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| ToR TF ONEM2M\_2020 (oneM2M) |
| Version: 0.2 |
| Author: Miguel Angel Reina Ortega – Date:27 January 2020 |
| Last updated by: FA – Date:29 January2020 |
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Terms of Reference - Task Force

TF oneM2M\_2020 (oneM2M Partnership Project)

Conformance testing for oneM2M specifications

Summary information

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| --- | --- | --- | --- |
| Approval status | Approved by oneM2M | | **YES** |
| Funding | oneM2M | | |
| ETSI Funding | **Maximum budget : 90 000 EUR (*100 000 USD*)** | | |
| Time scale | **From** | 2020-02-22 | |
| **To** | 2021-02-05 | |
| Work Items | TS-0018 (TS 118 118),  TS-0019 (TS 118 119) for Release 4 | | |

Part I – STF Technical Proposal

# Rationale & Objectives

## Rationale

oneM2M, the global standards initiative for M2M communications and the IoT, will publish a new set of oneM2M specifications (release 4). This release brings some new functionalities to oneM2M such as security enhancements (i.e. user/data privacy), service/user subscription, 3GPP Interworking, Fog/Edge Computing, semantic reasoning and ontology mapping. The new specifications will open up the IoT ecosystem to devices that lack the protocol and enable interworking among systems. Standardisation is key to achieving universally accepted specifications and protocols for true interoperability between IoT devices and applications.

oneM2M considers conformance testing as a key element in the success of oneM2M and therefore has initiated several work items for developing conformance test specifications.

ETSI CTI will continue supporting the oneM2M testing activities by bringing in the ETSI methodology, gained from many years of experience, being the centre of testing expertise in the area of M2M and Internet of Things (IoT) to support M2M services and applications.

ETSI CTI leading this conformance testing activity will ensure the quality of the oneM2M standards. The worldwide well-known ETSI methodology for developing high quality test specifications is a very important piece for the community to validate the conformity to the standards. With such conformity validation, companies will be confident to bring products to a mass market like IoT/M2M and thus make oneM2M a success.

The work of this TF proposal is to contribute to the development of test purposes and to develop TTCN-3 test suite on the oneM2M architecture and core protocol.

## Objectives of the work to be executed

The main objective of the present document is to define a project proposal for producing and maintaining a set of standardized conformance Abstract Test Suites (ATS) for oneM2M architecture and core protocol. The proposal includes also the development of test purposes prior the test cases implementation.

The produced test suites will be validated against implementations during a series of oneM2M Plugtests organized by ETSI which requires also the implementation of the test system composed of test adapter and codec systems. Although ETSI owns already such test system, some adaptation and extension are required for this TF to be able to validate the test suite.

In order to produce automatized and standardized test suites, test purposes need to be implemented in a specific testing language such as TTCN-3 and combined into an Abstract Test Suite (ATS). The test cases in the ATS are then validated against a number of Implementations Under Test (IUT) for correct operation according to some agreed procedures, before being released for use by the industry.

An Implementation eXtra Information for Test (IXIT) proforma associated to the ATS will also be produced complementing the test cases to help to perform conformance testing using oneM2M dedicated test equipment.

## 

## Previous funded activities in the same domain

STF531 – conformance testing for oneM2M technology (release 1 and 2)

STF559 – conformance testing for oneM2M technology (release 3)

## Market impact

The availability of reliable and validated test specifications will allow implementers of oneM2M to test the conformity of their products against the specifications. The conformance testing during the whole development phase of all oneM2M products will significantly reduce their time-to-market. It will enhance quality level and will hence be less likely to cause interoperability problems with the products of other vendors.

The overall deployment of oneM2M equipment will directly lead to a quick adoption of the related M2M standards from ETSI and oneM2M. These standards address a multi-billion products market.

## Consequences if not agreed

Standardized IoT/M2M systems supporting oneM2M will be deployed in the European market and worldwide. Conformance testing will increase the level of confidence that equipment from various suppliers will interwork. This in turn will reduce implementation and rollout times. Not providing timely test specifications could compromise the quality of oneM2M equipment and ultimately delay their deployment.

The test suites produced by this TF will be used to prepare oneM2M products for deployment and interoperability within commercial oneM2M networks. Without such test suites the oneM2M entities interoperability cannot be guaranteed. Without the standardized abstract test suites, test platform vendors will inevitably interpret differently the oneM2M specifications which will, in turn, lead to variable results and general confusion as to what constitutes a conformant oneM2M product. Furthermore, the broader implementation of oneM2M networks could be delayed as potential issues, such as interoperability of devices, may not be resolved.

# Relation with ETSI strategy and priorities

The proposed conformance testing activities and this TF are directly related and in line with the two ETSI Boards categories “Horizontal activities (quality, security, etc.)” and “Standards enablers/facilitators (conformance testing, interoperability, methodology)”.

# Deliverables

## Base documents

|  |  |  |
| --- | --- | --- |
| **Document** | **Title** | **Status** |
| oneM2M TS-0001 | Functional Architecture | V4.3.0 |
| oneM2M TS-0004 | Service Layer Core Protocol Specification | V4.0.0 |
| oneM2M TS-0017 | Implementation Conformance Statements | V3.0.0 |
| oneM2M TS-0018 | Test Suite Structure & Test Purposes | V3.0.0 |
| oneM2M TS-0019 | Abstract Test suite | V3.0.0 |

## New deliverables

The project will produce contributions to the following oneM2M deliverables:

|  |  |  |  |
| --- | --- | --- | --- |
| **Deliv.** | **Work Item code**  **Standard number** | **Working title**  **Scope** | **Expected date for publication** |
| D1 | WI-0086  oneM2M  TS-0019 rel-4  ETSI TS 118 119 v4 | Working title: Abstract Test Suite & Implementation eXtra Information for Test  Scope: conformance test suite  For release 4 | February 2021 |
| D2 | WI-0086  oneM2M  TS-0018 rel-4  ETSI TS 118 118 v4 | Working title: Test Suite Structure & Test Purposes  For release 4 | February 2021 |

The work plan of the TS-0018 and TS-0019 will be extended to continue beyond release 3. Therefore, the TF is perfectly in line with the work on these specifications.

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| --- | --- | --- | --- | --- | --- | --- |
| Document  Type | Document  Number\* | Title | Schedule (TP No.) | | | |
| Start | Change Control | Freeze | Approval |
| TS | TS-0019 | Abstract Test Suite and Implementation eXtra Information for Test  For Release 4 | TP38  (3-7 Dec 2018) | TP46  (July 2020) | TP47  (October 2020) | TP48  (November 2020) |
| TS | TS-0018 | Test Suite Structure & Test Purposes  For Release 4 | TP38  (3-7 Dec 2018) | TP46  (July 2020) | TP47  (October 2020) | TP48  (November 2020) |

# Maximum budget

## Task summary/Manpower Budget

|  |  |  |
| --- | --- | --- |
| **Task short description** | Budget (EUR) | *Budget (USD)* |
| Project management and code review |  |  |
| Implementation of test purposes | 32 400 | *36 000* |
| Implementation of TTCN-3 test cases | 32 400 | *36 000* |
| Enhancement and adaptation of test system |  |  |
| Validation of TTCN-3 test cases | 2 700 | *3 000* |
| **TOTAL** | **67 500** | *75 000* |

## Travel budget

10 working sessions should be organized during 2020 including remote sessions, f2f in ETSI and contractor’s premises.

The travel costs are included in the contracted amounts.

## Other budget line

NA

Part II – Details on STF Technical Proposal

# Tasks, Technical Bodies and other stakeholders

## Organization of the work

oneM2M TDE will be the group responsible for the technical guidance of the TF.

The TF (Task Force) under the monitoring and responsibility of oneM2M WG TDE, working together with the ETSI CTI (Centre for Testing and Interoperability).

The TF will provide regular reports to the oneM2M TDE WG. Conference calls may be held when appropriate. Face-to-face meetings will occur in connection with the Working Group meetings.

## Tasks for which the TF support is necessary

The oneM2M members do not have enough resources and skills to develop TTCN-3 conformance test suites on time, and with the required high quality that only the use of the ETSI recommended methodology may bring. The technical competence required to implement this methodology can only be achieved by a funded project as a TF.

Experience with the development of other testing standards has shown that involvement of experts on conformance testing requires highly specialized knowledge in testing methodology, TTCN-3 language and dedicated tools. There is an advantage if testing experts are disjoint from experts developing the protocol specifications. In addition, the development of this kind of specifications requires significant effort and it cannot be expected that this effort can be provided on a voluntary basis. Hence the involvement of testing experts is needed in order to assure timely completion and high-quality test specifications. These TTCN-3 testing experts are not available in oneM2M community and need to be recruited on a funded basis. The experts will use dedicated software tools available at ETSI.

There is a high expectation and pressure from market to release test specifications along with every release, which cannot rely on only voluntary contributions

## Other interested stakeholders

The oneM2M ETSI members are committed to supporting this TF in terms of providing input and review to the TF outcome.

Part III: Execution of Work

# Work plan, time scale and resources

The TF will be under the monitoring and responsibility of oneM2M TDE, working together with the ETSI CTI (Centre for Testing and Interoperability).

Working sessions will in principle take place at ETSI premises unless otherwise agreed among ETSI CTI leadership and recruited experts.

The TF will provide regular reports to the oneM2M TDE working group. Conference calls may be held when appropriate. Face-to-face meetings will occur in connection with the Working Group meetings.

## Task description

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| --- | --- |
| **Task #1** | **Project Management and Code Review** |
| **Objectives** | Project Management and TTCN-3 Code Review |
| **Input** | NA |
| **Output** | Professional project management and high quality of the specifications produced |
| **Interactions** | oneM2M TDE WG – Prioritization of the tests to be implemented and verification of the produced test cases |
| **Resources required** | * good knowledge of relevant oneM2M standards; * expert knowledge in writing ATS test specifications; * expert knowledge of TTCN-3; * expert experience of conformance and interoperability testing; * expert knowledge of software engineering and validation techniques; * good knowledge of relevant oneM2M equipment |

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| **Task #2** | **Test Purposes** |
| **Objectives** | **Implementation of test purposes for TS-0001 and TS-0004** |
| **Input** | **TS-0001, TS-0004, TS-0017** |
| **Output** | **Set of Test Purposes for TS-0001 and TS-0004 in form of oneM2M contributions** |
| **Interactions** | oneM2M TDE WG – Prioritization of the test purposes to be implemented |
| **Resources required** | * good knowledge of relevant oneM2M standards; * expert knowledge in writing conformance test specifications; * expert experience of conformance testing; |

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| **Task #3** | **ATS** |
| **Objectives** | Implementation of TTCN-3 test suite for TS-0018 |
| **Input** | TS-0017, TS-0018 |
| **Output** | Set of TTCN-3 test cases implementing the Test Purposes provided by oneM2M TDE WG in TS-0018 in terms of oneM2M contributions |
| **Interactions** | oneM2M TDE WG – Prioritization of the tests to be implemented and verification of the produced test cases |
| **Resources required** | * good knowledge of relevant oneM2M standards; * expert knowledge in writing ATS test specifications; * expert knowledge of TTCN-3; * expert experience of conformance testing; |

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| **Task #4** | **Test system implementation** |
| **Objectives** | Enhancement and adaption of test adapter and codec systems for the validation of the ATS |
| **Input** | TS-0019 |
| **Output** | Test adapter and codec for oneM2M ATS |
| **Interactions** | ETSI CTI – Prioritization of the modules to be implemented |
| **Resources required** | * expert knowledge of TTCN-3; * expert knowledge in Java; * expert experience of conformance and interoperability testing; * expert knowledge of software engineering and validation techniques; * good knowledge of relevant oneM2M equipment |

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| **Task #5** | **Validation** |
| **Objectives** | Validation of the TTCN-3 test suites |
| **Input** | TS-0019 |
| **Output** | Validation of TTCN-3 test cases |
| **Interactions** | oneM2M implementation vendors |
| **Resources required** | * good knowledge of relevant oneM2M standards; * expert knowledge in writing ATS test specifications; * expert knowledge of TTCN-3; * expert knowledge of software engineering and validation techniques; * good knowledge of relevant oneM2M equipment |

## Milestones

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Mil.** | **Description** | **Target date** | **Meeting** | **Remarks** |
| M0 | TF Official announcement | 02-2020 | oneM2M#44 – 17-21 Feb 2020 |  |
| M1 | First wave of first drafts of test purposes and test cases | 04-2020 | oneM2M#45 – 20-24 Apr 2020 |  |
| M2 | Validation in Plugtests and stable drafts of first wave of test purposes and test cases | 07-2020 | oneM2M#46 – 6-10 Jul 2020 |  |
| M3 | Second wave of first drafts of test purposes and test cases | 10-2020 | oneM2M#47 – 12-16 Oct 2020 |  |
| M4 | Stable drafts of second wave test purposes and test cases | 11-2020 | oneM2M#48 – 30 Nov–4 Dec 2020 |  |
| M5 | Finalization of first and second wave of test purposes and test cases | 02-2021 | oneM2M#49 – 1-5 Feb 2021 |  |
| **Total** | |  |  |  |

## Task summary

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|  | **Task / Milestone / Deliverable** | Target date | Estimated cost | | |
| EUR | *USD* | CTI Days |
| M0 | Start of work | 22-02-2020 |  |  |  |
| T1 | Project management and code review | From 22-02-2020  to 24-04-2020 |  |  | 5 |
| T2 | Implementation of test purposes | From 22-02-2020  to 24-04-2020 | 8 100 | *9000* |  |
| T3 | Implementation of TTCN-3 test cases | From 22-02-2020  to 24-04-2020 | 8 100 | *9000* |  |
| T4 | Enhancement and adaptation of test system | From 22-02-2020  to 24-04-2020 |  |  | 3 |
| M1 | First wave of first drafts of test purposes and test cases validated by ETSI/CTI | 21-02-2020 |  |  |  |
| T1 | Project management and code review | From 25-04-2020  to 10-07-2020 |  |  | 5 |
| T2 | Implementation of test purposes | From 25-04-2020  to 10-07-2020 | 8 100 | *9000* |  |
| T3 | Implementation of TTCN-3 test cases | From 25-04-2020  to 10-07-2020 | 8 100 | *9000* |  |
| T4 | Enhancement and adaptation of test system | From 25-04-2020  to 10-07-2020 |  |  | 3 |
| T5 | Validation of TTCN-3 test cases | From 25-04-2020  to 10-07-2020 | 2 700 | *3000* | 8 |
| M2 | Validation in oneM2M interop event#7  Stable drafts of first wave of test purposes and test cases validated by ETSI/CTI | 24-04-2020 |  |  |  |
| T1 | Project management and code review | From 11-07-2020  to 16-10-2020 |  |  | 5 |
| T2 | Implementation of test purposes | From 11-07-2020  to 16-10-2020 | 8 100 | *9000* |  |
| T3 | Implementation of TTCN-3 test cases | From 11-07-2020  to 16-10-2020 | 8 100 | *9000* |  |
| T4 | Enhancement and adaptation of test system | From 11-07-2020  to 16-10-2020 |  |  | 3 |
| M3 | Second wave of first drafts of test purposes and test cases validated by ETSI/CTI | 10-07-2020 |  |  |  |
| T1 | Project management and code review | From 17-12-2020  to 04-12-2020 |  |  | 5 |
| T2 | Implementation of test purposes | From 17-12-2020  to 04-12-2020 | 8 100 | *9000* |  |
| T3 | Implementation of TTCN-3 test cases | From 17-12-2020  to 04-12-2020 | 8 100 | *9000* |  |
| T4 | Enhancement and adaptation of test system | From 17-12-2020  to 04-12-2020 |  |  | 3 |
| M4 | Stable drafts of second wave test purposes and test cases validated by ETSI/CTI | 04-12-2020 |  |  |  |
| M5 | Finalization of first and second wave of test purposes and test cases | 05-02-2021 |  |  |  |
| **Total** | | | **67 500** | *75 000* | **40** |

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| **Task Milest.** | Description | **F** | **M** | **A** | **M** | **J** | **J** | **A** | **S** | **O** | **N** | **D** | **J** | **F** |
| T1 | Project management and code review |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T2 | Implementation of test purposes |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T3 | Implementation of TTCN-3 test cases |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T4 | Implementation of test system |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T5 | Validation |  |  |  |  |  |  |  |  |  |  |  |  |  |
| M1 | First wave of first drafts of test purposes and test cases |  |  |  |  |  |  |  |  |  |  |  |  |  |
| M2 | Validation in Plugtests and stable drafts of first wave of test purposes and test cases |  |  |  |  |  |  |  |  |  |  |  |  |  |
| M3 | Second wave of first drafts of test purposes and test cases |  |  |  |  |  |  |  |  |  |  |  |  |  |
| M4 | Stable drafts of second wave test purposes and test cases |  |  |  |  |  |  |  |  |  |  |  |  |  |
| M5 | Finalization of first and second wave of test purposes and test cases |  |  |  |  |  |  |  |  |  |  |  |  |  |

# Expertise required

## Team structure

Up to 3 participants to ensure the following mix of competences:

|  |  |
| --- | --- |
| **Priority** | **Qualifications and competences** |
| High/Low | good knowledge of relevant oneM2M standards; |
| High/Low | expert knowledge in writing ATS test specifications; |
| High/Low | expert knowledge of TTCN-3; |
| High/Low | expert knowledge of Java for TTCN-3 test adapter and codec; |
| High/Low | expert experience of conformance and interoperability testing; |
| High/Low | expert knowledge of software engineering and validation techniques; |
| High/Low | good knowledge of relevant oneM2M equipment |

The TF will be selected and recruited following the agreed ETSI procedures. The oneM2M TF experts will be recruited following the issuing of an ETSI Collective Letter and this will also be available from the ETSI STF page on the ETSI Portal via the ETSI website.

Part IV: STF performance evaluation criteria

# Performance Indicators

Contribution from oneM2M Members to TF work

* Direct financial contribution (co-funding)
* Support to the TF work (e.g., provision of test–beds, organization of workshops, events)
* Steering Group meetings (number of meetings / participants / duration)
* Number of delegates directly involved in the review of the deliverables
* Contributions/comments received from the reference TBs
* Contributions/comments received from other TBs

Contribution from the TF to ETSI work

* Contributions to TC/WG meetings (number of documents / meetings / participants)
* Contributions to other TBs
* Presentations in workshops, conferences, stakeholder meetings

Liaison with other stakeholders

* Stakeholder participation in the project (category, business area)
* Cooperation with other standardization bodies
* Potential interest of new members to join ETSI
* Liaison to identify requirements and raise awareness on ETSI deliverables
* Comments received on drafts (e.g. on WEB site, mailing lists, etc.)

Quality of deliverables

* Approval of deliverables according to schedule
* Respect of time scale, with reference to start/end dates in the approved ToR
* Comments from Quality review by TB
* Comments from Quality review by ETSI Secretariat

Time recording

For reporting purposes, the STF experts shall fill in the time sheet provided by ETSI with the days spent for the performance of the services

During the activity, the STF Leader shall collect the relevant information, as necessary to measure the performance indicators. The result will be presented in the Final Report.

# Document history

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| --- | --- | --- | --- | --- |
|  | **Date** | **Author** | **Status** | **Comments** |
| 0.0 | 17-Oct-2019 | Miguel Angel Reina Ortega |  | Initial draft |
| 0.1 | 28-Jan-2020 | Miguel Angel Reina Ortega & FA |  | IKOM version |
| 0.2 | 29-Jan-2020 | FA | oneM2M approved | Update before CL publication |