



VMs, Edge Services & Complex Network Orchestration

The customer, a major telecommunication company, was looking for **network orchestration** experts to lead their ambitious and complex project. That's exactly the kind of task we enjoy the most! Keep on reading to discover how Amartus team managed to not only fulfill but also exceed customer demands.

The Challenge

The goal presented by our customer, one of the leading global telecommunication companies, was to implement orchestration of the following three elements: Edge Connectivity, VNFs instantiation, and resources management. **Edge Connectivity** use case focused on connecting a number of **VNF Virtual Machines** (deployed on OpenStack in customer's data center lab) to corporate **Virtual Private Network**. This task itself consisted of 3 smaller parts:

- OpenStack networking
- SDN-enabled data center infrastructure connectivity (using Cisco Application Centric Infrastructure)
- External connectivity to the corporate network (based on configuration of MPLS BGP VPN of edge routers)

VNFs instantiation part focused on launching complex Virtual Network Services, like Virtual Border Session Controller, that consisted of multiple virtual machines. Our team had to take care of the VMs and all of their required OpenStack resources, like networks, subnets, keypairs, security groups, etc. Additionally, the initial setup of virtual firewall and virtual load balancer was also automated.

Resource management part was devoted to the validation of required OpenStack and Cisco ACI resources for a given scenario against current usage and defined quota to make a 'go/no go decision' for VNF provisioning. Sounds complicated? Yeah, it was! But that's not all – our engineers also automated some of the infrastructure management operations (such as tenant generation).

The final, and the trickiest, part of the challenge was **the integration of the above components** to provide a single overarching solution, tailored strictly to customer needs. Needless to say, our team nailed it!



The Solution

There was a third-party service orchestrator engaged to support the solution. The most challenging part of the implementation was about creating the following **dedicated plug-ins responsible for interactions with infrastructure management components using southbound interfaces**:

- Dedicated plug-in for communication with Cisco Application Centric Infrastructure over REST
- Dedicated plug-in enabling configuration of (BGP MPLS VPNs) Cisco N7K devices using REST API
- Dedicated plug-in for resource management (validation of OpenStack and APIC resources service demand vs. quota and usage)

Additionally, the native OpenStack plug-in has been extended to cover its initially missing features.

A collection of reusable service plug-ins necessary for the instantiation of essential functions has been developed as a next step:

- blueprints for different flavors of Edge Connectivity provisioning (OpenStack, N7K, APIC interrogations)
- blueprint for setting tenant, user, key pair, networks, etc. on OpenStack
- blueprint for setting tenant on APIC
- blueprints for demonstration of resource management capabilities
- blueprints for demonstration of edge connectivity types

Then, we developed a new set of complex blueprints incorporating previously prepared components.

The Network Innovation

The most innovative aspect of the project was surely the **service provisioning automation in a complex networking environment** containing legacy and SDN-based components using modern orchestration tool. We needed to deal with elements managed by different systems to deliver a single service. Additionally, our team of experts delivered the way to **manage SDN-enabled data center networking infrastructure with a dedicated solution** (Cisco ACI). Various options for providing external connectivity to VMs in the data center were examined.



Network Orchestration is usually a complex and challenging exercise, there is no shortcut or way around it. So if you're looking for an experienced partner for your network transformation, look no further! Our team will be happy to help. Let's get in touch!

Here's a visual representation of the project scope:

