오픈스택기반 NFV 관리 및 HA (high Availability) 기술

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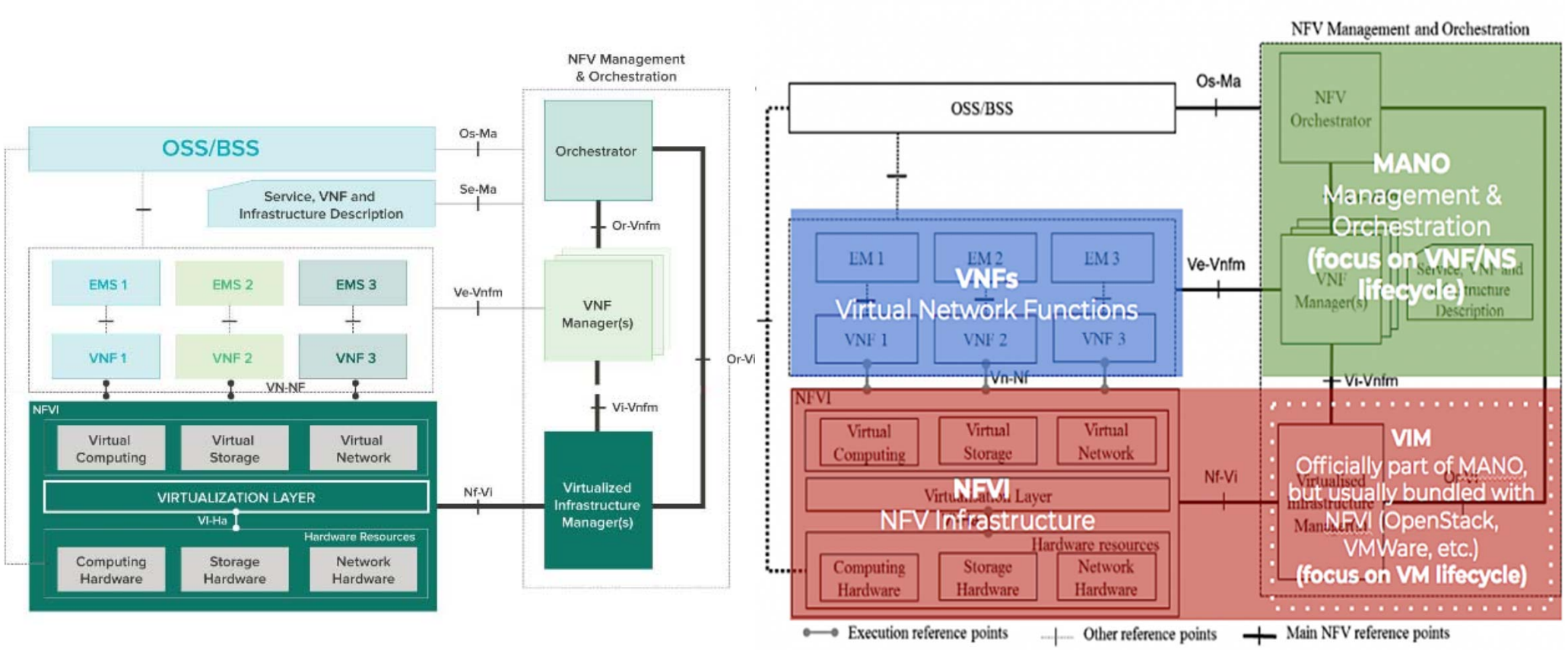
ETSI 표준 NFV Architecture

ETSI NFV Architecture



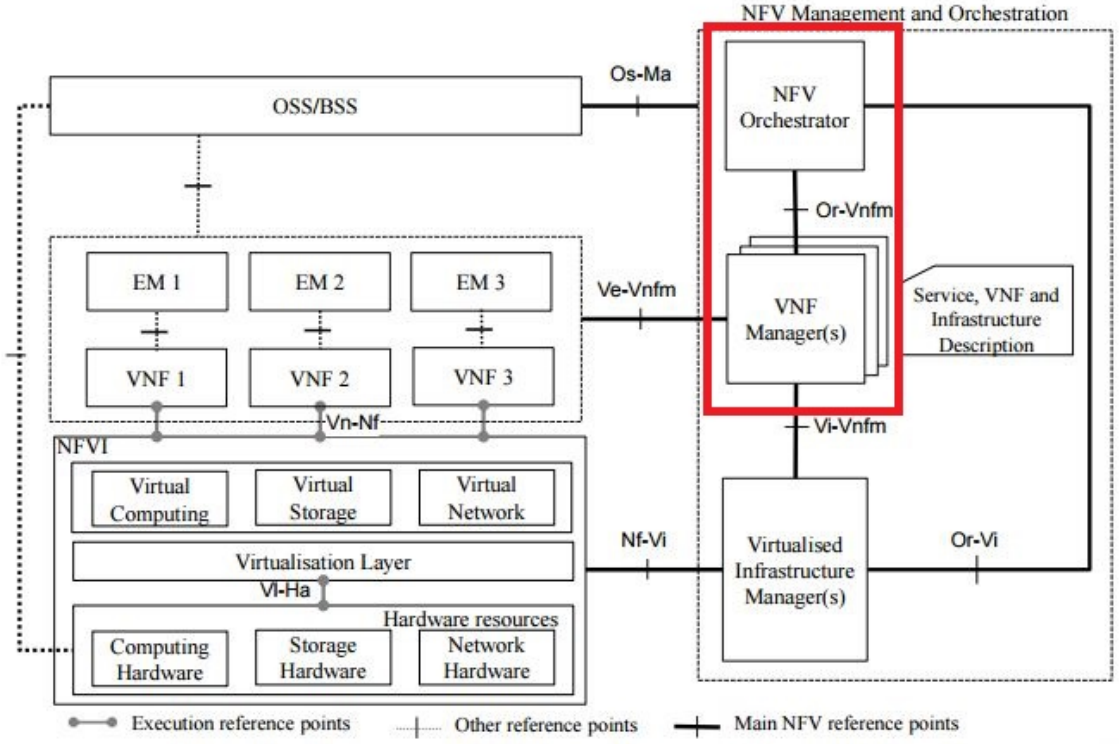
ETSI 표준 NFV Architecture

- **Role of the NFVO**
  - on-boarding of new **Network Service (NS), VNF-FG and VNF Packages**
  - **NS lifecycle management** (including instantiation, scale-out/in, performance measurements, event correlation, termination)
  - **Global resource management**, validation and authorization of NFVI resource requests
  - **policy management** for NS instances

- **Role of the VNFM**
  - **lifecycle management of VNF instances**
  - **overall coordination and adaptation role for configuration** and event reporting between NFVI and the E/NMS

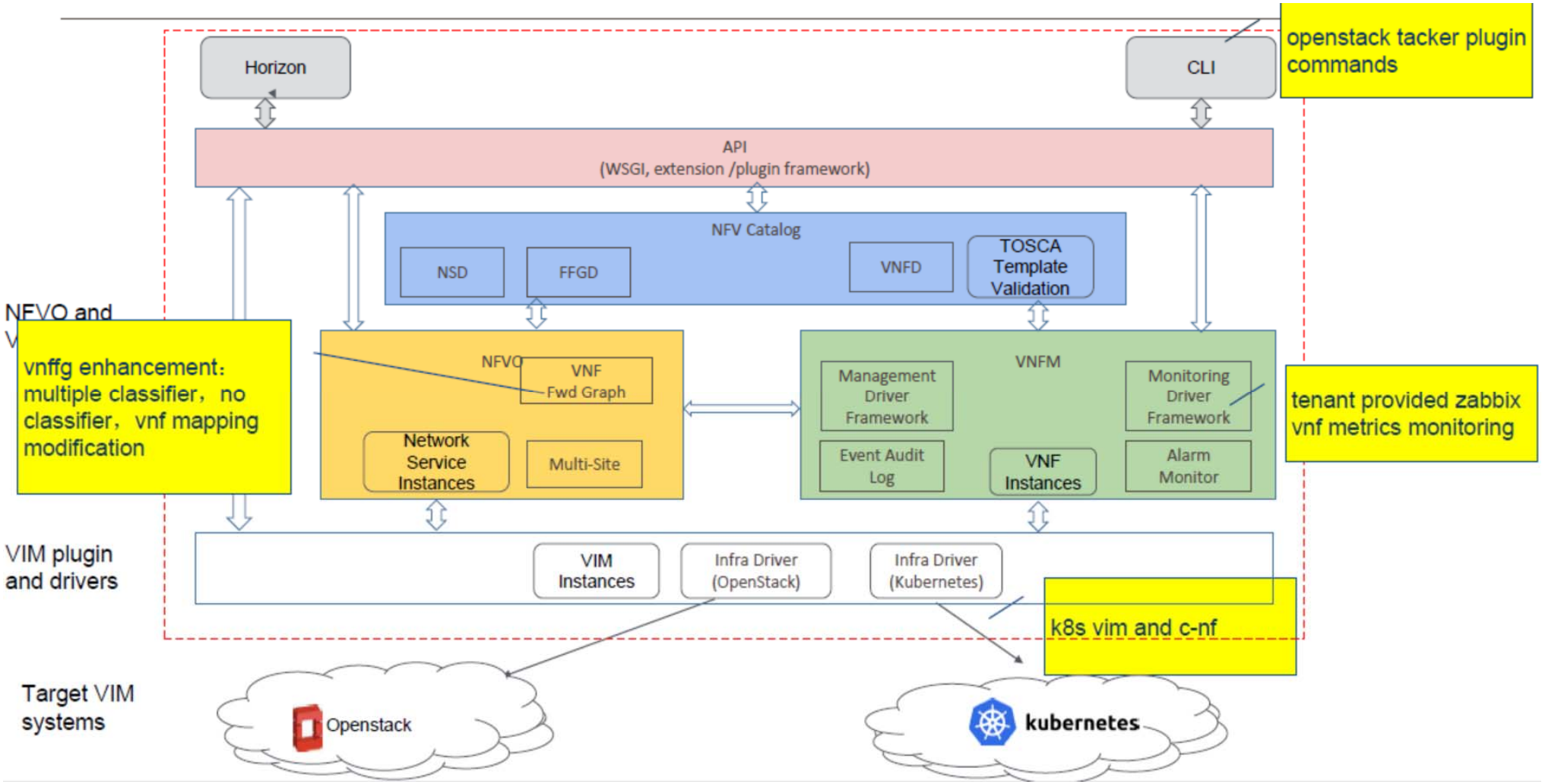
OpenStack Tacker(VNFM)

- Tacker is an OpenStack based **NFV Orchestration framework** used to deploy and operate Virtual Network Functions (VNFs).
- Tacker is compatible with **ETSI NFV Architectural Framework** and provides full functional stack to manage VNFs and orchestrate end-to-end Network Services on various VIMs.



OpenStack Tacker(VNFM)

- Updates on Tacker Architecture



OpenStack Tacker(VNFM)

OpenStack Queens Features

- **New features**
  - Multiple flow classifiers per VNF forwarding graph (VNFFG).
  - Symmetric VNFFG.
  - VNFFG updating.
  - VNFFG without flow classifiers.
  - Reusing VNFs in VNFFG.
  - **Zabbix plugin for monitoring VNF's application.**
  - **Kubernetes VIM.**
  - **Container based VNFs.**

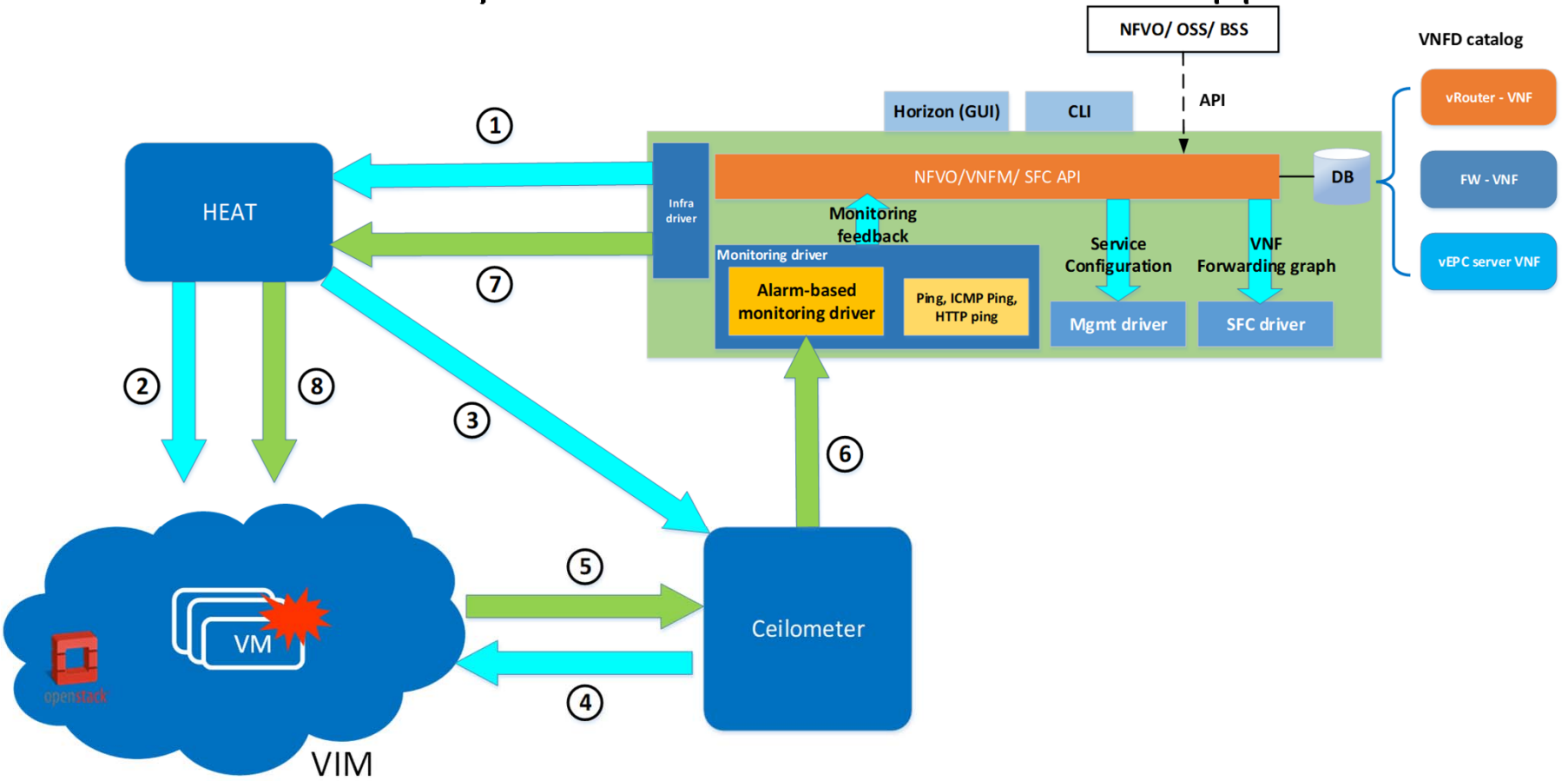
OpenStack Tacker(VNFM)

OpenStack Rocky Features

- **New features**
  - **SFC feature for hybrid container and VM based VNFs** (with Kuryr-kubernetes and networking-sfc)
  - Mistral workflow for VNF monitoring
  - Resource reservation for VNFs (with Blazar)
  - **Clustering feature**
  - Multiple forwarding path in VNFFG
  - VNFFG support in network service
  - Doc cleanup & bug fix

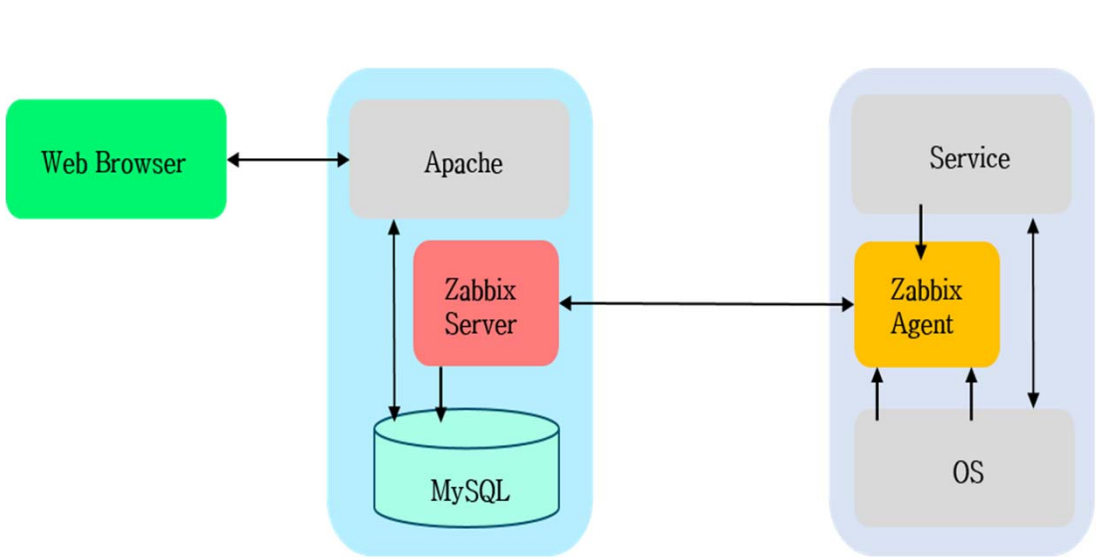
Tacker Contribution Result(1)

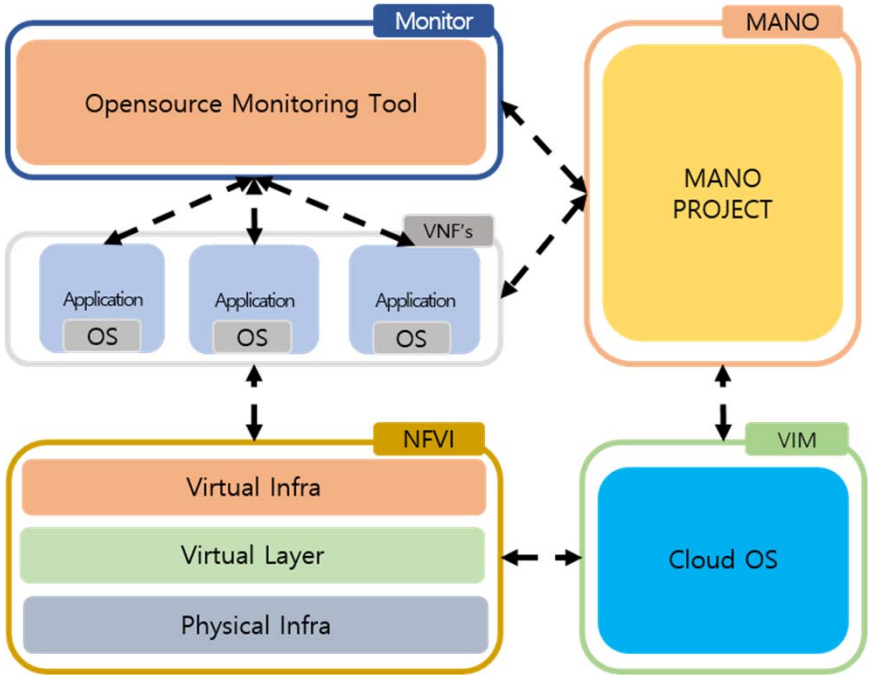
- **Alarm based Monitoring framework (Ocata)**
  - alarm-based monitoring driver can completely **monitor any resources** in OpenStack that Ceilometer can support.



Tacker Contribution Result (2)

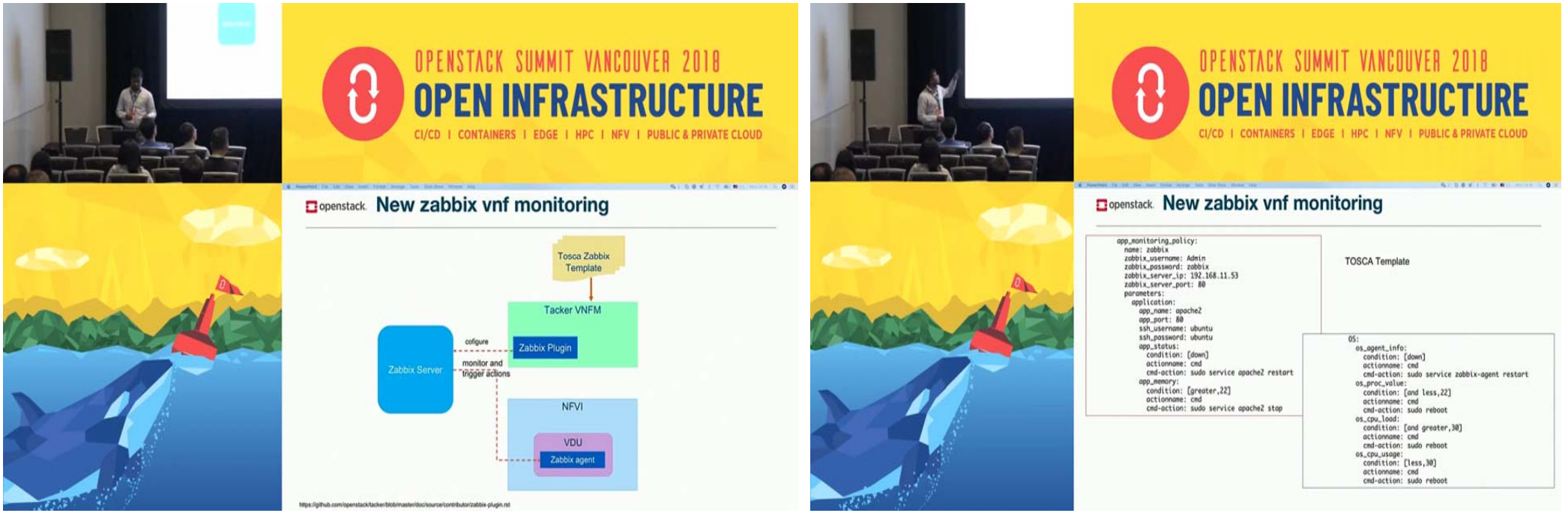
- **Zabbix Plugin for Application Monitoring (Pike)**
  - Develop a Zabbix plugin in Tacker VNF manager to **monitor application level parameters**





Tacker Contribution Result (2)

- Zabbix Plugin for Application Monitoring (Pike)
  - Proposed in September 2017, the final merge in January 2018
  - Announced at the Open Stack Vancouver Summit in May 2018

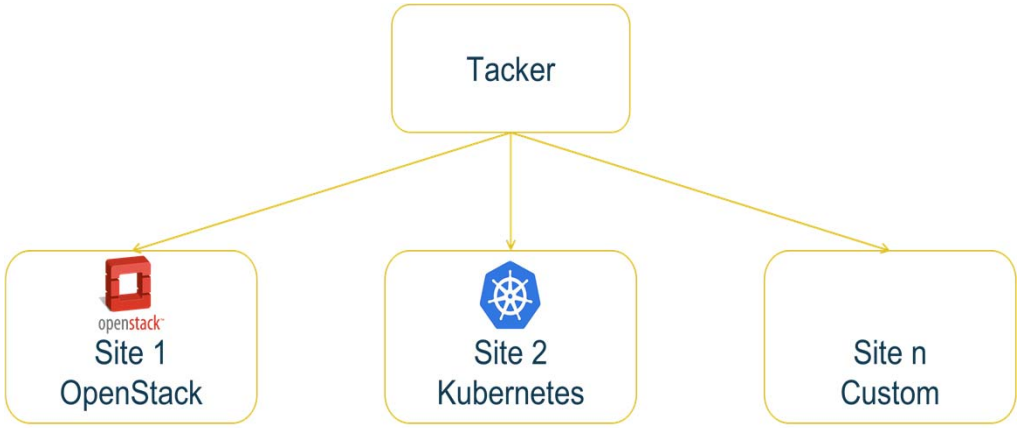


Vancouver Summit Announcement

Tacker Contribution Result(3)

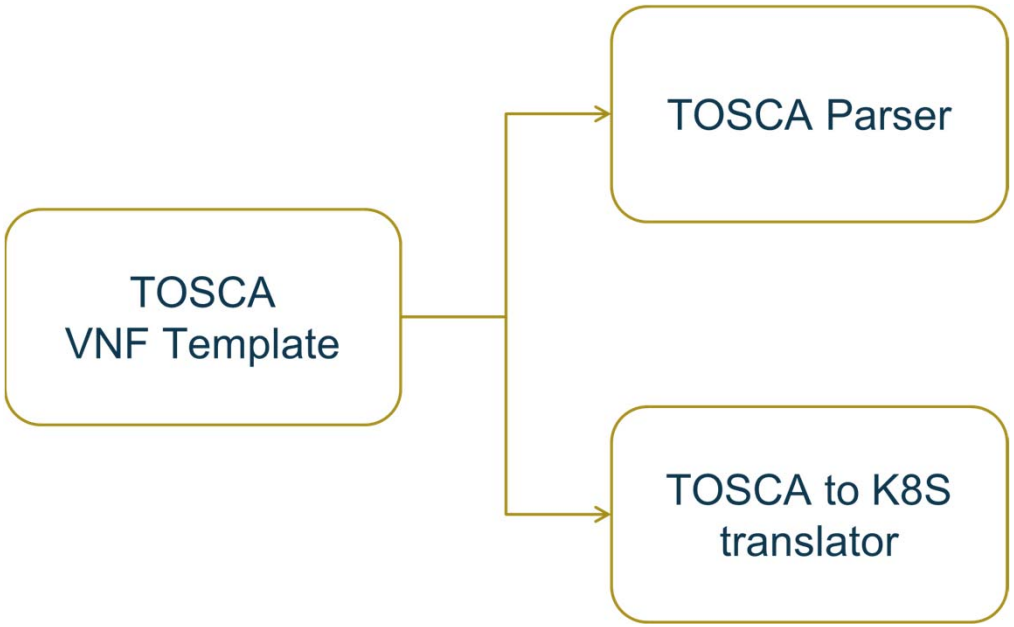
- **Kubernetes as VIM in Tacker (Pike)**
  - **Create Kubernetes type of containerized VNF(c-VNF)**
  - **Hybrid cloud deployments of VM and Container based VNF, NS.**

- auth_url: https://192.168.11.110:6443
- username: “admin”
- password: “admin”
- ssl_ca_cert: None
- type: “kubernetes”



Tacker Contribution Result (4)

- Add Kubernetes type of containerized VNF to Tacker (Pike)
  - Support network functions as containers using Kubernetes type, that will be deployed on Kubernetes VIM.

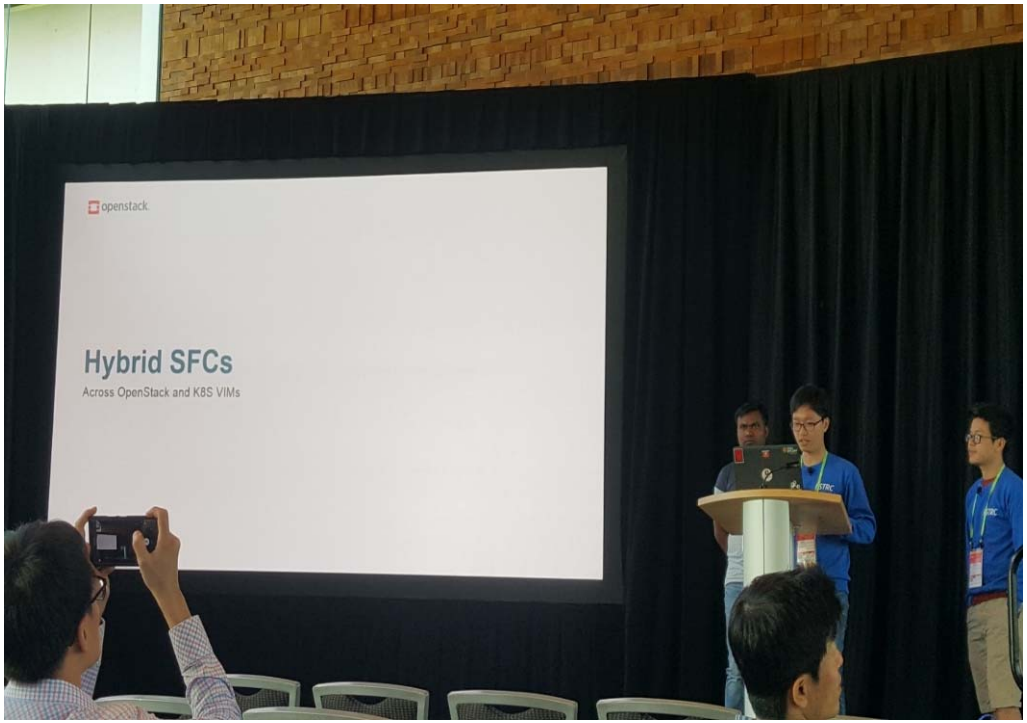


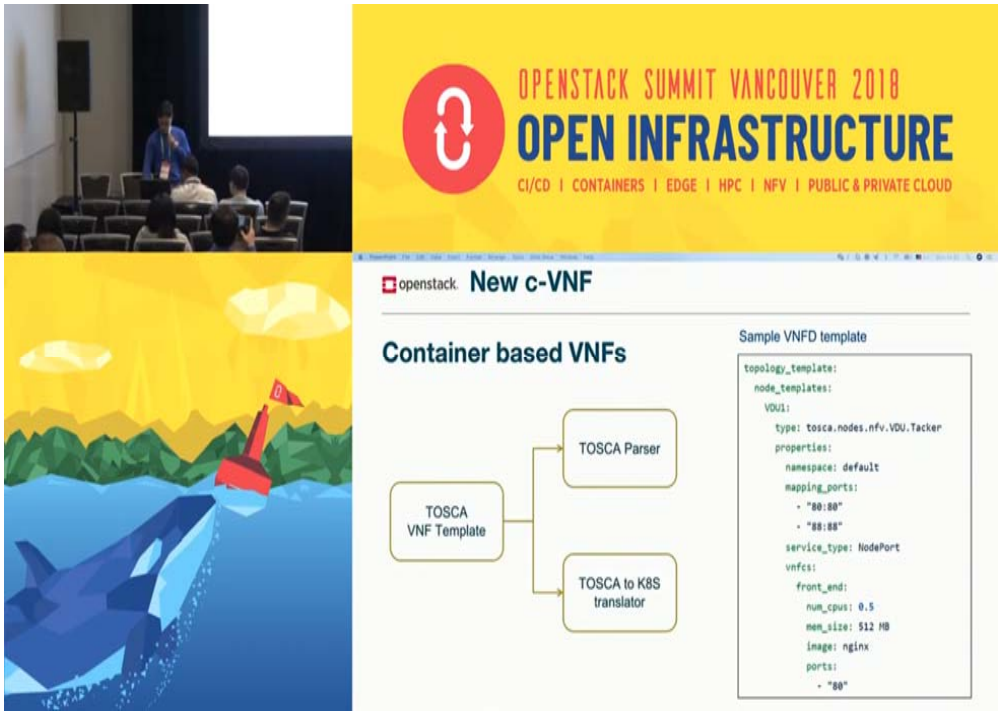
Sample VNFD template

```
topology_template:
  node_templates:
    VDU1:
      type: tosca.nodes.nfv.VDU.Tacker
      properties:
        namespace: default
        mapping_ports:
          - "80:80"
          - "88:88"
        service_type: NodePort
        vnfcs:
          front_end:
            num_cpus: 0.5
            mem_size: 512 MB
            image: nginx
            ports:
              - "80"
```

Tacker Contribution Result (4)

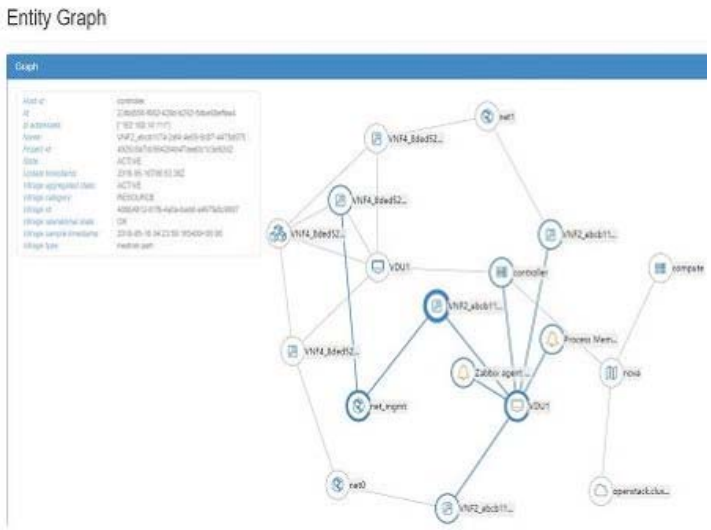
- Kubernetes VIM & Containerized VNF
  - Proposed in September 2017, the final merge in January 2018
  - Announced at the Open Stack Vancouver Summit in May 2018



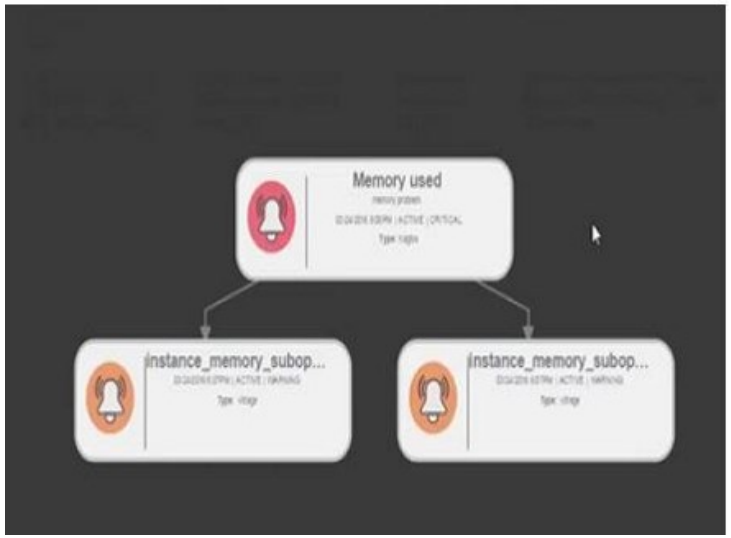


OpenStack Vitrage Project

- Vitrage(RCA)
  - Collecting Fault Alarms from the Monitoring Server
  - Infrastructure configuration and representation of each VNF as an entity, showing relationship between them
  - Provides a tree structure for the root cause of failure through relationship analysis



Vitrage Entity Graph

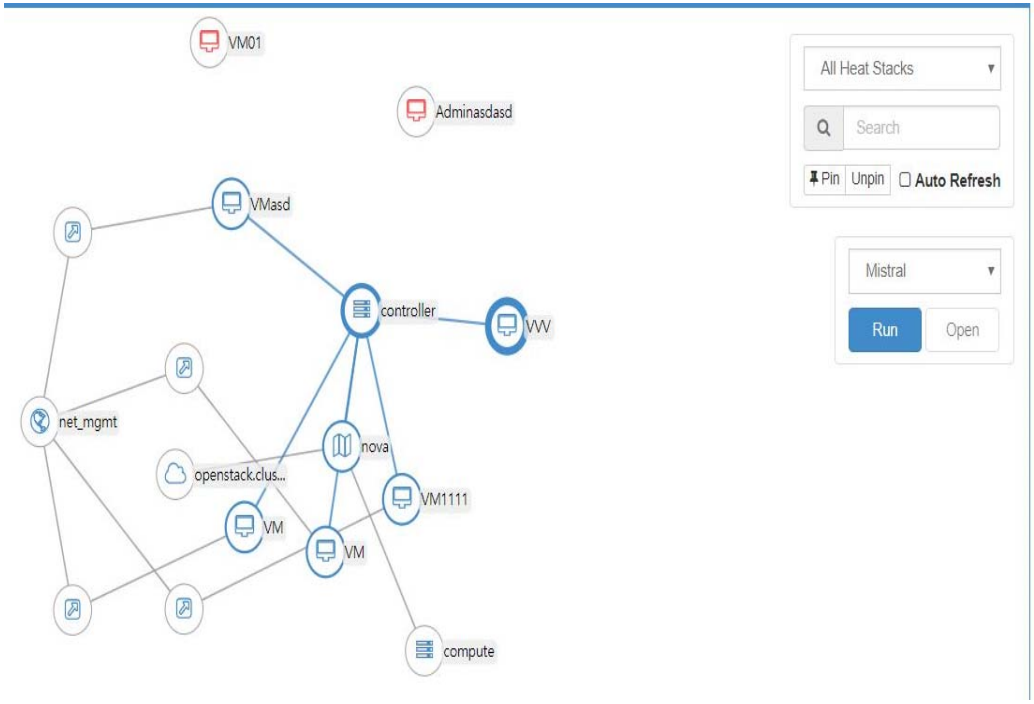


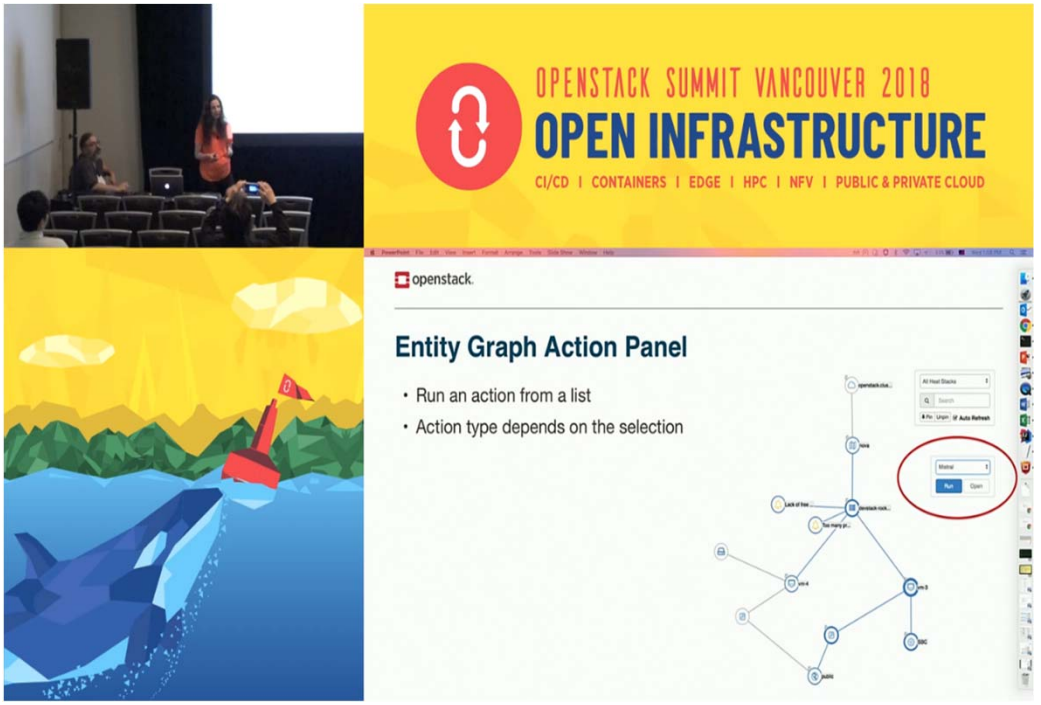
Vitrage RCA Graph

Vitrage Contribution Result

Vitrage Project(RCA)

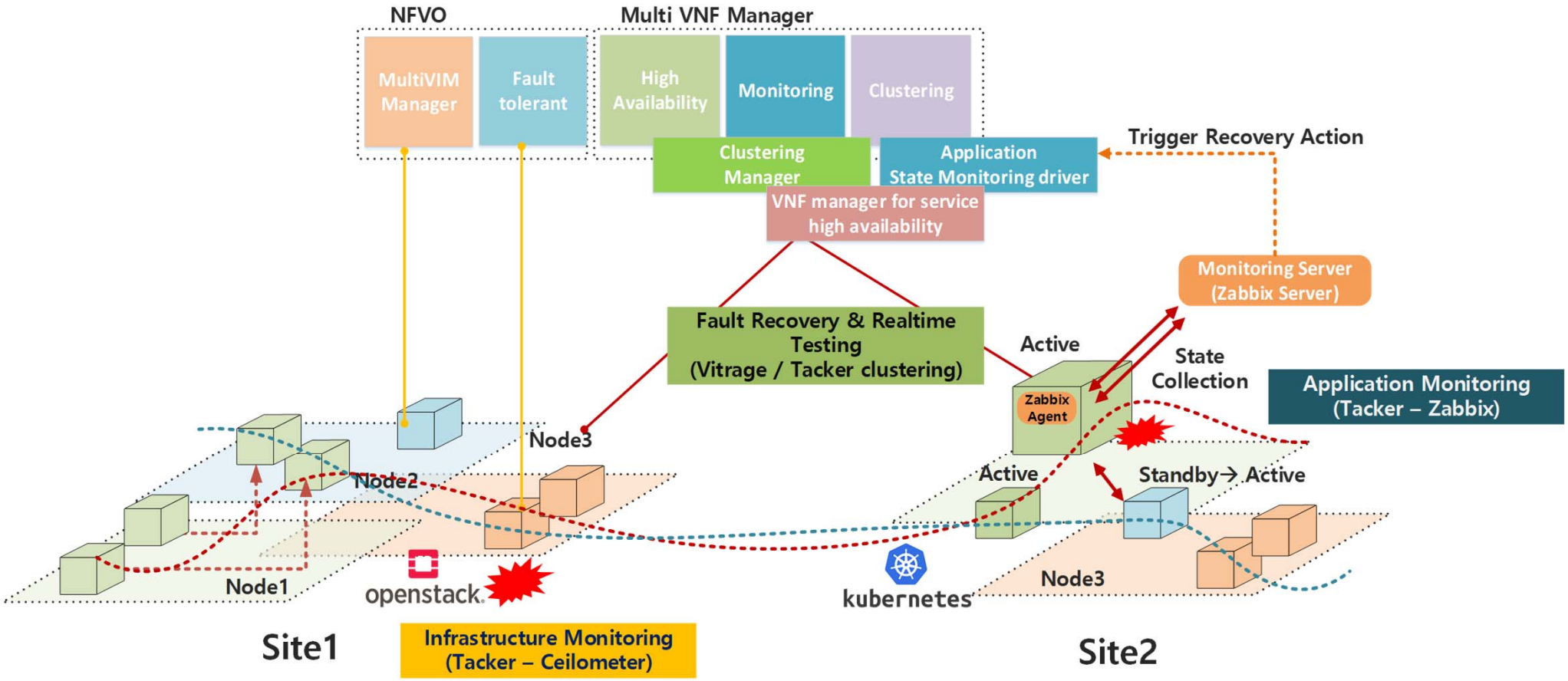
- Composite panel components for failure analysis (in progress)
  - Proposal of a plug-in panel component to provide testing and recovery of problems in case of failure analysis
  - Vitrage Rocky version featured at Vancouver Summit





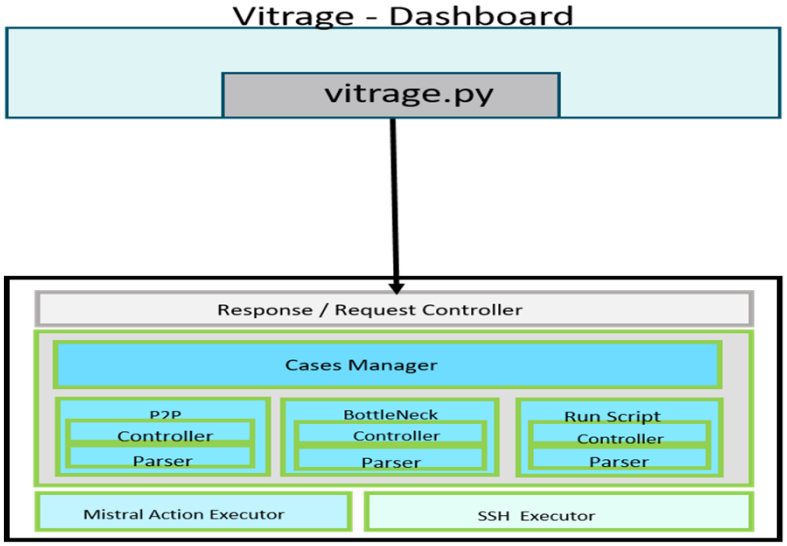
High Availability for Cloud

- **High Availability Features**
  - **Monitoring for Infrastructure / applications**
  - **Fault Recovery mechanism / Real time RCA & Testing**

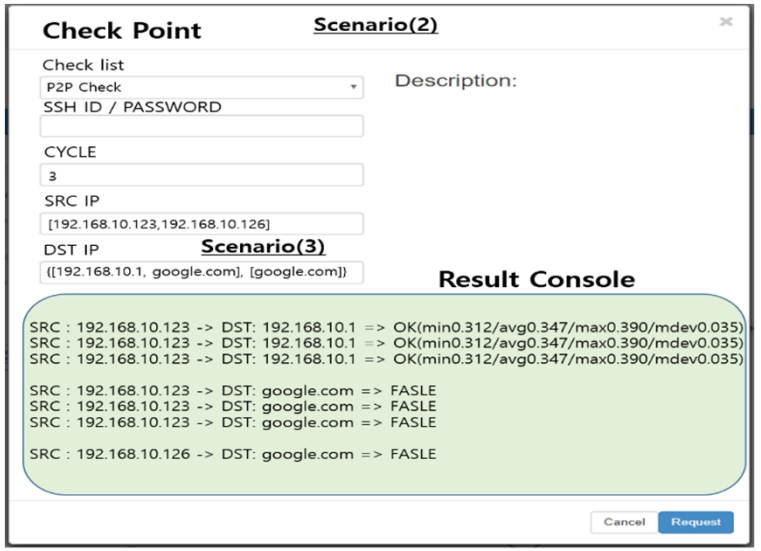


Future Plan for HA

- Real-time inspection component at VNF system level
  - A real-time inspection component for analyzing the cause of failure at the system level of VNF (2018.4)
  - Real-time check on multiple VNFs in private cloud provides accurate fault analysis
  - At the Open Stack Vancouver Summit Meeting, the proposal was discussed



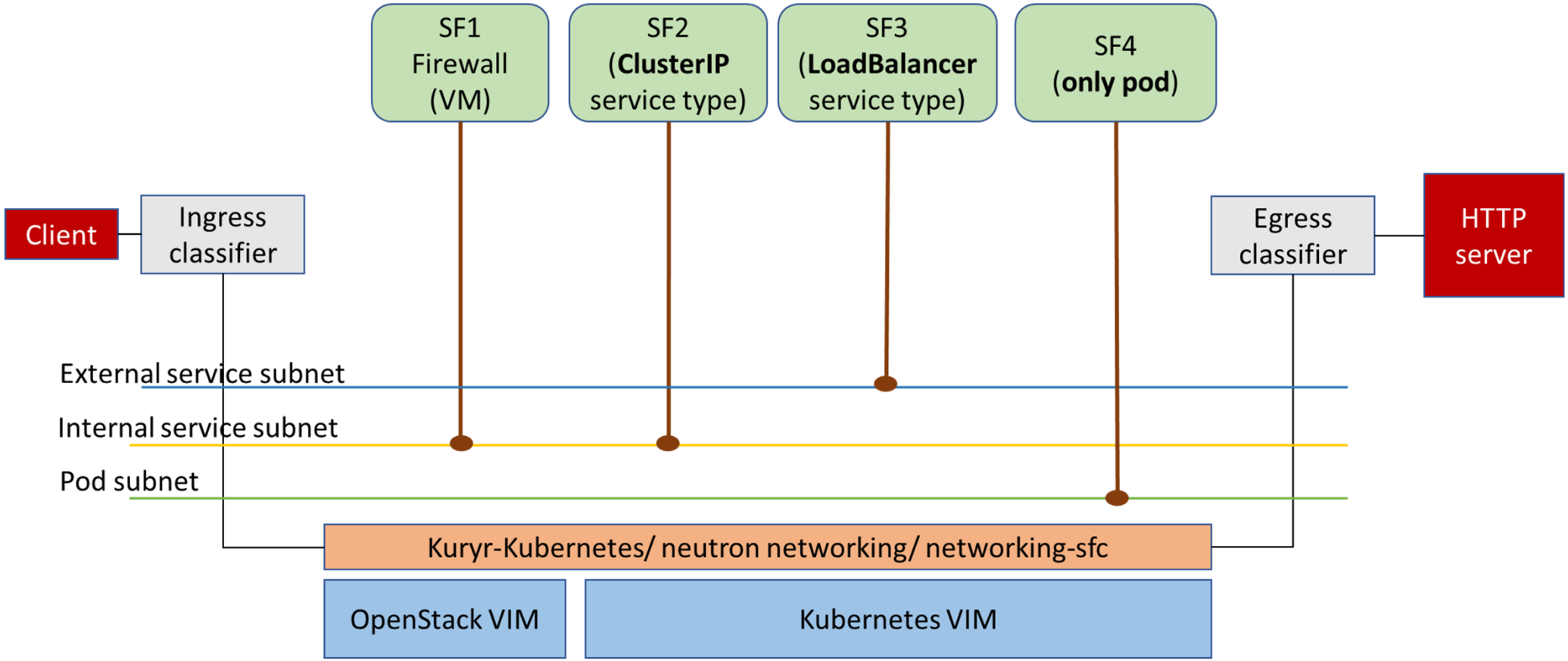
Component Architecture



Function use-case

Future Plan for HA

- **SFC for hybrid VNFs in Tacker**
  - **Support running VM and container based VNFs on the same neutron subnet (because networking-sfc does not support across subnets).**



Thank You