# Pharos Specification

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Objectives / Scope

The Pharos specification defines the OPNFV hardware environment upon which the OPNFV Arno platform release can be deployed on and tested. This specification defines:

- A secure, scalable, standard and HA environment

- Supports the full Arno deployment lifecycle (this requires a bare metal environment)

- Supports functional and performance testing of the Arno release

- Provides mechanisms and procedures for secure remote access to the test environment

Deploying Arno in a Virtualized environment is possible and will be useful, however it does not provide a fully featured deployment and test environment for the Arno release of OPNFV.

The high level architecture is outlined in the following diagram:
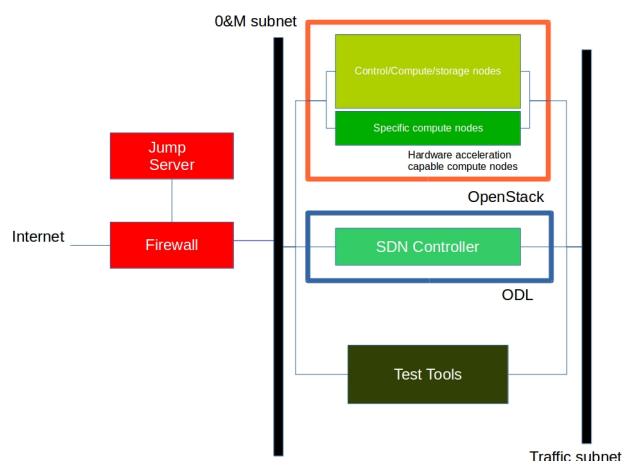
A Pharos compliant OPNFV test-bed environment provides

- One CentOS 7 jump server on which the virtualized Openstack/OPNFV installer runs

- In the Arno release you may select a deployment toolchain to deploy from the jump server from the Foreman and Fuel ISO images.

- 5 compute / controller nodes (BGS requires 5 nodes)

- A configured network topology allowing for LOM, Admin, Public, Private, and Storage Networks

- Remote access as defined by the Jenkins slave configuration guide http://artifacts.opnfv.org/arno.2015.1.0/docs/opnfv-jenkins-slave-connection.arno.2015.1.0.pdf

Hardware requirements

Servers

CPU:

- Intel Xeon E5-2600v2 Series (Ivy Bridge and newer, or similar)

Local Storage Configuration:

Below describes the minimum for the Pharos spec, which is designed to provide enough capacity for a reasonably functional environment. Additional and/or faster disks are nice to have and may produce a better result.

- Disks: 2 x 1TB + 1 x 100GB SSD

- The first 1TB HDD should be used for OS & additional software/tool installation

- The second 1TB HDD configured for CEPH object storage

- Finally, the 100GB SSD should be used as the CEPH journal

- Performance testing requires a mix of compute nodes that have CEPH(swift+Cinder) and without CEPH storage

- Virtual ISO boot capabilities or a separate PXE boot server (DHCP/tftp or Cobbler)

Memory:

- 32G RAM Minimum

Power Supply Single

- Single power supply acceptable (redundant power not required/nice to have)

Provisioning the jump server

1. Obtain CentOS 7 Minimal ISO and install

```
wget
http://mirrors.kernel.org/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1503-01.iso
```

2. Set parameters appropriate for your environment during installation

3. Disable NetworkManager

```
systemctl disable NetworkManager
```

4. Configure your /etc/sysconfig/network-scripts/ifcfg-* files for your network

5. Restart networking

```
service network restart
```

6. Edit /etc/resolv.conf and add a nameserver

```
vi /etc/resolv.conf
```

7. Install libvirt & kvm

```
yum -y update yum -y install kvm qemu-kvm libvirt systemctl enable
libvirtd
```

8. Reboot:

```
shutdown -r now
```

9. If you wish to avoid annoying delay when use ssh to log in, disable DNS lookups:

   `vi /etc/ssh/sshd_config` Uncomment "UseDNS yes", change 'yes' to 'no'. Save

10. Restart sshd

```
systemctl restart sshd
```

11. Install virt-install
```
yum -y install virt-install
```

12. Begin the installation of the Arno release

    Download your preferred ISO from the OPNFV dowloads page and follow the associated installation instructions.

Remote management

Remote access

- Remote access is required for …

    1. Developers to access deploy/test environments (credentials to be issued per POD / user)

    2. Connection of each environment to Jenkins master hosted by Linux Foundation for automated deployment and test

- OpenVPN is generally used for remote however community hosted labs may vary due to company security rules

- POD access rules / restrictions …

    - Refer to individual test-bed as each company may have different access rules and acceptable usage policies

- Basic requirement is for SSH sessions to be established (initially on jump server)

- Majority of packages installed on a system (tools or applications) will be pulled from an external repo so this scenario must be accomodated.

Firewall rules should include

- SSH sessions

- Jenkins sessions

Lights-out Management:

- Out-of-band management for power on/off/reset and bare-metal provisioning

- Access to server is through lights-out-management tool and/or a serial console

- Intel lights-out ⇒ RMM http://www.intel.com/content/www/us/en/server-management/intel-remote-management-module.html

- HP lights-out ⇒ ILO http://www8.hp.com/us/en/products/servers/ilo/index.html

- CISCO lights-out ⇒ UCS https://developer.cisco.com/site/ucs-dev-center/index.gsp

Linux Foundation - VPN service for accessing Lights-Out Management (LOM) infrastructure for the UCS-M hardware

- People with admin access to LF infrastructure:

1. amaged@cisco.com

2. cogibbs@cisco.com

3. daniel.smith@ericsson.com

4. dradez@redhat.com

5. fatih.degirmenci@ericsson.com

6. fbrockne@cisco.com

7. jonas.bjurel@ericsson.com

8. jose.lausuch@ericsson.com

9. joseph.gasparakis@intel.com
10. morgan.richomme@orange.com

11. pbandzi@cisco.com

12. phladky@cisco.com

13. stefan.k.berg@ericsson.com

14. szilard.cserey@ericsson.com

15. trozet@redhat.com

- The people who require VPN access must have a valid PGP key bearing a valid signature from one of these three people. When issuing OpenVPN credentials, LF will be sending TLS certificates and 2-factor authentication tokens, encrypted to each recipient's PGP key.

Networking

Test-bed network

- 24 or 48 Port TOR Switch

- NICS - 1GE, 10GE - per server can be on-board or PCI-e

- Connectivity for each data/control network is through a separate NIC. This simplifies Switch Management however requires more NICs on the server and also more switch ports

- Lights-out network can share with Admin/Management

Network Interfaces

- Option I: 4x1G Control, 2x40G Data, 48 Port Switch

    - 1 x 1G for ILMI (Lights out Management)

    - 1 x 1G for Admin/PXE boot

    - 1 x 1G for control Plane connectivity

    - 1 x 1G for storage

    - 2 x 40G (or 10G) for data network (redundancy, NIC bonding, High bandwidth testing)

- Option II: 1x1G Control, 2x 40G (or 10G) Data, 24 Port Switch

    - Connectivity to networks is through VLANs on the Control NIC. Data NIC used for VNF traffic and storage traffic segmented through VLANs

- Option III: 2x1G Control, 2x10G Data, 2x40G Storage, 24 Port Switch

    - Data NIC used for VNF traffic, storage NIC used for control plane and Storage segmented through VLANs (separate host traffic from VNF)

    - 1 x 1G for IPMI

- 1 x 1G for Admin/PXE boot

- 2 x 10G for control plane connectivity/Storage

- 2 x 40G (or 10G) for data network

Documented configuration to include: - Subnet, VLANs (may be constrained by existing lab setups or rules) - IPs - Types of NW - lights-out, public, private, admin, storage - May be special NW requirements for performance related projects - Default gateways

Controller node bridge topology overview
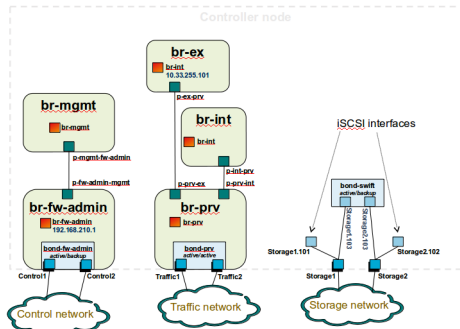
compute node bridge topology overview
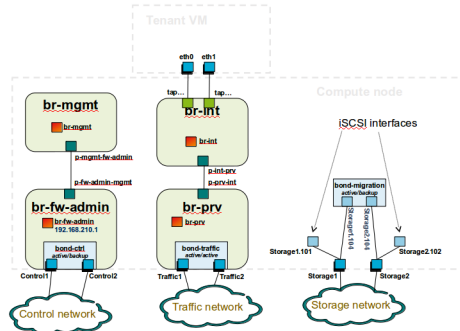
Architecture

** Network Diagram **

The Pharos architecture may be described as follow: Figure 1: Standard Deployment Environment

Figure 1: Standard Deployment Environment

Sample Network Drawings

Files for documenting lab network layout. These were contributed as Visio VSDX format compressed as a ZIP file. Here is a sample of what the visio looks like.

Download the visio zip file here: opnfv-example-lab-diagram.vsdx.zip
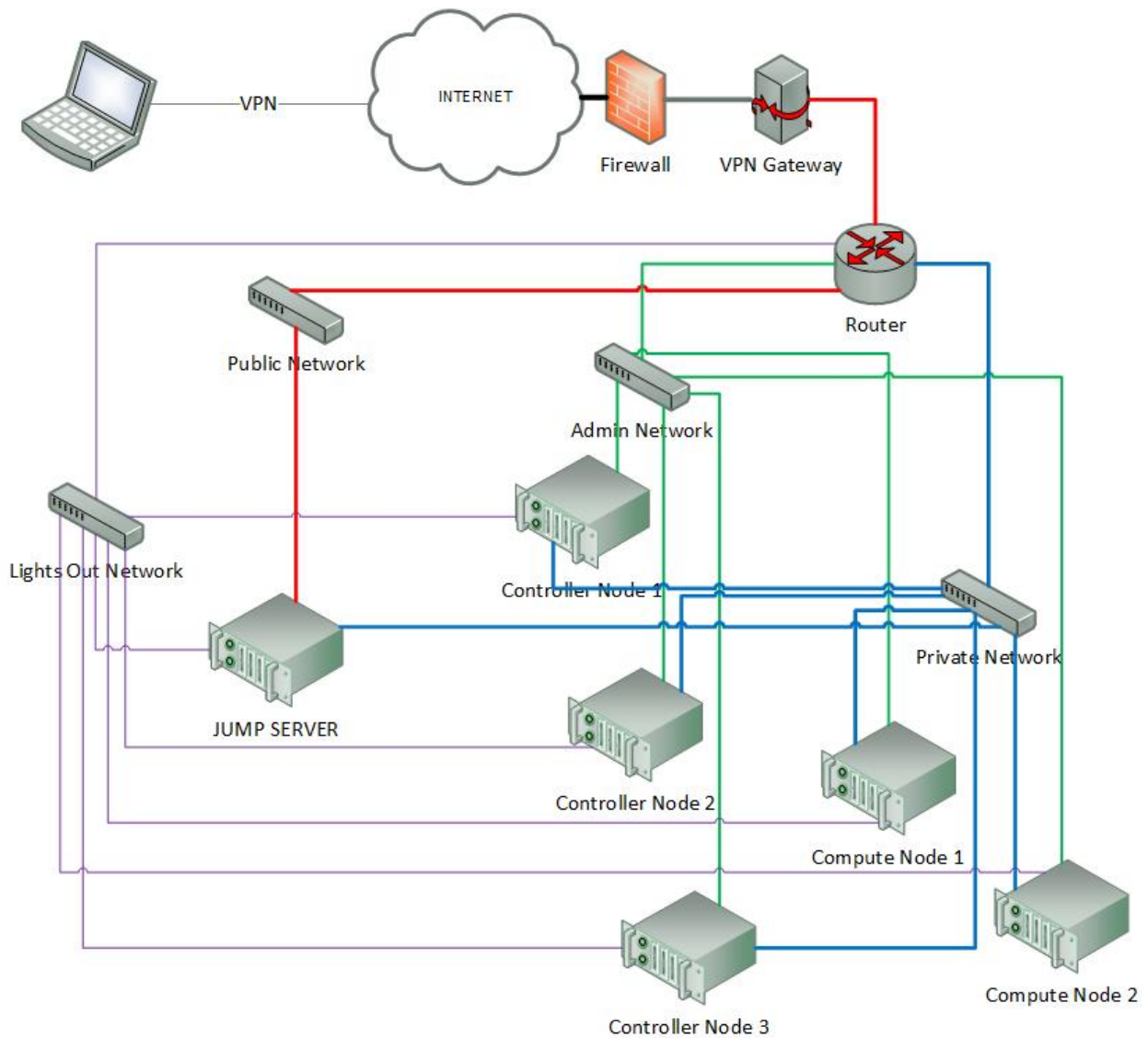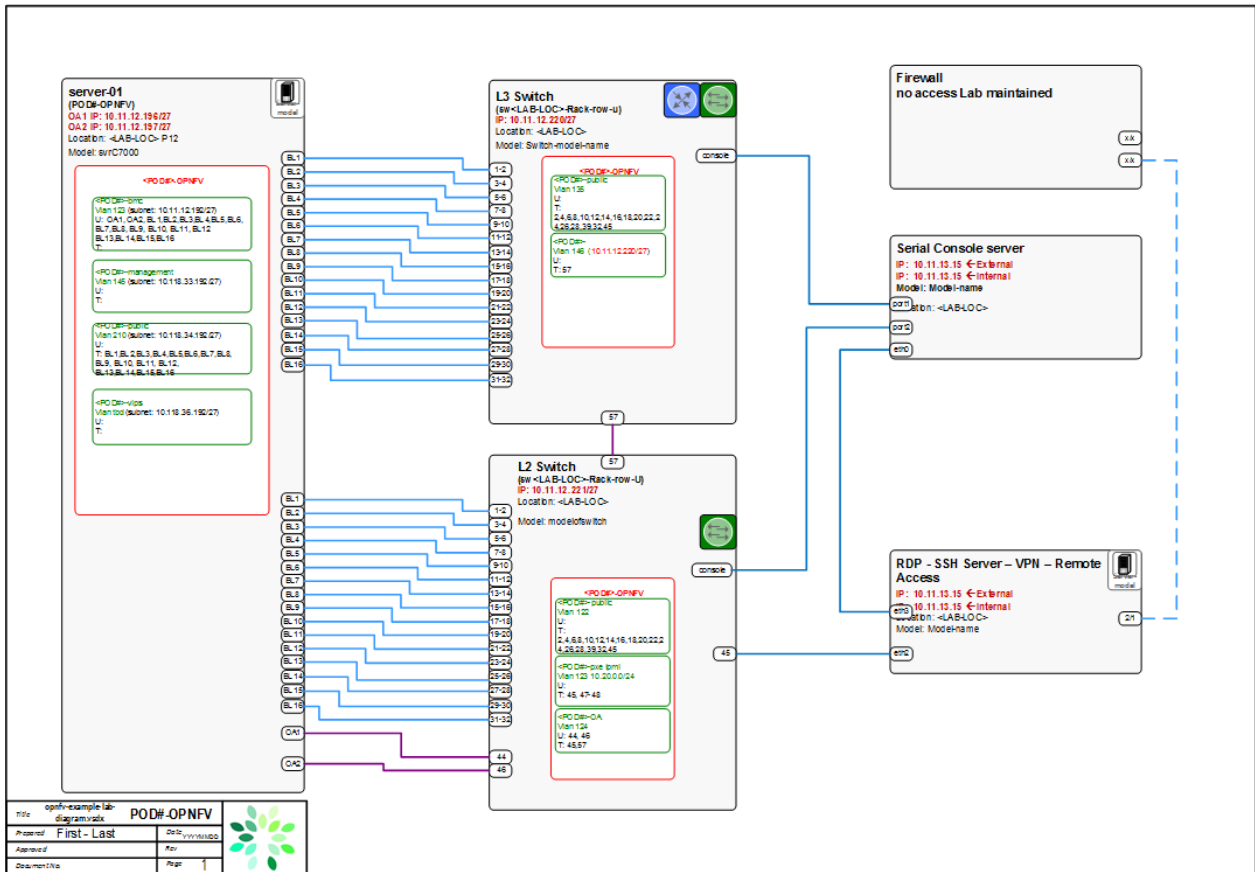
server-01
(POD#-OPNFV)
OA1 IP: 10.11.12.196/27
OA2 IP: 10.11.12.197/27
Location: <LAB-LOC> P12
Model: svrC7000

<POD#>-OPNFV

<POD#>-bmc
Vlan 123 (subnet: 10.11.12.192/27)
U: OA1, OA2, BL1,BL2,BL3,BL4,BL5,BL6,
BL7,BL8,BL9, BL10, BL11, BL12,
BL13,BL14,BL15,BL16
T:

<POD#>-management
Vlan 146 (subnet: 10.118.33.160/27)
U:
T:

<POD#>-public
Vlan 210 (subnet: 10.118.34.160/27)
U:
T: BL1,BL2BL3,BL4,BL5,BL6,BL7,BL8,
BL9, BL10, BL11, BL12,
BL13,BL14,BL15,BL16

<POD#>-vips
Vlan tbd (subnet: 10.118.36.160/27)
U:
T:

L3 Switch
(sw <LAB-LOC>-Rack-row-u)
IP: 10.11.12.220/27
Location: <LAB-LOC>
Model: Switch-model-name

<POD#>-OPNFV

<POD#>-public
Vlan 135
U:
T:
2,4,6,8,10,12,14,16,18,20,22,2
4,26,28,39,32,45

<POD#>
Vlan 146 (10.11.12.220/27)
U:
T: 57

Firewall
no access Lab maintained

x:x
x:x

Serial Console server
IP: 10.11.13.15 ← External
IP: 10.11.13.15 ← Internal
Model: Model-name
Location: <LAB-LOC>

console

L2 Switch
(sw <LAB-LOC>-Rack-row-U)
IP: 10.11.12.221/27
Location: <LAB-LOC>
Model: modelofswitch

console

<POD#>-public
Vlan 122
U:
T:
2,4,6,8,10,12,14,16,18,20,22,2
4,26,28,39,32,45

<POD#>-pxe /pmi
Vlan 123 10.20.0.0/24
U:
T: 45, 47-48

<POD#>-OA
Vlan 124
U: 44, 46
T: 45,57

RDP - SSH Server – VPN – Remote Access
IP: 10.11.13.15 ← External
IP: 10.11.13.15 ← Internal
Location: <LAB-LOC>
Model: Model-name

Title: opnfv-example lab-diagram.vsdx
POD#-OPNFV
Prepared: First – Last
Date: YYYY/MM/DD
Approved:
Rev:
Document No.:
Page: 1

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