

Request for Quotation

P_2020_04: ASAM OSI Further Development

ASAM calls for offers to support an ASAM project group for ASAM OSI 4.0.

- Please send your offers for this project to offers@asam.net.
- **Offers shall be submitted no later than Jan 10, 2022.**
- Interested parties can send an email to offers@asam.net for additional questions regarding the offer until Jan 3, 2022.
- Offer presentation will be in the week of Jan 10 – 14, 2022.

Project

The goal of the project is the further development of the ASAM OSI 3.x standard in both minor and major releases. As part of the major release decisions for an ASAM OSI 4.0 release, a decision on the potentially exclusive use of Google FlatBuffers instead of the currently used Google Protocol Buffers (protobuf) encoding for information transport must be made.

To base this decision in sufficient technical experience and performance considerations, a service provider is sought to perform the following set of tasks:

Tasks

The service provider is responsible for the completion of the following tasks

1. Port of open-source sensor models to OSI FlatBuffers

This task takes existing OSI protobuf based sensor models and ports them to the ASAM OSI FlatBuffers version available since ASAM OSI 3.4.

The first model is the OSMPDummySensor model, which is used for explanatory purposes.

The second model will be an Open Source reflection-based sensor model, like, e.g. the reflection_based_lidar_object_model made available by the SETLevel research project

(https://gitlab.setlevel.de/open/models/perception-sensor-models/reflection_based_lidar_object_model). The service provider may suggest a more suitable model for achieving the goals of the overall project if they deem this to be necessary.

- Port of OSMPDummySensor model to OSI FlatBuffers
 - The focus of this task lies in providing sample code utilizing the OSI FlatBuffers version for educational purposes and as a base line. No new functionality besides the handling of OSI FlatBuffer SensorView and SensorData messages at the currently supported level is required.
 - The result of the port shall be delivered as a Pull Request against the ASAM OSMP GitHub repository and shall be presented and discussed at an ASAM OSI CCB meeting.
- Port of Open Source reflection-based sensor model to OSI FlatBuffers
 - The focus of this task lies in providing implementation experience in utilizing the OSI FlatBuffers version and to serve as a basis for the performance analysis task.

- The result of the port shall be delivered as a Pull Request or Patch against the source repository of the sensor model and shall be presented at an ASAM OSI CCB meeting. This presentation shall also include an assessment on the effort and pitfalls encountered in the port.

2. OSI FlatBuffers SensorView generation

This task takes existing OSI protobuf based SensorView sources and ports them to the ASAM OSI FlatBuffers version available since ASAM OSI 3.4.

The first source is the OSMPDummySource model, which is used for explanatory purposes.

The second source will be used to enable the performance analysis task on the reflection-based sensor model of Task 1.

- Port of OSMPDummySource model to OSI FlatBuffers
 - The result of the port shall be delivered as a Pull Request against the ASAM OSMP GitHub repository and shall be presented and discussed at an ASAM OSI CCB meeting.
- Creation of a suitable SensorView input source for the reflection-based sensor model for performance analysis:
 - This task will be pursued either through enhancements of the OSMPDummySource FMU, or through other means of creating the required OSI protobuf and OSI FlatBuffers SensorView inputs, like e.g. conversion of protobuf-based trace files or use of adjusted implementations.
 - The result of this shall be delivered in executable and analyzable form. To the extent that this source is based on open-source software, sources shall be made available as per the relevant licenses.

3. Performance Analysis of OSI FlatBuffers vs. OSI protobuf

Based on the results of the preceding tasks a performance analysis setup is created that allows the execution and performance analysis (time measurement, file size) of the reflection-based sensor model in protobuf and FlatBuffers variants.

- Based on the results of the preceding tasks a simulation setup is generated that allows the execution and time measurement of the open-source reflection-based sensor model in protobuf and FlatBuffers variants for the purposes of performance measurement.
- Relevant test scripts or other infrastructure are created as needed to cause the sensor model to perform its function for a long enough duration and in a representative way, so that representative performance measurements can be performed.
- Representative performance measurements into the sensor model (encoding and decoding functionalities) and, where possible, into the input SensorView generation (encoding step) are performed, analyzed and documented in a performance analysis report to be presented at an ASAM OSI CCB meeting.

Deliverables

The following deliverables will be incorporated into ASAM OSI/OSMP 3.5 releases or will be used as a decision basis for an ASAM OSI 4.0 development project:

- Ported OSMPDummySensor FlatBuffers model variant provided as a Pull Request against ASAM OSMP GitHub repository.

- Ported Open-Source reflection-based sensor model in FlatBuffers model variant in Open-Source form.
- Ported OSMPDummySource FlatBuffers model variant provided as a Pull Request against ASAM OSMP GitHub repository.
- Any further infrastructure needed to run the ported Open-Source reflection-based sensor model for the generation of performance analysis report with the exception of required FMU simulators or other simulation engines.
- Performance analysis report of ported Open-Source reflection-based sensor model in FlatBuffers vs. protobuf versions.
- Experience report of porting effort and pitfalls encountered during the porting of the reflection-based sensor model from OSI protobuf to OSI FlatBuffers implementations.

Qualification

In order to be able to carry out the tasks, the service provider shall meet the following conditions:

- Expertise in ASAM OSI/OSMP especially with regard to sensor modelling.
- Expertise in Google Protocol Buffers and FlatBuffers Encodings and Language Bindings.
- Expertise in Open-Source development.
- Expertise in C/C++ development.
- Expertise in code benchmarking and performance analysis.
- Familiarity with Simulation Tools supporting ASAM OSI®.
- High proficiency in English.

General Conditions

Please note the following general conditions for the project.

- The project period is from Jan 18- Mar 31, 2022.
- Offers have to be preferably fixed-price. The offer shall itemize the costs for the tasks, as described above.
- In case of variable-price offers, please indicate upper limits for the costs.
- All work results of the project (including the sources to create them) will be in the public domain. They will be added to the existing open-source projects (includes ASAM OSI®) or open-sourced in agreement with ASAM. If the general terms & conditions of the service provider contain rules that are in conflict herewith, then they must be identified and explicitly declared as invalid for this offer.
- Offers have to be submitted in writing to ASAM within the above stated bidding period, including a clear description of the provided services and deliverables, terms & conditions, time period and costs for the service.
- Please note that offers will be reviewed by the members of the project group, the Technical Steering Committee of ASAM and the ASAM Office. The project group members will not receive pricing information. For this purpose, please put all pricing information on a separate page.