|  |
| --- |
| C:\Users\grayv\Desktop\oneM2M-Logo.gif |

|  |  |
| --- | --- |
| **oneM2M**  **Technical Report** | |
| Document Number | oneM2M-TR-0052-V-0.0.1 |
| Document Name: | Study on Edge and Fog Computing in oneM2M systems |
| Date: | 2018-03-15 |
| Abstract: | The document is a study of how to leverage Edge and Fog computing in oneM2M architecture. Based on the result of the study, it will identify possible advanced features and enhancements which the next oneM2M release(s) could support. |
| Template Version: January 2017 (Do not modify) | |

The present document is provided for future development work within oneM2M only. The Partners accept no liability for any use of this report.

The present document has not been subject to any approval process by the oneM2M Partners Type 1. Published oneM2M specifications and reports for implementation should be obtained via the oneM2M Partners' Publications Offices.

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

Copyright Notification

© 2017, oneM2M Partners Type 1 (ARIB, ATIS, CCSA, ETSI, TIA, TSDSI, TTA, TTC).

All rights reserved.

The copyright and the foregoing restriction extend to reproduction in all media.

Notice of Disclaimer & Limitation of Liability

The information provided in this document is directed solely to professionals who have the appropriate degree of experience to understand and interpret its contents in accordance with generally accepted engineering or other professional standards and applicable regulations. No recommendation as to products or vendors is made or should be implied.

NO REPRESENTATION OR WARRANTY IS MADE THAT THE INFORMATION IS TECHNICALLY ACCURATE OR SUFFICIENT OR CONFORMS TO ANY STATUTE, GOVERNMENTAL RULE OR REGULATION, AND FURTHER, NO REPRESENTATION OR WARRANTY IS MADE OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OR AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. NO oneM2M PARTNER TYPE 1 SHALL BE LIABLE, BEYOND THE AMOUNT OF ANY SUM RECEIVED IN PAYMENT BY THAT PARTNER FOR THIS DOCUMENT, WITH RESPECT TO ANY CLAIM, AND IN NO EVENT SHALL oneM2M BE LIABLE FOR LOST PROFITS OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES. oneM2M EXPRESSLY ADVISES ANY AND ALL USE OF OR RELIANCE UPON THIS INFORMATION PROVIDED IN THIS DOCUMENT IS AT THE RISK OF THE USER.

Contents

1 Scope 4

2 References 4

2.1 Normative references 4

2.2 Informative references 4

3 Definitions, symbols and abbreviations 4

3.1 Definitions 4

3.2 Symbols 5

3.3 Abbreviations 5

4 Conventions 5

5 Introduction 5

6 Analysis Background 5

6.1 Overview 5

6.2 Existing Technologies 5

6.2.1 Technology 1 5

6.2.2 Technology x 5

7 oneM2M Architectural Framework 6

7.1 Introduction 6

7.2 oneM2M Platform Optimization Scenarios 6

7.3 Architectural Models and Assumptions 6

8 Analysis 6

8.1 Key Issue 1 6

8.2 Key Issue N 6

9 Proposed Solutions 6

9.1 Solution A 7

9.1.1 Solution Applicability 7

9.1.2 Solution Description 7

9.2 Solution X 7

10 Conclusions 7

I. Annexes 7

III. History 8

# Scope

The present document studies how to Edge and Fog computing leverage in oneM2M architecture. It also includes architectural and gap analysis, including key issues and solutions. Based on the result of the study, it will identify possible advanced features and enhancements which the next oneM2M release(s) could support.

# References

The following text block applies.

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

## Normative references

Normative references are not applicable in the present document.

## 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.

NOTE: Available at <http://www.onem2m.org/images/files/oneM2M-Drafting-Rules.pdf>.

# Definitions, symbols and abbreviations

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

## Definitions

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.

## Symbols

Clause numbering depends on applicability.

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

Symbol format

<symbol> <Explanation>

<2nd symbol> <2nd Explanation>

<3rd symbol> <3rd Explanation>

## Abbreviations

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

Abbreviation format

<ABREVIATION1> <Explanation>

<ABREVIATION2> <Explanation>

<ABREVIATION3> <Explanation>

# Conventions

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

# Introduction

*Editor’s Note: This section provides background information, including benefits of Edge and Fog Computing (e.g. mitigates workload of data center, provides low latency services and improves reliability). The differences between Edge and Fog might be contained in this section.*

# Analysis Background

*Editor’s Note: The section summarizes existing technologies of Edge and Fog Computing that can be used for providing the capability enablement in oneM2M. It also includes descriptions of the optimizations which Edge and Fog Computing are expected to provide to oneM2M implementations.*

## Overview

*Editor’s Note: The section provides an overview of the technological landscape.*

## Existing Technologies

*Editor’s Note: The section introduces existing technologies.*

### Technology 1

### Technology x

# oneM2M Architectural Framework

*Editor’s Note: The section provides an analysis of the oneM2M architectural framework needed for employing Edge and Fog technologies in oneM2M*.

## Introduction

*Editor’s Note: This section provides an introduction to the framework developed for employing Edge and Fog technologies in oneM2M*. *Key terminology should be formalized for use in all subsequent sections.*

## oneM2M Platform Optimization Scenarios

*Editor’s Note: This section provides scenarios where Edge and Fog technologies are sought to bring optimizations to oneM2M platform implementations. It is recommended that each scenario is used to derive one or more Key Issues.*

## Architectural Models and Assumptions

*Editor’s Note: The section provides examples of architectural models derived from analysis and the associated assumptions. These models may be used for example in section 9 to provide the assumptions made and a frame of reference for the solutions proposed.*

# Analysis

*Editor’s Note: This section details Key Issues for employing Edge and Fog technologies for oneM2M deployments.*

## Key Issue 1

*Editor’s Note: Each Key Issue description references either optimization scenarios (section 6.3), use-cases from one of the relevant TRs (e.g. TR-0001, TR-0018, etc.) or requirements (TS-002) and concludes with a succinct statement defining the issue.*

## Key Issue N

# Proposed Solutions

*Editor’s Note: The section provides solutions to the Key Issues identified for employing Edge and Fog technologies in oneM2M*.

## Solution A

*Editor’s Note: Each Solution section references one or more Key Issues that it addresses and provides a brief solution description.*

### Solution Applicability

*Editor’s Note: The Solution Applicability states which Key Issues are addressed by the solution.*

### Solution Description

*Editor’s Note: This section provides a concise description of the solution which provides enough detail for further stage 2 development.*

## Solution X

# Conclusions

*Editor’s Note: This section provides a summary of the conclusions drawn during the study.*

# Annexes

Each annex **shall** start on a new page (insert a page break between annexes A and B, annexes B and C, etc.).

Use the **Heading 9** style for the title and the Normal style for the text.

Annex <A>:  
Title of annex *(style H9)*

<Text>

<PAGE BREAK>

# History

|  |  |  |
| --- | --- | --- |
| **Publication history** | | |
| V.1.1.1 | <dd Mmm yyyy> | <Milestone> |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

| **Draft history** (to be removed on publication) | | |
| --- | --- | --- |
| V0.0.1 | 2018-03-15 | Skeleton of the TR. |