High Availability of NFV Platform -- Requirements and Deployment

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High Availability Framework and Requirement of NFV
- High Availability Requirement of NFV
- Scenario and usecases of High Availability

Introduction of Senlin Project in Openstack

Demo
Telecom Systems requires 99.999% reliability, while virtualization technology brings extra challenges for high availability in NFV.

- Divide high availability problem in NFV scenarios into three layers: hardware layer, NFV platform layer, and service layer.
- Define requirements for each layer to provide overall high availability.
- Define common API for NFV platforms to provide carrier grade high availability feature for VNF services.

**Service HA**

- Traditional service HA schemes may not be suitable because of virtualization.
- Heart beat between services to provide high availability.
- Extra support from the NFVI can simplify the HA scheme.
- Interface with NFV platform should be defined for VNF HA mechanisms.

**NFV Platform HA**

- HA schemes for both the control nodes and the compute nodes should be considered.
- System fault management enhancement.
- API provided for service to support service HA schemes.

**Hardware HA**

- Traditional hardware HA mechanisms can be used.
- Fault detection, management, update, and prediction should be considered.
Failure detection: VNF & NFVI

1. VM fails
2. VM Service fails
3. VNFC fails
4. NF fails*
5a. VNF detects the failure
5b. NFVI detects the failure
6a. VNF fails over
6b. NFVI reports to VIM
7a. NF recovers
7b. VIM reports to VNFM
8. VNFM ok to VIM
9. VIM repairs VM
10. VM Service recovers
11. VNF repairs VNFC

*Steps 1-4 are simultaneous they are separated for clarity
Failure detection: VNF & NFVI

Spare VNFC may or may not be instantiated

1. VM fails
2. VM Service fails
3. VNFC fails
4. NF fails*
5a. VNF detects the failure
6a. VNF fails over
7a. NF recovers

5b. NFVI detects the failure
6b. NFVI reports to VIM
7b. VIM reports to VNFM
8. VNFM ok to VIM
9. VIM repairs VM
10. VM Service recovers
11. VNF restores redundancy

*Steps 1-4 are simultaneous they are separated for clarity
High Availability Project in OPNFV

- Project Page: [https://wiki.opnfv.org/high_availability_for_opnfv](https://wiki.opnfv.org/high_availability_for_opnfv)
- Weekly meeting: Wednesday at 13:00pm-14:00pm UTC [https://wiki.opnfv.org/high_availability_project_meetings](https://wiki.opnfv.org/high_availability_project_meetings)
- Mailing list: Opnfv-tech-discussion [availability]
- Road Map:
  - **2nd release (Q3-Q4, 2015):**
    - Scenario analysis doc
    - Requirement doc
  - **3rd-4th release (2016):**
    - HA API *(Dependent on the work of ETSI NFV)*
  - Continuous Work (will be updated with each release)
    - HA deployment for OPNFV *(Upgraded with the update of OPNFV releases)*
    - Gap analysis *(Cover all the upstream projects, e.g., pacemaker, odl, openstack, also gap for opnfv itself. All the gap we figure out should be promoted to the upstream and wait until the gap is fixed and is merged to the releases of OPNFV)*
    - Testing cases *(Upgraded with the release of OPNFV)*
    - Interface with other projects *(May include Doctor, Esculator, multisite, and etc.)*
Senlin: Clustering Service for OpenStack
Senlin Features

- Profiles: A specification for the objects to be managed
- Policies: Rules to be checked/enforced before/after actions are performed
Health Management using Senlin

**Placement Policy**
- cross availability zone
- cross region
- hypervisor specific policy

**Trigger Abstraction**
- hook to OpenStack alarms
- hook to event queues
- hook to other monitoring services

**Health Policy**
- translate event to actions
- list of recovery actions
- optional fencing operations

**Guest HA Policy (Planned)**
- automated guest HA setup
- options-only interface
- mapping 'service' to 'NVF'
Resource Pool1: “Openstack -common1”
Resource Pool2: “Openstack -common2”
Resource Pool3: “Openstack -drs”

Node Group 1
- Health-policy (HA):
  - Priority: ‘low’
  - Recovery actions...
- Attach Host 28
- Attach N11
- Attach N12
- Attach Host 29
- 10G to pSwitch 1

Node Group 2
- Health-policy (FT):
  - Priority: ‘high’
  - Recovery actions...
- Attach Host 24
- Attach Host 25
- 10G to pSwitch 2
- 10G to pSwitch 3