Towards a 5G Operating Platform: a Use Case on Infrastructure-Agnostic Orchestration

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Youtube video: https://www.youtube.com/watch?v=N6SBo2f6Lyc

Abstract

We are witnessing a high level of fragmentation, in international fora, bodies, projects and initiatives developing systems, platforms and solutions for management/control/orchestration of future 5G infrastructures. Moreover, it is not predictable today which of said platform(s) will be widely accepted and deployed, and how they will evolve. This is creating the need for a **5G Operating Platform**, defined as an "over-arching and agnostic platform"– with proper i/f and "adaptations" and leveraging on standard universal set of abstractions. **5G Operating Platform** will perform infrastructure-agnostic orchestration, referring this to the possibility to support the continuous onboarding of new *capabilities* (e.g., new types of network infrastructures) and *resources* (e.g., links with more bandwidth), (*i*) without affecting any already active service and (*ii*) by allowing new services to take advantages from the new features. This enable the orchestration architecture to be future-proof, being able to support the continuous evolution of infrastructure-level components when they offer new capabilities, add support for new technological domains, or replace an existing infrastructure controller with another software (e.g., an existing ONOS SDN controller is replaced with OpenDayLight).

This demo will show an overarching orchestration software architecture that is based on a continuous advertisement of capabilities and resources from underlying infrastructure-layer domains, which allows the orchestration to adapt its service logic to exploit the most up-to-date capabilities. The feasibility will be shown to setup a complex NFV service across multiple domains, such as two OpenStack instances connected by an SDN network, where all the service functions (e.g., NAT, firewall, etc.) are launched in the datacenter and the intermediate SDN network is used only to connect all the different components together. However, when the SDN network advertises also the capability to host a given set of network applications (e.g., a NAT), the orchestrator will adapt its service logic and it will instantiate part of the service in the datacenter (e.g., as virtual machines), part in the SDN domain (e.g., as ONOS applications), hence enabling more aggressive optimization strategies in the overarching orchestrator.

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References

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- The Universal Node – An NFV node orchestrator with support to resource-constrained hardware: http://github.com/netgroup-polito/un-orchestrator
- The EU-FP7 UNIFY project http://www.fp7-unify.eu/
- The EIT Digital CC4BA project: http://www.eitdigital.eu/innovation-entrepreneurship/future-networking-solutions/cc4ba/