CHARISMA NEWS

#5 – February 2017

Editorial

Dear Reader,

This is the fifth issue of CHARISMA News, the newsletter of the Horizon 2020 5G-PPP Project CHARISMA: **C**onverged **H**eterogeneous **A**dvanced 5G Cloud-**R**AN Architecture for **I**ntelligent and **S**ecure **M**edia **A**ccess.

This edition focuses on the latest CHARISMA results and the dissemination activities that have taken place in the past few months.

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

Dr. Theodoros Rokkas (INCITES CONSULTING, trokkas at incites.eu), Editor

Project results & activities

Refined architecture

Deliverable D1.2 "Refined architecture definitions and specifications" is now available at the CHARISMA website. It provides an update of the CHARISMA architecture in its multi-layered control-, data-, and service-plane form. The CHARISMA architecture has been designed to achieve many of the 5G KPIs as defined by the 5G-PPP programme, as well as other key technology drivers.

The goal of the CHARISMA architecture is to provide a 5G capability offering low latency, open access, and virtualised security (v-security). It has been designed to be hierarchical and distributed in nature, by providing four converged aggregation levels (CALs). The mapping of the anticipated 5G network functions to the CAL architecture has been described in this deliverable.

The expected service and workflow lifecycle that CHARISMA will have to support is also updated in this deliverable D1.2; particularly with regard to provisioning of network slices, caching and security services, which together are also enablers to support the CHARISMA features of low latency, open access, and v-security.

The deliverable focuses on two use cases, namely the transportation vertical sector, and the support of VNOs in a multi-tenancy video streaming environment. The former is a typical example of a use case in a fixed access network, while the latter gives insight into a mobile scenario. Both use cases integrate the research objectives of CHARISMA together with the features of a future converged access network as required by 5G. The selected use case scenarios will be used to verify the project results through specific and updated KPIs resulting from them. These KPIs will also be
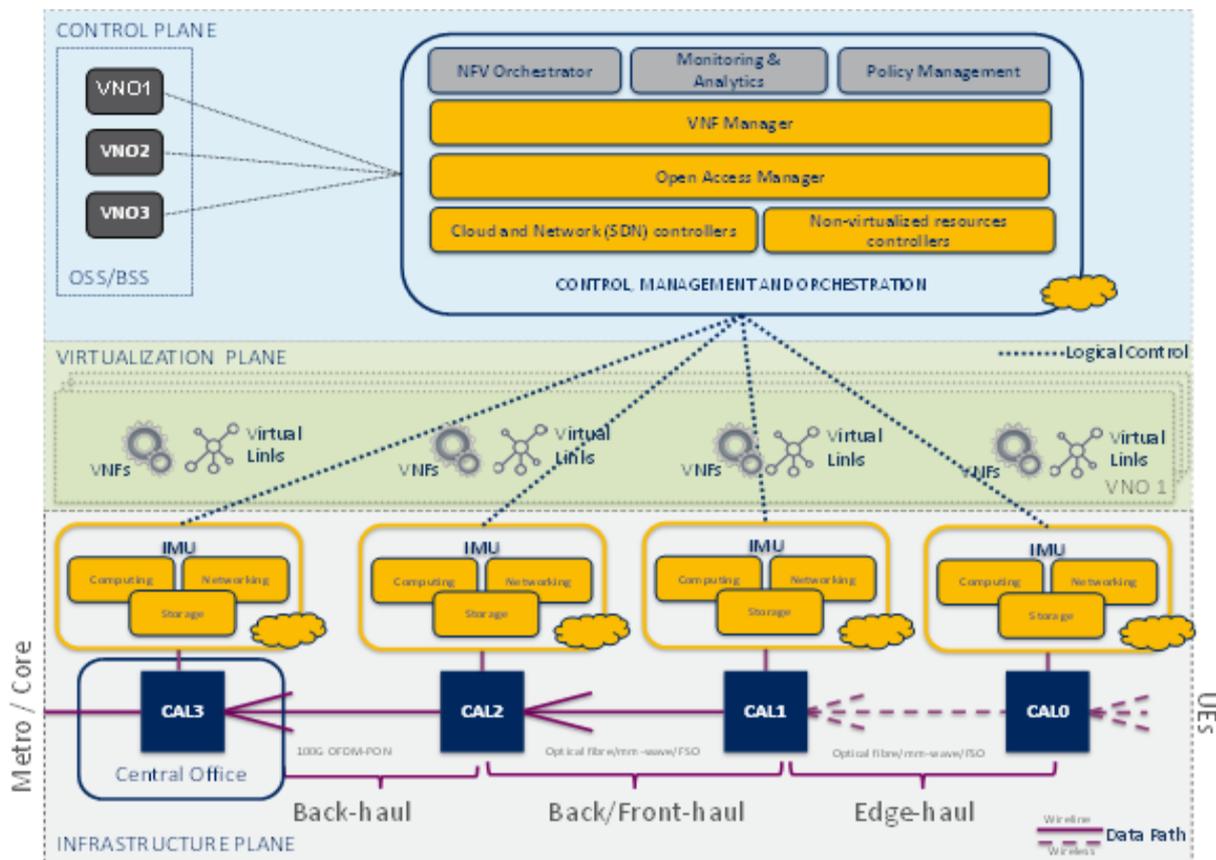
Figure 1: : CHARISMA refined architecture

verified through the project demos, final demonstration and field trials planned for the final year of CHARISMA.

CHARISMA PHY design and interfacing

Deliverable D2.2 provides an update on the physical layer design and interfacing towards the overall implementation of the CHARISMA architecture, and is now available at our website. The deliverable provides updates on the technical performances and requirements of the following devices, with regard to their interfacing for network resource management:

TrustNode 6Tree router: The configuration of the low-latency IPv6 router is changed using the hardware interface, and is also part of the TrustNode security concept. Integrity and authentication is achieved via a unique configuration parameter determined by a device's logical position in the network. The path of a packet through the network is predefined by the value of the IPv6 address bits inside the protection area of MACSec. By applying a plausibility check for the source address on incoming packets, network devices are therefore not vulnerable to address spoofing attacks.

MoBcache: This is managed and configured based on the Network Configuration Protocol (NETCONF); the NETCONF protocol operations being realized as remote procedure calls (RPCs). In the management system, a Netconf client is used to communicate with a Netopeer server running on the cache node.

100G OFDM-PON: The OLT of the 100G OFDM-PON is implemented on a Virtex7-based FPGA platform, with the interface to the CMO being handled via a Python script, which listens on a predefined port (15015) for a specific UDP packet. A new FFT IP core has been developed in order to choose the FFT size depending on the different requirements of OLT and ONU. Because of the high throughput of OLT and ONU only a parallel FFT architecture has been considered.

Millimetre-wave wireless backhaul system: This interfaces with an access base station (e.g. eNodeB) and transmits traffic through a processing chain consisting of a Network Processor performing upper MAC layer, a baseband processor executing the PHY layer processing, DAC/ADC, RF transceiver, and an antenna.

60-GHz omnidirectional antenna: A new design based on a horn antenna architecture is described, with the design exhibiting a gain of 13dBi over 360 degrees, with a predicted S_{11} return loss better than - 15dB across the required range, and with an associated VSWR being lower than 1.4.

Ericsson Hyperscale Datacentre System 8000 configures and manages the compute resources, storage capacity, and network connectivity, as well as the power systems, firmware, and related functions.

Virtualised CPE: CHARISMA uses the TeNOR NFVO for its MANO chores, the modelling of a vCPE being done within the TeNOR NF framework. The use of metadata for VNF description permits the service chaining and the service insertion, and building e2e services by composition.

In order to provide end-to-end security the user data is encrypted, with messenger applications (e.g. Signal and Threema) providing end-to-end security for messages and voice data. Methods and protocols used in these applications can be adapted and implemented into the 5G protocol stack in order to provide native e2e security. Three levels of e2e security are indicated: at the application level (e.g. Signal), on user devices (5G protocol stack), and at the digital units (DUs).

Dissemination Activities

Social Media
The YouTube channel of the project was enriched with two new videos describing the open access demo and the low latency demo with the help of a robot.

5G Cross-Project workshop
CHARISMA was present at the 5G Cross-Project workshop that took place on 6-7 February 2017 in Athens, Greece.

Konstantinos Filis (Cosmote) made a presentation in the Use-cases/model/performance session of the 5G-PPP workshop in Athens, where he outlined the use cases of CHARISMA and presented the major key performance indicators

(KPIs) that will be used to evaluate the performance of the CHARISMA solution during the field trials.

Konstantinos Katsaros (Intracom Telecom) presented the CHARISMA approach on multi-tenancy during the "Network slicing and Control Plane Architecture and SDN for 5G" session. The CHARISMA focus on inter-slice communication for the support of cache peering relationships was introduced, triggering interesting discussions on the emerging business opportunities for inter-VNO communications.

Eleni Trouva (NCSR Demokritos) gave an overview of the security aspects of the CHARISMA project. The Security Policy Manager, the Monitoring & Analytics, the Open Access Manager and the Virtual Security Functions were described, and the security demo was also explained. Finally, an overview of the project's current collaborations in the area of security was given.

Second International Workshop on Security in NFV-SDN

CHARISMA is co-organising with ENSURE and SHIELD the Second International Workshop on Security in NFV-SDN (SNS2017) in conjunction with the 3rd IEEE Conference on Network Softwarization (NetSoft 2017) to be held from 3-7 July 2017 in Bologna, Italy.
The workshop is addressing the security challenges associated with SDN and NFV, while more details can be found at: http://sns2017.eu/.

Paper submission is until 10 March 2017.

Workshop on Mobile Edge Communications (MECOMM)
The CHARISMA project is co-organizing the first workshop on Mobile Edge Communications, to be held in conjunction with the ACM SIGCOMM Conference on the UCLA campus in Los Angeles, CA, USA on 21-25 August 2017.

The workshop focuses on mobile edge communications, and in particular the challenges and opportunities arising by the introduction of virtualization at the edge of the network, in accordance to the emerging Network Functions Virtualization and Mobile Edge Computing paradigms. The workshop is organized in collaboration with the H2020 POINT Project. For more info use the link
Paper submission is until 23 March 2017.

Whitepaper: 5G Innovations for new business opportunities
A white paper highlighting the progress achieved in the 5G-PPP phase 1 projects (which includes CHARISMA) was presented at the recent MWC 2017 in Barcelona. Dr. Theodoros Rokkas was the editor of the chapter on "Business and stakeholders roles: transformations with 5G", with CHARISMA also contributing to topics related to low latency and security. The white paper can be downloaded from here.

About CHARISMA
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