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| ToR STF 625 (Ref. Body ISG MEC) |
| Version: 3.4 |
| Author: Robert Gazda – Date: July 23, 2021 |
| Last updated by ETSI Secretariat - Date: October 15, 2021 |
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Terms of Reference –Specialist Task Force Proposal

STF 625 (Ref. Body ISG MEC)

MEC Sandbox Feature Enhancement, Maintenance, and User Support

Summary information

|  |  |  |  |
| --- | --- | --- | --- |
| Approval status | Approved by Ref. Body ISG MEC (doc ref: MEC(21)000397r1) | | **YES** |
| Approved by Board#134 (21-23 September 2021) | | **YES** |
| Reference Body | ISG MEC | | |
| ETSI Funding | **Maximum budget : 95,000 EUR** | | |
| Minimum of 4 ETSI Members Support | **YES** | | |
| Time scale | **From** | 2022-01-10 | |
| **To** | 2022-12-17 | |
| Work Items | *List and date of the WI creation*  *DMI/MECDEC-34Sandbox, 2019-03-28* | | |
| 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>), ISG MEC made a pioneering step by offering edge application developers an online “MEC Sandbox” environment (<https://try-mec.etsi.org/>) 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. The Sandbox was publicly launch with STF587’s final delivery in December 2020.

In 2021, STF599 (<https://portal.etsi.org/STF/STFs/STF-HomePages/STF599>) has continued to ground-breaking MEC Sandbox work by providing: 1) Sandbox maintenance, support, established a Sandbox monitoring/analytic dashboard (providing live Sandbox performance and historical metrics), & established Sandbox user engagement framework (via Slack), and 2) feature enhancements which add new capabilities to the Sandbox based on ISG, DECODE, and Sandbox user feedback. STF599 is expected to complete all features that ISG MEC agreed as critical or high priority, as captured in [MEC(21)000148](https://docbox.etsi.org/ISG/MEC/05-CONTRIBUTIONS/2021/MEC(21)000148_STF599_-_ETSI_MEC_Sandbox_Feature_Enhancements.pptx), which include: updates to STF587 delivered services (MEC-012, MEC-013, and MEC-028), MEC-011 (Application Enablement over the Mp1 reference point), MEC-021 (Application Mobility Service), and a dual-MEC platform scenario (critical to demonstrating application mobility).

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 STF599, several MEC Service APIs and Sandbox Scenarios were identified as desirable for Sandbox implementation (e.g., MEC-015, MEC-016, MEC-30, etc.) that will not be realized in STF599 (as captured in: [MEC(21)000346](https://docbox.etsi.org/ISG/MEC/05-CONTRIBUTIONS/2021/MEC(21)000346_STF599_-_ETSI_MEC_Sandbox_Feature_Enhancement_Prioritization.pptx)). It may also be 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 like that experienced by STF599 in 2021.

Additionally, due to its success, the MEC Sandbox will be utilized as primary platform for the technical challenge of MEC 2021 Hackathon held at the Edge Computing World in October 2021: <https://www.edgecomputingworld.com/hackathon/>.

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 the 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/Plugtest 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 (<https://try-mec.etsi.org/>), 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 user 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, and responding to Sandbox user inquires on the Sandbox Slack workspace (<https://mecsandbox.slack.com/>).
* Sandbox enhancements: adding new capabilities to the Sandbox, based on ISG, DECODE, and Sandbox user feedback. The Sandbox feature prioritization (specifically the medium priority features) reviewed and approved by ISG MEC in [MEC(21)000346](https://docbox.etsi.org/ISG/MEC/05-CONTRIBUTIONS/2021/MEC(21)000346_STF599_-_ETSI_MEC_Sandbox_Feature_Enhancement_Prioritization.pptx) will service as the Sandbox feature enhancement requirements. As STF599 completes and ISG MEC continues its standardization progress, it is expected that proposals for additional capabilities may be identified.

## Previous funded activities in the same domain

* + 1. **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>

* + 1. **Specialist Task Force 569: MEC API Conformance Test Specifications**

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

The MEC API Conformance Test Specifications enable 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 were applied. The outputs contain Tests Scripts in both TTCN-3 and Robot Framework languages.

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

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

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

Robot Framework: <https://forge.etsi.org/rep/mec/gs032p3-robot-test-suite>

TTCN-3: <https://forge.etsi.org/rep/mec/gs032p3-ttcn-test-suite>

* + 1. **Specialist Task Force 587: MEC Sandbox scenarios and interface development**

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

STF587 is developed the first version of the MEC Sandbox (<https://try-mec.etsi.org/>), delivered in December 2020.

The result included:

* 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.

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

<https://portal.etsi.org/STF/STFs/STF-HomePages/STF593>

STF593 developed 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.

STF593 delivered:

- MEC-010-2 (OAS)

- MEC-012 (OAS+proto3)

- MEC-013 (OAS)

- MEC-015 (OAS)

- MEC-016 (OAS)

- MEC-021 (OAS+proto3)

- MEC-028 (OAS+proto3)

- MEC-029 (OAS+proto3)

- MEC-030 (OAS+proto3)

* + 1. **Specialist Task Force 599: MEC Sandbox scenarios and interface development**

<https://portal.etsi.org/STF/STFs/STFHomePages/STF599>

The objective of STF599 is to enhance and maintain the ETSI MEC Sandbox, an interactive environment (<https://try-mec.etsi.org/>) that enables edge application developers to learn and experiment with ETSI MEC Service APIs. STF599 will maintain the MEC Sandbox to assure its availability to the MEC ecosystem and will enhance the MEC Sandbox feature set, based on user and ISG MEC feedback.

STF599 is expected to deliver all critical and high priority MEC Sandbox Feature Enhancements as captured in [MEC(21)000148](https://docbox.etsi.org/ISG/MEC/05-CONTRIBUTIONS/2021/MEC(21)000148_STF599_-_ETSI_MEC_Sandbox_Feature_Enhancements.pptx) and documented in the MEC Sandbox Scenario repository on Forge: <https://forge.etsi.org/rep/mec/mec-sandbox-scenarios>.

* + 1. **Testing Task Force 012: Maintenance and development of MEC APIs conformance test suites**

<https://portal.etsi.org/STF/STFs/STF-HomePages/T012>

A set of API conformance test suites has been developed in 2019 and 2020 by ISG MEC as part of work items MEC-DEC 032-1, 032-2 and 032-3. As base specifications are updated and new APIs are added, the objective of the work proposed is mainly two-fold. First, maintain and update the currently available test suites. This consists of:

* Updating the test suites when new versions of the specification are available,
* Implement fixes and improvements, collecting feedback from users and reported issues.

Second, develop test suites for new specifications and specifications that were not in scope of the previous work, or were not available for testing.

### Specialist Task Force 606: OpenAPI and Protocol Buffer descriptions for MEC APIs

STF606 will update all 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. STF606 is organized to deliver in OpenAPI representations in the two deliverable milestones. MEC Service APIs that have MEC Sandbox impact are highlighted in yellow.

| **STF606 Open API Deliverables:** | **STF606 Milestone Cut-Off Date** |
| --- | --- |
| * ETSI GS MEC 010-2 2.1.1 * **ETSI GS MEC 011 2.1.1** * **ETSI GS MEC 012 2.1.1** * **ETSI GS MEC 013 2.1.1** * ETSI GS MEC 014 2.1.1 * **ETSI GS MEC 015 2.1.1** * **ETSI GS MEC 016 2.2.1** * **ETSI GS MEC 021 2.1.1** * **ETSI GS MEC 028 2.2.1** * ETSI GS MEC 029 2.1.1 * **ETSI GS MEC 030 2.1.1** | 17 Dec 2021 |
| * ETSI GS MEC 10-2 v2.2.1 * **ETSI GS MEC 11 v2.2.1** * **ETSI GS MEC 12 v2.2.1** * **ETSI GS MEC 13 v2.2.1** * **ETSI GS MEC 21 v2.2.1** * **ETSI GS MEC 28 v2.3.1** * ETSI GS MEC 29 v2.2.1 * **ETSI GS MEC 30 v2.2.1** * ETSI GS MEC 33 v2.1.1 | 31 Mar 2022 |

## Market impact

ISG MEC has entered its fourth phase, with all MEC Service API specifications in their second release with some in their third release. Application developers need to understand what the MEC Service 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 and STF599 produced 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, including updating services to their latest OAS versions, and enhanced to include additional scenarios and services based on usage feedback. By doing so, the MEC Sandbox will continue to facilitate future MEC hackathons (such as the MEC Hackathon – 2021, <https://www.edgecomputingworld.com/hackathon/>) and Plugfests / Plugtests. This, in turn, will influence the standardization activities in ISG MEC, through the real-life feedback from 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 STF599 and its resulting baseline MEC Sandbox, ETSI and ISG MEC made a pioneering step forward by creating an interactive environment for a set of MEC Service APIs (<https://try-mec.etsi.org/>). 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

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| --- | --- |
| **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 | InterDigital, Inc. | Robert Gazda |
| 2 | Intel Corporation (UK) Ltd | Dario Sabella |
| 3 | Samsung R&D Institute UK | Walter Featherstone |
| 4 | ZTE Corporation | Lijuan Chen |
| 5 | Hewlett-Packard Enterprise | Alex Reznik |
| 6 | FBK | Cristina Costa |
| 7 | Huawei Technologies R&D UK | Alice Li |

# Deliverables

## Base documents

### ETSI MEC Group Specifications and OpenAPI documents

The following table lists baseline MEC OpenAPI representations this STF ToR. OpenAPI representations that will be provided by deliverables from STF606 are highlighted in table, as follows:

* OAS deliverables from STF606 Milestone A (Dec. 2021) are marked in blue. The milestone will deliver OAS 3.1.0 compliant descriptions, whereas the current versions on Forge are compliant to OAS 3.0.0.
* OAS deliverables from STF606 Milestone B (Mar. 2022) are marked in yellow.

Note: the latest or highest available version of a MEC OpenAPI representation will serve as input as the API baseline for the MEC Sandbox realization. For example, if a MEC API has OpenAPI representations versions v2.1.1, v2.2.1 and v3.1.1 available on ETSI Forge, v3.1.1 will serve as the baseline for the MEC Sandbox. These are highlighted in bold in the following table.

|  |  |  |  |
| --- | --- | --- | --- |
| **Document** | **Title** | **Status** | **OpenAPI status** |
| ETSI GS MEC 002 2.1.1 | Multi-access Edge Computing (MEC);  Use Cases and Requirements | Published | n/a |
| ETSI GS MEC 003 2.2.1 | Multi-access Edge Computing (MEC);  Framework and Reference Architecture | Published | n/a |
| ETSI GS MEC 009 3.1.1 | Multi-access Edge Computing (MEC); General principles for MEC Service APIs | Published | n/a |
| ETSI GS MEC 011 2.1.1 | Multi-access Edge Computing (MEC);  Edge Platform Application Enablement | Published | Available  STF606: Dec'21 (OAS 3.1.0) |
| **ETSI GS MEC 011 2.2.1** | **Multi-access Edge Computing (MEC);**  **Edge Platform Application Enablement** | **Published** | **STF606: Mar ‘22** |
| ETSI GS MEC 011 3.1.1 | Multi-access Edge Computing (MEC);  Edge Platform Application Enablement | Early draft (3.0.1) | Not available |
| ETSI GS MEC 012 2.1.1 | Multi-access Edge Computing (MEC);  Radio Network Information API | Published | Available  STF606: Dec'21 (OAS 3.1.0) |
| **ETSI GS MEC 012 2.2.1** | **Multi-access Edge Computing (MEC);**  **Radio Network Information API** | **Early draft (2.1.2)** | **STF606: Mar ‘22** |
| ETSI GS MEC 013 2.1.1 | Multi-access Edge Computing (MEC);  Location API | Published | Available  STF606: Dec'21 (OAS 3.1.0) |
| **ETSI GS MEC 013 2.2.1** | **Multi-access Edge Computing (MEC);**  **Location API** | **Start of Work** | **STF606: Mar ‘22** |
| ETSI GS MEC 013 3.1.1 | Multi-access Edge Computing (MEC);  Location API | Start of Work | Not available |
| ETSI GS MEC 014 1.1.1 | Mobile Edge Computing (MEC);  UE Identity API | Published | Available |
| ETSI GS MEC 014 2.1.1 | Multi-access Edge Computing (MEC);  UE Identity API | Published | STF606: Dec'21 (OAS 3.1.0) |
| **ETSI GS MEC 015 2.1.1** | **Multi-access Edge Computing (MEC);**  **Bandwidth Management and Multi-access Traffic Steering service** | **Published** | **Available**  **STF606: Dec'21 (OAS 3.1.0)** |
| **ETSI GS MEC 016 2.2.1** | **Multi-access Edge Computing (MEC);**  **Device Application API** | **Published** | **Available**  **STF606: Dec'21 (OAS 3.1.0)** |
| ETSI GS MEC 021 2.1.1 | Multi-access Edge Computing (MEC); MEC Application Mobility Service API | Published | Available  STF606: Dec'21 (OAS 3.1.0) |
| **ETSI GS MEC 021 2.2.1** | **Multi-access Edge Computing (MEC); MEC Application Mobility Service API** | **Early draft (2.1.2)** | **STF606: Mar ‘22** |
| ETSI GS MEC 021 3.1.1 | Multi-access Edge Computing (MEC); MEC Application Mobility Service API | Early draft (3.0.1) | Not available |
| **ETSI GS MEC 028 2.2.1** | **Multi-access Edge Computing (MEC);**  **WLAN Information API** | **Published** | **Available – STF599**  STF606: Dec'21 (OAS 3.1.0) |
| ETSI GS MEC 029 2.1.1 | Multi-access Edge Computing (MEC);  Fixed Access Information API | Published | Available  STF606: Dec'21 (OAS 3.10) |
| ETSI GS MEC 029 2.2.1 | Multi-access Edge Computing (MEC);  Fixed Access Information API | Early draft  (2.1.3) | STF606: Mar ‘22 |
| ETSI GS MEC 030 2.1.1 | Multi-access Edge Computing (MEC);  MEC V2X API | Published | Available  STF606: Dec'21 (OAS 3.1.0) |
| **ETSI GS MEC 030 2.2.1** | **Multi-access Edge Computing (MEC);**  **MEC V2X API** | **Early Draft**  **(2.1.2)** | **STF606: Mar ‘22** |
| ETSI GS MEC 030 3.1.1 | Multi-access Edge Computing (MEC);  MEC V2X API | Early Draft  (3.0.3) | Not available |

### ETSI MEC Sandbox Scenario Specifications and Source Code

|  |  |
| --- | --- |
| **Specification:** | **Forge GitLab Locations:** |
| MEC Sandbox - Macro Network City Scenario - Monaco | <https://forge.etsi.org/rep/mec/mec-sandbox-scenarios/tree/master/Macro-Network-Scenario> |
| MEC Sandbox – MEC Service APIs | <https://forge.etsi.org/rep/mec/mec-sandbox-scenarios/tree/master/Macro-Network-Scenario#mec-services-apis> |
| MEC Sandbox – MEC Use-Cases(i.e., user stories) | <https://forge.etsi.org/rep/mec/mec-sandbox-scenarios/tree/master/Macro-Network-Scenario#mec-sandbox-use-cases> |
| MEC Sandbox – User Interface Design and Wireframes | <https://forge.etsi.org/rep/mec/mec-sandbox-scenarios/tree/master/Sandbox-User-Interface> |
| MEC Sandbox – Software Architecture, including use of AdvantEDGE (<https://github.com/InterDigitalInc/AdvantEDGE>) | <https://forge.etsi.org/rep/mec/mec-sandbox-scenarios/tree/master/Software-Architecture> |

## 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

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| --- | --- |
| **Task short description** | Budget (EUR) |
|
| T0 - Project Management | 5 000 |
| T1 - MEC Sandbox Maintenance and Support | 15 000 |
| T2 - MEC Sandbox Enhancement – Feature Set #1 (MEC-030 V2X) | 25 000 |
| T3 - MEC Sandbox Enhancement – Feature Set #2 (MEC-015: BWM and MTS; MEC-016 Mx2) | 25 000 |
| T4 *-* MEC Sandbox Enhancement – Feature Set #3 (features to be selected with the STF SG) | 25 000 |
| **TOTAL** | 95 000 |

## 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 Enhancement – Feature Set #1 (MEC-030 V2X)
* T3 - MEC Sandbox Enhancement – Feature Set #2 (MEC-015: BWM and MTS; MEC-016 Mx2)
* T4 - MEC Sandbox Enhancement – Feature Set #3 (features to be selected with the STF SG)

## Other interested ETSI Technical Bodies

NA

## Other stakeholders

NA

Part III: Execution of Work

# Work plan, time scale and resources

## Task description

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| --- | --- |
| **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** | * 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 STF599 * Sandbox user feedback |
| **Output** | * 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 Enhancement – Feature Set #1 (MEC-030 V2X)** |
| **Objectives** | * Introduce new MEC Sandbox features beyond those delivered by STF599, specifically, Feature Set #1:   + V2X Scenario #1 – MEC-030 (predicted\_qos endpoint support) * Design, develop, verify, and deploy to the MEC Sandbox Enhancement - Feature Set #1 (MEC-030 V2X) to the public MEC: <https://try-mec.etsi.org/> |
| **Input** | * Sandbox Macro Network City Scenario – Monaco: <https://forge.etsi.org/rep/stf-587/mec-sandbox-scenarios/tree/master/Macro-Network-Scenario> * MEC Sandbox – V2X Scenario #1: <https://forge.etsi.org/rep/mec/mec-sandbox-scenarios/blob/mec30_v2x_dev/Macro-Network-Scenario/MEC030.md>   + Note – the MEC Sandbox V2X scenario is under development and will be completed before the STF Call for Expertise. * Baseline ETSI MEC GS and OpenAPI specifications * Recommendations and priorities from ISG MEC and DECODE WG, via SG.   + Note – MEC Sandbox Enhancement Feature sets may be adjusted by the SG based on ISG, DECODE, and MEC Sandbox user feedback. * Final MEC Sandbox delivery from STF599 * AdvantEDGE open-source edge emulator: <https://github.com/InterDigitalInc/AdvantEDGE> |
| **Output** | * New / Updated set of MEC Sandbox Scenarios formatted in a mark-up language collected in the MEC Sandbox Scenario repository on ETSI Forge, if needed for Feature Set #1 * MEC Sandbox user interface design updates, if needed per the scenario, in wireframes or UI prototypes. * MEC-030 Service APIs implemented in the Sandbox backend, based on the MEC Sandbox – V2X Scenario #1. * Update of all existing Sandbox MEC Service APIs to the latest available OAS representations, per STF606. This includes:  |  | | --- | | ETSI GS MEC 011 2.2.1 | | ETSI GS MEC 012 2.2.1 | | ETSI GS MEC 013 2.2.1 | | ETSI GS MEC 021 2.2.1 |  * Required updates to the Sandbox frontend (such as endpoint URL, Sandbox swagger tab, etc.). * MEC Sandbox major update (MEC Sandbox Enhancement – Feature Set #1: MEC-030 V2X) deployed, verified, and documented on public ETSI Sandbox hosting environment (<https://try-mec.etsi.org/>). |
| **Interactions** | Feedback, review, and feature selection / prioritization from the SG.  Interactions with ETSI Secretariat for the logistics and support on the IT infrastructure.  The WG DECODE will approve all new MEC Sandbox scenarios.  The WG DECODE will approve all updates to the public MEC Sandbox. |
| **Resources required** | Background in Edge Computing. Expertise in Edge Network deployments and topologies. 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 3 (T3)** | **MEC Sandbox Enhancement – Feature Set #2 (MEC-015: BWM and MTS; MEC-016 Mx2)** |
| **Objectives** | * Introduce new MEC Sandbox features specifically, Feature Set #2:   + MEC-015     - BWM API – Bandwidth Allocation     - MTS API – Capability, MTS Sessions   + MEC-016 Mx2 * Design, develop, verify, and deploy to the MEC Sandbox Enhancement - Feature Set #2 (MEC-015: BWM and MTS; MEC-016 Mx2) to the public MEC: <https://try-mec.etsi.org/> |
| **Input** | * Output of Task 2 - MEC Sandbox Enhancement – Feature Set #1 (MEC-030 V2X) * Baseline ETSI MEC GS and OpenAPI specifications * Recommendations and priorities from ISG MEC and DECODE WG, via SG.   + Note – MEC Sandbox Enhancement Feature sets may be adjusted by the SG based on ISG, DECODE, and MEC Sandbox user feedback. |
| **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.   + Reviewed and approved by the SG. * MEC Sandbox user interface design updates, if needed per the scenarios, in wireframes or UI prototypes. * MEC-015 and MEC-16 Service APIs implemented in the Sandbox backend, based on the updated and approved scenarios. * Update of all existing Sandbox MEC Service APIs to the latest available OAS representations. * Required updates to the Sandbox frontend (such as endpoint URL, Sandbox swagger tab, etc.). * MEC Sandbox major update (Feature Set #2: MEC-015 BWM and MTS; MEC-016 Mx2) deployed, verified, and documented on public ETSI Sandbox hosting environment (<https://try-mec.etsi.org/>). |
| **Interactions** | Feedback, review, and feature selection / prioritization from the SG.  Interactions with ETSI Secretariat for the logistics and support on the IT infrastructure.  The WG DECODE will approve all new MEC Sandbox scenarios.  The WG DECODE will approve all updates to the public MEC Sandbox. |
| **Resources required** | Background in Edge Computing. Expertise in Edge Network deployments and topologies. 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 Enhancement – Feature Set #3 (features to be selected with the STF SG)** |
| **Objectives** | * Introduce new MEC Sandbox features specifically, Feature Set #3 :   + Features to be selected with the STF SG * Design, develop, verify, and deploy to the MEC Sandbox Enhancement - Feature Set #3 to the public MEC: <https://try-mec.etsi.org/> |
| **Input** | * Output of Task 3 - MEC Sandbox Enhancement – Feature Set #2: MEC-015 BWM and MTS; MEC-016 Mx2 * Baseline ETSI MEC GS and OpenAPI specifications * Recommendations and priorities from ISG MEC and DECODE WG, via SG. |
| **Output** | * MEC Sandbox Enhancement – Feature Set #3 selection and prioritization (critical, high, medium, low) based on SG and WG DECODE guidance.   + Reviewed and approved by the ISG MEC. * 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.   + Reviewed and approved by the SG. * MEC Sandbox user interface design updates, if needed per the scenarios, in wireframes or UI prototypes. * Selected MEC Service APIs implemented in the Sandbox backend, based on the updated and approved scenarios. * Update of all existing Sandbox MEC Service APIs to the latest available OAS representations. * Required updates to the Sandbox frontend (such as endpoint URL, Sandbox swagger tab, etc.). * MEC Sandbox major update (Feature Set #3) deployed, verified, and documented on public ETSI Sandbox hosting environment (<https://try-mec.etsi.org/>). |
| **Interactions** | Feedback, review, and feature selection / prioritization from the SG.  Interactions with ETSI Secretariat for the logistics and support on the IT infrastructure.  ISG MEC will approve the MEC Sandbox Enhancement – Feature Set #3  The WG DECODE will approve all new MEC Sandbox scenarios.  The WG DECODE will approve all updates to the public MEC Sandbox. |
| **Resources required** | Background in Edge Computing. Expertise in Edge Network deployments and topologies. 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 and Feature Set #1

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **A** | MEC Sandbox Maintenance Update and Feature Set #1 delivered and deployed. | Apr 29, 2022 |
| Reference Body Deliverable | NA |
| ETSI Deliverable | Progress report approved by MEC DECODE WG. |

Milestone B – MEC Sandbox Maintenance Update and Feature Set #2

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **B** | MEC Sandbox Maintenance Update and Feature Set #2 delivered and deployed. | Aug 31, 2022 |
| Reference Body Deliverable | NA |
| ETSI Deliverable | Progress report approved by MEC DECODE WG. |

Milestone C – MEC Sandbox Feature Set #3 – Selection and Prioritization

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **C** | MEC Sandbox Feature Set #3 selected, prioritized, reviewed, and approved. | Sep 30, 2022 |
| Reference Body Deliverable | NA |
| ETSI Deliverable | MEC Sandbox Feature Set #3 selection and prioritization presented and approved in an ISG MEC contribution for approval |

## 

Milestone D – MEC Sandbox Maintenance Update and Feature Set #3 delivered

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| **Milestone** | **Description** | **Cut-Off Date** |
| **D** | MEC Sandbox Maintenance Update and Feature Set #2 delivered and deployed. | Dec 17, 2022 |
| 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 2022 | Dec 2022 | 5 000 |
| T1 | MEC Sandbox Maintenance and Support | Jan 2022 | Dec 2022 | 15 000 |
| T2 | MEC Sandbox Enhancement – Feature Set #1 (MEC-030 V2X) | Jan 2022 | Apr 2022 | 25 000 |
| Milestone  A | MEC Sandbox Maintenance Update and Feature Set #1  Progress Report#1 approved by MEC DECODE WG |  | 29 Apr 2022 |  |
| T3 | MEC Sandbox Enhancement – Feature Set #2 (MEC-015: BWM and MTS; MEC-016 Mx2) | May 2022 | Aug 2022 | 25 000 |
| Milestone  B | MEC Sandbox Maintenance Update and Feature Set #2  Progress Report#2 approved by MEC DECODE WG |  | 31 Aug 2022 |  |
| T4 | MEC Sandbox Enhancement – Feature Set #3 (to be selected) | Sept 2022 | Dec 2022 | 25 000 |
| Milestone  C | MEC Sandbox Feature Set #3 *selected, prioritized, reviewed, and approved.* . |  | 30 Sep 2022 |  |
| Milestone  D | MEC Sandbox Maintenance Update and Feature Set #3.  Final report approved by ISG MEC  STF Closed. |  | 17 Dec 2022 |  |
|  | | | | **95 000** |

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

# 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 23, 2021 | Robert Gazda | Initial draft |  |
| 2.0 | August 10, 2021 | Robert Gazda | Updated draft | Resolve comments, added budget proposal, added an additional milestone capture Feature Set #3 selection and prioritization. |
| 3.0 | August 12,2021 | Robert Gazda | Updated draft | Resolved review comments from WG DECODE discussion ([MECDECODE(21)000072](https://docbox.etsi.org/ISG/MEC/DECODE/05-CONTRIBUTIONS/2021/MECDECODE(21)000072_MEC_Sandbox_STF_Proposal_for_2022.zip)):   * + - * Revised the budget       * Correct milestone dates for 2022 and other instances of 2021 in error.       * Marked specific MEC GS and OpenAPI versions for STF baseline documents in Section   Added Intel as a co-signing supporting company. |
| 3.1 | August 12,2021 | Robert Gazda | Updated draft | Incorporate additional reviewer comments.  Added Samsung as a co-signing supporting company. |
| 3.2 | August 17,2021 | Robert Gazda | Updated draft | Added co-signing supporting companies: HPE, ZTE, FBK, and Huawei. |
| 3.3 | August 26,2021 | ETSI Secretariat | Updated draft | Update after TB approval and before Board#134 Submission |
| 3.4 | Sept, 2021 | Walter Featherstone | Updated draft | Updates based on the STF 606 shift in delivery dates. |
| 3.5 | October 15, 2021 | ETSI Secreatariat | Board approved | Minor updates before CL publication |