Lamp

System Description

Abstract
This document provides the system description for the **Lamp System**.

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1 Overview

This document describes the Lamp system, which provides automated room lighting and must be controlled by another system.

The rest of this document is organized as follows. In Section 1.1, we reference major prior art capabilities of the system. In Section 1.2, we describe the intended usage of the system. In Section 1.3, we describe fundamental properties provided by the system. In Section 1.4, we describe delimitations of capabilities of 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.

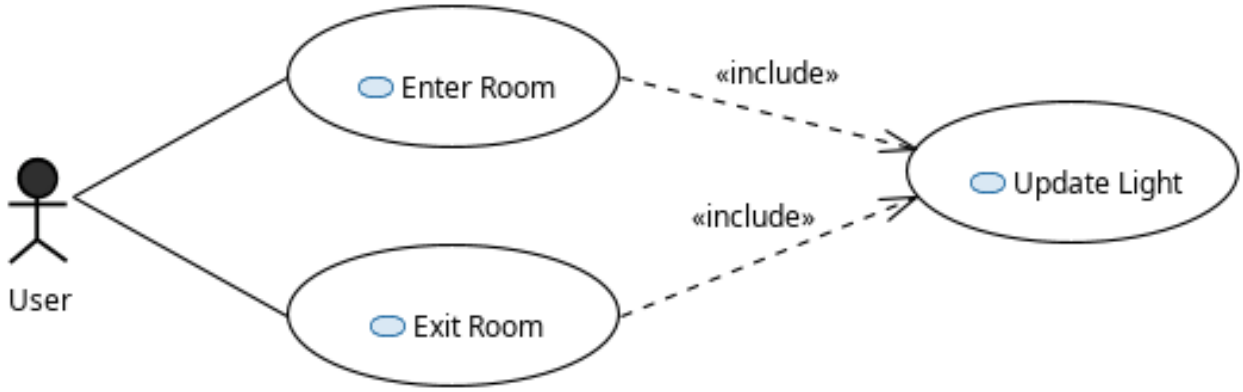

Figure 1: SysML use case diagram. A user can enter a room and the light will be turned on, depending on the movement of the person. A user can also leave a room and if no other person is in the room, the light will be turned off.

1.1 Significant Prior Art

The light is generated by an efficient LED, which is very energy efficient and can shine very brightly. The power source is a standard AA battery with a minimum voltage of 1.5V.

1.2 How This System Is Meant to Be Used

The lamp is a component of the smart home local cloud, serving as the primary source of light generation within a room. It seamlessly integrates with other smart devices in the network, enabling users to create personalized lighting scenarios and automate various tasks. For instance, users can set the lamp to turn on and off at specific times, or even synchronize with other devices to enable automatic lighting effects. This feature enhances convenience and energy efficiency.

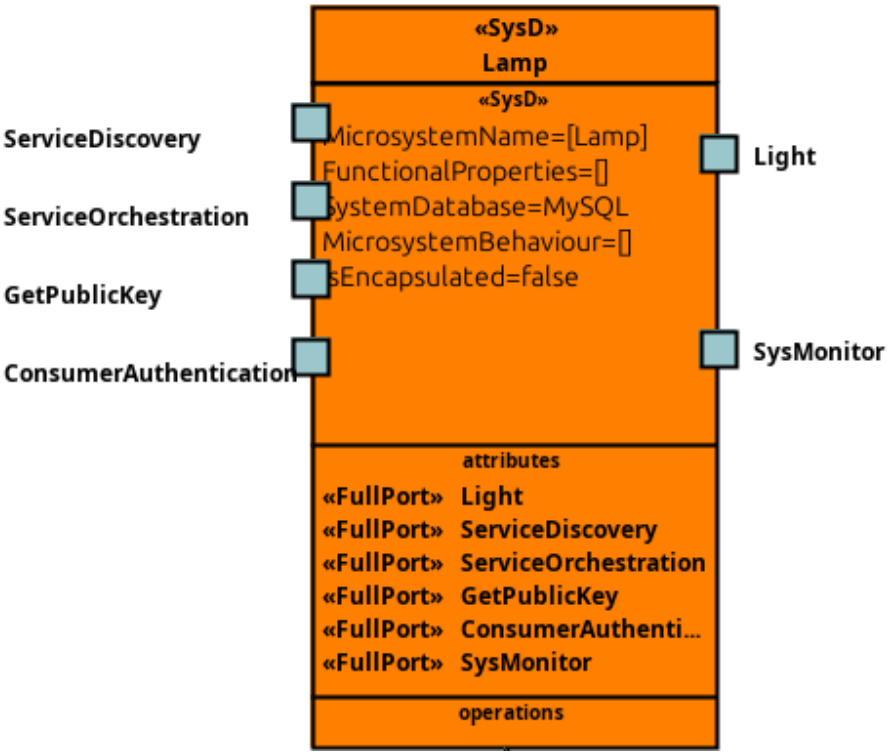

Figure 2: System Definition Block Diagram of the Lamp

1.3 System functionalities and properties

1.3.1 Functional properties of the system

The Lamp solves the following needs to fulfill the requirements of light control in a room.

- Enables a system operator to control the light.
- Enables others to implement a light saving system.

1.3.2 Data stored by the system

In order to achieve the mentioned functionalities, the Lamp is capable to store the current status of light as a boolean value (on=true, off=false).

1.3.3 Non-functional properties

The lamp is built with a small AA batterie, which minimizes the risk of an electric shock, but can still lead to the emission of sparks in the worst case. The light is generated with a LED, so the energy consumption is low. The lamp does not turn off on its on, so power saving capabilities must be managed by the controller of the lamp.

1.4 Important Delimitations

The system's primary function is to provide illumination for a single room, with no additional features or capabilities. It is designed specifically for use as a stationary lamp within a room, though it can be repositioned within the same space. The lamp does not support dimming or color adjustment. This simplifies the requirements for the AI system, which only needs to determine whether the lamp should be switched on or off.

2 Services

2.1 Produced service

2.1.1 service Light

The purpose of this service is to provide a possibility to determine, whether light should be emitted or not. The service is offered for the application system. See Light SD document for more details.

2.1.2 service SysMonitor

The purpose of this service is to generate monitoring data for a consumer with the current status of the lamp. The service is offered for the application system. See MicrosystemMonitor SD document for more details.

2.2 Consumed services

2.2.1 service ServiceDiscovery

The purpose of this service is to be discoverable by the system. It is part of the Arrowhead core system. See ServiceDiscovery SD for more details.

2.2.2 service ServiceOrchestration

The purpose of this service is to be orchestrated by the system. It is part of the Arrowhead core system. See ServiceOrchestration SD for more details.

2.2.3 service GetPublicKey

The purpose of this service is to provide authorization capabilities. It is part of the Arrowhead core system. See GetPublicKey SD for more details.

2.2.4 service ConsumerAuthentication

The purpose of this service is to provide authentication capabilities. It is part of the Arrowhead core system. See ConsumerAuthentication SD for more details.

3 Security

The security of Eclipse Arrowhead — and therefore the security of the Lamp — is relying on X.509 certificate trust chains. The Arrowhead trust chain consists of three levels:

- Master certificate: `arrowhead.eu`
- Cloud certificate: `my-smarthome.smarthome.arrowhead.eu`
- Client certificate: `my-lamp.my-smarthome.smarthome.arrowhead.eu`

For Arrowhead certificate profile, see: `https://github.com/eclipse-arrowhead/documentation`
The system does not contain configuration for Arrowhead unsecure/ secure mode.

4 Revision History

4.1 Amendments

No.	Date	Version	Subject of Amendments	Author
1	2024-10-12	4.6.2		Max Lütkemeyer

4.2 Quality Assurance

No.	Date	Version	Approved by
1	2024-10-12	4.6.2	