

**4th ETSI NFV Plugtests
MEC Interoperability
Sophia Antipolis, France**



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Foreword

This Test Plan has been produced by ETSI Centre for Testing and Interoperability during the preparation of the 4th ETSI NFV Plugtests for the Interoperability activity of the experimental MEC Track.

Introduction

The present document describes the Interoperability Test Plan that was followed during the 4th ETSI NFV Plugtests held in June 2019 in Sophia Antipolis, France.

The Test Plan was developed following the interoperability testing methodology and guidelines defined by ETSI MEC in [MEC003], [MEC017], [MEC025] and [MEC009].

1 Scope

The goal of this document is to support the interoperability test sessions run during the 4th NFV Plugtests, specific for MEC Track. This event aimed at verifying early interoperability between different implementations of the main components of the MEC Architectural Framework, which included:

- Mobile edge system level
- Mobile edge host level
- Networks

This document includes several System Under Test Configurations to illustrate how Functions Under Test are combined to provide different end-to-end functionality

The NS compositions shown in this Test Plan are not mandated but provided as examples. The Test Descriptions have been written in such a way that also apply to more complex NS derived from the examples provided in the SUT Configurations.

2 References

2.1 Normative references

Normative references are not applicable in the present document.

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.

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

- | | |
|----------|--|
| [MEC003] | ETSI GS MEC 003 V2.1.1: "Multi-access Edge Computing (MEC); Framework and Reference Architecture" |
| [MEC009] | ETSI GS MEC 009 V2.1.1: "Mobile Edge Computing (MEC); General principles for Mobile Edge Service APIs". |
| [MEC011] | ETSI GS MEC 011 V1.1.1: "Mobile Edge Computing (MEC); Mobile Edge Platform Application Enablement" |
| [MEC017] | ETSI GR MEC 017 V1.1.1: "Mobile Edge Computing (MEC); Deployment of Mobile Edge Computing in an NFV environment" |
| [MEC025] | ETSI GS MEC-DEC 025 V2.1.1: "Multi-access Edge Computing (MEC); MEC Testing Framework" |

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in [MEC003] apply.

3.2 Symbols

None

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in [MEC003] apply.

4 Test Suite Structure

4.1 Naming Conventions

The Test Ids of this Test Plan have been created as per the following naming convention:

TEST ID = TD_<ROOT>_<OPERATION>

Where <ROOT> is MEC.

5 System Under Test Configurations

5.1 MEC Basic

Two (2) different configurations were created for the MEC Track. For both configurations, the list of tests was the same:

The “MEC Basic” configuration which included 2 type of products: a MEC platform and a MEC application.

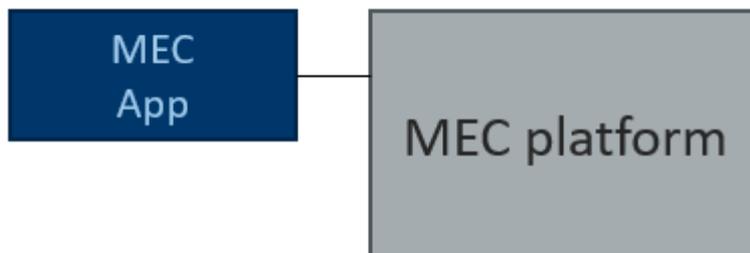


Figure 22: Test configuration “MEC Basic”

5.1 MEC + NFVI

The “MEC+NFVI” configuration which included a NFVI platform, a MEC platform and a MEC application.

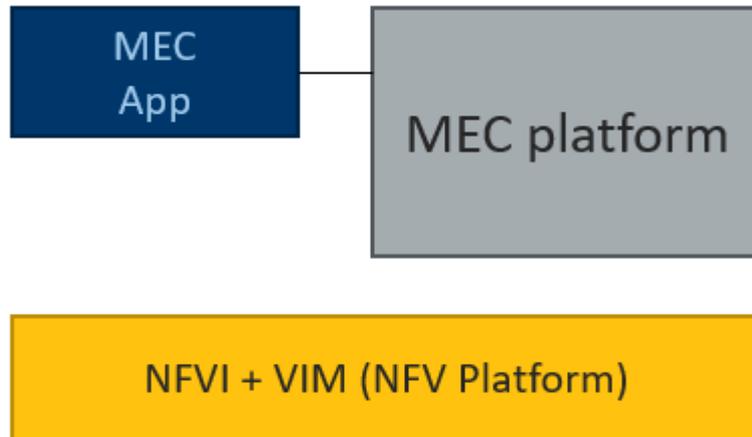


Figure 23: Test configuration “MEC + NFVI”

6 Interoperability Test Descriptions

6.1 Application Lifecycle Management

6.1.1 TD_MEC_PROV_IMG

Interoperability Test Description				
Identifier	TD_MEC_PROV_IMG			
Test Purpose	Onboard application image to the MEC platform			
Configuration	Edge platform in both Access network and Edge network MEC application is available to be provisioned (based on supported mechanism by the platform)			
References	ETSI MEC 011 - Provision individual meService			
Applicability	IFS_MEC_APP_PROV_IMG IFS_MEC_PLAT_PROV_IMG			
Pre-test conditions	MEC Platform is up and running			
Test Sequence	Step	Type	Description	Result
	1	Stimulus	Execute the onboarding/provisioning mechanism of your platform to add the test application. This can be executed through your user interface,	

			through an API or through a CLI. If through an API, testing tool like postman can be used.	
	2	IOP Check	Show through your preferred mechanism that the test application was onboarded successfully.	
IOP Verdict				

6.1.2 TD_MEC_INSTANCE_START

Interoperability Test Description				
Identifier	TD_MEC_INSTANCE_START			
Test Purpose	MEC Platform is able to start a new instance of the application to be executed in MEC location			
Configuration	Edge platform in both Access network and Edge network MEC application was provisioned and is available in the platform			
References	ETSI MEC 011 - Update individual meService			
Applicability	IFS_MEC_PLAT_INSTANCE_START			
Pre-test conditions	MEC Application image is onboarded and available within the MEC Platform			
Test Sequence	Step	Type	Description	Result
	1	Stimulus	Using your preferred mechanism, send a request to your system to start a new instance of the newly onboarded test application. This can be requested through the user interface, the API or the CLI.	
	2	IOP Check	Show through your preferred mechanism that the test application was requested and started successfully.	
IOP Verdict				

6.1.3 TD_MEC_INSTANCE_STATUS

Interoperability Test Description	
Identifier	TD_MEC_INSTANCE_STATUS
Test Purpose	Provide status of running application instance
Configuration	Edge platform in both Access network and Edge network MEC application is up and running within the platform
References	ETSI MEC 011 - Retrieve information about a list of meService resources
Applicability	IFS_MEC_APP_INSTANCE_STATUS IFS_MEC_PLAT_INSTANCE_STATUS

Pre-test conditions					MEC Platform is up and running in the platform				
Test Sequence	Step	Type	Description					Result	
	1	Stimulus	Using your preferred mechanism (UI, API, CLI), send a request to your system to retrieve the status of the instance created in the previous test.						
	2	IOP Check	Show that the application was started as expected and is now running successfully.						
	3	IOP Check	If the application was not started successfully, you should be able to see that the status is in failed state.						
IOP Verdict									

6.1.4 TD_MEC_INSTANCE_STOP

Interoperability Test Description									
Identifier		TD_MEC_INSTANCE_STOP							
Test Purpose		Stop the running application to be removed from the MEC platform							
Configuration		Edge platform in both Access network and Edge network MEC application is up and running in the platform							
References		ETSI MEC 011 - Update the information about a meService resource							
Applicability		IFS_MEC_PLAT_INSTANCE_STOP							
Pre-test conditions					MEC Application is up and running in the platform				
Test Sequence	Step	Type	Description					Result	
	1	Stimulus	Using your preferred mechanism (UI, API, CLI), send a request to your system to stop the previously started instance of the test application.						
	2	IOP Check	Show that the request was accepted by the system and that the instance gets shut down						
	3	IOP Check	Show that the instance is no longer running.						
IOP Verdict									

6.2 Routing

6.2.1 TD_MEC_ROUTE_TO_LOCAL_GENERIC

Interoperability Test Description				
Identifier	TD_MEC_ROUTE_TO_LOCAL_GENERIC			
Test Purpose	Steer traffic from test device locally to edge application			
Configuration	Test device (and/or traffic generator) in the access network. Edge platform in both Access network and Edge network			
References	ETSI MEC 011			
Applicability	IFS_MEC_PLAT_ROUTE_TO_LOCAL			
Pre-test conditions	<ul style="list-style-type: none"> - Device FUT is connected to the edge network segment managed by the MEC System - ME App is running in both the Edge site and in the Remote Network - Local steering is not activated - Device is able to generate the type of traffic handled by the ME App 			
Test Sequence	Step	Type	Description	Result
	1	Stimulus	The device FUT generates target traffic, e.g. HTTP request towards etsi.org.	
	2	IOP Check	The traffic requested is served by the Application instance from the Remote Network (i.e. the Cloud) or directly from the Internet.	
	3	Stimulus	MEC System activates the local traffic steering.	
	4	Stimulus	The device FUT generates target traffic, e.g. HTTP request towards etsi.org.	
	5	IOP Check	Verify that the traffic requested is served by the Application instance from the Edge Site.	
IOP Verdict				

6.2.2 TD_MEC_ROUTE_TO_LOCAL_WEB

Interoperability Test Description	
Identifier	TD_MEC_ROUTE_TO_LOCAL_WEB
Test Purpose	Steer web traffic from test device locally to edge application

Configuration	Test device (and/or traffic generator) in the access network. Edge platform in both Access network and Edge network Edge platform with access to internet			
References	ETSI MEC 011			
Applicability	IFS_MEC_PLAT_ROUTE_TO_LOCAL			
Pre-test conditions	<ul style="list-style-type: none"> - Device FUT is connected to the edge network segment managed by the MEC System - ME App is running in both the Edge site and in the Remote Network - Local steering is not activated - Device is capable of generating the web traffic - ME App is capable of consume web traffic 			
Test Sequence	Step	Type	Description	Result
	1	Stimulus	The device FUT sends HTTP request towards a domain name e.g. etsi.org.	
	2	IOP Check	The traffic requested is served by the Application instance from the Remote Network (i.e. the Cloud) or directly from the Internet.	
	3	Stimulus	MEC System activates the local traffic steering.	
	4	Stimulus	The device FUT sends HTTP request towards a domain name e.g. etsi.org.	
	5	IOP Check	Verify that the traffic requested is served by the Application instance from the Edge Site.	
IOP Verdict				

6.2.3 TD_MEC_ROUTE_TO_EXTERNAL

Interoperability Test Description	
Identifier	TD_MEC_ROUTE_TO_EXTERNAL
Test Purpose	Steer traffic from test device externally to external application
Configuration	Test device (and/or traffic generator) in the access network. Edge platform in both Access network and Edge network Edge platform with access to internet
References	ETSI MEC 011

Applicability	IFS_MEC_PLAT_ROUTE_TO_EXTERNAL			
Pre-test conditions	<ul style="list-style-type: none"> - Device FUT is connected to the edge network segment managed by the MEC System - ME App is running in both the Edge site and in the Remote Network - Local steering is not activated - Device is able to generate the type of traffic handled by the ME App 			
Test Sequence	Step	Type	Description	Result
	1	Stimulus	Using a test device (a laptop or a smartphone) connected at the same "edge network" as where the test application is running, open a browser and type the address of an external website.	
	2	IOP Check	Verify the DNS gets resolved properly and that you can browse to the external website. Content must come from the internet	
IOP Verdict				

6.2.4 TD_MEC_ROUTE_FROM_EXTERNAL

Interoperability Test Description				
Identifier	TD_MEC_ROUTE_FROM_EXTERNAL			
Test Purpose	Allow from external access to edge application			
Configuration	TBD			
References	ETSI MEC 011			
Applicability	IFS_MEC_PLAT_ROUTE_FROM_EXTERNAL			
Pre-test conditions	Platform is up and running Platform is connected to access and edge network test device is connected to edge network Platform can access the internet			
Test Sequence	Step	Type	Description	Result
	1	Stimulus	Using a test device (a laptop or a smartphone) not connected to the same network as the edge host where the test application is running, open a browser and type the address of the test application. The test device should be connected either on the internet or through another edge/core.	

	2	IOP Check	Verify you get the speedtest webpage. The tests in the web page should work properly.	
IOP Verdict				

6.2.5 TD_MEC_ROUTE_CONTROL

Interoperability Test Description				
Identifier	TD_MEC_ROUTE_CONTROL			
Test Purpose	Control VNF accessibility from MEC platform allowing/preventing access to edge application			
Configuration	TBD			
References	ETSI MEC 011			
Applicability	IFS_MEC_PLAT_ROUTE_CONTROL			
Pre-test conditions	Platform is up and running Platform is connected to access and edge network test device is connected to edge network Platform can access the internet			
Test Sequence	Step	Type	Description	Result
	1	Stimulus	Using a test device (a laptop or a smartphone) connected at the same network as the "edge host" where the test application is running, open a browser and type the address of an external website.	
	2	IOP Check	Verify the DNS gets resolved properly and that you can browse to the external website.	
	3	Stimulus	Using your preferred mechanism within your system (UI, API or CLI), block the traffic for the test device to prevent its access to the external website/internet.	
	4	IOP Check	Verify that the test device can't no longer retrieve the external content.	
IOP Verdict				

6.3 API

6.3.1 TD_MEC_API_DISCOVERY

Interoperability Test Description	
Identifier	TD_MEC_API_DISCOVERY
Test Purpose	Discover available service through API request to MEC platform

Configuration	Test device connected to the access and/or edge network Platform connected to the same network as the test device Tool(s) needed to generate the request and view the response			
References	https://forge.etsi.org/swagger/ui/?url=https://forge.etsi.org/gitlab/mec/g011-app-enablement-api/raw/master/Mp1.yaml#/default/Services_GET			
Applicability	IFS_MEC_APP_API_DISCOVERY IFS_MEC_PLAT_API_DISCOVERY			
Pre-test conditions	<ul style="list-style-type: none"> * MEC Platform is up and running (or Swagger is up) * MEC application is instantiated and working properly * MEC application can reach the MEC platform or swagger API simulator 			
Test Sequence	Step	Type	Description	Result
	1	Stimulus	The MEC application sends an API request to the MEC platform (or swagger) to request the available services. Details on the specific request can be found here in the API documentation. Link in the reference.	
	2	IOP Check	Verify the system return back to the MEC application a list of available services which can be consumed by the 3rd party/device.	
	3	CON Check	Verify the API response is in conformance with ETSI MEC MP1 API specifications.	
IOP Verdict				

6.3.2 TD_MEC_API_USAGE

Interoperability Test Description	
Identifier	TD_MEC_API_USAGE
Test Purpose	Use a specific service through MEC platform API
Configuration	Test device connected to the access and/or edge network Platform connected to the same network as the test device Tool(s) needed to generate the request and view the response
References	https://forge.etsi.org/swagger/ui/?url=https://forge.etsi.org/gitlab/mec/g013-location-api/raw/master/LocationAPI.yaml
Applicability	IFS_MEC_APP_API_USAGE IFS_MEC_PLAT_API_USAGE
Pre-test conditions	<ul style="list-style-type: none"> * MEC Platform is up and running (or Swagger is up) * MEC application is instantiated and working properly * MEC application can reach the MEC platform or swagger API simulator

Test Sequence	Step	Type	Description	Result
	1	Stimulus	The MEC application sends an API request to MEC platform (or swagger) to consume a service through the API. The API to be used is the location request API.	
	2	IOP Check	Verify the system return the expected answer. You should have received back the longitude and latitude. You need to use the read operation on a specific user to retrieve its location.	
	3	CON Check	Verify the API response is in conformance with ETSI MEC MP1 API specifications. You should receive the location of a given user.	
IOP Verdict				

Annex A Interoperability Feature Statements

A.1 IFS for MEC APP

IFS_ID	Description	Support
IFS_MEC_APP_PROV_IMG	MEC App image is capable of being provisioned	
IFS_MEC_APP_API_DISCOVERY	MEC APP is capable of discovering available services through API request	
IFS_MEC_APP_API_USAGE	MEC APP is capable of consuming at least a MEC Service through MEC platform API	

A.2 IFS for MEC Platform

IFS_ID	Description	Support
IFS_MEC_PLAT_PROV_IMG	Onboard application image to the MEC platform	
IFS_MEC_PLAT_INSTANCE_START	MEC Platform is able to start a new instance of the application to be executed in MEC location	
IFS_MEC_PLAT_INSTANCE_STATUS	MEC Platform is able to provide the status of running application instance	
IFS_MEC_PLAT_INSTANCE_STOP	MEC Platform is able to stop the running application to be removed from the MEC platform	
IFS_MEC_ROUTE_TO_LOCAL	MEC Platform is able to steer traffic from test device locally to edge application	
IFS_MEC_ROUTE_TO_EXTERNAL	MEC Platform is able to steer traffic from test device externally to external application	
IFS_MEC_ROUTE_FROM_EXTERNAL	MEC Platform is able to allow from external access to edge application	
IFS_MEC_ROUTE_CONTROL	MEC Platform is able to control VNF accessibility from MEC platform allowing/preventing access to edge application	
IFS_MEC_PLAT_API_DISCOVERY	MEC Platform is able to expose the discovery API for at least one available service	
IFS_MEC_PLAT_API_USAGE	MEC Platform is able to expose at least one MEC service through MEC APIs	