

► Integrating OPC UA Devices into EPICS
Using the Open62541 Library

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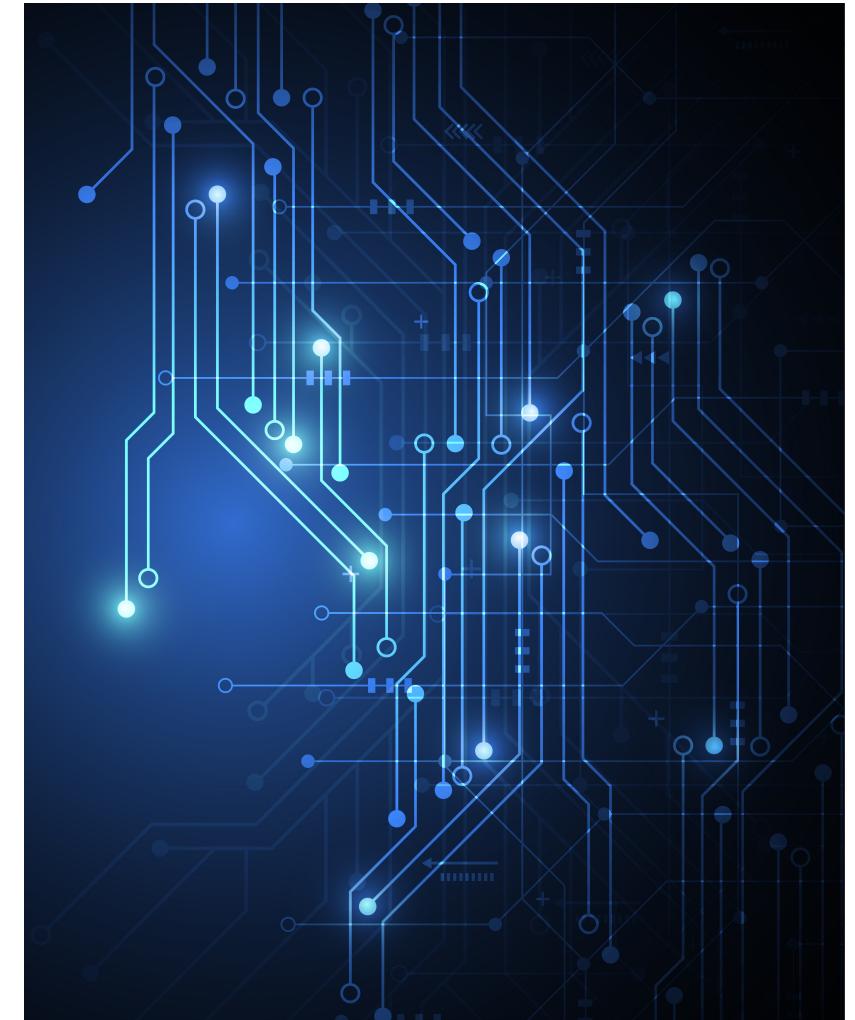
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Overview

- ▶ OPC UA
- ▶ Open62541
- ▶ EPICS Integration

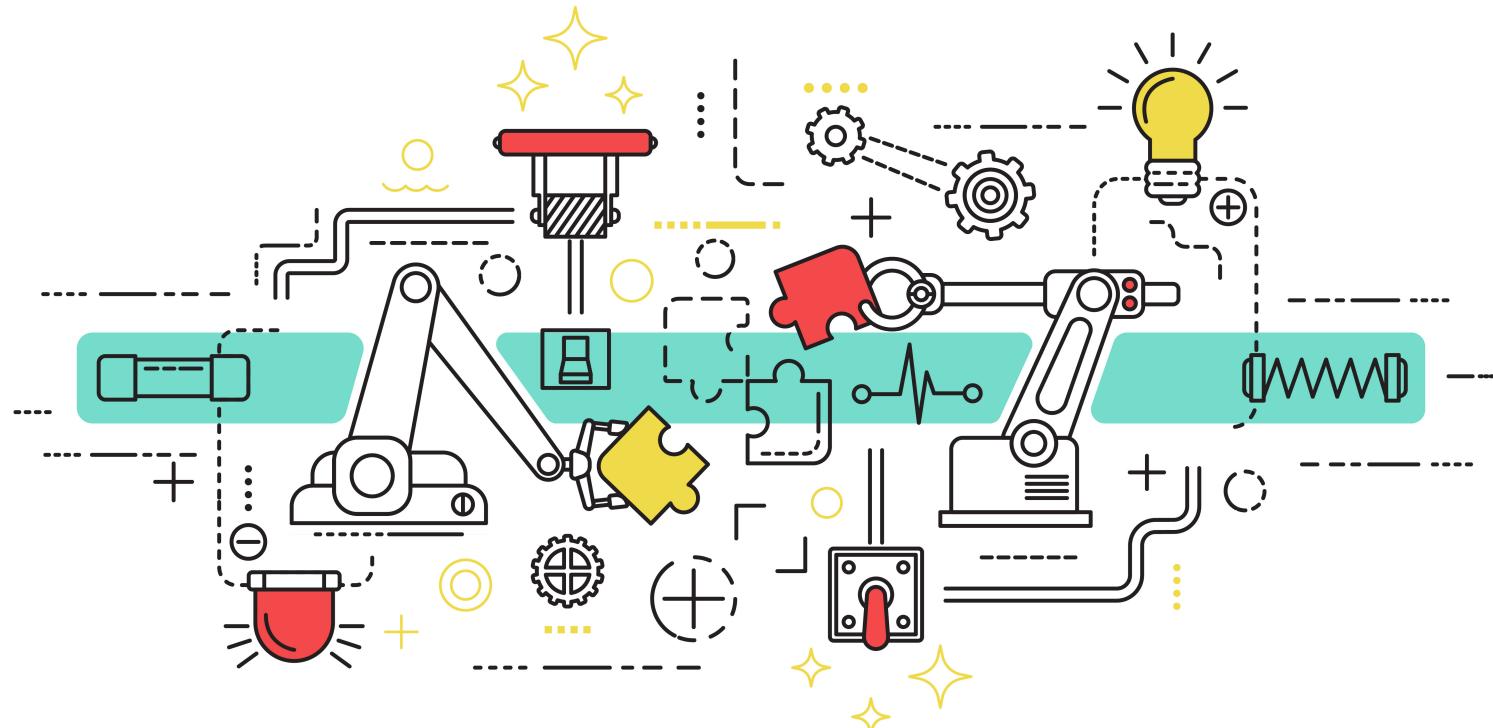


OPC Unified Architecture

- ▶ Vendor independent protocol for control-system communication
 - ▶ SCADA ↔ SCADA
 - ▶ SCADA ↔ Device
 - ▶ Device ↔ Device
- ▶ Managed by the OPC Foundation.
 - ▶ Successor but technically not related to OPC
- ▶ Supported by many vendors.
 - ▶ SCADA systems, PLCs, gateways, etc.
- ▶ Includes an information model and various subsystems
 - ▶ Most devices and software only implement a part of the standard

OPC Unified Architecture (continued)

- ▶ Client server architecture
 - ▶ Optional cryptography support
 - ▶ Designed for “Industry 4.0” / Internet of Things



Open62541

- ▶ Named after IEC62541, the official standard representing OPC UA.
- ▶ Open-source implementation (MPLv2) of OPC UA
- ▶ Maintained by a group of German universities, research institutes and private companies.
- ▶ Entirely written in C, supports Linux, macOS, Windows and various embedded systems.
- ▶ Cryptography support if compiled with mbed TLS
- ▶ Single or multi-threaded
- ▶ Client or server

 open62541

EPICS Integration

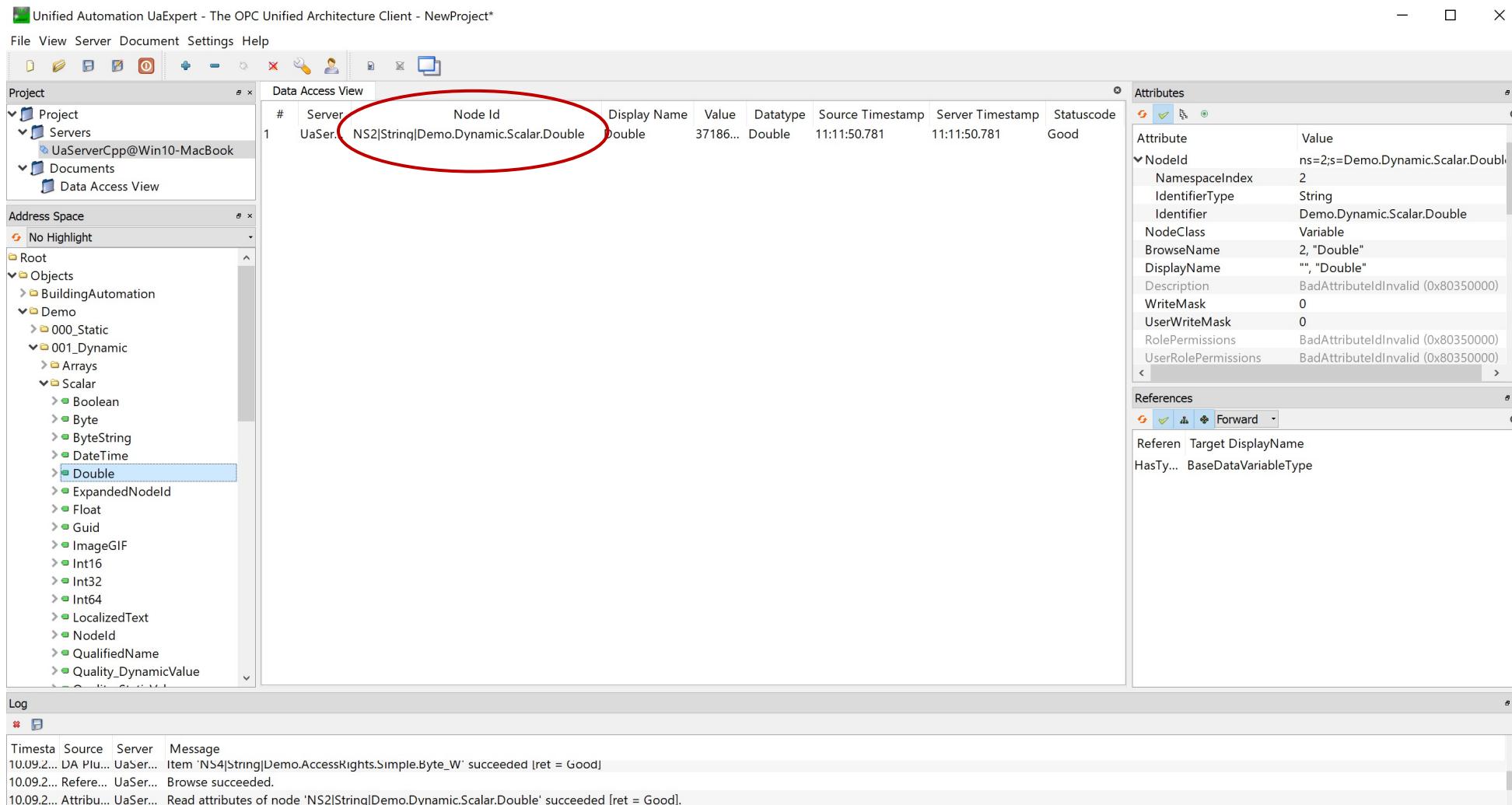
- ▶ Open source (LGPLv3)
- ▶ Acts as a client, connecting to OPC UA servers and providing their process variables in EPICS.
- ▶ All basic data types are supported.
- ▶ Open62541 library is embedded into the EPICS device support.
 - ▶ No external dependencies except EPICS Base and mbed TLS (only if cryptography support is needed)
- ▶ Primarily used for SCADA integration, but should work for other purposes as well.

Example: EPICS startup configuration

```
# Connect to the server
open62541ConnectionSetup("C0", "opc.tcp://opc-ua.example.com:4840",
"username", "password");

# Configure the default publishing interval
open62541SetSubscriptionPublishingInterval("C0", "default", 100.0)
```

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Example: EPICS record definition

```
record(ai, "test:doubleIn") {  
    field(DTYP, "open62541")  
    field(INP, "@C0 str:2,Demo.DynamicScalar.Double")  
    field(SCAN, "I/O Intr")  
}  
  
record(ao, "test:doubleOut") {  
    field(DTYP, "open62541")  
    field(OUT, "@C0 str:2,Demo.Static.Scalar.Double")  
}
```

Summary

- ▶ OPC UA is an IP-based protocol for communication between automation systems supported by many vendors.
- ▶ The open62541 library provides a free implementation of this protocol, that is suitable for both PCs and embedded systems.
- ▶ Using this library, an EPICS device support has been created that enables easy integration of process variables from OPC UA servers into EPICS IOCs.

Learn more

<https://github.com/KIT-IBPT/epics-open62541>

The screenshot shows the GitHub repository page for 'epics-open62541' owned by 'KIT-IBPT'. The repository is public and has 1 branch and 7 tags. The 'Code' tab is selected. The repository description is 'EPICS device support acting as an OPC UA client'. It features three main sections: 'About', 'Releases', and 'Packages'. The 'About' section includes links to 'Readme' and 'View license'. The 'Releases' section highlights 'Release 1.1.5' as the latest, published on April 23. The 'Packages' section indicates 'No packages published'.

Code Issues Pull requests Actions Projects Wiki Security Insights

master 1 branch 7 tags Go to file Code

smarsching Use DBDCAT instead of DBD. ... add4801 on 23 Apr 40 commits

configure Add support for signed and encrypted connections. 2 years ago

open62541App Use DBDCAT instead of DBD. 5 months ago

.gitignore Import sources into Git repository. 3 years ago

LICENSE-LGPL.md Import sources into Git repository. 3 years ago

LICENSE-MPL.txt Import sources into Git repository. 3 years ago

Makefile Import sources into Git repository. 3 years ago

README.md Document how to update the open62541 library. 13 months ago

README.md

EPICS Device Support for Open62541 (OPC

About

EPICS device support acting as an OPC UA client

epics opc-ua open62541

Readme View license

Releases 7

Release 1.1.5 Latest on 23 Apr + 6 releases

Packages

No packages published