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System Description (SysD) – Arrowhead Zwave System Demonstrator		SysD
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System Description (SysD) – Arrowhead Zwave System Demonstrator

Abstract

This document provides the System Description of Zwave Compliant Arrowhead System. The system provides the services to control the zwave devices, such as Wall Plug and Thermostat using secure HTTP.

www.arrowhead.eu

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1. System Description Overview:

The Arrowhead Zwave System Demonstrator is a SOS with a Z-wave Controller, a Z-wave compliant Dasnfoss Thermostat Valve and a Z-wave compliant Fibaro Wall Plug which all behave as service providers in the arrowhead framework and the consumer connect to these devices and consumes their services.

- The Zwave controller provider system get the metadata and services available of the live zwave devices in the network. It performs first exclusion of all the devices then inclusion to remove all the dead devices and only get the metadata and services of live devices. Then it registers these devices and corresponding services into the service registry.
- The Consumer will first send the orchestration request for getting the z-wave device list service to get all the available devices connected to z-wave controller.
- After the list of devices with unique device ids and their types is received from zwave controller service provider, it will use the device ids and device types to request for different kind of services.
- The consumer request get-setpoint-thermo from Thermostat provider after getting the orchestration response for get-setpoint-thermo service to receive the current setpoint value from Thermostat Valve while the Thermostat provider also stores the value with the timestamp into its inherent DataManager.
- The consumer then requests get-set-point-history from Thermostat provider after getting the orchestration response for get-setpoint-history service to receive the

records of setpoint value history stored in the Thermostat Provider inherent DataManager.

- Then the consumer requests switch-plug-state from Plug provider after getting the orchestration response for it to First Turn OFF the Switch then Turn it ON after 5 seconds.

Following is the Hardware used for this Project

- Raspberry Pi 4.0
- Z-Wave hat
- Fibaro Z-Wave electrical Outlet PLUG
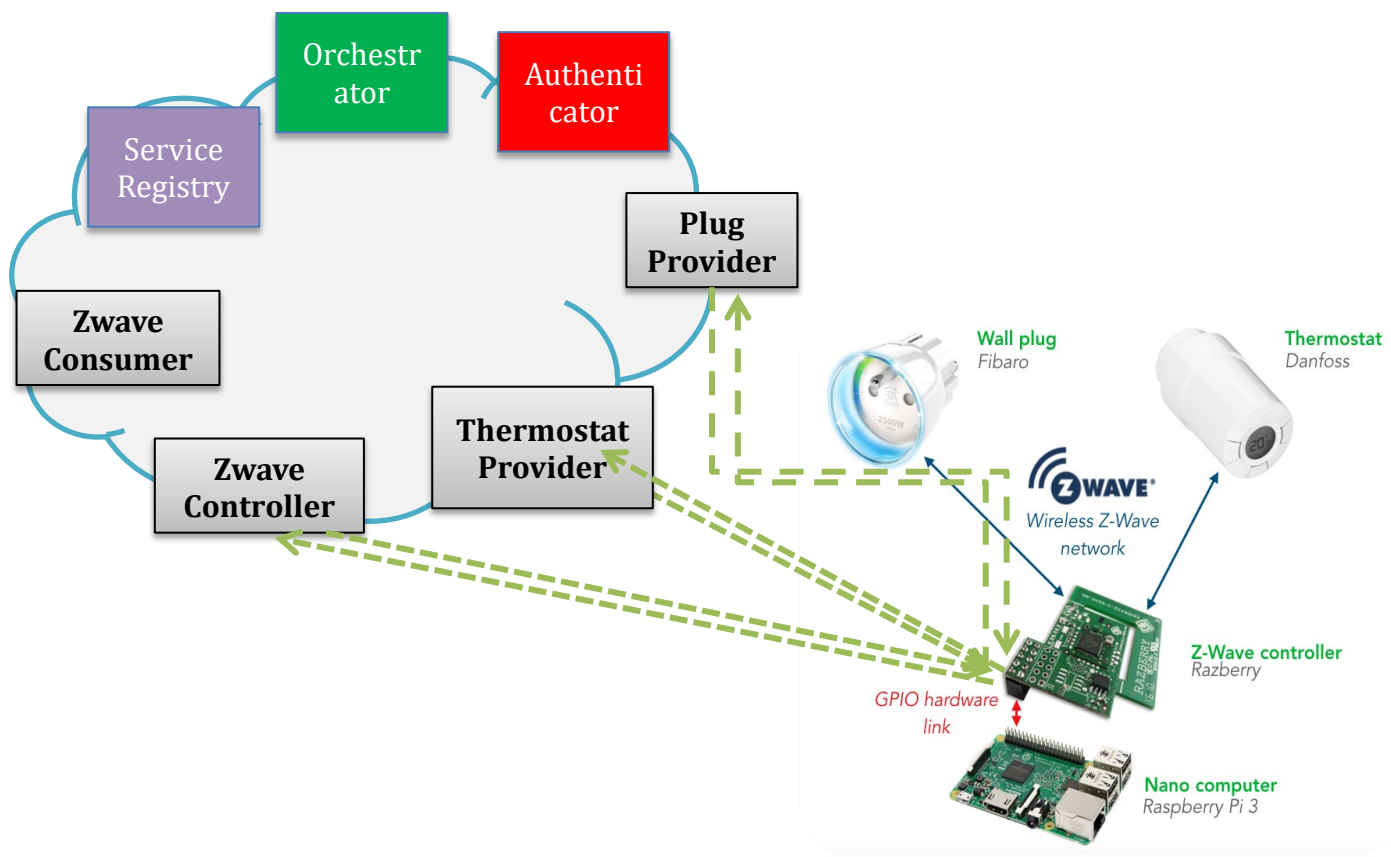- Danfoss Z-Wave radiator valve Thermostat

Figure 1 Arrowhead and Zwave Setup
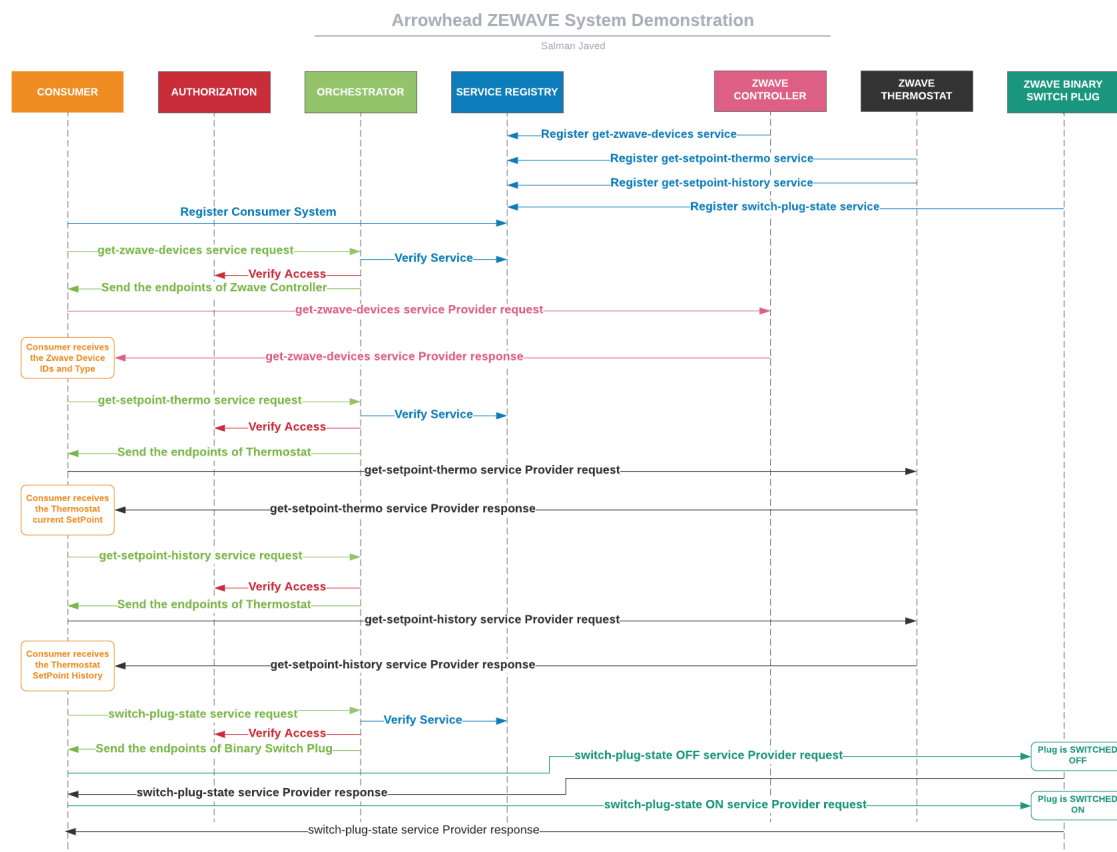
2. Behaviour Diagrams

Figure 2 Behavior Diagram showing the interaction of Zwave devices Provider systems with the Arrowhead core systems and Consumer System

3. Application services

This system provides four services:

3.1. Produced Services

Table 1 Pointers to IDD documents

Service	IDD Document Reference
live-zwave-devices	IDD Interface Design Description_Arrowhead_Zwave_System_Demonstrator_ZwaveController.docx

get-state	IDD Interface Design Description_Arrowhead_Zwave_System_Demonstrator_WallPlug-State-Services.docx
set-state	IDD Interface Design Description_Arrowhead_Zwave_System_Demonstrator_WallPlug-State-Services.docx
get-power	IDD Interface Design Description_Arrowhead_Zwave_System_Demonstrator_WallPlugEnergyServices.docx
get-energy-consumption	IDD Interface Design Description_Arrowhead_Zwave_System_Demonstrator_WallPlugEnergyServices.docx
set-energy-counter-reset	IDD Interface Design Description_Arrowhead_Zwave_System_Demonstrator_WallPlugEnergyServices.docx
get-setpoint	IDD Interface Design Description_Arrowhead_Zwave_System_Demonstrator_Thermostat-SetPoint-Services.docx
set-setpoint	IDD Interface Design Description_Arrowhead_Zwave_System_Demonstrator_Thermostat-SetPoint-Services.docx
get-battery-level	IDD Interface Design Description_Arrowhead_Zwave_System_Demonstrator_ThermostatBatteryLevelServices.docx

3.2. Consumed Services

Table 2 Pointers to IDD documents

Service	IDD Document Reference
Authorization Core Service	Arrowhead AuthorizationControl Service G4.0 IDD.docx
Orchestration Core Service	Arrowhead Orchestration Service G4.0 IDD.docx
Service Registry Core Service	Arrowhead ServiceDiscovery Service G4.0 IDD.docx

4. Security

The system is using the HTTPS-SECURE-JSON security interface. Each system both consumer and providers are using their corresponding client certificate for secure communication. Authorization core system is responsible for the access verification and token generation during the provider and consumer interaction.

5. References

https://github.com/arrowhead-f/core-java-spring
https://github.com/arrowhead-f/sos-examples-spring

6. Revision history

6.1.   Amendments

	Date	Version	Subject of Amendments	Author
	2021-01-6	0.1	First draft	Salman Javed
	2021-03-18	0.2	Second Draft	Salman Javed

6.2.   Quality Assurance

No.	Date	Version	Approved by
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