Virtual Network Functions Orchestration in Heterogeneous 5G Networks

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Abstract:

The objective of this demonstration is to showcase synergies among the H2020-COHERENT [1] and H2020-SESAME [2] projects both running under the 5GPPP umbrella. This is based on a use case execution and presentation that will bridge the gap between the telecom providers and the cloud worlds by creating an integrated network service based on the services and technologies originating from both projects. In more detail, in the proposed demonstration, we plan to show:

1) That a fully 3GPP approach is able to bring the required flexibility in splitting, chaining, and placement of RAN functions while meeting the real-time deadlines imposed by mobile networks.
2) How to achieve programmability through an agent in the LTE eNodeB, that acts as a local controller for one or many network functions and executes various actions in cooperation with the centralized controller as well as other agents.
3) Slice-based orchestration based on a service-level modelling approach to NFV.

Network services will be managed by using the OpenStack Heat component with the support of the Canonical's Juju platform [4]. All the aforementioned frameworks will be jointly orchestrated by the ETSI MANO compliant Hurtle service delivery framework [5]. In more detail, we will demonstrate the ability to deploy and orchestrate a fully Programmable LTE-based RAN as shown in the figure below.
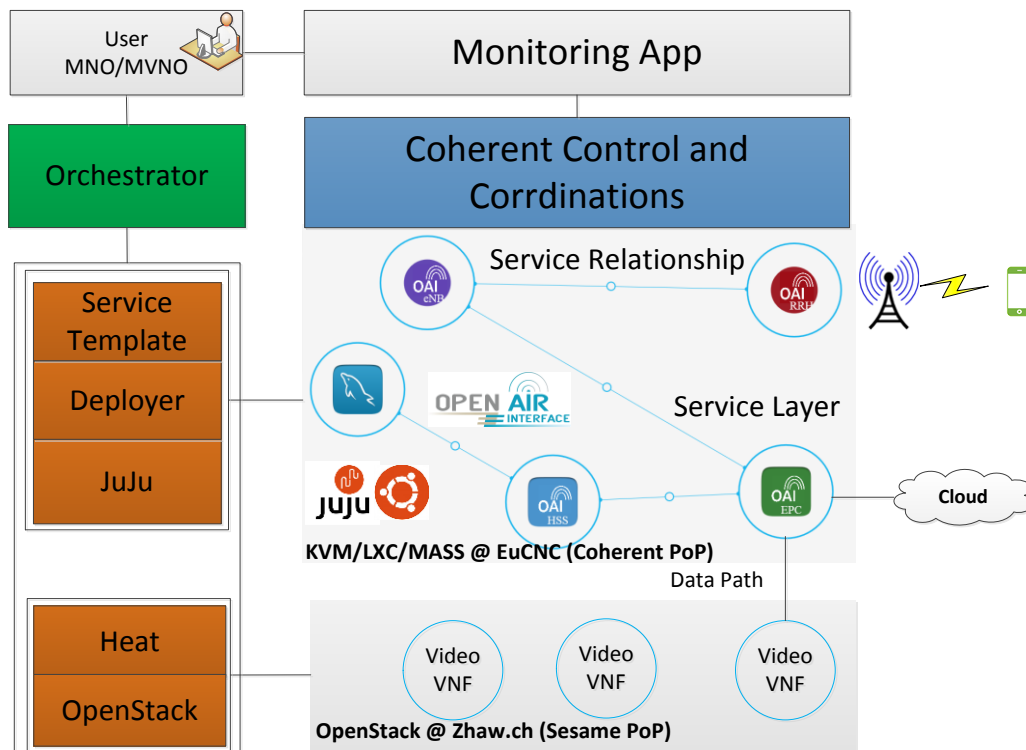
Figure 1: Demo setup and scenario

The demonstration will consist of 2 PoPs (point of presence). One deployed at the SESAME booth and another deployed at the COHERENT both. A remote cloud deployed located at ZHAW premises will also be used. During the demo we plan to the delivery of the following individual services:

- Cloud -RAN deployment of a RAN and EPC services based on the OpenAirInterface project [3] over the OpenStack + JuJu framework. The service on-boarding will be performed using the Hurtle orchestrator.
- SDN-based Service Function Chaining between the cloud-deployed VNFs, namely Virtual Traffic Classifier (vTC) and Virtual Media Transcoder (vMT). This leverage the LTE technologies in order to deliver connectivity to the end-users.

Access to the video VNF based service is provided by 5GPPP's COHERENT project. For the demo 1-2 RRHs will be provided, potentially one at the SESAME booth and the other at the COHERENT booth. These RRHs will operate in MIMO-mode and will provide access to the same eNodeB. This will allow access to the vTC and vMT based services.

References

[1]Coherent project, http://www.ict-coherent.eu/
[2]Sesame project, http://www.sesame-h2020-5g-ppp.eu/
[3]OpenAirInterface Software Alliance, http://www.openairinterface.org/ .
[4] Juju framework and OAI charms, https://jujucharms.com/q/oai
[5] Hurtle orchestration framework, http://hurtle.it