Weather Sensors

System Description

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

Contents

1 Overview

This document describes the Weather sensors system, which provides all the measurements of the sensors network of temperature, humidity, pressure, and wind speed. This enables the controller to detect if the weather conditions are extreme.

The rest of this document is organized as follows. In Section **??**, we reference major prior art capabilities of the system. In Section 1.1, we describe the intended usage of the system. In Section 1.2, we describe fundamental properties provided by the system. In Section 1.3, we describe delimitations of capabilities ofn the system. In Section 2, we describe the abstract service functions consumed or produced by the system. In Section 3, we describe the security capabilities of the system.

1.1 How This System Is Meant to Be Used

This system is used to send the values of all the sensors of the network to the controller as a list of WeatherResponse type which provides an integer id to the values.

1.2 System functionalities and properties

1.2.1 Functional properties of the system

- The system has the raw data and forwards it.

1.2.2 Configuration of system properties

1.2.3 Data stored by the system

The raw data is stored as a CSV file. It is internally processed to be stored in an map database within the system.

1.2.4 Non functional properties

- security: HTTP and arrowhead certificates
- Stateful: the data about the measurements of the sensors is kept in memory by the in-memory database (InMemoryWeatherSensorDB). The system keeps a persistent state while it is running.

1.3 Important Delimitations

The system can be delimited by the latency of the network and more importantly by the maintenance of the sensors, if the sensors are covered with snow for example, the measures become inaccurate.

1.4 Publishing of Contract Events

As also already illustrated in the beginning of this section, the system announces its destruction to subscribers within its local cloud. It should be noted that those announcements do not contain the concrete messages received by the systems. Rather, the event messages managed by the EventPublishEvent Publish contain three particularly significant fields, which are

1. a UTF-8 string event identifier,
2. a collection of metadata and
3. a UTF-8 string payload.

Concretely, those fields are populated as follows:

Field	Description
Event Identifier	Must be set to `PresetEventType.PUBLISHER_DESTROYED.getEventTypeName()`.
Metadata	Must contain the metadata related to the event. In this case, it is set to `null`.
Payload	The payload of the event, set to `PublisherConstants.PUBLISHR_DESTROYED_EVENT_PAYLOAD`.

When a subscriber is notified about the existence of a message of destruction, it uses the publishToEventHandler method of the arrowheadService to publish the event. The publishDestroyedEvent method constructs an EventPublishRequestDTO object with the event type, source system details, metadata, payload, and timestamp, and then publishes it to the event handler.

2 Services

2.1 Consumed Services

2.1.1 ServiceRegistryService Registry

This service is consumed to make sure that the Weather Sensors system becomes accessible to other systems.

2.1.2 EventPublishEvent Publish

This service is used to announce the destruction of the system to the subscribers.

2.2 Produced service

The produced service is ”getWeatherSensors”. The service sends formatted data to the Controller system.

3 Security

- The Weather Sensors system utilizes secure protocols such as:
  - HTTP/HTTPS: For web-based communication, with HTTPS ensuring secure communication via encryption.
- The system performs strict authorization checks before providing services, based on:
  - Arrowhead Authorisation System: This checks the legitimacy of service requests within the Arrowhead ecosystem, ensuring that services are only consumed by authorized actors.

For Arrowhead certificate profile see github.com/eclipse-arrowhead/documentation

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	2020-12-05	X.Y.Z		Tanyi Szvetlin
2	2021-07-14	X.Y.Z	Minor updates	Jerker Delsing
3	2022-01-12	X.Y.Z	Minor updates	Jerker Delsing

5.2 Quality Assurance

No.	Date	Version	Approved by
1	2022-01-10	X.Y.Z	