Intent-Based Networking systems and MEC

IRTF NMRG Interim Meeting

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ETSI 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.
ETSI Multi-access Edge Computing
System Design

Device Application / IBN System

User Space : Translation / IBS : Network Ops Space
  : Space
Fulfill recognize/ generate
  | translate/ | learn/ plan/ render
  | configue/ provision
  | refine
  | refine
Assure validate
  | monitor/ observe
  | validate
  | monitor/ observe
  | refine
  | refine
  | refine
  | refine
IBN Proxy
User
Zone 1
Zone 2
System Design

An IBN agent is deployed in the MEC host to consume the services exposed by the MEC Platform over the mp1 interface (e.g., Radio Network Information Service, Location Service). This data could be used to assist the IBN Monitor Block. For example it could track down the position of the intent-requesting user and alert the IBN system whenever the required MEC application should be moved (e.g., from Zone 1 to Zone 2).

Furthermore it could execute all the health-checking functions on the MEC application (GET `services/{appInstanceId}` -> extract contact point -> Health check).
IBN and MEC integration

IBN component communicates with the MEC system level through the Mx2 interface toward the “User app LCM proxy”, using MEC 016 standardized API. Specifically:

GET /app_list  -> To monitor existing applications (Monitor/Observe IBN block)

POST /obtain_app_loc_availability  -> To request an available location (MEC host) to deploy the desired MEC application (Configure/Provision IBN block)

POST /app_contexts  -> To launch a new MEC application (Configure/Provision IBN block). It replies with the address(es) (reference URIs) provided for clients that are external to the MEC system to interact with the user application (Monitor/Observe IBN block for app Health-Check)

PUT /app_contexts  -> To update the location constraints of an existing MEC application (Monitor/Observe -> Configure/Provision IBN blocks)

DELETE /app_contexts  -> To stop an existing MEC application (Configure/Provision IBN block)
MEC 013 - Location API - Get Users location

GET /queries/users :
...
"user": [ {
  "accessPointId": "4g-macro-cell-2",
  "address": "10.100.0.1",
  "locationInfo": {
    "latitude": [ 43.72946 ],
    "longitude": [ 7.413239 ],
    "shape": 2,
    "timestamp": { ... } },
  "resourceURL": "/location/v2/queries/users?address=10.100.0.1",
  "zoneld": "zone01" } ] ...
MEC 013 - Location API - Tracking Users movement

POST /subscriptions/userTracking
{
  "userTrackingSubscription": {
    "clientCorrelator": "0123",
    "callbackReference": {
      "notifyURL": "http://my.callback.com/location-user-tracking/some-id"
    },
    "address": "10.100.0.1",
    "userEventCriteria": [
      "Entering"
    ]
  }
}
When the user enters a new zone, the MEP notifies the subscribed user

```json
{  "zonalPresenceNotification": {  
    "address": "10.100.0.1",  
    "callbackData": "0123",  
    "currentAccessPointId": "4g-macro-cell-4",  
    "timestamp": {  
      "nanoSeconds": 0,  
      "seconds": 1613171308  
    },  
    "userEventType": "Entering",  
    "zoneId": "zone02"  
  } }
```

Example taken from ETSI MEC Sandbox
Contact points

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