Lab as a Service
Compose Your Cloud Automatically with Few Clicks

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Agenda

❖ What is OPNFV?
❖ Challenges
❖ The Solution
❖ Walkthrough / Demo
OPNFV facilitates the development and evolution of NFV components across various open source ecosystems. Through system level integration, deployment and testing, OPNFV creates a reference NFV platform to accelerate the transformation of enterprise and service provider networks.
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 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

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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<td>IOL Dev Machine hpe-10</td>
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<td>mbull</td>
<td>March 31, 2018, 10 a.m.</td>
<td>Show demo for ONS</td>
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<td>IOL Dev Machine hpe-16</td>
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<td>Joe kidder</td>
<td>March 28, 2018, 2 p.m.</td>
<td>testing some auto scripts on x86</td>
<td>43%</td>
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<td>Joe kidder</td>
<td>March 30, 2018, 6 p.m.</td>
<td>host Auto pod 1 VM</td>
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<td>Joe kidder</td>
<td>March 29, 2018, midnight</td>
<td>virtual oprfv pod for auto project work</td>
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<td>IOL Dev Machine hpe-21</td>
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<td>ParkerBerberian</td>
<td>March 29, 2018, midnight</td>
<td>Building FOG for ARM</td>
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## Booking Creation

### Booking: IOL Dev Machine hpe-20

#### Calendar

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#### Booking Details

- **Start**: 03/09/2018 00:00
- **End**: 03/17/2018 00:00
- **Operating System**: ubuntu
- **Purpose**: ONS Demo
- **Installer**: [Link]
- **Scenario**: [Link]

**Book**
Stackstorm Automation Server

StackStorm Event-driven automation

History

FRI, 16 MAR 2018

09:135  pharoslaas.deployment_workflow
        scenario="None", print=true, host="hp36", installer="None", os="CentOS", bootmgd="102"
        Manual
        A: stadmin

09:136  image_host
        pharoslaas.fog_imageWorkflow
        image="None", os="Ubuntu", host="hp36"

09:136  changeimage
        pharoslaas.fog_changeimage
        image="None", os="Ubuntu", host="hp36"

09:137  startimageing
        pharoslaas.fog_startimageing
        host="hp36"

09:138  restartHost
        pharoslaas.restart_workflow
        print=true, host="hp36", cmd="/bin/sh -c "echo Administrators""

09:139  branch
        core local
        cmd="exit 0"

09:139  getLpml_hostname
        pharoslaas.get_ipmi_hostname
        host="hp36"

09:140  getLpml_password
        pharoslaas.get_ipmi_password
        host="LNAV092909BG2"

09:142  ipmi_restart
        pharoslaas.ipmi_restartHost

09:147  waitForImageing
        pharoslaas.fog_waitForImageing
        host="hp36", timeout=3000

09:129  pharoslaas.deployment_workflow
        scenario="None", print=true, host="hp36", installer="None", os="CentOS", bootmgd="102"
        Manual
        A: stadmin

09:130  image_host
        pharoslaas.fog_imageWorkflow
        image="None", os="CentOS", host="hp36"

09:130  changeimage
        pharoslaas.fog_changeimage
        image="None", os="CentOS", host="hp36"

09:131  startimageing
        pharoslaas.fog_startimageing
        host="hp36"

09:133  restartHost
        pharoslaas.restart_workflow
        print=true, host="hp36"
# FOG - Free Open-source Ghost

## Dashboard

### System Overview
- **Username:** admin
- **Web Server:** 10.10.30.8
- **TFTP Server:** 10.10.30.8
- **Load Average:** 0.05, 0.06, 0.95
- **System Uptime:** Up: 3 days 17 hrs 42 mins

### Storage Group Activity
- **Active:** 0
- **Quiesced:** 0
- **Paused:** 4
- **Initial:** 0

### Storage Node Disk Usage
- **Free:** 6.84 TB
- **Used:** 156.77 GB

## Imaging Over the last 30 days

![Imaging Graph]

## Bandwidth - Transmit

![Bandwidth Graph]
Partclone
Disk Imaging and Cloning

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

- We have brought our MVP to production
- Dynamic POD allocation
- Automatic deployment of OPNFV
- Multi-user bookings
- Snapshotting
Questions?

https://labs.opnfv.org

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