

# TOSCA-based MANO Orchestration for NFV based on Cloudify Orchestration & VMware Infrastructure

*“One enterprise IT vendor (GigaSpaces) has been included in this report because its open source technology is the basis for a number of telco vendors NFV MANO implementations.”...*

— Caroline Chappell, Principal Analyst, NFV & Cloud | Heavy Reading

"Network functions virtualization (NFV) is at the heart of some major transformations for telecom operators, but it's only going to work if it remains as open as possible...vendors' enthusiasm for NFV is leading to "a zoo of orchestrators," where each vendor proposes its own variety of NFV management. What's needed is a unified approach, one where all services are managed end-to-end."

-- Axel Clauberg, Vice president of IP architecture and design at Deutsche Telekom

## Use Cases

- Service orchestration
- VNF management
- Service chaining
- Dependency management
- SDN integration via TOSCA to YANG modules

## Open TOSCA-based MANO Orchestration for NFV powered by Cloudify Orchestration & VMware Infrastructure

NFV, (network function virtualization), is the growing need by telcos and enterprises to deploy, manage and scale their network functions and services on standardized hardware, thus reducing CAPEX and OPEX and significantly decreasing time required to introduce new services to the network.

Achieving NFV requires a robust virtualized infrastructure, or what is called the NFVI layer, and built-in orchestration (known as MANO) to pull it all together.

VMware has been leading the enterprise virtualization space for many years and is by far the most popular industry solution to date. From an NFV perspective, VMware has partnered with Cloudify, the only open source orchestration that integrates natively with the VMware stack, including VMware vCloud Director® (VCD), VMware Integrated OpenStack (VIO) and VMware vSphere® to bring true NFV orchestration (MANO) to the VMware stack.

### A truly open NFV orchestration

The integration between Cloudify & VMware provides truly open NFV orchestration through its Open Service Blueprinting using TOSCA, as well as open infrastructure supporting both OpenStack and vCloud enabling real world hybrid environments.

### Maximize the utilization of existing infrastructure

The joint solution enables carriers to gain the best of both worlds. They can leverage their existing VMware infrastructure assets and existing skillsets combined with a new OpenStack environment. Users can also mix and match services between environments to manage hybrid cloud architectures, achieving automated lifecycle management of critical network functions and services.

### Ensure best performance and SLA by correlating application requirements with the infrastructure capacity

The joint solution correlates intimate information gathered through the VMware infrastructure and hypervisor level with the application requirements gathered through Cloudify. In this way, it is now possible to ensure best performance and utilization of the underlying resources, along with a guaranteed SLA.

### MANO Orchestration - Solution Architecture

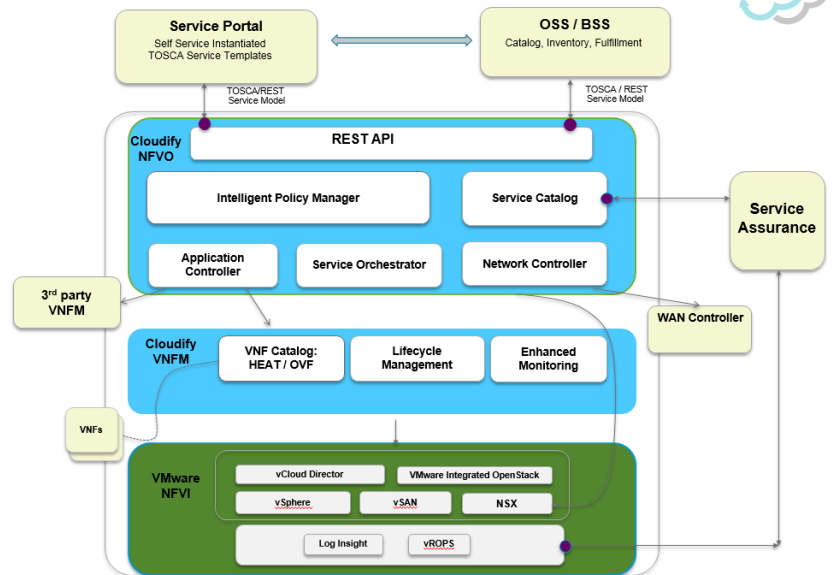
ETSI, the European Telecommunications Standards Institute, has defined a standard reference architecture to achieve NFV, centered around a management and orchestration layer (MANO). Cloudify essentially plays the role of the ETSI orchestrator, leveraging its open and pluggable architecture to interface with the

**Cloudify** by GigaSpaces is an open source, TOSCA-based, pure-play cloud orchestration platform for multi-tier applications. Cloudify addresses the challenges of implementing virtualized network functions or NFV. Being standard-driven, and therefore, inherently infrastructure agnostic, Cloudify is uniquely positioned to fit into heterogeneous telco and enterprise environments by supporting any application stack, handling containerized and non-containerized workloads and integrating seamlessly with any DevOps-related tool chain.

Virtual Network Functions Manager, the Virtual Infrastructure Manager and the Network Functions Virtualization Infrastructure to better orchestrate the lower level software defined networks. Cloudify can further serve as a VNFM for end-to-end lifecycle management of network functions.

The heart of the MANO Orchestration solution relies on VMware as the infrastructure manager (VIM) and Cloudify as the orchestration engine as outlined in the diagram below.

## Solution Architecture



Cloudify brings enhanced knowledge of the application requirements and architecture through application driven orchestration. The integration with VMware enables the matching of application requirements with actual capacity of the infrastructure resources in both the network and compute domains. VMware support for both VMware Integrated OpenStack (VIO) and VMware vCloud Director® (VCD), combined with Cloudify support for both environments, provides a powerful flexibility for customers who can choose between the two infrastructures while at the same time managing their application across the two environments consistently.

### Key Solution Benefits

- Pure-play, open source, TOSCA orchestration with no lock-in
- Native support for VMware VCD and VIO infrastructure
- Built-in network orchestration with support for Netconf/YANG based devices and managers (such as Tail-F)
- Built-in auto-healing and auto-scaling policies for dynamic VNF lifecycle management
- Built-in service chaining and dependency management
- Support for multi-site/multi-VIM deployment
- Support for cloud native architecture
- IPv6 Support

To learn more about this solution visit <http://getcloudify.org/network-function-virtualization-vnf-nfv-orchestration-sdn-platform.html>