Nokia CloudBand Application Manager

Release 24

CloudBand Application Manager is a ready-to-use ETSI NFV-compliant Virtualized Network Function Manager (VNFM). It automates VNF lifecycle management and cloud resource management, and its standards-based APIs make it easy to work with any vendor's VNF, Element Management System (EMS), Virtualized Infrastructure Manager (VIM), and NFV Orchestrator (NFVO).

CloudBand Application Manager is a VNFM that automates lifecycle management by providing an open templating system, managing resources and applying associated workflows. It executes lifecycle management actions more easily and predictably than manual methods. It supports Nokia and third-party VNFs. Using OpenStack Heat orchestration templates, VMware Open Virtualization Format templates (OVF), Mistral workflows and Ansible playbooks, CloudBand Application Manager is open to the broadest range of VNF onboarding options. It visualizes the structure and status of applications and performs lifecycle management, including basic functions (create, instantiate, scale, terminate, delete, operate, query and modify VNF) and advanced functions (such as healing, update/patching, upgrades, backup and restore).

Features

- VNF lifecycle management (standard, custom, auto operations, notifications, granting)
- VNF Resources FM and mediation to EMS
- Open templates (HOT & OVF based), workflow engine (Mistral), commissioning engine (Ansible)
- Built in VNF Catalog with versioning support + support for external VNF Catalog
- Multi-tenant VNF management
- Install, config, backup, upgrade and monitoring
- NetAct, NSP, SNMP support for own alarms and PM
- High availability, Geo-redundancy
- Role Based Access Control, external auth, CMP, TLS 1.3

Benefits

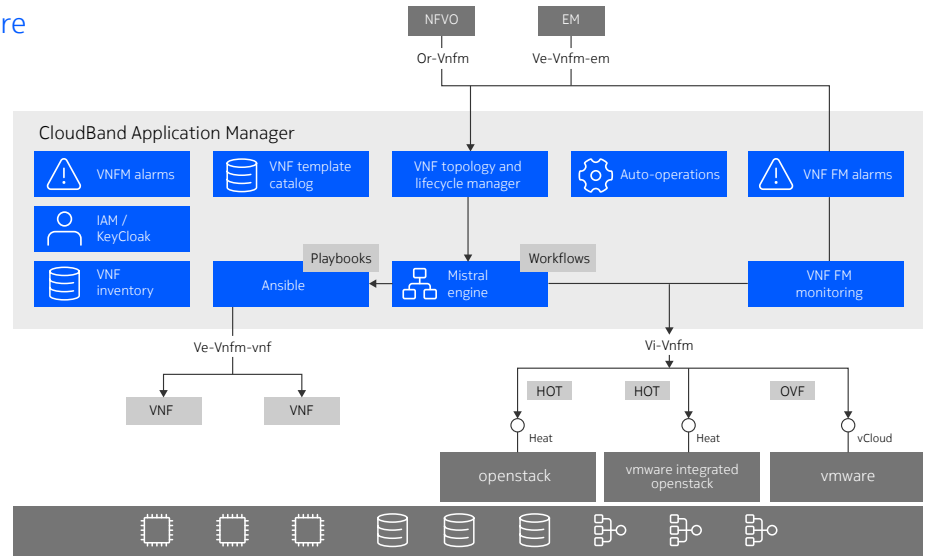
- Improves VNF lifecycle management
  - Fast deployment compared to manual methods
  - Avoids human errors in manual methods
  - Scaling to meet demand
- Manages multi-vendor deployments in a single window, cloud independent view of operations, across OpenStack and VMware
- Prevents VNFM vendor lock-in by using open and community driven frameworks, and a VNFM that works with the VNF and MANO elements of the multi-vendor NFV network
- Reduces integration effort via ETSI NFV compatible interfaces
- Reliable, field-proven design including high availability, geo-redundancy and multi-tenancy

Architecture

CBAM is installed on multiple Virtual Machines (VMs) on non-privileged accounts on any cloud implementation. It provides robust reliability and high availability (HA) by using an internal microservice architecture with rapid attention to failures and the transference of service when a VM fails.

Multiple VIMs (OpenStack, VMware) and VNFs are supported, where one instance of CloudBand Application Manager consumes resources from multiple VIMs that have differing capabilities; it also supports multiple VNF types that have differing versions. It is a multi-tenant VNFM, supporting accounts per VNF type. It can be deployed localized to NFVI, localized to VNF, or centralized.

Figure 1. Architecture



Lifecycle and workflow management

CloudBand Application Manager provides an open templating system for defining and managing VNFs. The templating system includes the VNF Descriptor (VNFD) data model (aligned with ETSI NFV IFA011/SOL001, IFA014/SOL004 and OASIS TOSCA), and guidelines on how to use Heat orchestration templates, Ansible playbooks, and Mistral workflows. This includes auto-operations of VNF lifecycle management, such as scale, heal and other operations defined in the VNF Descriptor file.

Lifecycle workflows are supported by a Mistral workflow engine and Ansible-based commissioning of virtual machines where the parameters are calculated based on what is needed for deployment. Lifecycle operations often consist of multiple distinct, interconnected steps that need to be executed in a particular order in a distributed environment. Such workflows are described as a set of tasks and task relations, managed by the Mistral workflow engine. This takes care of state management, correct execution order, parallelism, synchronization and high availability.

VNF and EMS APIs

As shown in Figure 1, CloudBand Application Manager performs several functions for the VNF EMS, including registering created VNFs into their EMS, mediating notifications sent to the EMS, mediating VNF resource alarms (FM) and receiving lifecycle management triggers from the EMS. The VNFM executes lifecycle operations via the Ve-Vnfm-vnf reference point (SOL 002).

Nokia VNFs and third party VNFs are supported by CloudBand Application Manager. A complete list of pre-integrated VNF and EMS is available.

VNF Infrastructure Manager API

CloudBand Application Manager interfaces with one or more VIMs via the OpenStack Heat API, VMware vCloud API using the Vi-Vnfm reference point. CloudBand manages VNF virtual resources, as described in the HOT stacks, OVF files according to the ETSI NFV defined VNF structure (SOL 001-compliant VNFD).

CloudBand Application Manager is certified with Nokia CloudBand Infrastructure Software (CBIS), VMware vCloud Director and VIO. Further OpenStack-based VIMs are supported by Nokia Professional Services' integration.

NFV Orchestrator API

The NFVO is supported via an ETSI-compliant (SOL 003) interface, the Or-Vnfm reference point. This supports NFVO-triggered lifecycle operations, granting and lifecycle change notifications.

CloudBand Application Manager is integrated with Nokia CloudBand Network Director. Further NFVOs are supported by Nokia Professional Services' integration.

Product characteristics

Standard interfaces	• Vi-Vnfm: OpenStack Heat (Queens, Rocky, Stein, Train, Ussuri, Victoria, Wallaby) and VMware TCI CDE 2.2, 2.5, 3.0 (vCloud 10.3, 10.4), and VIO 7.0, 7.2, 7.3 • Ve-Vnfm-vnf: ETSI NFV IFA 008 / SOL 002, the VNF information model of IFA 011 / SOL 001, and the VNF Package format of IFA 014 / SOL 004. • Ve-Vnfm-em: Nokia NSP, Nokia NetAct, and third-party EMS per ETSI NFV IFA 008 / SOL 002 • Or-Vnfm: ETSI NFV IFA 007 / SOL 003 • For the above mentioned ETSI specifications, generation 2.4.1/2.5.1 and 3.3.1 are supported
Commercial openness	• Modular and open support of multiple NFVO, VIM and NFVI • 65+ VNF types are already onboarded including Nokia and third parties

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