High Availability of NFV Platform --Requirements and Deployment

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Outline

- 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

High Availability for NFV

vmware IBM 中国移动 China Mobile

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

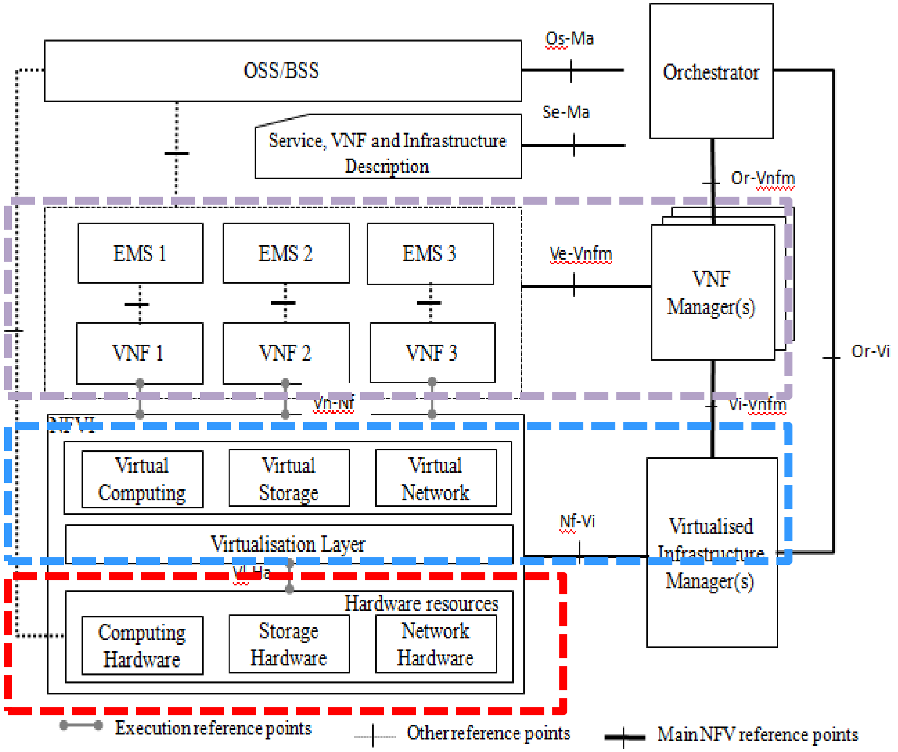
- ✓ Traditional service HA schemes may not be suitable because of virtualization.
- ✓ Heart beat between services to provide high availability
- ✓ Extra support from the NFVI can simplify the HA scheme
- ✓ Interface with NFV platform should be defined for VNF HA mechanisms.

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

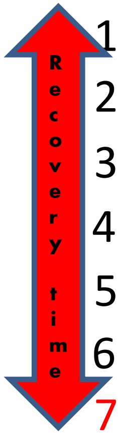
Hardware HA

- ✓ Traditional hardware HA mechanisms can be used
- ✓ Fault detection, management, update, and prediction should be considered



UC1: Stateful VNF with Redundancy

Failure detection: VNF & NFVI



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

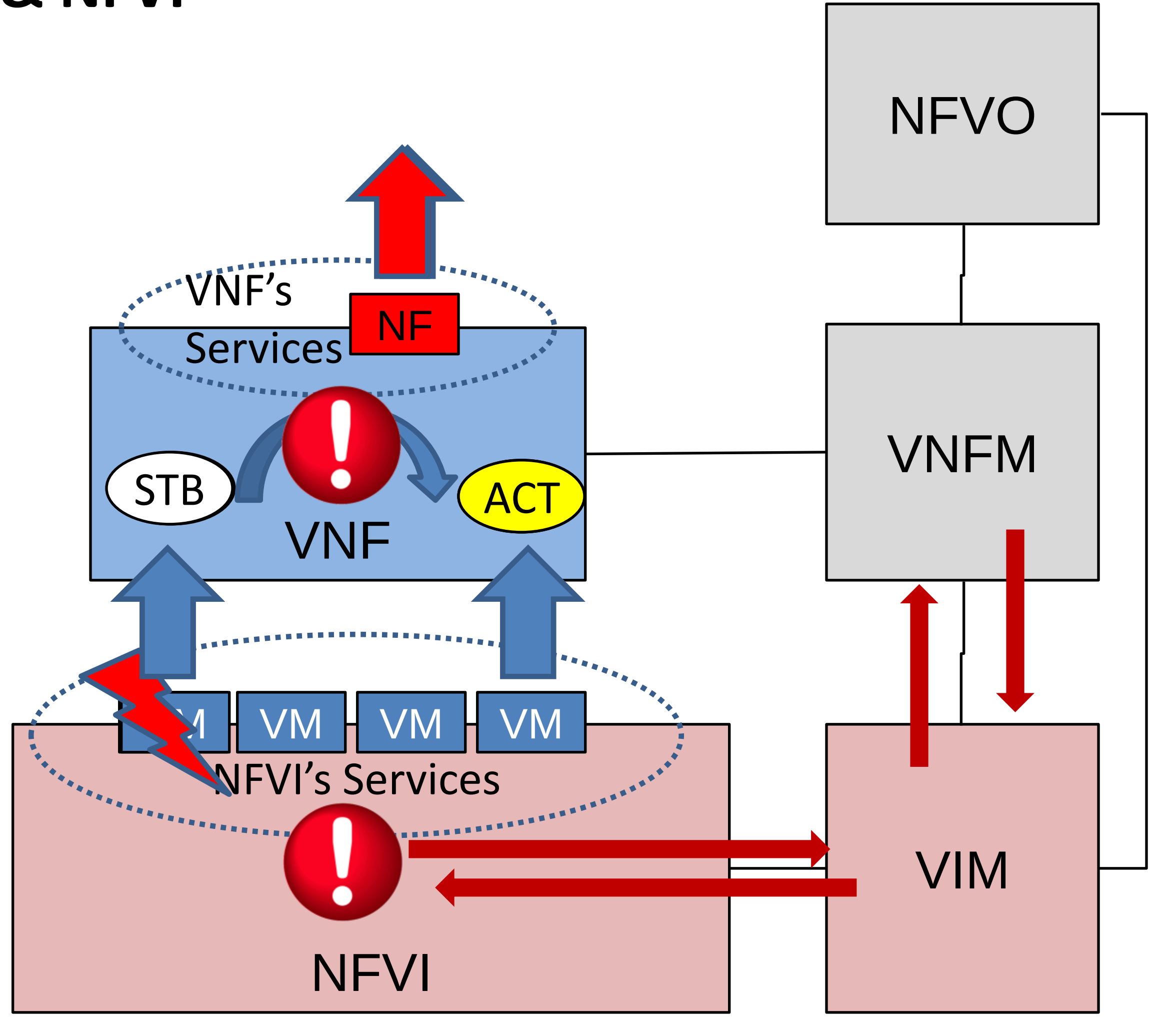
7b. VIM reports to VNFM

8. VNFM ok to VIM

9. VIM repairs VM

10. VM Service recovers

11. VNF repairs VNFC

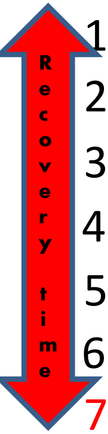


*Steps 1-4 are simultaneous they are separated for clarity

UC2: Stateless VNF with Redundancy

Failure detection: VNF & NFVI

Spare VNFC may or may not be instantiated



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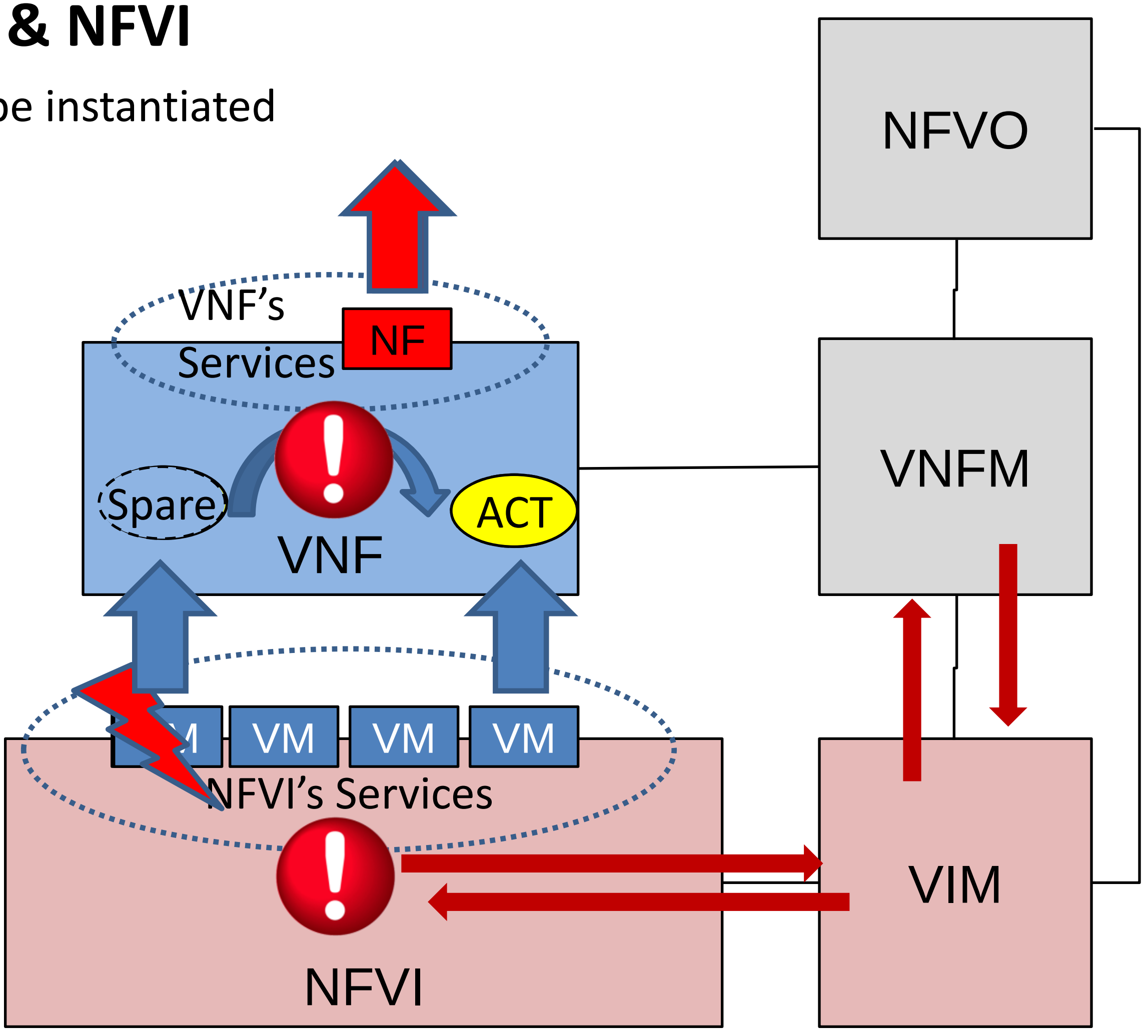
10. VM Service recovers

11. VNF restores redundancy



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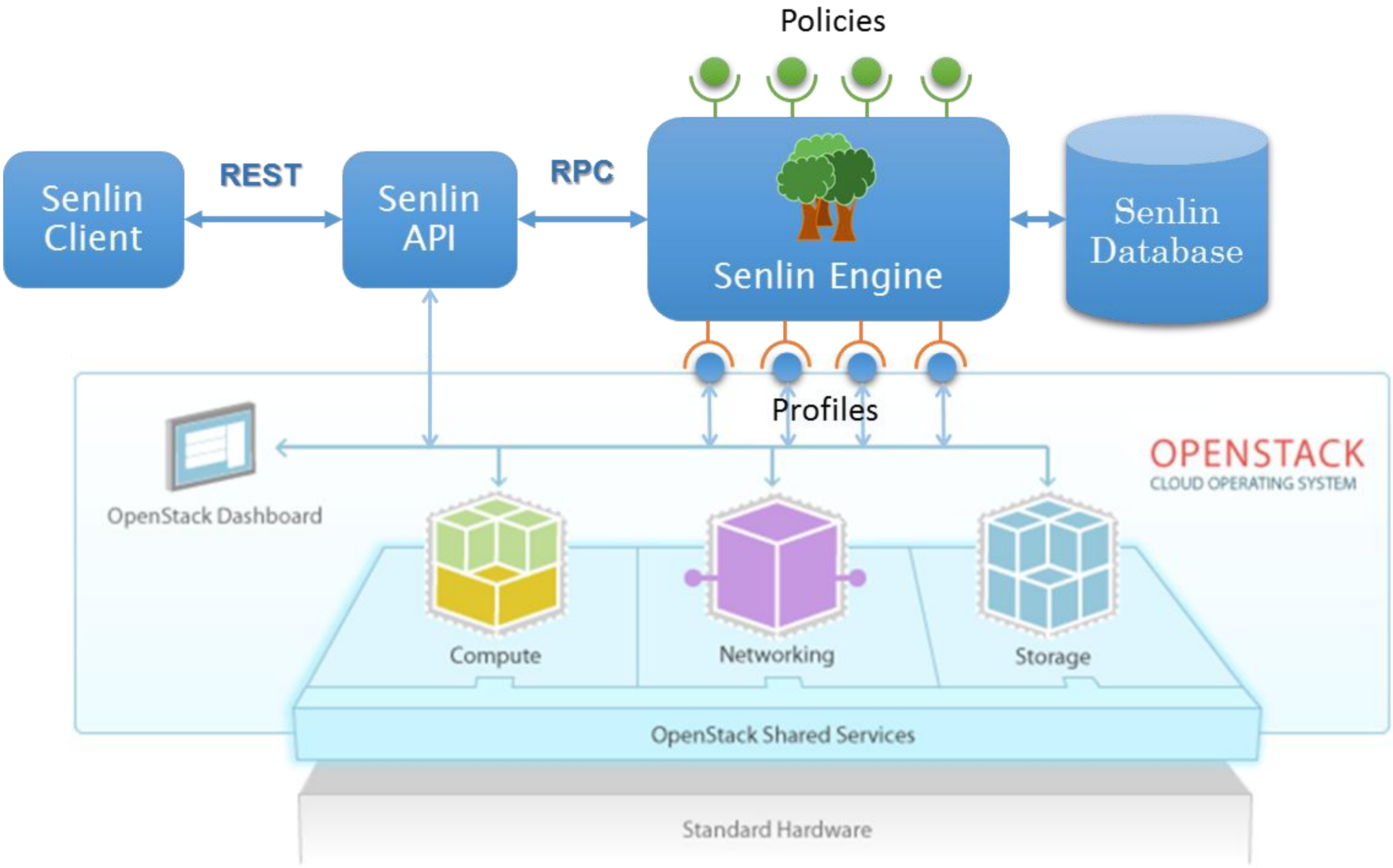
High Availability Project in OPNFV

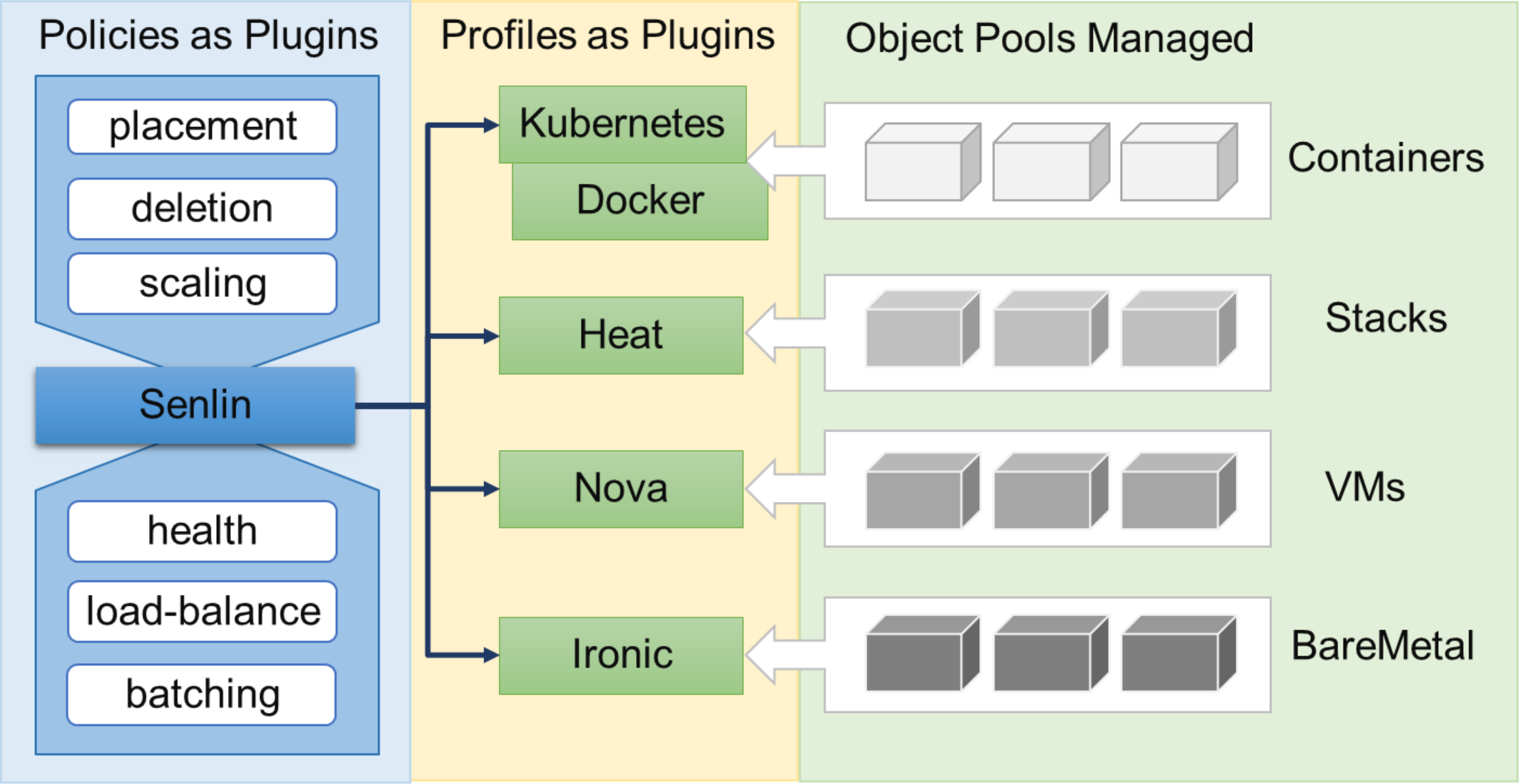
- **Project Page:** https://wiki.opnfv.org/high_availability_for_opnfv
- **Weekly meeting:** Wednesday at 13:00pm-14:00pm UTC
  https://wiki.opnfv.org/high_availability_project_meetings
- **Mailing list:** Opnfv-tech-discussion [availability]
- **Road Map:**
  - **2nd release (Q3-Q4, 2015):**
    - ✓ 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



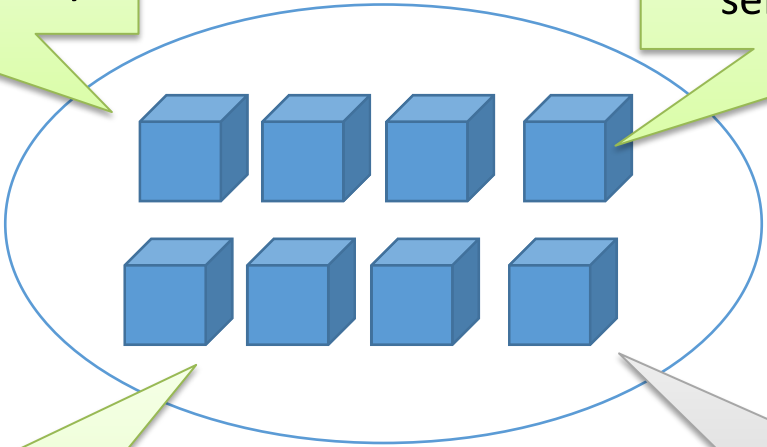
Health Management using Senlin

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



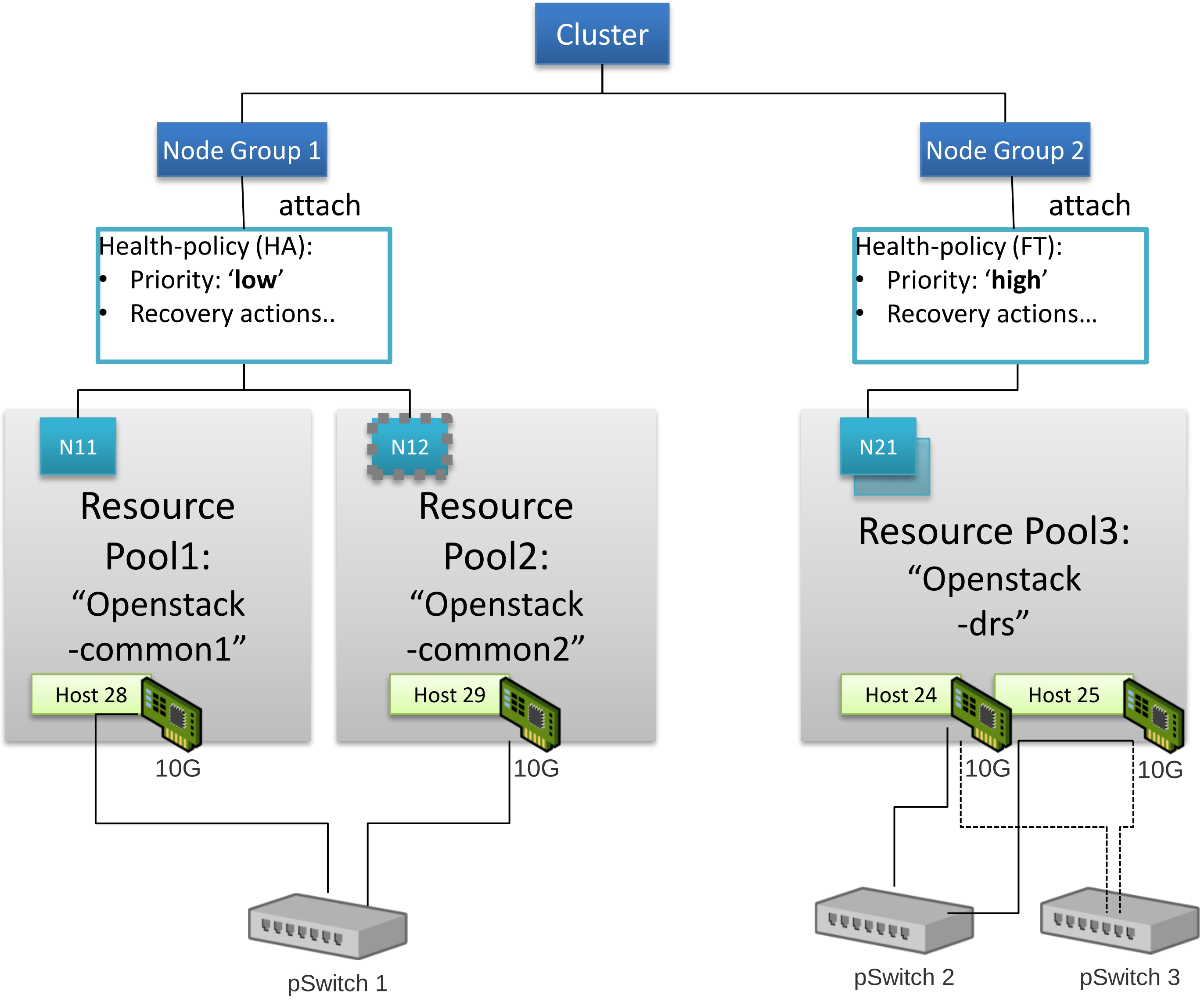
Health Policy

- 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'

Demo Scenario



Cluster
Node Group 1
attach
Health-policy (HA):
• Priority: '**low**'
• Recovery actions..
Node Group 2
attach
Health-policy (FT):
• Priority: '**high**'
• Recovery actions...
N11
Resource Pool1: "Openstack -common1"
Host 28
10G
N12
Resource Pool2: "Openstack -common2"
Host 29
10G
N21
Resource Pool3: "Openstack -drs"
Host 24
Host 25
10G
10G
pSwitch 1
pSwitch 2
pSwitch 3