



## CHARISMA NEWS



#1 – February 2016

### Editorial

Dear Reader,

This is the first issue of CHARISMA News, the newsletter of the Horizon 2020 5G-PPP Project CHARISMA: **Converged Heterogeneous Advanced 5G Cloud-RAN Architecture for Intelligent and Secure Media Access**.

This first edition provides you with relevant information on the initial activities and results of the CHARISMA project in the 5G networking area. We provide a detailed focus on the CHARISMA use case (UC) scenarios, as well as on our various dissemination activities.

I hope you will find the contents of this newsletter interesting, and your comments and suggestions are always appreciated.

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### Project results & activities

#### CHARISMA 5G Use Cases

The CHARISMA UCs have been selected to highlight the main drivers of the project including: support of low latency, multi-tenancy (open access), and enhanced security of operation. The purpose of these UCs is twofold:

- To highlight how the key innovations of the CHARISMA architecture will benefit the various stakeholders involved (e.g., end-users, network/service providers);
- To help define the widest range of performance and functional requirements that the CHARISMA architecture needs to meet.

The objective, a brief description and general requirements are provided below for two of the indicative 5G use cases.

#### Automotive - Buses

The objective of this use case is to ensure that 5G networks can provide optimized and secured Internet access in the public transport scenario such as the bus UC. The open access solutions deployed by CHARISMA will ensure end user's service continuity and low service latency in a secured solution in the mobile context of the bus UC scenario.

Public transport services like buses or metro generally operate along a regular route and a published transport timetable. This allows for the provision of network services such as caching and routing to provide optimized Internet access in the public transport by reducing resources and service latency.

As shown in Figure 1, distributing intelligence like caching, switching and routing closer to end-users

(even on user devices) assists in reducing network latency.



Figure 1: Bus/Tram use case scenario

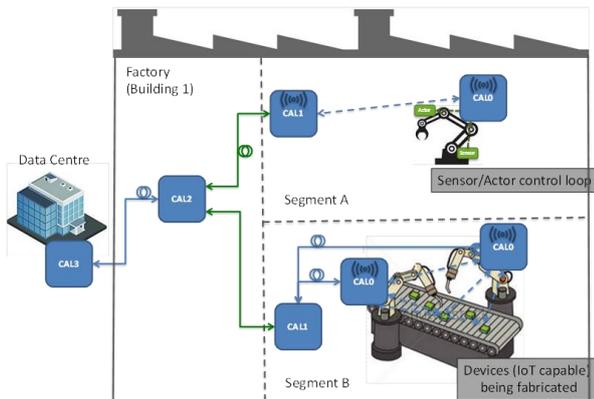
The virtualization and security management provided by SDN and NFV control of the CHARISMA 5G network will significantly improve network usage efficiency of the public transport network and reduce service latency for bus passengers. We assume that a number of users are commuting by metro or bus, for instance, and are periodically connected to access points (APs) or BSs, which are sometimes disconnected. Through deploying the CHARISMA open access solution across the bus, AP/BS and C-RAN infrastructure, even through providing D2D communications between users by the infrastructure provider, the service provider is able to ensure users' service continuity and improve the quality of service and experience (QoS/QoE). Key aspects include:

- Network controlled offloading between WiFi and mobile networks depending on network status and user profiles;
- D2D communication helping reduce consumed resources for a crowded area in the event of a traffic jam;
- Enabling cache functionalities, such that content is intelligently cached or pre-fetched according to a social-networking aware delivery mechanism or real-time use of the content;

- Cloud-based flexible and dynamic deployment of media services, to ensure continuous use of content even when disconnected and meeting real-time constraints;
- Consideration of secured content distribution, such as content confidentiality and access privilege violation, etc.

### Factory of the Future (IoT)

The objective of this UC is to evaluate and ensure that 5G networks can support the industrial Internet (Industry 4.0) by providing secure and low latency connectivity. The Industry 4.0 scenario involves customers, who design their intended products on their home computer devices using graphical design tools, such as configuring a brand new car. The product is paid for via the Internet, the customized product plans are transferred to the Factory of the Future, which is entirely defined by software, where the purchased product is then produced automatically according to a customer's demands. The 5G network needs to support off-loading of a control loop calculation as well as industrial production, while still keeping the security and latency requirements. For 5G, this scenario has the implication that the whole production scenario is changing and becoming more flexible and reconfigurable. Communications links inside the future factory will be wireless; but they need to have the same robustness, availability, security and low latency as wired links currently have.



**Figure 2: Factory of the future use case**

The principle idea of implementation is to install several wireless access points covering the area, similar to a small-cell mobile network deployment, as shown in Figure 2. These small cells are centrally controlled inside the factory (and not externally, at the EPC, as in current mobile networks) so that coordinated handover and interference management can be done with high efficiency and with very low latency.

## Dissemination Activities

Although CHARISMA is in its first year, it has already achieved several dissemination activities. Moreover, two papers have been submitted to EuCNC and the 3rd International Workshop on 5G Architecture (5GArch 2016) co-located with IEEE ICC 2016 (May 23-27 2016, Kuala Lumpur, Malaysia) respectively. In addition, CHARISMA partners are participating in the 5G-PPP Working Groups where they are actively contributing and communicating CHARISMA's concepts into the research community.

## CHARISMA Networking Session

On 20<sup>th</sup> October 2015, CHARISMA organized a networking session entitled "Towards a 5G Connected World: A Security Insight" during the ICT event of the European Commission. The aim of the session was to provide an open forum for discussion about how security should be considered within upcoming 5G systems, networks and components.

The session paved the way towards opening security considerations in the initial core 5G design such as multi-operator isolation, privacy preservation between virtual tenants, trust requirements and management in heterogeneous environments and low-latency security constraints at the physical level in 5G systems.



High quality presentations were given. A great number of participants attended the session, posing relevant and interesting questions to the speakers.

## COMBO workshop

On 10<sup>th</sup> November 2015, CHARISMA participated in the COMBO workshop co-located with the 12th Conference of Telecommunication, Media and Internet Techno-Economics (CTTE). The workshop

accommodated discussions on several aspects of new integrated approaches for Fixed / Mobile Converged (FMC) broadband access / aggregation networks. Representatives from several 5G related projects provided an insight into their projects' first steps. The workshop was organized by the FP7 COMBO project.



under the grant agreement No: 671704. The project is set to run for thirty months from July 2015 to December 2017.

It is aiming to develop a new 5G Open Access network architecture where the same physical network is shared by multiple fixed and mobile services. On top of multiple physical layers, intelligent hierarchical routing is enabled and a new end-to-end virtualized security service will also be demonstrated. The project aims to fulfill many of the important 5G-PPP key performance indicators (KPIs) such as 1,000x higher speed, 100x more devices and 5x reduced latency for the wireless Internet of things (IoT).

[CHARISMA website](#)

## Upcoming Events

### EuCNC 2016

The conference will take place from 27<sup>th</sup> to 30<sup>th</sup> June 2016 in Athens, Greece. The aim of EuCNC is to showcase the status of research in advanced 5G networking and associated topics.

The CHARISMA project is aiming to have an exhibition booth presenting demos. Two papers have also been submitted for presentation during the conference.

[EuCNC website](#)

### About CHARISMA

The CHARISMA project is funded by the European Commission (Horizon 2020 program) within the 5G Public-Private Partnership (5G PPP) initiative