Device management and service enablement for the Internet of Things

- Short intro -

IOTECC

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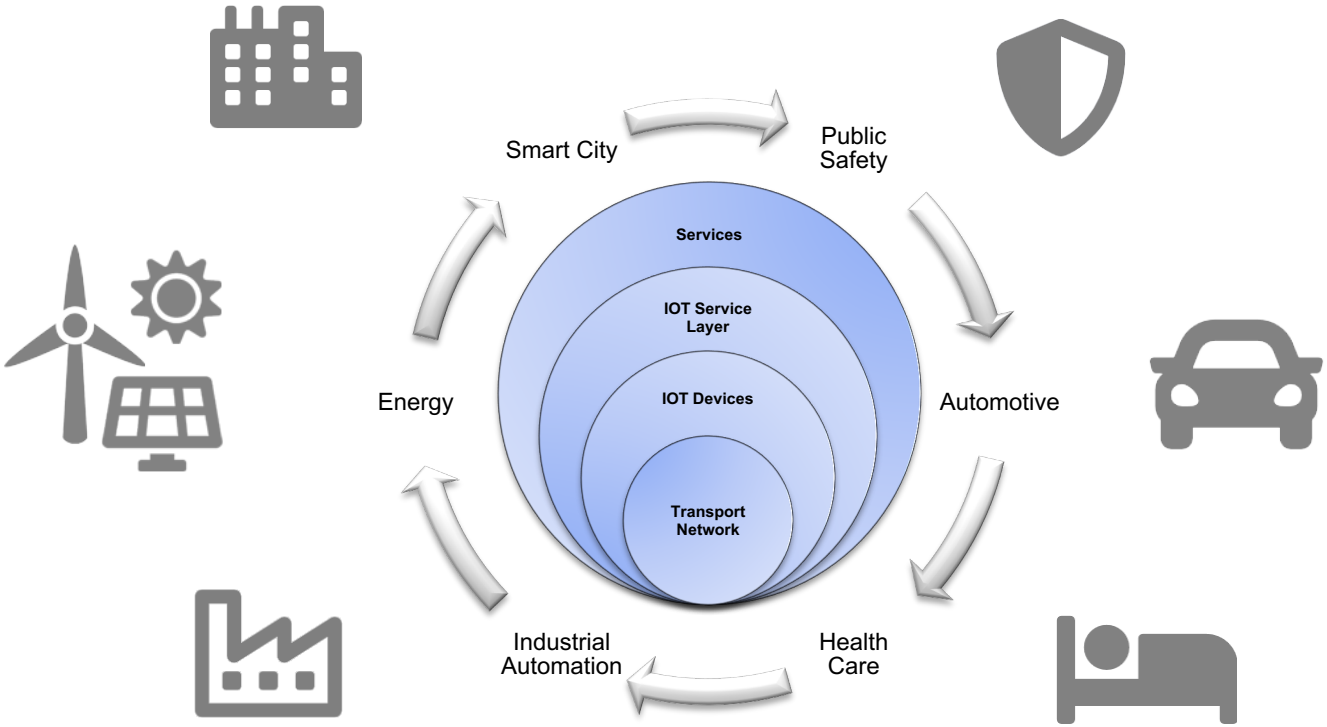
MAIN IOT BARRIERS ...

Device Management –> firmware updates, remote maintenance, ...

Fragementation -> IoT needs a common language for devices, gateways and cloud -> **Interoperability**

Security -> hackers love the IoT!

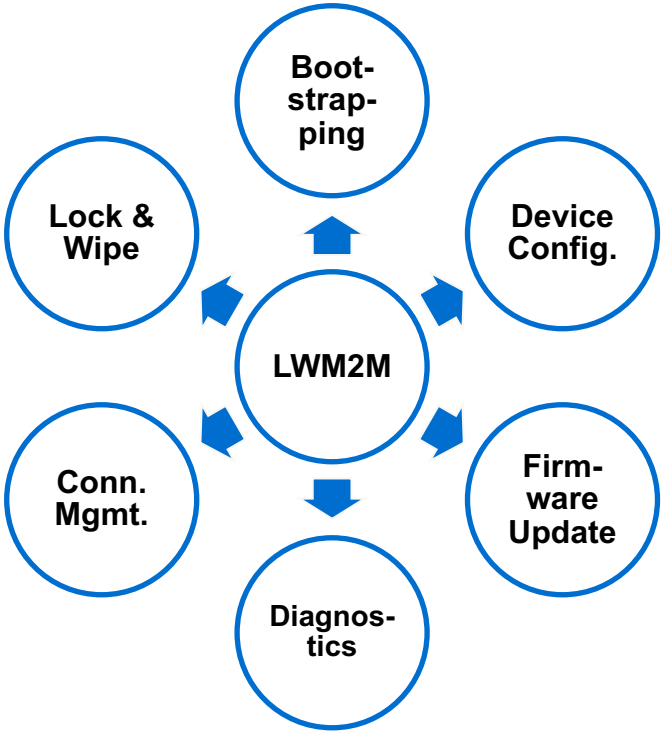
… ACROSS ALL INDUSTRIES



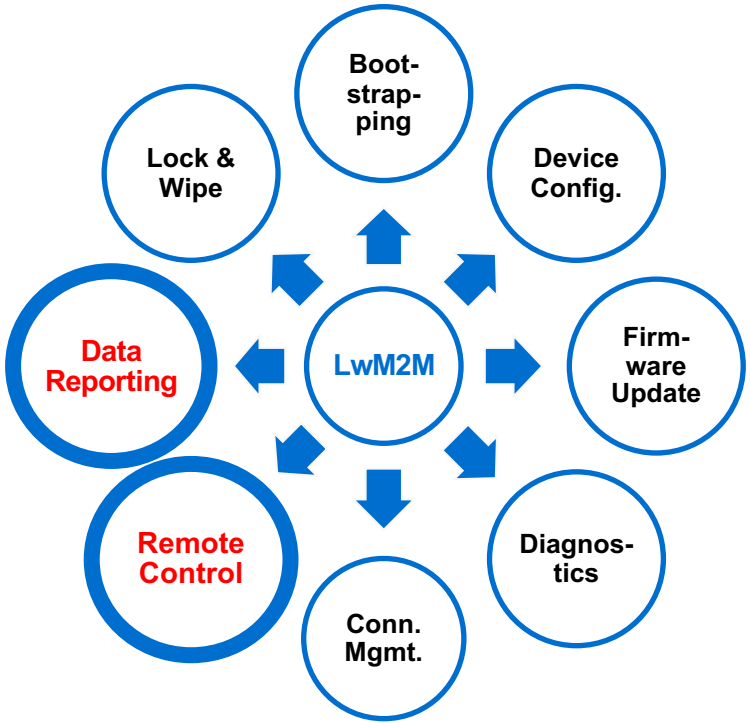
THE Solution:
OMA Lightweight M2M (LwM2M)

- Horizontal standard for any industry and application
- Single protocol for device management and service enablement
- Highly efficient protocol: reduced traffic and power consumption
- Small CPU/memory footprint: lower device costs
- Transport agnostic: 2G-5G, NB-IoT, LTE-M, WiFi, LoRaWAN, mesh, ..
- State-of-the-art security
- Easily extendable: developer friendly

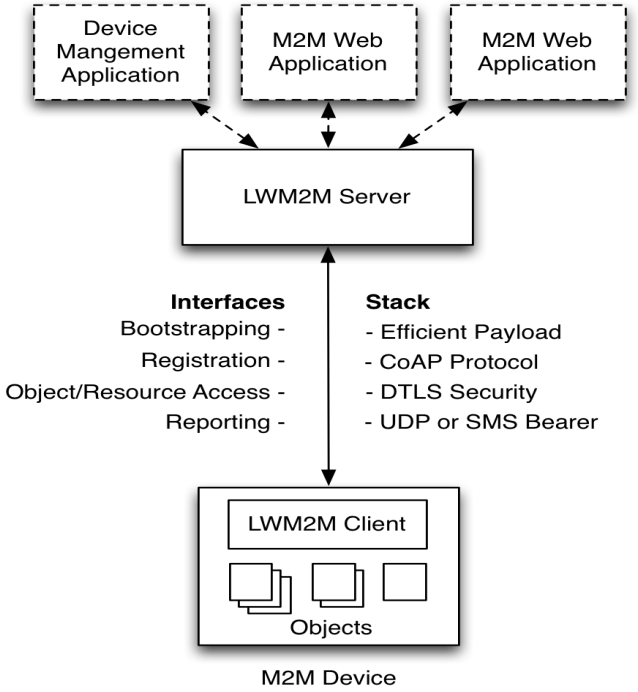
DEVICE MANAGEMENT …

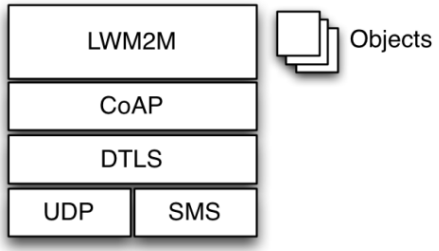


... AND SERVICE ENABLEMENT



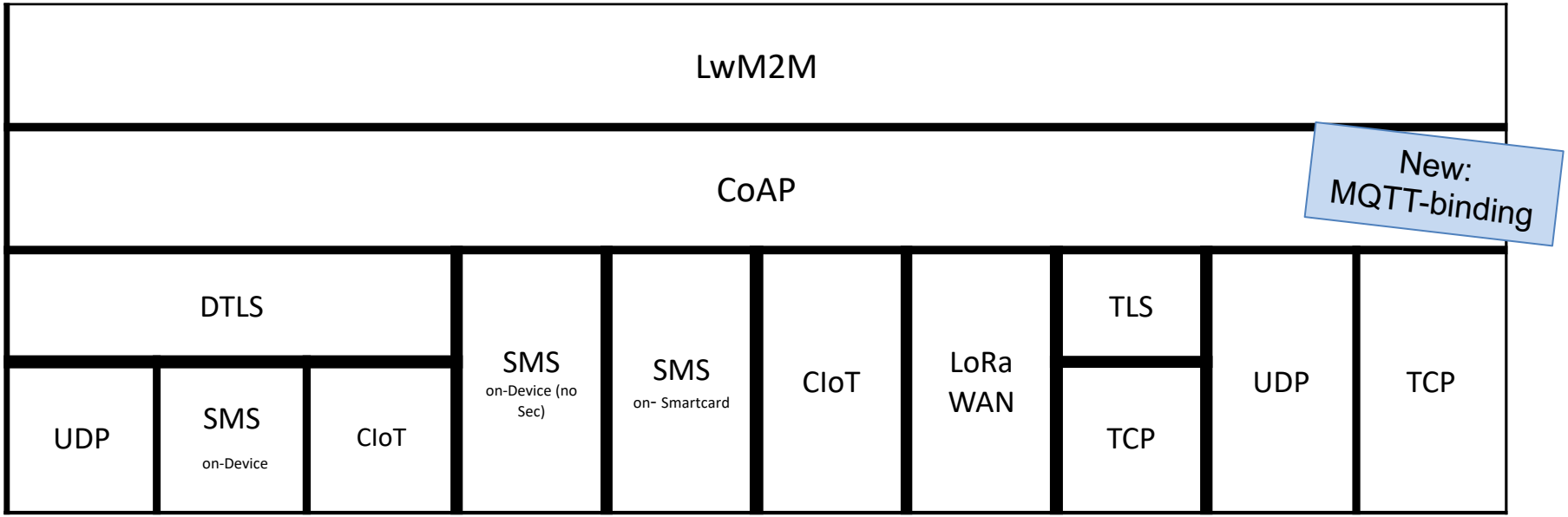
LwM2M Architecture



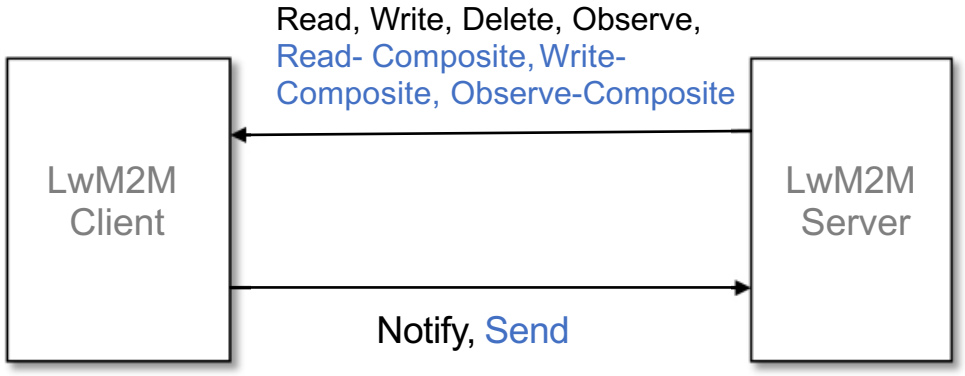


Protocol Stack Options

incl. LoRaWAN and CIoT (NB-IoT) support

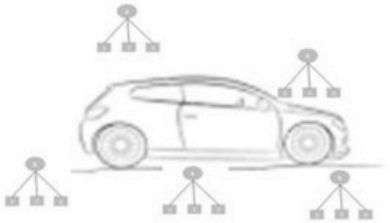


LwM2M Operations

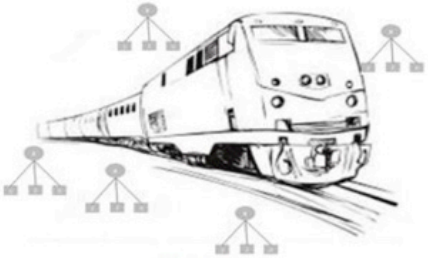


/3/0/9	(Battery Level)
/4/0/2	(Radio Signal Strength)
/4/0/8	(Cell ID)
/3303/0/5700	(Temperature)

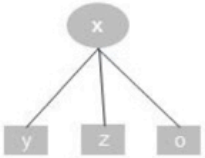
Expandible Data Model for any Thing



Connected Car

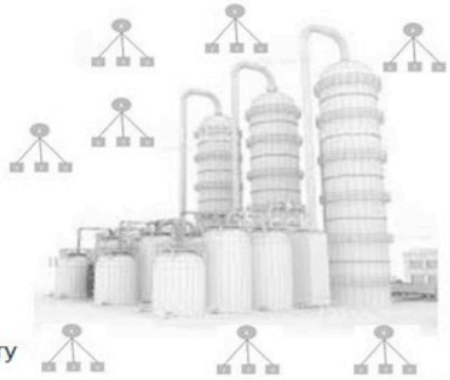


Transport



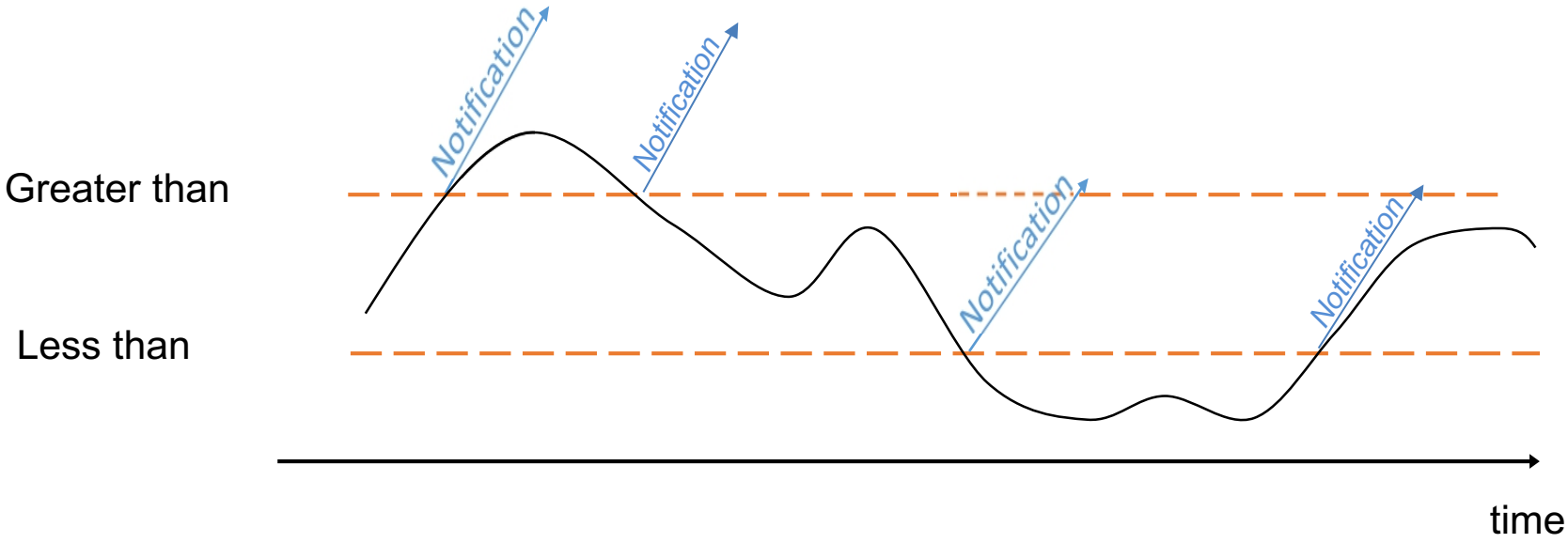
IPSO V1.0
Data Model

Smart Cities



Industry

Observe Function (example)



LwM2M main characteristics

- LwM2M is an IoT service layer standard defined by OMASpecWorks
- Adequate for both data plane and device management – avoiding ”protocol hell”
- Made for both constrained (e.g < 20 kB RAM) and powerful IoT devices
- Supports battery-driven devices thanks to low footprint
- Highly optimized bandwidth consumption, using COAP (= simplified HTTP; COAP header = 4bytes), HTTP and MQTT as additional transport options
- Highly optimized encoding formats such as LwM2M CBOR
- Simple, stateless protocol
- Crosses FW and NAT systems thanks to support of COAP/UDP and COAP/TCP
- Security by design: COAP over UDP or TCP relies on DTLS or TLS respectively, plus Object security (OSCORE) as an additional option
- Developer friendly: open source and dev-kit available, simple, expandable data model to enable any kind of IoT use case

LwM2M Adopters in the Industry (selection)

LwM2M deployments

- LwM2M is used e.g. in the following industries: **smart city, utilities, automotive, agriculture, robotics, drones, smart home, smartphones**, …

- LwM2M is deployed worldwide: **USA, Canada, Europe, South Korea, Japan, China, India, Australia,** …

LwM2M Forecast

- 235 million of LwM2M-enabled devices are expected to be deployed by 2022
  - "IDATE explored the market opportunities over four markets including automotive, utilities, building automation and logistics. The total installed base of LwM2M-enabled devices will reach over 235 million units in 2022, from less than 0.5 million units in 2015," said Samuel Ropert, Head of IoT Practice at IDATE Digiworld. "This represents a CAGR of 154% in the 2015-2022 period."

SUMMARY

- LwM2M offers a lightweight, standardized, secure approach for managing IoT devices and delivering application data to the cloud
- Any kind of use case can be supported with LwM2M via the extendible data model
- LwM2M is allowing devices and systems from different vendors to co-exist in the IoT ecosystem
- LwM2M is 5G-ready: enabling configuration of 5G-NR-devices