Fig. 1. vCPE Service Design Architecture

Fig. 2. Service Deployment Model

I. vCPE System Overview

Our object is to demonstrate that our vCPE system can help the telco to reduce the Capex and Opex when deploying, maintaining and updating CPE service. This section describes our vCPE system architecture and how we achieve our goal. In the subsection I-A, we will introduce the overview architecture of our virtual CPE Service. Then in subsection I-B, we will explain that through the advantages of service architecture, our vCPE system can deploy our service to the customer easily. In the subsection I-C, we will give details of the whole vCPE system.

A. vCPE Service Design Overview

With the concept of SDN-enabled[1] VNFs in Fig. 1, the network functions have been achived by the synergies between compute and network infrastructures. The former is mainly responsible for dealing with stateful processing, and the latter is used for stateless processing component.

1) Stateful Processing Componemt: This component have to perform more complex algorithm, keep the state associated with the VNF and provide interface for service providers or customers to configure and update the behavior of the stateless datapath processing component, since software is good at these tasks. It's worth noting that we use southbound APIs of SDN controller to handle the interface between the stateful and stateless component with OpenFlow protocol, which was originally designed for this.

2) Stateless Processing Componemt: Stateless processing component, are implemented by SDN datapath resources, which is optimized for data plane traffic processing. Since SDN datapath have decoupled the control plane and data plane, so it can accept the control message from the stateful processing component.

B. Service Deployment Model

In this picture, each green area is a local network domain of customer. At the gateway of this domain, there's a SDN-enabled switch. The customer can subscribe to our vcpe service through our vcpe dashboard. after subscribing, the vCPE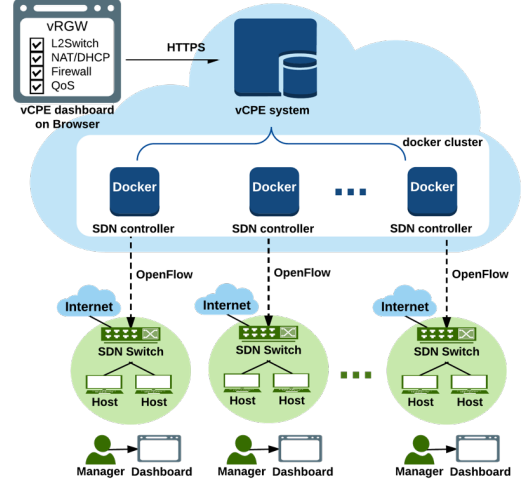 system will create a new docker container, in which running a SDN controller we developed. The customer only need to setup the gateway SDN switch to connect the SDN controller by the OpenFlow protocol, then the switch will handle these service.

C. Architecture of the vCPE system

1) System Overview:
2) System Implementation: Infrastructure Controller Infrastructure Orchestrator VNF Controllers VNF Orchestrator

II. Virtula CPE Services

REFERENCES

[1] J. Matias, J. Garay, N. Toledo, J. Unzilla, and E. Jacob, "Toward an sdn-enabled nfv architecture," *IEEE Communications Magazine*, vol. 53, pp. 187–193, 04 2015.