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| **Title\*:** | PoC Proposal for MEC infotainment for smart roads and city hot spots | | |
|  |  | | |
| from **Source**\*: | TIM, INTEL, ISMB | | |
| Contact: | Antonio Manzalini (TIM), Anurag Ranjan (INTEL), Daniele Brevi (ISMB) | | |
|  |  | | |
| input for **Committee**\***:** | MEC DECODE | | |
|  |  | | |
| Contribution **For\*:** | Decision | **X** |  |
|  | Discussion |  |  |
|  | Information |  |  |
|  |  | | |
| Submission date**\***: | 2018-12-05 | | |
|  |  | | |
| Meeting & Allocation: | - | | |
| Relevant WI(s), or deliverable(s): |  | | |
|  | | | |

**Decision/action requested:** Please approve

**ABSTRACT:***Proposal for a new MEC Proof of Concept (PoC). R1 converts the proposal from an MDT into a Proof of Concept proposal.*

This document contains a PoC proposal on “**MEC Infotainment for smart roads and city hot-spots**”

MEC Deployment Trial (PoC) Proposal

# 1 PoC Project Details

## 1.1 PoC Project

PoC Number (assigned by ETSI): **MEC(18)000536r1**

PoC Project Name: **MEC infotainment for smart roads and city hot spots**

PoC Project Host: TIM and City of Turin

Short Description: The use case aims at demonstrating innovative 4G/5G infotainment services for both pedestrians and car drivers/passengers in smart roads and city hot spots:

* 4G/5G infotainment services are seamlessly provided both to car drivers/passengers and to pedestrians in smart roads and city hot spots (e.g., commercial areas, Stadium, Stations, during events/concerts etc)

## 1.2 PoC Team Members

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Organisation name | ISG MEC participant  (yes/no) | Contact (Email) | PoC Point of Contact  (\*) | Role (\*\*) | PoC Components |
| 1 | TIM | Yes | Antonio Manzalini  ([antonio.manzalini@telecomitalia.it](mailto:antonio.manzalini@telecomitalia.it)) | X | operator |  |
| 2 | INTEL | Yes | Anurag Ranjan ([anurag.ranjan@intel.com](mailto:anurag.ranjan@intel.com))  Prakash Kartha ([prakash.kartha@intel.com](mailto:prakash.kartha@intel.com)) |  | infrastructure provider | MEC platform |
| 3 | VIVIDA | No | Vincenzo Capuano ([vcapuano@vividaweb.com](mailto:vcapuano@vividaweb.com)) |  | application provider |  |
| 4 | ISMB | Yes | Daniele Brevi ([brevi@ismb.it](mailto:brevi@ismb.it))  Edoardo Bonetto ([bonetto@ismb.it](mailto:bonetto@ismb.it))  Riccardo Scopigno ([scopigno@ismb.it](mailto:scopigno@ismb.it)) |  | application provider |  |
| 5 | City of Turin | No | Dario Malerba ([dario.malerba@collaboratori.comune.torino.it](mailto:dario.malerba@collaboratori.comune.torino.it)) |  | infrastructure provider | Road infrastructure |
| (\*) Identify the PoC Point of Contact with an X.  (\*\*) The Role will be network operator/service provider, infrastructure provider, application provider or other. | | | | | | |

All the PoC Team members listed above declare that the information in this proposal is conformant to their plans at this date and commit to inform ETSI timely in case of changes in the PoC Team, scope or timeline.

## 1.3 PoC Project Scope

### 1.3.1 PoC Topics

PoC Topics identified in this clause need to be taken for the PoC Topic List identified by ISG MEC and publicly available in the MEC WIKI. PoC Teams addressing these topics commit to submit the expected contributions in a timely manner.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PoC Topic Code | PoC Topic Description | Related WG/WI | Expected Contribution | Target Date |
| PT01 | Demonstration of MEC Service Scenarios |  | Report on infotainment scenarios and demo | 1Q2019 |
| PT02 | MEC Architecture | MEC-013 Location API | Demonstration with use case enhanced by the usage of location information | 2Q2019 |
| PT04 | MEC enabled vertical segments applications |  | Report on infotainment scenarios and demo | 4Q2019 |

### 1.3.2 Other topics in scope

List here any additional topic for which the PoC plans to provide input/feedback to the ISG MEC.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PoC Topic Code | PoC Topic Description | Related WG/WI | Expected Contribution | Target Date |
| A |  |  |  |  |
| B |  |  |  |  |
| <…> |  |  |  |  |
|  |  |  |  |  |

## 1.4 PoC Project Milestones

|  |  |  |  |
| --- | --- | --- | --- |
| PoC Milestone | Milestone description | Target Date | Additional Info |
| P.S | PoC Project Start | Nov 2018 |  |
|  |  |  |  |
| P.C1 | First implementation and demo | 1Q2019 | Implementation of a first PoC with OverBrowser proxies virtualised (as VNFs) and running on MEC servers |
|  |  |  |  |
| P.C2 | Further Lab implementation | 2Q2019 | implementation and testing of the previous milestone (P.C1) in Lab environment, with MEC servers connected to the TIM cellular infrastructure |
|  |  |  |  |
| *P.D1* | *Project dissemination n.1* | 3Q2019 | Opportunity to disseminate the PoC activity results in GSMA IG MEC API and GSMA Future Networks Programme |
|  |  |  |  |
| *P.D2* | *Project dissemination n.2* | 4Q2019 | Opportunity to disseminate the PoC activity results at the Edge Computing Congress 2019 |
|  |  |  |  |
| P.C2 | Further Field implementation | 4Q2019 | implementation and testing of the previous milestone (P.C2) in Field environment (in a selected urban area in Turin), with MEC servers connected to the TIM cellular infrastructure |
|  |  |  |  |
| P.R | PoC Report | 4Q2019 |  |
| P.E | PoC Project End | End of 2019 |  |

NOTE: Milestones need to be entered in chronological order.

## 1.5 Additional Details

For example, URL, planned publications, conferences, etc.

Possible other publications/conferences to be defined.

# 2 Organization of the PoC

## 2.1 The overall framework: Turin City Lab

The proposed PoC activity is essentially a **MEC trial** inserted in the **Torino Smart Road** project, which is part of a wider set of experimental activities promoted by the City of Turin, called Turin City Lab.

**Turin City Lab** is the new innovation policy promoted by the City of Torino to support companies in co-development and testing of frontier innovations on the territory of Torino. Thanks to the vast partnership of public and private actors - Major Industrial Partners, Utilities, Research, Entrepreneurial Representative Associations, the aims of Torino City Lab is to be recognized as a platform for testing urban innovations and as an entry point for its dissemination in Europe. Torino offers the entire city for the testing of innovation, providing a system of physical, technological, relational and know-how infrastructures to experiment and then scale the proposed innovations.

## 2.1 The Torino Smart Road project

The territory of Turin is rich in companies, university departments and research institutions active in the fields of automotive, components, telecommunications, sensors, advanced electronics and artificial intelligence. The City of Turin intends to promote dialogue between these stakeholders, in order to preserve and strengthen the ecosystem conducive to the development of innovation in the field of mobility and transport, also with the aim of enhancing existing know-how and attracting new companies.



**Figure 1 - Partners of Torino Smart Road.**

The City of Turin, with a Deliberation of City Council, has committed itself to making available some roads of its territory to allow the experimentation of autonomous and connected vehicles. The signatories of **Torino Smart Road** MoU (listed in the above figure), as vehicle manufacturers, manufacturers or developers of automotive components, manufacturers of sensors and automation equipment, telecommunications companies, universities and research institutes, share a common interest in carrying out research, testing and prototyping activities in Turin in the field of autonomous and connected vehicles.

The City of Turin intends to create the conditions for these activities, by providing roads and telematics infrastructures that are present, or that will be activated for this purpose.



**Figure 2 - The urban circuit of Torino Smart Road.**

In the following sections, some details related to the PoC technical activities on MEC are described.

# 3 PoC Technical activities

## 3.1 Overview

This PoC activity is a MEC trial in the city of Turin, with the intention to demonstrate a relevant automotive use case for automotive, i.e. innovative 4G/5G infotainment services for both pedestrians and car drivers/passengers in smart roads and city hot spots.

In this use case, 4G/5G infotainment services are seamlessly provided both to car drivers/passengers and to pedestrians in smart roads and city hot spots (e.g., commercial areas, Stadium, Stations, during events/concerts etc). More in detail, Overbrowser services (by Vividaweb) provide a clientless interactive communication/ infotainment platform which can be executed over the MEC servers distributed in smart roads and city hot spots.



**Figure 1 - view of the Overbrowser service (by Vividaweb)**

More in detail:

OverBrowser proxies are virtualised (as VNFs) and can run on MEC servers which are distributed in the smart roads;

* OverBrowser services basically inject the OverBrowser code inside HTML pages during the User browsing (http, https);
* An icon appear on the browser and a panel pops up on click or push to in order to access infotainment services;
* Cars’ and/or Users’ terminals GPS sensors communicate with the MEC servers to estimate position and speed of the Users, so to distinguish if they are pedestrians or car drivers/passengers.

Moreover, SafeBrowsing services - working with OverBrowser - will protect Users from virus, malware and unsafe web sites by providing alerts, warning and re-directing Users to safe areas.



**Figure 2 - high level overview of the "smart road infotainment" use case**

Intel is providing the MEC servers with NEV SDK platforms. The usage of OverBrowser on MEC servers can leverage the platform capabilities and APIs. The OverBrowser will be onboarded as a VNF on the NEV SDK. By setting up routing rules in the NEV SDK, traffic from devices will be diverted to the OverBrowser VNF.

## 3.2 Architecture

Include a schema outlining how the different PoC components fit in the PoC architecture.

### 3.2.1 Overview

Overbrowser implementation is divided in Web and Network services. Web services is the service group that provides the Network Services API and Configuration, the Back-End user interface and Front-End HTTP services. The Network Services is the OverBrowser service group responsible of the OverApp injection during the user Internet browsing.

### 3.2.2 Web services

Web services are built to be hosted as a native cloud application but needs a centralized Database in order to keep the consistency of the UX configuration and the analytics. The single services such:

• Database

• API

• HTTP Public Services (Front End)

• HTTP Back End

Every service can be installed in different server groups for vertical/horizontal scalability, on the infrastructural and security needs of the Company.

### 3.2.3 Network services

Network Services provides the software stack for the OverApp Injection in the HTTP User traffic. Depending on the Host Network capabilities, Network Services can be integrated in a L2 (switched) network, L3 (Routed) network or with the Proxy or ICAP configuration of the installed network equipment.

The common approach in ISP networks is the L3 integration in a routing loopback with the Core or Edge router, such the diagram:



### 3.2.1 Advantages provided by MEC Platform

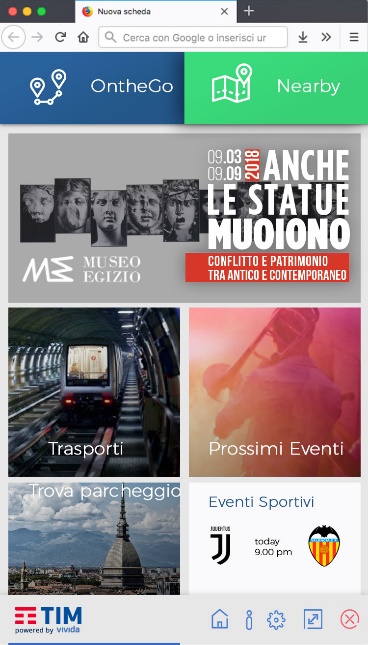
The OverBrowser distribution on the Edge instead of the Core of an ISP network allow a more granular resource management of the Overbrowser Network Services NVF and reduces the service activation effort. Installing the OverBrowser in the Backbone of the network require the configuration of equipment that handles most of the customer ISP traffic, and the activation of the Network Function impacts all the APN traffic at once. The installation with the MEC platform in the edge allows the activation in smaller network chunks with less resources per node, and a gradual activation for the entire network coverage of the service.

## 3.3 Additional information

The expected use case will provide two different scenarios to the test users: a “stand-by” and a “driving scenario”. This can be done using the same OverApp (one OverBrowser Icon, one OverBrowser Panel) with 2 tabs which are activated by the users and/or by the car movement.

Below some pictures with a graphic representation of the possible OverApp.

* Stand-by scenario



* Driving Scenario

