



Open Source Automation Development Lab (OSADL) eG

Phase #3 of OSADL project "Building an Open Source OPC UA over TSN Ecosystem" successfully completed



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Since 2018, Fraunhofer IOSB, Kalycito and OSADL have been forming a working group to create a publically available framework for real-time communication over Ethernet, based on OPC UA and TSN. The associated work was divided into several project phases. With the successful completion of phase #3 another important milestone has now been reached.

Phase #3 of the "Building an Open Source OPC UA over TSN Ecosystem" project received funding of €117,500 from participating companies. Specifically, these are the following companies (in alphabetical order):

- ABB
- Arm
- B&R
- Intel
- Kontron Europe
- Siemens

In addition, the following companies provided funding in the previous two project phases:

- Balluff
- Heidelberger Druckmaschinen
- Linutronix
- Nestfield
- Pepperl+Fuchs
- Pilz
- SICK
- TQ-Systems
- WIKA Mobile Control

The software developed within the project concerned the OPC UA stack open62541, publisher and subscriber applications for PubSub as well as installation and configuration scripts for TSN.

1. OPC UA stack open62541

The OPC UA stack open62541 has been successfully developed further and has meanwhile become the second most used OPC UA stack worldwide. After the successful certification according to the "Micro Embedded Device Server" profile, the certification according to the "Standard UA Server" profile is now aimed for, for which

meanwhile about 80 to 90% of the requirements are fulfilled. Successful certification to this much more advanced profile is expected in the next few months.

2. PubSub security

An outstanding achievement in this project was the complete implementation of an encryption layer, so that the requirements for PubSub security are now met.

3. TSN

With the help of a Quick Start Guide under an Open Source license that was developed as part of the project, interested individuals can test set up an OPC UA PubSub connection over TSN and perform their own performance tests between two Intel systems that are equipped with a standard Linux distribution. The included instructions explain the steps to set up real-time Linux and to run examples of publisher and subscriber applications on one of the two systems respectively. These applications use bandwidth reservation and timestamp-based transmission of network packets, and the maximum latency between the theoretical and the actually measured arrival time of the network packets is provided as result. If the systems are correctly configured, the measured latency is of the same order of magnitude as the system latency; this proves that an ideal real-time Ethernet connection was created. Thus, the real-time Ethernet set of methods that OPC UA PubSub over TSN provides qualifies as a worthy Open Source successor to the existing predominantly proprietary protocols and for the first time opens up novel end-to-end communication concepts from the sensor to the cloud.

The above-mentioned companies participating in the project have thus made a significant contribution to the technological progress of the automation industry, which is recognized and appreciated on many occasions.

About the Open Source Automation Development Lab (OSADL):

The Open Source Automation Development Lab (OSADL) was founded in 2005 by companies using Open Source software (OSS) in industry and in general in embedded systems. OSS preferably is used in know-how areas such as the operating system that do not belong to a company's individual intellectual property. Sharing of such know-how among members of a community is not only required to master the complexity of state-of-the-art devices with reasonable effort but also offers important economical advantages. However, an organization is needed to manage the networking and the interaction of the community members. OSADL has taken on this challenge and is offering collaboration and membership to interested companies.

Among other, OSADL provides know-how on the following topics:

- Quality assessment and assurance, particularly on real-time Linux, security and safety
- Provision of OSS additions as needed by industry
- Legal aspects of using OSS:
 - Legal support on OSS issues by certified copyright and media law attorney (legal know how data-base and legal assessments)
 - Legal compliance through standardized audits
 - Special scanning procedures
 - License checklists and templates of Open Source policy
- Company processes to deal with requirements Open Source technology
- Organization of seminars, conferences and workshops

OSADL members come from all industries in which embedded systems are used or components for them are developed, such as the automation industry, automotive engineering, semiconductor manufacturers, mechanical engineering and Open Source service providers.

For more information, please visit <https://www.osadl.org/>

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