## Purpose

Functional specification for unified control plane – host control plane applications on existing 3 node storage plane of starter kit.

Impacted teams

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Infrastructure (servers, network, switch automation, storage) | control plane, CPLM | Diagnostics (CLI, NFVshell, UI) | VIM |
| Unified control plane | x | x | x | x |
| RHOSP installation automation | x | x | x | x |

## Introduction



## Feature Specifications

* First 4 controllers are used for VIM – HCG/WR or RH or HCG4.0 or VMWare
* PIM Control plane will be hosted on 3 node control plane
* Control plane expansion on RH release and beyond, will use DL 380 nodes (instead of DL 360)

**Use cases**

1. Standardize the NFV reference architecture for multi VIM
   * 4 nodes – hosting VIM
   * 3 nodes – VSA storage and PIM
   * 4 nodes – expanded control plane (3 nodes in case of DC kits, due to RU limitation)
2. Modular and re-usable installer code.

Distinguish the roles played by individual machines and code is modularized to install/configure a specific role.

Example: the seed host role and opensaf node role will be 2 ansible playbooks, even though they are installed on the same host. one playbook to configure the seed host with the necessary packages and other to configure the host as an opensaf controller/payload. The ansible hosts file will contain name/IP of seed host and opensaf controller (the same IP in both groups, in this case).

## Design description

Update CID and schema

CID change for RH release to include new VLAN BLS-MGMT (KVM host role will configure these VLANs). Rename HOS-PXE as NFV-PXE

Schema update to 2 Enclosure starter kit - **nfvsystem\_schema\_strem232n.json** to reflect new reference architecture.

JSON creation

The jsons are created using Systeminit script

Apply BIOS Settings

The BIOS settings are listed in NFV 2.2 Installation guide.

Seedhost RU location has changed from 2.2 (now on VSA1, instead of CTRL1).

NIC configuration of VSA nodes:

* Embedded NIC will be disabled.
* Enable legacy PXE boot mode on port 1 of Emulex 556.
* Emulex 556 FLR will route all networks (CLM, BLS etc).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| VSA 1 | Embedded NIC 1 | disabled |  |  |
| Emulex FLR1 | Active - Backup | Tagged Port | Tagged VSI: CLM, BLS, BLS-MGMT, DCM (?), CAN (?) Untagged Vlan: NFV-PXE |
| Emulex FLR2 | Tagged Port | Tagged VSI: CLM, BLS, DCM (?), CAN (?) Untagged Vlan: HOS-PXE |
| VSA 2 | Embedded NIC 1 | disabled |  |  |
| Emulex FLR1 | Active - Backup | Tagged Port | Tagged VSI: CLM, BLS, BLS-MGMT, DCM (?), CAN (?) Untagged Vlan: NFV-PXE |
| Emulex FLR2 | Tagged Port | Tagged VSI: CLM, BLS, DCM (?), CAN (?) Untagged Vlan: NFV-PXE |
| VSA 3 | Embedded NIC 1 | disabled |  |  |
| Emulex FLR1 | Active - Backup | Tagged Port | Tagged VSI: CLM, BLS, BLS-MGMT, DCM (?), CAN (?) Untagged Vlan: NFV-PXE |
| Emulex FLR2 | Tagged Port | Tagged VSI: CLM, BLS, DCM (?), CAN (?) Untagged Vlan: NFV-PXE |

Switch config

* 5950 Switch automation to update config for:
  + New BLS-MGMT VLAN created on switch.
  + Switch port descriptions are changed for new RA.
  + Switch to Emulex 556 are trunk ports (instead of access port)
* 5900 switch port to VSA embedded NIC are disabled.

Apply RAID Settings

In a 2 enclosure starter kit, VSA disk numbers are:

* 12 SAS disks (1.2TB)
* 2 SSD (1.6TB)

RAID configuration per node will be:

|  |  |  |  |
| --- | --- | --- | --- |
| Disk numbers | Type | Purpose | RAID |
| 2 | SAS | OS | RAID 1 |
| 4 | SAS | GlusterFS | RAID 5 |
| 6 | SAS | Cinder | RAID 5 |
| 2 | SSD | Cinder | RAID 10 |

Installation and Configuration of unified control plane

**Artifacts**

* hlinux ISO image that has: KVM, libvirt, ovs installed and nfvadmin user created. The same iso image will be used by cobbler to deploy on VSA 2 & 3. Will have the UID same across all 3 hosts.
* seedHost debian
* hlinux QCOW2 base image - used to create seedVM and CLIToolVM
* seedVM debian (Install Pre-req debian), debians.tar and artifacts.tar

**Roles**

* seed host role – install seedhost debian packages. start seedVM QCOW with default bridge (Eg. virbr0), courtesy of libvirt
* seedVM role – repo refresh from local directory to upgrade debian repo and artifacts to their data store on seedVM.

**Roles invoked by seedVM and configured on target machines by Ansible playbooks** (grouped under ansible host file).

* kvm host role - network xml file, configure ovs, create VLANs

OVS to include addition VLAN BLS-MGMT.

* gluster role - take disk drive, put brick, create gluster volume

Gluster volume should be mounted before starting opensaf service, else Opensaf service will fail due to Gluster volume unavailability during reboot. Mounting /data1/opensaf on local nodes would need entry in /etc/rc.local to handle the re-mounting of volume during reboots.

Update run level to start opensaf service after the Gluster volume is mounted.

* opensaf controller - install controller packages
* opensaf payload role - install payload packages

(install & configure code to consider 3rd controller)

* storage controller role - install vsa packages and start VSA VMs

VSA VM will be deployed after the KVM configuration. This would require Network XML file modification. VSA VM will not be hosted on OpenSAF cluster.

VSA configured on ILO and OS hostname:

*ILO name: <kit>NFVSYS-ctl1-dl001 to 3*

*OS name: rack1-ctrl1 to 3*

Instead of:

*ILO name: <kit>NFVSYS-stor00-dl001 to 3*

*OS name: nfvsys-kvmvsahost-01 to 3*

* PIM controller role – install OV, IMC, CMC, CLITool/NFVshell/UI. Hlinux VM (value-add VM) will not be installed.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Seedhost role** | **SeedVM role** | **KVM host role** | **Gluster role** | **Opensaf role** | **Storage controller role** | **PIM controller role** |
| VSA1 | seedhost | seedVM | OVS | Gluster node | Opensaf controller | VSA VM | PIM VMs |
| VSA2 |  |  | OVS | Gluster node | Opensaf controller | VSA VM | PIM VMs |
| VSA3 |  |  | OVS | Gluster node | Opensaf payload | VSA VM | PIM VMs |

**Install sequence**

On VSA1

* DL ILO naming, BIOS, RAID. Install OS on VSA1 from the ISO image. Configure seedhost role and start hLinux QCOW2 VM on VSA1.
* Configure seedVM role. From seedVM, generate SSH key and push to nfvadmin of VSA1 host via default bridge (SSH channel for ansible).
* Call KVM host role to configure OVS and networks on VSA1 host
* Invoke switch automation for TOR switches.

On VSA 2&3

* DL naming, BIOS, RAID, Install OS on VSA 2 & 3 via cobbler using the same ISO image. (code update to consider 3rd controller)
* Call KVM host role to configure OVS and networks on VSA2 & 3

On VSA 1,2&3

* Certificate authority
* Call Gluster role on all 3 hosts
* Call opensaf controller role on VSA 1&2
* Call opensaf payload role on VSA3
* Call storage controller role
* Call PIM controller role

Each VSA node is hosting GlusterFS volume, VSA VMs (cinder volume) and PIM controller VMs. Single node reboot should not cause service outage. 2 node reboot is not supported.

In 3 node opensaf cluster, issues on a single controller such as: OVS failure or node reboot is not expected to cause split brain issues (since there are 2 other nodes that are operational)

* + PIM VMs seamlessly failover to stand-by node on the 2 operational nodes and re-balanced by opensaf
  + VSA VMs (cinder volume) has quorum with 2 remaining operational VMs
  + GlusterFS has quorum with 2 remaining operational nodes

## Logging and Debugging

## Operations not supported

## Test plan

## Package dependency