Bridge

System Description

Abstract
This is the template for System of Systems Description (SoSD document) according to the Eclipse Arrowehad documentation structure.

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1 Overview

This document describes the Bridge system of systems (SoS), which provides maintanence predictions.

The rest of this document is organized as follows. In Section 1.1, we reference major prior art capabilitites of the SoS. In Section 1.2, we the intended usage of the SoS. In Section 1.3, we describe fundmental properties provided by the SoS. In Section 1.4, we describe de-limitations of capabilitites ofn the SoS. In Section 2, we describe the microsystem (abstract level with references to their SysDs) which constitutes the SoS. In Section 3, we describe the security capabilitites of the SoS.

1.1 Significant Prior Art

Needs a central database and a central AI model that will be used for federated learning.

1.2 How This SoS Is Meant to Be Used

This system is meant to monitor a single bridge. Through the help of the local AI model it will help maintenance team to prevent any accident related to wear and tear from weather conditions and passing traffic.

1.3 SoS functionalities and properties

Narrative describe system functionalities and properties (no implmentation details) like e.g.:

1.3.1 Functional properties of the SoS

SoS collects necessary data and tries to make a prediction for when a bride is required to have a maintenance.

1.3.2 Configuration of SoS properties

Each instance of this SoS has 4 sensors, one local AI model and one central data processor.

1.3.3 Data stored by the individual microsystem

Data is stored inside the data processor, but only for the past 10 day. For any other data before that you need to look at the central database.

1.3.4 Non functional properties

- Uses only secure channels to communicate with other SoS,
- uses RSA encryption for data,
- Varied energy consumption,
- low latency,
- All sensor except the traffic sensor sample every 10 min

1.4 Important Delimitations

It doesn't store all the data, only past ten days. It requires a central AI model that it can use for the federated learning. It only predicts the chance that the bridge requires maintenance meaning it does not tell exactly where or when the bridge requires maintenance.

2 Services

2.1 Produced service

- databaseData
- model

2.2 Consumed services

- model

3 Security

the system can be started in Arrowhead secure mode. All unauthorized data or orders are ignored.

3.1 Security model

The following points should be described:

- https
- RSA data encryption
- Uses authenticator microsystem.
- Only two micro-systems are authorized to produce services that go out of the SoS, data processor and AI model.

4 References

5 Revision History

5.1 Amendments

Revision history and Quality assurance as per examples below

No.	Date	Version	Subject of Amendments	Author
1	2023-08- 10	5.0.0		Jerker Delsing
2				
3				

5.2 Quality Assurance

No.	Date	Version	Approved by
1	2022-01-10	5.0.0	