



# oneM2M Stakeholders' Day

*Hosted by*

Telecommunications Standards Development Society, India

*Supported by*

India-EU ICT Standardisation Collaboration Project

24 February 2023 0800 – 1630 IST

# About oneM2M

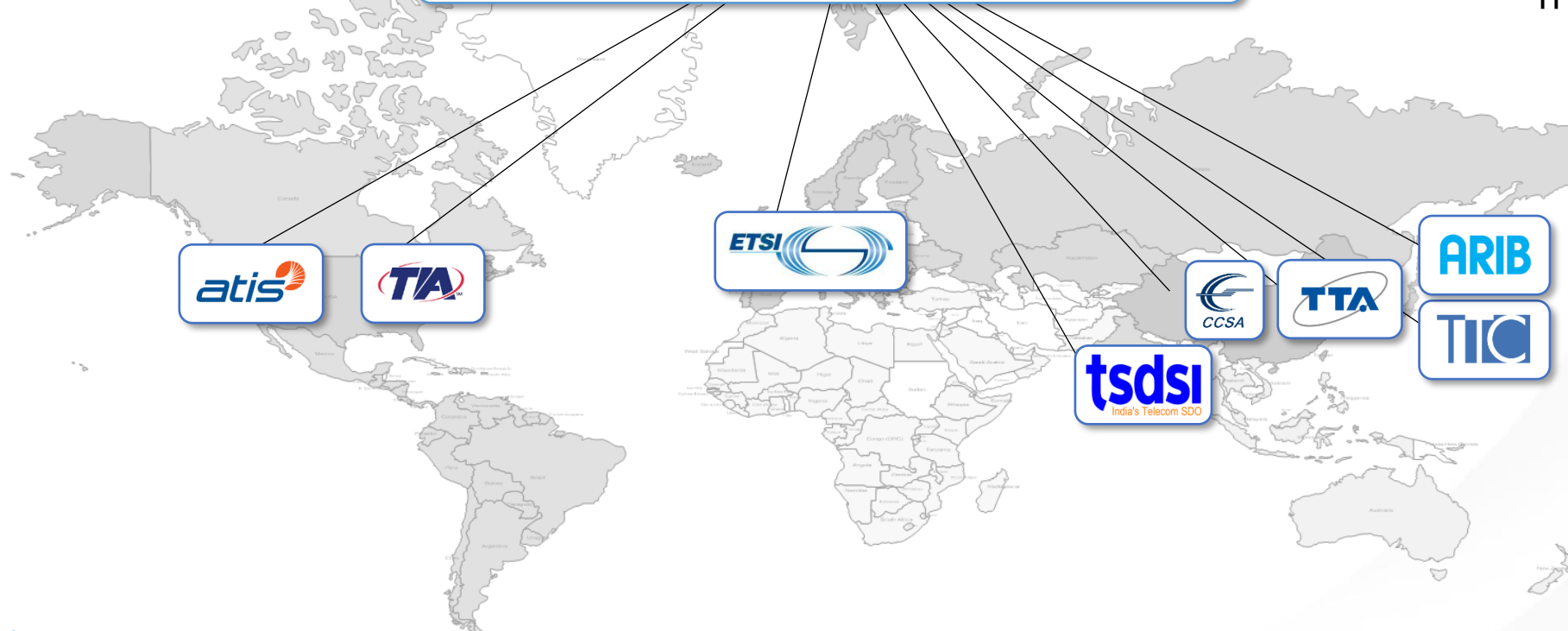
## Organization, Standard, Roadmap

Roland Hechwartner  
oneM2M TP Chair, Deutsche Telekom

# oneM2M Partnership Project

More than 200 member organizations in oneM2M

founded<sup>1</sup> July, 24<sup>th</sup> 2012  
TP#1: Sep 24<sup>th</sup>-29<sup>th</sup> 2012



Join forces  
=> reduce fragmentation

=> Reuse e.g.



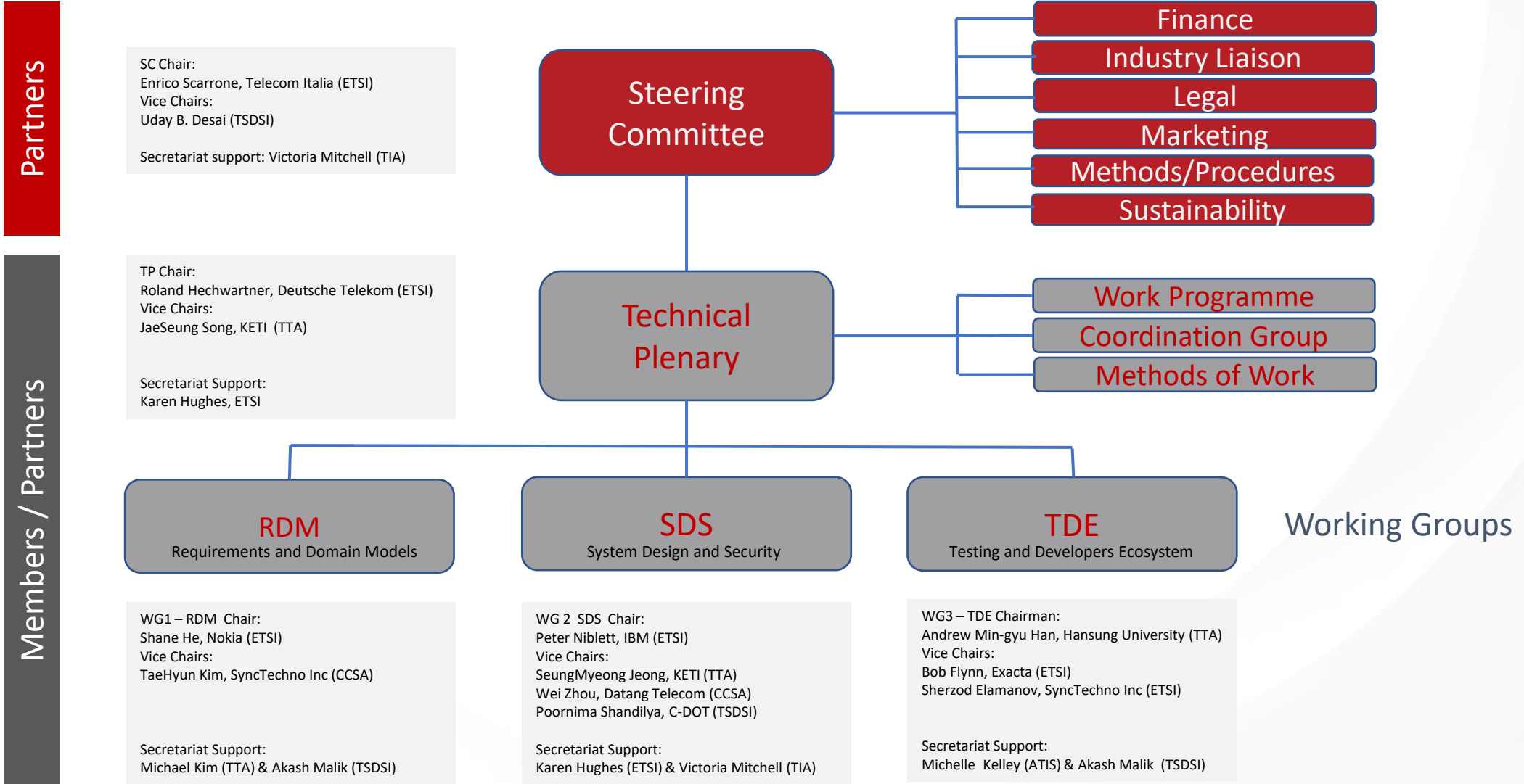
e.g. Release 2 transposition  
ITU-T SG20 Y.4500.x

GLOBALPLATFORM<sup>®</sup>  
THE STANDARD FOR SECURE DIGITAL SERVICES AND DEVICES

[www.oneM2M.org](http://www.oneM2M.org) All documents and specifications are publically available

[1] Partnership Agreement V 2.0 (Approved March 2013)

<http://onem2m.org/about-onem2m/organisation-and-structure>



# Working Groups Terms Of Reference

## RDM

Requirements &  
Domain Models

- Collect and document use cases that are relevant for oneM2M, including both domain-specific and cross-domain ones
- Identify and specify service and system requirements, including interworking aspects to other systems
- Conduct studies, including aggregation and analysis of requirements, leading to identification of key issues for development of the oneM2M system
- Elicit ecosystem engagement and gather IoT/M2M service requirements from vertical industry groups and fora
- Identify and specify information and data models and ontologies to support harmonisation and interworking with vertical domains and to enable cross domain data exchange.

## SDS

System Design &  
Security

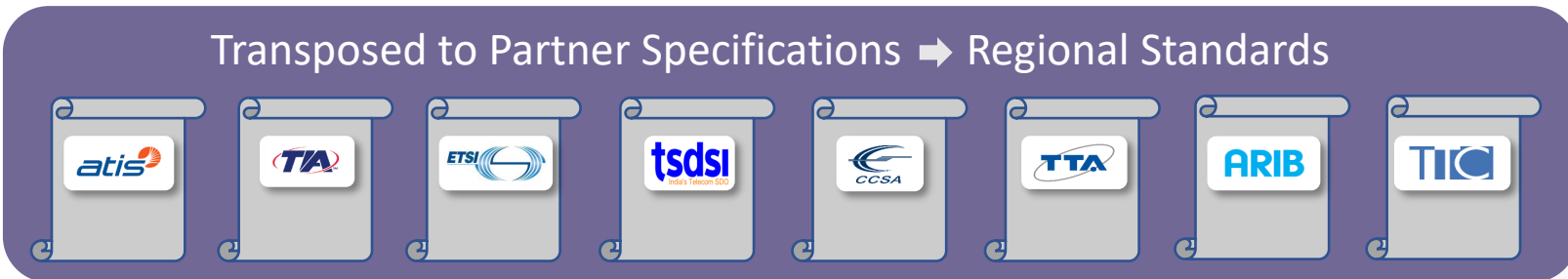
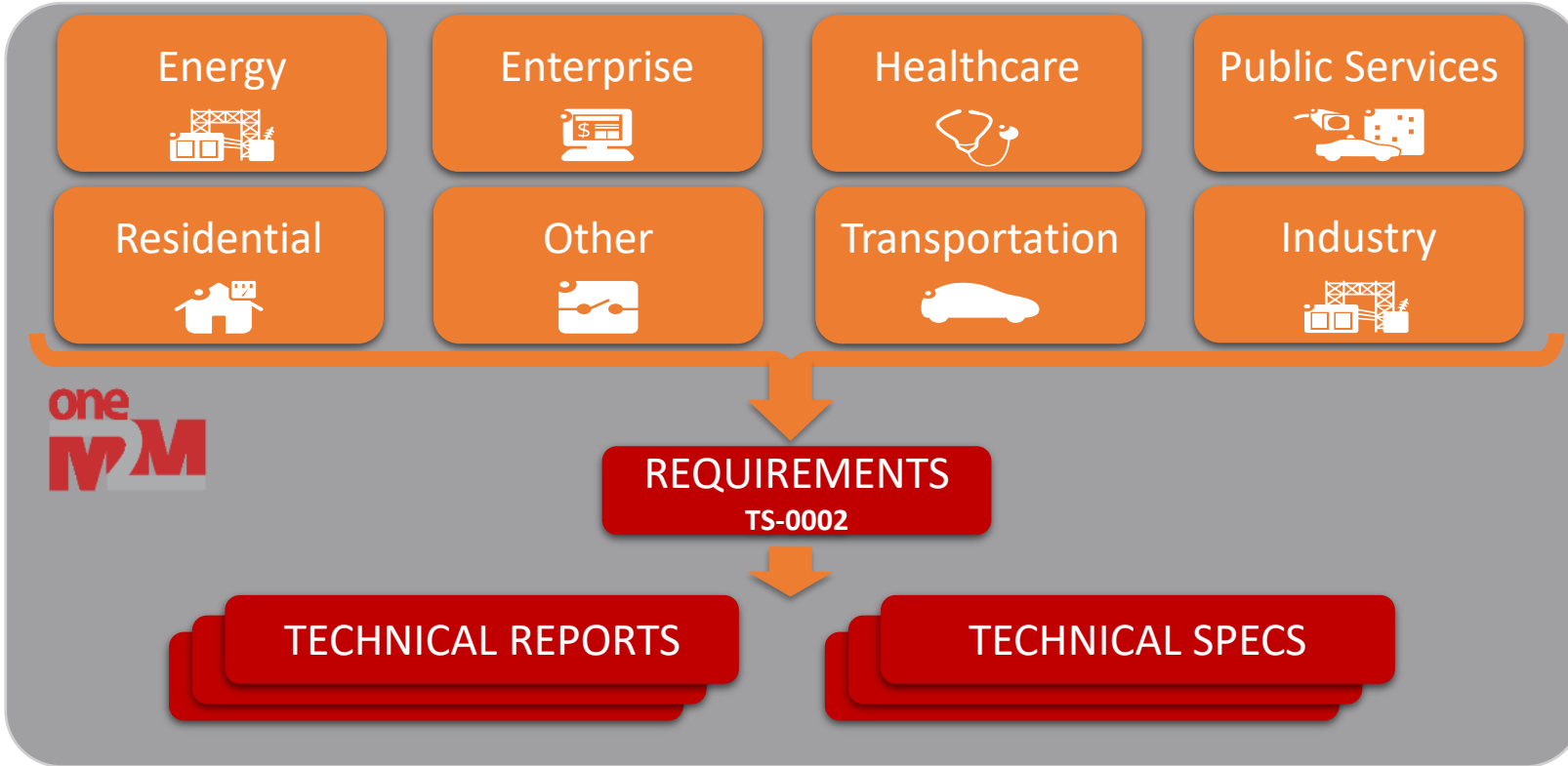
- Definition of the oneM2M system architecture including the oneM2M functional entities, resources, reference points and related message flows.
- Definition of oneM2M system management including device management aspects.
- Definition of the oneM2M protocol aspects including the oneM2M data types, request and response message primitives, procedures, schema definitions, serialization and bindings to underlying transport protocols.
- Definition of the oneM2M security framework including means for identity, credential management, data privacy and security functions (authentication, confidentiality, integrity verification and authorization).
- Development of specifications that clearly capture the definitions of the oneM2M architecture, protocol and security framework.

## TDE

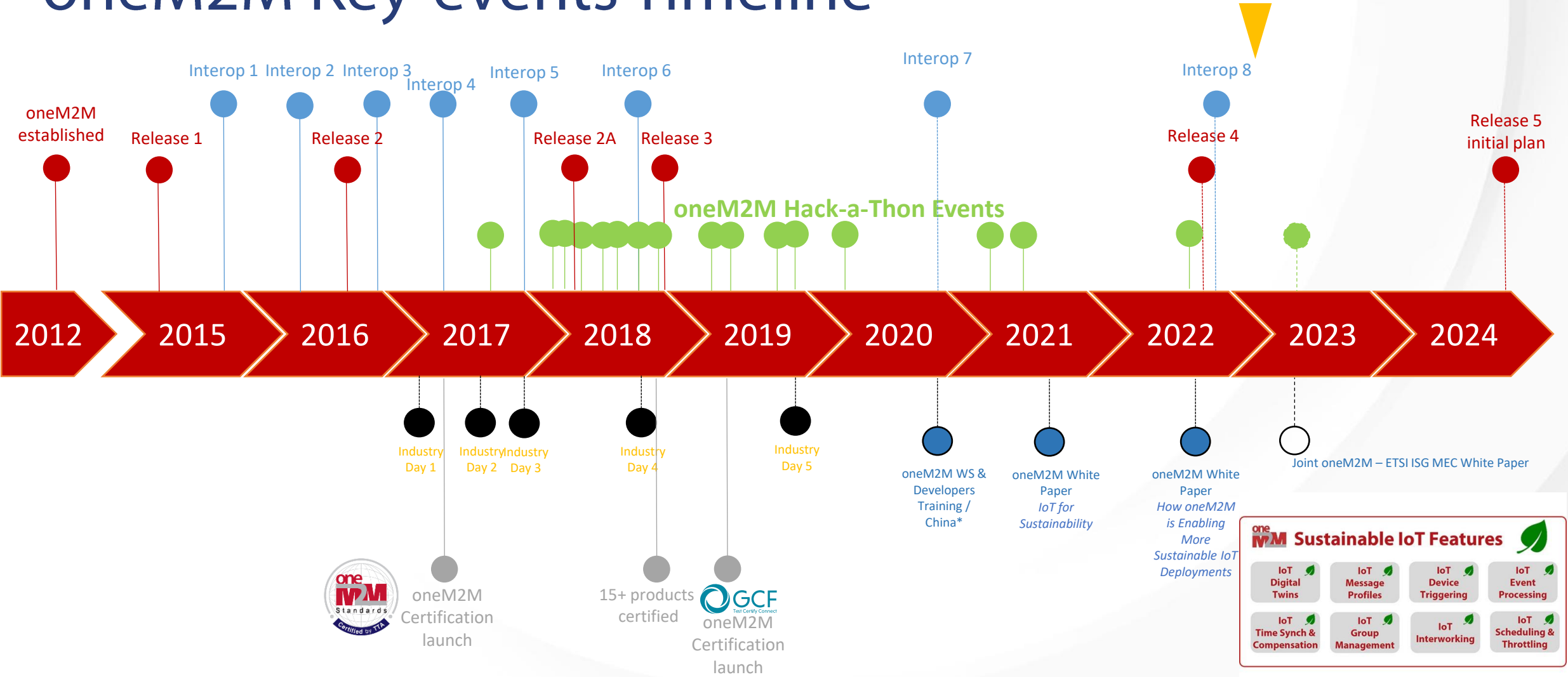
Testing &  
Developers  
Ecosystem

- Identify and define test requirements for oneM2M System and services related to it.
- Develop and maintain a set of specifications to support conformance tests, interoperability tests, and developers guides
- Specify and maintain standard feature catalog and product profiles
- Cooperate with other working groups to define the proper testing scope and strategy
- Initiate and supervise test related events (such as Plugtests) as well as developer related events (such as hackathons and developers tutorials)
- Coordinate interoperability events in collaboration with other organizations
- Support the implementation of oneM2M Certification Program and its maintenance

# oneM2M Standard – Testing – Certification Program



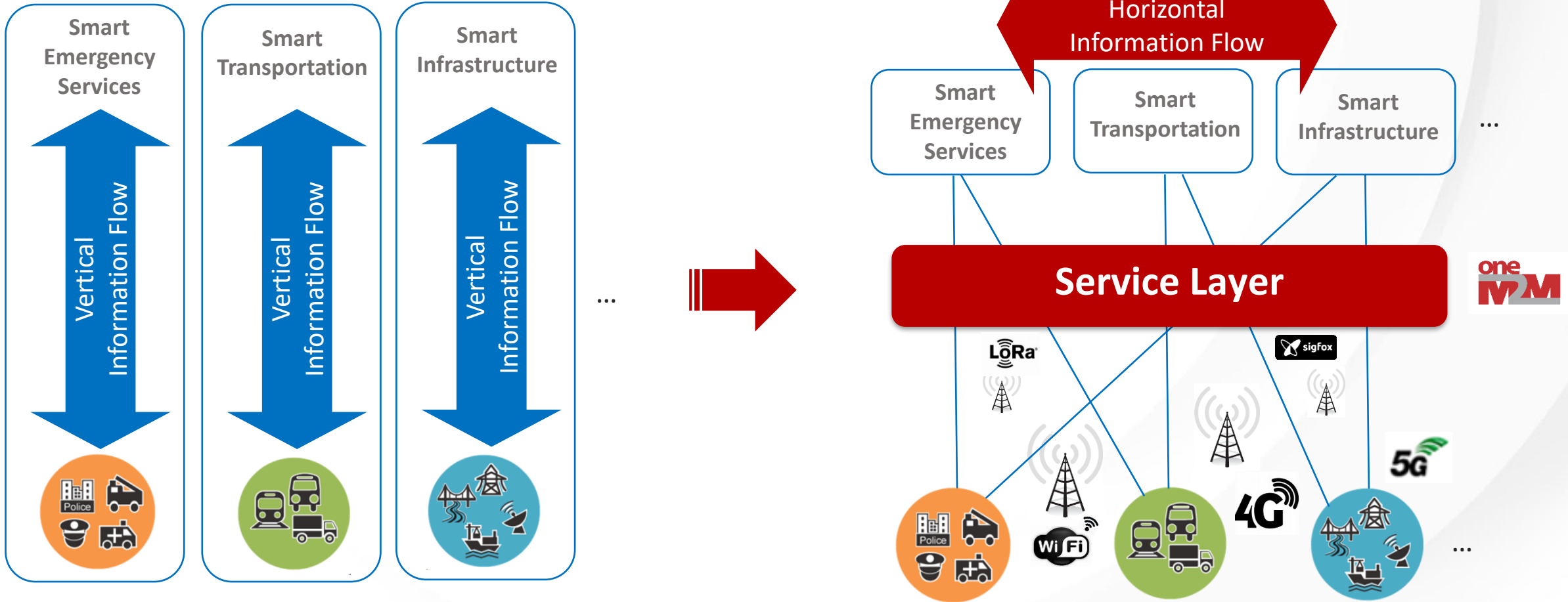
# oneM2M Key-events Timeline



**oneM2M Sustainable IoT Features**

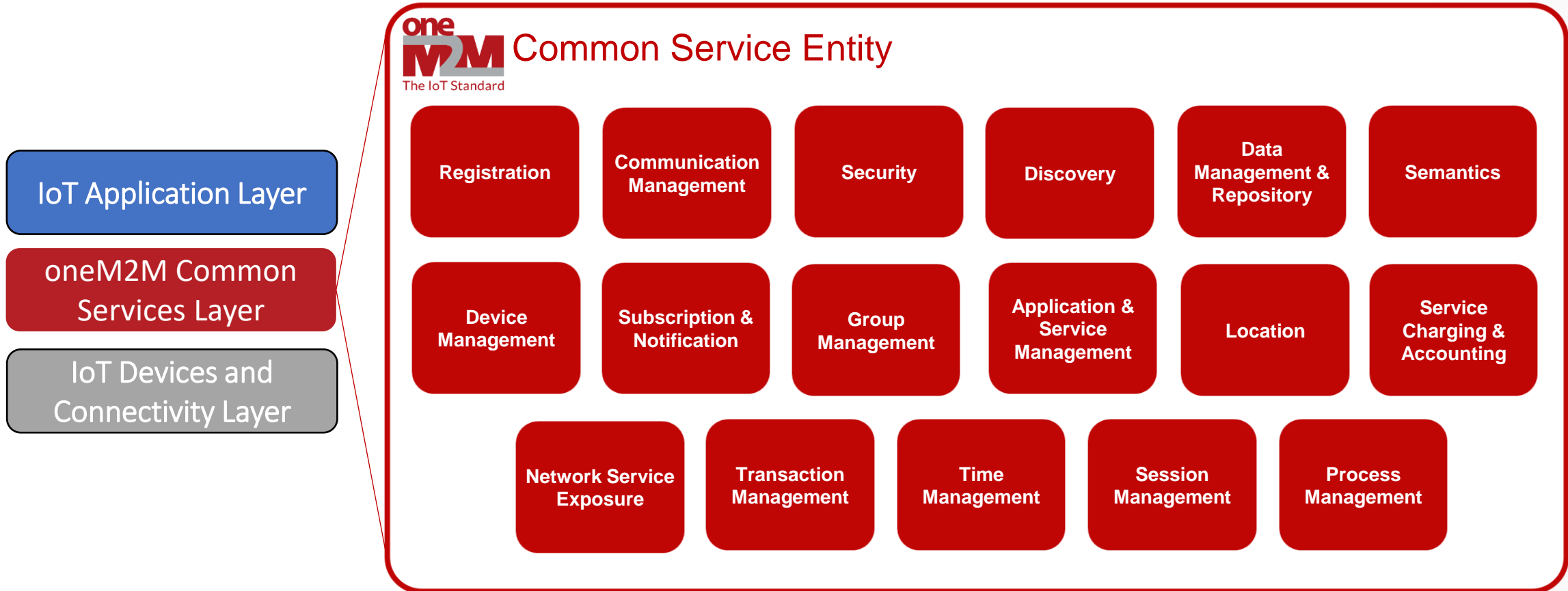
|   |                      |                       |                             |
|---|----------------------|-----------------------|-----------------------------|
| IoT Digital Twins                       | IoT Message Profiles | IoT Device Triggering | IoT Event Processing        |
| IoT Time Synchronisation & Compensation | IoT Group Management | IoT Interworking      | IoT Scheduling & Throttling |

# oneM2M Breaks Down the Silos





# oneM2M Common Services “Toolkit”



# oneM2M Feature Summary by Release

## Release 1

- Registration
- Discovery
- Security
- Group Management
- Data Mgmt. & Repository
- Subscription & Notification
- Device Management
- Communication Mgmt
- Service Charging
- Network Service Exposure
- App & Service Mgmt
- HTTP/CoAP/MQTT Bindings

## Release 2

- + Time Series Data
- + Flexible Resources that can be customized by app developers (flex container)
- + Semantics Description & Discovery
  - Dynamic Authorization
  - Content Security
  - E2E Security
- + WebSocket Binding
- + Ontology for Home Area Information Model
- + oneM2M App-ID Registry
- + oneM2M Interworking
  - LWM2M
  - Alljoyn
  - 3GPP Triggering

## Release 3

- + Semantic Querying/Mashup
- + 3GPP SCEF Interworking
  - Non-IP Data Delivery
  - UE reachability Monitoring
  - Device triggering
  - Etc.
- + Transaction Management
- + Service Layer routing
- + Common oneM2M Interworking Framework
  - OCF
  - OPC-UA
  - OSGi
- + oneM2M Conformance Tests and Profiles
- + Security Enhancements
  - Distributed Authorization
  - etc.
- + Ontology Based Interworking

## Release 4

- + SDT 4.0 and the Information Models for Multiple Domains
- + oneM2M Conformance Tests
- + Geo Query
- + Process Management
- + Message Primitive Profiles
- + Semantic Reasoning
- + Time Management
- + Enhanced 3GPP Interworking
  - Session QoS
  - Congestion Monitoring
- + Enhanced support of Fog/Edge Computing
  - Software Campaigning
  - Resource Synchronization
- + Service Subscriber Management
- + Security Enhancements
- + Group Anycast/Somecast
- + Modbus Interworking
- + Discovery Based Operations
- + Semantic OntologyMapping
- + Public Warning Services enablement

2015

2016

2018

2022

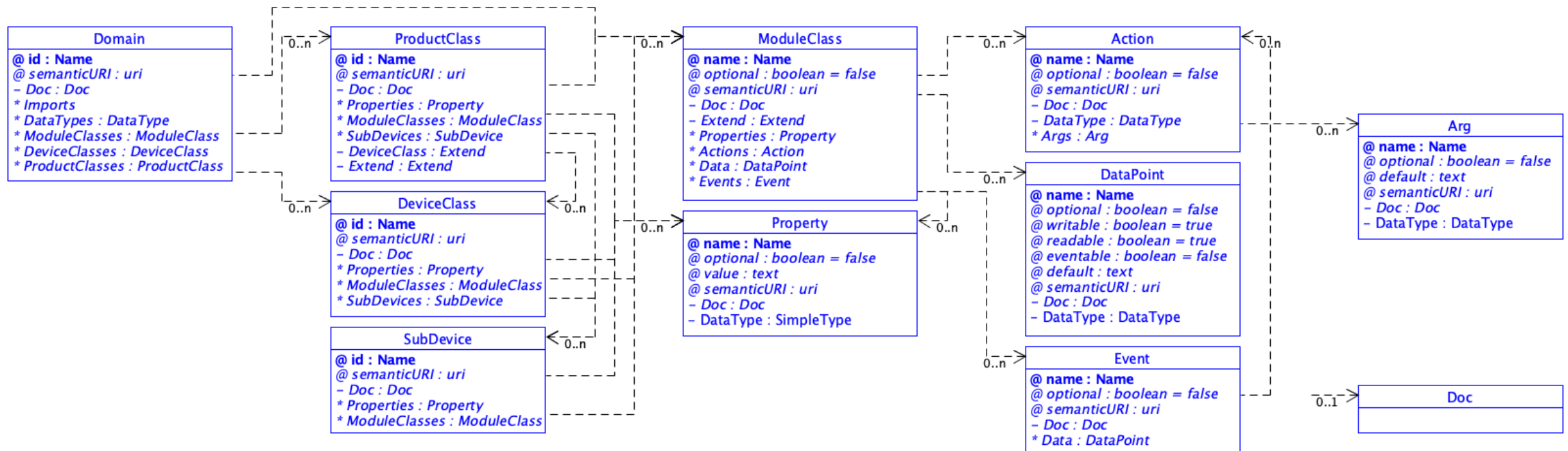
# Release 4 Features Overview

See also oneM2M Release 4 webinar:

oneM2M Release 4 Preview of new features by Dale Seed, Convida Wireless

# SDT 4.0: make it easy for IoT developers

- Provides an abstraction layer for connected devices
- Together with other organizations, such as OCF and OMA, oneM2M Rel 3 defines 84 ModuleClasses and 50 Devices with various functionalities
- In Rel 4 SDT is restructured to fit more the verticals (Home, City, Industry, Health, Automotive,...)



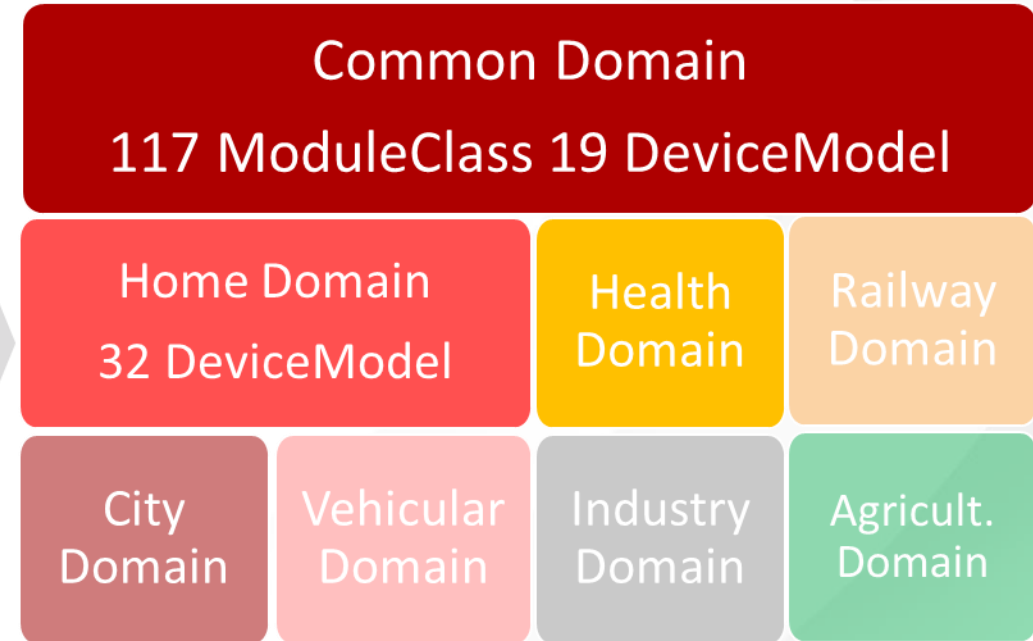
# SDT based Information Models

## ModuleClass

| Name  | Type                     | R/W           | Optional | Unit  | Documentation                            |  |
|---|--------------------------|---------------|----------|-------|--|--|
| powerGenerationData   | xs:float                 | R             | true     | W     | Amount of instantaneous generation data. |  |
| rounding<br>Generat<br>significa<br>multiply<br>rs<br>generati<br>e | flowInterval             | xs:integer    | RW       | false | s  | The measurement interval of water consumption.         |
|   | reverseFlowInterval      | xs:integer    | RW       | false | s  | The measurement interval of reverse water consumption. |
|   | waterTemperatureInterval | xs:integer    | RW       | true  | s  | The measurement interval of water temperature.         |
|   | waterPressureInterval    | xs:integer    | RW       | true  | s  | The measurement interval of reverse water pressure.    |
|   | intensiveSampleInterval  | xs:integer    | RW       | true  | s  | The time interval of intensive data sampling.          |
|   | intensiveReportInterval  | xs:integer    | RW       | true  | s  | The time interval of intensive data report.            |
|   | intensiveReportStartTime | m2m:timestamp | RW       | true  |  | The start time of data intensive report.               |

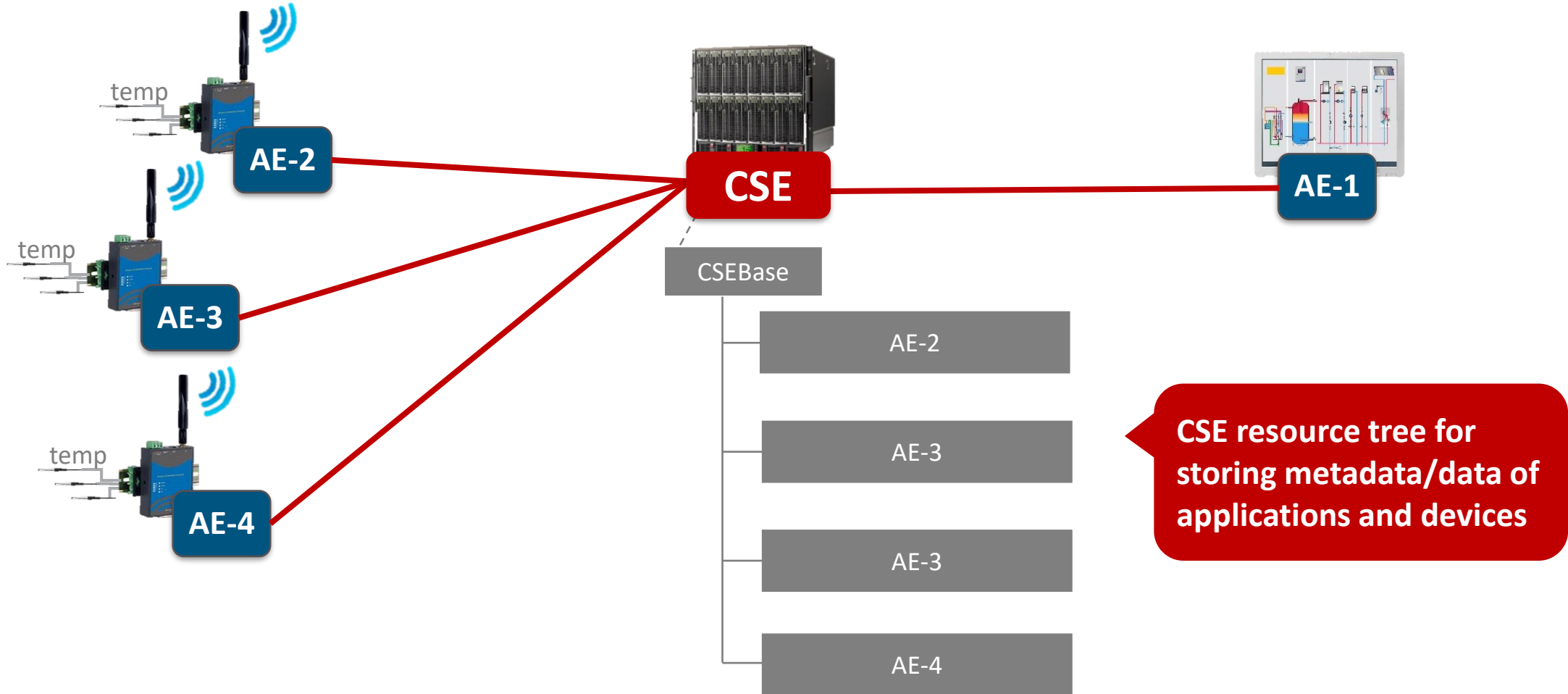
## DeviceModel

| Module Instance Name | Module Class Name | Multiplicity | Description          |
|----------------------|-------------------|--------------|----------------------|
| openLevel            | openLevel         | 0..1         | See clause 5.3.1.56  |
| doorlock             | binarySwitch      | 1            | See clause 5.3.1.12. |
| doorState            | runState          | 0..1         | See clause 0.        |
|                      | dishWasherJobMode | 0..1         | See clause 5.3.1.29. |



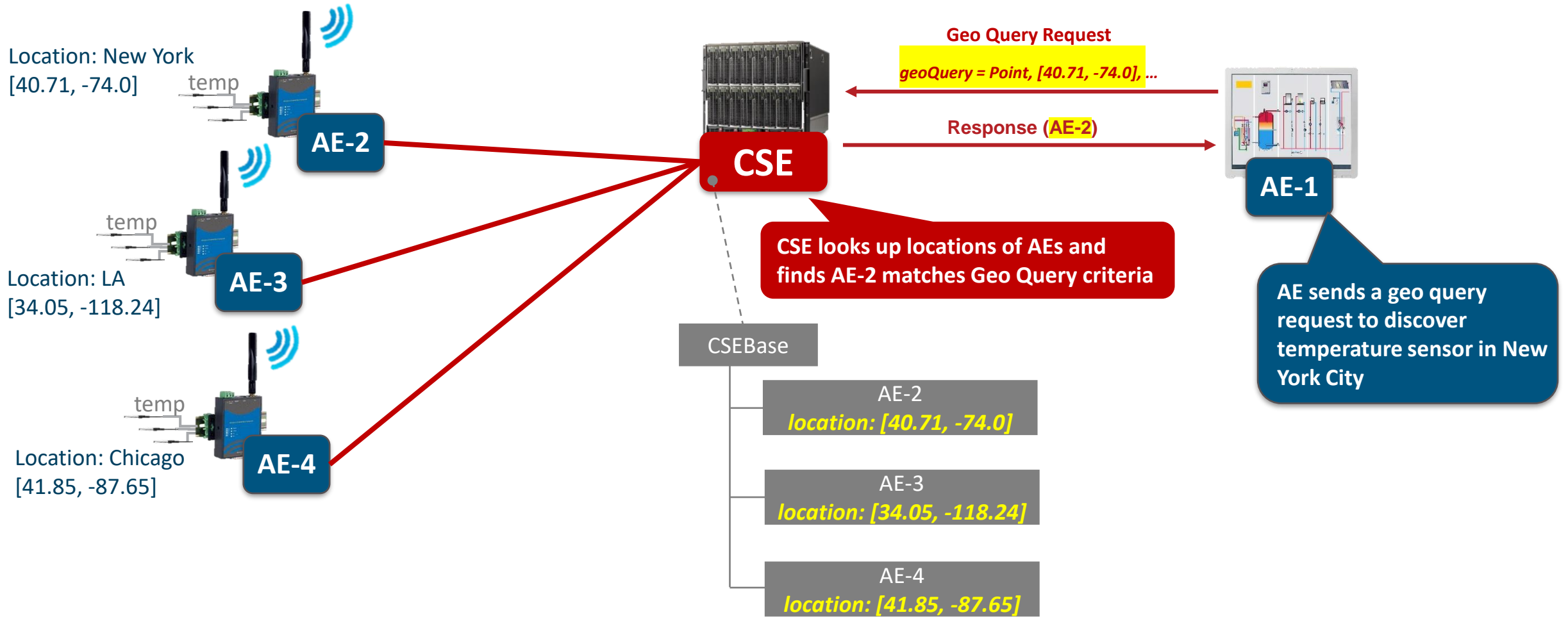
SDT based Information Model and Mapping for Vertical Industries (TS-0023)

# Quick Overview of oneM2M Entities



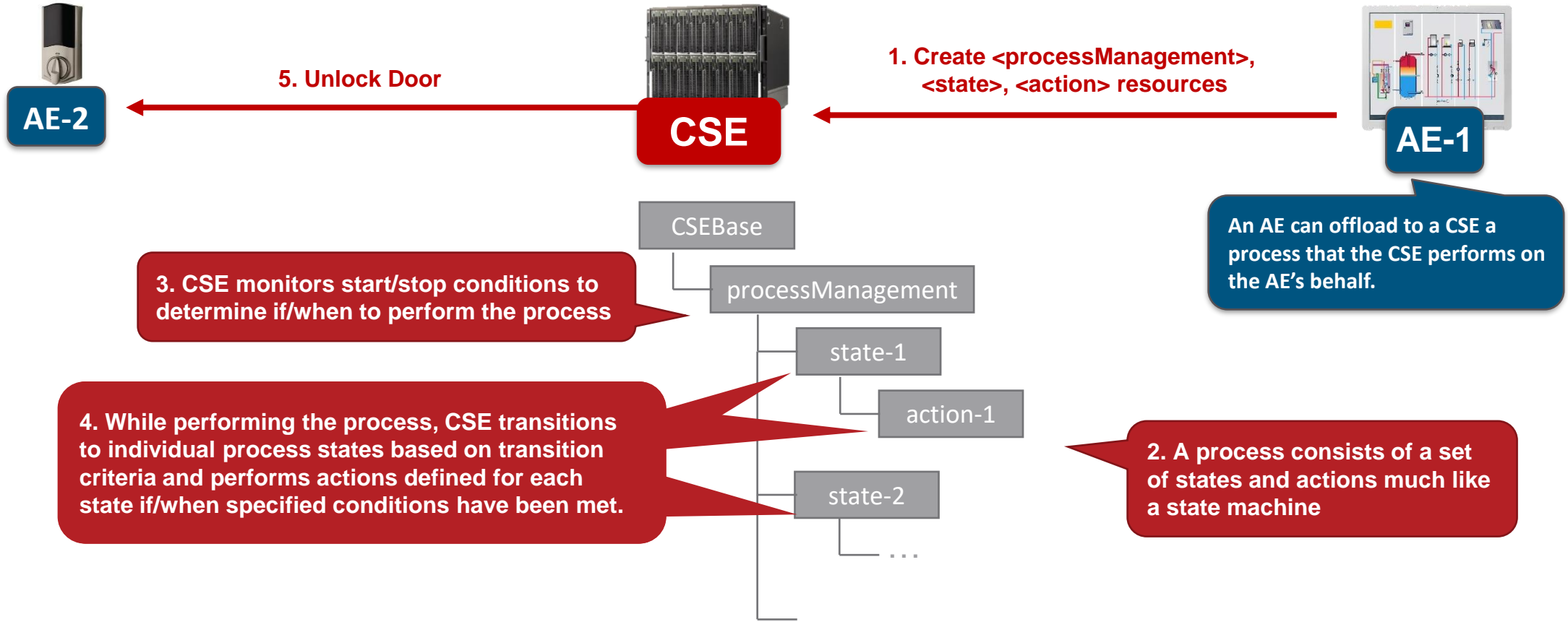
**AE: Application Entity**  
**CSE: Common Services Entity**

# Geo Query



AE: Application Entity  
CSE: Common Services Entity

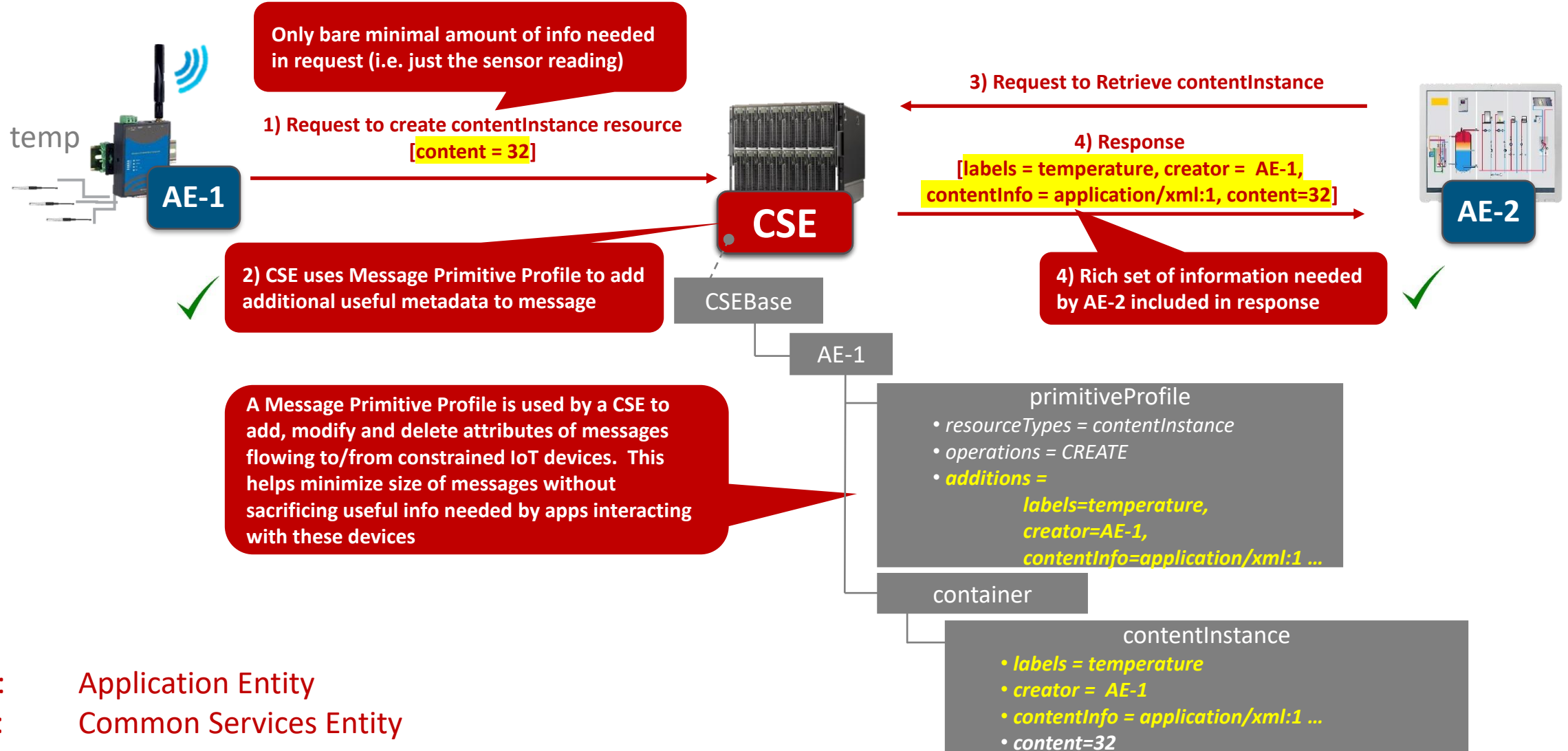
# Process Management Services



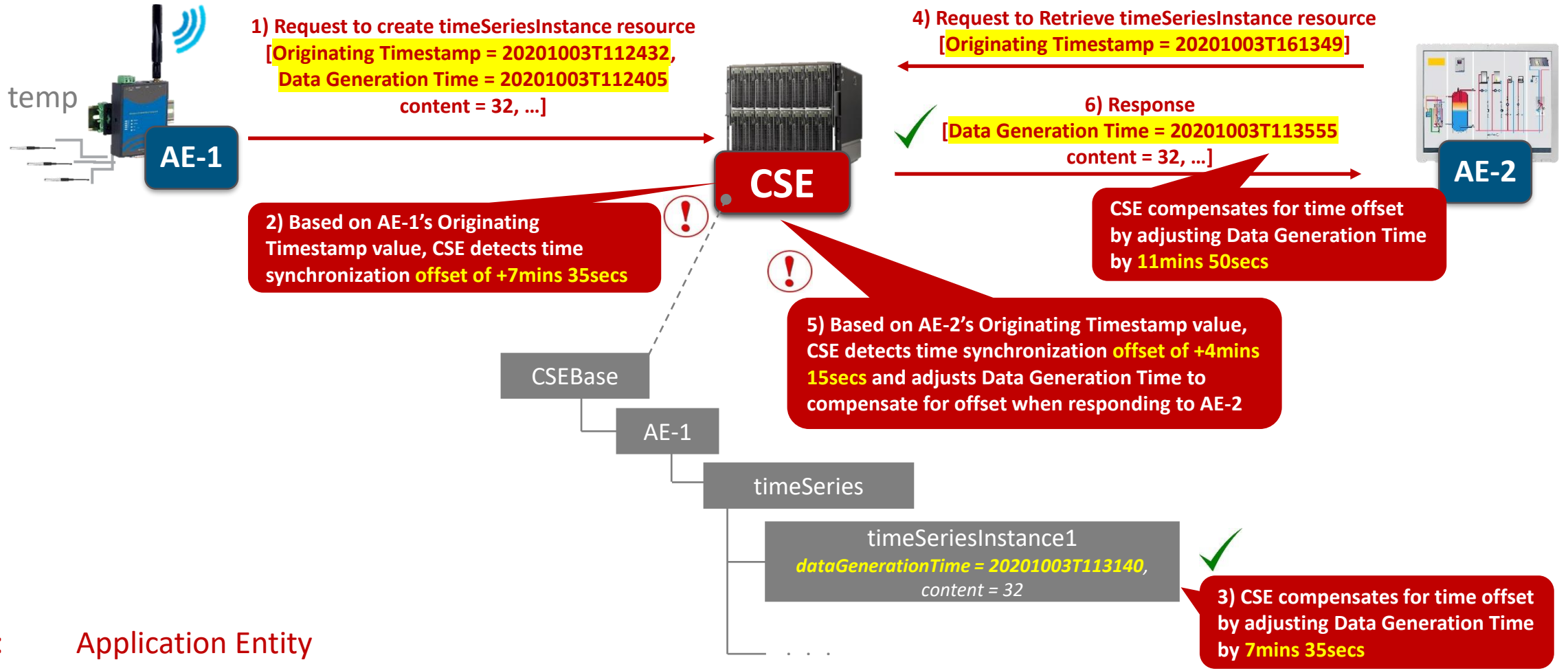
AE: Application Entity  
CSE: Common Services Entity



# Message Primitive Profiles

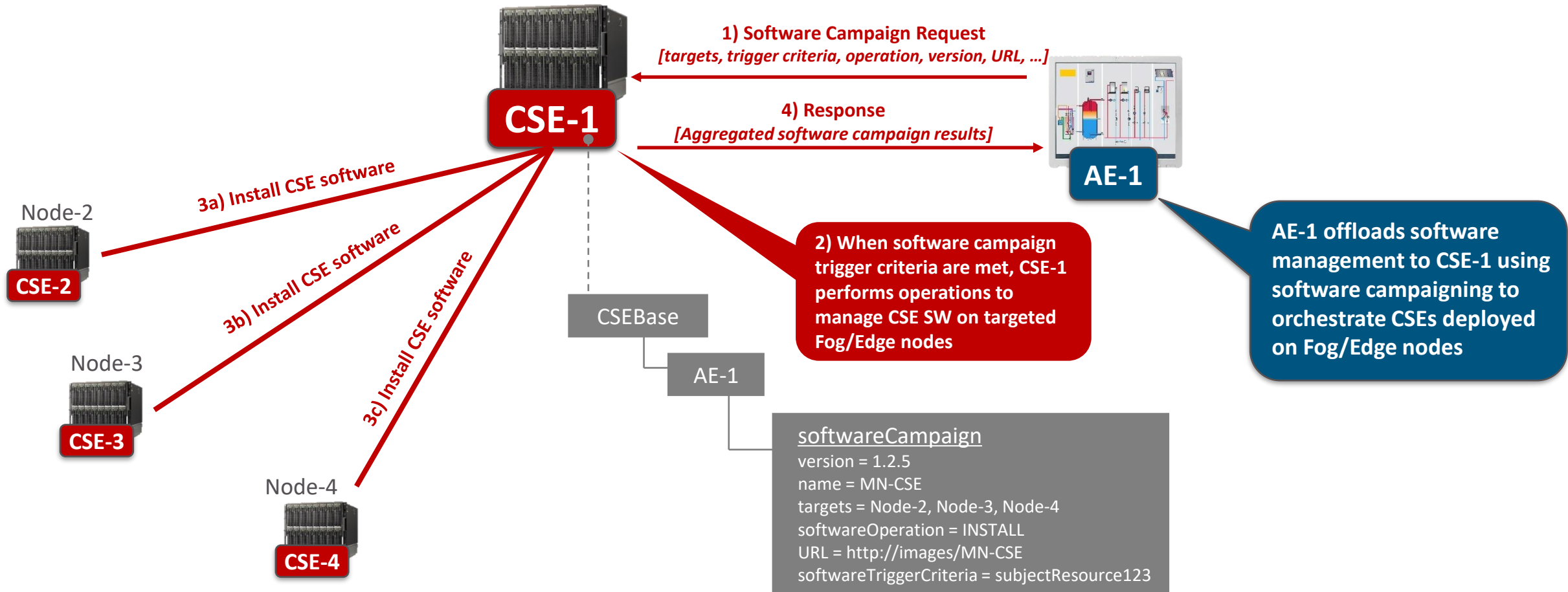


# Time Management



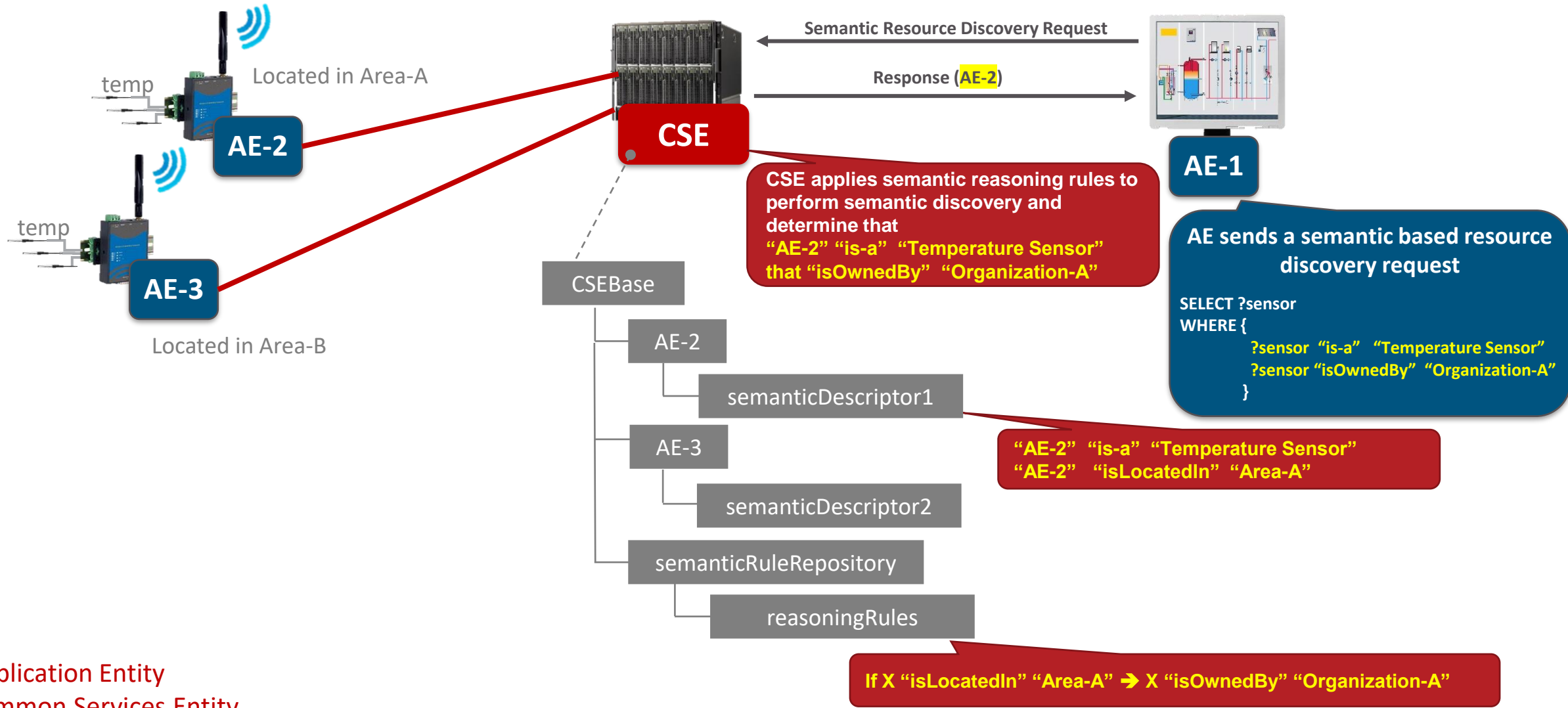
AE: Application Entity  
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# Software Campaigning



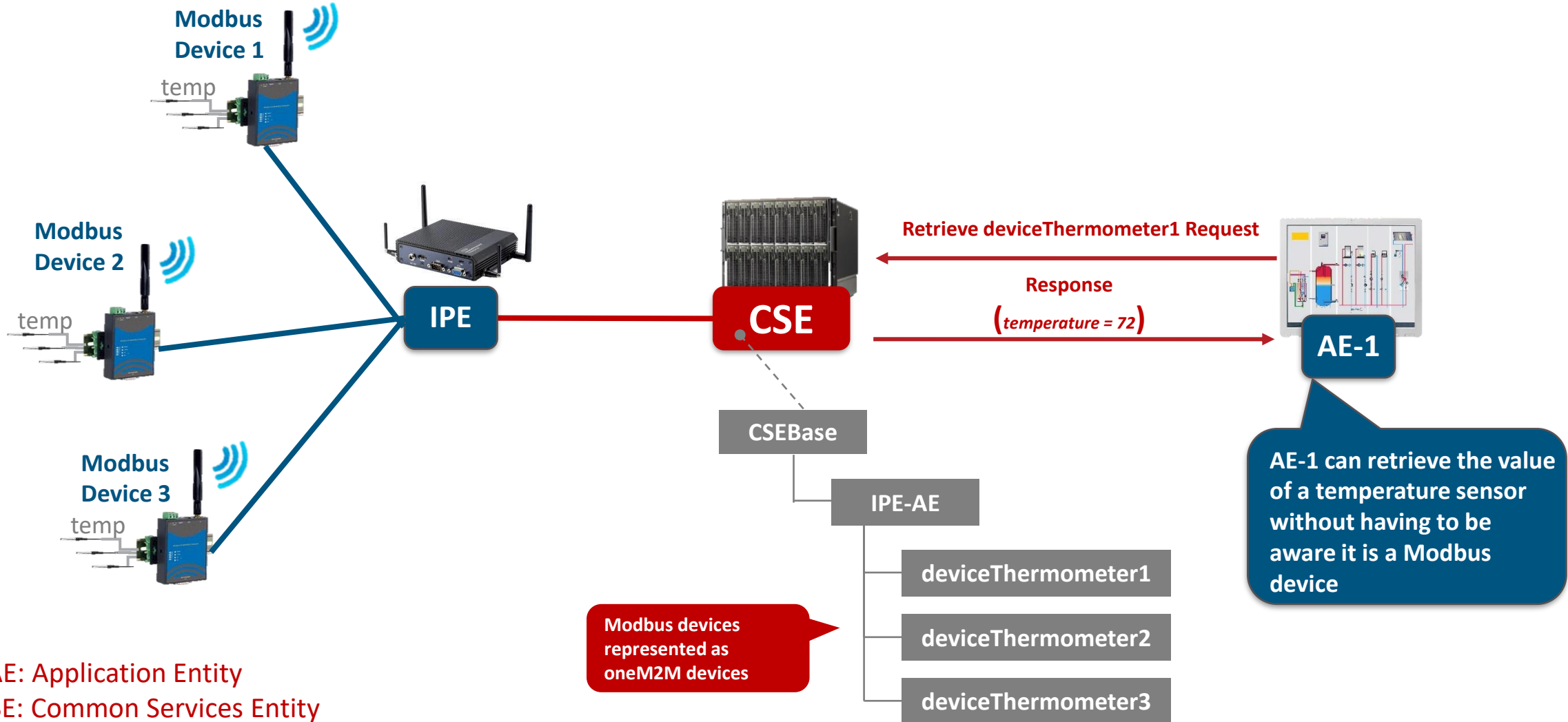
AE: Application Entity  
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# Semantic Reasoning



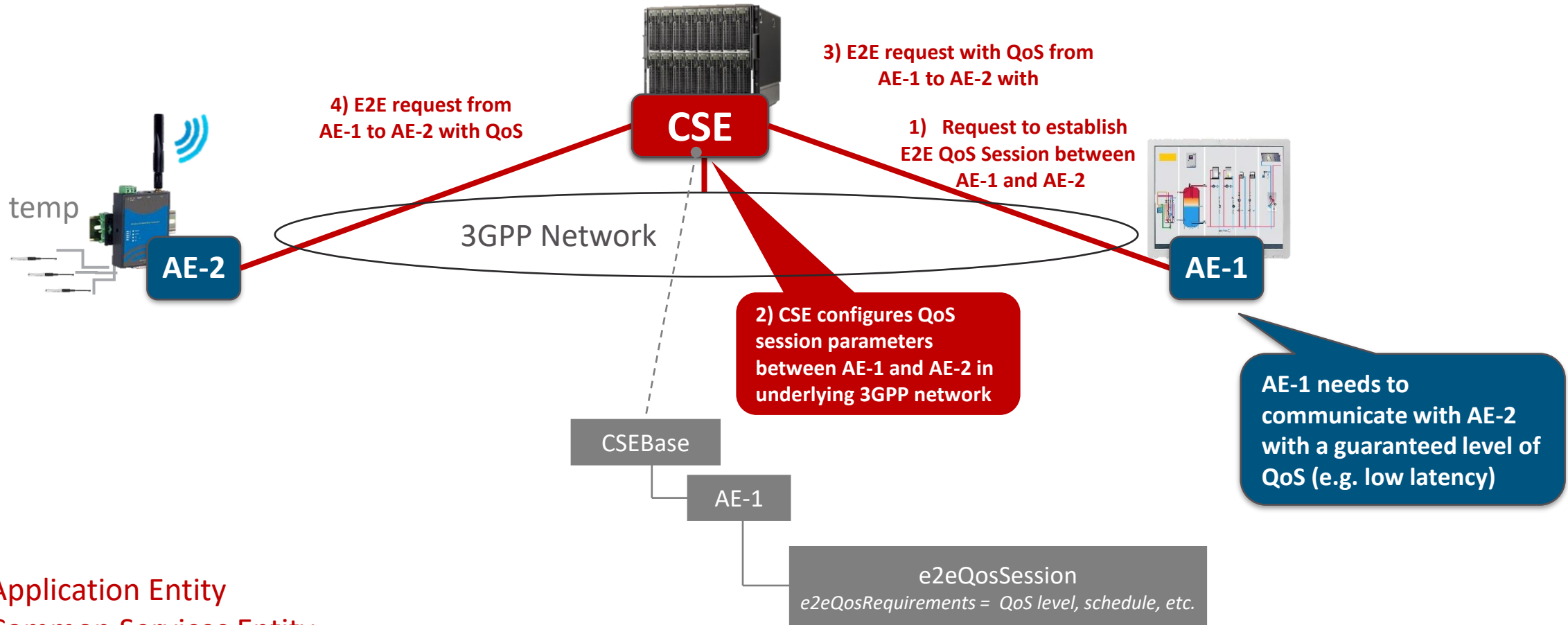
AE: Application Entity  
CSE: Common Services Entity

# Modbus Interworking



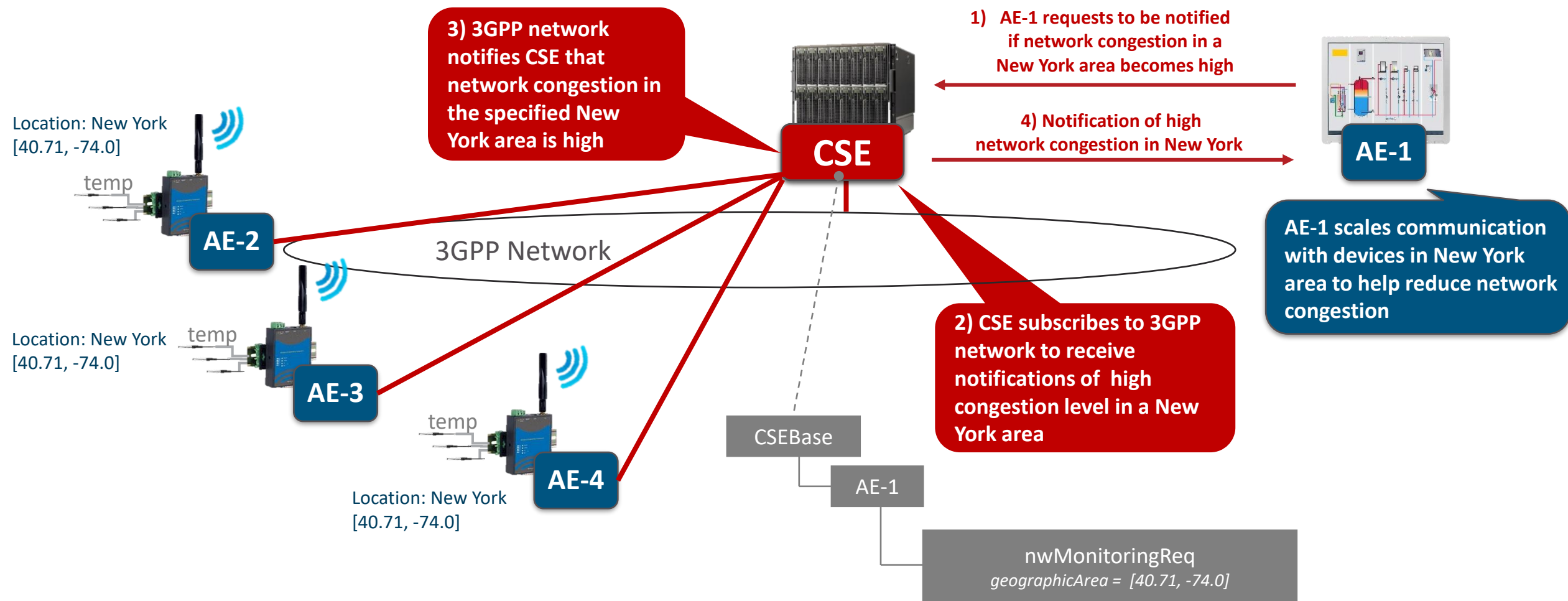
AE: Application Entity  
CSE: Common Services Entity  
IPE: Interworking Proxy Entity

# End-to-End QoS Session



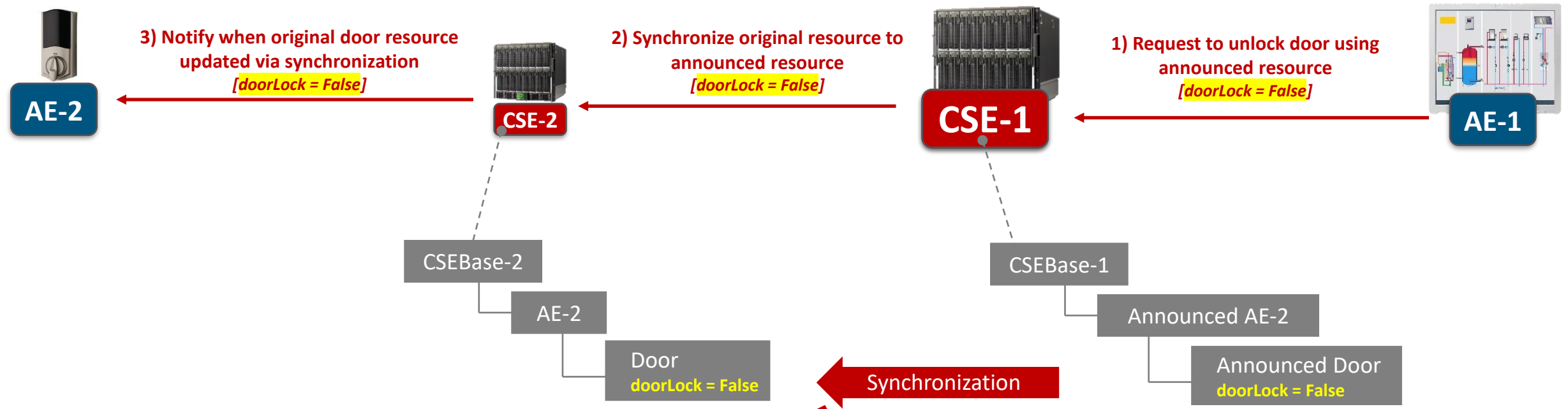
**AE:** Application Entity  
**CSE:** Common Services Entity

# Network Congestion Monitoring



AE: Application Entity  
CSE: Common Services Entity

# Resource Synchronization



In Rel-4, when announced resource is updated, original resource is updated automatically to keep it synchronized. Synchronization in the opposite direction supported in prior releases.

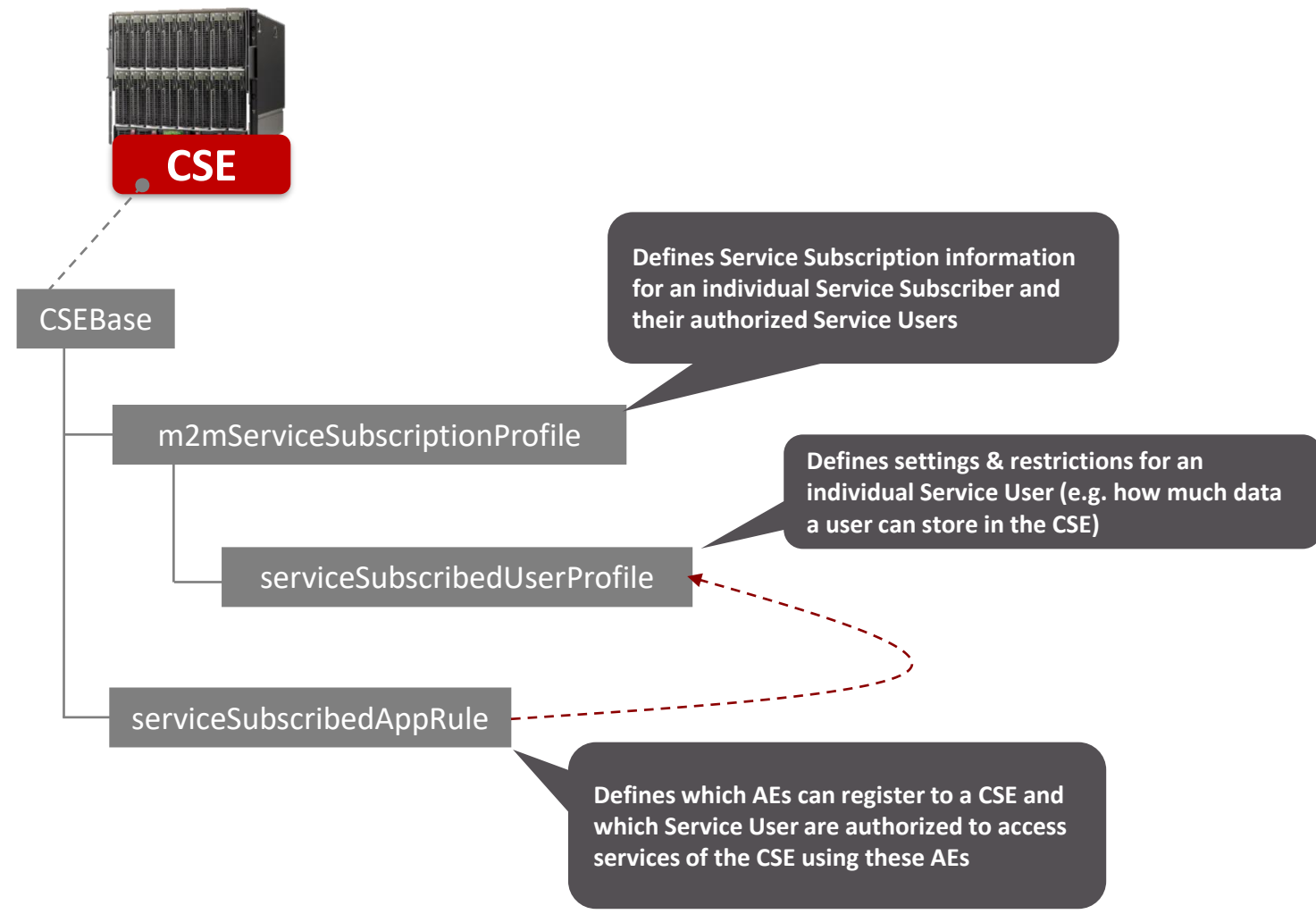
AE: Application Entity  
CSE: Common Services Entity



# Service Subscriber & User Management

## New Service Subscriber / User Features:

- Service Subscriber & User profiles
- Service User based authorization
- Service User based charging & accounting

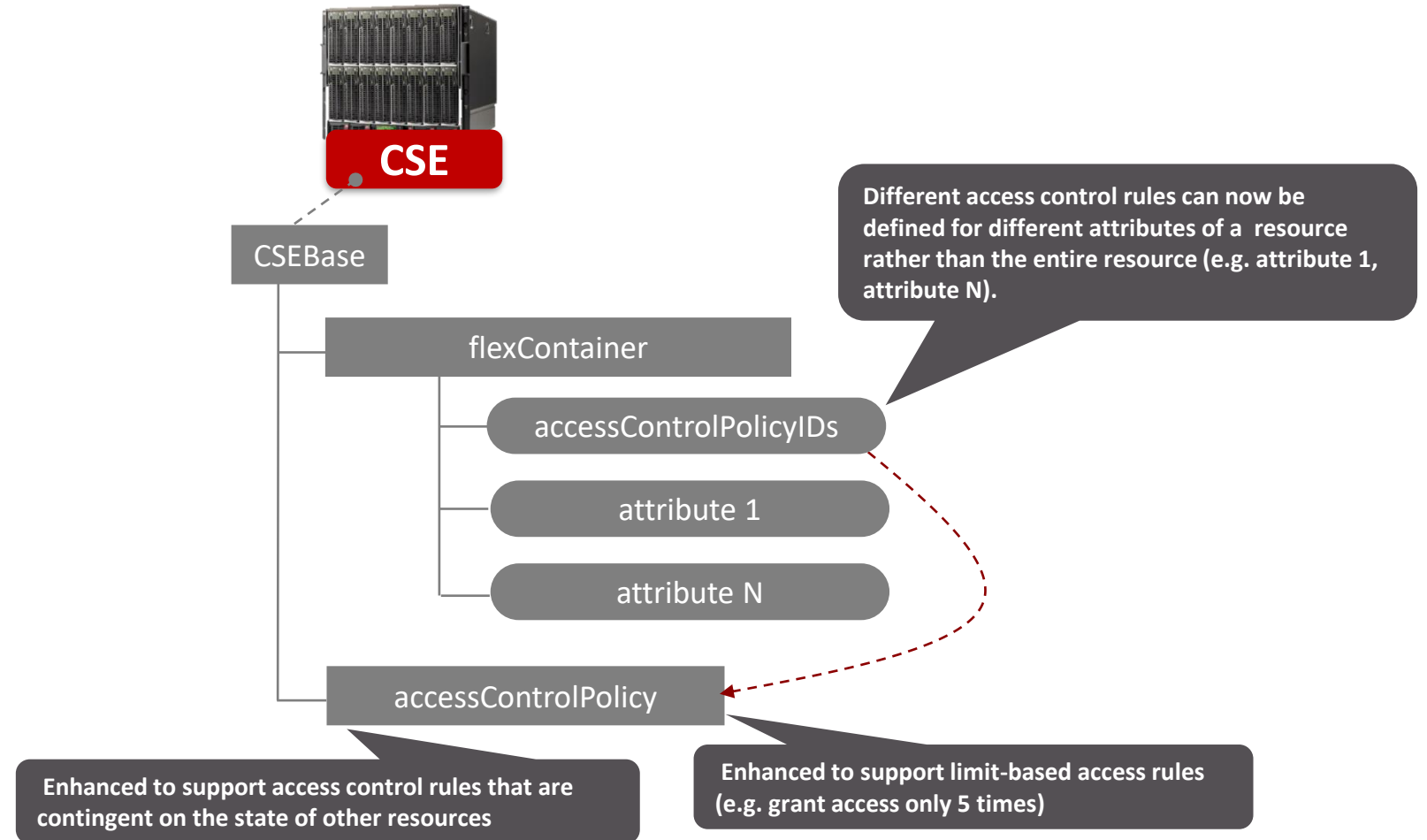


AE: Application Entity  
CSE: Common Services Entity

# Security Enhancements

## New Security Features:

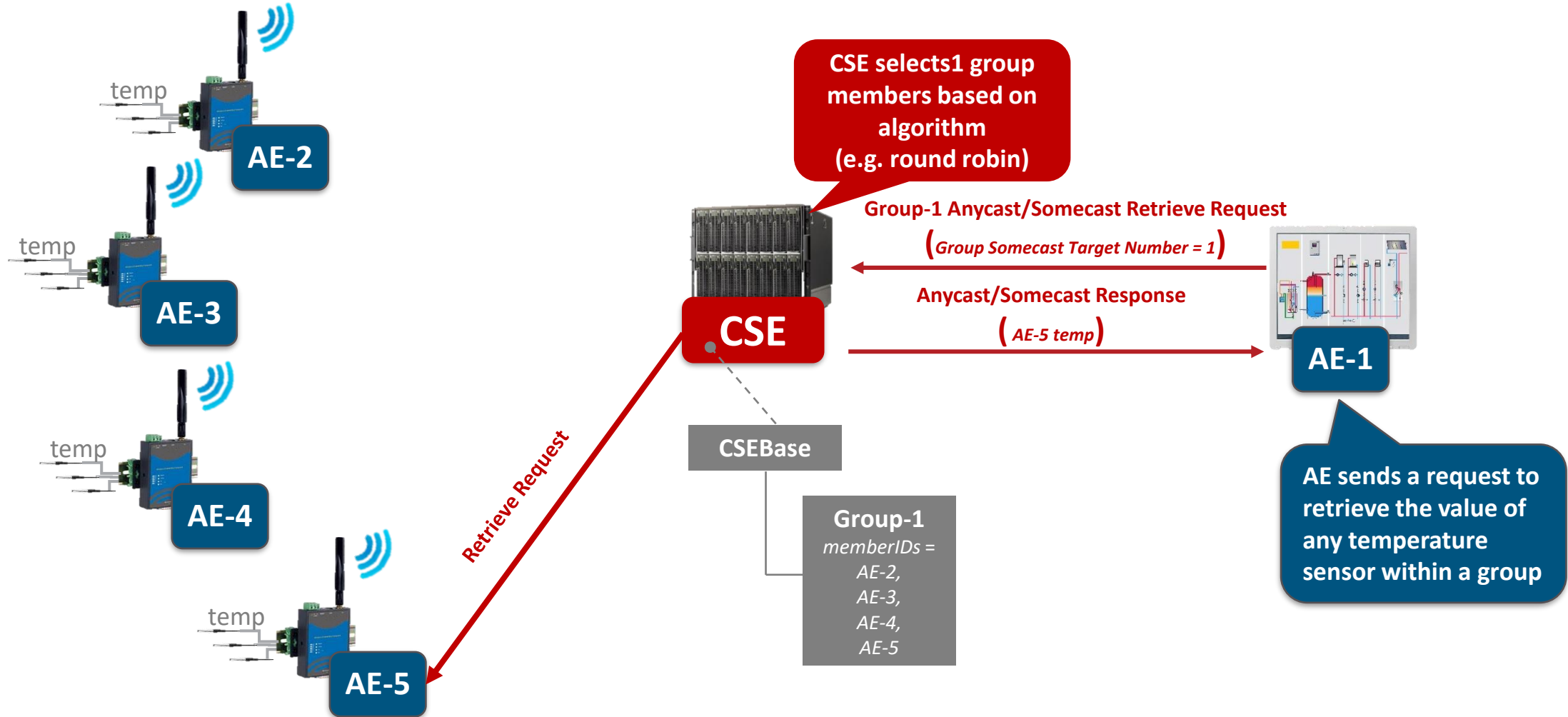
- Attribute level access control policies
- Context aware access control policies
- Permission-based discovery



AE: Application Entity

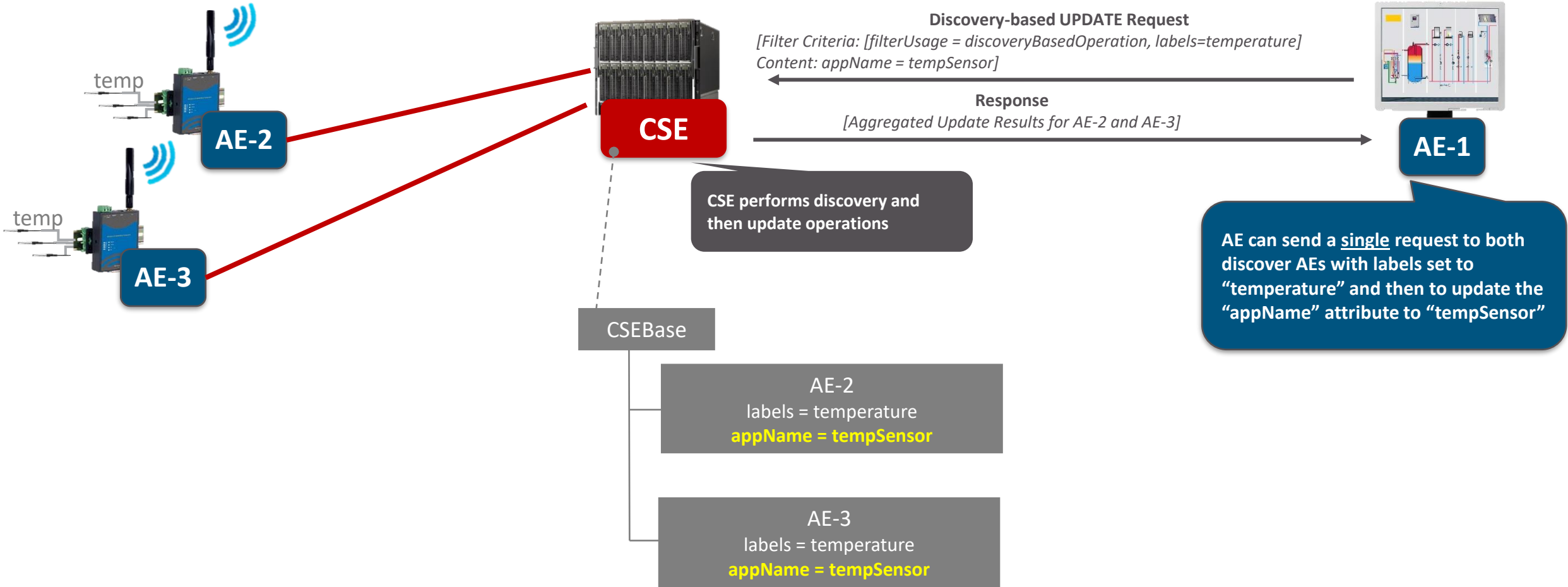
CSE: Common Services Entity

# Group Anycast / Somecast



AE: Application Entity  
CSE: Common Services Entity

# Discovery-based Operations



AE: Application Entity  
CSE: Common Services Entity

# What's next?

# oneM2M Future Feature development

## Release 5

## Studies, Use Case and Requirements development

- AI enablement
- Information Model enhancements – SDT4.0
- Support of Data Protection Regulations
- Support of Data License Management
- Smart City and Enterprise domain enablement enhancement
- Enablement of IoT in the metaverse
- Advanced Semantic Discovery
- Additional Interworkings (e.g. OGC's Sensor Thing API)
- Effective IoT Communication to Protect 3GPP Networks (cont'd)

TECHNICAL REPORTS

REQUIREMENTS  
TS-0002

TECHNICAL SPECS

# For more information ...

## visit [www.oneM2M.org](http://www.oneM2M.org)

Executive Viewpoints - <https://onem2m.org/insights/executive-viewpoints>

oneM2M in the News - <https://onem2m.org/news-events/newsmenu/onem2m-in-the-news>

Technical Specifications - <https://onem2m.org/technical/published-drafts>

Roland Hechwartner – [roland.hechwartner@magenta.at](mailto:roland.hechwartner@magenta.at)

# Thank You

[roland.hechwartner@magenta.at](mailto:roland.hechwartner@magenta.at)



# oneM2M Tutorials



The first set of the **oneM2M Tutorials using Jupyter Notebooks** is now online!

## oneM2M Wiki

[https://wiki.onem2m.org/index.php?title=OneM2M\\_Jupyter\\_Notebooks](https://wiki.onem2m.org/index.php?title=OneM2M_Jupyter_Notebooks)

## YouTube

[https://www.youtube.com/playlist?list=PLDd4EJmw5gUnA\\_d1RgYnxrOrYeYuHdH5u](https://www.youtube.com/playlist?list=PLDd4EJmw5gUnA_d1RgYnxrOrYeYuHdH5u)

## GitHub & Discussions

<https://github.com/oneM2M/onem2m-jupyter-notebooks>

<https://github.com/oneM2M/onem2m-jupyter-notebooks/discussions>

## MyBinder Runtime

[https://mybinder.org/v2/gh/oneM2M/onem2m-jupyter-notebooks/master?urlpath=lab/tree/\\_START\\_.ipynb](https://mybinder.org/v2/gh/oneM2M/onem2m-jupyter-notebooks/master?urlpath=lab/tree/_START_.ipynb)

A collage of images showcasing the oneM2M tutorial content. It includes a YouTube playlist titled "Jupyter Notebook Videos &amp; Presentations | Episode 0 - Introduction" with four episodes listed. Below that is a screenshot of the GitHub repository "oneM2M/onem2m-jupyter-notebooks" showing the "Episodes" directory. To the right is a screenshot of a Jupyter Notebook titled "oneM2M - First Contact" showing code for initialization and a diagram of the resource tree. The diagram shows a "Notebook AE" box connected to a "CSE" box, with a "RETRIEVE" arrow pointing from the CSE to the Notebook AE and a "Response" arrow pointing back.