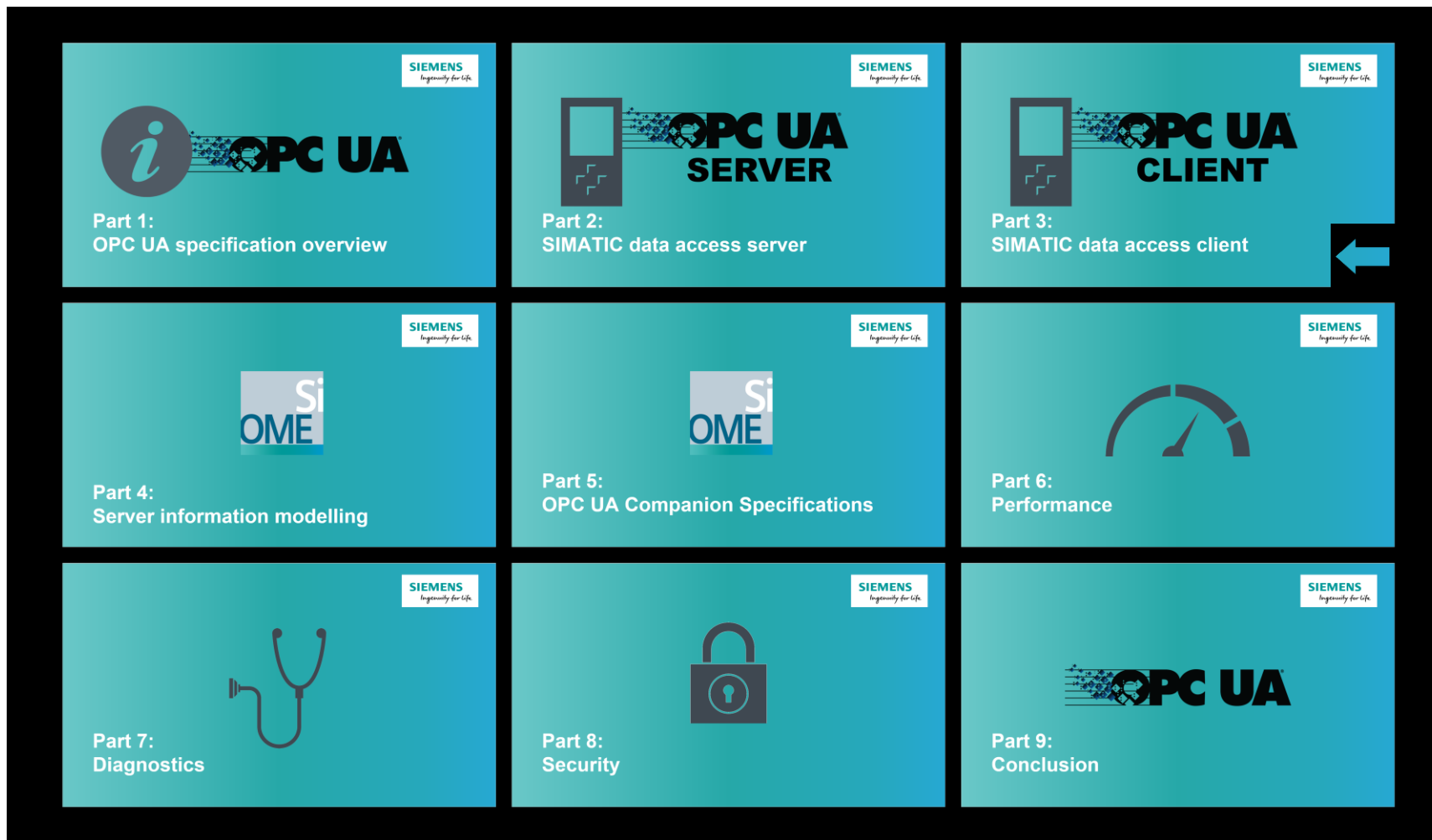


SIMATIC OPC UA

Web based training

Part 3 → S7-1500 OPC UA data access client

Agenda

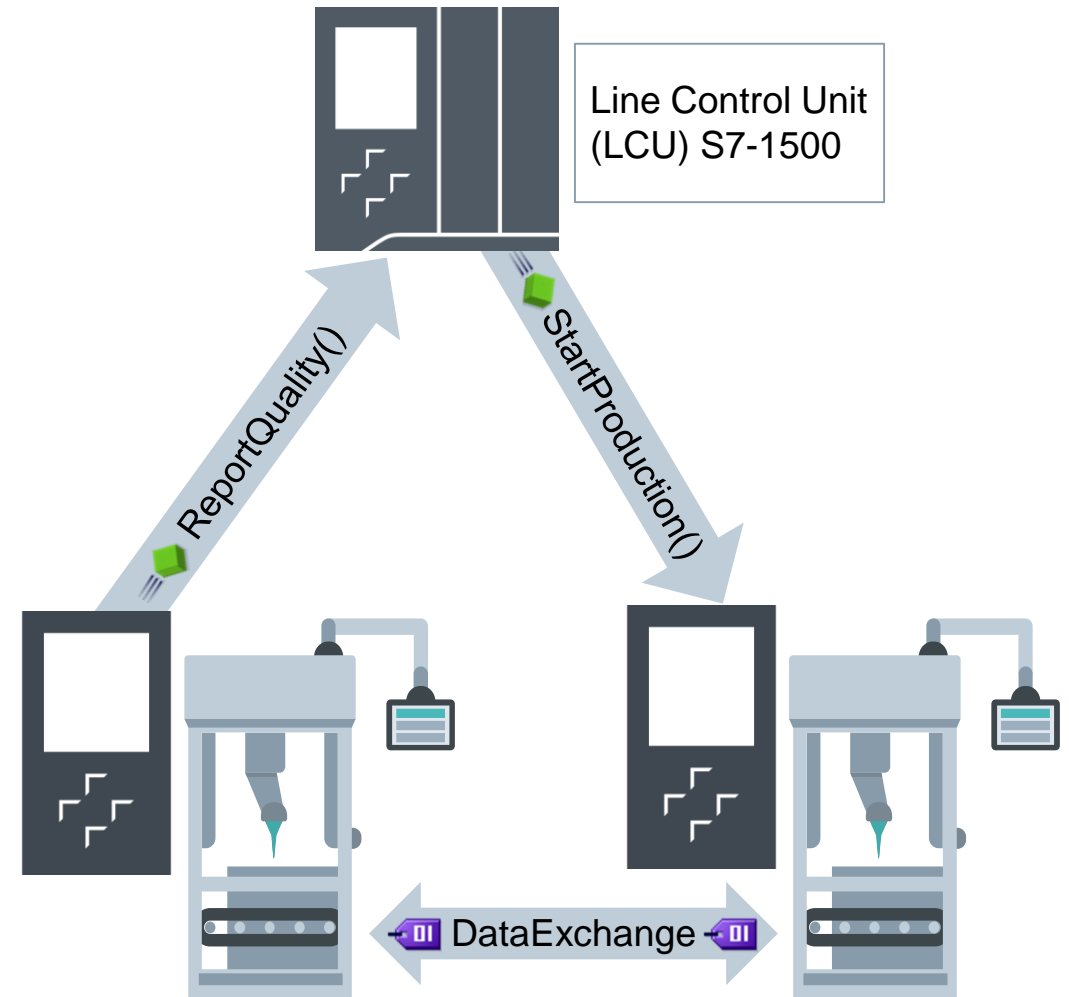
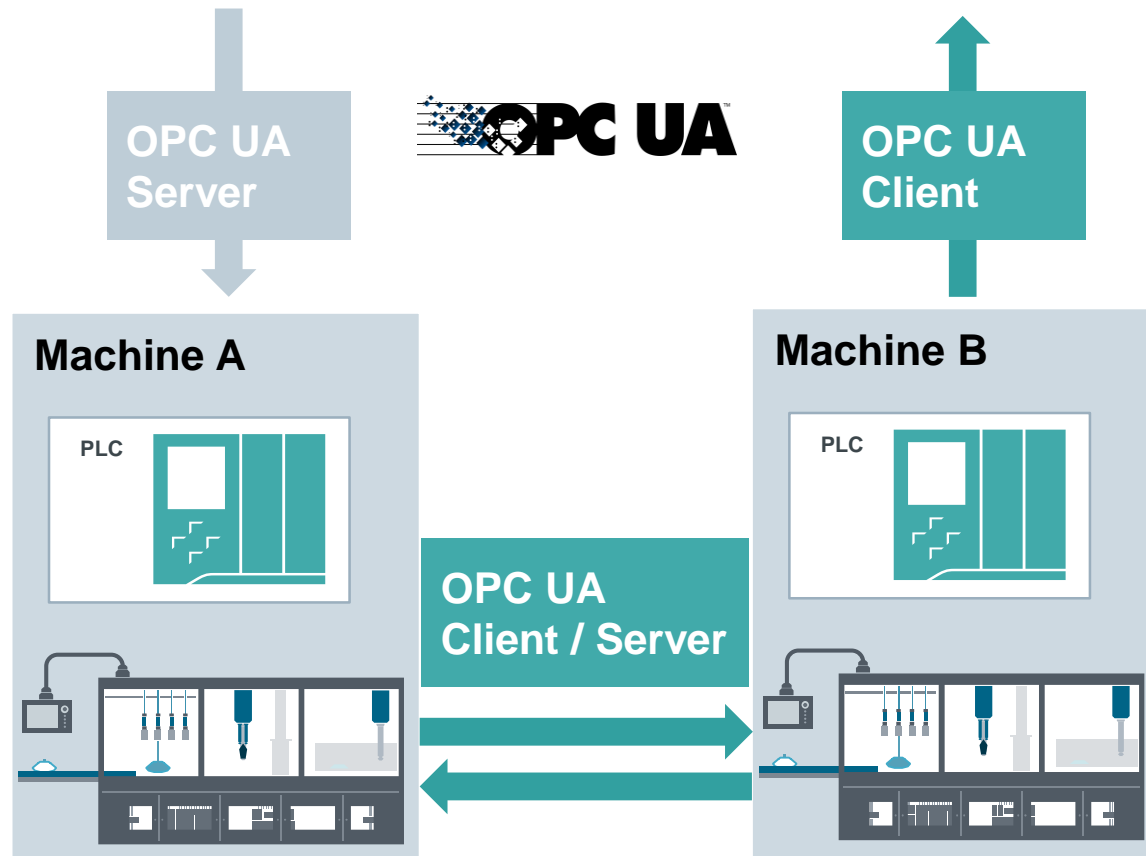


S7-1500 OPC UA client

Benefits of PLC OPC UA client communication

SIEMENS
Ingenuity for life

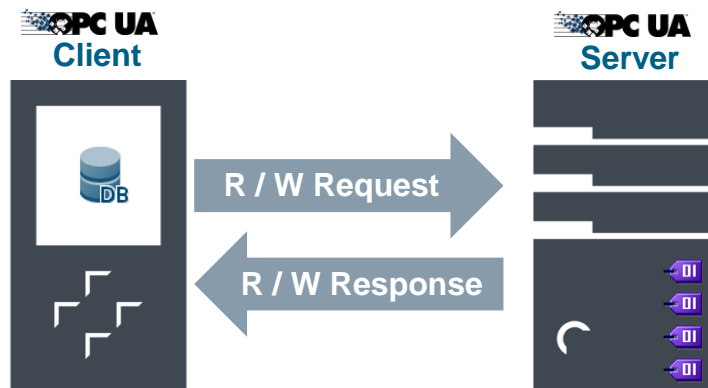
Vertical line integration: e.g. MES, SCADA



S7-1500 OPC UA client

Feature set

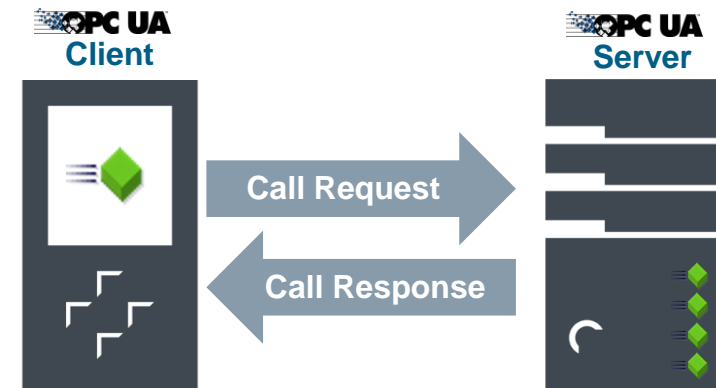
Registered Read/Write



Acyclic data access

- Nodes are registered by the firmware
- Nodes are handled in list operations

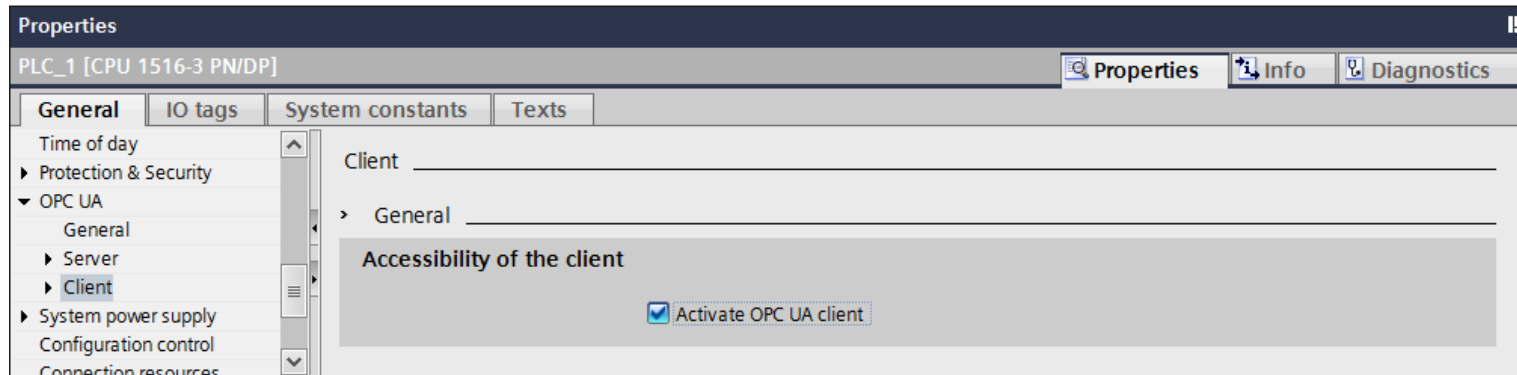
Methods



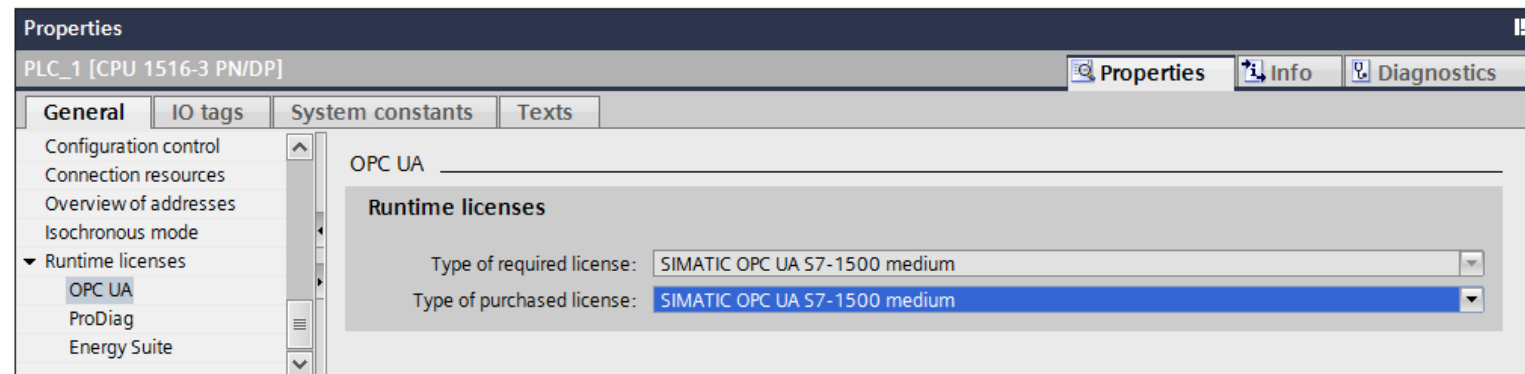
Consistent data transmission by
function calls
Request based interaction with OPC
UA servers

S7-1500 OPC UA client Configuration

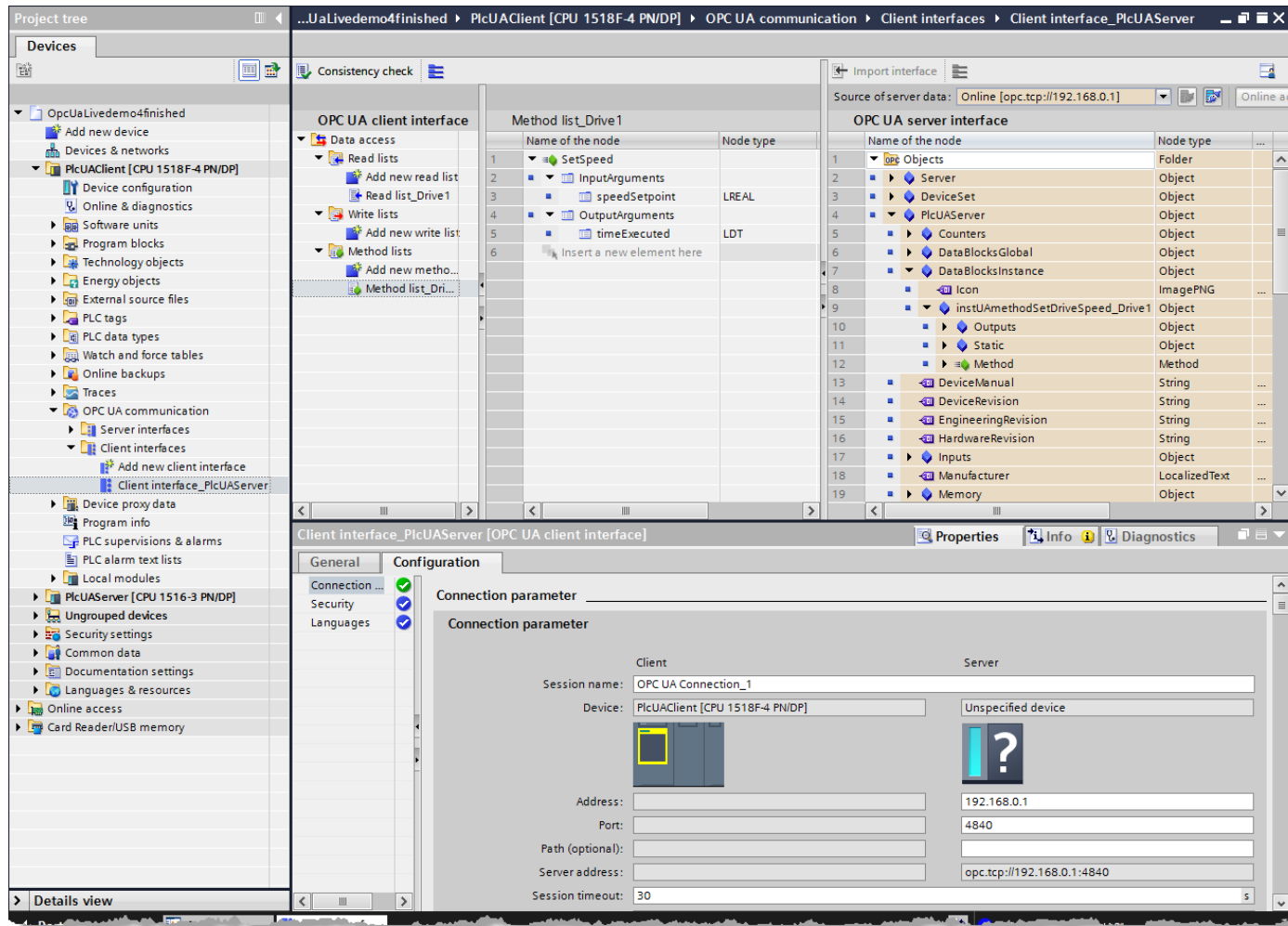
- The client must be activated in the device configuration



- OPC UA runtime license is necessary
(Server license includes client license)



S7-1500 OPC UA client Configuration



Client interface editor

- Easy drag and drop configuration of Read / Write / Method lists
- Wizard based configuration of connection properties
- The compile of the interface creates all necessary data structures

S7-1500 OPC UA client Configuration

SIEMENS
Ingenuity for life



[ClientInterfaceName]_Configuration

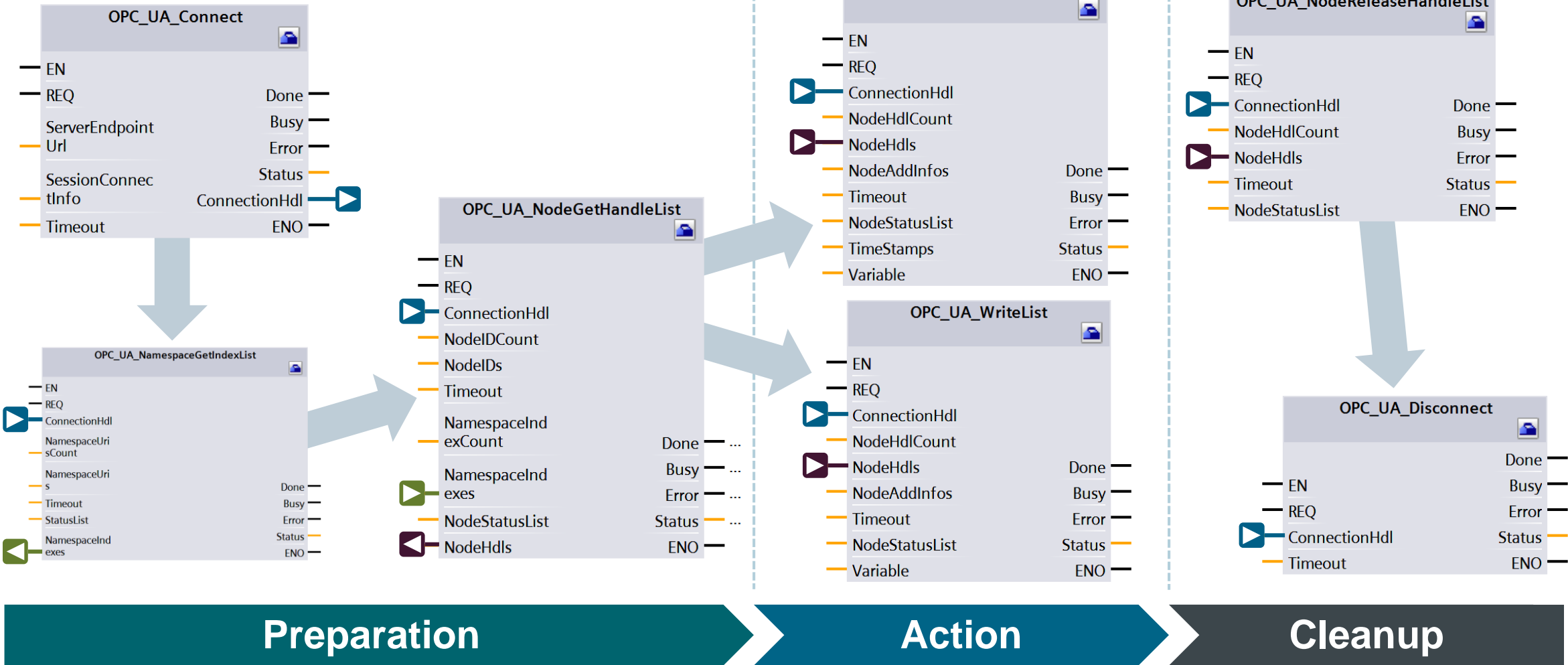
	Name	Data type	Start value
1	▼ Static		
2	▼ Connection	Struct	
3	ConnectInfo	OPC_UA_SessionConnectInfo	
4	ConnectionHdl	DWord	16#0
5	ServerEndpointUrl	String[254]	'opc.tcp://192.168.0.1:4840'
6	▼ Namespaces	Struct	
7	NamespaceURIs	Array[0..0] of WString	
8	ServerNamespaceIndexes	Array[0..0] of UInt	
9	NamespaceStatusList	Array[0..0] of DWord	
10	NamespaceCount	UInt	1
11	▼ ReadLists	Struct	
12	Read list_Drive1	Struct	
13	NodeCount	UInt	2
14	Nodes	Array[0..1] of OPC_UA_NodeId	
15	▼ NodeHdls	Array[0..1] of DWord	
16	NodeHdls[0]	DWord	16#0
17	NodeHdls[1]	DWord	16#0
18	▼ MethodLists	Struct	
19	▼ Method list_Drive1	Struct	
20	MethodCount	UInt	1
21	ObjectNodes	Array[0..0] of OPC_UA_NodeId	
22	MethodNodes	Array[0..0] of OPC_UA_NodeId	
23	▼ MethodHdls	Array[0..0] of DWord	
24	MethodHdls[0]	DWord	16#0



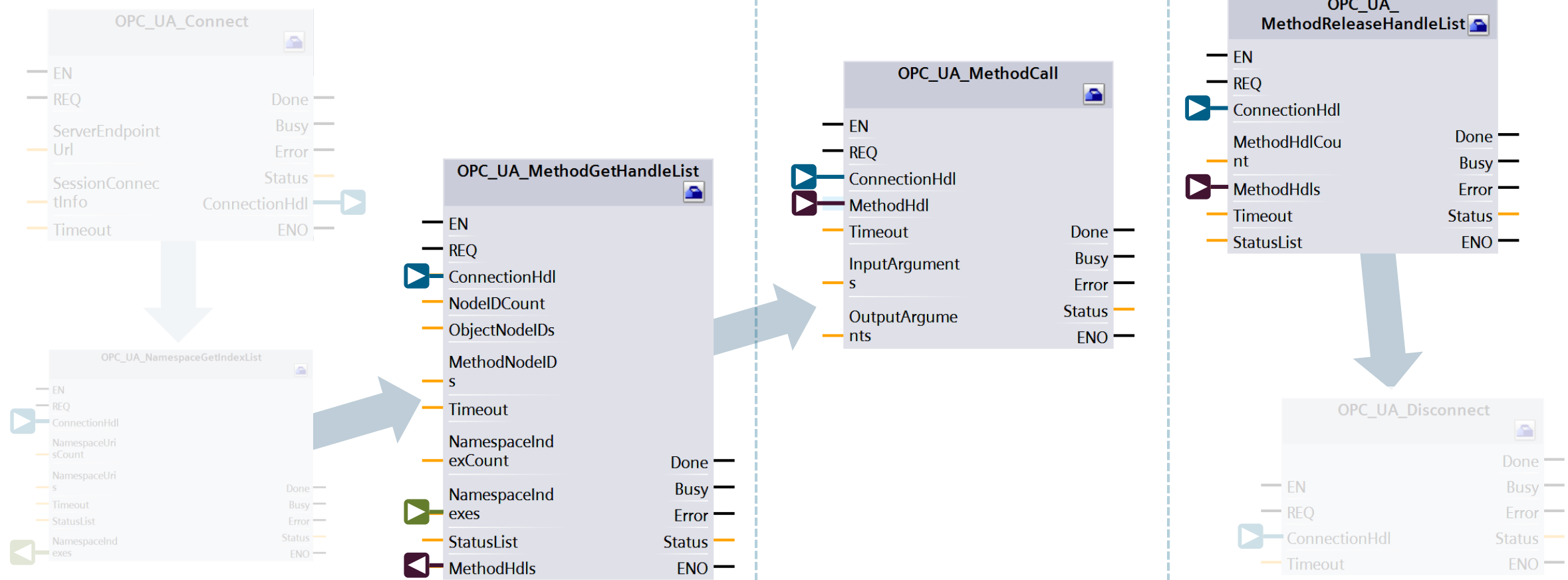
[ClientInterfaceName]_Data

	Name	Data type	Start value
1	▼ Static		
2	▼ Read list_Drive1	Struct	
3	▼ Variable	*Client interface_PlcUAServe..	
4	isActive	Bool	false
5	actualSpeed	LReal	0.0
6	▼ NodeStatusList	Array[0..1] of DWord	
7	NodeStatusList[0]	DWord	16#0
8	NodeStatusList[1]	DWord	16#0
9	▼ TimeStamps	Array[0..1] of LDT	
10	TimeStamps[0]	LDT	LDT#1970-
11	TimeStamps[1]	LDT	LDT#1970-
12	▼ Method list_Drive1	Struct	
13	▼ MethodStatusList	Array[0..0] of DWord	
14	MethodStatusList[0]	DWord	16#0
15	▼ MethodResultList	Array[0..0] of DWord	
16	MethodResultList[0]	DWord	16#0
17	▼ SetSpeed	Struct	
18	▼ Inputs	*Client interface_PlcUAServe..	
19	speedSetpoint	LReal	0.0
20	▼ Outputs	*Client interface_PlcUAServe..	
21	timeExecuted	LDT	LDT#1970-

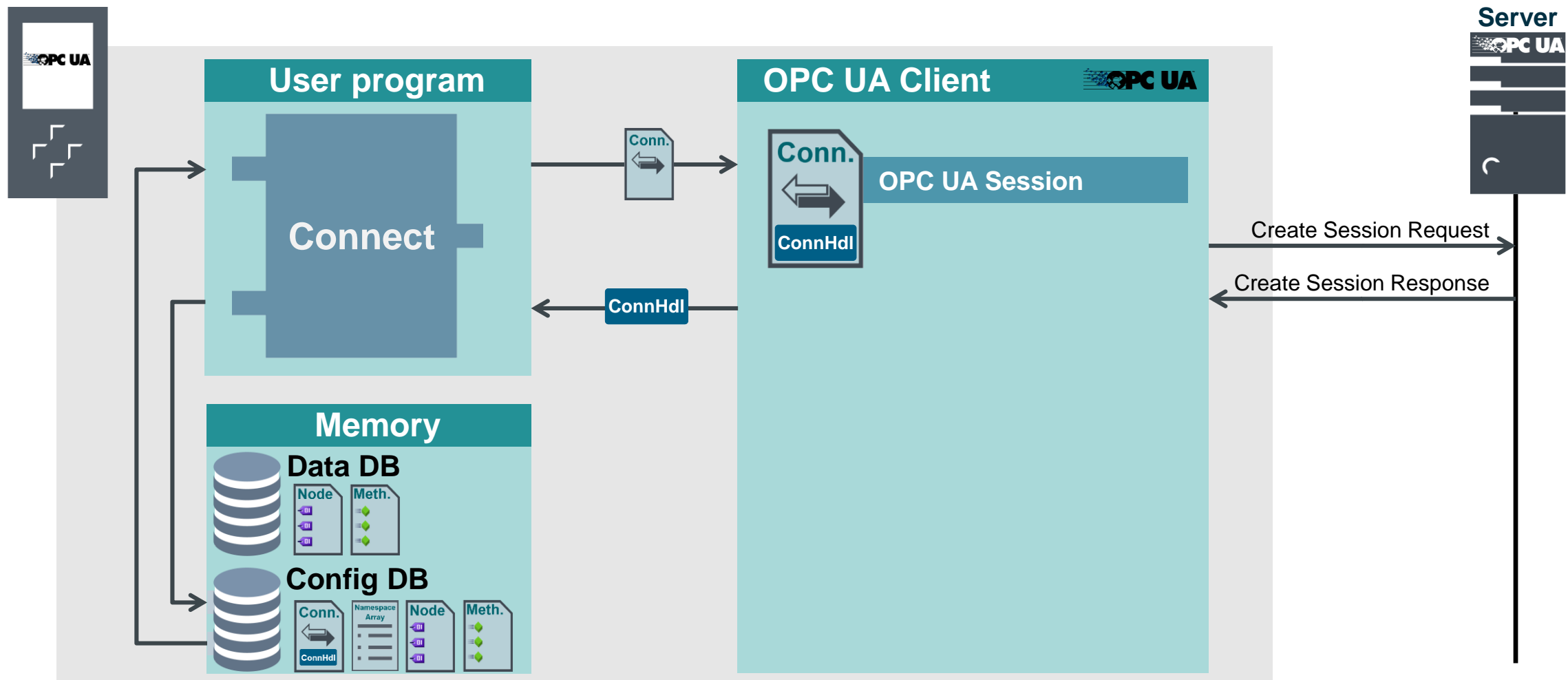
S7-1500 OPC UA client Configuration



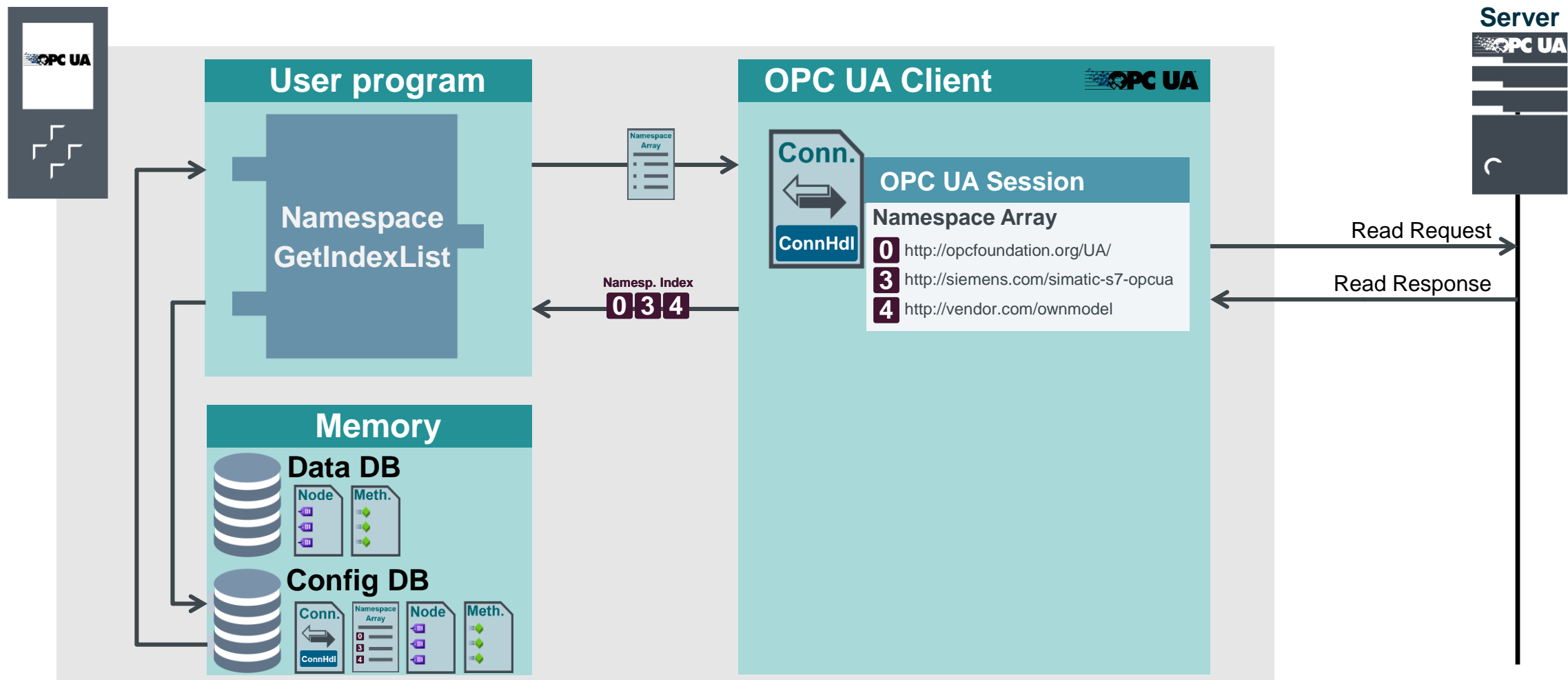
S7-1500 OPC UA client Configuration



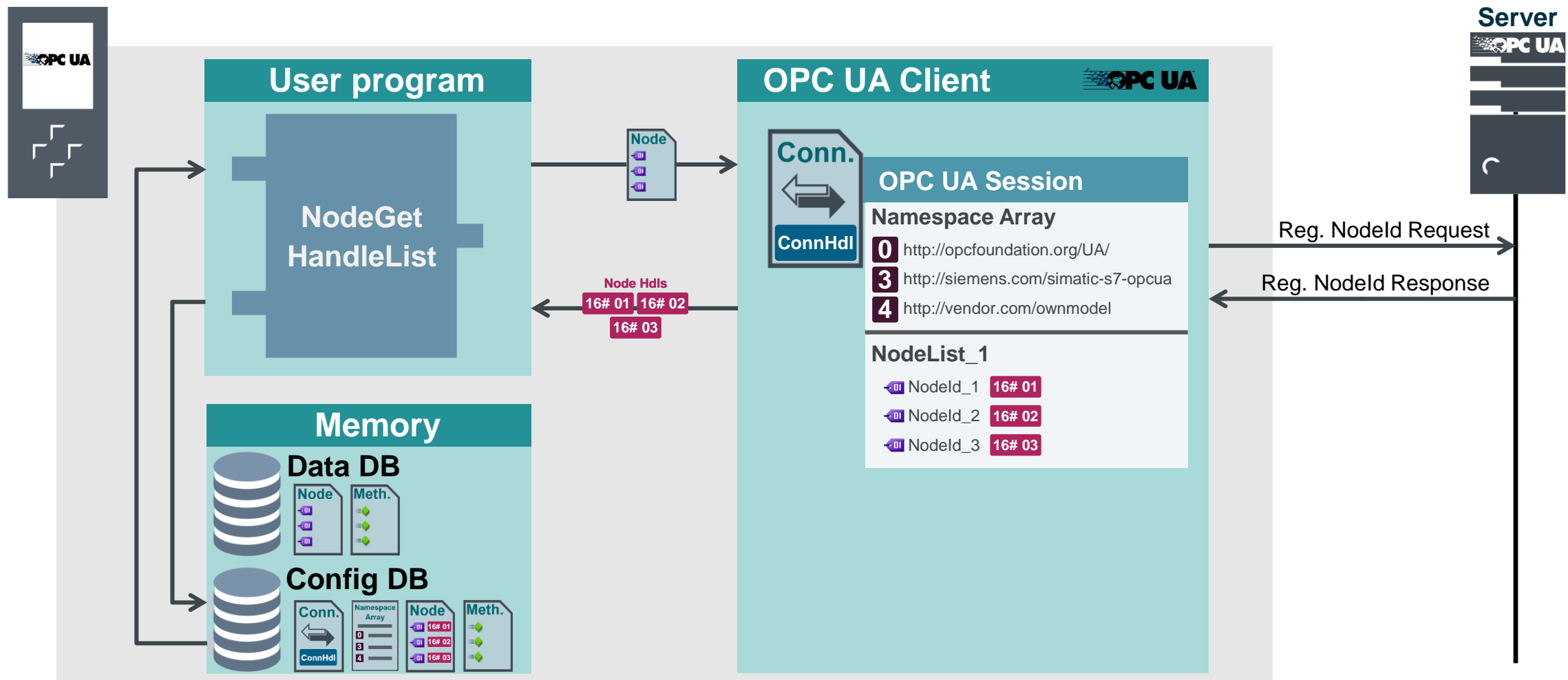
S7-1500 OPC UA client Connect



S7-1500 OPC UA client NamespaceGetIndexList

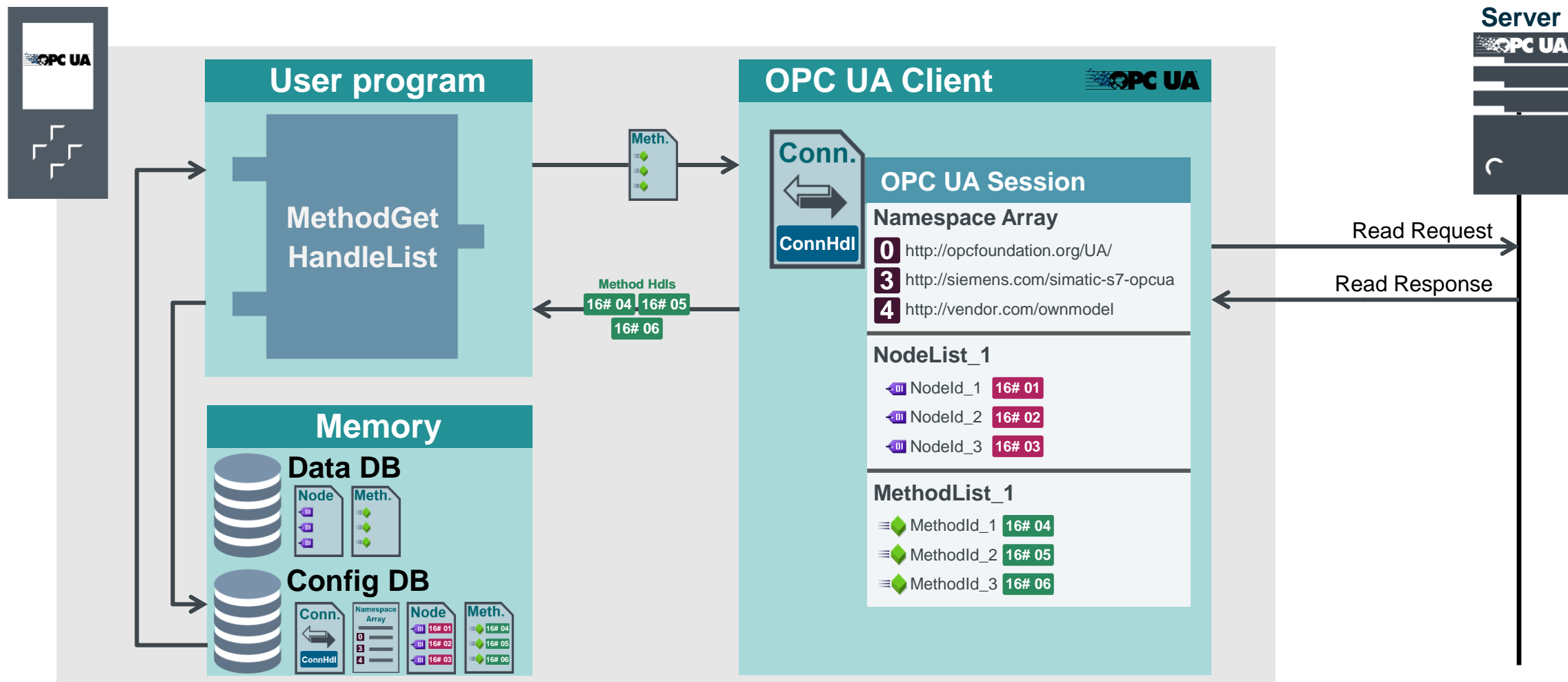


S7-1500 OPC UA client NodeGetHandleList

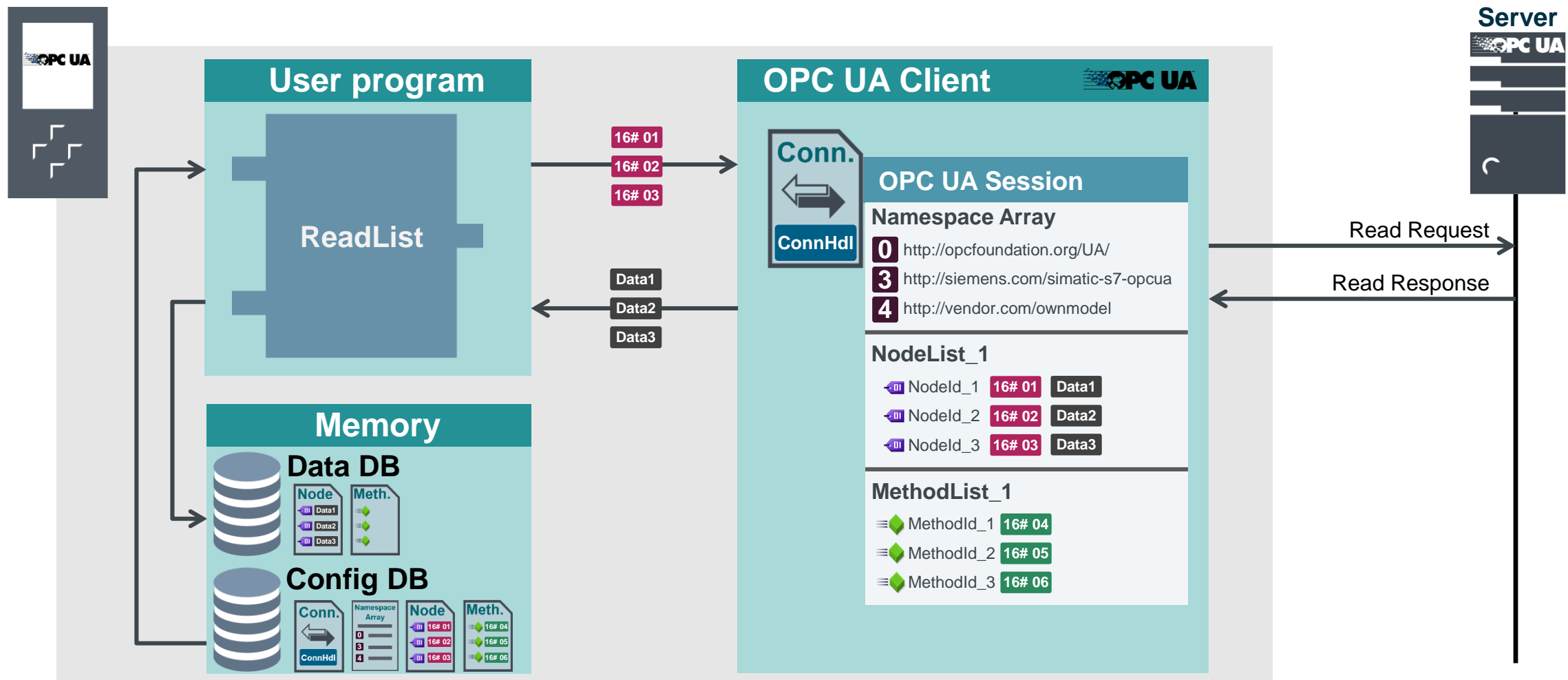


S7-1500 OPC UA client

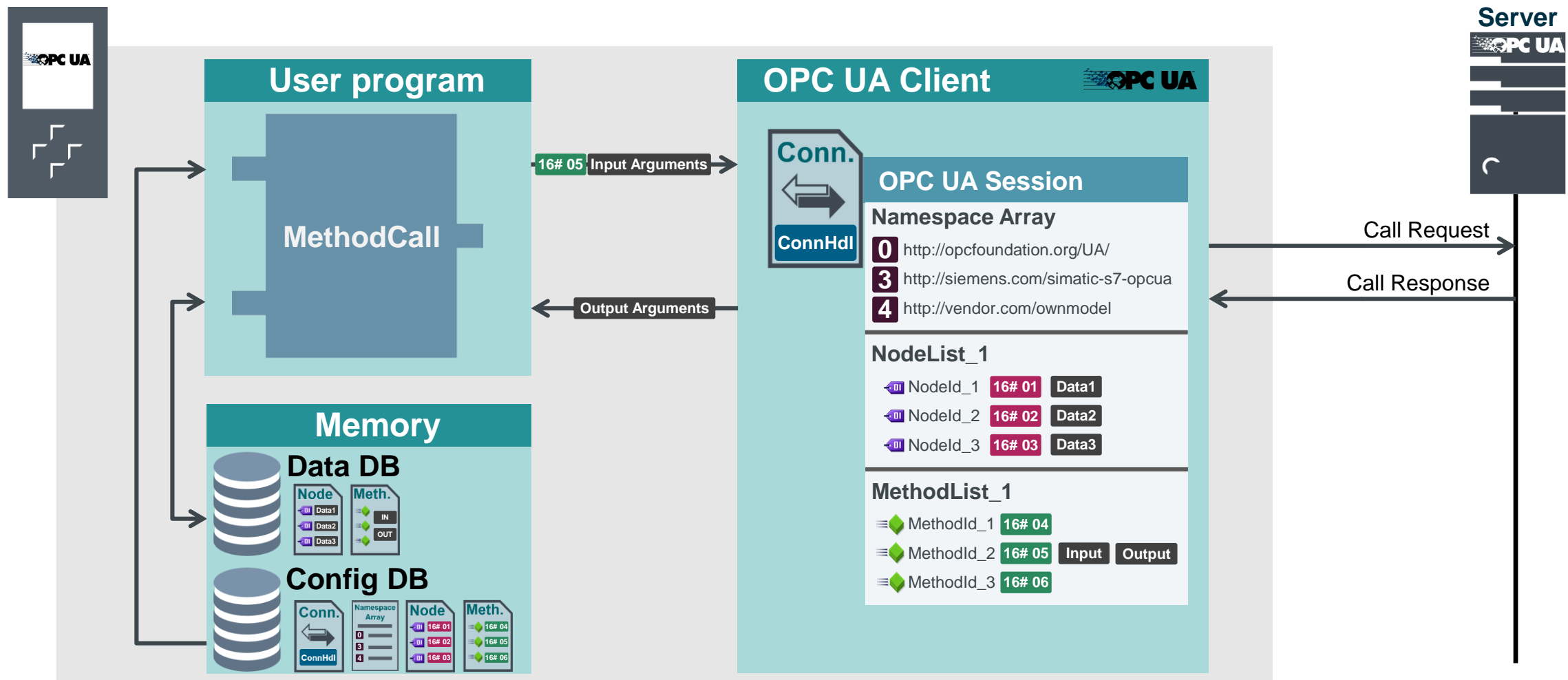
MethodGetHandleList



S7-1500 OPC UA client ReadList

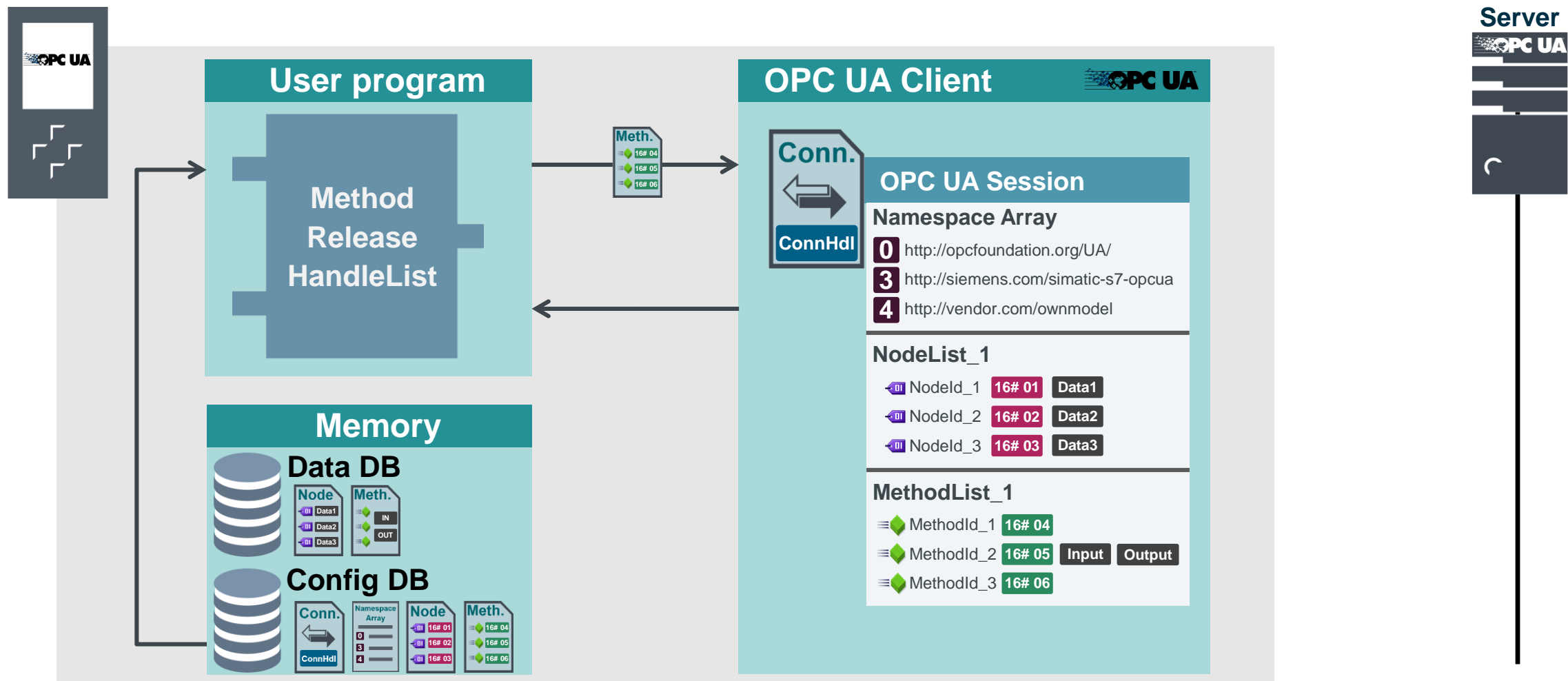


S7-1500 OPC UA client MethodCall



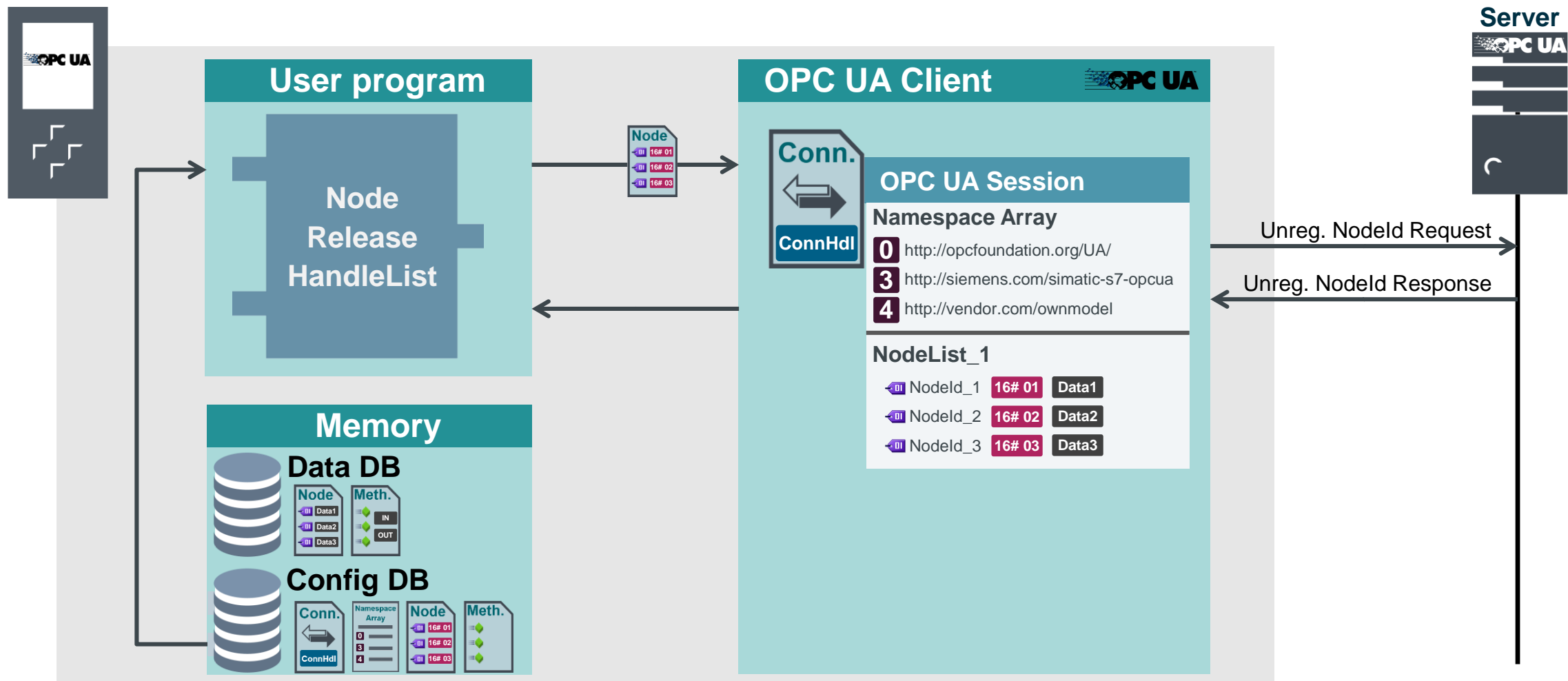
S7-1500 OPC UA client

MethodReleaseHandleList

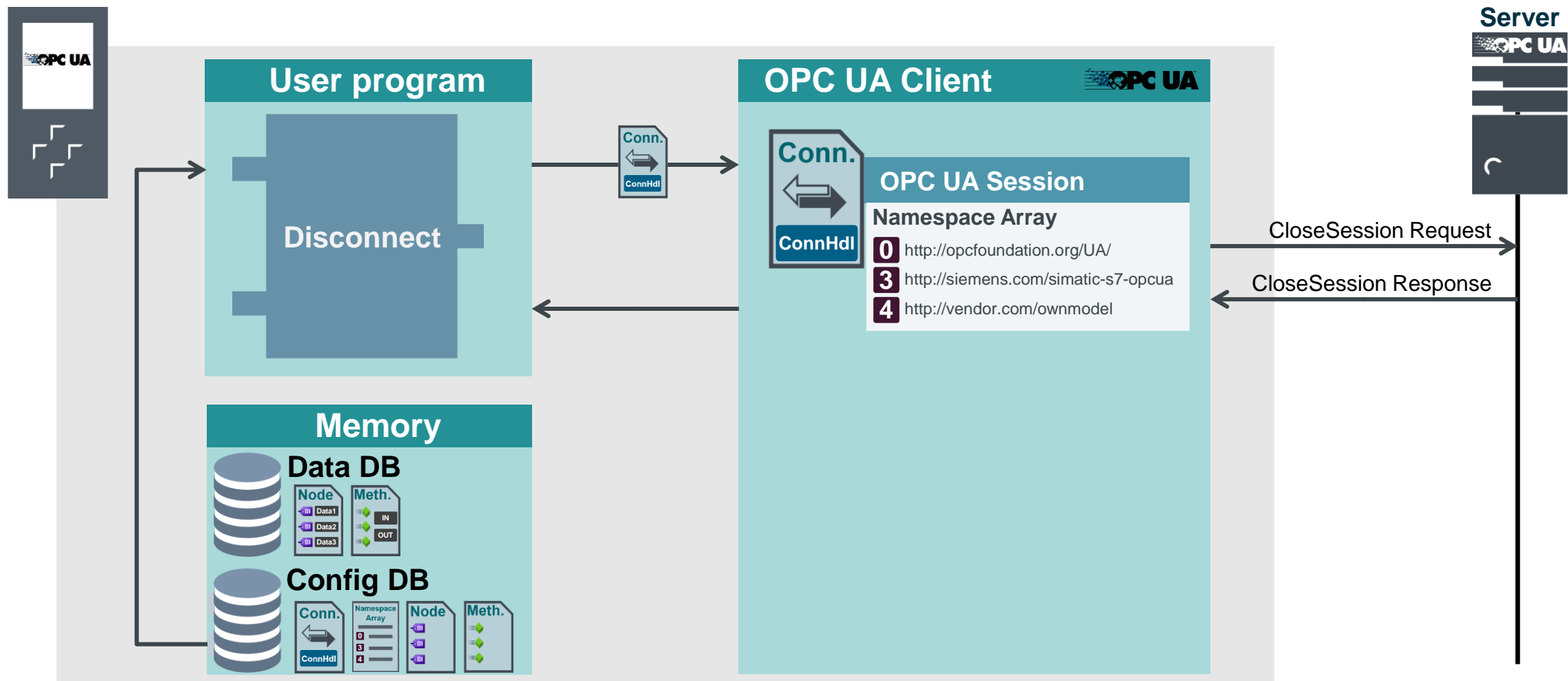


S7-1500 OPC UA client

NodeReleaseHandleList

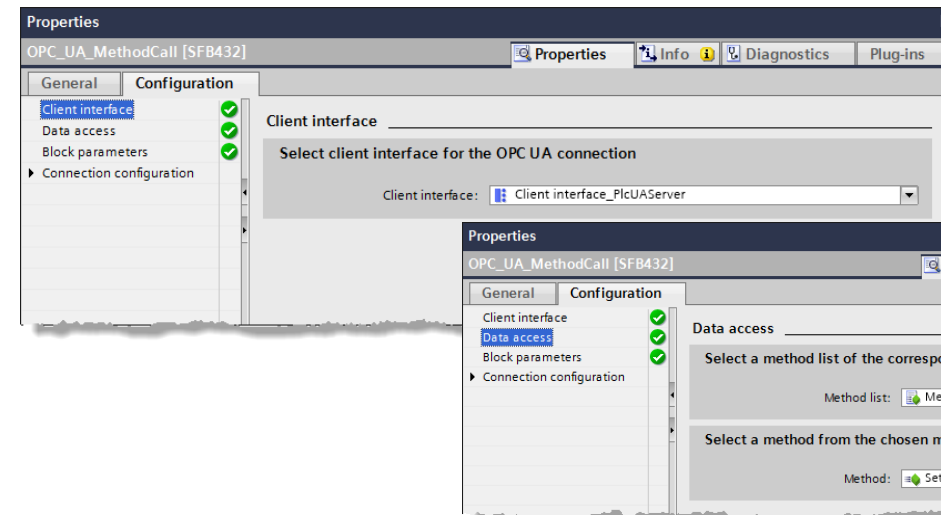
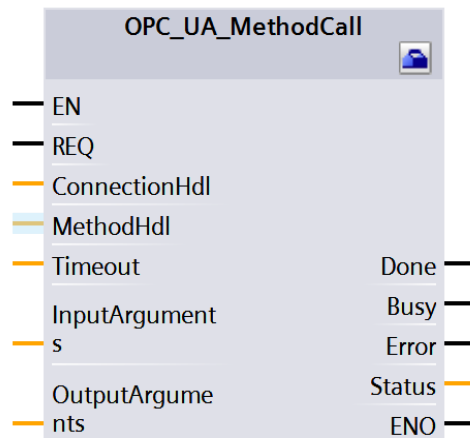
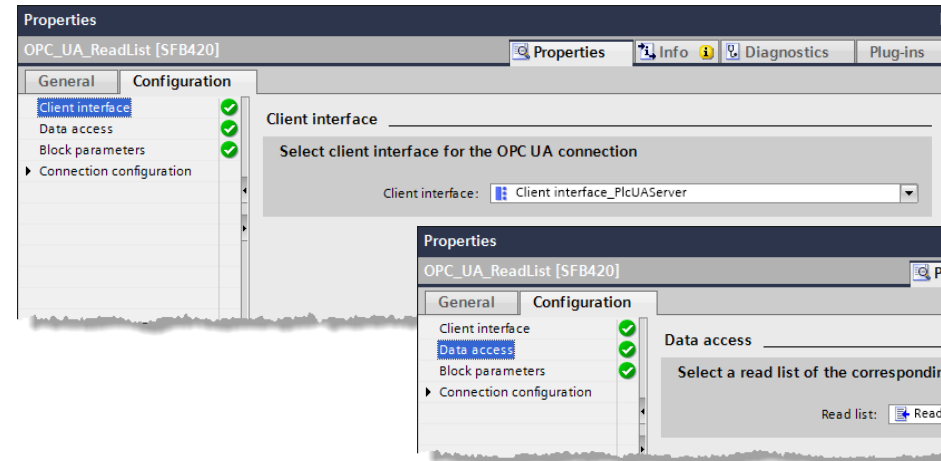
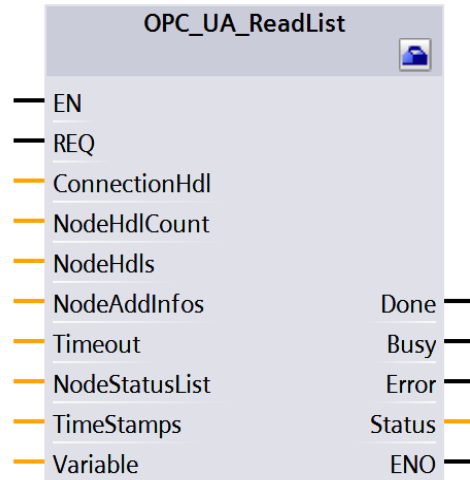


S7-1500 OPC UA client Disconnect



S7-1500 OPC UA client Configuration

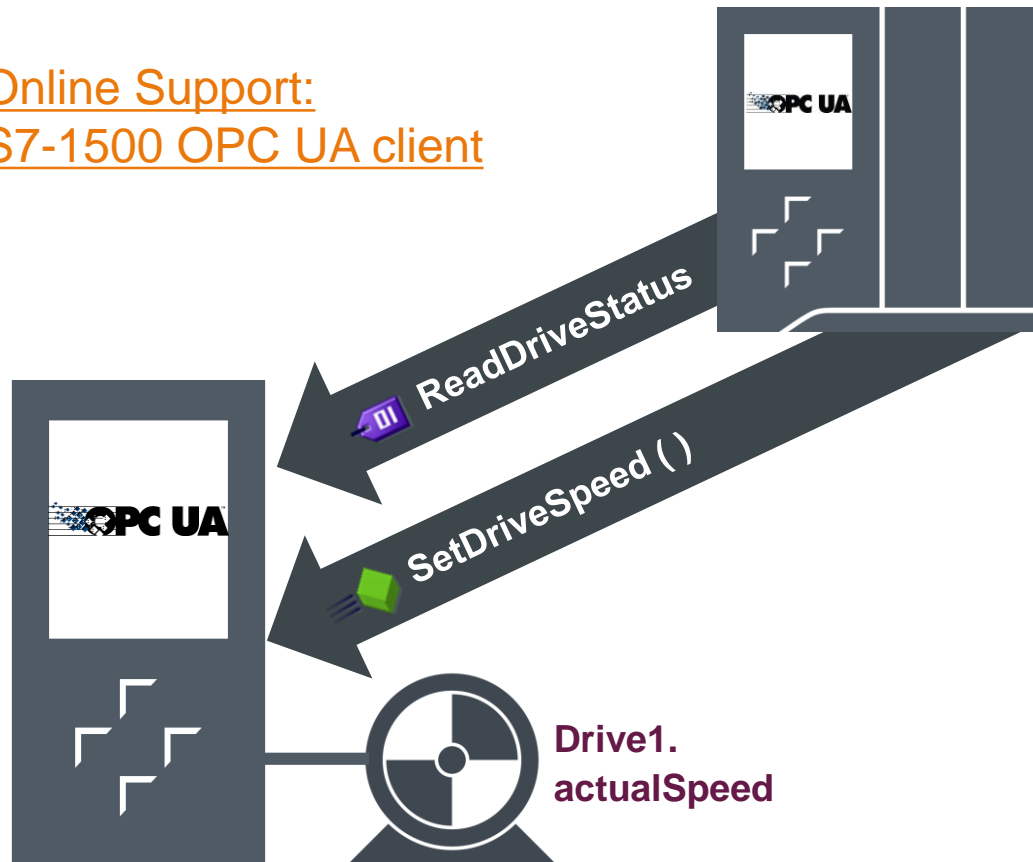
- Addressing of a whole
Read or Write list



- Addressing of an
individual method

LIVE DEMO

Online Support:
S7-1500 OPC UA client



- Wizard based client configuration
- Read the status of motor 1
- Call the method programmed in the last part of this WBT series to set a speed setpoint

Siemens - C:\Users\Siemens\Desktop\OpcUaLivedemo3\OpcUaLivedemo3\OpcUaLivedemo3

Project Edit View Insert Online Options Tools Window Help

Save project Go online Go offline Search in projects

Totally Integrated Automation PORTAL

Project tree

Devices

- OpUaLivedemo3
 - Add new device
 - Devices & networks
 - PlcUaClient [CPU 1518F-4 PN/DP]
 - Device configuration
 - Online & diagnostics
 - Software units
 - Program blocks
 - Add new block
 - Main [OB1]
 - GlobalTrigger [DB10]
 - System blocks
 - Technology objects
 - Energy objects
 - External source files
 - PLC tags
 - PLC data types
 - Watch and force tables
 - Add new watch table
 - Force table
 - OPCUA
 - Online backups
 - Traces
 - OPC UA communication
 - Device proxy data
 - Program info
 - PLC supervisions & alarms
 - PLC alarm text lists
 - Local modules
 - PlcUaServer [CPU 1516-3 PN/DP]
 - Ungrouped devices
 - Security settings
 - Common data
 - Documentation settings
 - Languages & resources

Details view

Name

PlcUaClient [CPU 1518F-4 PN/DP]

Topology view Network view Device view

Hardware catalog

Options

Catalog

Filter <All>

- PM
- PS
- CPU
- DI
- DQ
- DI/DQ
- AI
- AQ
- AI/AQ
- Communications m...
- Technology modules
- Interface modules

Device data

PlcUaClient [CPU 1518F-4 PN/DP]

Properties Info Diagnostics

General IO tags System constants Texts

System and clock me...
SIMATIC Memory Card

System diagnostics
PLC alarms

Web server
DNS configuration

Display
Multilingual support
Time of day

Protection & Security
OPC UA

System power supply
Configuration control
Connection resources
Overview of addresses
Isochronous mode

Runtime licenses
OPC UA
ProDiag
Energy Suite

OPC UA

General

OPC UA application name

Application name: SIMATIC.S7-1500.OPC-UA.Application:PlcUaClient

General user management

Note: User management via the project security settings is only enabled if the project status is set to protected with the settings options of the security settings.

Enable additional user management via project security settings

Server

General

Accessibility of the server

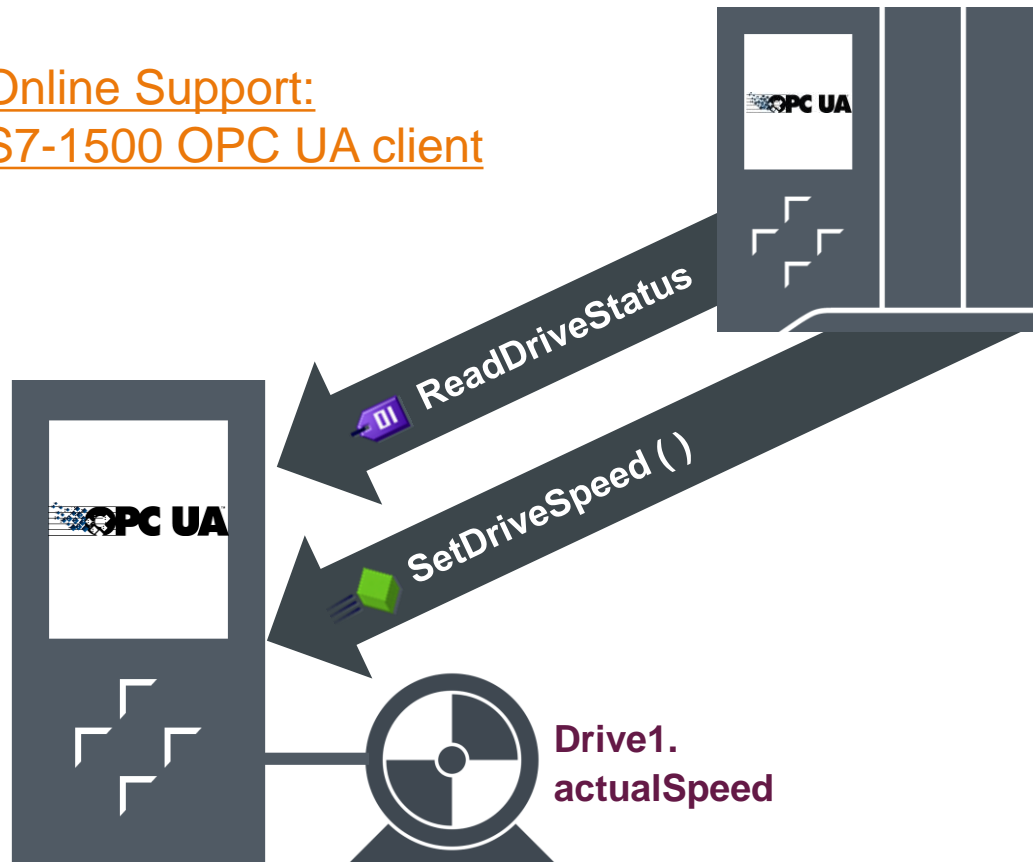
Portal view Overview OPCUA PlcUaClient

The project OpUaLivedemo3 was save...

17:52 27.06.2019

LIVE DEMO

Online Support:
S7-1500 OPC UA client



- Wizard based client configuration
- Read the status of motor 1
- Call the method programmed in the last part of this WBT series to set a speed setpoint

S7-1500 OPC UA client Restrictions

1. **Arrays of struct / UDT are not supported by the client wizard**
→ The data blocks must be defined by hand to support this datatypes
2. **Type check is not implemented for complex datatypes (UDTs / Structs)**
→ In case of complex types the client only checks the length of the data
3. **Nesting depth of datatypes is limited to 6 layers**
→ Due to TIA limitations and two additional layers in the OPC UA data DBs
4. **The following data types are not supported by the client:**
→ “Block_FB”, “Block_FC”, “Any”, “Pointer”, “Remote”

S7-1500 OPC UA client

Quantity structure - CPU 1516



OPC UA

• Runtime-Lizenz erforderlich	Ja
• OPC UA-Client	Ja
— Applikations-Authentifizierung	Ja
— Security Policies	verfügbare Security Policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
— Benutzer-Authentifizierung	"Anonym" oder mittels Benutzername & Passwort
— Anzahl Verbindungen, max.	10
— Anzahl Knoten der Client-Schnittstellen, max.	2 000
— Anzahl Elemente für jeweils einen Aufruf von OPC-UA_NodeGetHandleList/OPC-UA_ReadList/OPC-UA_WriteList, max.	300
— Anzahl Elemente für jeweils einen Aufruf von OPC-UA_NameSpaceGetIndexList, max.	20
— Anzahl Elemente für jeweils einen Aufruf von OPC-UA_MethodGetHandleList, max.	100
— Anzahl gleichzeitiger Aufrufe der Client-Anweisungen pro Verbindung (außer OPC-UA_ReadList, OPC-UA_WriteList, OPC-UA_MethodCall, max.	1
— Anzahl gleichzeitiger Aufrufe der Client-Anweisungen OPC-UA_ReadList, OPC-UA_WriteList und OPC-UA_MethodCall, max.	5
— Anzahl registrierbarer Knoten, max.	5 000
— Anzahl registrierbarer Methoden Aufrufe von OPC-UA_MethodCall, max.	100
— Anzahl Eingänge/Ausgänge bei Aufruf OPC-UA_MethodCall, max.	20

[CPU 1516-3 PN/DP datasheet](#)

S7-1500 OPC UA client

Quantity structure - CPU 1518



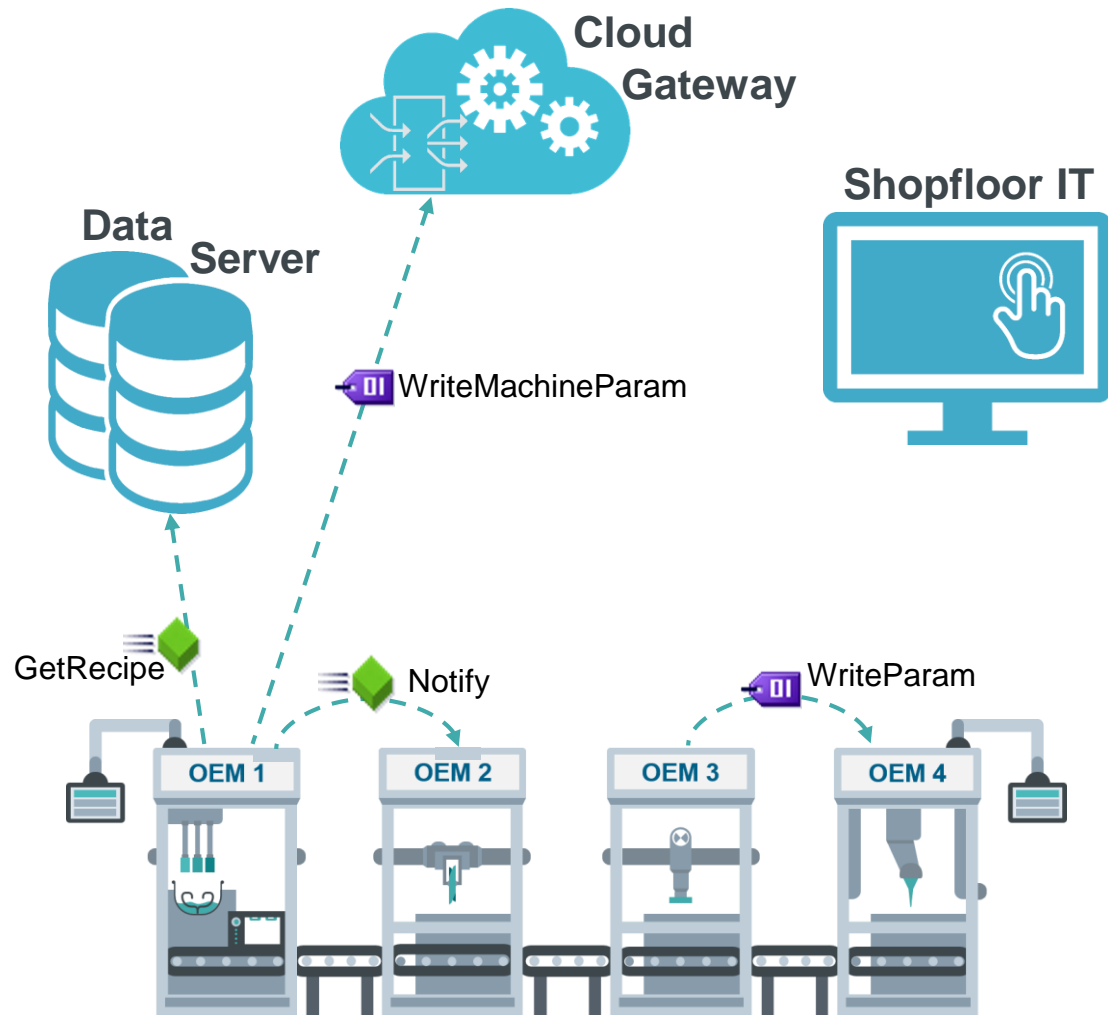
OPC UA

- Runtime-Lizenz erforderlich
- OPC UA-Client
 - Applikations-Authentifizierung
 - Security Policies
 - Benutzer-Authentifizierung
 - Anzahl Verbindungen, max.
 - Anzahl Knoten der Client-Schnittstellen, max.
 - Anzahl Elemente für jeweils einen Aufruf von OPC-UA_NodeGetHandleList/OPC-UA_ReadList/OPC-UA_WriteList/OPC-UA_MethodCall, max.
 - Anzahl Elemente für jeweils einen Aufruf von OPC-UA_NameSpaceGetIndexList, max.
 - Anzahl Elemente für jeweils einen Aufruf von OPC-UA_MethodGetHandleList, max.
 - Anzahl gleichzeitiger Aufrufe der Client-Anweisungen pro Verbindung (außer OPC-UA_ReadList, OPC-UA_WriteList, OPC-UA_MethodCall), max.
 - Anzahl gleichzeitiger Aufrufe der Client-Anweisungen OPC-UA_ReadList, OPC-UA_WriteList und OPC-UA_MethodCall, max.
 - Anzahl registrierbarer Knoten, max.
 - Anzahl registrierbarer Methoden Aufrufe von OPC-UA_MethodCall, max.
 - Anzahl Eingänge/Ausgänge bei Aufruf OPC-UA_MethodCall, max.

Ja
Ja
Ja
verfügbare Security Policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
"Anonym" oder mittels Benutzername & Passwort
40
5 000
300
20
100
1
5
5 000
100
20

CPU 1518-4 PN/DP datasheet

Use cases for PLC OPC UA clients



Methods could be used for consistent data which require interaction with the other system. (e.g. call a method to request a job from a higher level system)

Read/writes could be used to read or write data (without consistency requirements) to other systems

Agenda

