

"Toward a telco cloud environment for service functions"

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FIGURE 1
 Cloud4NFV architecture detailing the high level components.

FIGURE 2
 Example of a PoP with a virtual environment applying SF chaining.

Deploying network Service Functions (SFs) is an essential action for a network provider. However, the act of creating, modifying and removing network SFs is traditionally very costly in time and effort, requiring the acquisition and placement of specialized hardware devices and its interconnection. Fortunately, the emergence of concepts like Cloud Computing, Software Defined Networking, and ultimately, Network Functions Virtualization (NFV) is expected to raise new possibilities about the management of SFs with a positive impact in terms of agility and cost. From a telecom operator (Telco) viewpoint these concepts can help to reduce both OPEX and open the door to new business opportunities.

Our work is focused in identifying how Telcos can benefit from these paradigms, and explore some of the aspects that still need to be addressed in the NFV domain. We address two major aspects: enabling Telco infrastructures to adopt this new paradigm; and orchestrating and managing SFs towards Telco-ready cloud infrastructures. Our Cloud4NFV architecture makes extensive use of reference platforms such as OpenStack and OpenDaylight, as well as ETSI NFV, and proposes methods allowing Telcos to effectively deploy and manage SFs in a distributed cloud infrastructure. Special attention is given to the way SFs are modeled towards cloud infrastructure resources, in particular when considering the classification and forwarding processes. Therefore, we consider both tag based approaches (e.g., VLANs), where packets are marked at the classification stages and then routed, and tag less based approaches, where traffic is continuously analyzed.

With this insight it became possible to apply Service Function Chaining, one of the fundamental features in the composition of SFs, to the Cloud4NFV platform. Our prototype, validated in a real world proof of Concept, demonstrates how a Telco can benefit from these technologies, and enhance the flexibility of their infrastructure.

