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| ***ToR TTF T019 (Ref. Body TC SmartM2M)*** |
| Version: 1.4 |
| Author: Samir Medjiah – Date: 2021-06-30 |
| Last updated by: ETSI Secretariat – Date: 2021-10-20 |
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**Terms of Reference –Testing Task Force Proposal**

**TTF T019 (Ref. Body TC SmartM2M)**

**Performance Evaluation and Analysis for oneM2M Planning and Deployment**

**Summary information**

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| --- | --- | --- | --- |
| Approval status | Approved by TC SmartM2M (doc ref:  **SmartM2M(21)000173r3**) | | **YES on Monday 6 September 2021 ordinary meeting** |
| Reference Body | Ref. Body TC SmartM2M | | |
| ETSI Funding | **Maximum budget : 80 000 EUR** | | |
| Minimum of 4 ETSI Members Support | **YES** | | |
| Time scale | **From** | 2022-01-04 | |
| **To** | 2024-01-20 | |
| Work Items  **approved by SmartM2M on 6 September 2021** | *D1:* [*DTS/SmartM2M-103839*](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=63603) *(TS 103 839) Representative oneM2M deployments scenarios*  *D2:* [*DTS/SmartM2M-103840*](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=63604) *(TS 103 840) oneM2M Platform Performances Evaluation Tool*  *D3:* [*DTR/SmartM2M-10841*](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=63605) *(TR 103 841) oneM2M Platform Performances Evaluation Tool (Proof of Concept)*  *D4:* [*DTR/SmartM2M-103842*](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=63606) *(TR 103 842) Demonstration of Performance Evaluation and Analysis for oneM2M Planning and Deployment*  *D5:* [*DTR/SmartM2M-103843*](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=63607) *(TR 103 843) oneM2M deployment guidelines and best practices* | | |
| TTF Roadmap reference | TTF 2022 Roadmap | | |

**Part I –TTF Technical Proposal**

# Rationale & Objectives

## Rationale

oneM2M, the global standard initiative for M2M communications and the IoT, has published several releases. Each release has added new and advanced features for the oneM2M standard in several aspects: connectivity, interoperability, data management, security, complex architecture, etc. The oneM2M standard is now mature and multiple deployments exist all over the world at both experimental and operational levels. The experimental deployments are conducted for multiple reasons: to evaluate the capabilities of the standard in terms of expressiveness, usability on specific equipment, connection with specific existing systems or performance evaluation.

Even though many stakeholders have the same objectives, they develop their own partial approaches and try to provide an answer to the same questions:

* Will a given IoT platform support the target use case?
* How many devices can be connected to a given IoT gateway with a certain network technology?
* What is the best topology to deploy in terms of gateways and servers?
* Is it possible to have an approximation of the response time of my IoT application when using a given oneM2M IoT platform?
* What will be the behaviour of a target system if the number of devices shall be doubled or if data requests of the applications increase by x% next year?
* Etc.

These are classical questions that a telecom operator is used to answer about his network at the design and planification phase but from now, these aspects have not been well studied at the level of oneM2M standardisation group. This is a real obstacle for new IoT customers who desire to explore the potential of oneM2M for their specific use cases.

A second difficulty for the operational adoption of the oneM2M standard comes from the fact that a deployment of oneM2M-based solutions is often occurs within a complex system. This results in one instance of oneM2M platform that cooperates with one or multiple oneM2M instances or non-oneM2M platforms. The question of how a given oneM2M platform will behave in such complex ecosystem is essential and constitutes a decision factor for its deployment.

It is necessary to help the adoption of the oneM2M standard to answer these questions. This requires both a good characterization of the responses to be given, the production of models and tools allowing to simulate / emulate a oneM2M platform within a targeted ecosystem, a test environment, the extraction of adequate quality of service metrics, and finally, the production of guidelines to drive the planning of an efficient deployment of oneM2M-based IoT solutions.

## Objectives of the work to be executed

The objectives of this TTF proposal based on oneM2M release 3, are:

* The identification of realistic deployments scenarios of oneM2M-based IoT solutions that will serve as baseline scenarios to help IoT platforms vendors to assess the performance of their oneM2M stack. Such reference scenarios should include single and multiple vertical domains.
* The specification of a data model for describing deployment scenarios
* The specification of a data model for describing performance attributes of oneM2M CSE implementations
* The specification of a simulation model of a oneM2M-based IoT solution
* The implementation of a software tool to test/evaluate the performances of a oneM2M CSE implementation
* The implementation of a software tool to simulate a complete oneM2M-based IoT solution.
* Use of existing open-source implementations of oneM2M IoT platforms to demonstrate the methodology to evaluate the performances of oneM2M-based IoT solutions and help to re-use this test environment system with any oneM2M implementation.
* The derivation of guidelines and best practices for efficient oneM2M-based IoT solution deployments.

## 

## Previous funded activities in the same domain

Conformance tests have been already developed to validate the conformance with a specific release of oneM2M. In ETSI TR 103 716, performance and simulation have been studied on a subset of oneM2M service: semantic discovery and query but the equipment, complex oneM2M architecture, other services has not been integrated. In ETSI TS 103 527 and ETSI TS 103 529, cloud deployment has been studied in term of proof of concept but planification and dimensioning of solution and architecture in term of performance were not part of this TS*.*

## Consequences if not agreed

Actors interested in using oneM2M will lack information for implementation/UCs. The acceleration of the use of oneM2M requires not only to show the maturity of the standard (which is acquired through the number of releases), the wide use in various fields (aspect on which it is still necessary to progress) and the ability of an onem2M solution to meet a specific need that evolves over time, particularly in terms of stability (partially covered through conformance tests) and also performance in a particular context (subject not yet addressed ).Providing the necessary tests and tools to the community has become fundamental if we really want to attack the core applications of oneM2M with several domains, large deployment and a need for interoperability. Not supporting this TTF will not make it possible to have a common base for the samrtM2M, oneM2M community and the ability to have a solution that everyone can use and develop under the aegis of ETSI. As in the field of telecom, a few decades ago these tools were necessaryto fill the gap in terms of planning deployments and evaluating it a priori performances in use cases as realistic as possible. Beyond that, it will reduce the difficulty of promoting oneM2M solutions in a context of competition between standards or non-standard proposals for IoT.

# ETSI Members Support

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| **#** | **ETSI Member** | **Supporting delegate** |
| 1 | TELECOM ITALIA S.p.A. | Enrico Scarrone |
| 2 | CNRS | Thierry Monteil |
| 3 | INRIA | Luigi Liquori |
| 4 | HUAWEI Technologies Sweden AB | Francisco Da Silva |
| 5 | SBS aisbl | Massimo Vanetti |
| 6 | FBConsulting S.A.R.L. | Michelle Wetterwald |

# Deliverables

## Base documents

|  |  |  |
| --- | --- | --- |
| **Document** | **Title** | **Status** |
| ETSI TR 103 716 | SmartM2M; oneM2M Discovery and Query solution(s) simulation and performance evaluation | published |
| ETSI TS 103 529 | SmartM2M; IoT over Cloud back-ends: A Proof of Concept | published |
| ETSI TS 103 527 | SmartM2M; Virtualized IoT Architectures with Cloud Back-ends | published |
| oneM2M release 3 TS-0004 | Service Layer Core Protocol V3\_22 | published |
| oneM2M release 3 TS-0001 | Functional architecture V3 | published |
| oneM2M TR-0001 | Use Cases Collection | published |

## New deliverables

|  |  |  |  |
| --- | --- | --- | --- |
| **Deliv.** | **Work Item code**  **Standard number** | **Working title**  **Scope** | **Expected date for publication** |
| D1 | DTS/SmartM2M-103839 (TS 103 839) | Working title: **Scenarios for evaluation of oneM2M deployments**  Scope: Identification of relevant deployment scenarios. The description of these scenarios include detailed information of the IoT solution topology, characteristics of both IoT devices and applications in terms of number of entities, traffic profiles, targeted performances, etc.  The deliverable will also include the procedures to define additional evaluation scenarios. | 2022-07-29 |
| D2 | DTS/SmartM2M-103840 (TS 103 840) | Working title: **oneM2M Performances Evaluation**  Scope: Specification of procedures to assess the performance of oneM2M-based IoT platforms. This deliverable will include the identification and definition of a set/list of KPIs necessary to assess the deployment. The deliverable will include, for those KPIs, a formal description of the test campaign and the test results to be obtained. | 2022-09-29 |
| D3 | DTR/SmartM2M-103841 (TR 103 841) | Working title: **oneM2M Performances Evaluation Tool (Proof of Concept)**  Scope: Implementation of the simulation tool (e.g. a simulation library in OMNeT++). This deliverable will also include a formal description of two identified deployment scenarios (single vertical domain & multiple vertical domains) | 2023-09-29 |
| D4 | DTR/SmartM2M-103842 (TR 103 842) | Working title: **Demonstration of Performance Evaluation and Analysis for oneM2M Planning and Deployment**  Scope: Example of use of the proposed tools with a specific oneM2M implementation to help the adoption and re-use of the results of DTS/SmartM2M-103839 (TS 103 839) (D1), DTS/SmartM2M-103840 (TS 103 840) (D2) and DTR/SmartM2M-103841 (TR 103 841) (D3) with any oneM2M implementations by oneM2M users | 2022-12-20 |
| D5 | DTR/SmartM2M-103843 (TR 103 843) | Working title: **oneM2M deployment guidelines and best practices**  Scope: Instructions for IoT solution topology, capacity provisioning, expected performances; best practices; lessons learnt. | 2024-02-20 |

# Maximum budget

## Task summary/Manpower Budget

|  |  |
| --- | --- |
| **Task short description** | **Budget (EUR)** |
|
| Task 0: Project Management | **0,00** |
| Task 1: oneM2M deployments scenarios | **6 600,00** |
| Task 2: oneM2M platform evaluation tool | **12 600,00** |
| Task 3: oneM2M platform evaluation tool (PoC) | **44 000,00** |
| Task 4: Performance evaluation of open oneM2M platforms | **10 800,00** |
| Task 5: oneM2M deployment guidelines & good practices | **6 000,00** |
| **TOTAL** | **80 000,00** |

## Travel budget

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| --- | --- |
| **Expected travels** | **Cost estimate**  **(in €)** |
|
| Reference TB meetings (8 travels) = **8 \* 600** | **4 800,00** |
| Dissemination events (ETSI IoT Week 2022 and 2023) (2 travels)= **2 \* 600** | **1 200,00** |
| oneM2M (TTF results contribution) (4 travels)= **4 \* 1000** | **4 000,00** |
|
|
|
| **TOTAL** | **10 000,00** |

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**Part II – Details on TTF Technical Proposal**

# Tasks, Technical Bodies and other stakeholders

## Organization of the work

The TTF will be under the monitoring and responsibility of TC SmartM2M and CTI.

It is intended that ETSI CTI will be responsible of the Project management of the TTF.

A Steering Group (SG) will be formed comprising members of ETSI CTI, ETSI TC SmartM2M, oneM2M WG TDE officials. The SG will be set up and jointly led by the chair and the vice-chair of TC SmartM2M. The SG meetings will take place together with TC SmartM2M Plenaries.

The TTF will provide regular reports to the Steering Group. Conference calls will be held when appropriate. Face-to-face meetings will occur in connection with the relevant TC SmartM2M meetings and Working Group meetings.

The proposed work will rely on the analysis of oneM2M use cases in relation with some actual deployments of oneM2M-based solutions in real life. The TTF will explore approaches for formal characterisation of IoT solution deployment (topology, IoT devices and applications traffic profiles, nodes’ resources, connectivity, etc.), and tools for performance evaluation assessment through discrete simulation.

The definition of the baseline scenarios will be done by the TTF with the support of TC SmartM2M. However, the formal description of a deployment scenario, the formal description of oneM2M platform performance, and the implementation of the simulation tool will rely on the resources provided by the TTF. The final codes will be available on an ETSI source code repository (the practical details for such repository will be defined separately in agreement with ETSI).

Finally, the redaction of best practices and guidelines for an efficient oneM2M-based IoT solution deployment will rely on the analysis of the first results from evaluating open source oneM2M platforms such as Eclipse OM2M, ACME, or Mobius.

## Other interested ETSI Technical Bodies

Liaising with oneM2M for consultation during the definition of the deployment scenarios would help to complement the ETSI view.

## Other stakeholders

* IoT platforms vendors may benefit from the result of the TTF through using the specified baseline deployment scenarios and the performance test evaluation tool to assess the performances of their proposed products.
* IoT platforms customers can define their specific deployment scenarios and evaluate the performance of a given IoT platform against their scenarios.
* The Open Source Communities around oneM2M may benefit from the results of the TTF and take the output of the development of the TTF PoC into their roadmaps.

**Part III: Execution of Work**

# Work plan, time scale and resources

## Task description

|  |  |
| --- | --- |
| **Task #0** | **Project management** |
| **Objectives** | Plan the work of the TTF members, ensuring that the timescales of the TTF deliverables are met. |
| **Input** | NA |
| **Output** | 1. Report to TC SmartM2M as appropriate on the work of the TTF   Draft progress report and final report as required |
| **Interactions** | Attending TC SmartM2M, and TTF meetings, presentation of the TTF activity |
| **Resources required** | * Project management and team leadership   Communication skills |

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| **Task #1** | **oneM2M deployments scenarios** |
| **Objectives** | Identification of deployment scenarios of IoT solutions using oneM2M standard for single vertical domain and multiple vertical domains. |
| **Input** | oneM2M TR-0001 Use Cases Collection  oneM2M release 3 TS-0001 Functional architecture V3  ETSI TR 103 716 SmartM2M; oneM2M Discovery and Query solution(s) simulation and performance evaluation |
| **Output** | D1: DTS/SmartM2M-103839 (TS 103 839) Scenarios for evaluation of oneM2M deployments |
| **Interactions** | TC SmartM2M - oneM2M |
| **Resources required** | * good knowledge of IoT solutions. * good knowledge of relevant oneM2M standards; |

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| **Task #2** | **oneM2M platform evaluation tools** |
| **Objectives** | Specification of:   * Data model for describing IoT solutions deployment (**OASd**: oneM2M Application Scenario Descriptor) * Data model for describing performances of oneM2M-based IoT platforms (**OCPd**: oneM2M CSE Performance Descriptor) * Simulation model of a oneM2M-based IoT platform |
| **Input** | D1: DTS/SmartM2M-103839 (TS 103 839) Scenarios for evaluation of oneM2M deployments |
| **Output** | D2: DTS/SmartM2M-103840 (TS 103 840) oneM2M Performances Evaluation |
| **Interactions** | TC SmartM2M - oneM2M |
| **Resources required** | * good knowledge of IoT solutions. * good knowledge of relevant oneM2M standards. * good knowledge of data modelling. * good knowledge of simulation theory and tools. * good knowledge of software engineering. |

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| **Task #3** | **oneM2M platform evaluation tool (PoC)** |
| **Objectives** | Design and Implementation of the performance evaluation tools:   * oneM2M CSE performances evaluator. * oneM2M deployment simulator. |
| **Input** | Task#2 outputs |
| **Output** | D3: DTR/SmartM2M-103841 (TR 103 841) oneM2M Performances Evaluation Tool (Proof of Concept)  Source code available in ETSI repository |
| **Interactions** | TC SmartM2M - oneM2M |
| **Resources required** | * good knowledge of IoT solutions. * good knowledge of relevant oneM2M standards. * good knowledge of data modelling. * good knowledge of simulation theory and tools. * good knowledge of software engineering. |

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| **Task #4** | **Demo/Example of use** |
| **Objectives** | Demonstrate the use of test and performance evaluation and analysis toolkit on oneM2M IoT platforms through the developed tools (task#3) and against the identified scenarios (task#1) |
| **Input** | outputs from tasks #1 & #3  Examples of oneM2M IoT platforms that could be used:   * Eclipse OM2M * ACME * Mobius * XXX |
| **Output** | D4: DTR/SmartM2M-103842 (TR 103 842) Demonstration of Performance Evaluation and Analysis for oneM2M Planning and Deployment |
| **Interactions** | TC SmartM2M - oneM2M - Eclipse OM2M - ACME -– Mobius |
| **Resources required** | * good knowledge of IoT solutions. * good knowledge of relevant oneM2M standards. * good knowledge of software engineering. * good knowledge of software testing. * good experience with the identified open-source implementations of oneM2M standard |

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| **Task #5** | **oneM2M deployment guidelines & good practices** |
| **Objectives** | Redaction of instructions for efficient deployment of oneM2M-based IoT solutions. |
| **Input** | Outputs from task #4 |
| **Output** | D5 : DTR/SmartM2M-103843 (TR 103 843) oneM2M deployment guidelines & best practices |
| **Interactions** | TC SmartM2M - oneM2M |
| **Resources required** | * good knowledge of IoT solutions. * good knowledge of relevant oneM2M standards. * good knowledge of software engineering. |

## Milestones

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| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **A** | Reference oneM2M deployment scenarios defined | 2022-05-30 |
| Reference Body Deliverable | Final Draft D1 (DTS/SmartM2M-103839 (TS 103 839)) approved by TC SmartM2M |
| ETSI Deliverable | Progress Report approved by TC SmartM2M |

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| **Milestone** | **Description** | **Cut-Off Date** |
| **B** | Stable specification of evaluation tools and data models | 2022-07-30 |
| Reference Body Deliverable | Final Draft D2 (DTS/SmartM2M-103840 (TS 103 840)) approved by TC SmartM2M |
| ETSI Deliverable | Progress Report approved by TC SmartM2M |

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| **Milestone** | **Description** | **Cut-Off Date** |
| **C** | Early delivery of performances evaluations tool :   * oneM2M CSE performances evaluator; * oneM2M deployment simulator; | 2023-07-30 |
| Reference Body Deliverable | Final Draft D3 (DTR/SmartM2M-103841 (TR 103 841)) approved by TC SmartM2M |
| ETSI Deliverable | Progress Report approved by TC SmartM2M |

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| **Milestone** | **Description** | **Cut-Off Date** |
| **D** | Performance evaluation and analysis of open oneM2M IoT platforms | 2023-10-30 |
| Reference Body Deliverable | Final Draft D4 (DTR/SmartM2M-103842 (TR 103 842)) approved by TC SmartM2M |
| ETSI Deliverable | Progress Report approved by TC SmartM2M |

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| **Milestone** | **Description** | **Cut-Off Date** |
| **E** | Guidelines, Best practices, and Lessons learnt | 2023-12-30 |
| Reference Body Deliverable | Final Draft D5 (DTR/SmartM2M-103843 (TR 103 843)) approved by TC SmartM2M |
| ETSI Deliverable | Progress Report approved by TC SmartM2M |

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| **Milestone** | **Description** | **Cut-Off Date** |
| **F** | D5 Deliverable adopted and published and TTF closed | 2024-01-30 |
| Reference Body Deliverable | D5 Published by ETSI |
| ETSI Deliverable | Final Report approved by TC SmartM2M |

## Task summary

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| --- | --- | --- | --- | --- |
| **Code** | **Task / Milestone** | **Target Date** | | **Estimated Cost (EUR)** |
| **From** | **To** |
|  | Start of work |  | 4/1/22 |  |
| T0 | Project management | 4/1/22 | 20/2/24 | 0 |
| T1 | oneM2M deployments scenarios | 4/1/22 | 30/5/22 | 6 600 |
| Milestone A | Reference oneM2M deployment scenarios defined  Final Draft D1 (DTS/SmartM2M-103839 (TS 103 839)) approved by TC SmartM2M  Progress Report#1 approved by TC SmartM2M |  | 30/5/22 |  |
| T2 | oneM2M platform evaluation tools | 1/3/22 | 30/7/22 | 12 600 |
| Milestone *B* | Stable specification of evaluation tools and data models  Final Draft D2 (DTS/SmartM2M-103840 (TS 103 840)) approved by TC SmartM2M  Progress Report#2 approved by TC SmartM2M |  | 30/7/22 |  |
| T3 | oneM2M platform evaluation tool (PoC) | 1/5/22 | 30/7/23 | 44 000 |
| Milestone *C* | Stable delivery of performances evaluations tools  Final Draft D3 (DTR/SmartM2M-103841 (TR 103 841)) approved by TC SmartM2M  Progress Report#3 approved by TC SmartM2M |  | 30/7/23 |  |
| T4 | Performance evaluation of open oneM2M platforms | 1/4/23 | 30/10/23 | 10 800 |
| Milestone *D* | Performance evaluation and analysis of open oneM2M IoT platforms  Final Draft D4 (DTR/SmartM2M-103842 (TR 103 842)) approved by TC SmartM2M  Progress Report#4 approved by TC SmartM2M |  | 30/10/23 |  |
| T5 | oneM2M deployment guidelines & good practices | 1/10/23 | 20/2/24 | 6 000 |
| Milestone E | Guidelines, Best practices, and Lessons learnt  Final Draft D5 (DTR/SmartM2M-103843 (TR 103 843)) approved by TC SmartM2M  Progress Report#5 approved by TC SmartM2M |  | 30/12/23 |  |
| Milestone F | Deliverables (D1, D2, D3, D4, D5) published  Final Report approved by TC SmartM2M  TTF closed |  | 20/2/24 |  |
|  | | | | **80 000** |

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| **Task/ Mil.** | **J** | **F** | **M** | **A** | **M** | **J** | **J** | **A** | **S** | **O** | **N** | **D** |  | **J** | **F** | **M** | **A** | **M** | **J** | **J** | **A** | **S** | **O** | **N** | **D** |  | **J** | **F** |
| T0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MA  D1 |  | E |  | S | F |  | P |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MB  D2 |  |  | E |  |  | S | F |  | P |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MC  D3 |  |  |  |  |  | E |  |  |  |  |  | I |  |  |  | I |  |  | S | F |  | P |  |  |  |  |  |  |
| T4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MD  D4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | E |  |  |  | S | F |  | P |  |  |  |
| T5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ME  D5 |  |  |  |  |  |  |  |  |  |  | E |  |  |  |  | I |  |  |  | I |  |  |  | S | F |  |  |  |
| MF  D5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | P |

E=Early Draft accepted,

I=interim Draft (between Early & Stable Draft, not an official ETSI Work Item milestone)

S=Stable Draft accepted, F=Final Draft TB approved, P=Publication

# Expertise required

## Team structure

Up to 2 participants to ensure the following mix of competences:

|  |  |
| --- | --- |
| High | *good knowledge of IoT solutions.* |
| High | *good knowledge of relevant oneM2M standards.* |
| High | *good knowledge of software engineering.* |
| High | *good knowledge of software testing.* |
| High | *good knowledge of data modelling.* |
| High | *good knowledge of simulation theory and tools.* |

**Part IV: TTF performance evaluation criteria**

# Performance Indicators

|  |  |
| --- | --- |
| ***Select relevant Performance indicators applicable for these ToR (X)*** | |
| **Contribution from ETSI Members to TTF work** | |
| *Direct financial contribution (co-funding)* |  |
| *Support to the TTF work (e.g., provision of testbeds, organization of workshops, events)* | *X* |
| *Steering Group meetings (number of meetings / participants / duration)* | *X* |
| *Number of delegates directly involved in the review of the deliverables* | *X* |
| *Contributions/comments received from the Reference Bodies* | *X* |
| *Contributions/comments received from other Reference Bodies* | *X* |
|  |  |
| **Contribution from the TTF to ETSI work** | |
| *Contributions to Reference Body meetings (number of documents / meetings / participants) (SmartM2M)* | *X* |
| *Contributions to other Reference Bodies (oneM2M)* | *X* |
| *Presentations in workshops, conferences, stakeholder meetings* | *X* |
|  |  |
| **Liaison with other stakeholders** | |
| *Stakeholder participation in the project (category, business area)* | *X* |
| *Cooperation with other standardization bodies* | *X* |
| *Potential interest of new members to join ETSI* | *X* |
| *Liaison to identify requirements and raise awareness on ETSI deliverables* | *X* |
| *Comments received on drafts (e.g. on WEB site, mailing lists, etc.)* | *X* |
|  |  |
| **Quality of deliverables** | |
| *Approval of deliverables according to schedule* | *X* |
| *Respect of time scale, with reference to start/end dates in the approved ToR* | *X* |
| *Comments from Quality review by Reference Body* | *X* |
| *Comments from Quality review by ETSI Secretariat* | *X* |
|  |  |

# Document history

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|  | **Date** | **Author** | **Status** | **Comments** |
| 0.0 | 2021-05-01 |  | Draft |  |
| 0.1 | 2021-05-21 | SM, TM | Draft | Initial proposal of TTF TOR |
| 0.2 | 2021-06-30 | SM, TM | Draft | Integration of TC remarks |
| 0.3-04 | 2021-08-23 | TM | Draft | Integration of ETSI remarks |
| 0.5 | 2021-09-03 | PG | Draft | Technical Officer Review before TB discussion (and approval) planned on Monday 6 September 10h-12h TC SmartM2M Ordinary Meeting |
| 1.0 | 2021-09-06 | SmartM2M and PG | Final Version | 6 September ordinary meeting decisions on ToR and WIs to finalize the ToR for Board submission before 10 September |
| 1.1 | 2021-09-07 | ETSI HelpDesk and PG | Final Version with good NWI ref | HelpDesk solved the issue with NWI contributions upload bugging and NWI Approval was possible, so NWI final ref were updated |
| 1.2 | 2021-09-08 | PG | Editorial correction | Suppressed “*PWIs contributions (with no uploaded contribution possible and no approval marking possible) until ETSI HelpDesk resolve this strange ETSI Portal’s bug/issue.”* |
| 1.3 | 2021-10-18 | PG | Editorial | IKOM preparation with TS/TR numbers update from EditHelp with new WI references (for D1,D2,D3,D4 and D5) associated to allocated TS/TR numbers (SmartM2M convention) |
| 1.4 | 2021-10-20 | ETSI | Board#134 Approved | Updates before CL publication |