaseDataVariableType String HasComponent Variable Manufacturer Mandatory String \checkmark Variable Model BaseDataVariableType Mandatory HasComponent BaseDataVariableType Int32 HasComponent Variable RevisionCounte Mandatory HasComponent Variable SerialNumber BaseDataVariableType Mandatory String + +

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- 1. Import of Information Models / Companion Specs or Create Types / Structures
- 2. Instantiate Types / Creation of the OPC UA instance Model
- 3. Mapping with PLC Data

Done!

Transfer of the OPC UA Model in the TIA Portal and download to PLC.

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Information model offline • @@c Objects • @@c ProductionEquipment • @ DeviceManual (String) • @ DeviceRevision (String) • @ Diagnostics (1:typeDiagnostics) • @ Diagnostics (1:typeDiagnostics) • @ HardwareRevision (String) • @ IMVersion (1:typeVersionDataType) • @ ItemDesignation (String) • @ Manufacturer (String) • @ Manufacturer (String)	B Show all Show all Contract Stress Show all Contract Stress Show all Contract Stress	Portal OPCL S.1 (connected) OPCL S.1 (connected) OPCL S.1 (connected) OPCL OPCL	C Details X	Attributes Nodeld NodeClass BrowseName DisplayName Description WriteMask UserWriteMask	x ns=1;i=1036 Variable 1:DeviceManual DeviceManual Address (pathname in the file system or a 0	
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Ingenuity for life = SIEMENS SiOME - OPC UA Modeling Editor × Attributes Information model -+-TIA Portal ▼ OPC Root C Day.ap15_1 (connected) Nodeld ns=2:i=1010 ▼ Opc Objects NodeClass Object Drag & Drop 2:VW BDE OPC Audi WerkSpec n blocks BrowseName - Server ► E: DisplavName VW BDE n Data VW BDE 🕨 🛅 Prodi Description null uipment 0 ▼ 🔋 DB BDE Maschinenzustand 🔻 🚹 VW BDB WriteMask ÷ 🕨 🧧 DB_BC EKS (2:typ_BDE_EKS) → ✓ "DB BDE Maschinenzustand"."EKS" UserWriteMask 0 chine V 📔 DB_BD Koordinierung (2:typ_BDE_Koordinierung) → ✓ "DB BDE Maschinenzustand"."Koordinieru hinenzustand RolePermissions Status (2:typ_BDE_Maschinenstatus) → ✓ "DB BDE Maschinenzustand"."Status" Koordinierung ("typ_BDE_Koordinierung") EventNotifier 0 Werkstueck (2:typ_BDE_Werkstueck_Identifikation) → ✓ "DB BDE Maschinenzustand"."Werkstued Werkstueck ("typ_BDE_Werkstueck_Identifikation") OPC Types -> EKS ("typ_BDE_EKS") OPC DataTypes → Status ("typ BDE Maschinenstatus") OP¢ EventTypes DB_BDE_Meldung ÷ ÷ Opc ObjectTypes BaseObjectType ÷ OPC ReferenceTypes ÷ OPC VariableTypes ÷ OPC Views ÷ "Brownfield" Mapping: **Create an OPC UA Model** and Mapping on the basis 4 of PLC Data or Methods Show all 🔻 References × Namespaces OPC UA Modeling Editor Project Type Defined References Namespaces Imported model from file C:\User Name TypeDefinition ReferenceType NodeClass ModellinaRule DataType O: http://opcfoundation.org/UA/ I Opened project C:\Users\wr4814 1: Audi WerkSpec I Set TIA Portal detail switch to on Type Defined Placeholder 2: VW BDE Unlocked model Audi WerkSpec \sim Added new model with namespace + Hierarchical References \sim ► : Added new Object with name 2: +
Non-Hierarchical References Removed node VW BDE from nar \sim Added new Object with name 2:\ Dragged DB DB_BDE_Maschinen

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Thank your for your attention !



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OPC Unified Architecture