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| ToR STF 678 (Ref. Body ISG MEC) |
| Version: 1.5 |
| Author: ISG MEC – Date: August 16, 2023 |
| Last updated by ETSI Secretariat - Date: October 5, 2023 |
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Terms of Reference – Specialist Task Force Proposal

STF 678 (Ref. Body ISG MEC)

Edge Native Connector: Critical cross-organisation MEC Sandbox enhancements

Summary information

|  |  |  |
| --- | --- | --- |
| Approval status | Approved by Ref. Body ISG MEC (doc ref: MEC(23)000323r4) | **YES** |
| Approved by Board#144 (19-21 September 2023) | YES |
| Reference Body | ISG MEC |
| ETSI Funding | **Maximum budget : 128 000 EUR** |
| Minimum of 4 ETSI Members Support | **YES** |
| Time scale | **From** | 2024-01-10 |
| **To** | 2025-06-20 |
| Work Items  | *List and date of the WI creation**DMI/MECDEC-049EdgeConnector, 2023-09-16* |
| 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 |  |

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Part I – STF Technical Proposal

# Rationale & Objectives

## Rationale

### Rationale Summary

The **Edge Native Connector** STF proposal is planned to deliver an edge application development experimentation environment, based on the cross-organisation harmonisation efforts that have been led by ETSI MEC. That includes alignment with 3GPP, in particular the WG SA6 defined EDGEAPP architecture (stage 2) with associated CT1 & CT3 specified APIs (stage 3); GMSA’s Operator Platform, which facilitates edge federation and capability exposure to application service providers; 5GAA, who have provided V2X related requirements directly to ISG MEC. The intent of the proposal is to leverage ETSI’s existing investment in the MEC Sandbox emulation platform, but with a shift in focus to deliver capabilities that have cross-organisation relevance. The resulting platform will have the capability to demonstrate the complimentary nature of the edge computing solutions offered by different organisations, which in turn will help avoidance of market fragmentation and enable developers to experiment and develop applications that are edge native by design.

### Rationale Detailed

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. By completion of STF587, the MEC Sandbox included 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>) continued its 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. At its conclusion, STF599 completed 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%2821%29000148_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 continued to improve its API specifications, it was important to enhance the MEC Sandbox in alignment with the latest published API versions. Furthermore, during STF599, several MEC Service APIs and new scenarios were identified as desirable for Sandbox implementation (e.g., MEC-015, MEC-016, MEC-30, etc.) that were not realized by that STF (as captured in: [MEC(21)000346](https://docbox.etsi.org/ISG/MEC/05-CONTRIBUTIONS/2021/MEC%2821%29000346_STF599_-_ETSI_MEC_Sandbox_Feature_Enhancement_Prioritization.pptx)). This led to the creation of STF625 that started in Jan 2022 and completed in early 2023, for which two new STF expert organisations were selected (with significant onboarding offered by the original STF organisation). This introduced initial V2X service support (MEC 030 V2X) and demonstration of the Traffic Management APIs (MEC-015) and Device application interface (MEC-016), noting that the MEC Sandbox does not offer a data plane on which traffic steering would be applied.

As an indication of its adoption and success, the MEC Sandbox has been utilized as the primary platform for the technical challenge of 2021 and 2022 editions of the MEC Hackathons (see Wiki page: <https://mecwiki.etsi.org/index.php?title=MEC_Hackathons>), and it will be also used for the MEC 2023 Hackathon jointly organized in collaboration with LF and OCP, hosted at the OCP summit: <https://www.etsi.org/events/2257-2023-edge-native-ai-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. Since 2021, the ISG has worked on MEC Phase 3 specifications, by continuously aligning with 3GPP EDGEAPP and also GSMA OPG, for the standardization work on MEC federation. More recently, the ISG is establishing collaboration with CAMARA project (under LF), and for a better reason, developers need a tool that help them to develop their application and understand how to consume APIs even defined by multiple entities (e.g., standard APIs or open source implementations etc..).

Finally, to set the scene toward future MEC Phase 4 work, ETSI published a White Paper on “MEC support for Edge Native design” (<https://www.etsi.org/images/files/ETSIWhitePapers/ETSI-WP55-MEC_support_towards_Edge_native.pdf>). The paper provides an overview and vision about the Edge Native approach, as a natural evolution of Cloud Native. The paper explained in detail the concept of “Edge Native”, describing what Edge Native means for edge developers to build their applications and introduces how ETSI ISG MEC and other organizations support this Edge Native design paradigm. In particular, the White Paper guided developers in the principles and specific requirements of edge computing and how they can combine them with the modern architectural approach introduced by Cloud Native. It also provided insight into the general technical community interested in ETSI MEC solutions or Edge Native application design concepts, where the MEC Sandbox is considered a key tool in facilitating Edge Native design.

This new STF is thus critical for ETSI to open the door for edge application design and unleash edge computing market also in the view of future system. The general goal of the new STF is certainly to providing to developers some complementary tool for stimulating the API market demand and edge application design. More in detail, there is a growing need to show coherence among the various standards and projects, to not confuse developers but instead provide them means to further foster interoperability among the various standards (ETSI MEC and 3GPP EDGEAPP) also in the view of MEC Federation, according to the OPG requirements. Additionally, this new STF will be a convenient tool that may help the collaboration between ETSI MEC and CAMARA, as they are implementing APIs and can complement (from their open-source community) the work done in standards like ETSI MEC. So, all stakeholders may appreciate if this new **Edge Native Connector** will be provided to developers to “practice” on APIs and facilitate their application design process.

## Objectives of the work to be executed

The objective is to leverage the existing capabilities of the ETSI hosted MEC Sandbox environment (<https://try-mec.etsi.org/>), by adding critical software called “Sandbox Edge Native Connector”. This will help developers to consume MEC service APIs while being able to experiment with the adoption of other complementary APIs, in an interoperable environment that will help the application development process.

This work will include:

* Development of the software plugin called Sandbox Edge Native Connector, as an open functionality connecting the MEC Sandbox with other software frameworks and allow interoperable API consumption from multiple sources (e.g., CAMARA APIs, or frameworks already listed on the MEC ecosystem Wiki <https://mecwiki.etsi.org/index.php?title=MEC_Ecosystem> such as Simu5G that offers data plane support).
* Fulfilling the requirement for Sandbox instantiation via API calls, bypassing the UI and enabling greater experimentation of a multitude of scenarios without manual intervention for scenario establishment (e.g., number of emulated users and their characteristics). This way the MEC Sandbox could be easily integrated with experimentation platforms such as the platforms developed in the context of SNS projects including 6G-SANDBOX (<https://6g-sandbox.eu/> ).
* Critical sandbox enhancements, by adding the support for MEC Federation (i.e., multi MEC system support), and in accordance with EDGEAPP (e.g., application server registration to the MEC platform utilising the 3GPP specified CAPIF that has been adopted by ETSI MEC as an option for Mp1).
* Enhance the existing capabilities of the MEC Sandbox based on the latest input from 5GAA regarding GS MEC 030 V2X Service APIs, thereby for instance providing support for potential future vehicular focused hackathon events and demonstration of MEC Federation in such scenarios.
* 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/>).

## 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%2821%29000148_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 was 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 were updated and new APIs were added, the objective of the work proposed was mainly two-fold. First, maintain and update the 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

During its lifespan, STF606 updated 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.

### Specialist Task Force 625: MEC Sandbox Feature Enhancement, Maintenance, and User Support

<https://portal.etsi.org/STF/STFs/STFHomePages/STF625>

The objective was to maintain and enhance the MEC Sandbox environment (<https://try-mec.etsi.org/>), which is publicly accessible and running on the ETSI Forge website for demonstrating and experimenting with the MEC service APIs.

The MEC Sandbox environment is also used to validate MEC API Conformance test suites. It is also used as the main MEC Platform for supporting the ETSI MEC Hackathons.

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

<https://portal.etsi.org/xtfs/#/xTF/T027>

A set of API conformance test suites was developed in 2021 and 2022 by ISG MEC as part of WIs MEC-DEC 032-1, 032-2 and 032-3. Following on from that work, the objective of this TTF is to update these test suites as new versions of the specification become available, and also to implement fixes and improvements, collecting feedback from users and reported issues.

A potential extension of the TTF is to maintain and revise the integration of the TTCN-3 MEC Test System into the ETSI Hive-Tap architecture to provide a permanent MEC API Conformance testing tool.

## 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-marketestablish leadership in key areas impacting members' future activitiesMoreover, as part of ETSI strategy, the STF will critically contribute to the overall vision of **Intelligent Distributed Edge**, which is considered as a key enabler for the future of communication and computation (see ETSI Tech Radar, 2023). |
| Horizontal activities (quality, security, etc.) |  |
| Societal good / environmental |  |

# ETSI Members Support

|  |  |  |
| --- | --- | --- |
| **#** | **ETSI Member** | **Supporting delegate** |
| 1 | Apple France | Walter Featherstone |
| 2 | Intel Corporation (UK) Ltd | Dario Sabella |
| 3 | FSCOM | Yann Garcia |
| 4 | InterDigital, Inc. | Robert Gazda |
| 5 | ZTE Corporation | Lijuan Chen |
| 6 | Huawei Technologies R&D UK | Alice Li |
| 7 | China Telecommunications | Hongmei Zhu |
| 8 | Motorola Mobility UK Ltd. | Apostolis Salkintzis |
| 9 | AT&T Global Network Services Belgium SPRL | Dan Druta |
| 10 | xFlow Research Inc. | Muhammad Hamza |
| 11 | Nokia Germany | Uwe Rauschenbach |
| 12 | Mavenir | Jane Shen |
| 13 | CNIT | Cristina Costa |
| 14 | Samsung R&D Institute UK | Basavaraj Pattan |
| 15 | Mitsubishi Electric R&D Centre Europe | Mourad Khanfouci |

# Deliverables

## Base documents

### ETSI MEC Group Specifications and OpenAPI documents

The following table lists baseline MEC Group Specifications and OpenAPI representations this STF ToR.

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.

|  |  |  |  |
| --- | --- | --- | --- |
| **Document** | **Title** | **Status** | **OpenAPI status** |
| ETSI GS MEC 002 3.1.1 | Multi-access Edge Computing (MEC);Use Cases and Requirements | Published | n/a |
| ETSI GS MEC 003 3.1.1 | Multi-access Edge Computing (MEC);Framework and Reference Architecture | Published | n/a |
| ETSI GS MEC 009 3.2.1 | Multi-access Edge Computing (MEC); General principles for MEC Service APIs | Published | n/a |
| ETSI GS MEC 010-2 3.1.1 | Multi-access Edge Computing (MEC);MEC Management; Part 2: Application lifecycle, rules and requirements management | Published | Available |
| ETSI GS MEC 011 3.1.1 | Multi-access Edge Computing (MEC);Edge Platform Application Enablement | Published | Available |
| ETSI GS MEC 012 2.2.1 | Multi-access Edge Computing (MEC);Radio Network Information API | Published | Available |
| ETSI GS MEC 013 3.1.1 | Multi-access Edge Computing (MEC);Location API | Published | Available |
| ETSI GS MEC 014 3.1.1 | Mobile Edge Computing (MEC);UE Identity API | Published | Available |
| ETSI GS MEC 015 2.2.1 | Multi-access Edge Computing (MEC);Bandwidth Management and Multi-access Traffic Steering service | Published | Available |
| ETSI GS MEC 016 2.2.1 | Multi-access Edge Computing (MEC);Device Application API | Published | Available |
| ETSI GS MEC 021 2.2.1 | Multi-access Edge Computing (MEC); MEC Application Mobility Service API | Published | Available |
| ETSI GS MEC 028 2.3.1 | Multi-access Edge Computing (MEC);WLAN Information API | Published | Available |
| ETSI GS MEC 029 2.2.1 | Multi-access Edge Computing (MEC);Fixed Access Information API | Published | Available |
| ETSI GS MEC 030 3.1.1 | Multi-access Edge Computing (MEC);MEC V2X API | Published | Available |
| ETSI GS MEC 033 3.1.1 | Multi-access Edge Computing (MEC);IoT API | Published | Available |
| ETSI GS MEC 040 3.1.1 | Multi-access Edge Computing (MEC);MEC Federation enablement APIs | Published | n/a |

### 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-DEC049EdgeConnector | Working title: Multi-access Edge Computing (MEC) MEC Edge Connector Scope: The target of this work item is to provide a, publicly accessible and running sandbox “Edge Connector” environment on the ETSI Forge website for demonstrating and experimenting with MEC service APIs. The minimal output is to provide access from Application Clients and 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 new “Edge Connector” environment targeted at MEC API service consumers, e.g., MEC Application software developers.  | .2025-06-27 |

# Maximum budget

## Task summary/Manpower Budget

|  |  |
| --- | --- |
| **Task short description** | Budget (EUR) |
|
| T0 - Project Management | 8 000 |
| T1 - MEC Sandbox maintenance and support (including support for 5GAA-focused predictive QoS: MEC-030 V2X service) | 20 000 |
| T2 – API driven Sandbox (enabling Sandbox instantiation and execution via API calls) | 25 000 |
| T3 - Edge Native Connector – Feature Set #1 (3GPP EDGEAPP EAS and Edge Native apps registration to MEC platform, Mp1/EDGE-3 alignment through 3GPP CAPIF: MEC-011 Application Enablement) | 25 000 |
| T4 - Edge Native Connector – Feature Set #2 (E/WBI and NBI for MEC Federation; referring to MEC-040 Federation APIs) | 25 000 |
| T5 *-* Edge Native Connector – Feature Set #3 (capability to be selected by STF SG coordinated with MEC DECODE and ISG MEC, e.g., MEC ecosystem solution integration / plugin for data plane support: <https://mecwiki.etsi.org/index.php?title=MEC_Ecosystem>) | 25 000 |
| **TOTAL** | 128 000 |

## 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 (MEC-030: V2X)
* T2 - API driven Sandbox
* T3 - Edge Native Connector – Feature Set #1 (MEC-011: Application Enablement)
* T4 - Edge Native Connector – Feature Set #2 (MEC-040: Federation enablement APIs)

T5 - Edge Native Connector – Feature Set #3 (connector features)

## 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 |

|  |  |
| --- | --- |
| **Task 1 (T1)** | **MEC Sandbox Maintenance and Support (inc. V2X)** |
| **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
* Provide a vehicle for test suite validation, aligned with the TTF 027 planned deliverables
 |
| **Input** | * Final MEC Sandbox delivery from STF625
* 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
* Enhancement of the predictive QoS support feature to MEC 030 v3.1.1
* Alignment with the MEC APIs that are targeted by TTF 027
 |
| **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. |

|  |  |
| --- | --- |
| **Task 2 (T2)** | **API driven Sandbox** |
| **Objectives** | * To provide the ability to instantiate and execute the MEC Sandbox via API calls
* This may be directly with the public Sandbox, but more likely with a standalone instantiation
	+ The potential to overload the public MEC Sandbox must be prevented
 |
| **Input** | * Final MEC Sandbox delivery from STF625
 |
| **Output** | * Demonstratable ability to instantiate and execute MEC Sandbox scenarios via an API call
 |
| **Interactions** | The Steering Group for this STF will be consulted for guidance on the requirements. 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** | Expertise including micro-services deployment, containers, MEC & emulation techniques, required for front-end interfacing.  |

|  |  |
| --- | --- |
| **Task 3 (T3)** | **Edge Native Connector: Feature Set #1 (MEC-011)** |
| **Objectives** | * Introduce new MEC Sandbox features beyond those delivered by STF625, specifically, Feature Set #1:
	+ MEC-011
		- EAS/ Edge Native application registration to MEC platform
		- EDGE-3 / Mp1 alignment via CAPIF
		- Application discovery (EDGE-1 /4)
* Design, develop, verify, and deploy to the MEC Sandbox Enhancement - Feature Set #1 (MEC-011) to the public MEC: <https://try-mec.etsi.org/>
 |
| **Input** | * Baseline ETSI MEC GS and OpenAPI specifications
* MEC-011 latest stable draft
* 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 STF625
* AdvantEDGE open-source edge emulator: <https://github.com/InterDigitalInc/AdvantEDGE>
* For the CAPIF implementation, consider existing open source software, e.g.,

 https://github.com/EVOLVED-5G/CAPIF\_API\_Services |
| **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-011 Service APIs implemented in the Sandbox backend, based on the MEC Sandbox – V2X Scenario #1.
* EDGE-3 / Mp1 alignment via CAPIF
* Update Sandbox MEC Service APIs to the latest available OAS representations:

|  |
| --- |
| ETSI GS MEC 011 3.1.1 |
| ETSI GS MEC 011 3.2.1 latest draft |

* APIs to facilitate discovery of applications registered to the MEC platform
* Required updates to the Sandbox frontend (such as endpoint URL, Sandbox swagger tab, etc.).
* MEC Sandbox major update (MEC Sandbox Enhancement – Feature Set #1 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)** | **Edge Native Connector: Feature Set #2 (MEC-040)** |
| **Objectives** | * Introduce new MEC Sandbox features specifically, Feature Set #2:
	+ - E/WBI support (aligned with MEC 040)
		- Multi MEC System support
* Design, develop, verify, and deploy to the MEC Sandbox Enhancement - Feature Set #2 to the public MEC: <https://try-mec.etsi.org/>
 |
| **Input** | * Baseline ETSI MEC GS and OpenAPI specifications
* Recommendations and priorities from ISG MEC and DECODE WG, via SG.
* Final MEC Sandbox delivery from STF625
* 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 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.
* E/WBI / MEC-040 Service APIs implemented in the Sandbox backend, based on the updated and approved scenarios.
* Required updates to the Sandbox frontend (such as endpoint URL, Sandbox swagger tab, etc.).
* MEC Sandbox major update (Feature Set #2) 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 5 (T5)** | **Edge Native Connector: 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 to facilitate the **Edge Native Connector**
* Design, develop, verify, and deploy to the MEC Sandbox Enhancement - Feature Set #3 to the public MEC: <https://try-mec.etsi.org/>
 |
| **Input** | * 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 with 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.
* 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 #3The 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 V2X update.**

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **A** | MEC Sandbox Maintenance and Support (inc. MEC-030 V2X) | Mar 29, 2024 |
| *Reference Body Deliverable* | NA |
| *ETSI Deliverable* | Progress report approved by MEC DECODE WG. |

**Milestone B – API driven Sandbox.**

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **B** | API driven Sandbox delivered as (ETSI GitLab hosted) code and demonstrated. | Jun 21, 2024 |
| *Reference Body Deliverable* | NA |
| *ETSI Deliverable* | Progress report, covering demonstration, approved by MEC DECODE WG. |

**Milestone C – Edge Native Connector: Feature Set #1 delivered.**

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **C** | Edge Native Connector Feature Set #1 delivered and deployed. | Oct 25, 2024 |
| *Reference Body Deliverable* | NA |
| *ETSI Deliverable* | Progress report approved by MEC DECODE WG regarding Feature Set #1. |

**Milestone D – Edge Native Connector: Feature Set #2 delivered.**

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **D** | Edge Native Connector Feature Set #2 delivered and deployed.  | Feb 28, 2025 |
| *Reference Body Deliverable* | NA |
| *ETSI Deliverable* | MEC Sandbox Feature Set #3 selection and prioritization presented and approved in an ISG MEC contribution (with initial presentation to DECODE) for approval.Progress report approved by MEC DECODE WG regarding Feature Set #2. |

**Milestone E – Edge Native Connector: Feature Set #3 delivered.**

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **E** | Edge Native Connector Feature Set #3 delivered and deployed. | Jun 20, 2025 |
| *Reference Body Deliverable* | NA |
| *ETSI Deliverable* | Final report approved by ISG MEC (with initial presentation to DECODE) regarding the full SPF deliverable and in particular Feature Set #3. |

## Task summary

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Task / Milestone**  | Target Date | Estimated Cost (EUR) |
| From | To |
|  | Start of work |  |  |  |
| T0 | Project Management | Jan 2024 | Jun 2025 | 8 000 |
| T1 | MEC Sandbox Maintenance and Support (*inc.* MEC-030 V2X) | Jan 2024 | Jun 2025 | 20 000 |
| MilestoneA | MEC Sandbox Update (MEC-030)**Progress Report#1**Approved by MEC DECODE WG |  | 29 Mar 2024 |  |
| T2 | API driven Sandbox | Jan 2024 | Jun 2024 | 25 000 |
| MilestoneB | API driven Sandbox: **Progress Report#2**Approved by MEC DECODE WG |  | 21 Jun 2024 |  |
| T3 | Edge Native Connector: Feature Set #1 (MEC-011) | Jul 2024 | Oct 2024 | 25 000 |
| MilestoneC | Edge Native Connector: Feature Set #1**Progress Report#3**Approved by MEC DECODE WG |  | 25 Oct 2024 |  |
| T4 | Edge Native Connector: Feature Set #2 (MEC-040) | Nov 2024 | Feb 2025 | 25 000 |
| MilestoneD | Edge Native Connector: Feature Set #2Edge Native Connector: Feature Set #3 *selected, prioritized, reviewed, and approved*.**Progress Report#4**Approved by MEC DECODE WG |  | 28 Feb 2025 |  |
| T5 | Edge Native Connector: Feature Set #3 (STF/ISG selected) | Jan 2025 | Jun 2025 | 25 000 |
| MilestoneE | Edge Native Connector: Feature Set #3. **Final report (#5)**Approved by ISG MEC, STF Closed. |  | 20 Jun 2025 |  |
|  | **128 000** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Task/ Mil.** | **J** | **F** | **M** | **A** | **M** | **J** | **J** | **A** | **S** | **O** | **N** | **D** | **J** | **F** | **M** | **A** | **M** | **J** |
| T0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MA |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MB |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MC |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MD |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 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 | Aug 11, 2023 | Walter Featherstone and Dario Sabella | Initial draft |  |
| 1.1 | Aug 16, 2023 | Walter Featherstone | Updated draft | Updated based on offline comments received before initial presentation at MEC Tech 295. |
| 1.2 | Aug 16, 2023 | Walter Featherstone | Updated draft | Updated based on comments received during MEC Tech 295. |
| 1.3 | Aug 31, 2023 | ETSI Secretariat | Final | Comment from RC addedApproved by ISG MECUpdate for Board#144 submission |
| 1.4 | Sep 7, 2023 | Walter Featherstone | Updated Final | Only change is the inclusion of additional supporting companies. |
| 1.5 | Oct 5, 2023 | ETSI Secretariat | Final | Update before CL publication. |

Annex I Response to the Request for Proposals
CfE – STF 678 (REFERENCE BODY ISG\_MEC)

Deadline: 19 November 2023

**If you are an ETSI Member \***

**ETSI membership status (Indicate your status):**

 Full

 Associate

 Observer

**If you are not an ETSI Member \***

Please indicate:

**Full name of the ETSI member supporting the application (list of ETSI members on etsi.org):**

-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Official contact name of the ETSI member supporting the application:**

-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Note: A formal confirmation of the support from the Official contact is required (e.g. by e-mail sent to STFLINK@etsi.org) and an “ETSI Member Support Letter” will be required if you are selected.*

|  |
| --- |
| **Contractor information \*** |
|  |
| **Contractor name \*:***Indicate the Company/Organization Name* |  |
|  |
| **Contact person for the technical aspects** | **Contact person for Decision on ETSI financial offer to this project (if any)** |
| Title |  | Title |  |
| First name |  | First name |  |
| Last name  |  | Last name  |  |
| Role |  | Role |  |
| e-mail |  | e-mail |  |
| Phone |  | Phone |  |
|  |
|  | **Yes** | **No** |
| Do you or any employee of your Company/Organization hold an elected or appointed position in the Reference Body requesting the STF 678 creation? | oIndicate in which position:----------------------------------- | o |
| **If you are self-employed candidate:**Do you currently have other contracts in progress with ETSI? | o | o  |

All fields marked with an asterix (\*) are mandatory

**1.1 Introduction**

A short presentation of the technical structure responsible for this activity, e.g.:

* Business area, number of employees, link to WEB site,
* Department(s)/team(s)/experts in charge of the technical activities related to this Project,
* Reference to products/services of your Company/Organization or supporting Member to which the standards developed by this Project will apply,
* Motivation for your Company/Organization or supporting Member to participate in this Project.

**1.2 Proposed approach**

**Proposed contribution to tasks & related cost**

Identify the tasks to which your Company/Organization is proposing to contribute by filling-in the table below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tasks\_No** | **Tasks\_Description** | **Max\_Budget\_Allocated\_in\_ Euro** | **Amount\_in\_Euro\_ (mandatory)** | **%\_of\_whole\_Task\_(mandatory)** |
| 00 | Project Management | 8000 | . | . |
| 01 | MEC Sandbox maintenance and support (including support for 5GAA-focused predictive QoS: MEC-030 V2X service) | 20000 | . | . |
| 02 | API driven Sandbox (enabling Sandbox instantiation and execution via API calls) | 25000 | . | . |
| 03 | Edge Native Connector – Feature Set #1 (3GPP EDGEAPP EAS and Edge Native apps registration to MEC platform, Mp1/EDGE-3 alignment through 3GPP CAPIF: MEC-011 Application Enablement) | 25000 | . | . |
| 04 | Edge Native Connector – Feature Set #2 (E/WBI and NBI for MEC Federation; referring to MEC-040 Federation APIs) | 25000 | . | . |
| 05 | Edge Native Connector – Feature Set #3 (capability to be selected by STF SG coordinated with MEC DECODE and ISG MEC, e.g., MEC ecosystem solution integration / plugin for data plane support: https://mecwiki.etsi.org/index.php?title=MEC\_Ecosystem) | 25000 | . | . |
| 06 |  | **128000** |  |  |

**Amount in Euro (mandatory)**: Indicate the price offered for your contribution to the task(s)

**% of whole task (mandatory)**: Indicate to which percentage of the execution of the whole task your offer corresponds

Provide a description of the proposed approach, competences, reference to related activities:

* Explain which part of the task is corresponding to the requested percentage that your Company/Organization will handle,
* Explain the scope that your Company/Organization will cover,
* Explain your approach to the management of the quality and,
* Explain your approach to the management of the risks and their mitigation,
* Describe and justify the proposed costs to achieve this project objectives.

Annex II Terms and Conditions
CfE – STF 678 (REFERENCE BODY ISG\_MEC)

Deadline: 19 November 2023

**2.1 Submission of Proposals**

All proposals in response to this CfE shall be submitted before the deadline indicated in thisCollective Letter, using exclusively the WEB application on the ETSI Portal at the following address: <https://portal.etsi.org/cfe>.

Proposals shall be composed of Curriculum Vitae of the proposed service providers’ personnel and the Annex I of this CfE duly filled-out.

Proposals that will be partial or incomplete at the deadline will not be accepted.

The Terms and Conditions in this Annex will apply.

**2.2 Modification and Withdrawal of Proposals**

Applicants may, without prejudice to themselves, modify or withdraw their proposal by written request, provided that the request is received by ETSI prior to the due date and time, at the address to which their proposal was submitted. The applicant may submit a new proposal provided that such new proposal is received prior to the deadline for responding which is specified in this Collective Letter.

**2.3 Assessment of Proposals**

The ETSI Director-General, in consultation with the Reference Body Chairman, is responsible for the selection of the service providers that will be contracted to perform this Project work. The ETSI Director-General and the Reference Body Chairman may be assisted by a Selection Panel to assess the applications received and make the final decision.

As per article 1.10.4 of the ETSI Directives, the Director-General may discard proposals that could be identified as creating potential conflict of interest.

The ETSI Secretariat will only communicate to the applicants the result of the selection (accepted or not accepted). Should applicants need more information on the rationale for the selection, they must address a formal request to the ETSI Director-General.

The following evaluation criteria will be applied to all proposals, in order of priority:

* Evidence that the applicant has the necessary structure and expertise to ensure delivery
* Reference to current or previous activities in the specific technical domain of this project
* Critical review of the most efficient way to achieve the objectives in this Project ToR
* Effective proposed approach/methodology for the execution of the tasks
* Implementation schedule
* Clear pricing policy

Compliance with the first two (2) criteria is mandatory.

Proposals that are not considered compliant with these criteria will be discarded.

Priority will be given to technical quality of the proposals. Pricing considerations will be taken into account to ensure that the best value for money is achieved. Compatibility with the maximum budget allocated to this Project will be verified before placing a Service Contract.

Following the assessment process, ETSI reserves the right to grant contracts to other than the cheapest proposals, to accept or reject any offer completely or in part, or to reject all proposals, without providing the reasons. If no offer is accepted, ETSI may decide to abandon the work or proceed in any other manner ETSI may select.

**2.4 IPR and confidentiality Agreements**

The information provided in this CfE, as well as the fact that the applicant has received the CfE, is considered confidential and protected under copyright laws. The applicant may not discuss, share, or use the information in this CfE for any purpose other than the response to this CfE.

ETSI will not disclose the content of any proposals to other applicants or any other party, with the exception of the persons involved in the assessment process described in §2.3 above.

However, ETSI reserves the right to make use of the information provided in this proposal to improve this project definition for the purpose of this CfE or any other manner in which ETSI may decide to proceed to select the service providers.

If successful, the applicant will be required to sign a Service Contract, which includes IPR and Confidentiality clauses aligned with the relevant policies in the ETSI Directives.

**2.5 Preparation cost**

ETSI will not be responsible for any costs or expenses that the applicant may incur in preparing and/or submitting the proposal.

**2.6 Service Contract**

A Service Contract will be proposed to the applicants that will be selected to perform the work.

Details on the Terms and Conditions of this contract can be found on the ETSI Portal, at the following address: <https://portal.etsi.org/STF/STFs/Contracts.aspx>