



Demonstration of MEC Applications deployment with OSM



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Table of Contents

MEC Principles	3-11
Multi-Access Edge Computing Architecture	
MEC-in-NFV Architecture	
MEC 011 interactions	
MEC Demo using WhiteNFV	12-19
MEC Demo	
MEC Demo Result	

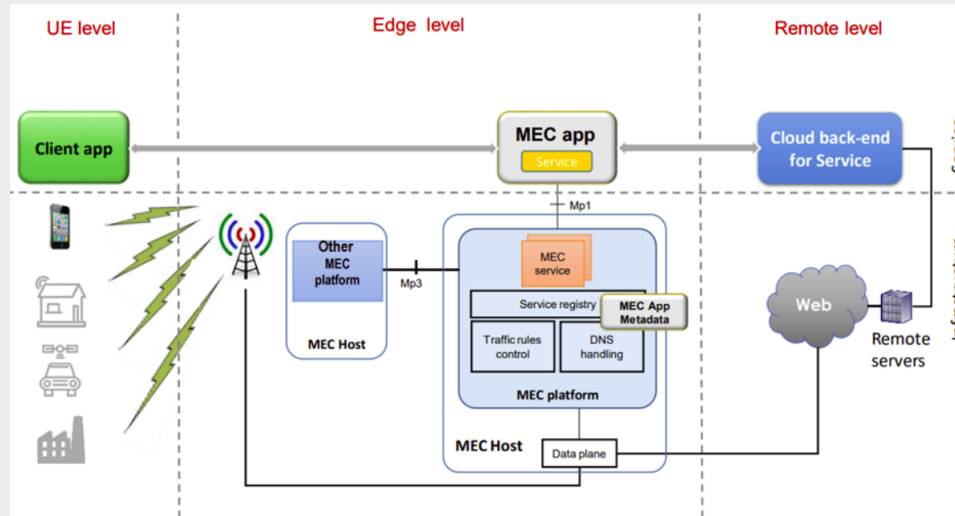
1: MEC Principles

Network Modularization

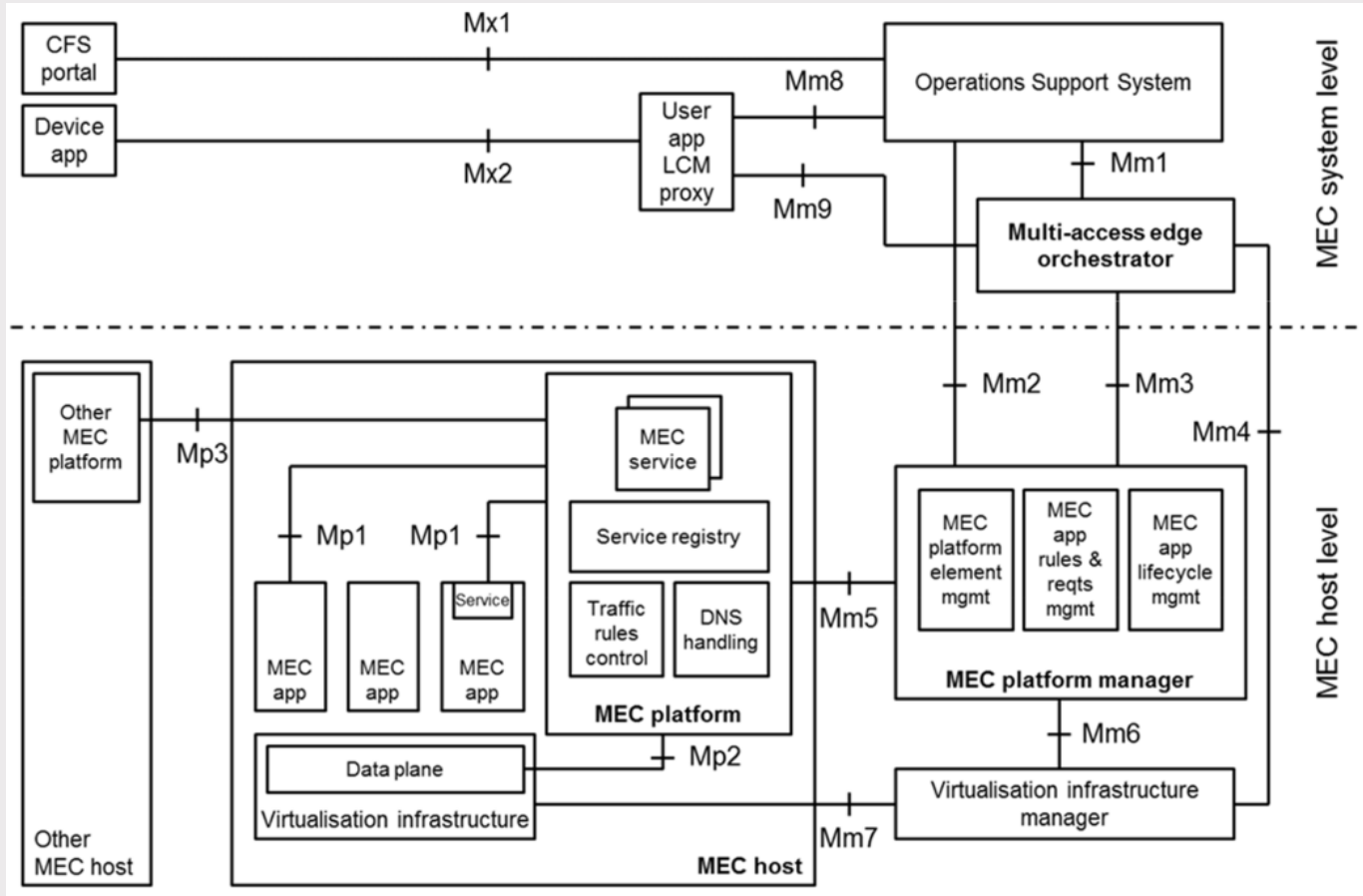
Multi-Access Edge Computing

Multi-access Edge Computing (MEC) offers application developers and content providers cloud-computing capabilities and an IT service environment at the edge of the network. This environment is characterized by ultra-low latency and high bandwidth as well as real-time access to radio network information that can be leveraged by applications.

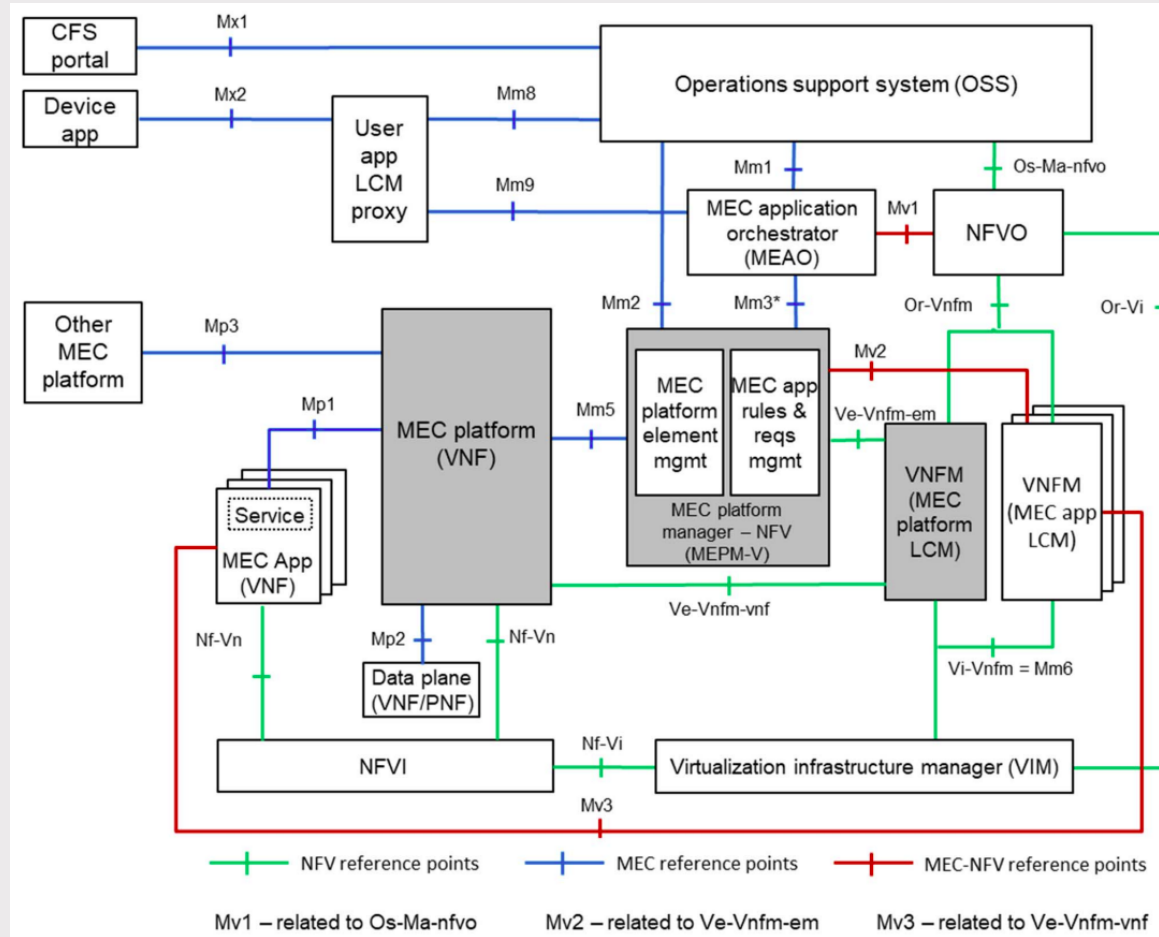
MEC provides a new ecosystem and value chain. Operators can open their Radio Access Network (RAN) edge to authorized third-parties, allowing them to flexibly and rapidly deploy innovative applications and services towards mobile subscribers, enterprises and vertical segments.



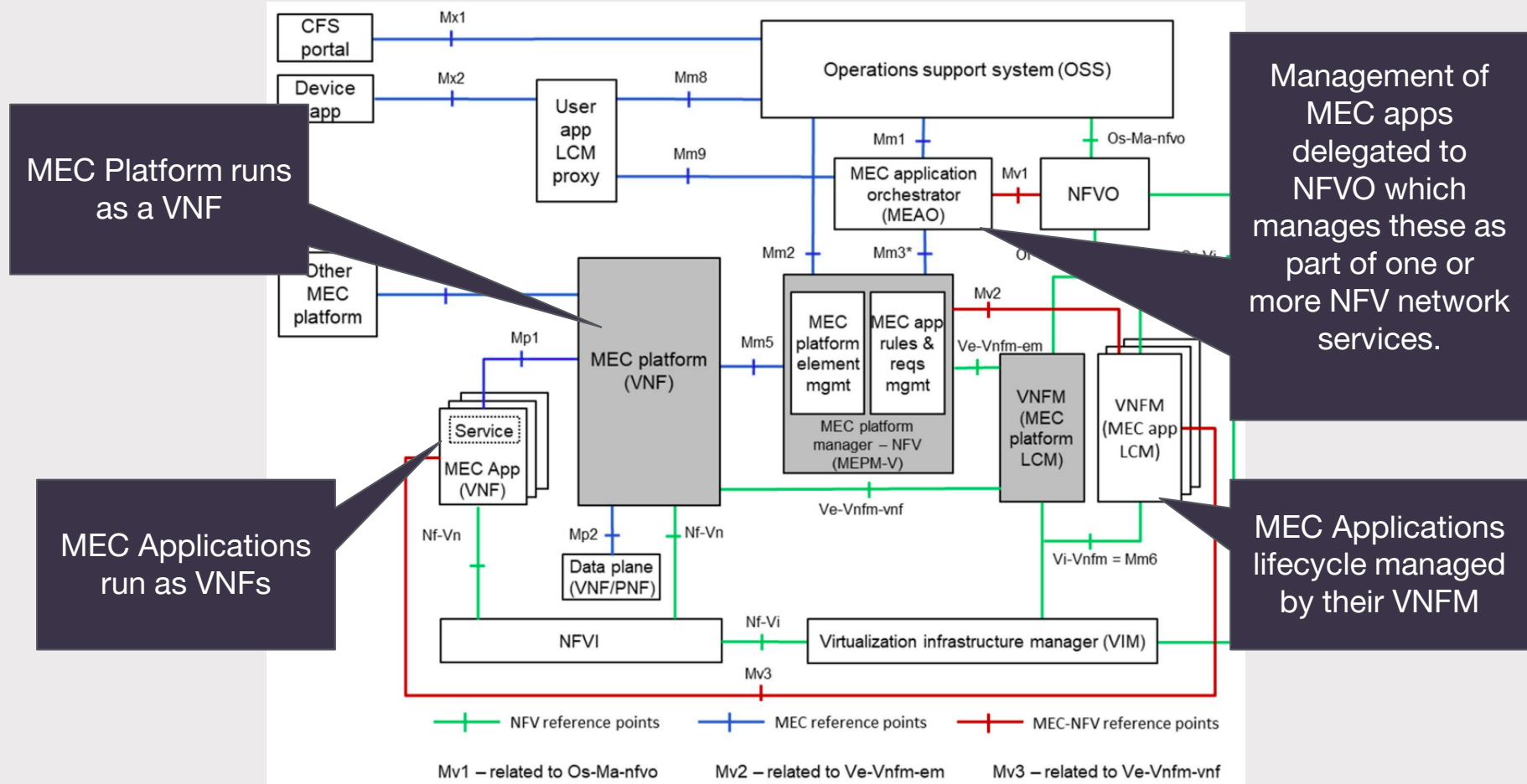
Multi-Access Edge Computing Architecture



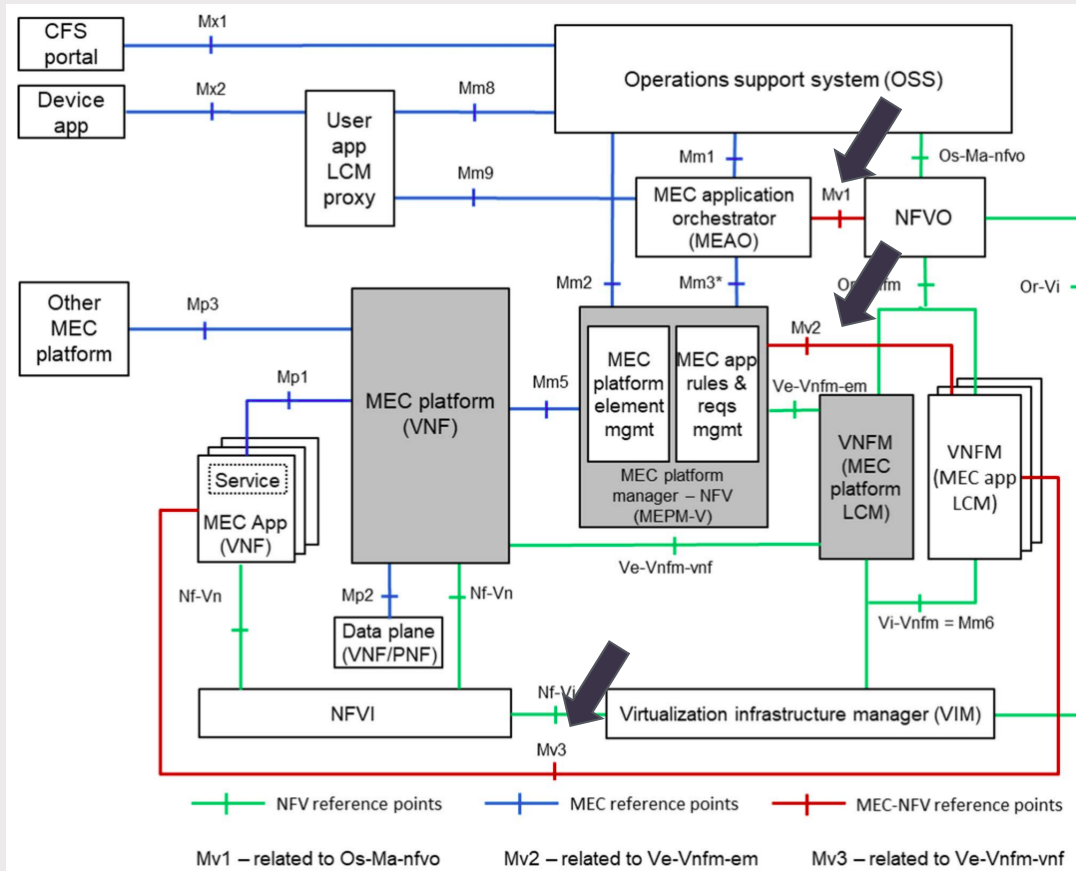
MEC-in-NFV Architecture



MEC-in-NFV Architecture



MEC-in-NFV Architecture



3 “Hybrid” Reference points:

- **Mv3:** at this point no specific changes to Ve-Vnfm-vnf are expected (i.e. it can be used as is)
- **Mv2:** Necessary changes are being addressed by NFV IFA as part of FEAT12 work (MECinNFV)
- **Mv1:** work identified, coordination plan is on-going

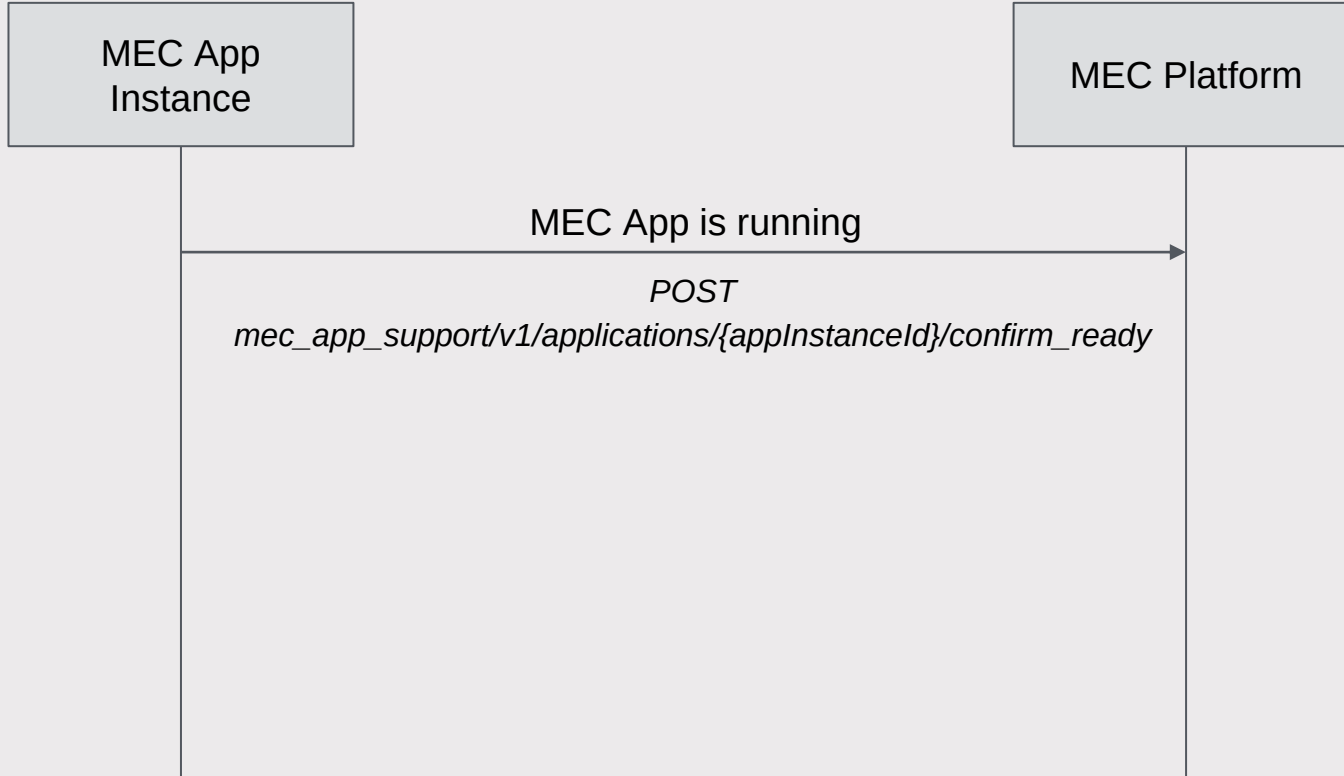
MEC descriptor (AppD) must be linked to NFV descriptor (VNFD). This has been addressed as part of Rel 3 work using Non-MANO artifact capability as defined in Annex B of ETSI GS NFV-SOL 004 v. 2.5.1 and higher.

MEC 011 interactions

“The MEC platform, as defined in ETSI GS MEC, offers an environment where MEC applications may discover, advertise, consume and offer MEC services. Upon receipt of update, activation or deactivation of traffic rules from the MEC platform manager, applications or services, the MEC platform instructs the data plane accordingly. The MEC platform also receives DNS records from the MEC platform manager and uses them to configure a DNS proxy/server.”



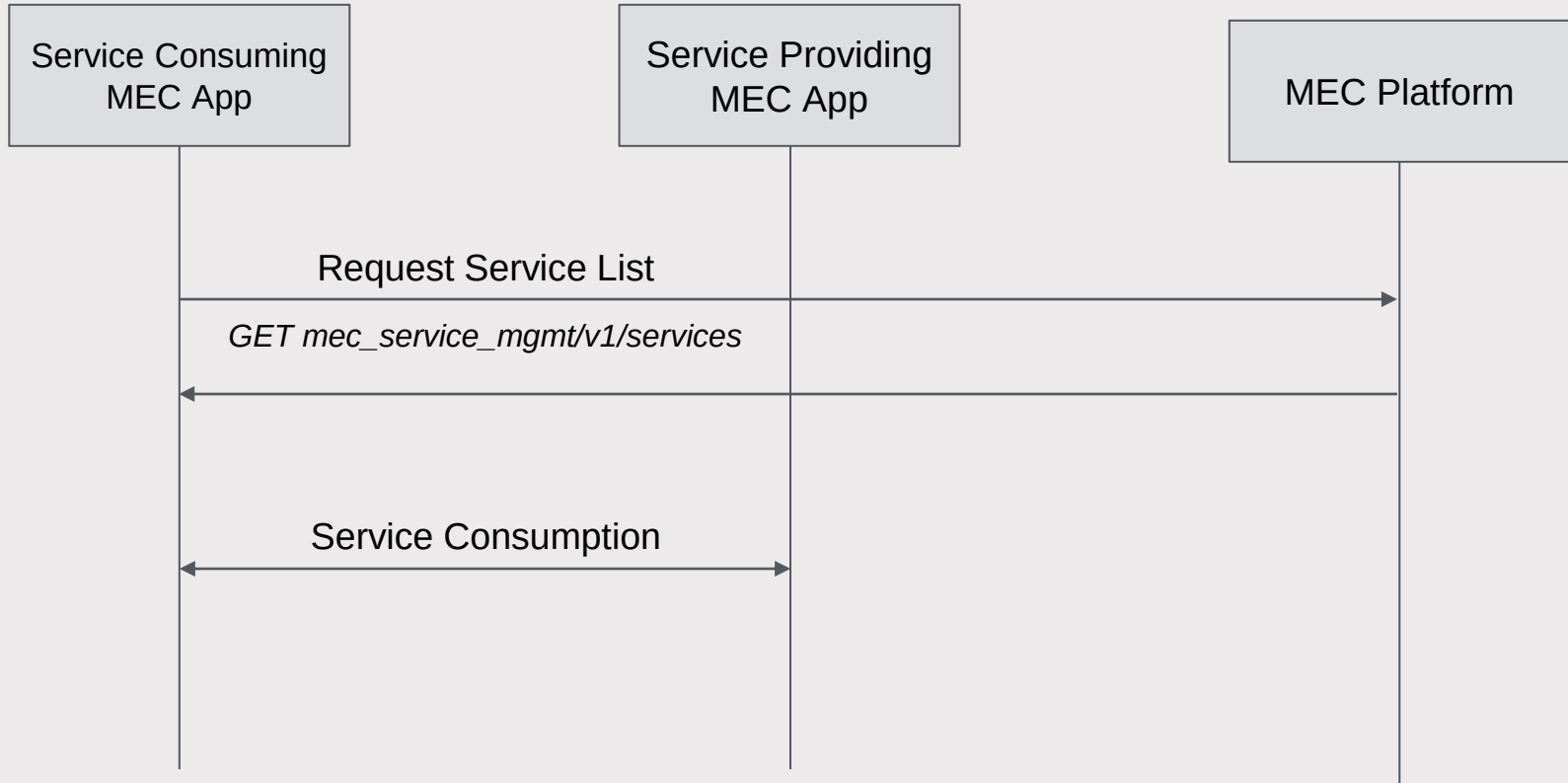
MEC 011 interactions



MEC 011 interactions



MEC 011 interactions

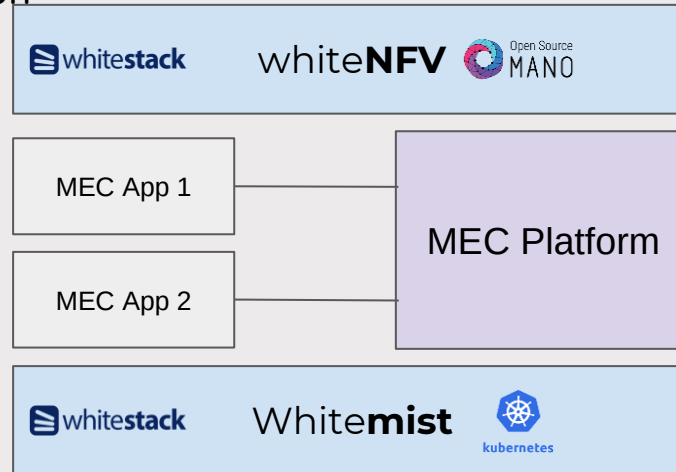


2: MEC demo using WhiteNFV

MEC demo

We're going to test MEC-platform using MEC Apps designed by Università di Bologna:

- WhiteNFV will be used to orchestrate the MEC platform and apps.
- Whitemist will be used as kubernetes environment
- We will test interactions based on ETSI standards:
 - ✓ MEC App is running
 - ✓ Service registration
 - ✓ Request service list
 - ✓ Service consumption



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MEC demo

NS creation in WhiteNFV:

Here is the new version 10.0 of OSM!

 powered by 

Dashboard

PROJECT

Packages

Instances

NS Instances

VNF Instances

PDU Instances

NetSlice Instances

Operational Dashboard

SDN Controller

VIM Accounts

K8s

OSM Repositories

WIM Accounts

Dashboard

NS Instances

Init running /

Name
mec
unibotest01
unibotest02
unibotest03

New Instance

Mandatory fields are marked with an asterisk (*)

Ns Name*

Ns Name

Description*

Description

Nsd Id*

VIM Account*

Select VIM Account

SSH Key

Paste your key here

Config

Yaml Config

Cancel

Create

omebu 1 - RC1

Projects (admin)

User (admin)

New NS

Entries 10

Detailed Status

Actions

Done	Action
Done	Action
Done	Action
Done	Action

MEC demo

Checking the status in WhiteNFV:

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WhiteNFV Fomebu 1 - RC1

Projects (admin) ▾

User (admin) ▾

Dashboard

Projects

admin

NS Instances

PROJECT

Packages

Instances ▾

NS Instances

VNF Instances

PDU Instances

NetSlice Instances

Operational Dashboard

SDN Controller

NS Instances

New NS

🕒 Init

✅ running / configured

❌ failed

🔄 scaling

Entries 10

🔄

Name	Identifier	Nsd name	Operational Status	Config Status	Detailed Status	Actions
Name	Identifier	Nsd name	Select	Select	Detailed Status	
mec	3a77f9c6-356f-40c6-8b34-6a18d6d09fc5	mecplatform_ns	✅	✅	Done	🕒 📊 👤 🗑️ Action ▾
unibotest01	6385ed1c-3069-4e70-b256-9f44a886e71a	unibotest01_ns	✅	✅	Done	🕒 📊 👤 🗑️ Action ▾
unibotest02	c16d37a4-35a3-4fde-9578-4f028182088a	unibotest02_ns	✅	✅	Done	🕒 📊 👤 🗑️ Action ▾

MEC demo

After register the 2 apps:

MEC API Tester

ServicesSubscriptionsInteractions with AppsTransportsDNS rulesTimingsTraffic RulesAuth TokenConfiguration

Services

Services

My Services

Register

Unregister

Service Ready

Result

```
[ { "consumedLocalOnly": false, "isLocal": true, "scopeOfLocality": "MEC_SYSTEM", "serCategory": { "href": "/example/catalogue1", "id": "id12345", "name": "RNI", "version": "version1" }, "serInstanceId": "44bfc9e-e261-4c73-999e-94bebcfd7943", "serName": "Mec-Test-Service", "serializer": "JSON", "state": "ACTIVE", "transportInfo": { "description": "Dummy Service", "endpoint": { "uris": [ "http://unibo-mec-api-tester01.281c554b407943919c4d0249dcf20e60/get-data" ] }, "id": "TransId", "implSpecificInfo": {}, "name": "REST", "protocol": "HTTP", "security": { "oAuth2Info": { "grantTypes": [ "OAUTH2_CLIENT_CREDENTIALS" ], "tokenEndpoint": "/mecSerMgmtApi/security/TokenEndPoint" } }, "type": "REST_HTTP", "version": "2.0" }, "version": "ServiceVersion1" }, { "consumedLocalOnly": false, "isLocal": true, "scopeOfLocality": "MEC_SYSTEM", "serCategory": { "href": "/example/catalogue1", "id": "id12345", "name": "RNI", "version": "version1" }, "serInstanceId": "d4cd6835-52c6-4a16-aa4a-6507603c73f2", "serName": "Mec-Test-Service", "serializer": "JSON", "state": "ACTIVE", "transportInfo": { "description": "Dummy Service", "endpoint": { "uris": [ "http://unibo-mec-api-tester02.281c554b407943919c4d0249dcf20e60/get-data" ] }, "id": "TransId", "implSpecificInfo": {}, "name": "REST", "protocol": "HTTP", "security": { "oAuth2Info": { "grantTypes": [ "OAUTH2_CLIENT_CREDENTIALS" ], "tokenEndpoint": "/mecSerMgmtApi/security/TokenEndPoint" } }, "type": "REST_HTTP", "version": "2.0" }, "version": "ServiceVersion1" } ]
```

MEC demo

Details of registered apps:

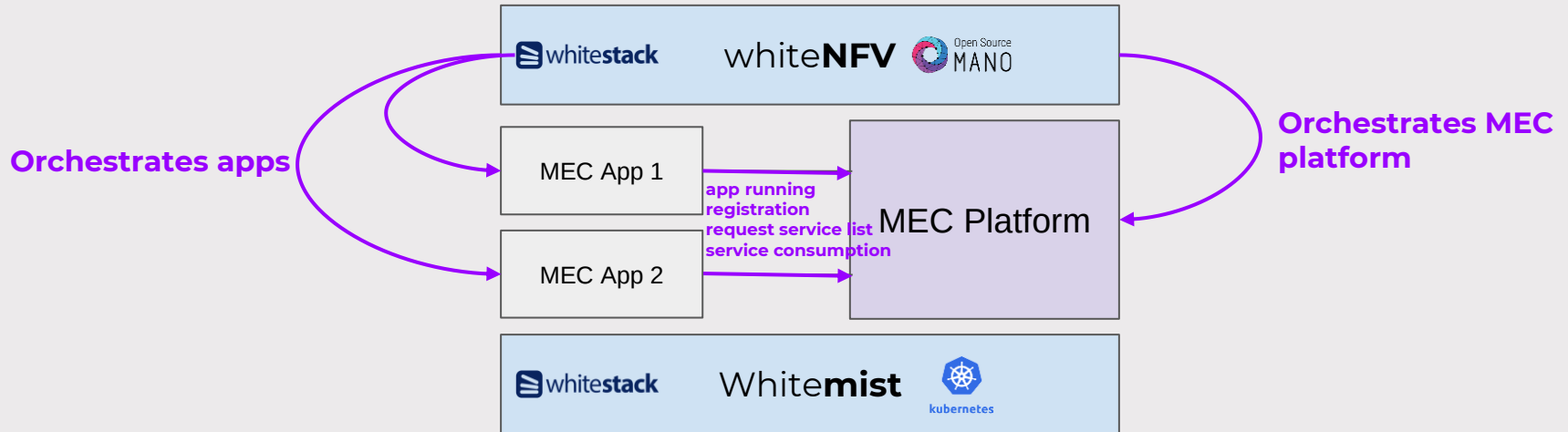
```
{
  "consumedLocalOnly": false,
  "isLocal": true,
  "scopeOfLocality": "MEC_SYSTEM",
  "serCategory": {
    "href": "/example/catalogue1",
    "id": "id12345",
    "name": "RNI",
    "version": "version1"
  },
  "serInstanceId": "44bfcf9e-e261-4c73-999e-94bebcfd7943",
  "serName": "Mec-Test-Service",
  "serializer": "JSON",
  "state": "ACTIVE",
  "transportInfo": {
    "description": "Dummy Service",
    "endpoint": {
      "uris": [
        "http://unibo-mec-api-tester01.281c554b407943919c4d0249dcf20e60/get-data"
      ]
    }
  },
  "id": "TransId",
  "implSpecificInfo": {},
  "name": "REST",
  "protocol": "HTTP",
  "security": {
    "oAuth2Info": {
      "grantTypes": [
        "OAUTH2_CLIENT_CREDENTIALS"
      ],
      "tokenEndpoint": "/mecSerMgmtApi/security/TokenEndPoint"
    }
  },
  "type": "REST_HTTP",
  "version": "2.0"
},
"version": "ServiceVersion1"
},
```

```
{
  "consumedLocalOnly": false,
  "isLocal": true,
  "scopeOfLocality": "MEC_SYSTEM",
  "serCategory": {
    "href": "/example/catalogue1",
    "id": "id12345",
    "name": "RNI",
    "version": "version1"
  },
  "serInstanceId": "d4cd6835-52c6-4a16-aa4a-6507603c73f2",
  "serName": "Mec-Test-Service",
  "serializer": "JSON",
  "state": "ACTIVE",
  "transportInfo": {
    "description": "Dummy Service",
    "endpoint": {
      "uris": [
        "http://unibo-mec-api-tester02.281c554b407943919c4d0249dcf20e60/get-data"
      ]
    }
  },
  "id": "TransId",
  "implSpecificInfo": {},
  "name": "REST",
  "protocol": "HTTP",
  "security": {
    "oAuth2Info": {
      "grantTypes": [
        "OAUTH2_CLIENT_CREDENTIALS"
      ],
      "tokenEndpoint": "/mecSerMgmtApi/security/TokenEndPoint"
    }
  },
  "type": "REST_HTTP",
  "version": "2.0"
},
"version": "ServiceVersion1"
},
```

MEC demo result

Using OSM (WhiteNFV) we are able to deploy MEC platform and 2 apps on top of kubernetes cluster (Whitemist), then app declares that is running and registers to MEC Platform, finally the apps retrieve the service list from MEC platform.

Every interaction is ETSI standard compliant.



Thanks!



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