

# oneM2M Developer Supports from open sources to international hackathons

#### SeungMyeong JEONG

Korea Electronics Technology Institute (KETI) / oneM2M SDS WG Vice-Chair sm.jeong@keti.re.kr 2025.11.12

#### **Outline**



- oneM2M Open Source Implementations
- oneM2M Developer Guides (TRs)
- oneM2M Developer Tutorials
- oneM2M International Hackathons

© 2021 oneM2M

## **Open-Source oneM2M platforms**



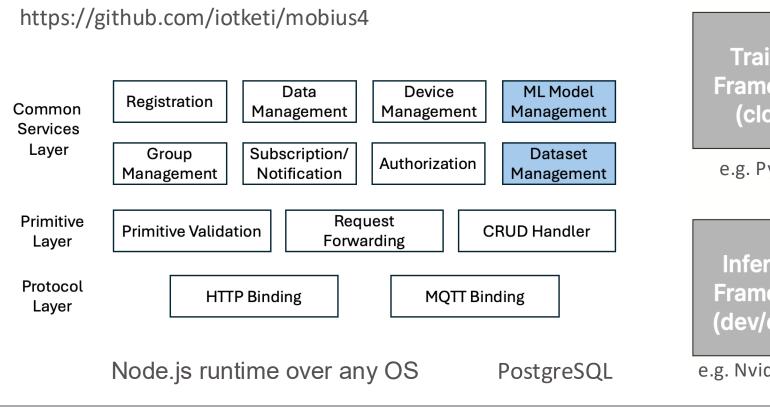
- Members support different projects for different dev environments
  - Different open sources gives better opportunity for standard adoption

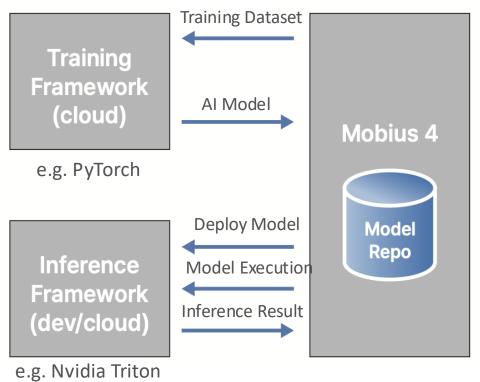
	<b>MOBIUS</b>	ACME	TINYIOT	OM2M Connecting things
Lead	KĖTI	Andreas Kraft	W 등 대학교 SEJONG UNIVERSITY	LAAS-CNRS
Homepage	https://github.com/iotketi/ mobius4	https://github.com/ankraft/ ACME-oneM2M-CSE/	https://github.com/seslabSJ U/tinyIoT	https://www.eclipse.org/om 2m
License	BSD 3-Clause	BSD 3-Clause	BSD 3-Clause	EPL 1.0
Offering	Platform, Dev Tools	Platform	Platform & Edge	Platform
Binding	HTTP, MQTT	HTTP, MQTT	HTTP, MQTT, CoAP (under dev.)	HTTP, CoAP
Format	JSON	JSON, CBOR	JSON	XML, JSON
Language	Javascript (Node.js)	Python	С	Java (OSGi)

#### Mobius 4 released in 2025



- Next version of Mobius to enhance AI capabilities support
  - Implements AI services supporting APIs in oneM2M TR-0071





### oneM2M Developer Guides (TRs)



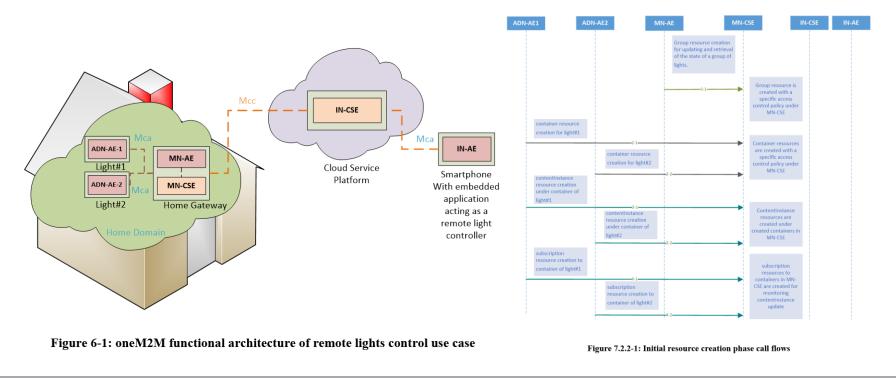
- Since Release 2, oneM2M has been publishing developer guide series in TRs
  - TR-0025-Application Developer Guide
  - TR-0034-Developer Guide CoAP binding and long polling for temperature monitoring
  - TR-0035-Developer guide of device management
  - TR-0038-Developer guide Implementing security example
  - 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

© 2021 oneM2M

#### 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?



```
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"
```

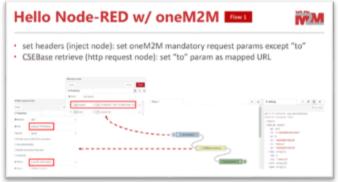
### oneM2M Developer Tutorials

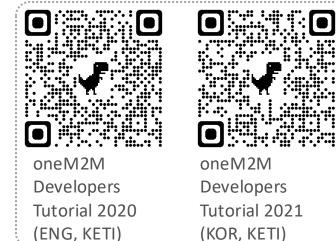


• A series of developer tutorial videos are available on the web like Youtube

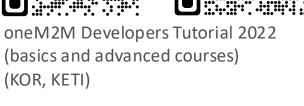














MOOC (ENG, C-DOT)



Tutorial w/ Jupyter Notebook (ENG, DT)

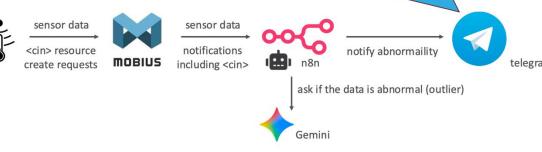
### oneM2M Developer Tutorials

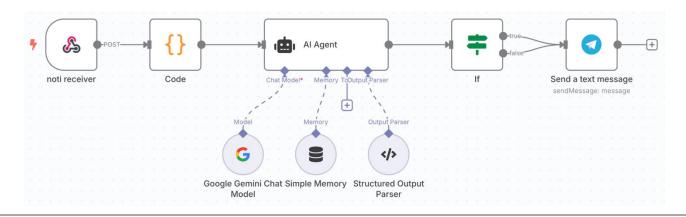


- Tutorials from KETI are available 24/7 on the Youtube (ENG/KOR) and include
  - oneM2M Overview
  - oneM2M Platform and Tools
  - oneM2M Architecture and APIs
  - oneM2M Protocols
  - oneM2M Practice (HTTP and MQTT)
  - oneM2M Virtual Devices
  - oneM2M Access Control
  - oneM2M Dashboard
  - oneM2M ZigBee Interworking
  - oneM2M LoRaWAN Interworking
  - oneM2M Node-RED Application
  - oneM2M Vue.js Application
  - oneM2M Digital Twin Interworking
  - oneM2M Drone GCS
  - oneM2M n8n Applications (w/ Al agent)

- Scenario
  - a temperature sensor stores data on Mobius
  - n8n received new data over notifications
  - Al agent on n8n asks whether data is abnormal
  - if yes, notify the abnormality to user on telegram







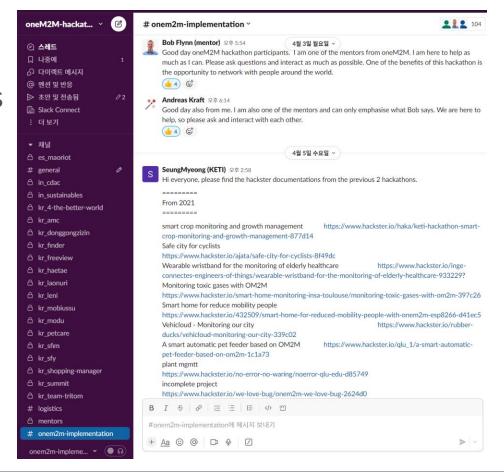
#### oneM2M International Hackathons



- 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





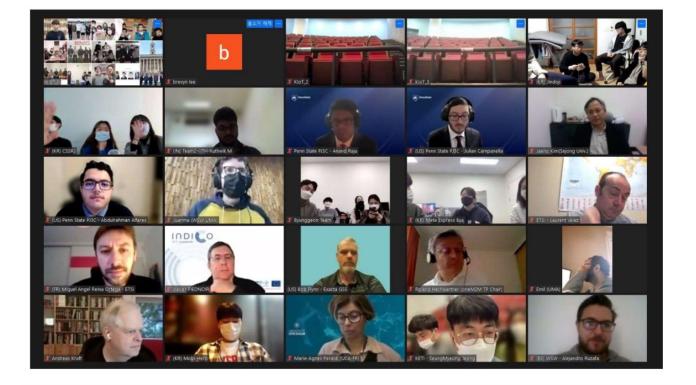


© 2021 oneM2M

#### oneM2M International Hackathon (2021)







**<=** 

Video of the Hackathon Awards Ceremony 1st Prize: oneM2M Autonomous cooperative smart delivery

system (KR)

2nd Prizes: Cellular IoT Irrigation System (US)

A smart automatic pet feeder (CN)

### oneM2M International Hackathon (2022)









Winners

Video of the Hackathon Awards Ceremony 1st Prize: Fire Situation Monitoring System (KR)
2nd Prizes: Air quality monitoring system (AT)
Smart School Bus (KR)

#### oneM2M International Hackathon (2023)



More oneM2M APIs implemented, and more participations from SMEs

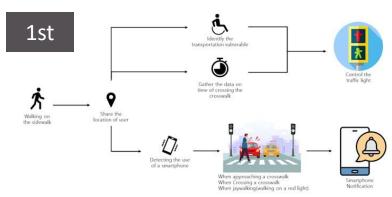




Awards Ceremony (2023)















Smart Farm Infrastructure with Metaverse

Remotely Operated AI Enabled Robot Using oneM2M





**Smart Traffic Light Alarm App** 

Demo



Doc



Demo



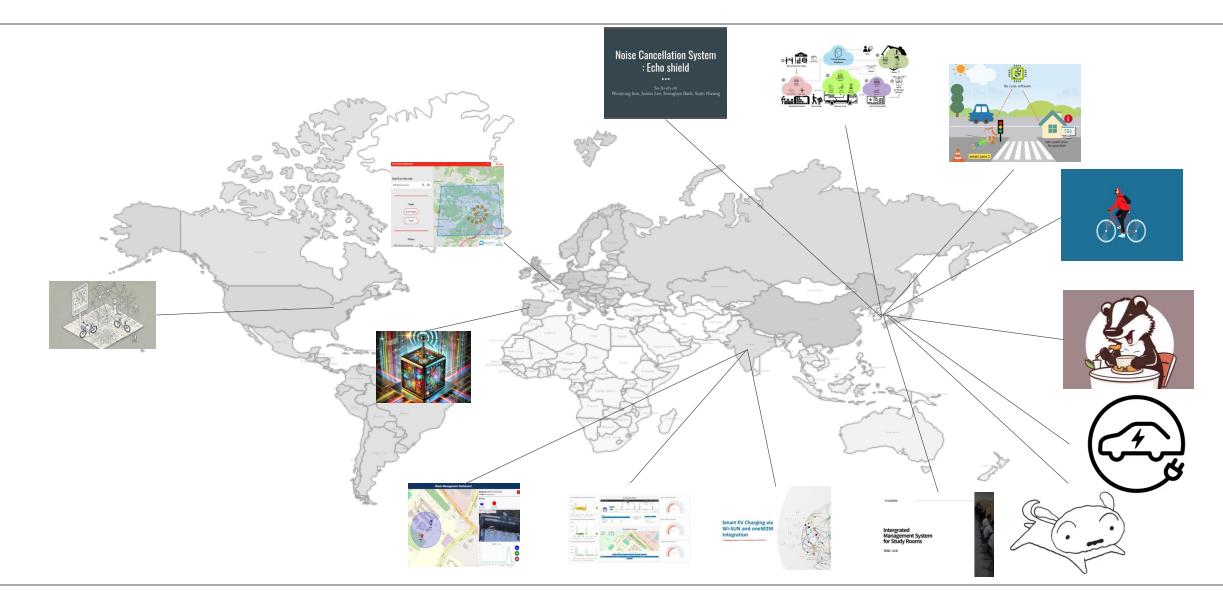
Doc



Demo

# oneM2M International Hackathon (2024)





### oneM2M International Hackathon (2024)









Bike Share System with Cellular-Based IoT and oneM2M

Restaurant Ambience Tracker



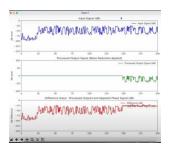






Noise Cancellation System: Echo shield





## oneM2M International Hackathon (2025)



13 global teams joined the hackathon

Team Name (Nationality)	Project Name	Key words
Twinkle (KR)	FireScene TwinLink	Digital Twin, Isaac Sim
My Little Soda Farm (KR)	AloT Mini Farm Platform using oneM2M	Al inference, Unity
Pringles (KR)	Watch out	Al analytics
GrowMate (KR)	Smart Pot for Single Person Households	Vision Al
9P (KR)	All In One Smart Aquarium	Vision Al
Myong Jung Hyun (KR)	Rehome Lab	IoT automation
Nexus (IN)	Smart Edge AI for Energy-Efficient and Resilient Building Management	Al agents
Eagle Eye (IN)	Smart Crowd Monitoring and Evacuation Using IoT and oneM2M with 5G Connectivity	5G, Al-based risk prediction

### oneM2M International Hackathon (2025)



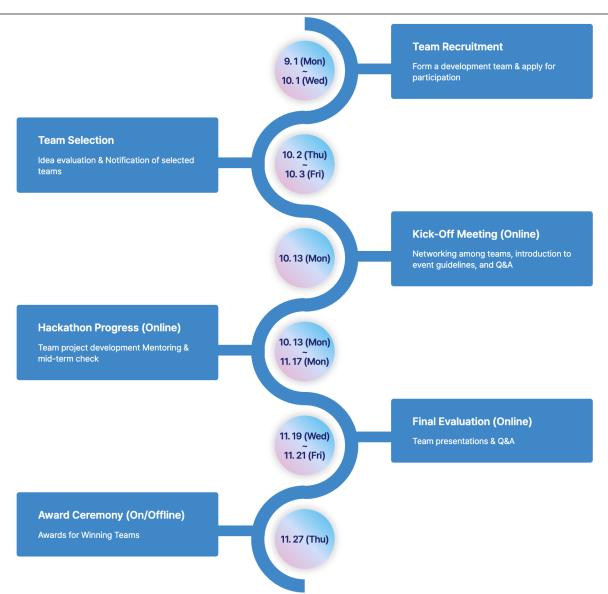
Global participants including a Malaysian team

Team Name (Nationality)	Project Name	Key words
Team Echo (IN)	Integrated multi domain monitoring net zero objective	Wi-SUN, Al-driven insights
Penn State Nittany Lions (US)	Cellular based IoT using oneM2M	low-power IoT handover
Tuber Divers (US)	Al For Tubing Outer Diameter Wavy Condition Detection	Al model
VibeTribe (AT)	Workspace Mood Monitor	real-time analytics
Lorry System (ML)	Al-powered Transport Management System	Al optimization, 5G

#### oneM2M International Hackathon (2023)



- Kick-off: Oct. 13<sup>th</sup>
- Working on projects
- Deliverables submission: Nov. 17<sup>th</sup>
- Evaluation: Nov. 19<sup>th</sup> ~ 21<sup>st</sup>
- Award Ceremony: Nov. 28<sup>th</sup>
  - Co-location with AloT Week in Seoul, Korea



# **Mentors and Judges**

#### Andreas Kraft

- Over 20 years at Deutsche Telekom in IoT, execution environments, and remote management
- Senior Research Expert and Principal Enterprise Architect, participating in OSGi Alliance, Broadband Forum, UPnP Forum, and one M2M Partnership Project.
- Freelance consultant for IoT and oneM2M topics, active contributor to oneM2M working groups, and author/maintainer of the open-source ACME oneM2M CSE.

#### JaeSe ung Song

- one M2M TP Vice Chair (Since 2019)
- Distinguished Professor, Department of Computer and Information Security, Sejong University
- · Visiting Professor, Department of Electrical and Computer Engineering, University of British Columbia (UBC)
- IEEE Senior member

#### SeungMyeong Jeong

- Principal Researcher in Autonomous IoT Research Center, KETI
- SDS WG Vice-chai
- one M2M developer tutorials since 2020 (recordings available on youtube)

#### Poornima Shandilya

- Team Leader/Scientist-E at C-DOT with over 17 years of experience in telecom technologies
- Lead for the development and deployment of a one M2M IoT platform, enabling secure and scalable IoT solutions
- Mentored numerous IoT vendors in developing standards-compliant applications, fostering a robust ecosystem

#### Miguel Angel Reina Ortega

- one m2 m testing expert
- Automation process expert OR CI/CD expert
- 17 years at ETSI as testing expert

#### Bob Flynn

- Firmware developer: Cellular IoT
- Chair of oneM2M Test and Developer Ecosystem, oneM2M
- Freelance consultant: one M2M, R&D for IoT technologies











2021 onel/21



# Thank you!

Terima kasih!