oneM2M
Technical Report

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About oneM2M

The purpose and goal of oneM2M is to develop technical specifications which address the need for a common M2M Service Layer that can be readily embedded within various hardware and software, and relied upon to connect the myriad of devices in the field with M2M application servers worldwide.

More information about oneM2M may be found at: http//www.oneM2M.org

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History

1 Scope

The present document ...

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EXAMPLE:    The present document provides the necessary adaptions
to the endorsed document.
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The Scope shall not contain requirements.

2 References

The following text block applies.

References are either specific (identified by date of publication and/or edition number or version number) or nonspecific. For specific references,only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

2.1 Normative references

As a Technical Report (TR) is entirely informative it shall not list normative references.

The following referenced documents are necessary for the application of the present document.

Not applicable.

2.2 Informative references

Clause 2.2 shall only contain informative references which are cited in the document itself.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] oneM2M Drafting Rules https://member.onem2m.org/static_Pages/others/Rules_Pages/oneM2M-Drafting-Rules-V1%202%202.doc

3 Definition of terms, symbols and abbreviations

Delete from the above heading the word(s) which is/are not applicable.

3.1 Terms

Clause numbering depends on applicability.

- A definition shall not take the form of, or contain, a requirement.

- The form of a definition shall be such that it can replace the term in context. Additional information shall be given only in the form of examples or notes (see below).
- The terms and definitions shall be presented in alphabetical order.

For the purposes of the present document, the [following] terms and definitions [given in ... and the following] apply:

Definition format

<defined term>: <definition>

If a definition is taken from an external source, use the format below where [N] identifies the external document which must be listed in Section 2 References.

<defined term>[N]: <definition>

example 1: text used to clarify abstract rules by applying them literally

NOTE: This may contain additional information.

3.2 Symbols

Clause numbering depends on applicability.

For the purposes of the present document, the [following] symbols [given in ... and the following] apply:

Symbol format

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&lt;symbol>    &lt;Explanation>
&lt;2nd symbol>    &lt;2nd Explanation>
&lt;3rd symbol>    &lt;3rd Explanation>
```

3.3 Abbreviations

Abbreviations should be ordered alphabetically.

Clause numbering depends on applicability.

For the purposes of the present document, the [following] abbreviations [given in ... and the following] apply:

Abbreviation format

```
&lt;ABBREVIATION1>    &lt;Explanation>
&lt;ABBREVIATION2>    &lt;Explanation>
&lt;ABBREVIATION3>    &lt;Explanation>
```

4 Conventions

The key words “Shall”, “Shall not”, “May”, “Need not”, “Should”, “Should not” in this document are to be interpreted as described in the oneM2M Drafting Rules [i.1]

5 Introduction to Interworking with ETSI MEC

Interworking oneM2M with ETSI MEC aims to add capabilities that enable hosting a (potentially more than one) oneM2M CSE as well as IPE AE's (as needed) on an edge platform. This will allow oneM2M to leverage recent capabilities that focus on edge platforms that can perform complex processing and reduce end-to-end latency and throughput. The document describes services that are exposed by ETSI MEC and additional new features that are defined to offer enhanced services from oneM2M and ETSI MEC.

5.1 Deploying oneM2M with ETSI MEC

Introduction of 4 deployment options which basic architectur

The services in this clause are fundamentally based on an edge computing compliant deployment, where oneM2M and ETSI MEC platforms are central to the architecture. Such an integration can consider several deployment options, each presenting distinct technical and business implications. In June 2023, oneM2M and ETSI MEC collaboratively developed a white paper titled “Enabling Multi-access Edge Computing in Internet-of-Things: how to deploy ETSI MEC and oneM2M.” [i.15] This white paper proposes four distinct deployment options for how oneM2M and MEC can be integrated and operated.

5.1.1 Option A

oneM2M CSE is deployed in a cloud platform and MEC in an Edge platform. This deployment scenario positions the IoT platform itself primarily on the cloud side, with MEC functioning at the edge. It represents one of the most common deployment configurations for cloud-based IoT platforms integrating with edge computing. While it allows for some benefits of edge computing through localized network and processing, it doesn't fully leverage the advantages of a 100% edge computing environment, as the cloud remains the ultimate endpoint for data storage and management.

architecture may require an IPE to convert from MEC api to oneM2M primitives

5.1.2 Option B

oneM2M CSE and MEC as Edge Nodes hosted on different physical Nodes. In this option, both oneM2M and MEC are deployed as edge nodes, but they reside on physically separate edge hardware. Compared to Option A, this setup

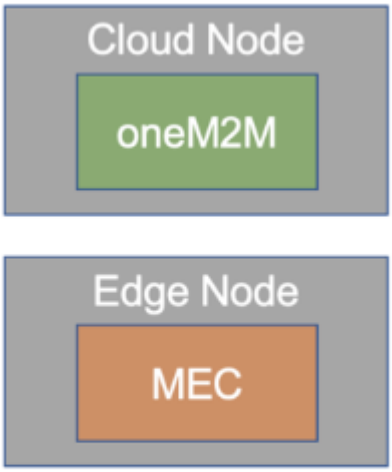


Figure 1: Deployment A

allows for all data and information exchange between oneM2M and MEC to be performed locally at the edge, resulting in faster processing. Despite oneM2M IoT service providers and ETSI MEC entities potentially being distinct, this scenario is viable, particularly in the nascent stages of the edge computing market.

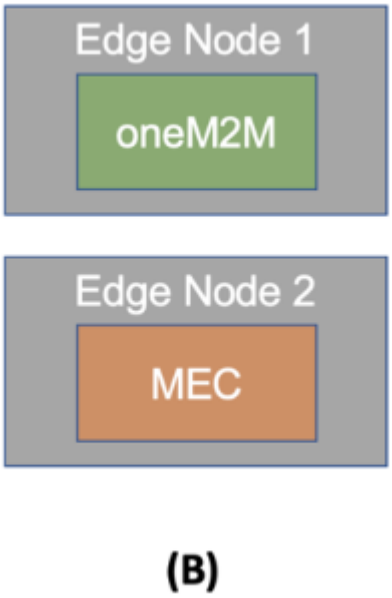


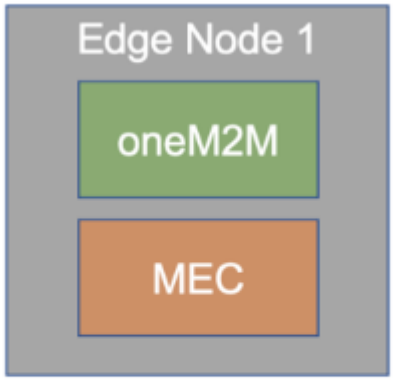
Figure 2: Deployment B

5.1.3 Option C

oneM2M and MEC are deployed on the same physical Edge Node. This scenario involves the oneM2M and MEC platforms being installed and operated on the very same physical edge node. This co-location can significantly enhance service performance by eliminating unnecessary data and information exchange between separate nodes. Implementing this option typically necessitates a Service Level Agreement (SLA) between the respective platform providers, and both platforms must support dynamic deployment capabilities across various edge nodes.

5.1.4 Option D

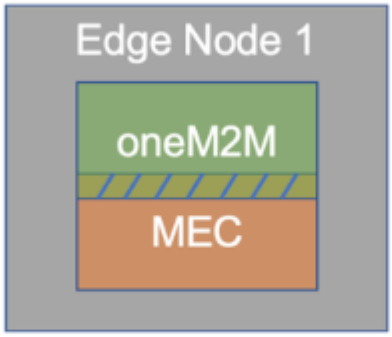
oneM2M and ETSI MEC are tightly coupled within the same edge node. This represents the deepest level of integration, where oneM2M and MEC platforms are physically coupled, often through direct API-level interworking. In this setup,



(C)

Figure 3: Deployment C

the oneM2M platform can be recognized and function as an MEC application, fully leveraging all services and functions provided by the MEC environment to deliver a truly 100% edge computing solution. Conversely, the MEC platform can directly offer data source, processing, and multi-access networking capabilities by hosting oneM2M as an integrated application. Achieving this level of tight coupling necessitates the development of standard documents defining clear interoperability and interworking specifications between the oneM2M and ETSI MEC platforms.



(D)

Figure 4: Deployment D

5.2 Additional services to be deployed

5.2.1 Swarm Computing Services

Architecture using oneM2M and ETSI MEC ### 5.2.2 Federated Learning Services Architecture using oneM2M and ETSI MEC

6 Potential impacts for Interworking with ETSI MEC

This will describe the desired functional capabilities of oneM2M/MEC For example 6.1 can discuss registration of oneM2M to MEC capturing the outcome. The solutions will be explored in clause 7.

7 Potential solutions for Interworking with ETSI MEC

This will describe solutions that are discussed considering options and alternative if available. ## 7.1 feature/services using oneM2M with ETSI MEC ### 7.1.1 Description ### 7.1.2 Feature Gap Analysis ### 7.1.3 Key Issues and requirements ### 7.1.4 Solution #n

7.1 Registration of oneM2M to ETSI MEC

7.1.1 Description

To deploy oneM2M along with ETSI MEC will require a registration process. The process will need to address registration from IPE AEs and CSEs (IN, MN, AN). The registration process will also require discovery of capabilities that are exposed by ETSI MEC and publishing services available from oneM2M. ### 7.1.2 Feature Gap Analysis ### 7.1.3 Key Issues and requirements ### 7.1.4 Solution 1: Registering IPE AE ### 7.1.5 Solution 2: Registering IN-CSE to MEC hosted IPE AE ### 7.1.6 Solution 3: Registering MN-CSE to MEC on separate platform ### 7.1.7 Solution 4: Registering MN-CSE as MEC application ### 7.1.8 Solution 5: Integrating oneM2M as a MEC service

7.2 Transfer registration from oneM2M host on a first MEC platform to another second MEC Platform

7.2.1 Description

show a couple images from use cases showing some sort of neighbor search and handover process

7.2.2 Feature Gap Analysis

7.2.3 Key Issues and requirements

7.2.4 Solution #n

7.3 Coordinate Federated Learning

7.3.1 Description

Overview of FL. Provision model, coordinator, selection of nodes, private data used for training

7.3.2 Feature Gap Analysis

7.3.3 Key Issues and requirements

7.3.4 Solution #n

7.4 Coordinate Swarm computing

7.4.1 Description

Overview of Swarm Computing; selection of coordinator, selection of nodes; ..

7.4.2 Feature Gap Analysis

7.4.3 Key Issues and requirements

7.4.4 Solution #n

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Title of annex

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History

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