Open
Source
Automation
Development
Lab eG

Building an Open Source OPC UA/TSN Ecosystem

Project phase #2: “Security & Certifiability”

Letter of Intent (V4, September 8, 2018)

This Letter of Intent is signed between

_____

hereafter Open Source OPC UA/TSN Ecosystem participant and the

Open Source Automation Development Lab (OSADL) eG, 69120 Heidelberg, Germany

hereafter OSADL.

Introduction

A rapidly growing number of companies and organizations is fostering the development of a standardized method for real-time network communication based on OPC UA as platform protocol and TSN as link layer. This broad interest has led to the open62541 project (https://open62541.org/). It was founded to provide an OPC UA implementation that can be freely copied and distributed under the Mozilla 2.0 Open Source license.

The next important evolution of OPC UA after having implemented the base technology were the Publish/Subscribe (PubSub) components to allow for a connection-less and, thus, resource saving communication suitable for the low-power devices that are expected to be used throughout the future Internet of Things. For this purpose, Fraunhofer IOSB in Karlsruhe, Germany, the India based system integrator Kalycito and the Open Source Automation Development Lab (OSADL) founded a joint interest working group. This group launched a community project and distributed a call for contributions in form of a Letter of Intent of project phase #1. This Letter of Intent was signed by the working group participants

a) Heidelberger Druckmaschinen AG
b) Kontron AG
c) Linutronix GmbH
d) Pilz GmbH & Co. KG
e) SICK AG
f) TQ-Systems GmbH

which resulted in sufficient funding to execute the project in addition to the contributions made by Fraunhofer IOSB, Kalycito and OSADL. The support of all participants is gratefully acknowledged.

The software that was created during the project phase #1 from January to March 2018 was merged gradually into the existing open62541 repository in April 2018. The implemented features are

a) brokerless OPC UA PubSub via IP multicast and the binary message encoding format according to the draft of part 14 of the OPC UA specification,
b) integration of the publisher in a regular OPC UA server with additional real-time interrupting,
c) implementation of the subscribers as standalone software, and
d) a first step towards secure client/server communication.

Another result of the project phase #1 was the creation of a demonstrator that was exhibited at Embedded World 2018 in Nuremberg, Germany. The following hardware platforms were integrated into and running on the demonstrator:

a) Intel Atom/I210 by TQ-Systems
b) Dual chip solution with ARM Cortex M4 + TSN switch by Analog Devices
c) FPGA-TSN Cyclone V SoC by Intel PSG/Altera
d) FPGA-TSN Zync SoC by Xilinx

Letter of Intent of project phase #2 of the community project

After the successful completion of the above described project phase #1, there is now an OPC UA implementation available that can be used by industry with rich generic features ready to be combined with a proprietary technology and application to deliver tangible outcomes to customers. While a very affordable total cost of ownership is a key differentiator of this joint initiative, the market demands longevity, maturity and commercial support alongside such a program. It, thus, is the aim of this Letter of Intent of project phase #2 to launch a subsequent community project that fills the gap to use the existing OPC UA PubSub over TSN software components in real products and release them to the industry and automation market.

Benefits for the entire community

In more detail, the community project described herein aims to develop and provide the following minimum guaranteed deliverables:

a) At least one Linux real-time hardware platform is consistently implemented under an Open Source license and runs the following software components:
   i. Linux real-time
   ii. open62541
   iii. Linux PTP
   iv. Netconf
   v. LLDP
b) The existing OPC UA PubSub implementation will be extended with additional features and tools such as for configuration and deployment.
c) The existing OPC UA PubSub implementation will be made production ready.
d) The full set of features for secure communication will be added.
e) Tools and scripts and a library switch will be provided to optionally equip the OPC UA PubSub implementation with the various TSN features to ensure real-time communication.
f) The open62541 SDK will be readied for certification of the "Embedded OPC UA Server Profile" by the OPC Foundation.
g) The demonstrator and other hardware that will be used in the project is kept in the OSADL test farm (certified performance, stability and quality results)
h) Additional whitepapers on the technology and performance will be provided similar to the one that is part of this Letter of Intent (see appendix)

Additional exclusive benefits for contributors (depending on contribution level)

a) The OPC UA PubSub implementation will be integrated into hardware platforms and software products of contributors and tested for performance and stability.
b) Contributors will receive assistance in the certification process for their hardware and software products based on open62541. The targeted certification level is the “Embedded UA Server Profile”.
c) Contributors will possibly receive assistance in the certification of OPC UA PubSub, if certification is offered by the OPC Foundation during the project time frame.
d) Contributors will have early access to the technology and the code.
e) Contributors will receive hotline support.
f) Contributors may participate at technology workshops.

Project management, software development and testing

The technical project management, acquisition of contributors and implementation of TSN drivers into the Linux kernel and other software components that form the complete OPC UA/TSN distribution will be provided or outsourced by Kalycito. The OPC UA and related software shall be developed by Fraunhofer IOSB. Project management, book keeping, marketing and acquisition of contributors as well as testing will be in the hands of OSADL. OSADL will also provide booth space at the exhibitions

SPS IPC Drives 2018 and embedded world 2019 in Nuremberg/Germany to demonstrate the progress of the project, and OSADL will provide related press and marketing material.

Budget

The estimated minimum budget threshold required for project phase #2 is 120,000 euros and will be used in the following way:

Fraunhofer IOSB, OPC UA software development	50,000 euros
Kalycito, software development, assistance for certification	50,000 euros
OSADL, project management, software development and testing	20,000 euros
	120,000 euros

Any obtained funding above this threshold will go towards developing additional features on top of the minimum guaranteed deliverables. In this case, funding is forwarded to the three organizations in the same distribution as indicated above. Development of custom components such as configuration tools and any activities that require one-to-one development or support for a particular project participant will require a separate support contract.

Contribution levels

The following contribution levels are offered:

a) **Platinum-level contributors** will contribute 60,000 euros each plus 40,000 euros per each additional hardware platform that undergoes certification. One hardware platform is included.

b) **Gold-level contributors** will contribute 20,000 euros each.

c) **Silver-level contributors** will contribute 10,000 euros each.

Contribution benefits

a) Platinum-level contributors (preferably for semiconductor manufacturers)

i. Make the network controller hardware of this contributor one of the standard and preferred hardware platforms of the project and advertise accordingly, if desired.

ii. Get assistance in the preparation of a number of same network controller based hardware products with open62541 based software for certification by the OPC Foundation. Assistance for one hardware product is included in the base contribution.

iii. Have hardware platforms deployed in the OSADL testing farm for long-term latency and jitter measurements.

iv. Get early access to the technology and to the code.

v. Get a total of 30 hours hotline support.

vi. Participate in workshops (up to 12 employees).

b) Gold-level contributors (preferably for computer board manufacturers)

i. Get assistance in the preparation for certification by the OPC Foundation for one open62541 based software product that runs on the contributor's hardware.
ii. Have one open62541 based software solution of the contributor deployed in the OSADL test environment.
iii. Get early access to the technology and to the code.
iv. Get a total of 10 hours hotline support.
v. Participate in workshops (up to 4 employees).

c) Silver-level contributors

i. Get early access to the technology and to the code.
ii. Get a total of 5 hours hotline support.
iii. Participate in workshops (up to 2 employees).

Confidentiality and IP Issues

Any contribution or communication will be kept confidential on request of the Open Source OPC UA/TSN Ecosystem participants with the only exceptions that i) the software and accompanying material will be released under the Mozilla Public License 2.0 (MPL-2.0) and ii) example software and test programs will be released under the Creative Commons Zero v1.0 Universal (CC0-1.0).

Schedule

The project will be launched when and if a minimum threshold of 120,000 euros has been reached. The project is intended to start not later than end of November 2018 at the occasion of the SPS IPC Drives exhibition and last at least until embedded world exhibition in February 2019. The invoice of the project funds will be due in January 2019.

Agreed intent

By signing this Letter of Intent, the Open Source OPC UA/TSN Ecosystem participant agrees to accept the above-mentioned conditions in the final consortium agreement which will automatically be concluded when the funding threshold is reached without requiring further contracts. Withdrawal from the final agreement without any penalty shall be limited to the following condition

a) at least 120,000 euros estimated minimum budget is not committed by November 26, 2018.

In any other case, a penalty for breach of contract in the amount of 20 % of the accepted contribution to the budget shall be applicable. By signing this Letter of Intent, the Open Source OPC UA/TSN Ecosystem participant also agrees to join OSADL as Regular or Associate Member at Bronze, Silver or Gold level, if this is not yet the case.

Place of jurisdiction

This Letter of Intent will be governed by the laws of Germany, except for its conflicts of laws principles. The place of jurisdiction for all disputes arising from or in connection with this Letter of Intent shall be Mannheim, Germany.

Appendices

The performance of the existing Open Source OPC UA PubSub over TSN software developed so far is demonstrated in two whitepapers entitled “Open Source OPC UA PubSub over TSN for Realtime Industrial Communication” and “Real-time Open Source Solution for Industrial Communication Using OPC UA PubSub over TSN” that are part of this Letter of Intent. They also are available online under the URLs https://www.osadl.org/OPCUA-TSN-RT-IEEE/ and https://www.osadl.org/OPCUA-TSN-RT/, respectively.

Signatures

Open Source OPC UA/TSN Ecosystem participant:

Contribution level: ☐ **Platinum** with a total of _____* additional platforms

☐ **Gold**

☐ **Silver**

*may also be ordered later

Name of the company:

Location:

Date:

Name of the signatory or signatories:

Signatures:

Open Source Automation Development Lab (OSADL) eG:

Location:

Date:

Signatures:

General Manager or Member of the Board of Directors