ETSI GS MEC-DEC 032-2 V3.2.1 (2024-11)

Multi-access Edge Computing (MEC); API Conformance Test Specification; Part 2: Test Purposes (TP)

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Foreword

This Group Specification (GS) has been produced by ETSI Industry Specification Group (ISG) Multi-access Edge Computing (MEC).

The present document is part 2 of a multi-part deliverable. Full details of the entire series can be found in part 1 [i.9].

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

1 Scope

Based on the testing methodology guidelines and framework specified in ETSI GR MEC-DEC 025 [i.8], the present document specifies part 2 of a multi-part deliverable test specification for the MEC service APIs (currently ETSI GS MEC 012 [5], ETSI GS MEC 013 [6], ETSI GS MEC 014 [7], ETSI GS MEC 015 [8], ETSI GS MEC 016 [9], ETSI GS MEC 021 [10], ETSI GS MEC 028 [11], ETSI GS MEC 029 [12], ETSI GS MEC 030 [13]), ETSI GS MEC 033 [14], ETSI GS MEC 040 [15]), and the MEC APIs specified in ETSI GS MEC 010-2 [3] and ETSI GS MEC 011 [4].

The present document includes the Test Suite Structure (TSS) and Test Purposes (TPs) using the standardized notation Test Description Language - Test Objectives extension (TDL_TO).

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at https://docbox.etsi.org/Reference/.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] Void.

[2] ETSI GS MEC 009 (V2.2.1): "Multi-access Edge Computing (MEC); General principles, patterns and common aspects of MEC Service APIs".

[3] ETSI GS MEC 010-2 (V3.1.1): "Multi-access Edge Computing (MEC); MEC Management; Part 2: Application lifecycle, rules and requirements management".

[4] ETSI GS MEC 011 (V3.2.1): "Multi-access Edge Computing (MEC); Edge Platform Application Enablement".

[5] ETSI GS MEC 012 (V2.2.1): "Multi-access Edge Computing (MEC); Radio Network Information API".

[6] ETSI GS MEC 013 (V3.1.1): "Multi-access Edge Computing (MEC); Location API".

[7] ETSI GS MEC 014 (V3.1.1): "Multi-access Edge Computing (MEC); UE Identity API".

[8] ETSI GS MEC 015 (V2.2.1): "Multi-Access Edge Computing (MEC); Traffic Management APIs".

[9] ETSI GS MEC 016 (V2.2.1): "Multi-access Edge Computing (MEC); Device application interface".

[10] ETSI GS MEC 021 (V3.1.1): "Multi-access Edge Computing (MEC); Application Mobility Service API".

[11] ETSI GS MEC 028 (V2.3.1): "Multi-access Edge Computing (MEC); WLAN Access Information API".

[12] ETSI GS MEC 029 (V2.2.1): "Multi-access Edge Computing (MEC); Fixed Access Information API".

[13] ETSI GS MEC 030 (V3.1.1): "Multi-access Edge Computing (MEC); V2X Information Services API".

[14] ETSI GS MEC 033 (V3.1.1): "Multi-access Edge Computing (MEC); IoT API".

[15] ETSI GS MEC 040 (V3.1.1): "Multi-access Edge Computing (MEC); Federation enablement APIs".

[16] ETSI TS 102 894-2: "Intelligent Transport Systems (ITS); Users and applications requirements; Part 2: Applications and facilities layer common data dictionary".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] Void.

[i.2] Void.

[i.3] Void.

[i.4] Void.

[i.5] Void.

[i.6] Void.

[i.7] TTCN-3 abstract test language.

[i.8] ETSI GR MEC-DEC 025: "Multi-access Edge Computing (MEC); MEC Testing Framework".

[i.9] ETSI GS MEC-DEC 032-1: "Multi-access Edge Computing (MEC); API Conformance Test Specification; Part 1: Test Requirements and Implementation Conformance Statement (ICS)".

[i.10] ETSI GR MEC 001 (V3.1.1): "Multi-access Edge Computing (MEC); Terminology".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the following terms apply:

certification/compliance assessment: major goal of a compliance assessment is to ensure the interoperability of implementations, and the conformance of implementations to the standard

conformance testing: purpose of conformance testing is to determine to what extent a single implementation of a particular standard conforms to the individual requirements of that standard

interoperability testing: purpose of interoperability testing is to prove that end-to-end functionality between (at least) two communicating systems is as required by the standard(s) on which those systems are based

Test Case (TC): complete and independent specification of the actions required to achieve a specific Test Purpose

NOTE: TCs are written in testing languages, e.g. TTCN-3 [i.7].

Test Descriptions (TD): specification of the sequence of actions required to realize the verdict identified in the TP

NOTE: TDs are primarily intended for use in interoperability test specifications. However, in some instances, particularly where there is a considerable difference in complexity between the TPs and the TCs, it is worthwhile adding TDs as an extra design stage in a conformance test specification.

Test Purpose (TP): definition in broad terms of the goal of a particular test

NOTE: A TP should be written for each potential test of each identified requirement. A TP is defined in prose, or in high level languages such as TDL-TO.

test suite: collection of Test Cases

testing framework: guidance for development of conformance and interoperability test strategies, test systems and the resulting test specifications

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI GR MEC 001 [i.10] apply.

4 Prerequisites and Test Configurations

4.1 Test Configurations

Test configurations capture and describe the components identified in the tests and the connections between them. In particular and as reported in ETSI GR MEC-DEC 025 [i.8], in the context of conformance testing the test configuration "defines how the test system connects to the SUT".

For the present test suite, six (6) configurations are identified and listed in the present clause.

For each test configuration two (2) main components are identified: the IUT implementing the API provider and the Tester implementing the API consumer. The IUT is part of a SUT (System Under Test), thus the component may be run together with other components of the MEC System that are required to enable the behaviour to be tested. The definition of the other components is out of scope.

Figure 4.1-1 depicts configuration Config_MEC_1 which includes a MEC Platform as the IUT and a MEC App as the Tester. This configuration is applicable for all test purposes in all subgroups of the SRV Group.

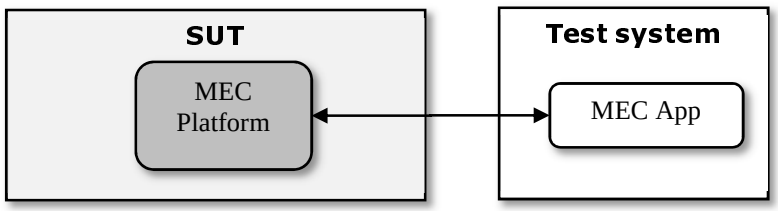

Figure 4.1-1: Config_MEC_1

Figure 4.1-2 depicts configuration Config_MEC_2 which includes a MEO as the IUT and OSS/BSS as the Tester. This configuration is applicable for group MEO, subgroup PKGM.

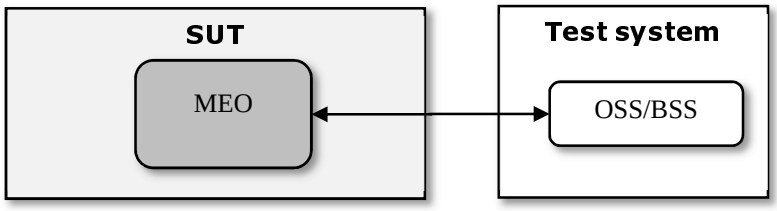

Figure 4.1-2: Config_MEC_2

Figure 4.1-3 depicts configuration Config_MEC_3 which includes a MEO as the IUT and a MEPM as the Tester. This configuration is applicable for subgroup MEO/GRANT and in subgroup MEPM/PKGM.

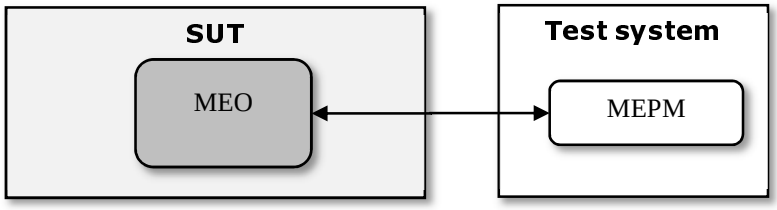

Figure 4.1-3: Config_MEC_3

Figure 4.1-4 depicts configuration Config_MEC_4 which includes a UALCM Proxy as the IUT and a DEV App as the Tester. This configuration is applicable for group MEO subgroups UEAPPCTX and UEAPPS.

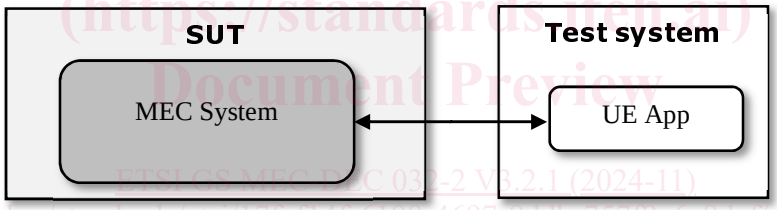

Figure 4.1-4: Config_MEC_4

Figure 4.1-5 depicts configuration Config_MEC_5 which includes a MEPM as the IUT and a MEO as the Tester. This configuration is applicable for group MEPM, subgroup PKGM.

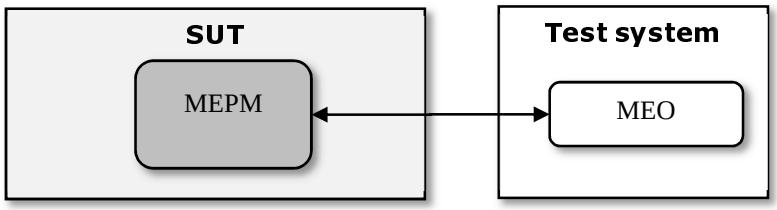

Figure 4.1-5: Config_MEC_5

Figure 4.1-6 depicts configuration Config_MEC_6 which includes a generic MEC API Provider as the IUT and a generic MEC API consumer as the Tester. This configuration is applicable for test targeting generic API behaviours, thus group MEX, subgroup ANY and LCM.

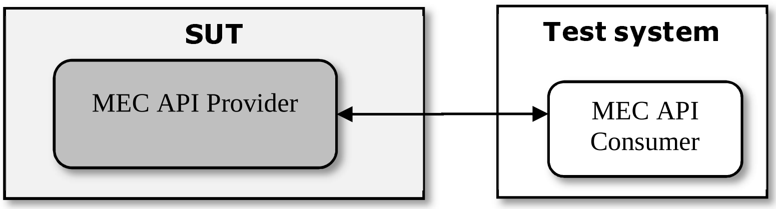

Figure 4.1-6: Config_MEC_6

Figure 4.1-7 depicts configuration Config_MEC_7 which includes a MEF as the IUT and a MEO as the Tester. This configuration is applicable for test targeting MEC Federation API behaviours [15].

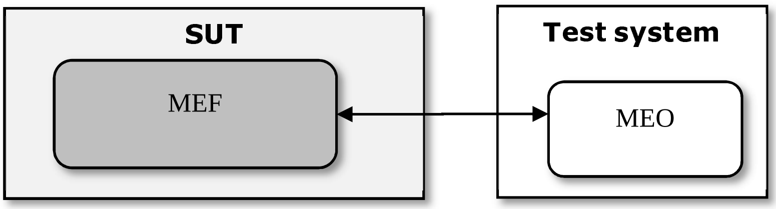

Figure 4.1-7: Config_MEC_7

5 Test Suite Structure (TSS)

5.1 Overview

The test suite structure identifies grouping of test purposes and serves as a base for grouping of Test Case in the ATS (Abstract Test Suite).

The Test Suite structure is used for the creation of identifiers of Test Purposes.

Table 5.1-1 identifies the Test Suite Structure for the MEC API Conformance test suites. Documentation on the groups and subgroups is provided in clause 5.2.

Table 5.1-1: Test Suite Structure for MEC API Conformance

TP_<root>_<doc>_<gr>_<subgr>_<nnn>_<xx>		
<root> = root	MEC	MEC
<doc> = base document	MEC009	Addressing base requirements in ETSI GS MEC 009 [2]
	MEC010p2	Addressing base requirements in ETSI GS MEC 010-2 [3]
	MEC011	Addressing base requirements in ETSI GS MEC 011 [4]
	MEC012	Addressing base requirements in ETSI GS MEC 012 [5]
	MEC013	Addressing base requirements in ETSI GS MEC 013 [6]
	MEC014	Addressing base requirements in ETSI GS MEC 014 [7]
	MEC015	Addressing base requirements in ETSI GS MEC 015 [8]
	MEC016	Addressing base requirements in ETSI GS MEC 016 [9]
	MEC021	Addressing base requirements in ETSI GS MEC 021 [10]
	MEC028	Addressing base requirements in ETSI GS MEC 028 [11]
	MEC029	Addressing base requirements in ETSI GS MEC 029 [12]
	MEC030	Addressing base requirements in ETSI GS MEC 030 [13]
	MEC033	Addressing base requirements in ETSI GS MEC 033 [14]
	MEC040	Addressing base requirements in ETSI GS MEC 040 [15]

TP_<root>_<doc>_<gr>_<subgr>_<nnn>_<xx>		
<gr> = group	SRV	MEC Services
	MEO	MEC Orchestrator
	MEPM	MEC Platform Manager
	PLAT	MEC platform
	MEX	Generic MEC API Producer
<subgr> = subgroup	AMS	Application Mobility Service
	ANY	Un-specified feature, used for generic test purposes
	APPASQ	Application Service Availability Query
	APPSUB	Application Subscriptions
	CONFTASK	Confirmation Tasks
	DNS	DNS rules
	FAIS	Fixed Access Information Service
	GRANT	Granting
	IOTDEV	IoT Device Provisioning
	IOTPLAT	IoT Platform Discovery
	LCM	Lifecycle Management
	LIV	Liveness
	MEF	MEC Federation
	MTS	Multi-access Traffic Steering
	PKGM	App Package Management
	REGAPPS	Register Apps
	RLOCLOOK	Radio Node Location Lookup
	RNIS	Radio Network Information Service
	SAQ	Service Availability Query
	SRVSUB	Service Subscriptions
	TIME	Timing capabilities
	TM	Traffic Management
	TRAF	Traffic rules
	TRANS	Transport
	UEAPPCTX	Device Application Contexts
	UEAPPS	Device Applications
	UEAPPLOC	UE App Location
	UEAREASUB	UE Area Subscribe
	UEDISTLOOK	UE Distance Lookup
	UEDISTSUB	UE Distance Subscribe
	UEINFOLOOK	UE Information Lookup
	UELOCLOOK	UE Location lookup
	UELOCSUB	UE Location Subscription
	UETAG	UE Identity Tag
	UETRACKSUB	UE Tracking Subscribe
	UETESTNOT	UE Test Notification
	UEZONELOOK	UE Zone Lookup
	UEZONESUB	UE Zone Subscription
	V2X	V2X Information Service
	WAI	WLAN Access Information
<nnn> = sequential number		001 to 999
<xx> = type of testing	OK	Valid/Successful behaviour (200, 201, 202, 204)
	BR	Bad request
	NT	No token
	WT	Wrong Token
	NF	Missing (404)
	CO	Conflict (409)
	PF	Precondition Failed (412)
	E1	Generic error condition 1
	E2	Generic error condition 2
	E3	Generic error condition 3
	…	

5.2 Test groups and subgroups specifications

The test grouping is organized on three (3) levels. The first level is the reference to the base Document that contains the requirements for the tests. The second level is the Group and identifies the MEC component that is providing the Service or Interface to be tested. The third level is called Subgroup and identifies a set of functionalities within an API. In general this is related to the entities and resources manipulated or served by the API.

Moreover, test purposes are identified and categorized by a sequential three-digits number (uniquely assigned upon definition of each test purpose) and by the type of test performed. The type of test helps quickly identify the type of behaviour that is expected by the IUT in the test purpose.

5.3 Conventions

Conventions reported in ETSI GR MEC-DEC 025 [i.8], clauses 4.3.3.2.3 and 4.3.3.2.4 shall apply.

The test purposes are primarily developed in textual syntax of TDL-TO. The sources for the Test Purposes are available in https://forge.etsi.org/rep/mec/gs032p2-test-purposes/-/tree/3.1.1.

The definitions of PICS, Entities, Events and data types are available in Domain section in the mec-common.tplan2 file.

6 Test Purposes (TP)

6.1 MEC009

6.1.1 Generic MEC API Producer (MEX)

6.1.1.1 Generic feature (Any)

Table 6.1.1.1-1: TP_MEC_MEC009_MEX_ANY_001_NT

TP Id	"TP_MEC_MEC009_MEX_ANY_001_NT"
Test Objective	Check that a MEC API provider responds with an error when it receives a request without token
Reference	ETSI GS MEC 009 V2.1.1 [2], clause 6.16.1
Configuration	Config_MEC_6
Initial Conditions	

with {
the IUT being_in idle_state
}	

Expected Behaviour	

ensure that {
when {
the IUT receives a HTTP_REQUEST containing
uri indicating value ACCEPTABLE_URI,
not authorization
from the MEC_CONSUMER entity
}
then {
the IUT sends a HTTP_RESPONSE containing
status set to "401 Unauthorized"
to the MEC_CONSUMER entity
}
}	

TP Id	"TP_MEC_MEC009_MEX_ANY_001_WT"
Test Objective	Check that a MEC API provider responds with an error when it receives a request with a wrong token
Reference	ETSI GS MEC 009 V2.1.1 [2], clause 6.16.1
Configuration	Config_MEC_6
Initial Conditions	

with {
the IUT being_in idle_state
}	

Expected Behaviour	

ensure that {
when {
the IUT receives a HTTP_REQUEST containing
uri indicating value ACCEPTABLE_URI,
headers containing
authorization set to NOT_VALID_TOKEN
 	
from the MEC_CONSUMER entity
}
then {
the IUT sends a HTTP_RESPONSE containing
status set to "401 Unauthorized"
to the MEC_CONSUMER entity
}
}	

6.2 MEC010p2

6.2.1 Multi-access Edge Orchestrator (MEO)

6.2.1.1 Granting (GRANT)

TP Id	"TP_MEC_MEC010p2_MEO_GRANT_001_OK"
Test Objective	Check that MEO sends a synchronous grant response when a grant request is requested - INSTANTIATE
Reference	ETSI GS MEC 010-2 V3.1.1 [3], clause 7.5.1.3.1 ETSI GS MEC 010-2 V3.1.1 [3], clause 6.2.4.2.2 ETSI GS MEC 010-2 V3.1.1 [3], clause 6.2.4.4.2
Configuration	Config_MEC_3
PICS Selection	PIC_GRANTS_MANAGEMENT
Initial Conditions	

with {
the IUT having a app_instance containing
appInstanceID indicating value APP_INSTANCE_ID,
link indicating value H_LINK
 	
}	

Expected Behaviour	

ensure that {
when {
the IUT receives a vPOST containing
uri indicating value "/granting/v1/grants",
body containing
GrantRequest containing
appInstanceId set to APP_INSTANCE_ID,
appLcmOpOccId set to any_value,
appDId set to any_value,
operation set to INSTANTIATE,
addResources set to INST_RESOURCES_LIST,
_links containing
appLcmOpOcc set to APP_LCM_OP_OCC_LINK,
appInstance set to APP_INSTANCE_LINK
 	
from the MEPM entity
}
then {
the IUT sends a HTTP_RESPONSE containing
status set to "201 Created",	