



物联网标准互通与合作

IOT STANDARDS INTERWORKING & COLLABORATION

Presenter: Yongjing ZHANG (oneM2M WG5 chair / Huawei)

oneM2M www.oneM2M.org

Outline

- IoT standardization landscape
- The IoT standardization dilemma
- Introduction to oneM2M
- Take-away

The IoT standardization challenge

The IoT standard Landscape

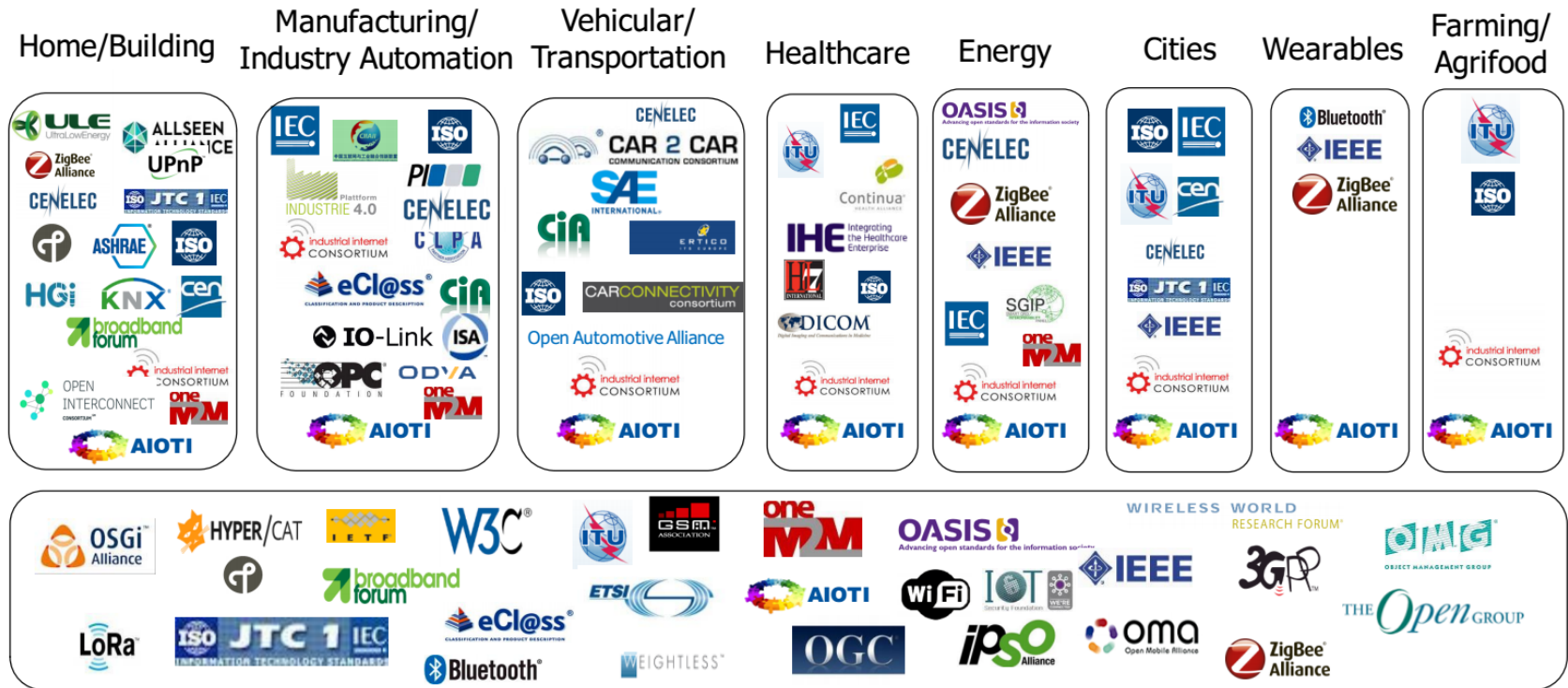


Source: AIOTI WG03, 2015

- IoT standards are no doubt the key enablers for IoT industries.
- But the growth looks a bit “wild” (and still extending)

The IoT standardization challenge

The IoT standard Landscape (Vertical & Horizontal)

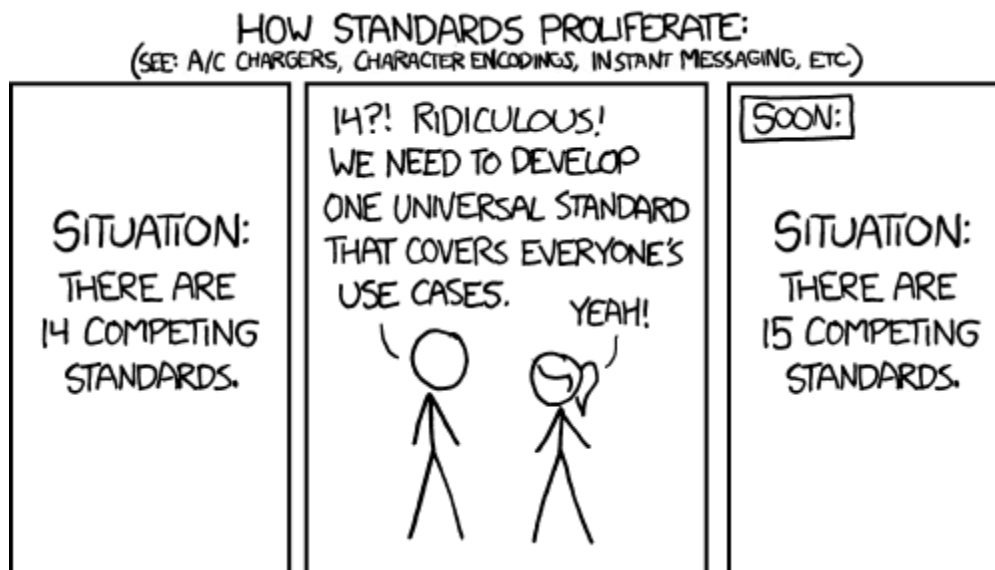


Source: AIOTI WG03, 2015

Horizontal/Telecommunication

- Different standards may focus differently (vertical/horizontal), but
- Sometimes overlap (for good or bad reasons), and
- Don't forget the open source developments...

Standards Dilemma



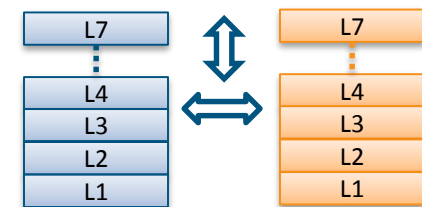
Source: xkcd.com



- Everyone knows the problem, and has the same goal – “global and converged IoT standards”, but the dilemma still exists.
- Reasons behind the gap:
 - ❑ technical differences: comm. ranges, QoS levels, protocol layers, tools vs systems...
 - ❑ regional interests/policies: local vs international
 - ❑ business drives: ecosystem dominance

IoT Standards Interworking & Collaboration

- Where are the solutions?
 - (Operational) Collaboration → to let different organizations to exchange, coordinate and cooperate
 - Information Sharing (Liaison, workshop, ...)
 - Endorsement (adopt standards from other organizations)
 - Partnership (joint development based on common agreement)
 - Merging (transfer/integrate the work into one organization)
 - (Technical) Interworking (in a broad sense) → to make different standards working smoothly together
 - Horizontal (complementary, peering)
 - Vertical (bindings, integration, API invoking)



oneM2M Partnership Project



Over 200 member organizations in oneM2M



8 Type-1 Partners

7 Type-2 Partners

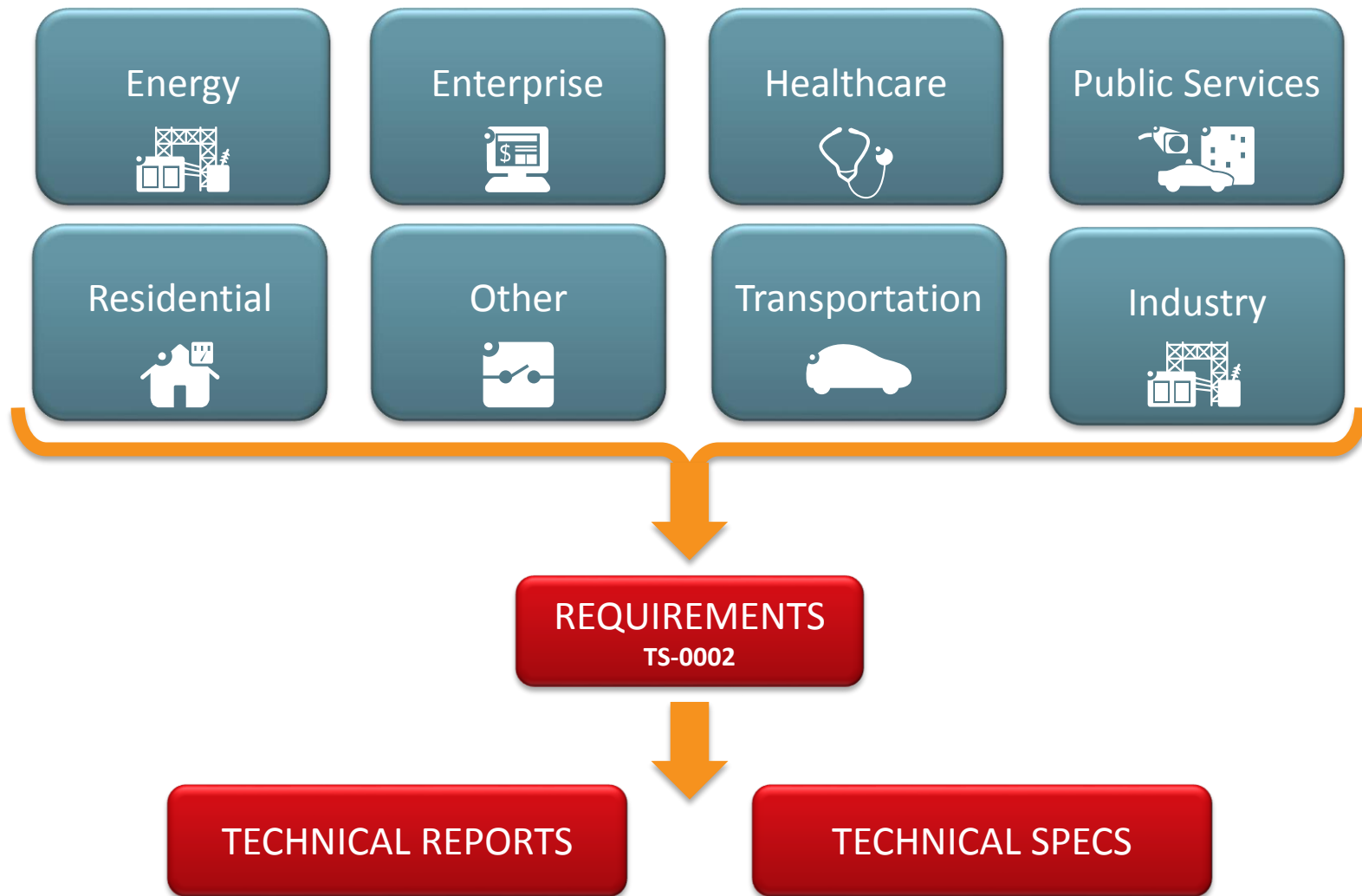


www.oneM2M.org

All document are publicly available

©2016 oneM2M

oneM2M enabled IoT Domains



All document are publically available

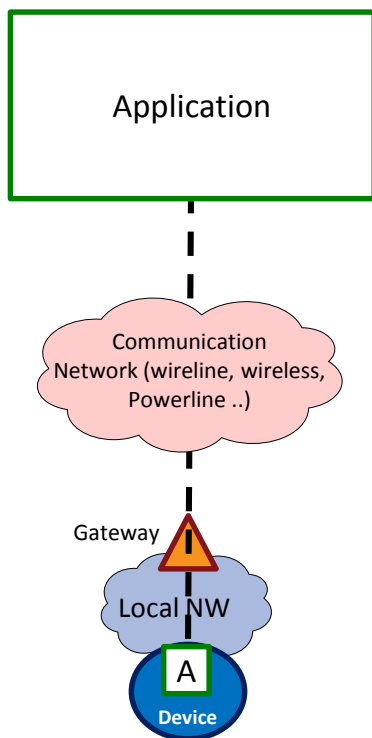
©2016 oneM2M

oneM2M Positioning

Focuses on the common service layer, while leaves the dev/nwk/app specifics to others

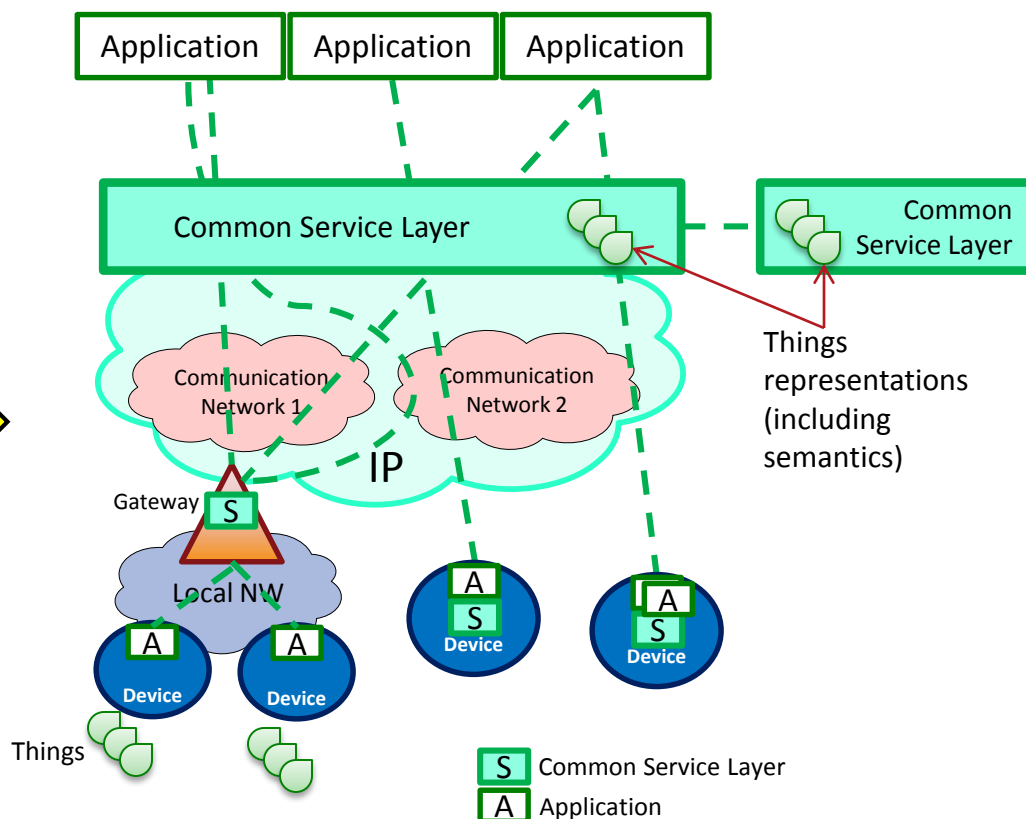
Pipe (vertical):

1 Application, 1 NW,
1 (or few) type of Device
Point to point communications



Common Service Layer (Horizontal)

Applications share common service and network infrastructure
Multipoint communications



oneM2M Common Service Layer in a nutshell



- It is a software layer
- It sits **between M2M applications and communication HW/SW** that provides data transport
- It normally rides on top of **IP**
- It provides functions that M2M applications **across different industry segments commonly** need. Those functions are exposed to Applications via developer friendly APIs.
- It allows for **distributed** intelligence (device, gateway, cloud apps)

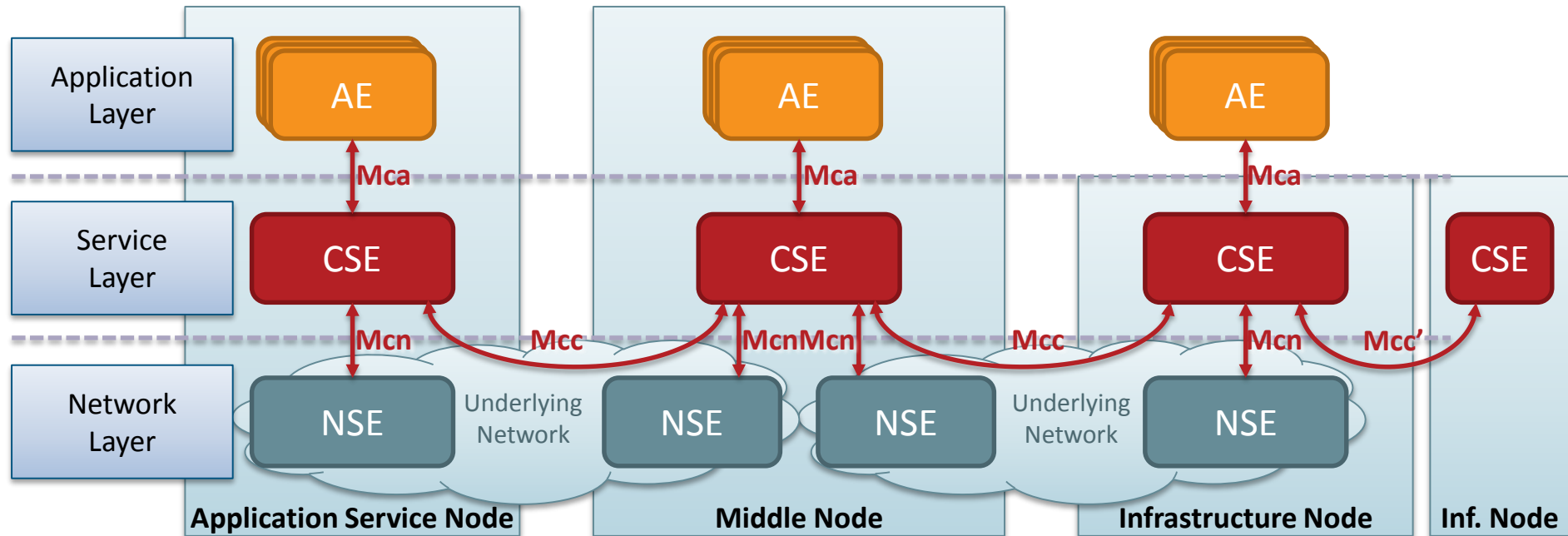
oneM2M Common Service Functions



oneM2M Architecture



- Reference Point** One or more interfaces - Mca, Mcn, Mcc and Mcc' (between 2 service providers)
- Common Services Entity** Provides the set of "service functions" that are common to the M2M environments
- Application Entity** Provides application logic for the end-to-end M2M solutions
- Network Services Entity** Provides services to the CSEs besides the pure data transport
- Node** Logical equivalent of a physical (or possibly virtualized, especially on the server side) device

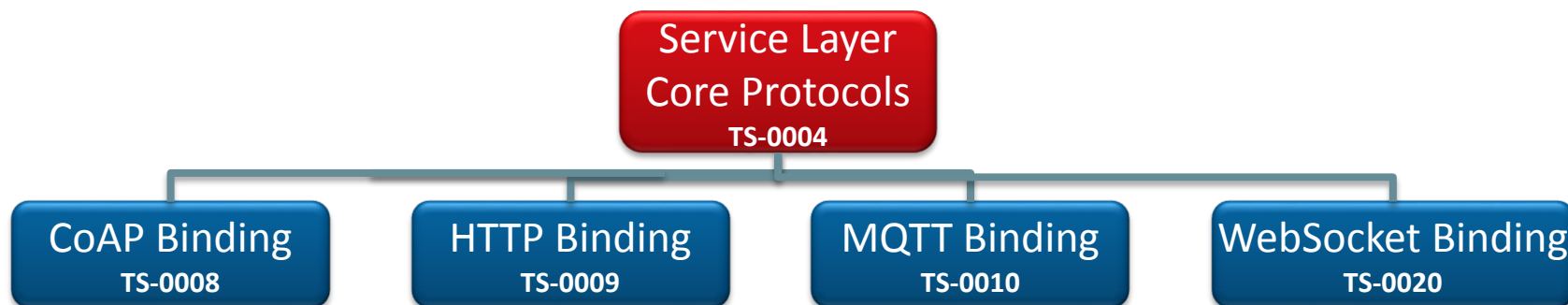


RESTful APIs over Mca/Mcc/Mcc', Invoke underlying network capabilities over Mcn

oneM2M Protocol Bindings



Reuse IP-based existing protocols



XML or JSON Content serialization - HTTP Example

REQUEST

GET /~/CSE-178/CSEBase/home/temperature HTTP/1.1
Host: provider.net
X-M2M-Origin: /CSE-123/WeatherApp42
X-M2M-RI: 56398096
Accept: application/json

RESPONSE

HTTP/1.1 200 OK
X-M2M-RI: 56398096
X-M2M-RSC: 2000
Content-Type: application/vnd.onem2m-res+json
Content-Length: 101
{
 "m2m:cin": [
 {
 "cnf": "application/json:0",
 "con": "{ 'timestamp': 1413405177000, 'value': 25.32 }"
 }
]
}

External Collaboration

- ✓ Information Sharing (Liaison, workshop, ...)



- ✓ Endorsement (adoption)



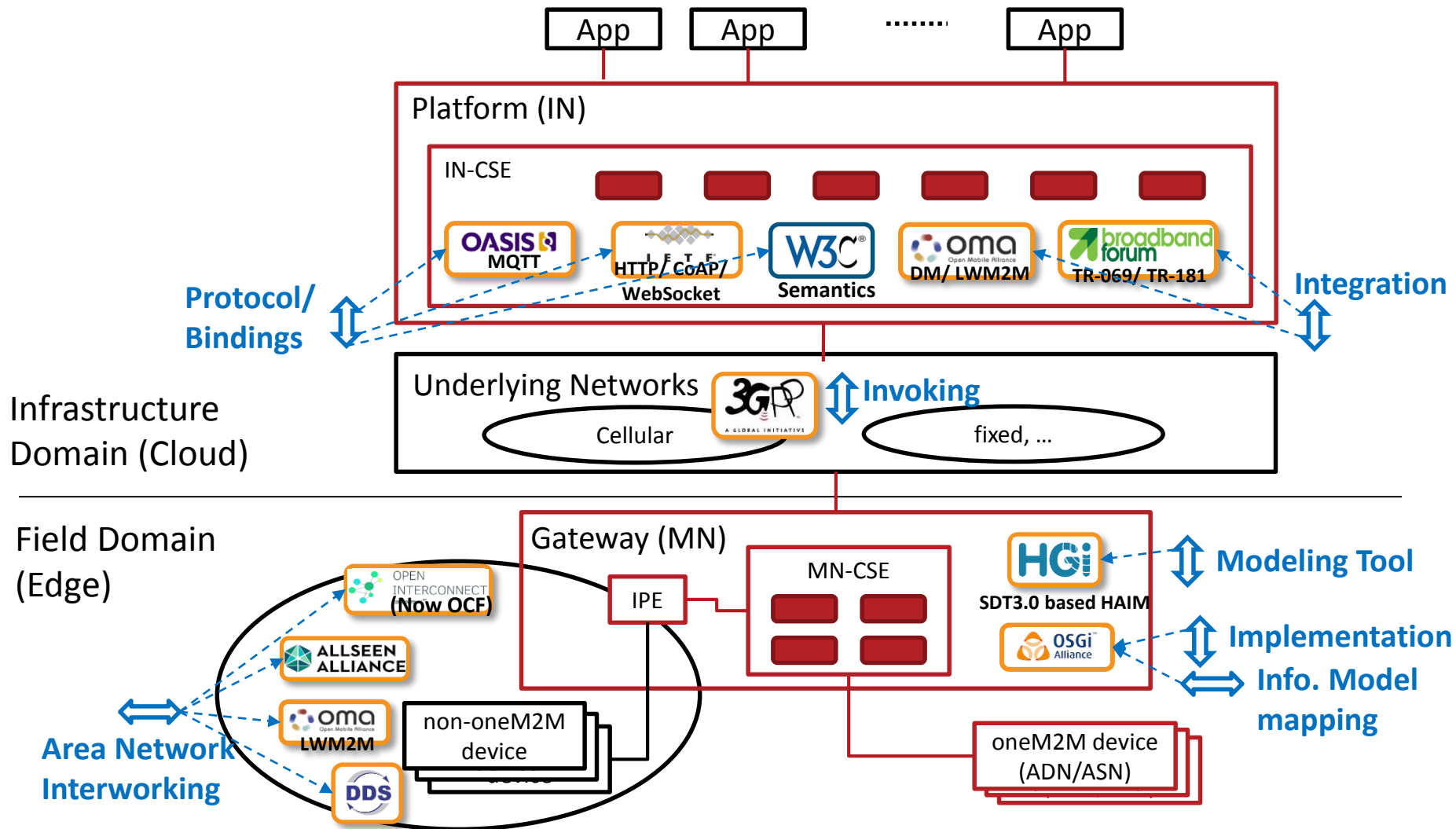
- ✓ Partnership



- ✓ Merging/Integration



Interworking (in a broad sense)



Strong implementation base



Industry-driven Open source implementations

goiot-forum.org

LAAS-CNRS



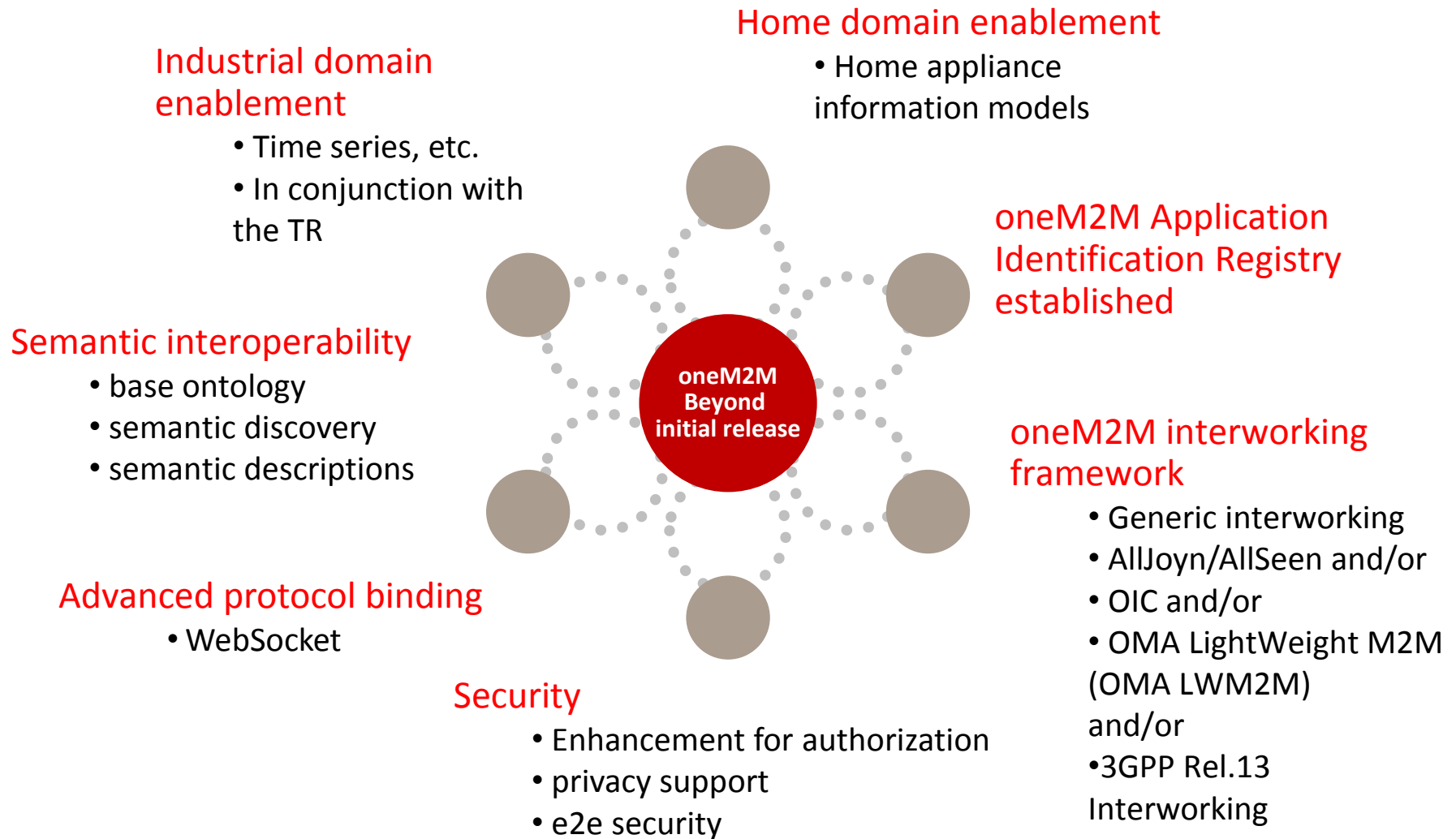
Examples of Commercial implementations /demos



Two interop test events (Sept 14-16 2015, May 10-13 2016)

With ~30 participating organizations

oneM2M release 2 features



oneM2M Release 3 is coming...

- Proposals under discussion
 - market adoption: interop & certification, device profiling, simplification & optimization, ...
 - more interworking with verticals and networks
 - more advanced features: semantics, analytics, ...

Proposal for R3: three main tracks by order of priority

Market adoption track – High priority

- Specification simplification
- Developer view
- Interop and certification
- Robustness and optimization

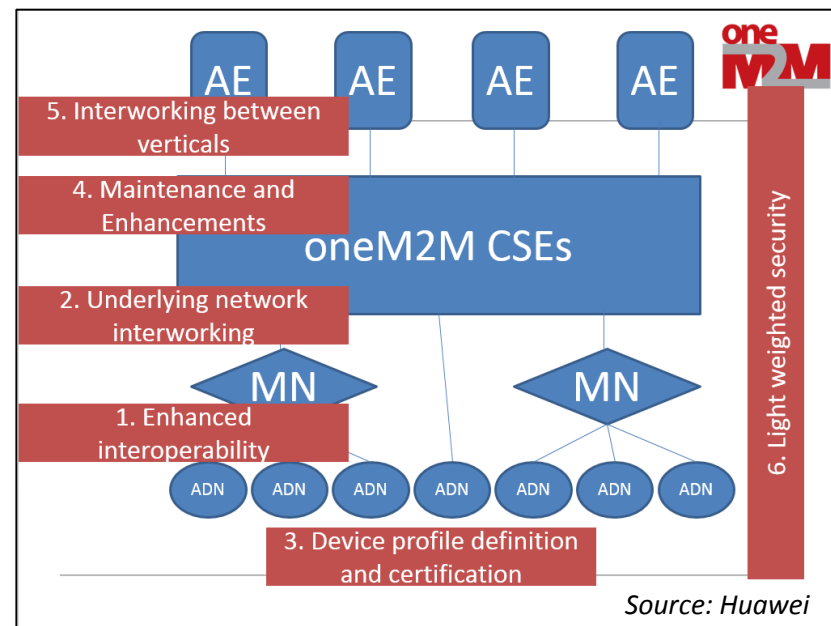
Industrial IoT track – second priority

- A new development area
- As much as possible should not disrupt the Market adoption track (start with TRs first)
- Need to attract more experts and reassess our collaboration strategy
- DDS, time sensitive use cases, semantics evolution

Future looking track – third priority

- Forward looking topics
- Generate TRs for next steps

Source: Nokia/TP Chair



Source: Huawei

List of potential topics for Release 3

1. QoS support for IoT/M2M
2. Semantics enhancement
3. Enablement of sequential executions
4. Analytics enablement
5. Zero configuration
6. Cognitive IoT

Source: KETI

Take-away

- IoT standards are already very prosperous.
- Standard interworking & collaboration is the key to build a harmonized IoT Ecosystem at the global scale.
- oneM2M is following this approach all the way, and open to collaborate with worldwide IoT organizations and industries.

Thank you!