Lab as a Service
Compose Your Cloud Automatically with Few Clicks

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Agenda

❖ What is OPNFV?
❖ Challenges
❖ The Solution
❖ Walkthrough / Demo
Network Transformation

Classical Network Appliance

From physical network functions (PNF)

Application
OS
Processor
Network

To virtual network functions (VNF)

Application
OS
Processor
Network

Application
Industry standard virtualization
Industry standard processor
Industry standard networking

From specialized HW & OS

- Hardware development large barrier to entry for new vendors, constraining innovation & competition.

To open, industry standard platform

Network Virtualisation Approach
Network Functions Virtualization
What does OPNFV Actually do?
Resulting in lots of combinations...
Challenges

❖ It is not straightforward to bring entire stack up
  ➢ Especially with the number of combinations we have
  ➢ Resource intensive - cannot be done on a developer’s laptop

❖ Allocating resources statically
  ➢ Not scalable
  ➢ Inefficient and under utilization
  ➢ Bottleneck for development and releases
Community Labs

Several community labs
❖ Geographical located
❖ Standard configurations
❖ Hosted by member organizations

Multiple roles…
❖ CI Production (OPNFV releases)
❖ Testing
❖ Development
Pharos

Pharos Specification
❖ Jump server - virtualized OpenStack/OPNFV installer
❖ Controller/Compute nodes – for high availability
❖ Network topology – LOM, Admin, Public, Private and Storage
❖ Remote management – OpenVPN + SSH access

Hardware requirements
❖ Intel and ARM processor
❖ Minimum 32GB RAM
❖ 1TB HDD – OS and additional software/tools
❖ 1TB HDD – CEPH object store
❖ 100GB SSD – CEPH journal
Lab as a Service (LaaS)

❖ Automated provisioning, deployment, and verification
  ➢ Configurable to fit user’s needs
  ➢ Runs on baremetal servers

❖ Allocating resources dynamically
  ➢ Use resources as they are needed
  ➢ Scalable for development and releases
Architecture of LaaS

1) Issue request

LaaS Dashboard

2) Trigger deployment

3) Deploy OPNFV

4) Update status

5) Mail access details

6) Connect to OpenVPN server, SSH to jump host, access VIM UI, etc.
UNH IOL Lab

- 38 intel servers
  - 512 GB RAM
  - 1TB SSD Storage

- 14 arm servers
  - 256 GB RAM
  - 1TB SSD Storage

- All 10G networking, with 40G interconnect between switches
Deployment Overview
## Development Pods

<table>
<thead>
<tr>
<th>Name</th>
<th>Slave Name</th>
<th>Booked by</th>
<th>Booked until</th>
<th>Purpose</th>
<th>Utilization</th>
<th>Status</th>
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<tbody>
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<td>virtual opr4v pod for auto project work</td>
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<td>ParkerBerberian</td>
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<td>Building FOG for ARM</td>
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Booking: IOL Dev Machine hpe-20

Start: 03/09/2018 00:00
End: 03/17/2018 00:00
Operating System: ubuntu
Purpose: ONS Demo
Installer: 
Scenario: 

Book
FOG - Free Open-source Ghost

Dashboard

System Overview
- Username: admin
- Web Server: 10.10.30.8
- TFTP Server: 10.10.30.8
- Load Average: 0.90, 0.91, 0.95
- System Uptime: Up: 3 days 17 hrs 42 mins

Storage Group Activity
- Active: 0
- Queued: 8
- Free: 2

Storage Node Disk Usage
- Free: 34 GB
- Used: 2%
- Total: 150.17 GB

Imaging Over the Last 30 Days

Bandwidth - Transmit
- Transmission
- Reception
- 1 Mbps
- 0.75 Mbps
- 0.5 Mbps
- 0.25 Mbps
- 0 Mbps

Graphs showing data over a 30-day period and bandwidth statistics.
Partclone v0.2.76 http://partclone.org
Starting to clone device (/dev/sda1) to image (-)
Reading Super Block
Calculating bitmap... Please wait... done!
File system: NTFS
Device size: 136.3 GB = 33264582 Blocks
Space in use: 2.8 GB = 677020 Blocks
Free Space: 133.5 GB = 32587562 Blocks
Block size: 4096 Byte

Elapsed: 00:00:04 Remaining: 00:02:16  Rate:  1.18GB/min
Current Block: 19250  Total Block: 33264582

Data Block Process: 2.84%
Total Block Process: 0.06%
Post Installation Actions

❖ User management

❖ VPN Access

❖ IPMI and console access for developers
  ➢ iLO / Integrated Lights Out
  ➢ BMC/ Baseboard Management Controller

❖ Email notification to user
On Booking End

❖ All accounts deleted
❖ Server shut down
❖ Server made available for another booking
Roadmap

❖ Bring MVP to production
❖ Dynamic POD allocation
❖ Automatic deployment of OPNFV
❖ Multi-user bookings
Questions?

https://labs.opnfv.org

https://wiki.opnfv.org/display/INF/Lab-as-a-Service+at+the+UNH-IOL