Enhancement activities to oneM2M open sources

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Contents

• Overview on Open Source Software Design and Implementation

• Enhancement activities
  • Adopting new database
  • Drag-and-Drop resource modelling
  • Add bindings
  • Interworking proxies
  • Dashboard
Introduction to Open Source SW Class

• Open source software design and implementation class
  • University: Sejong University
  • Objective: Introduce open source software projects and encourage students to contribute to open source communities (targeting oneM2M open source projects)
  • Duration: 01. Sep. 2023 ~ 15. Dec. 2023 (Open every year in autumn term)
  • Credits: 3 credits (3 hours in a week for 15 weeks)
  • Number of students: 30~40 students (5~8 teams)

• Curriculum
  • Introduction to IoT technologies (definition, history, network technologies, cloud platforms, etc.)
  • oneM2M introduction (architecture, bindings, APIs, main features, etc.)
  • Tutorials from open source communities: ACME (Andreas Kraft, Deutsche Telekom), OM2M (Sherzod, Synchtechno), Mobius (Hyeonseo Son, SJU), tinyIoT (Jieun Lee, SJU) → Installation, configuration, basic running commands, code analysis and review for platform and application
  • Git tutorials (history, overview, basic commands, etc.)
  • Final pitch for the team projects
Topics for OSSD team project

• 2018 ~ 2022
  • Development of IoT application or service using open source projects
  • Given basic sensor and development kits
  • Install oneM2M IN-CSE, develop device (Raspberry pi + sensors), develop web-app

• 2023
  • Adopting PostgreSQL database to ACME
  • **Drag-and-Drop resource modelling for tinyIoT and ACME**
  • Add CoAP bindings to tinyIoT
  • **Modbus Interworking proxy for OM2M**
  • Zibgee Interworking proxy for OM2M
  • Dashboards for Mobius
  • **Digital Twin Elevator**
Modbus / Zigbee Interworking

Modbus IPE
- Modbus master
- ADN-AE (gateway app)
- Data cache

Zigbee IPE
- Zigbee controller
- ADN-AE (gateway app)
- Data cache

MN-CSE
- Modbus IPE data
- Zigbee IPE data

IN-CSE

ADN-AE (dashboard app)
Drag&Drop Resource Modelling Tool

oneM2M Resource Modelling Tool

- Local storage
  - Save in .json format

Main Page (User Interaction)
- Main page
- Drag & Drop Resources
- Modelling oneM2M resources
- Hierarchical resource tree
- Resource validation
- Applicable to various platforms (ACME, Mobius, tinyIoT, etc.)

oneM2M Platforms
- Create request
  - HTTP or MQTT
- Retrieve CSE Attributes
- Resource & Attribute Validation check
- Creation Request by Hierarchical Addressing

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Drag&Drop Resource Modelling Tool

Main Modelling Page

Retrieve and Set CSE Attribute Automatically

Resource Attribute setting + Simple Explanation

Create:
Resource create requests to oneM2M server

Save:
Create date tree .json file in local storage

Load:
Load .json file from local storage and make resource tree
Digital Twin Application

• Development of a smart elevator system for energy saving

• Collect user data
  • Who pressed button?
  • Which level a button pressed?
  • Which level the passenger moved?

• Final expected dataset
  • Statistic of passengers
  • Actual elevator movement with time stamp
  • Energy usage (based on ISO standardized algorithm)
Thank you!