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| --- |
| ToR STF 599 (Ref. Body ISG MEC) |
| Version: 4.4 |
| Author: Robert Gazda – Date: July 14, 2020 |
| Last updated by: ETSI Secretariat – Date: 20 October 2020 |
| page 1 of 15 |

Terms of Reference –Specialist Task Force Proposal

STF 599 (Ref. Body ISG MEC)

MEC Sandbox Maintenance and Development

Summary information

|  |  |  |  |
| --- | --- | --- | --- |
| Approval status | Approved by ISG MEC on 2-Aug-2020 via remote consensus ( [MEC(20)DEC117](https://portal.etsi.org/ngppapp/RemoteConsensusReport.aspx?RCID=4171) ) | | **YES** |
| Approved by Board#129 | | **YES** |
| Reference Body | ISG MEC | | |
| ETSI Funding | **Maximum budget : 70,000 EUR** | | |
| Minimum of 4 ETSI Members Support | **YES** | | |
| Time scale | **From** | 2021-01-11 | |
| **To** | 2021-12-24 | |
| Work Items | *List and date of the WI creation*  *DMI/MECDEC-034* | | |
| Board priority | [ETSI STF funding criteria](https://portal.etsi.org/STF/STFs/Funding/ETSIbudget.aspx)   |  |  | | --- | --- | | **Priority Criteria** |  | | Maintenance of standards in mature domains |  | | Innovation in mature domains |  | | Emerging domains for ETSI | X | | Horizontal activities (quality, security, etc.) |  | | Societal good / environmental |  | | | |

Part I – STF Technical Proposal

# Rationale & Objectives

## Rationale

Through its specifications, ISG MEC has developed a set of service APIs targeted for consumption by MEC applications and services deployed in an edge cloud environment. These APIs include Radio Network Information (MEC-012), Location (MEC-013), WLAN Information (MEC-028) and Fixed Access Information (MEC-029). In addition to the conventional Group Specification (GS), where APIs are specified using text and tables, publicly accessible, [OpenAPI™ Specification (OAS)](https://github.com/OAI/OpenAPI-Specification) compliant, descriptions have been provided for each of these APIs. These are available through the [ETSI Forge](https://forge.etsi.org/rep/mec) site, which ISG MEC was instrumental in pioneering in collaboration with ETSI CTI. Subsequently other groups including ETSI NFV have also adopted the ETSI Forge platform.

With STF587 (<https://portal.etsi.org/STF/STFs/STF-HomePages/STF587>), MEC has taken a pioneering step by offering edge application developers an online “MEC Sandbox” environment to interact with live MEC Service APIs through an ETSI hosted web-portal. Through the portal, developers can experiment and learn about MEC Service API responses and notifications from a web-based “Try-it” user interface or invoking MEC Sandbox Service API endpoints from their own environment. At completion of STF587, the MEC Sandbox will include a set of MNO Macro network scenarios set in Monaco, with implementations of MEC-012, MEC-013, and MEC-028 (depending on its OpenAPI availability on ETSI Forge). The Sandbox will publicly launch with STF587’s final delivery in December 2020.

As ISG MEC continues to improve its API specifications, it is important to enhance the MEC Sandbox to be up to date with the latest published API versions. During the preparation for STF587 ([MEC(19)000471](https://docbox.etsi.org/ISG/MEC/05-CONTRIBUTIONS/2019/MEC(19)000471_MEC-DEC34_Sandbox_API_and_scenario_approval.zip)), several MEC Service APIs were identified as desirable for Sandbox implementation (MEC-014, MEC-015, MEC-29, MEC-30, etc.) that will not be realized in STF587. It is also desirable to include an indoor and hybrid (indoor and outdoor) network scenarios in the Sandbox. Finally, as with any web-portal service, it should be expected that some level of operational maintenance and bug support will be required once the Sandbox launches for public use.

As ISG and its Working Group (WG) Deployment and Ecosystem Development (DECODE) have been promoting the MEC Sandbox, a high-level of interest in the Sandbox has been consistently received from stakeholders with the ISG community and externally in the edge ecosystem at large (for example, from the LF Edge Akraino community), validating need for such an environment in the ecosystem. To ensure continued success and relevance, the Sandbox must be updated to match the latest and greatest API versions and include additional APIs and services to cover a wider set of MEC specifications. The Sandbox is expected to also continue to support and encourage entrants to MEC hackathons and Plugfest events, as well as triggering expansion of the MEC ecosystem overall.

## Objectives of the work to be executed

The objective is to maintain and enhance the MEC Sandbox environment, which is publicly accessible running on the ETSI Forge website for demonstrating and experimenting with the MEC service APIs.

This work will include:

* Sandbox maintenance and support: ensuring that the Sandbox is available and functioning by addressing issue reports and bugs from the Sandbox user community, making updates to the Sandbox as needed.
* Sandbox enhancements: adding new capabilities to the Sandbox, based on ISG, DECODE, and Sandbox user feedback. Enhancements are expected to include a micro/indoor network scenario and additional MEC Service APIs. As STF587 completes beta testing of the initial MEC Sandbox in 2020, it is expected that proposals for additional capabilities will be identified. Specific enhancements will be selected as an STF task.

## Previous funded activities in the same domain

### Specialist Task Force 593: OpenAPI and Protocol Buffer descriptions for MEC APIs

STF593 will develop the ETSI Forge OpenAPI representations of existing and new MEC API specifications. In addition to the GS specifications for Sandbox selected APIs, the OpenAPI representations are used to realize the MEC Services within the Sandbox.

### Specialist Task Force 587: MEC Sandbox Scenarios and Interface Development

<https://portal.etsi.org/STF/STFs/STF-HomePages/STF587>

STF587 is developing the first version of the MEC Sandbox, with its final delivery in December 2020.

The results will include:

* Macro Network Scenario configurations set in Monaco for 4G and 5G
* MEC Sandbox web-portal user interface
* Sandbox backend realized via the AdvantEDGE open source edge emulator (<https://github.com/InterDigitalInc/AdvantEDGE>)
* Implementations of MEC Services, including MEC-012, MEC-013, and MEC-028 (depending on OpenAPI availability)

### Specialist Task Force 551: MEC Testing Framework

<https://portal.etsi.org/STF/STFs/STFHomePages/STF551>

The MEC Testing Framework defines a methodology for development of interoperability and conformance test strategies, test systems and the resulting test specifications for MEC standards. The MEC Testing Framework has been published and is available at:

<https://www.etsi.org/deliver/etsi_gr/MEC-DEC/001_099/025/02.01.01_60/gr_MEC-DEC025v020101p.pdf>

### Specialist Task Force 569: MEC API Conformance Test Specifications

<https://portal.etsi.org/STF/STFs/STFHomePages/STF569>

MECDEC-032, part 1: Test Requirements and Implementation Conformance statements (ICS)

Stable draft: <https://docbox.etsi.org/ISG/MEC/Open/>

MECDEC-032, part 2: Test Suite Structure and Test Purposes (TSS&TP) written in TDL-TO

Stable draft: <https://docbox.etsi.org/ISG/MEC/Open/>

MECDEC-032, part 3: Test Scripts developed into Abstract Test Suites (ATS)

Early draft: <https://forge.etsi.org/rep/mec/gs032p3-robot-test-suite> & <https://forge.etsi.org/rep/mec/gs032p3-ttcn-test-suite>

The resulting set of specifications will allow successful testing activities in the many industrial contexts and segments where MEC technology is relevant. In order to reach this objective, best practices and tools from both the Telecommunication and IT communities are being applied. The output will contain Tests Scripts in both TTCN-3 and Robot Framework languages. Collaboration with the Edge Task Force within the GCF is already at a mature state, which it is anticipated will lead to the establishment of an MEC API focused certification programme.

## Market impact

ISG MEC is about to enter its fourth phase, with many MEC Service API specifications in their second, or even third, release. Application developers need to understand what these APIs offer and how to interpret the information they provide. The OpenAPI realizations of the MEC Service APIs on ETSI Forge provides an effective format to browse and understand the APIs, as well as providing the ability to auto-generate implementations. However, the OpenAPI format provides static content. Edge developers need a dynamic environment to interface with MEC APIs, as expressed from the MEC Hackathon winner (Berlin 2018): “The Forge Site is nice, but running APIs is what I want”. The MEC Sandbox provides such a dynamic, interactive environment. STF587 is producing the baseline Sandbox with relevant MEC APIs. To maintain relevance and to continue to assist to build the MEC ecosystem, the MEC Sandbox must be maintained and enhanced to include additional scenarios and services based on usage feedback. By doing so, the MEC Sandbox will facilitate future MEC hackathons and Plugfests. This, in turn, will influence the standardization activities in ISG MEC, through the real-life feedback from the end users, i.e. the application developers for which the MEC system has been designed to accommodate and ultimately the end users of the resulting MEC applications.

## Consequences if not agreed

With STF587 and its resulting baseline MEC Sandbox, ETSI and ISG MEC are making a pioneering step forward by creating an interactive environment for a set of MEC Service APIs. If this concludes the work and the Sandbox is not enhanced further, the Sandbox will have limited impact in the ecosystem and its usage will decrease over time. There is also risk that without dedicated maintenance slow response (or even failure to respond) to user reported issues will cause developers to abandon the Sandbox. This will limit development of the MEC ecosystem and understanding of MEC standardized service APIs.

# Relation with ETSI strategy and priorities

|  |  |
| --- | --- |
| **Priority Criteria** | **Rationale** |
| Maintenance of standards in mature domains |  |
| Innovation in mature domains |  |
| Emerging domains for ETSI | The STF will contribute to the following ETSI Strategy:  keep ETSI effective, efficient and recognised as such  create high quality standards for global use and with low time-to-market  establish leadership in key areas impacting members' future activities |
| Horizontal activities (quality, security, etc.) |  |
| Societal good / environmental |  |

# ETSI Members Support

|  |  |  |
| --- | --- | --- |
| **#** | **ETSI Member** | **Supporting delegate** |
| 1 | Hewlett-Packard Enterprise | Alex Reznik |
| 2 | InterDigital, Inc. | Robert Gazda |
| 3 | ZTE Corporation | Yonggang Fang |
| 4 | Huawei Technologies France | Sami Kekki |
| 5 | Intel Corporation (UK) Ltd | Dario Sabella |
| 6 | Samsung R&D Institute UK | Walter Featherstone |
| 7 | FBK | Cristina Costa |

# Deliverables

## Base documents

|  |  |  |  |
| --- | --- | --- | --- |
| **Document** | **Title** | **Status** | **OpenAPI status** |
| ETSI GS MEC 002 2.1.1 | Multi-access Edge Computing (MEC);  Use Cases and Requirements | Published | - |
| ETSI GS MEC 003 2.1.1 | Multi-access Edge Computing (MEC);  Framework and Reference Architecture | Published | - |
| ETSI GS MEC 009 2.1.1 | Multi-access Edge Computing (MEC); General principles for MEC Service APIs | Published | - |
| ETSI GS MEC 011 2.1.1 | Multi-access Edge Computing (MEC);  Edge Platform Application Enablement | Published | Available |
| ETSI GS MEC 012 1.1.1 | Multi-access Edge Computing (MEC);  Radio Network Information API | Published | Available |
| ETSI GS MEC 012 2.1.1 | Multi-access Edge Computing (MEC);  Radio Network Information API | Published | Not available |
| ETSI GS MEC 013 1.1.1 | Multi-access Edge Computing (MEC);  Location API | Published | Available |
| ETSI GS MEC 013 2.1.1 | Multi-access Edge Computing (MEC);  Location API | Published | Not available |
| ETSI GS MEC 014 1.1.1 | Mobile Edge Computing (MEC);  UE Identity API | Published | Available |
| ETSI GS MEC 015 1.1.1 | Mobile Edge Computing (MEC);  Bandwidth Management API | Published | Available |
| ETSI GS MEC 015 2.1.1 | Mobile Edge Computing (MEC);  Bandwidth Management and Multi-access Traffic Steering service | Published | Not available |
| ETSI GS MEC 016 1.1.1 | Mobile Edge Computing (MEC);  UE Application API | Published | Available |
| ETSI GS MEC 016 2.1.1 | Mobile Edge Computing (MEC);  UE Application API | Published | Available |
| ETSI GS MEC 016 2.2.1 | Mobile Edge Computing (MEC);  UE Application API | Published | Not available |
| ETSI GS MEC 021 2.1.1 | Multi-access Edge Computing (MEC); MEC Application Mobility Service API | Published | Not available |
| ETSI GS MEC 028 2.1.1 | Multi-access Edge Computing (MEC);  WLAN Information API | Published | Not available |
| ETSI GS MEC 029 2.1.1 | Multi-access Edge Computing (MEC);  Fixed Access Information API | Published | Not available |
| ETSI GS MEC 030 2.1.1 | Multi-access Edge Computing (MEC);  MEC V2X API | Published | Not available |

## New deliverables

|  |  |  |  |
| --- | --- | --- | --- |
| **Deliv.** | **Work Item code**  **Standard number** | **Working title**  **Scope** | **Expected date for publication** |
| D1 | DMI/MEC-DEC34Sandbox | Working title: Multi-access Edge Computing (MEC) MEC Sandbox  Scope: The target of this work item is to provide a, publicly accessible, running sandbox environment on the ETSI Forge website for demonstrating and experimenting with MEC service APIs. The minimal output is to provide API server prototypes with sufficient capability to: facilitate exploration of selected MEC service APIs by application developers and candidate MEC hackathons entrants and support an associated informative Webinar. A second output is to facilitate the availability of MEC developer environments made available by ETSI MEC member companies to let application developers experiment with their applications in real MEC system environments. The final output is to provide coverage for all MEC service APIs and the ability to demonstrate selected test cases aligned with the outcomes of MEC032. The final output will also provide a user guide for the sandbox environment targeted at MEC API service consumers, e.g. MEC Application software developers. | NOTE: The work item schedule will be updated to match the schedule of this STF ToR. |

# Maximum budget

## Task summary/Manpower Budget

|  |  |
| --- | --- |
| **Task short description** | Budget (EUR) |
|
| T0 – Project Management | 6 000 |
| T1 – Sandbox Maintenance and Support | 24 000 |
| T2 – Sandbox Scenario Specification | 7 000 |
| T3 – Sandbox API Development (3-4 Service APIs) | 15 000 |
| T4 – Sandbox API Development (3-4 Service APIs) | 18 000 |
| **TOTAL** | 70 000 |

## Travel budget

NA

## Other budget line

NA

Part II – Details on STF Technical Proposal

# Tasks, Technical Bodies and other stakeholders

## Organization of the work

The selected expert(s) will mainly work autonomously based on the work plan detailed in the present ToR.

*A Steering Group (SG) will be created to be the first contact point and interface between the STF and ISG MEC, in particular the DECODE WG. The SG will be composed by ISG MEC officials and experts and will be chaired by the DECODE WG Chairman.*

*Milestones and major updates will be reported by the STF Leader to the DECODE WG, through the means of contributions on the ETSI Portal.*

Remote meetings between the STF and the Steering Group will be organized and planned upon initialization of the STF. Frequency and logistics of the remote meetings may be re-discussed throughout the duration of the STF.

## Tasks for which the STF support is necessary

* T0 - Project Management
* T1 - MEC Sandbox Maintenance and Support
* T2 - MEC Sandbox Scenario Specification
* T3 - MEC Service API Development in the Sandbox
* T4 - MEC Sandbox Scenario Development, Integration, and Deployment

## Other interested ETSI Technical Bodies

NA

## Other stakeholders

NA

Part III: Execution of Work

# Work plan, time scale and resources

## Task description

|  |  |
| --- | --- |
| **Task 0 (T0)** | **Project Management** |
| **Objectives** | * Technical lead of the STF * Manage the resources assigned to this project * Chair periodic meetings of the STF * Ensure that the project stays on track and meets all milestone delivery dates * Identify if/when there are impediments that may affect the delivery of the project at an early stage so that stakeholders can help mitigate potential risks |
| **Input** | * Periodic meetings of this STF, reflecting interactions (as shown below). * The tasks and schedule in this STF. |
| **Output** | * Progress reports, including report to the WG DECODE after each Steering Committee meeting summarizing the status of this STF. * Intermediate reports to the STF Steering Group * STF updates to the ISG. |
| **Interactions** | The Steering Group for this STF will be consulted for guidance throughout the STF. There will be regular interactions between the experts and the STF Steering Group.  The WG DECODE will review the progress of the ToR tasks (see clause 7.3). |
| **Resources required** | One of the resources required for this STF which is charged with the responsibility to manage the delivery of the tasks according to the milestone table (see clause 7.4), in addition to contributing to other tasks |

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| --- | --- |
| **Task 1 (T1)** | **MEC Sandbox Maintenance and Support** |
| **Objectives** | * Establish an issue reporting framework for the MEC Sandbox to solicit feedback from users (i.e. bug / issue reports and feature / enhancement requests) * Respond to MEC Sandbox user feedback and reported issues * Perform MEC Sandbox maintenance updates (to released, published features), as needed to address reported issues.   + Debug and isolation of issues   + Issue resolution   + System test and verification |
| **Input** | * Final MEC Sandbox delivery from STF587 * Sandbox user feedback |
| **Output** | * MEC Sandbox issue reporting framework * Reponses to user reported issues and requests * Maintenance updates of the MEC Sandbox deployed on the ETSI web-portal, anticipating no more 2 maintenance updates |
| **Interactions** | The Steering Group for this STF will be consulted for guidance when processing issue and bug reports, including how to respond or address them (when needed).  Interactions with ETSI Secretariat for the logistics and support on the IT infrastructure.  The WG DECODE will approve all maintenance updates to the public MEC Sandbox. |
| **Resources required** | Working knowledge of MEC service APIs. Expertise including micro-services deployment, containers, MEC & emulation techniques, required for front-end interfacing. Frontend expertise, including web design and web development expertise. |

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| **Task 2 (T2)** | **MEC Sandbox Scenario Specification** |
| **Objectives** | * Define additional scenarios beyond the Macro Network Scenario from STF587. * Scenarios can include network configurations, such as an indoor micro-network, and additional MEC Service APIs, endpoints, or data models. |
| **Input** | * Sandbox Macro Network City Scenario – Monaco: <https://forge.etsi.org/rep/stf-587/mec-sandbox-scenarios/tree/master/Macro-Network-Scenario> * Baseline ETSI MEC GS and OpenAPI specifications * Recommendations and priorities from ISG MEC and DECODE WG. |
| **Output** | * New / Updated set of MEC Sandbox Scenarios formatted in a mark-up language collected in a repository on ETSI Forge as identified together with the SG. * The number of scenarios and the MEC Services supported will be agreed with SG. * Sandbox user interface design updates, if needed per the scenarios, in wireframes or UI prototypes. |
| **Interactions** | Guidance, review, and feedback from the SG will be provided on the Scenario selection, development, and documentation.  Discussions on Scenarios may be shared on the DECODE WG mailing list when WG input is required, at the discretion of the STF Leader or of the SG Chair.  The WG DECODE will approve all new MEC Sandbox scenarios. |
| **Resources required** | Background in Edge Computing. Expertise in Edge Network deployments and topologies. Working knowledge of MEC service APIs. |

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| --- | --- |
| **Task 3 (T3)** | **MEC Service API Development in the Sandbox** |
| **Objectives** | * Development of the MEC Services API endpoints to support the scenarios developed in Task 2 in the Sandbox (backend engine and user interface) |
| **Input** | * Output of Task 2 * Baseline ETSI MEC GS and OpenAPI specifications |
| **Output** | * ETSI MEC Service APIs implemented in the Sandbox backend, based on scenario selected in Task 2 * Required updates to the Sandbox frontend (such as endpoint URL, Sandbox swagger tab, etc.) |
| **Interactions** | Feedback and review from the SG. |
| **Resources required** | Working knowledge of MEC service APIs. Expertise including micro-services deployment, containers, MEC & emulation techniques, required for front-end interfacing. Frontend expertise, including web design and web development expertise. |

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| **Task 4 (T4)** | **MEC Sandbox Scenario Development, Integration, and Deployment** |
| **Objectives** | * Development of the Sandbox Scenario network configuration (scenario topology, types of terminals, mobility, other dynamic profiles, or other features), including any required user-interface enhancements * Integration of the Sandbox Scenario with MEC Service API implementations from Task 3 * Sandbox verification in preparation for deployment to the public Sandbox on ETSI infrastructure. * Deployment and launch to the public MEC Sandbox on ETSI infrastructure |
| **Input** | * Output of Task 2 – Scenario Specification * Output of Task 3 – MEC Service API implementations * Output of Task 1 – Sandbox maintenance updates |
| **Output** | * MEC Sandbox major update (new scenario and services) deployed, verified, and documented on public ETSI Sandbox hosting environment (after release transitioned to maintenance). |
| **Interactions** | Feedback and review from the SG.  Interactions with ETSI Secretariat for the logistics and support on the IT infrastructure.  The WG DECODE will approve all updates to the public MEC Sandbox. |
| **Resources required** | Working knowledge of MEC service APIs. Expertise including micro-services deployment, containers, MEC & emulation techniques, required for front-end interfacing. Frontend expertise, including web design and web development expertise. |

## Milestones

Milestone A – MEC Sandbox Maintenance Update - #1

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **A** | MEC Sandbox Maintenance Update - #1 | Mar 31, 2021 |
| Reference Body Deliverable | NA |
| ETSI Deliverable | Progress report approved by MEC DECODE WG. |

Milestone B – Additional MEC Scenario and Services Finalized

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **B** | Additional MEC Scenario and Services Finalized | Jun 30, 2021 |
| Reference Body Deliverable | NA |
| ETSI Deliverable | Progress report approved by MEC DECODE WG. |

Milestone C – MEC Sandbox Maintenance Update - #2

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **C** | MEC Sandbox Maintenance Update - #2 | Jul 31, 2021 |
| Reference Body Deliverable | NA |
| ETSI Deliverable | Progress report approved by MEC DECODE WG. |

Milestone D – MEC Sandbox scenario – beta test available

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **D** | MEC Sandbox Scenario – beta test available | Sep 20, 2021 |
| Reference Body Deliverable | NA |
| ETSI Deliverable | Progress report approved by MEC DECODE WG. |

Milestone E – MEC Sandbox Update Finalized + Maintenance Update

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **E** | MEC Sandbox finalized with additional scenario(s) from Milestone B, deployed to the public Sandbox.  Sandbox update includes all agreed maintenance changes since last update, Milestone B. | 2020-12-24 |
| Reference Body Deliverable | NA |
| ETSI Deliverable | Final report approved by ISG MEC. |

## Task summary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Code** | **Task / Milestone** | Target Date | | Estimated Cost (EUR) |
| From | To |
|  | Start of work |  |  |  |
| T0 | Project Management | Jan 2021 | Dec 2021 | 6 000 |
| T1 | MEC Sandbox Maintenance and Support | Jan 2021 | Dec 2021 | 24 000 |
| Milestone A | MEC Sandbox Maintenance Update - #1  Progress Report#1 to be approved by MEC DECODE WG |  | Mar 31, 2021 |  |
| Milestone C | MEC Sandbox Maintenance Update - #2  Progress Report#2 to be approved by MEC DECODE WG |  | Jul 31, 2021 |  |
| T2 | MEC Sandbox Scenario Specification | Mar 2021 | Jun 2021 | 7 000 |
| Milestone B | Additional MEC Scenario and Services Finalized  Progress Report#3 to be approved by MEC DECODE WG |  | Jun 30, 2021 |  |
| T3 | MEC Service API Development in the Sandbox | May 2021 | Nov 2021 | 15 000 |
| Milestone D | MEC Sandbox Scenario – beta test available  Progress Report#4 to be approved by MEC DECODE WG |  | Sep 30, 2021 |  |
| T4 | MEC Sandbox Scenario Development, Integration, and Deployment | May 2021 | Nov 2021 | 18 000 |
| Milestone  E | MEC Sandbox finalized, i.e. all scenarios implemented.  Final Report to be approved by ISG MEC  STF Closed. |  | Dec 24, 2021 |  |
|  | | | | **70 000** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Task/ Mil.** | **J** | **F** | **M** | **A** | **M** | **J** | **J** | **A** | **S** | **O** | **N** | **D** |
| T0 |  |  |  |  |  |  |  |  |  |  |  |  |
| T1 |  |  |  |  |  |  |  |  |  |  |  |  |
| MA |  |  |  |  |  |  |  |  |  |  |  |  |
| MB |  |  |  |  |  |  |  |  |  |  |  |  |
| T2 |  |  |  |  |  |  |  |  |  |  |  |  |
| MC |  |  |  |  |  |  |  |  |  |  |  |  |
| T3 |  |  |  |  |  |  |  |  |  |  |  |  |
| MD |  |  |  |  |  |  |  |  |  |  |  |  |
| T4 |  |  |  |  |  |  |  |  |  |  |  |  |
| ME |  |  |  |  |  |  |  |  |  |  |  |  |

# Expertise required

## Team structure

Up to two (2) service providers to ensure the following mix of competences:

|  |  |
| --- | --- |
| **Priority** | **Qualifications and competences** |
| High | Excellent knowledge of Edge Computing and MEC specifications |
| High | Expert knowledge of the OpenAPI specification language and supporting drafting tools (e.g. Swagger tools) |
| High | Proven expertise in Web development and devops |
| High | Working knowledge in network and edge emulation techniques (especially, of the AdvantEDGE emulator – MEC Sandbox backend). |

Part IV: STF performance evaluation criteria

# Performance Indicators

|  |  |
| --- | --- |
| **Select relevant Performance indicators applicable for these ToR (X)** | |
| Contribution from ETSI Members to STF work | |
| Direct financial contribution (co-funding) |  |
| Support to the STF work (e.g., provision of test–beds, organization of workshops, events) |  |
| Steering Group meetings (number of meetings / participants / duration) | X |
| Number of delegates directly involved in the review of the deliverables |  |
| Contributions/comments received from the Reference Bodies | X |
| Contributions/comments received from other Reference Bodies |  |
|  |  |
| **Contribution from the STF to ETSI work** | |
| Contributions to Reference Body meetings (number of documents / meetings / participants) | X |
| Contributions to other Reference Bodies |  |
| 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 | X |
| Respect of time scale, with reference to start/end dates in the approved ToR | X |
| Comments from Quality review by Reference Body |  |
| 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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Date** | **Author** | **Status** | **Comments** |
| 1.0 | July 14, 2020 | Robert Gazda | Initial draft |  |
| 2.0 | July 20, 2020 | Robert Gazda | Stable Draft | Added supporting companies, budget, adjust maintenance milestones as agreed. |
| 3.0 | July 22, 2020 | Robert Gazda | Stable Draft | Added additional supporting companies and removed man-day estimates from 5.1 |
| 4.0 | July 23, 2020 | Robert Gazda | Stable Draft | Added STF593, OpenAPI STF information. Noted that MEC-DEC34Sandbox schedule will be updated with this proposal.  Updated the title to include maintenance. |
| 4.1 | 2020-08-21 | Youssouf Sakho | Stable draft | Update before submission to Board |
| 4.2 | 2020-09-08 | Robert Gazda / Youssouf Sakho | ISG MEC approved | Further updates before submission to Board |
| 4.3 | 2020-09-11 | Robert Gazda / Youssouf Sakho | ISG MEC approved | Further updates before submission to Board – complete Milestone D (timeframe and definition) |
| 4.4 | 2020-10-20 | ETSI Secretariat | Board Approved | Update before CL publication |