On Management, Abstraction & Semantics

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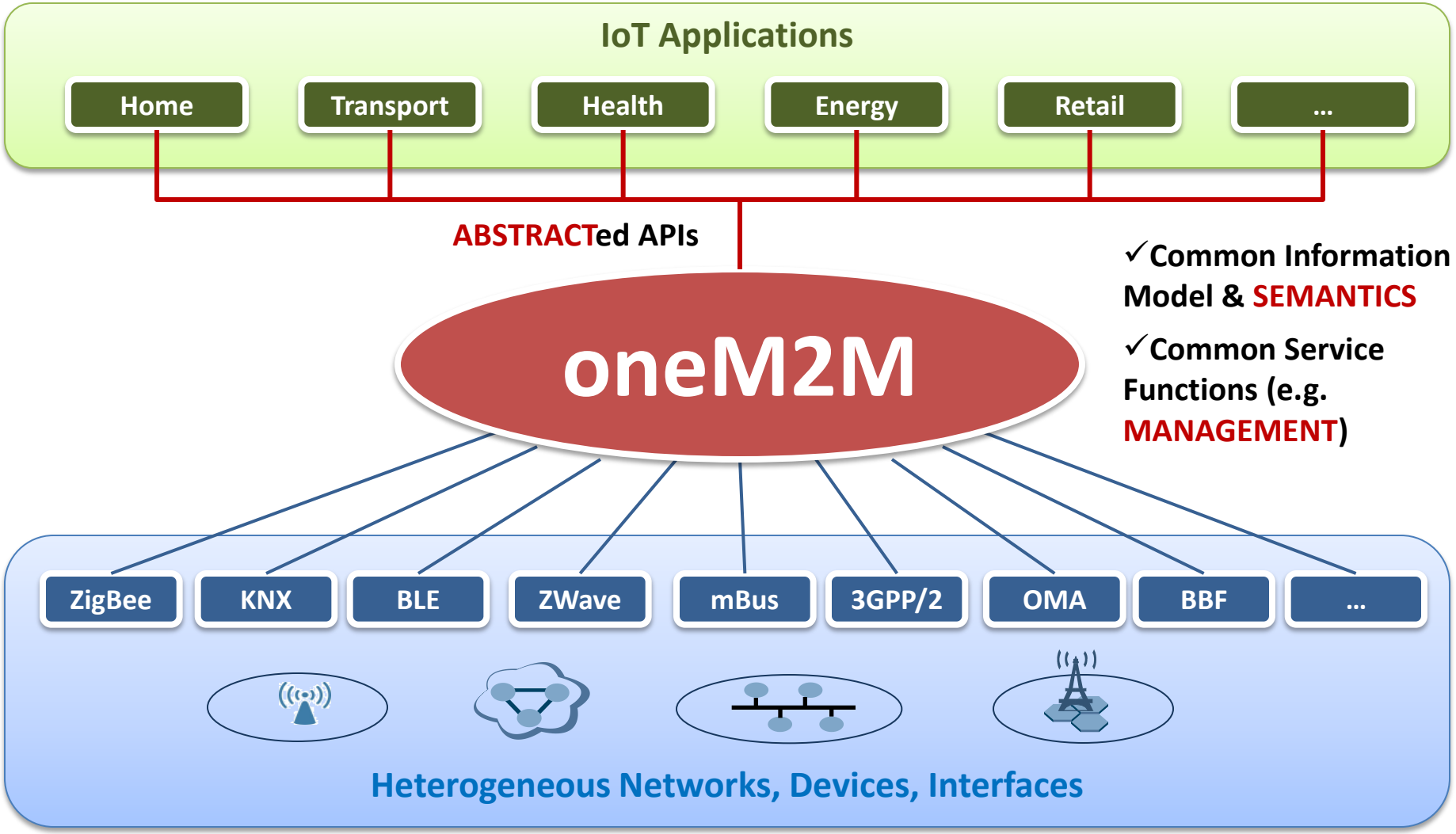
Agenda

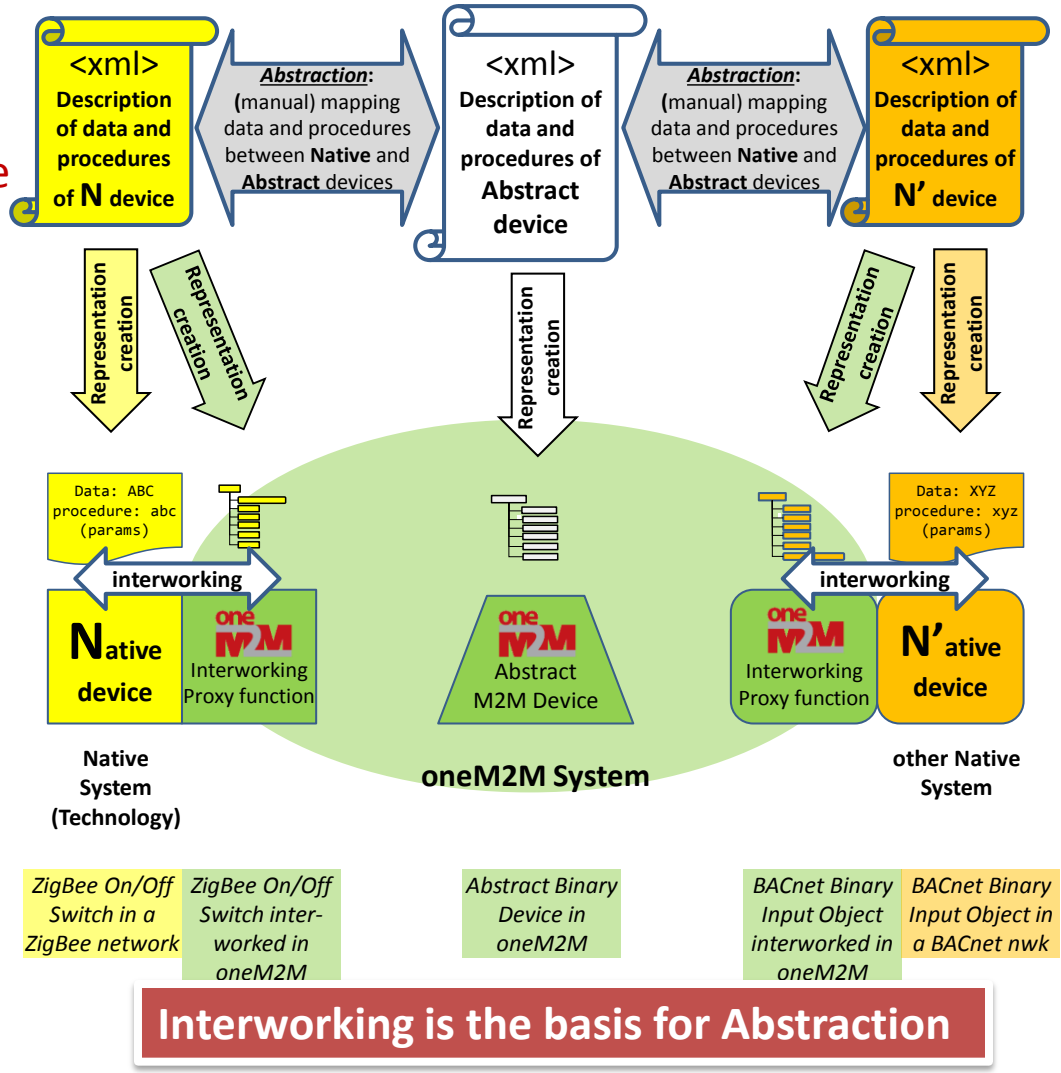
- Concepts about M.A.S.
- The Management Capabilities in oneM2M
  - Architecture
  - Resource modeling
  - Protocol mapping
- The Generic Abstraction & Semantic Capabilities in oneM2M
  - Resource modeling
  - Interworking framework
  - Semantic enhancement
  - Evolution roadmap
- Conclusion

Why M.A.S.



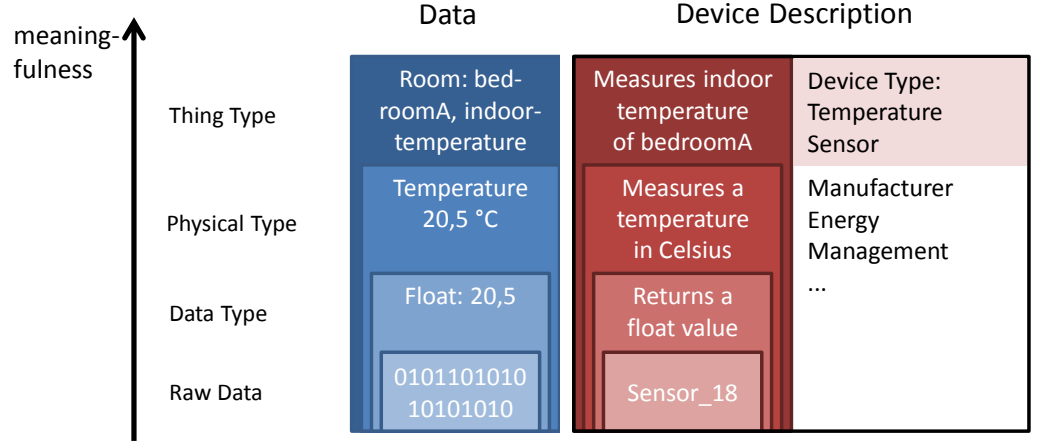
Concepts - Abstraction

- **Abstraction:** generalizing the information model
  - → to hide the complexity of the specific technologies by providing a single format to represent devices and unified methods directly usable by the applications.
- **Interworking:** mapping betweer two specific technologies
  - → to enable the information exchange between heterogeneous systems
  - Applications may still need to understand the native information model (e.g. Zigbee profile)

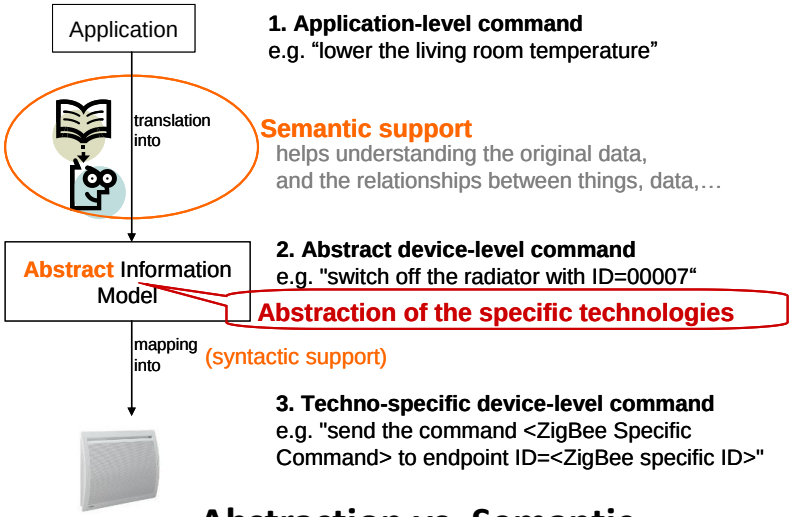


Concepts - Semantics

- **Semantics:** adding the meaning and relationships between concepts (e.g. data, devices, things) and their instances
  - → to enable machine understandable interoperability without a-priori agreement or configuration between communication parties
  - the formal specification of a conceptualization is done by 'ontology', which provides unambiguous vocabulary and model about objects, measurands, their properties and relationships.



Levels of meaningfullness



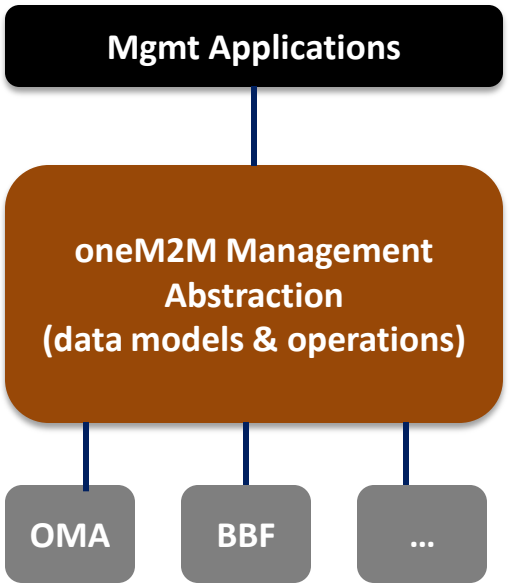
Abstraction vs. Semantic

Semantics is the evolution of Abstraction

Concepts - Management

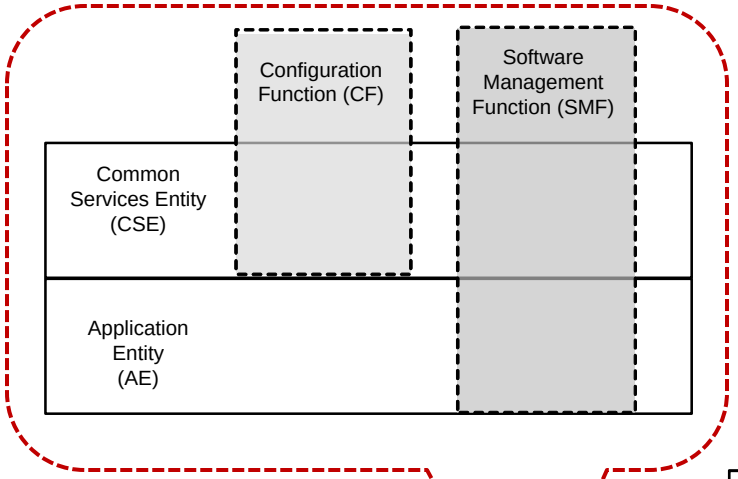
- **Management:** the management (configuration, monitoring, trouble shooting, upgrade, etc.) of devices (ADN/ASN/NoDN), applications (AEs) and common service entities (CSEs)
  - to provid '**Abstracted**' unified & simplified management APIs for M2M applications.

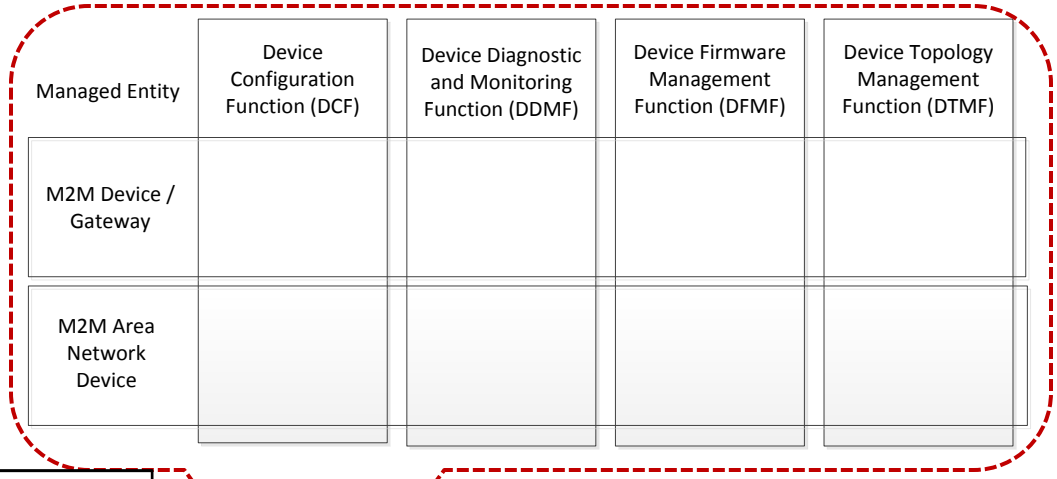
- Management is essentially a specific aspect of oneM2M Abstraction framework:
  - **Data models:** the resources describing the mgmt capabilities, properties and status
  - **Operations:** the actions performing mgmt tasks, e.g. download (firmware), get (status) or set (properties), execute (software installation)



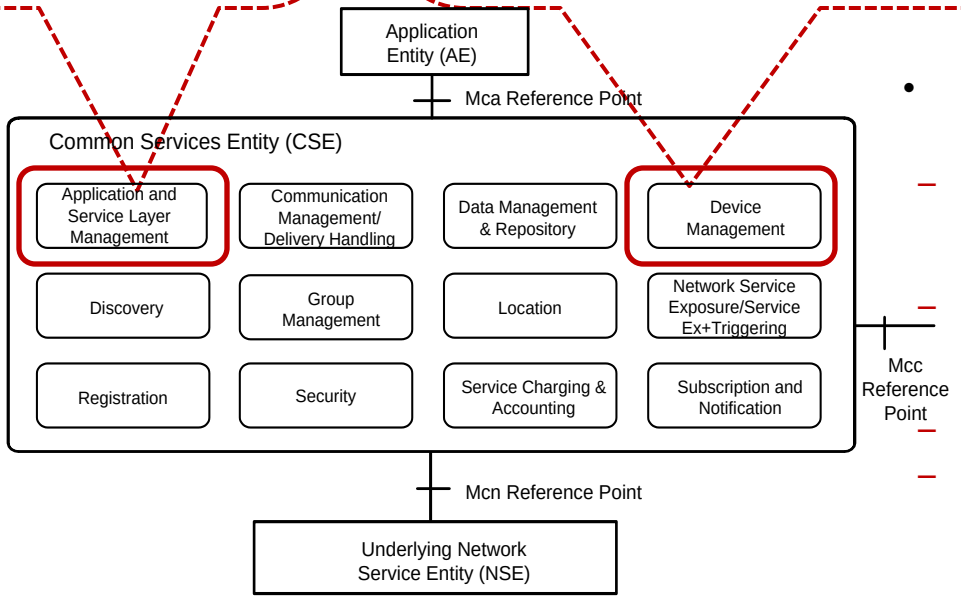
Management is a specific aspect of Abstraction

Management Capabilities



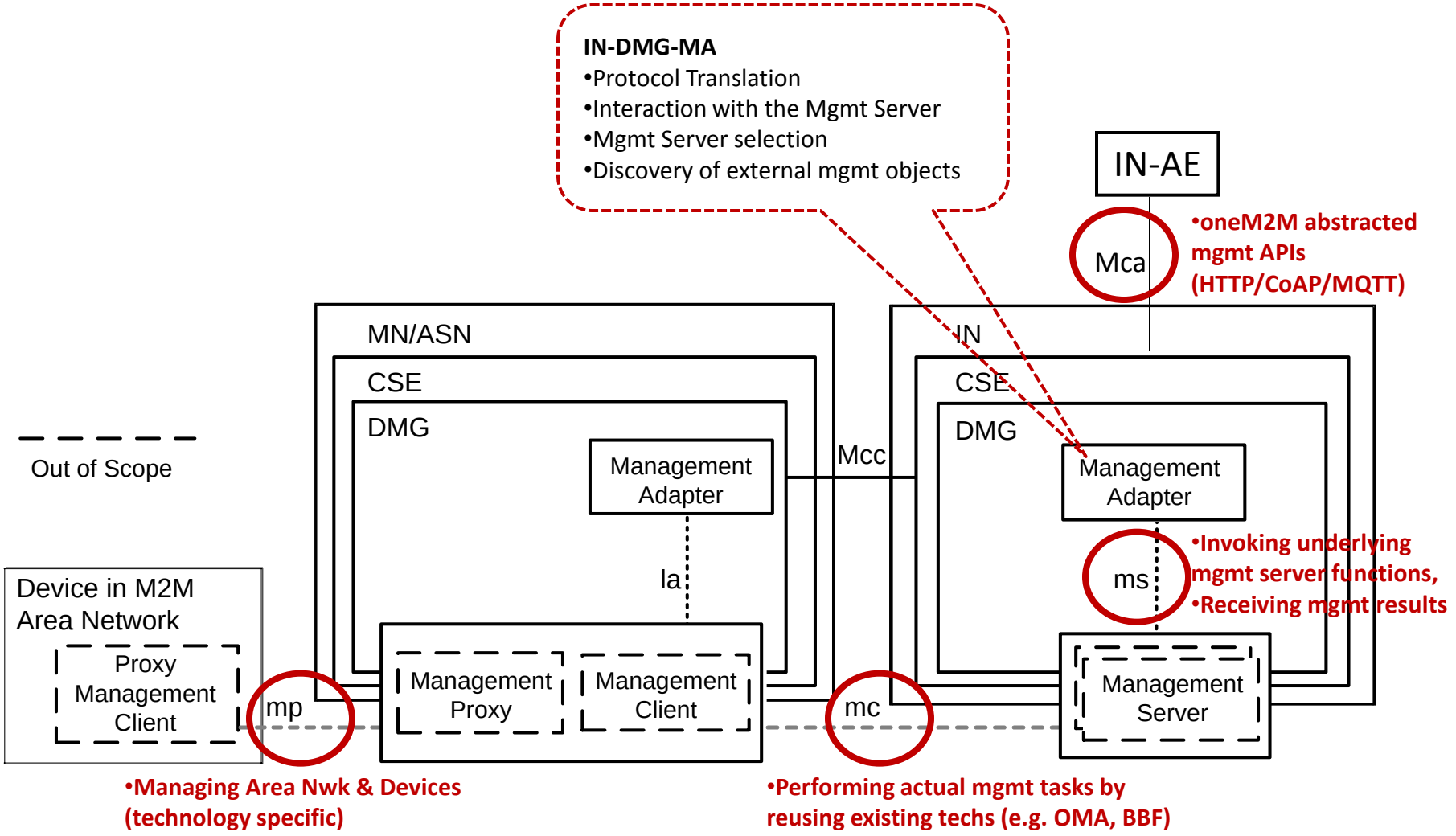


- **Application & Service Layer Management (ASM CSF)**
  - **Configuration** (e.g. CMDH Policy configuration)
  - **Software Management** (e.g. download/ install/ activation):

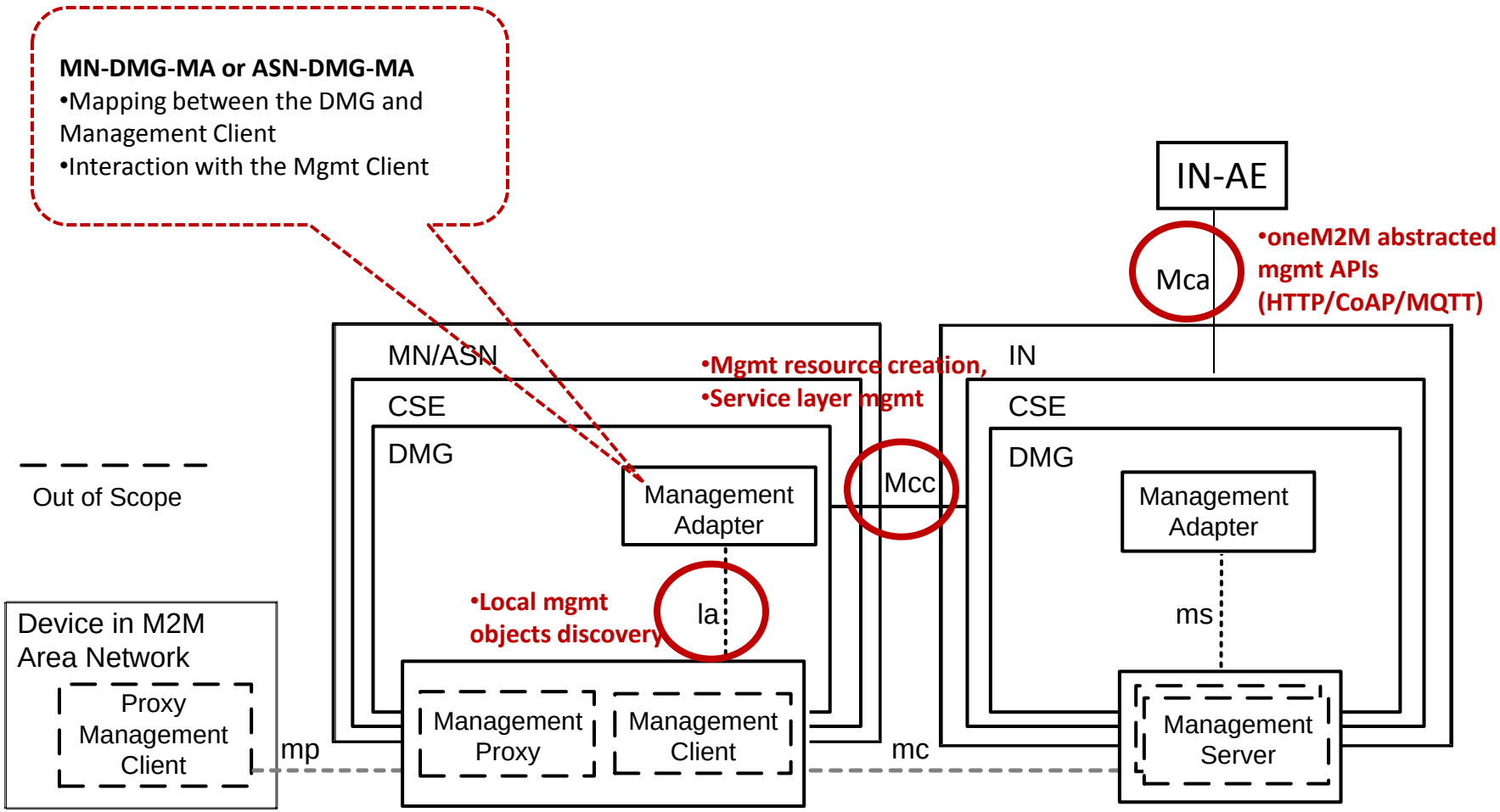


- **Device Management (DMG CSF)**
  - **Device Configuration** (e.g. enable/ disable capabilities, provisioning)
  - **Device Diagnostics and Monitoring** (e.g. memory, battery, event logs, reboot)
  - **Device Firmware Management**
  - **Device Topology Management** (e.g. Area Network topology & characteristics)

Management Architecture

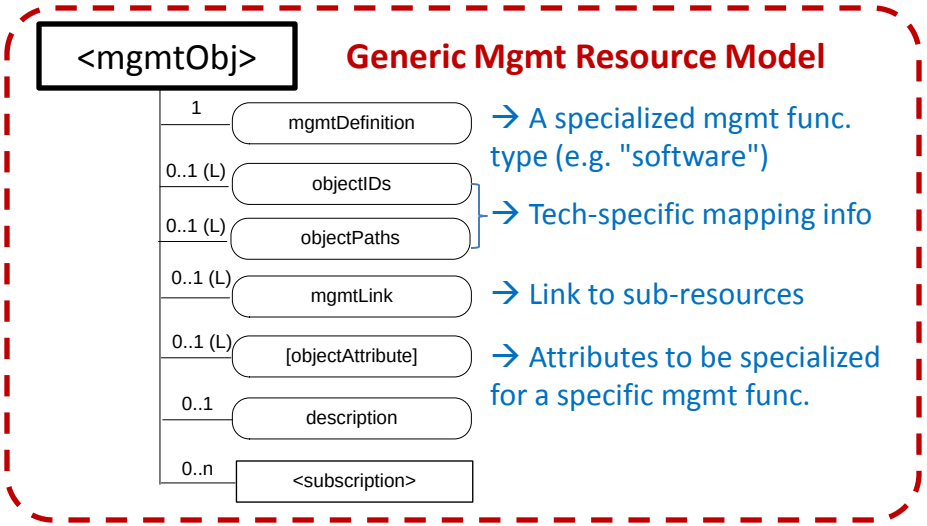


Management Architecture



Management Abstraction

oneM2M TS-0001 (ARC)/ TS-0004 (PRO)



Specialization

Application &Service Layer Mgmt

[software] [cmdhPolicy]

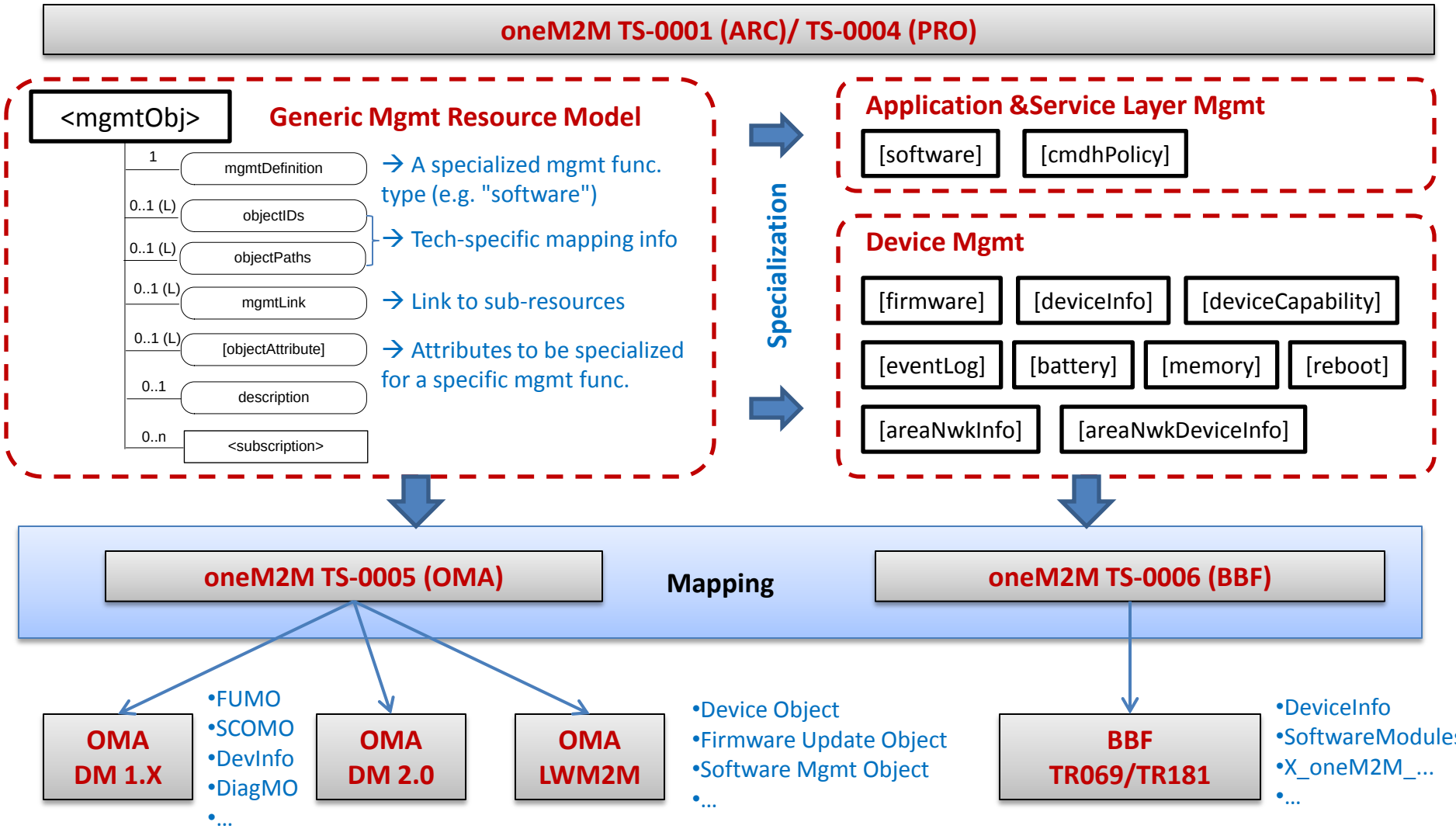
Device Mgmt

[firmware] [deviceInfo] [deviceCapability]

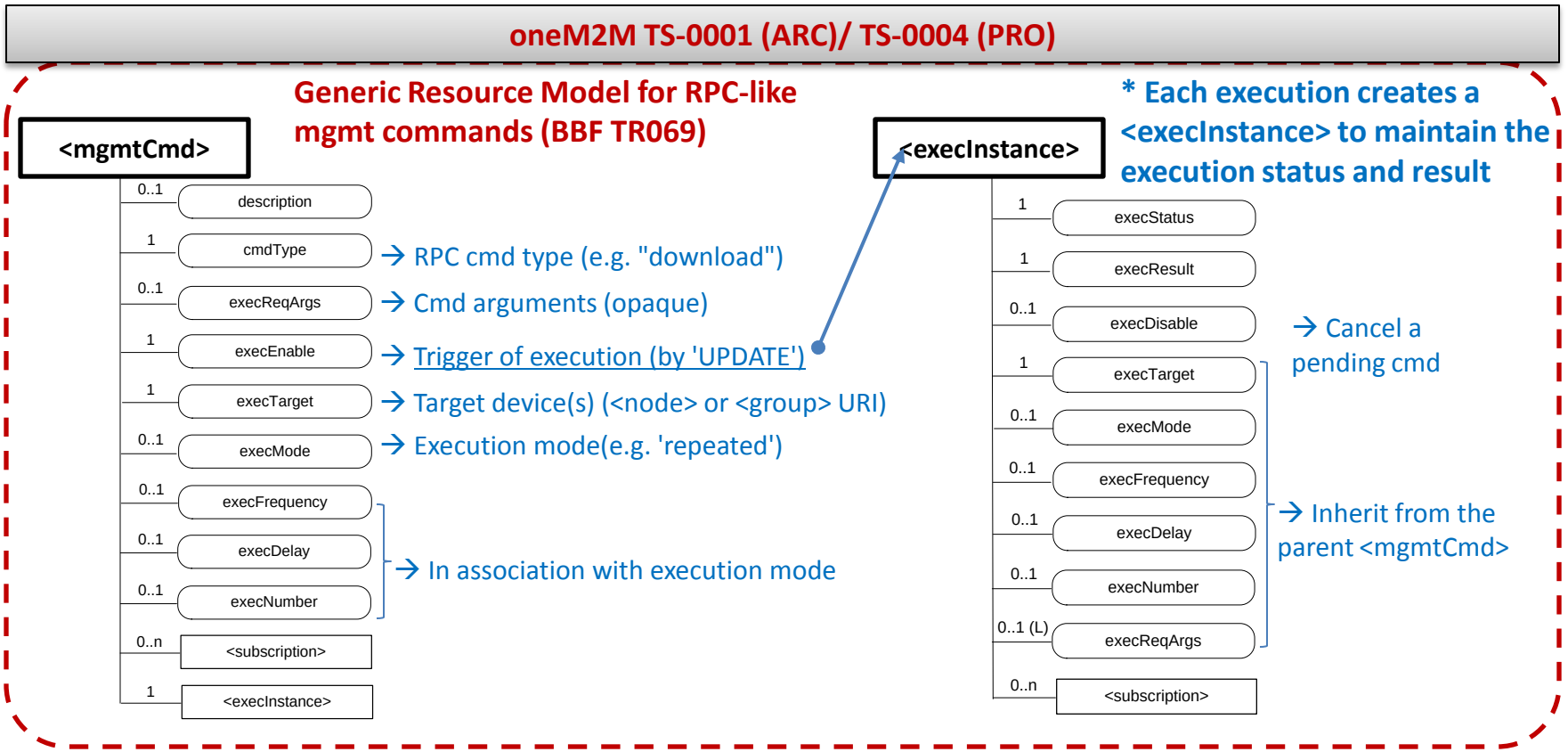
[eventLog] [battery] [memory] [reboot]

[areaNwkInfo] [areaNwkDeviceInfo]

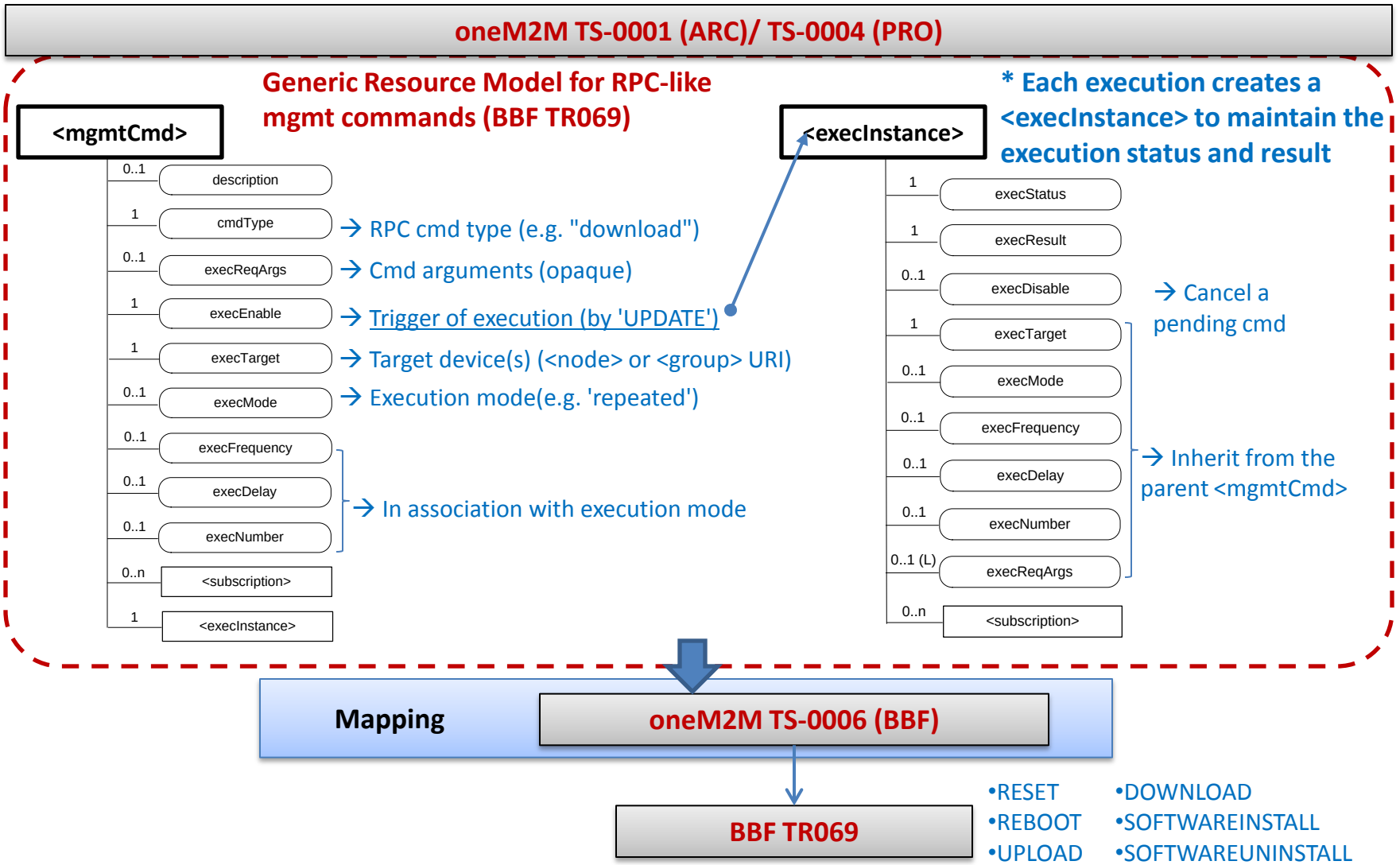
Management Abstraction



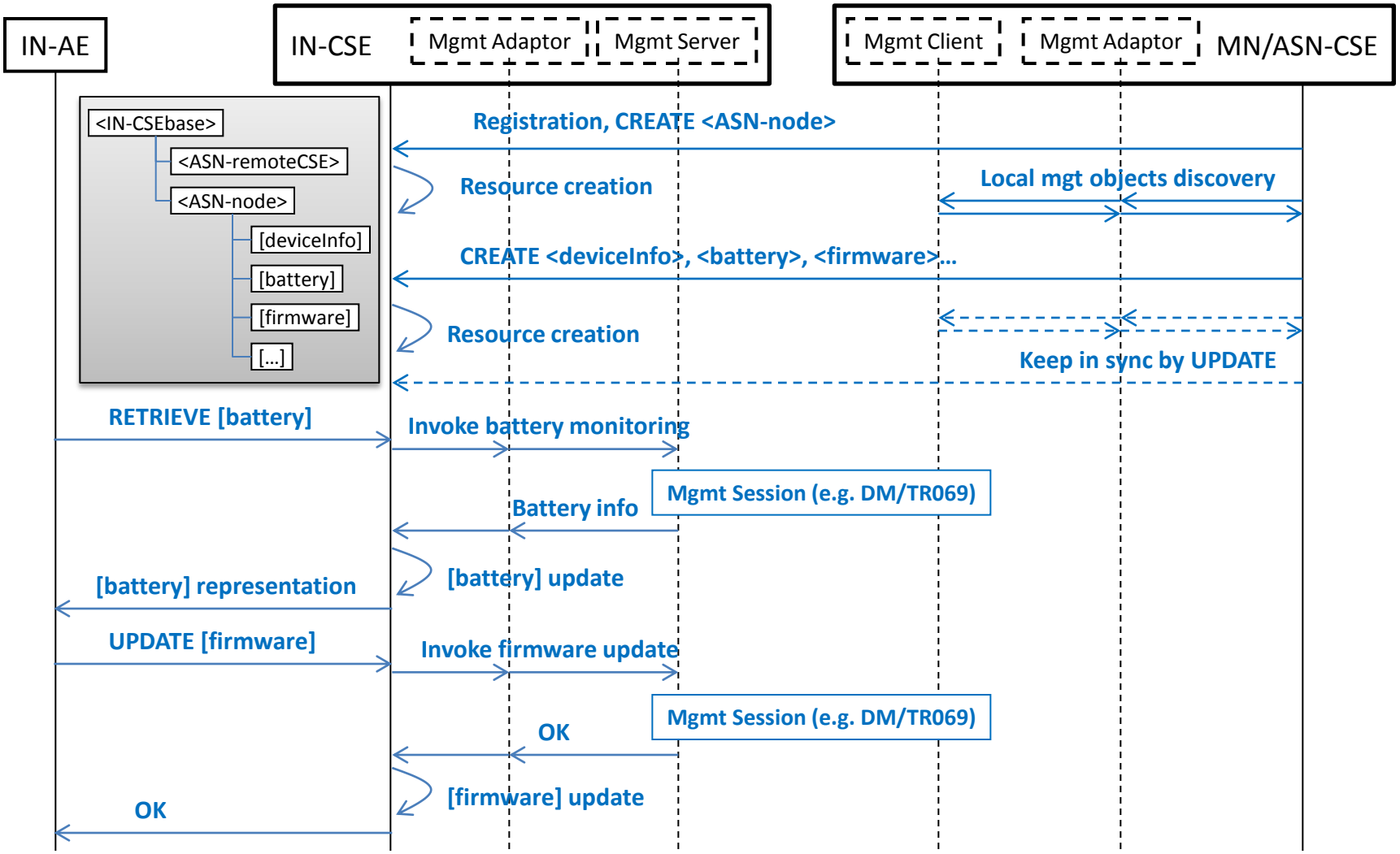
Management Abstraction



Management Abstraction

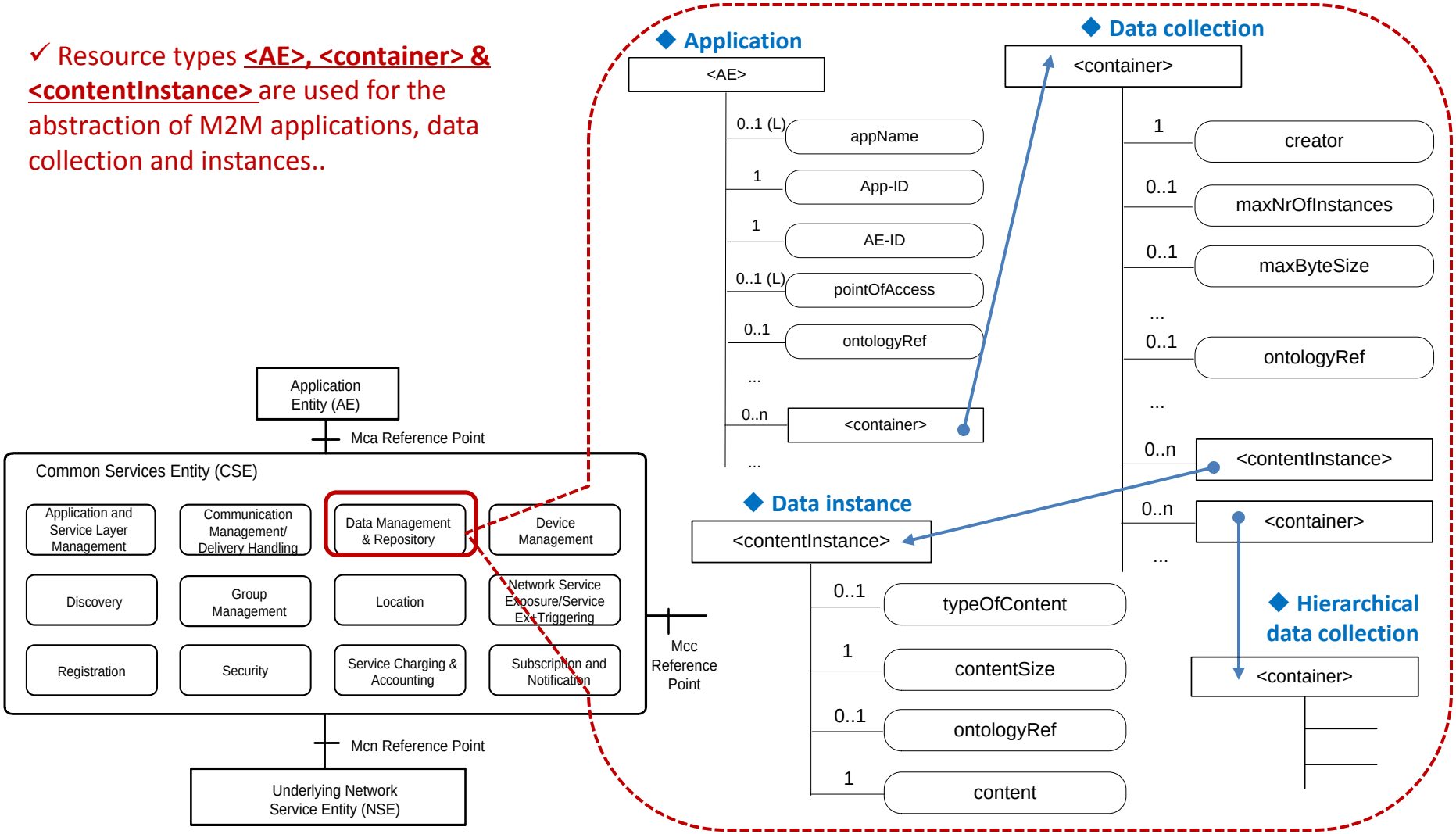


Management Example Flow



Generic Abstraction/Semantics

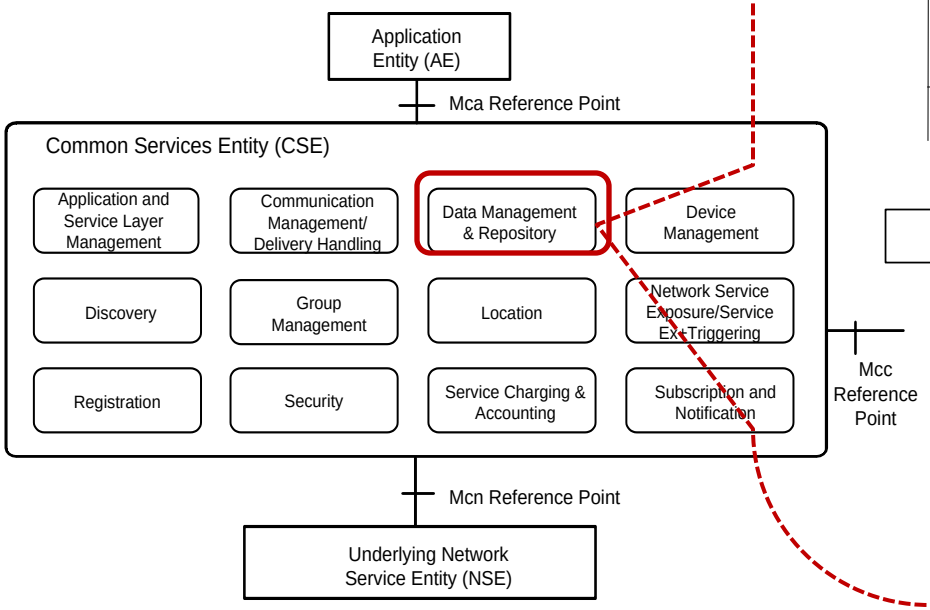
✓ Resource types **<AE>, <container> & <contentInstance>** are used for the abstraction of M2M applications, data collection and instances..

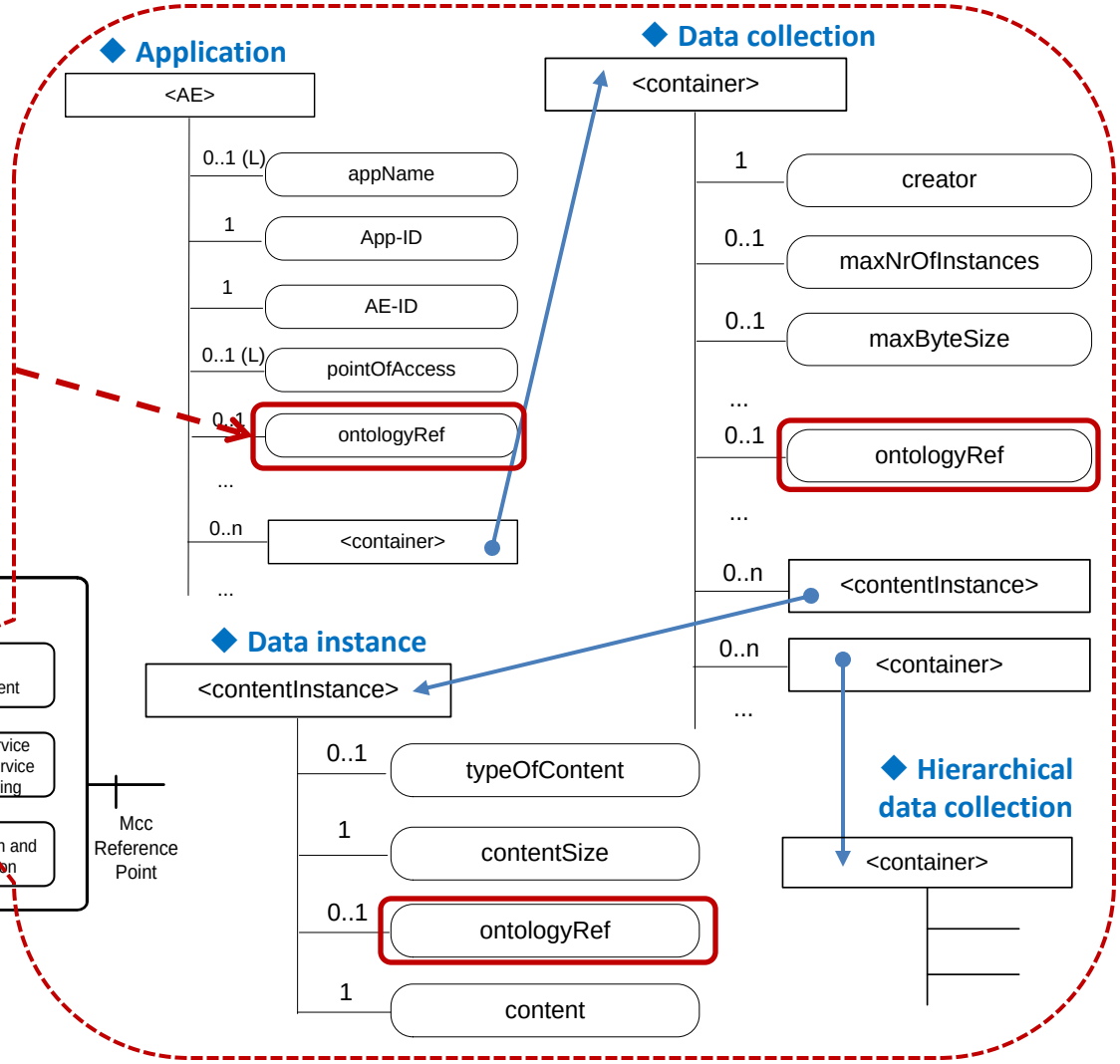


Generic Abstraction/Semantics

✓ Resource types **<AE>, <container> & <contentInstance>** are used for the abstraction of M2M applications, data collection and instances..

✓ Attribute **'ontologyRef'** is to provide the semantic annotation (meaning) for application and data. It's the rudimentary step towards semantic capability enablement.

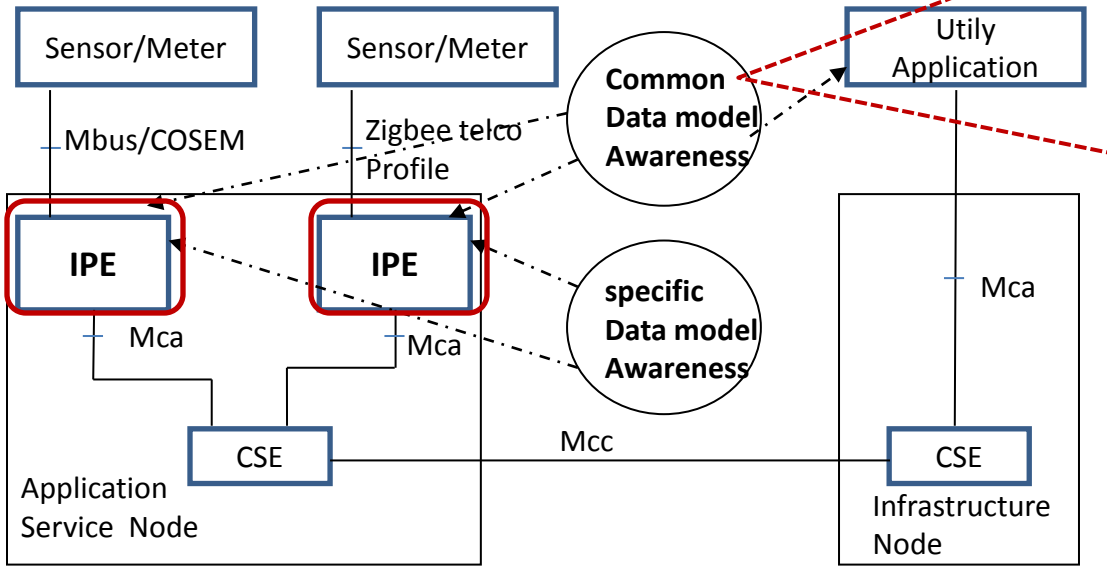




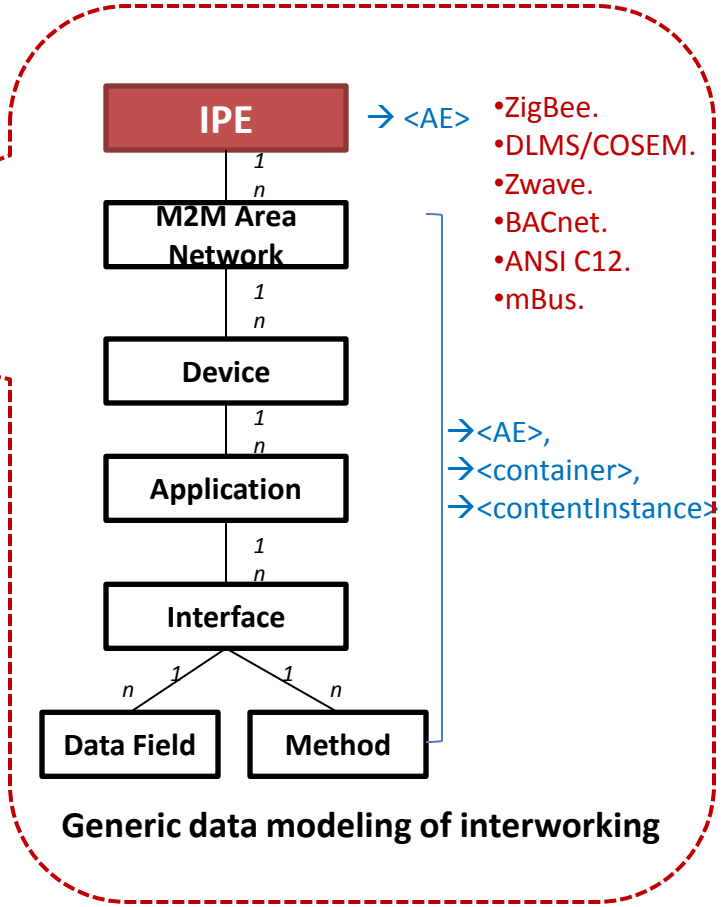
Interworking with non-oneM2M

(*Informative*)

✓ The **Inter-working Proxy Application Entity (IPE)** abstracts and maps the non-oneM2M data model to the oneM2M resources exposed via the Mca reference point



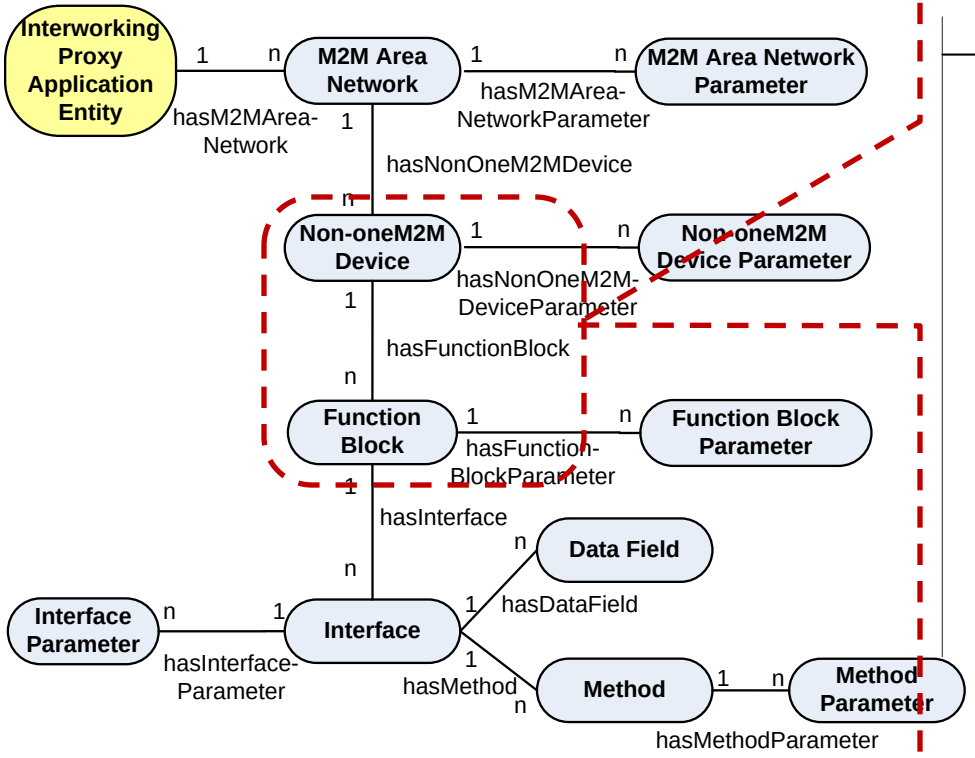
Translation of non-oneM2M Data Model to oneM2M Specific Data Model



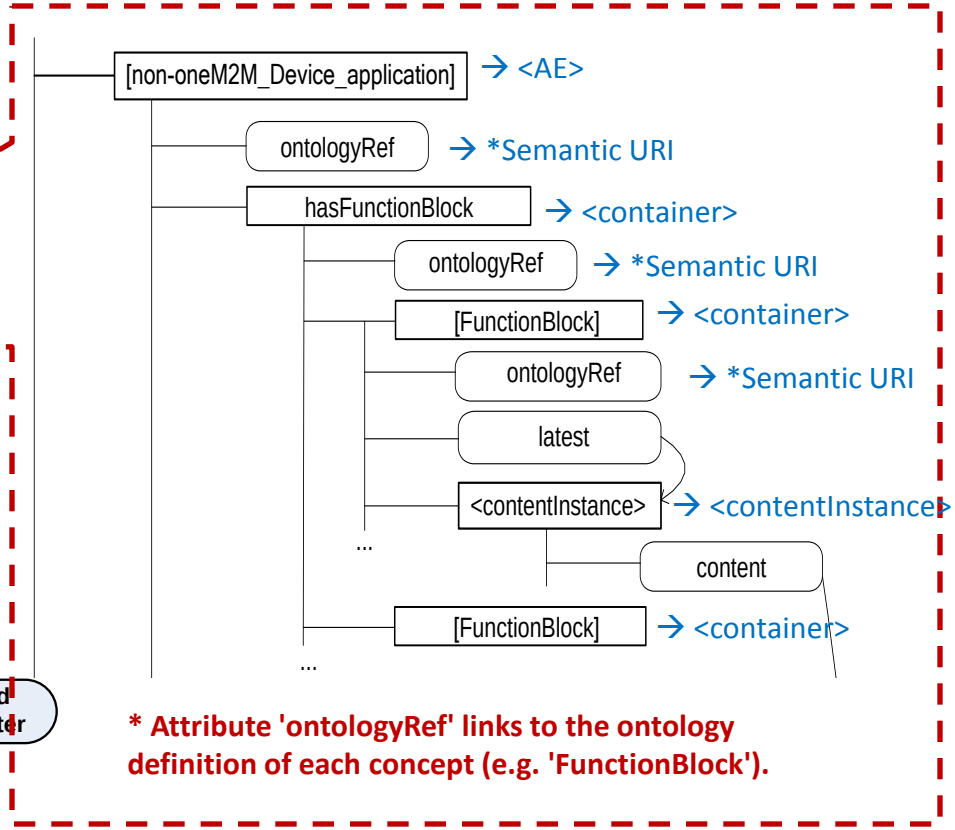
Generic data modeling of interworking

Interworking Enhancement with Semantics

(*Informative*)



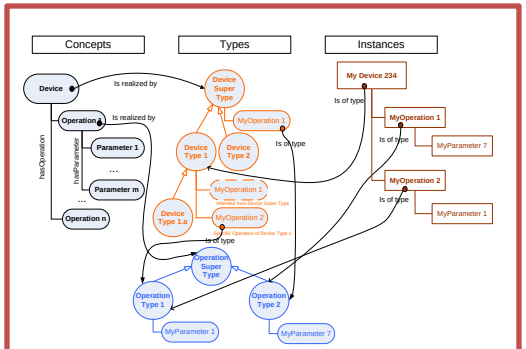
A generic semantic concept model (ontology) representing an Area Network



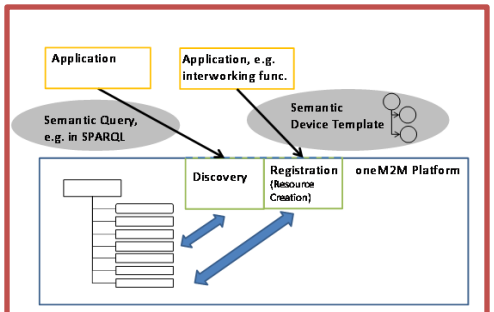
An example of mapping to oneM2M resources

Roadmap to Semantic Enablement

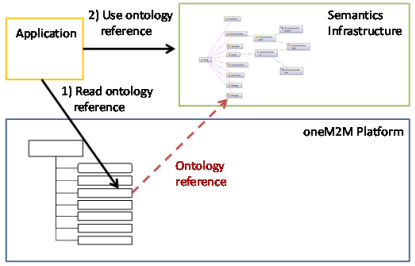
(*Informative*)



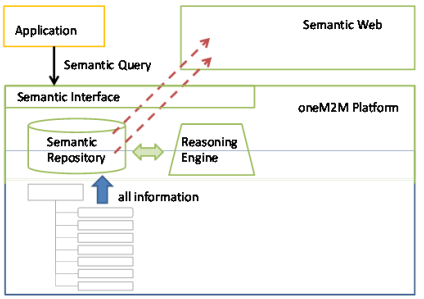
1. Semantic Modeling (Ontology)



3. Use of Semantic Technologies for specific Platform Functionalities



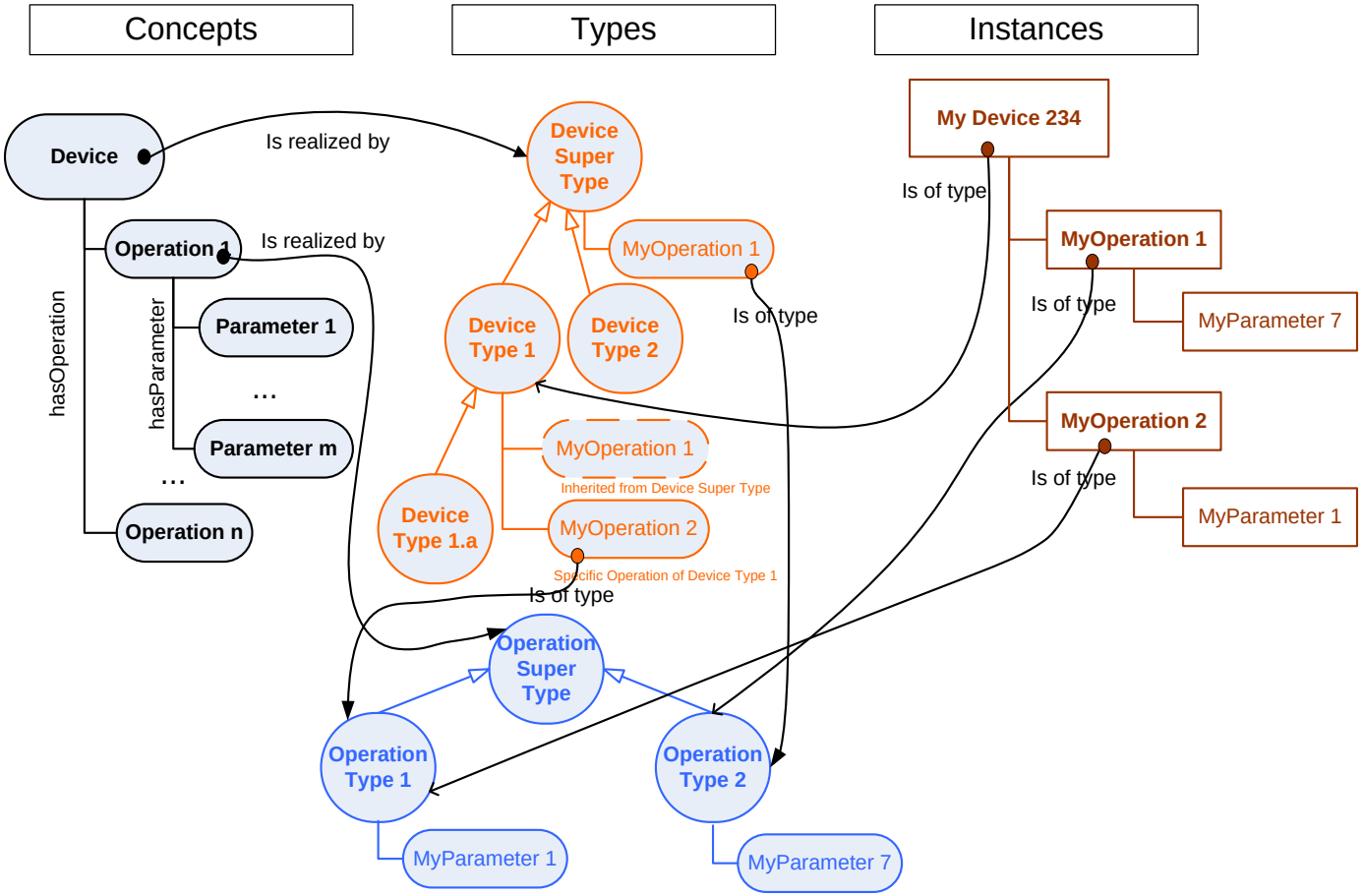
2. Semantic Annotation



4. Full Semantic Platform

Roadmap to Semantic Enablement

(*Informative*)



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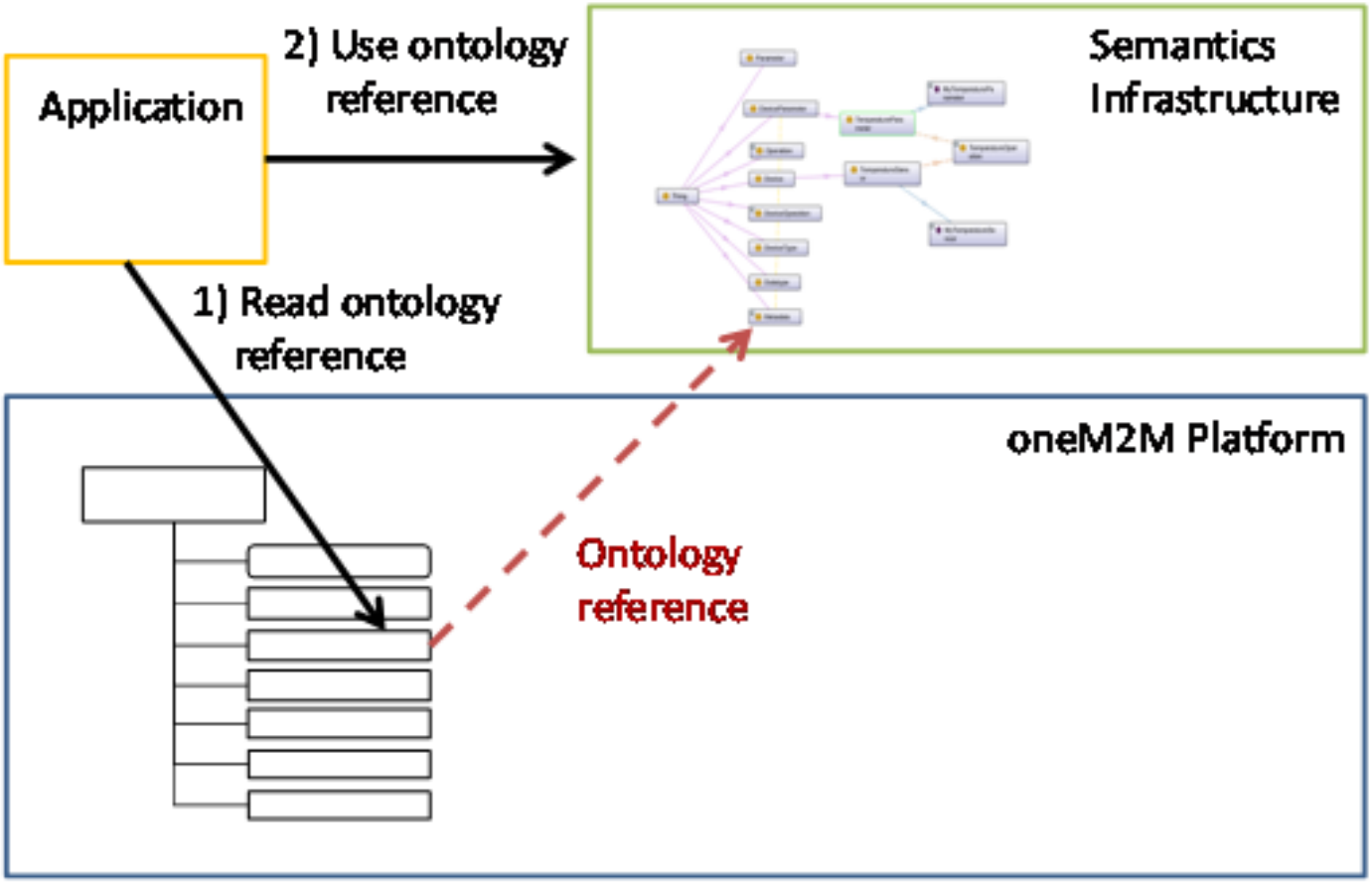

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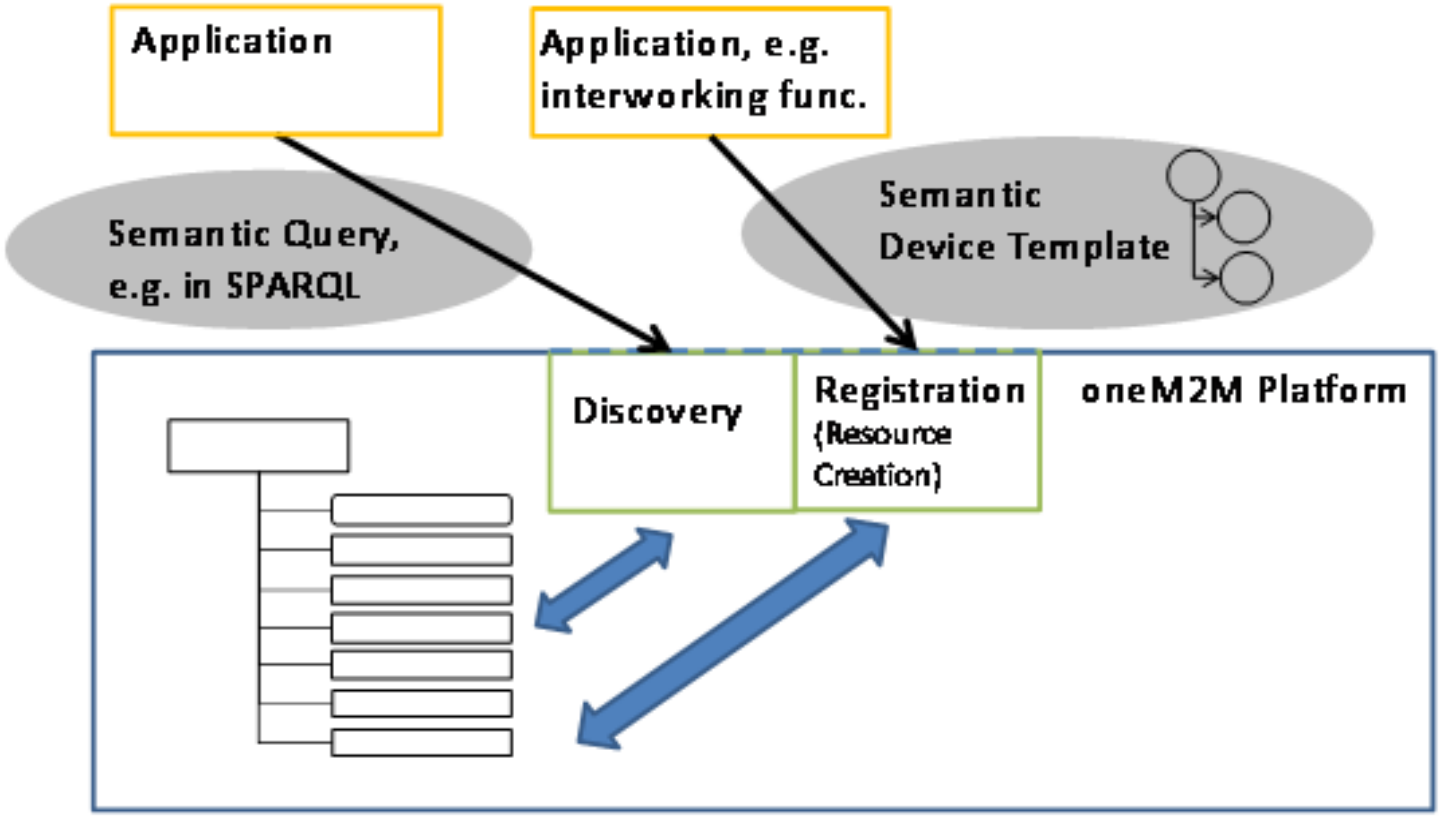

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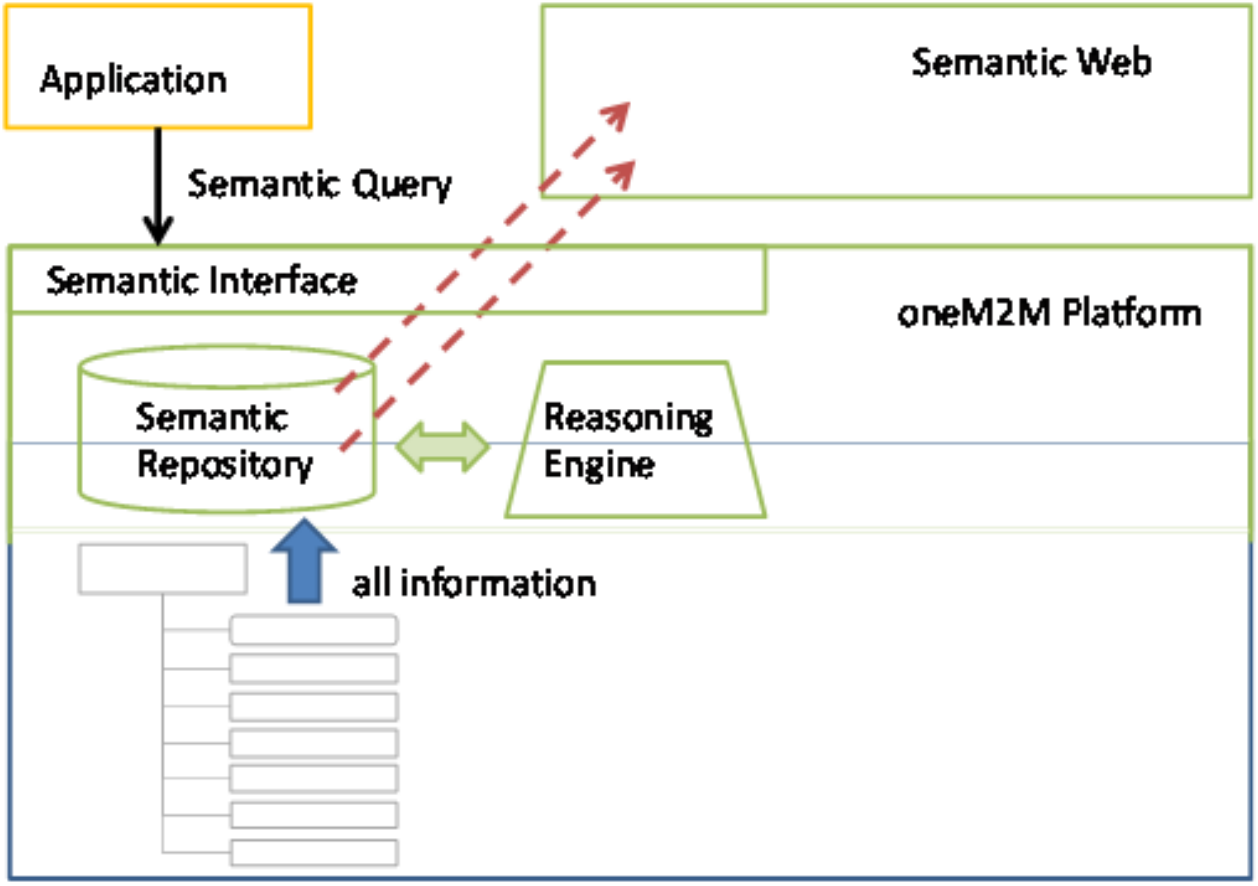
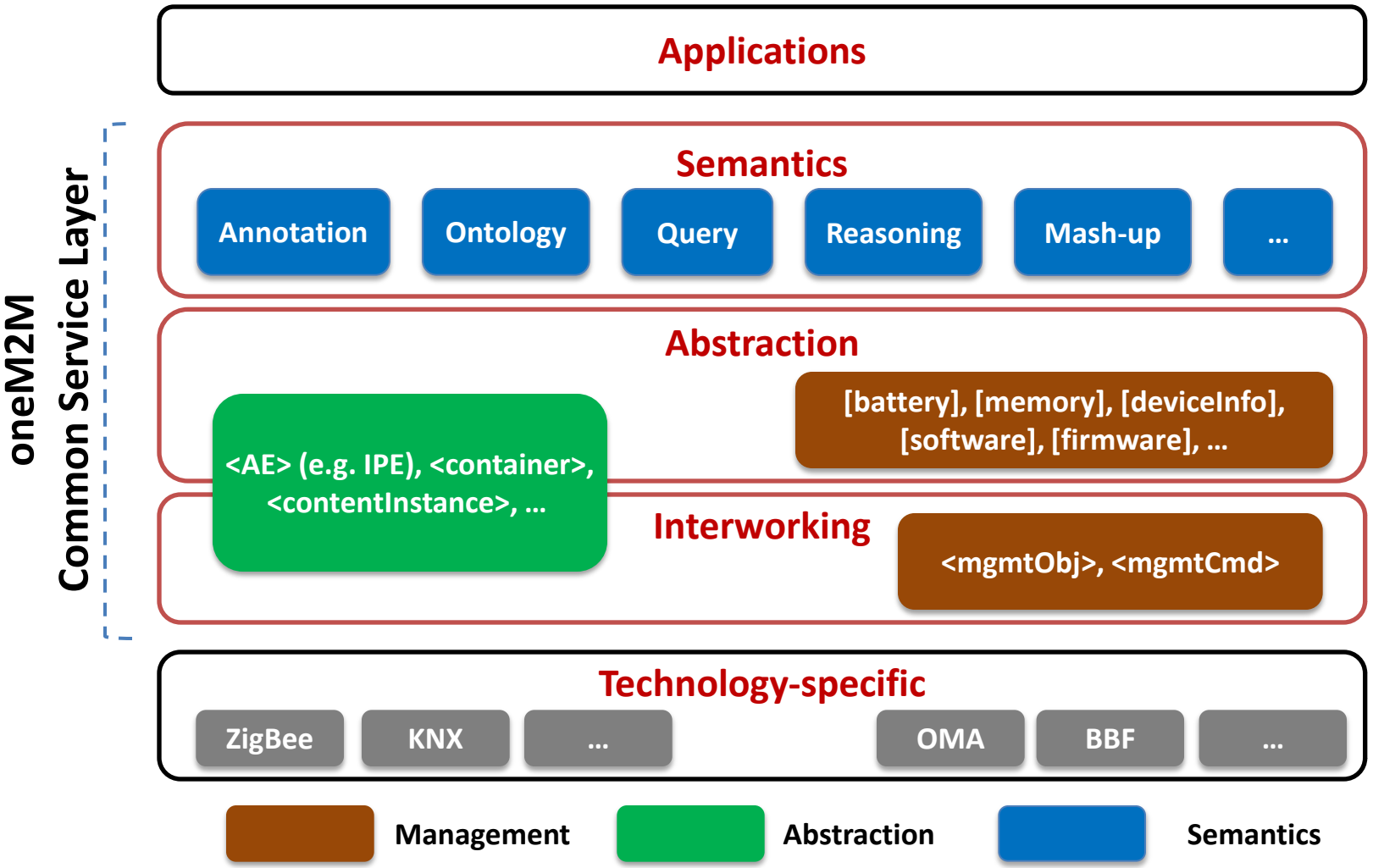


4. Full Semantic Platform

Conclusion



Join us at the oneM2M showcase event

- OneM2M project partners, rationale and goals
- OneM2M Service Layer Specification release
- Showcase demos that demonstrate oneM2M “live"

9 December 2014, Sophia-Antipolis, France

(free of charge, but online registration is required)

http://www.onem2m.org/Showcase

Followed by the ETSI M2M workshop

Thank You!

Q&A