oneM2M Developer Supports
for you to consider oneM2M adoption

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Outline

- oneM2M Developer Guides (TRs)

- oneM2M Open Source Implementations

- oneM2M Developer Tutorials

- oneM2M International Hackathons

- Other Activities Coming Up

oneM2M Developer Guides (TRs)

- Since Release 2, oneM2M has been publishing developer guide series in TRs
  - TR-0025-Application Developer Guide
  - TR-0034-Developer Guide CoAP binding and long polling for temperature monitoring
  - TR-0035-Developer guide of device management
  - TR-0038-Developer guide Implementing security example
  - TR-0039-Developer guide SDT-based implementation
  - TR-0045-Developer Guide Implementing Semantics
  - TR-0047-Developer Guide of 3GPP Interworking
  - TR-0051-oneM2M API guide

oneM2M Developer Guides (TRs)

- TR-0025-Application Developer Guide, for example
  - System configuration: Which oneM2M entities needs to be implemented and deployed?
  - Call flows: What are the use case scenarios for oneM2M actors?
  - Messages: What are the oneM2M defined request and response messages in XML/JSON over HTTP?
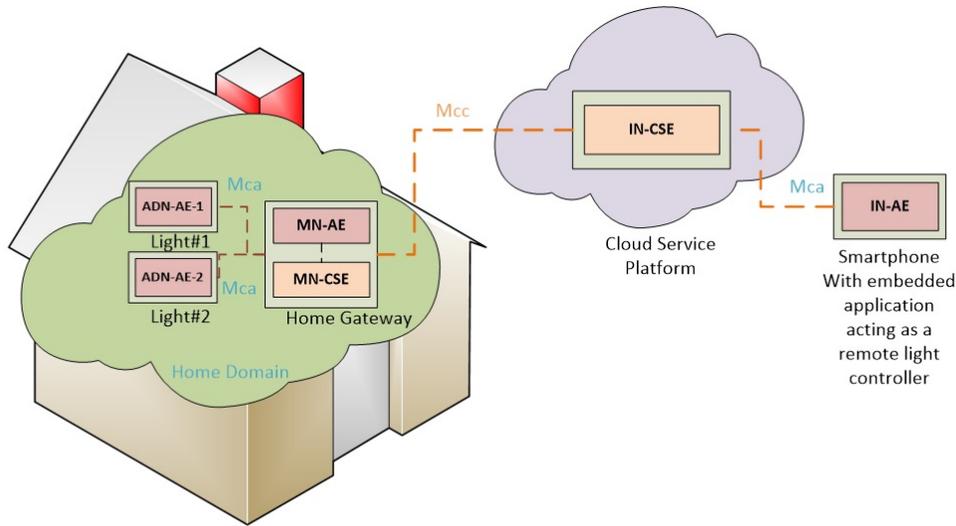

Figure 6-1: oneM2M functional architecture of remote lights control use case
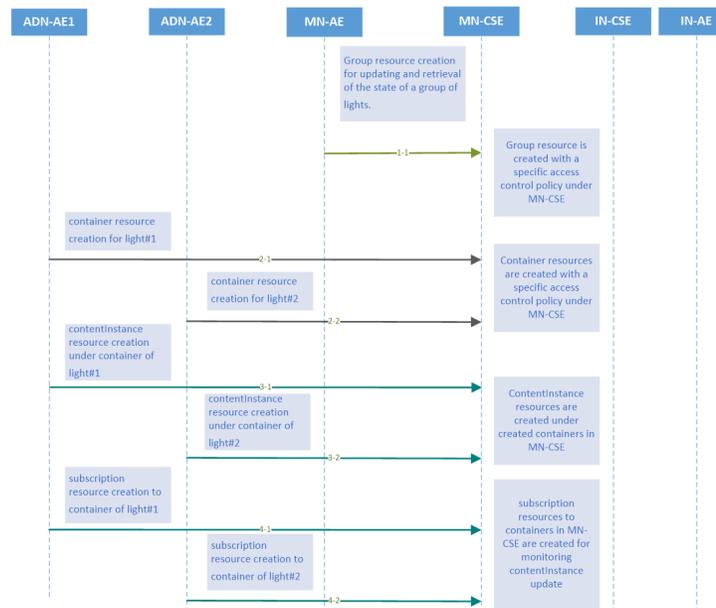
Figure 7.2.2-1: Initial resource creation phase call flows

```
GET /~/mn-cse/home_gateway/light_ae1/light/la HTTP/1.1
Host: in.provider.com:8080
X-M2M-Origin: /in-cse/Csmartphone_ae
X-M2M-RI: mncse-11223
Accept: application/json

HTTP Response:

200 OK
X-M2M-RSC: 2000
X-M2M-RI: mncse-11223
Content-Type: application/json

{
    "m2m:cin":
    {
        "ty":4,
        "ri":"cin-394798749",
        "pi":"cnt-181049109",
        "rn":"cin-394798749",
        "ct":"20150925T045938",
        "lt":"20150925T045938",
        "et":"20151107T154802",
        "st":0,
        "cnf":"text/plain:0",
        "cs":3,
        "con":"OFF"
    }
}
```

Open-Source Implementations

- Members support different projects for different dev. environments
  - Different open sources gives better opportunity for standard adoption

	OM2M Connecting things	[ACME]	OCEAN	OS IoT	tinyIoT
Lead	LAAS-CNRS	Andreas Kraft	KETI	atis	세종대학교 SEJONG UNIVERSITY
Homepage	www.eclipse.org/om2m	Github.com/ankraft/ACME-oneM2M-CSE/	developers.iotocean.org	os-iot.org	TBD ('23.11)
License	EPL 1.0	BSD 3-Clause	BSD 3-Clause	BSD 3-Clause	BSD 3-Clause
Offering	Platform	Platform	Platform, Dev Tools	Lightweight Dev API	Platform & Edge
Binding	HTTP, CoAP	HTTP, MQTT	HTTP, CoAP, MQTT, WebSocket	HTTP	HTTP, MQTT, CoAP (under dev.)
Format	XML, JSON	JSON, CBOR	XML, JSON, CBOR	XML, JSON	JSON
Language, Framework	Java / OSGi	Python	Node.js, Java	C++	C
Interworking	KNX, ZigBee, HUE, LoRa, SigFox, etc.	-	OCF, Nest, ZigBee, FIWARE, JawBone	-	Modbus

oneM2M Developer Tutorials

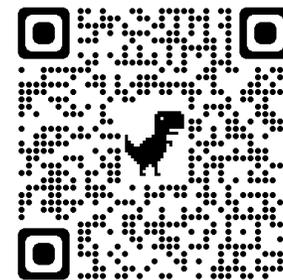- A series of developer tutorial videos are available on the web like Youtube
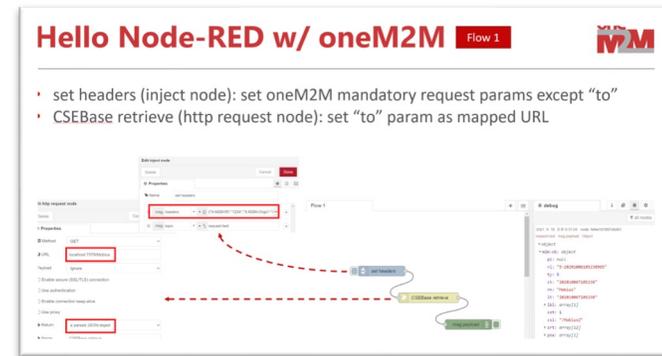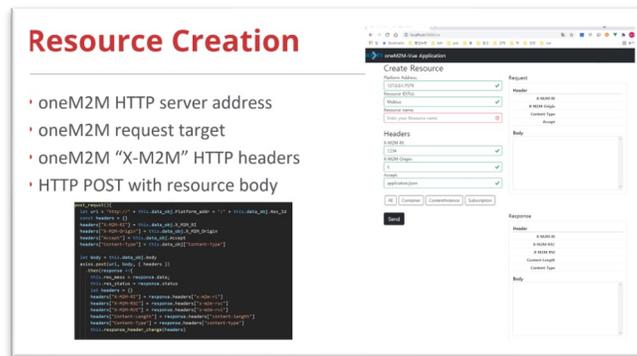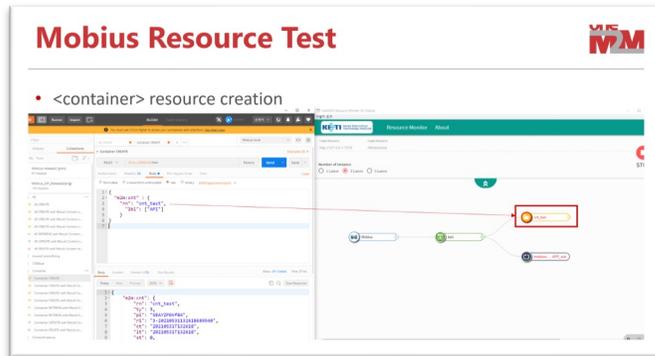
oneM2M Developers Tutorial 2020 (ENG, KETI)

oneM2M Developers Tutorial 2021 (KOR, KETI)

oneM2M Developers Tutorial 2022 (basics and advanced courses) (KOR, KETI)

MOOC (ENG, C-DOT)

Tutorial w/ Jupyter Notebook (ENG, DT)

oneM2M Developer Tutorials

- Tutorials from KETI are available 24/7 on the Youtube (ENG/KOR) and include
  - oneM2M Overview
  - oneM2M Platform (i.e. Mobius) and Tools
  - oneM2M Architecture and APIs
  - oneM2M Protocols
  - oneM2M Practice 101 (i.e. Postman and MQTT client)
  - oneM2M Practice 102 (i.e. Jupyter Notebook w/ javascript kernel)
  - oneM2M Virtual Devices
  - oneM2M Access Control
  - oneM2M Dashboard
  - oneM2M Interworking overview with SDT
  - oneM2M – ZigBee Interworking
  - oneM2M – LoRaWAN Interworking
  - oneM2M Node-RED Application
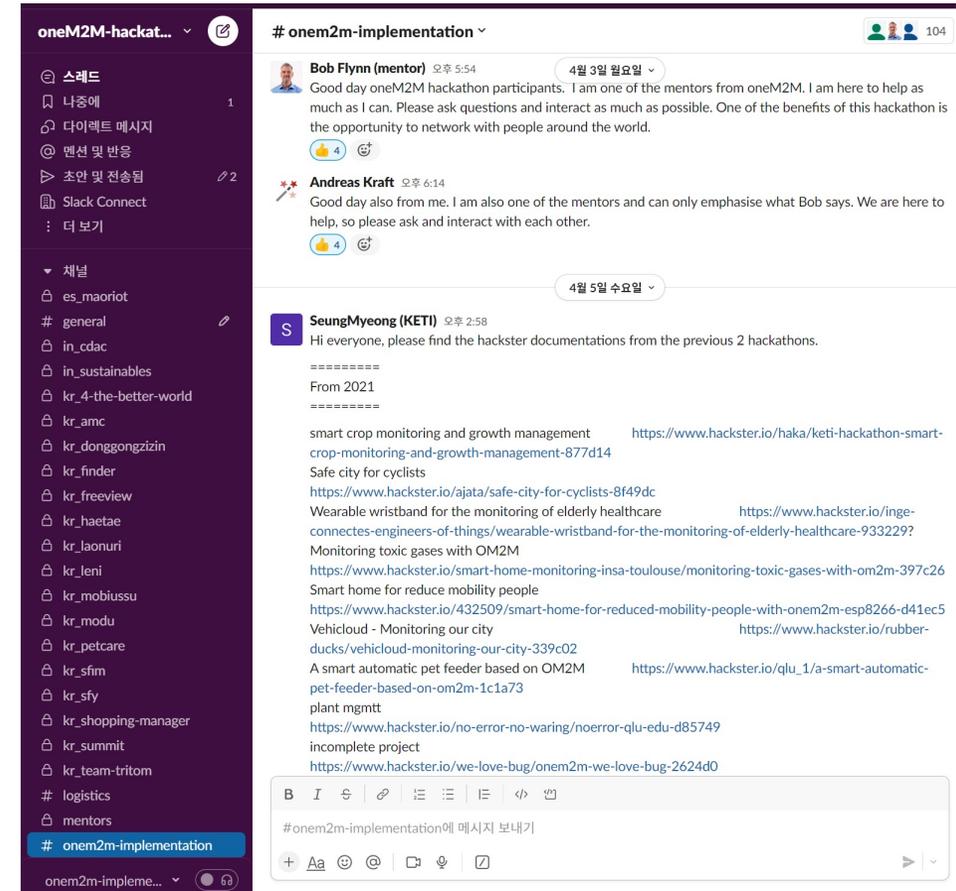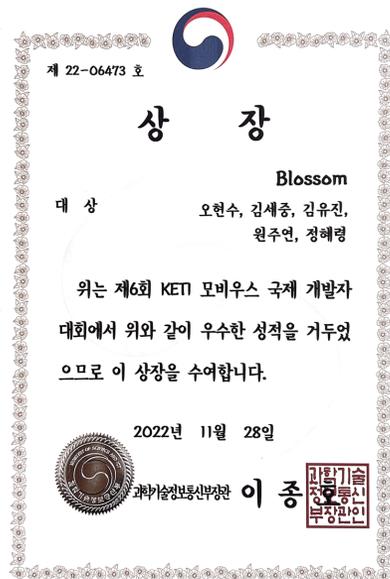 - oneM2M Vue.js Application

+ IoT Drone GCS (Ground Control System)
Digital Twin Interworking (w/ Unity 3D)

oneM2M 세미나 (2022 하반기)　　oneM2M 세미나 (2022 상반기)　　OCEAN Summit 2021　　ICT 표준 전문인력 양성 교육　　oneM2M tutorial

oneM2M International Hackathons

- There has been oneM2M hackathons by ETSI and Mobius developer events by KETI

- Since 2021, KETI, ETSI and TTA host oneM2M International Hackathon together, funded by KETI

- The hackathons are run online/remotely with tutorials and the mentors' support

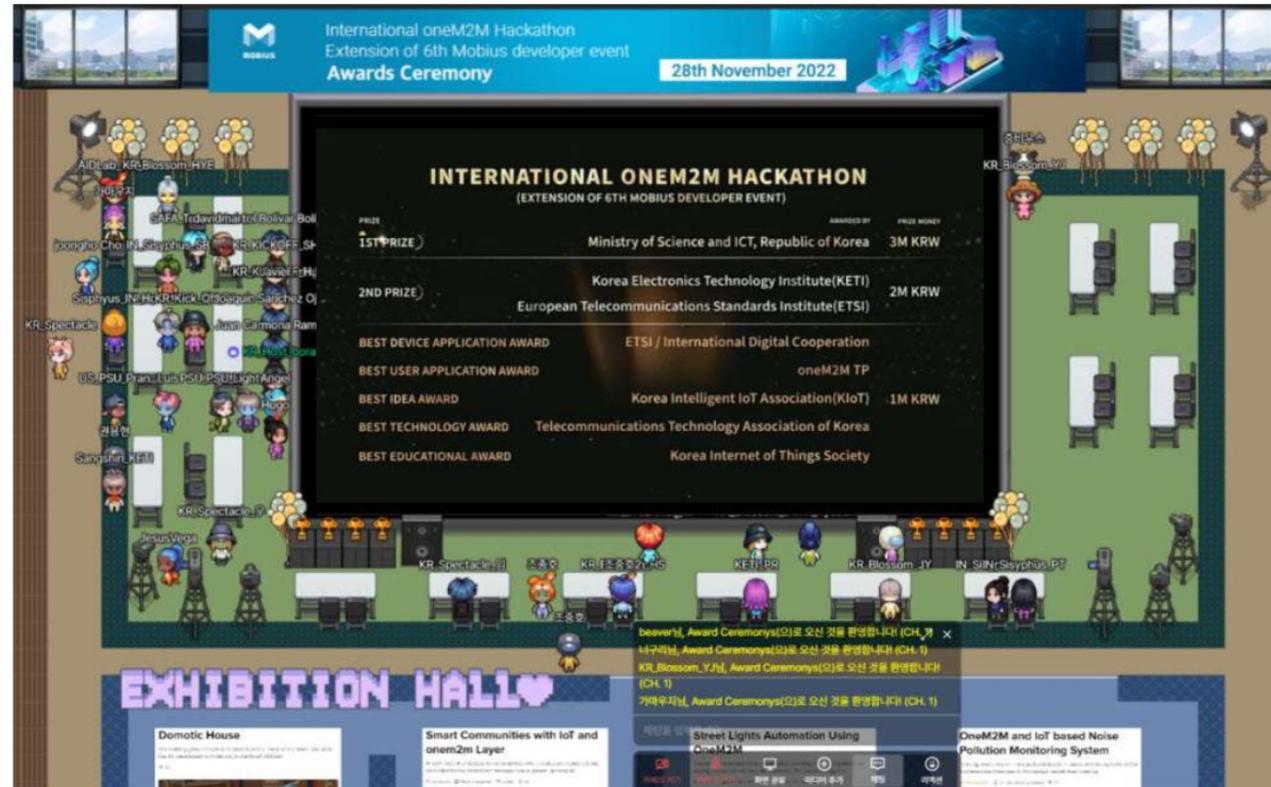# oneM2M International Hackathon (2021)
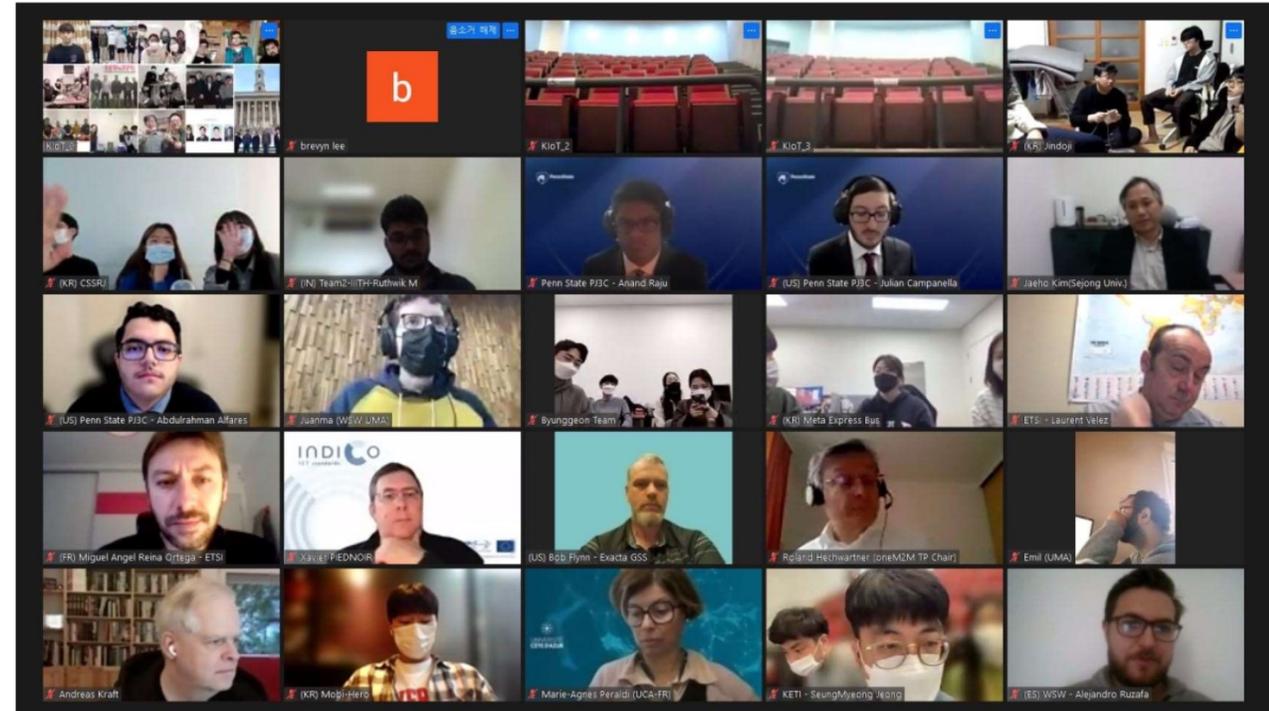
Winners

1st Prize: oneM2M Autonomous cooperative smart delivery system (KR)

2nd Prizes: Cellular IoT Irrigation System (US)
A smart automatic pet feeder (CN)

Video of the Hackathon Awards Ceremony

oneM2M International Hackathon (2022)

Video of the Hackathon Awards Ceremony

Winners

1st Prize: Fire Situation Monitoring System (KR)
2nd Prizes: Air quality monitoring system (AT)
Smart School Bus (KR)

Award Winners News (2022, 1st Prize)

INTERNATIONAL ONEM2M HACKATHON
(EXTENSION OF 6TH MOBIUS DEVELOPER EVENT)

1ST PRIZE

Yujin Kim

MINISTRY OF SCIENCE AND ICT, REPUBLIC OF KOREA

- TEAM NAME : BLOSSOM
- NATIONALITY : KOREA
- PROJECT NAME : FIRE EVACUTATION

3,000,000 KRW
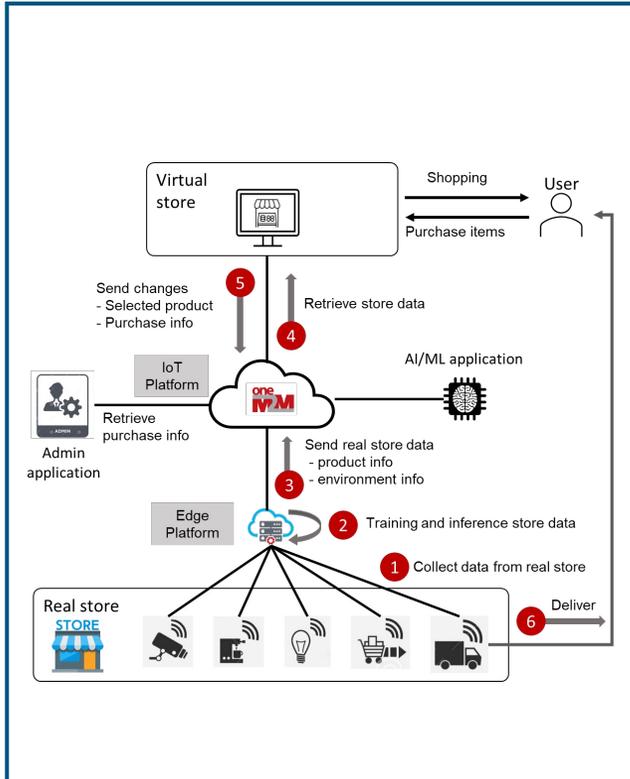ABOUT 2210 USD / 2150 EUR

Fire Situation Monitoring System Through Connection with DT

Fire Situation Monitoring System Through Connection with Digital Twin and Unmanned Smart Mobility Vehicles
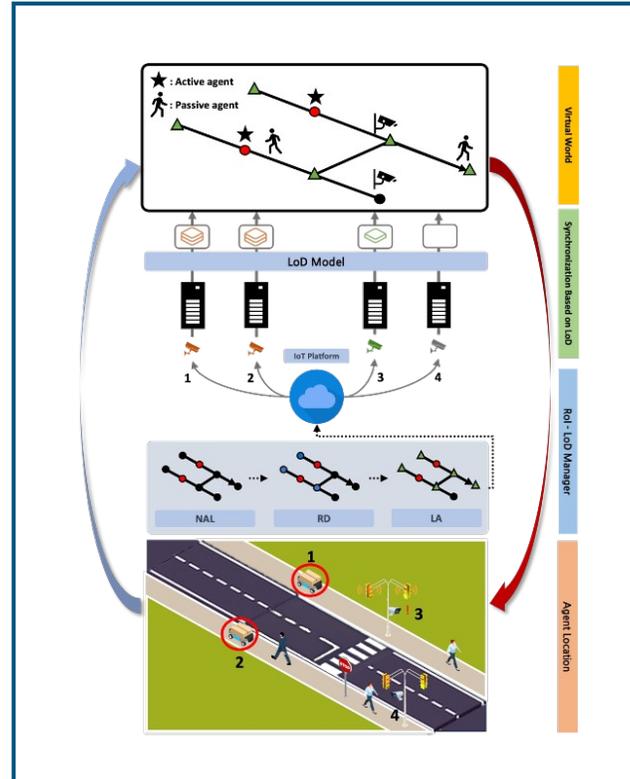
Advanced   Full instructions provided   588
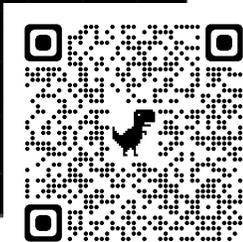
Award Winners News (2022, 1st Prize)

AI4IoT is an AI enabler for standard IoT platforms. Our goal is to develop open sources to support AI functions on standard IoT platforms such as Mobius, an open-source platform of oneM2M.

In the joint digital twin research, we conduct research for high-speed synchronization of digital twins. To achieve high-speed synchronization, a new digital twin synchronization method was proposed.

2023 AIoT Taiwan Exhibition
Intelligent Sensor Platform

Yujin Kim

(2023 World IT Show, KR)
Fire Situation Monitoring System Through Collaboration of Metaverse and Unmanned Smart Mobility Vehicles
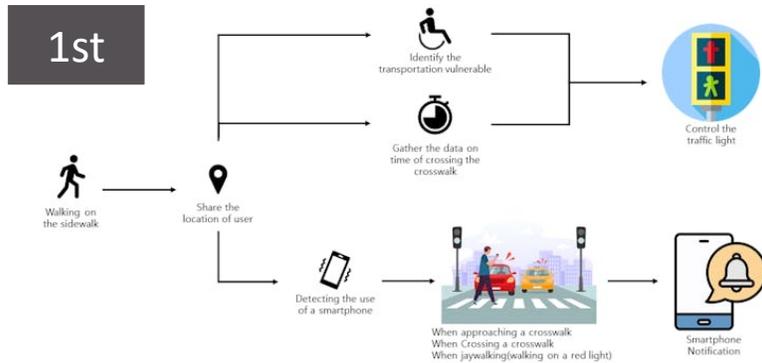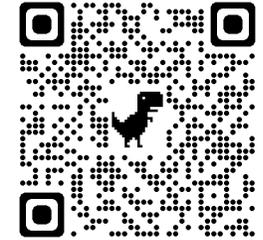
oneM2M International Hackathon (2023)

- More oneM2M APIs implemented, and more participations from SMEs

Awards Ceremony (2023)

1st

Smart Traffic Light Alarm App

2nd

Smart Farm Infrastructure with Metaverse

2nd

Remotely Operated AI Enabled Robot Using oneM2M

Doc Demo   Doc Demo   Doc Demo

Award Winners News (2023, 2nd Prize)

2023 INTERNATIONAL ONEM2M HACKATHON
(7TH MOBIUS DEVELOPER CHALLENGE)

2ND PRIZE

EUROPEAN TELECOMMUNICATIONS STANDARDS INSTITUTE(ETSI)

TEAM NAME : CompEng PSU

NATIONALITY : UNITED STATES

PROJECT NAME : IOT CARE PSU

Ghule Siddharth

2,000,000 KRW
ABOUT 1,528 USD / 1,430 EUR
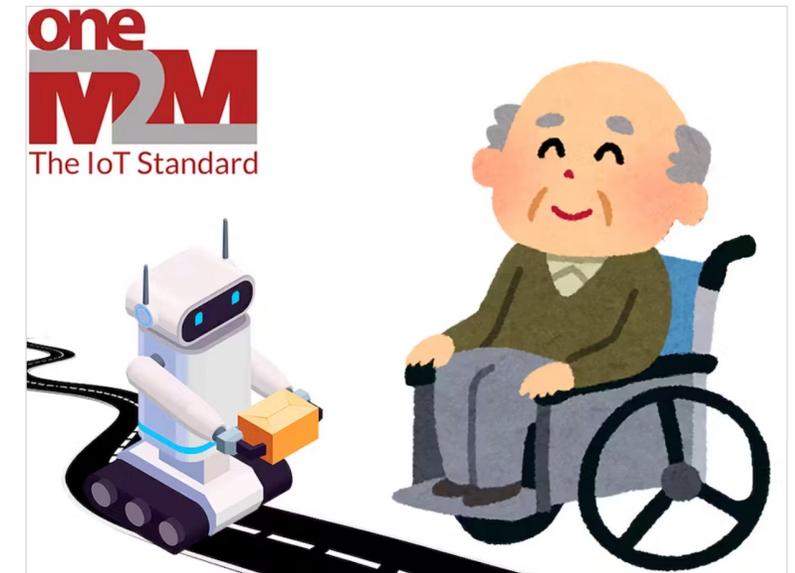
Remotely Operated AI Enabled Robot Using oneM2M

AI powered robo car with gripper arm for elderly and people with disabilities

Intermediate   Full instructions provided   Over 1 day   570

one**M2M**
The IoT Standard

Award Winners News (2023, 2nd Prize)

- After the Hackathon, Ghule worked on the Cyber Farming SAMBOT 360 (CFS-360) as part of a team that participated in the Nordic Connect for Good Challenge.

- He was responsible for developing two-way communication between CFS-360 and the oneM2M server.

CFS-360 is an **interworking module** that uses a **cellular connection to** report status (and control) of **agriculture robots**. The CFS-360 is customized to use an API/interface of each agriculture robot. The CFS-360 then uses oneM2M, an open-source standards-based IoT framework, hosted locally or in the cloud to expose a common API for application developers.

Other Activities

- Exhibitions in 2023
  - 2023 AIoT Week Korea (11th to 13th in Oct.) in Seoul
  - 2023 AIoT Taiwan (25th to 27th in Oct.) in Taipei
  - R&D projects using oneM2M and 2023 hackathon winner demo was exhibited

- oneM2M International Workshop @Taipei
  - In 2017, oneM2M Interoperability test event and workshop held in Taipei (hosted by III)
  - 2023 workshop again, to promote oneM2M in Taiwan with oneM2M progresses

- Follow-up oneM2M workshop or industry day along with the hackathon is expected in 2024
  - Malaysia is the candidate for now
  - (TBD) co-hosts: KETI, TTA, ETSI
  - (TBD) possibly in Dec. with the oneM2M TP