
NFV ISG PoC Proposal – Automated Network Orchestration

A.1 NFV ISG PoC Proposal Template

A.1.1 PoC Team Members

PoC Project Name: Automated Infrastructure Orchestration

Network Operators/ Service Providers:
Deutsche Telekom

Contact: Jörg Rass (joerg.rass@telekom.de)

Manufacturer A: Ericsson

Contact: Christoph Meyer
(christoph.meyer@ericsson.com)

Manufacturer B: x-ion GmbH

Contact: Stephan Renatus (srenatus@x-ion.de)

Additional Members:

Deutsche Telekom Innovation
Laboratories

Contact: Jannis Rake-Revelant
(jannis.rake-revelant@telekom.de)

A.1.2 PoC Project Goals

The PoC will verify that all components required for a Telecom application (Messaging is implemented as an example) including the required set of virtual machines, the connectivity required for the application's cluster setup, and the connectivity to external systems can be orchestrated automatically in an SDN-enabled cloud infrastructure.

In the context of the NFV IaaS use the, the PoC mainly addresses the following requirements [ETSI GS NFV 004]:

- Port.2: It implements an interfaces that allows to run legacy telecom applications to run on standardized infrastructure including networking aspects
- OaM.1 and OaM.2: Creation and scaling of needed resources is completely automated using mainly open source components
- OaM.3: The orchestration is limited to the IaaS layer. No changes to the application's management interface are included
- OaM.5: The PoC demonstrates the use of DMTF standards to model the application's infrastructure requirements. Identified required extensions for handling of networking are added and documented.
- OaM.14: The application sees a completely abstracted view of the infrastructure, as offered by OpenStack for compute and storage resources, and by the SDN controller for the networking resources. Resource sharing is handled in the infrastructure layer.
- Mod.6: The application can be deployed for multiple tenants on the same infrastructure keeping full separation of resources.

PoC Project Goal #1: Demonstrate the use of an extended standardized model to describe infrastructure requirements on the NFV Or-Vi and Se-Ma interfaces to orchestrate a typical telecom application with all its components.

PoC Project Goal #2: Implement orchestration software using open source components that automatically orchestrates the application infrastructure.

PoC Project Goal #3: Use SDN technologies to implement networking functions providing a full separation of different application instantiations while re-using layer 2 and layer 3 network addresses.

A.1.3 PoC Demonstration

Venue for the demonstration of the PoC: Deutsche Telekom T-Labs OpenStack Reference Lab Berlin

Public Venue: SDN & OpenFlow World Congress 2013, Bad Homburg (partial scope)

A1.4 Publication

Currently not planned.

A.1.5 PoC Project Timeline

- What is the PoC start date? 01/07/2013
- (First) Demonstration target date Q1 2014
- PoC Report target date 31/03/2014
- When is the PoC considered completed? 31/03/2014

A.2 NFV PoC Technical Details

A.2.1 PoC Overview

When requesting a tenant's virtual network within a data center infrastructure, the virtual resources need to be orchestrated. This includes the provisioning of virtual machines, the loading of disk images, and the provisioning of network connectivity.

In this PoC, special focus is put on the network orchestration part and the integration of infrastructure networking with SDN technologies.

The implementation uses open source components as much as possible. The architecture in Figure 1 is used to do this orchestration.

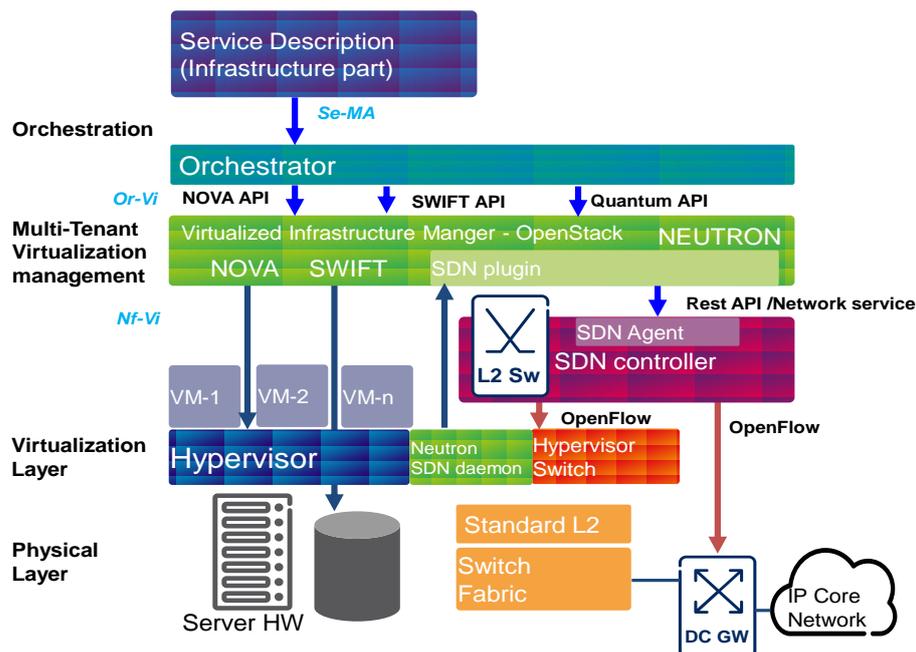


Figure 1: PoC architecture for Infrastructure as a Service provisioning

The essential input to the orchestration process is the infrastructure part of the Service Description that describes the requirements on the infrastructure that need to be communicated between the application-specific BSS/OSS and the infrastructure management parts. These two instances are often handled within different organizations.

A.2.2 PoC Scenarios

Scenario 1: Automated network orchestration

In this PoC, the implemented service is a messaging application consisting of standard commercial software rolled out on dedicated hardware today. It illustrates the infrastructure requirements coming from moving such an application directly into a datacenter environment without major re-design of the application software.

The use of SDN for the networking part increases the flexibility in adapting the datacenter networking to the needs of the application, such as fixed MAC addresses and VLAN tags, and thus seems a good match for this and similar use cases.

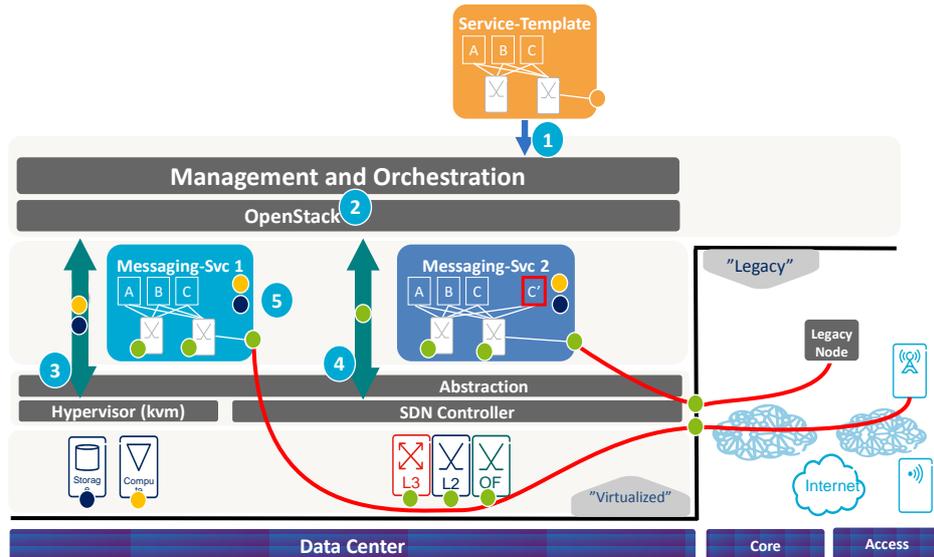


Figure 2: PoC Setup

The messaging application is available in a service template documented in a single OVF file including 3 virtual machines and the required connectivity between these machines.

The orchestration tool provides a Graphical User Interface to enable a one-click-deployment of the complete service.

Scenario 2: Multi-tenancy

The same service template can be used to deploy a second instance of the same service in the datacenter. The SDN controller provides a clean separation of the network instances even though the same low-level addressing is used.

The PoC exemplifies the deployment of the same service for an additional national branch of the same operator. Other potential use cases are test deployments for new software, temporary integration environments for 3rd party integrators, etc.

Scenario 3: Infrastructure scaling

The PoC includes the capability to add infrastructure resources such as VM to the service in a way that is pre-defined in the related service description. In the PoC implementation a manual trigger to scale is used, which symbolizes different possible triggers to scale service infrastructure including infrastructure accessible triggers (CPU load, throughput, etc.) as well as service-specific triggers (application overload, control layer triggers, etc.).

A.2.3 Mapping to NFV ISG Work

Scenario	Use Case	Requirement	E2E Arch	Comments
Scenario 1	UC#1	Port. 2, Mig. 2, OaM 3, OaM 5, OaM14		Automated deployment of networking using SDN to adapt to existing software.
Scenario 2	UC#1	Mod. 6		Full tenant isolation.
Scenario 3	UC#1	OaM. 1, OaM. 2		Application scaling.

A.2.4 PoC Success Criteria

All goals are met when the described functionality is available

A.2.5 Expected PoC Contribution

List of contributions towards specific NFV ISG Groups expected to result from the PoC Project:

- PoC Project Contribution #1: Automated IaaS orchestration NFV Group MAN WG