History

- OPNFV Santa Clara hackfest March 2016
  - Go for OpenStack Nova
- OpenStack Austin summit April 2016, Nova + OPS
- OpenStack Barcelona summit October 2016, OPS -> Craton
  - Nova BP to continue later
- OpenStack Atlanta PTG February 2017
  - At the end maybe no changes to Nova. Out of scope
- OPS Milan March 2017, Craton
  - OSIC funding cut -> Craton development to halt in April 2017
- OPNFV Peking summit, First POC and discussion
- Doctor design guideline, August 2017
- POC September 2017
- OpenStack Sydney summit November 2017, Upgrade a big topic. Time couldn’t be better.
Agenda

Goal is to make automated NFV infrastructure maintenance and upgrade with application awareness into open source.

- Doctor maintenance use case
- Planned architecture for maintenance
- Demo setup
- Live POC Demo
- Highlights
- Next steps & Discussion
OPNFV Doctor Maintenance Use Case

1. Maintenance Request (Server S3)

2. Which VMs are affected? Find Consumer owning the VM(s) from the database.

3. Maintenance Notification (VM ID)

4. Switch to SBY configuration

5. Instruction (VM ID)

6. Execute Instruction - e.g. migrate VM

Virtualized Infrastructure Manager (VIM), e.g. OpenStack

Resource Map

Cloud Admin

OpenStack Northbound Interface

Consumer C1

Consumer C2

Consumer C3

Hypervisor

Hypervisor

Hypervisor

Hardware
Server S1

Hardware
Server S2

Hardware
Server S3

Resource Pool

VM-1

VM-2

VM-7

VM-4

Server – VM mapping

VM-1, VM-2

VM-7

VM-4

Ownership information

VM-1, VM-7 Consumer C1

VM-2 Consumer C2

VM-4 Consumer C3
Design

http://docs.opnfv.org/en/latest/submodules/doctor/docs/development/design/maintenance-design-guideline.html

Virtualized Infrastructure (Resource Pool)

Application
Optionally Re-instantiate (and delete)

Switch over

Physical host

Optionally Delete

Physical host Empty

Physical host

Migrate

HAPP1

NONHAP P1

HAPP2 stdby

NONHAP P2

HAPP1 stdby

NONHAP P1

HAPP1

NONHAP P1

Cloud Admin

Schedule maintenance

Cloud configuration DB

Fleet management tool

Workflow engine

Craton

Failure Policy

Inspector

Vitrage

Congress

OpenStack project

Cloud Infra Entity

Maintenance workflow actions

Migrate, Delete, None...

Ack + Admin action

Is project alarm enabled

Maintenance state events

Create Alarm

Admin maintenance alarm

Alarm Conf.

Ceilometer / Aodh

Notifier

App Manager / VNFM

Create Alarm

Project maintenance alarm

Controller

Resource Map

Nova

Admin action

Project action

Optionally Delete

Maintenance

Physical host

HAPP1 act

NONHAP P1

HAPP2 stdby

NONHAP P2

HAPP1 stdby

NONHAP P1

HAPP1

NONHAP P1
Demo setup

A single compute host at a time will be maintained in rolling fashion. There is one empty host where application payload (vms) is moved in interaction with application manager.

Application may do upgrade at the same time with infrastructure upgrade.

Application with 2 type of VMs:

- **ha_app**: 2 instances taking 32 VCPUs each. Floating IP is set for the active instance. Uses AntiAffinity so they are assured to be in different host:
  - ha_app1, ha_app2

- **nonha_app**: 5 instances taking 16 VCPUs each:
  - nonha_app1, nonha_app2, nonha_app3, nonha_app4, nonha_app5

4 Nokia AirFrame Compute nodes with 48 VCPUs each. One host empty, others fully occupied.

- overcloud-novacompute-0.opnfvlf.org nonha_app1, nonha_app2, nonha_app3
- overcloud-novacompute-1.opnfvlf.org ha_app1, nonha_app4
- overcloud-novacompute-2.opnfvlf.org ha_app2, nonha_app5
- overcloud-novacompute-3.opnfvlf.org
Demo Design

Virtualized Infrastructure (Resource Pool)

- Physical host
  - ha_app1
    - act
  - nonha_app1
    - stdby
  - ha_app2
    - stdby
  - nonha_app2
    - stdby

- Physical host Empty

Application

- Switch over
- Re-instantiate
- Migrate
- Delete

Maintenance

Admin action

Project action

Cloud Admin

Schedule maintenance for a host aggregate/cell

Craton

Audit Nova for hosts, projects and their payload. Disable nova-compute.

Maint. workflow

Migrate: ha_app1
Delete: nonha_app1
Migrate: ha_app1
Delete: nonha_app1

Answer admin actions

Host empty, Ready for maintenance

Disable host automatic fault management

Enable host automatic fault management

Actual host maintenance done here (out of demo scope). After that compute back to enabled

Maintenance over

Maintenance done. Enable nova-compute.

App Manager

Inspector

Project own actions

Event to project about their payload affected and allowed admin actions (migrate, delete or none)

Disable host automatic fault management

Enable host automatic fault management
Highlights

• Work flow
  • **Cloud admin needs to interact with project** owning payload on host before doing maintenance action requiring downtime for the host
  • Before maintenance starts, **project will do actions** for his payload and tells admin workflow when he is ready for maintenance
  • Project can reply with **admin action** that should be performed to his payload.

• Benefits
  • A solid way to make **automated Telco infrastructure maintenance**
  • **Zero downtime** for application over planned infrastructure maintenance
  • Ability for application to **know about new capabilities**
  • Ability to make **application upgrades** together with cloud infrastructure maintenance/upgrade in controlled manner

• Pain point
  • Might be only feasible to start with messaging part and make Doctor test case that has the example of using it.
Next Steps

http://docs.opnfv.org/en/latest/submodules/doctor/docs/development/design/maintenance-design-guideline.html

[Diagram showing maintenance workflow actions and notifications]
Let’s keep our clouds running with five nines
It’s no rocket science

Thank you!!!