

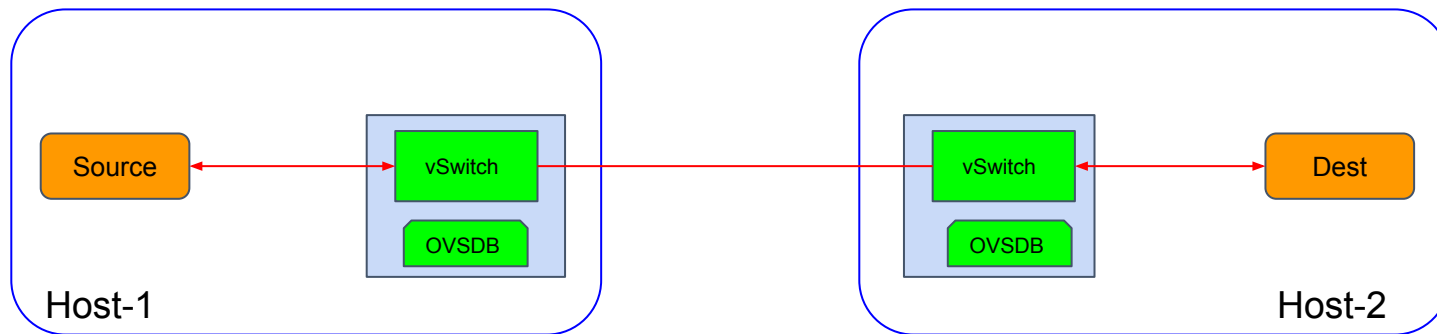
# OpenStack and OpenDaylight Integration for Service Function Chaining

Anil Vishnoi ( Brocade), Tim Rozet (RedHat), Sam Hague (RedHat)

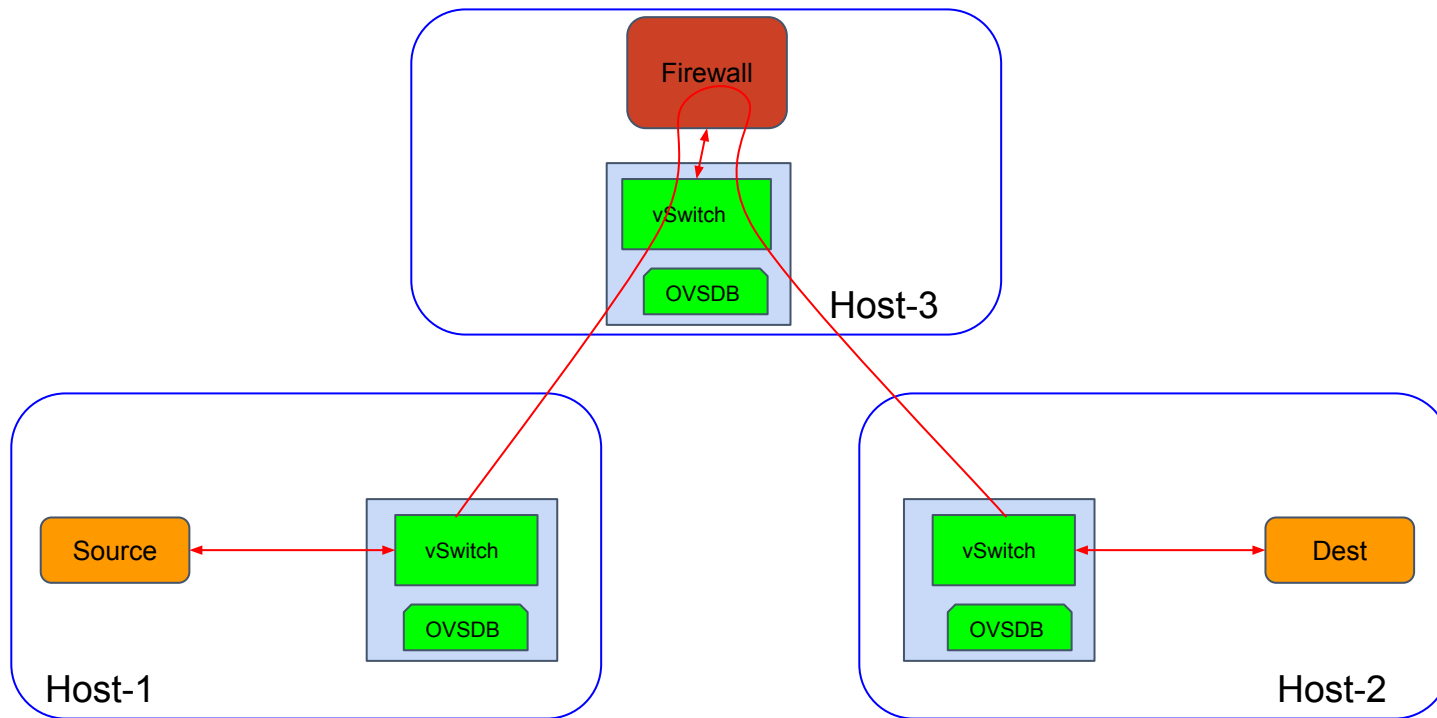
# Agenda

- Service Function Chaining
- Existing SFC support for MANO/OpenStack
- New Integration architecture for SFC support
- Demo

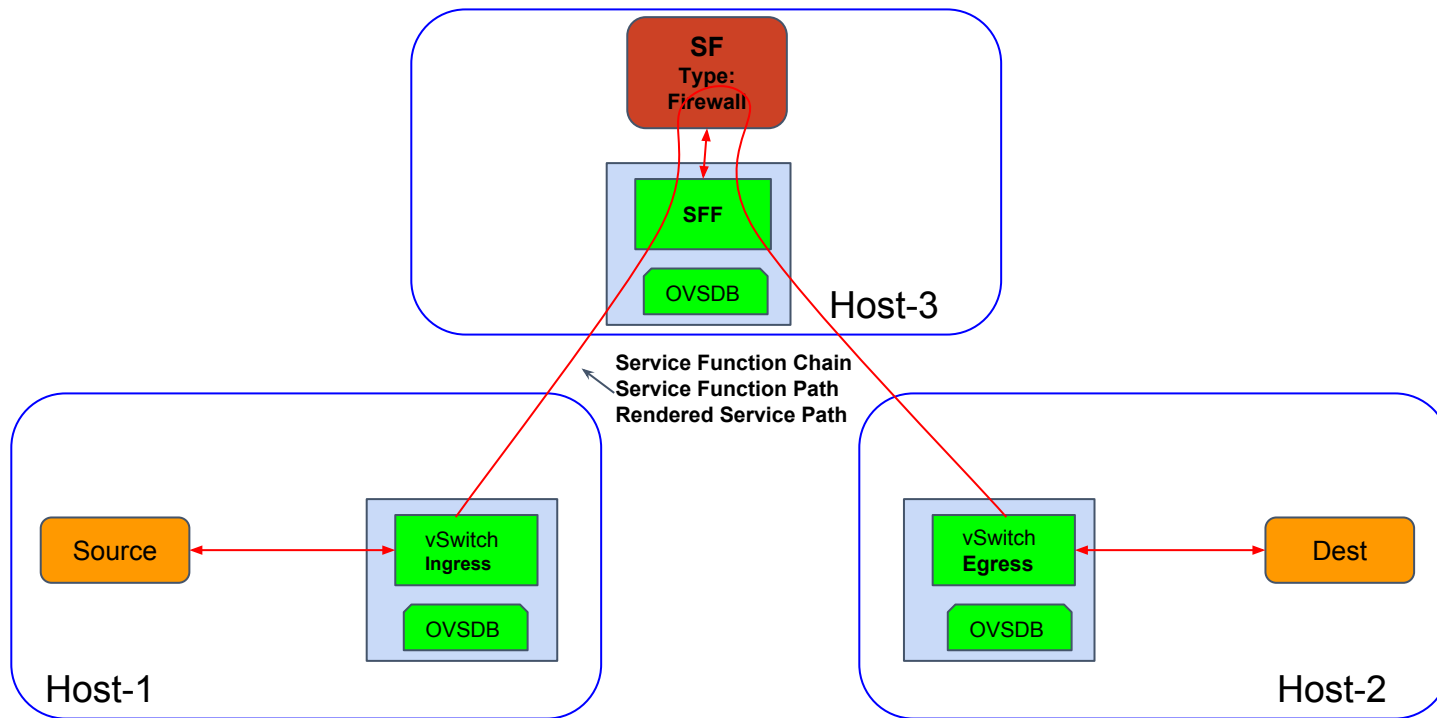
# Service Function Chaining



# Service Function Chaining

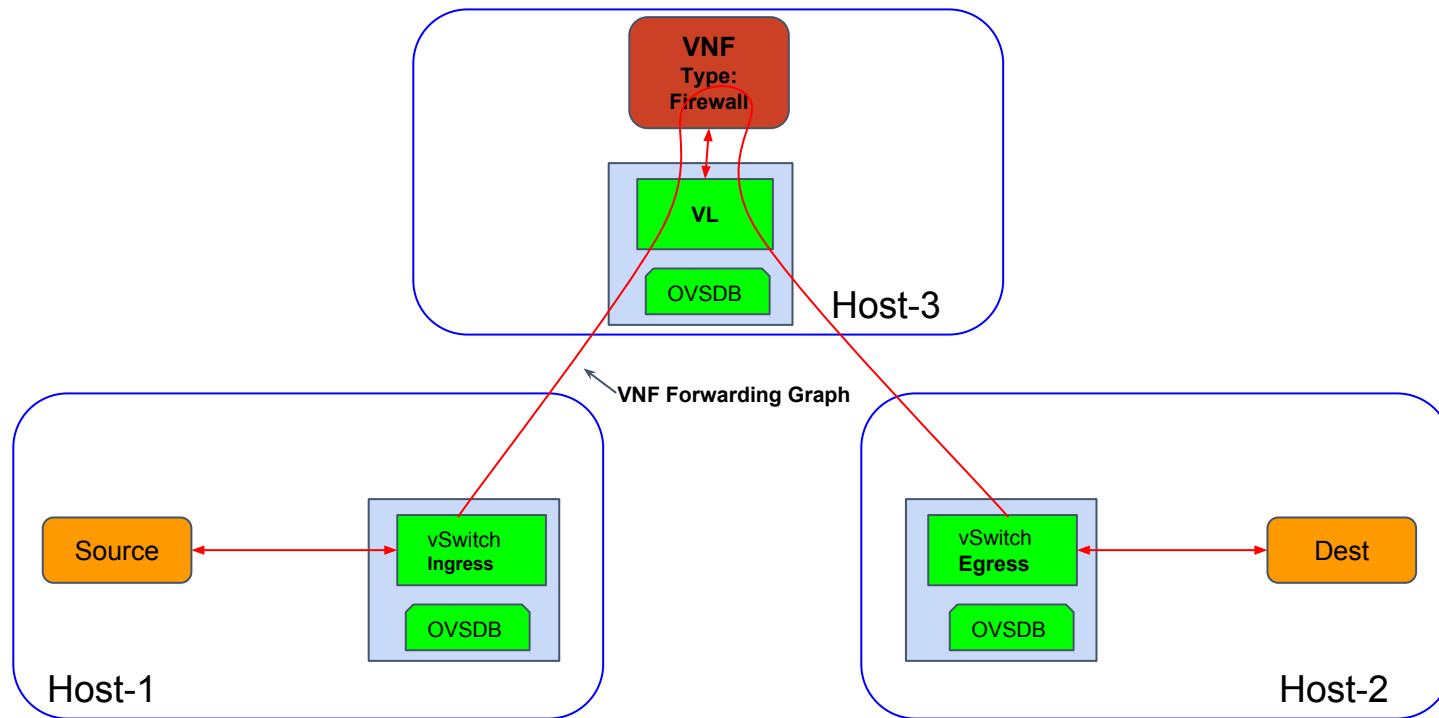


# Service Function Chaining (IETF)

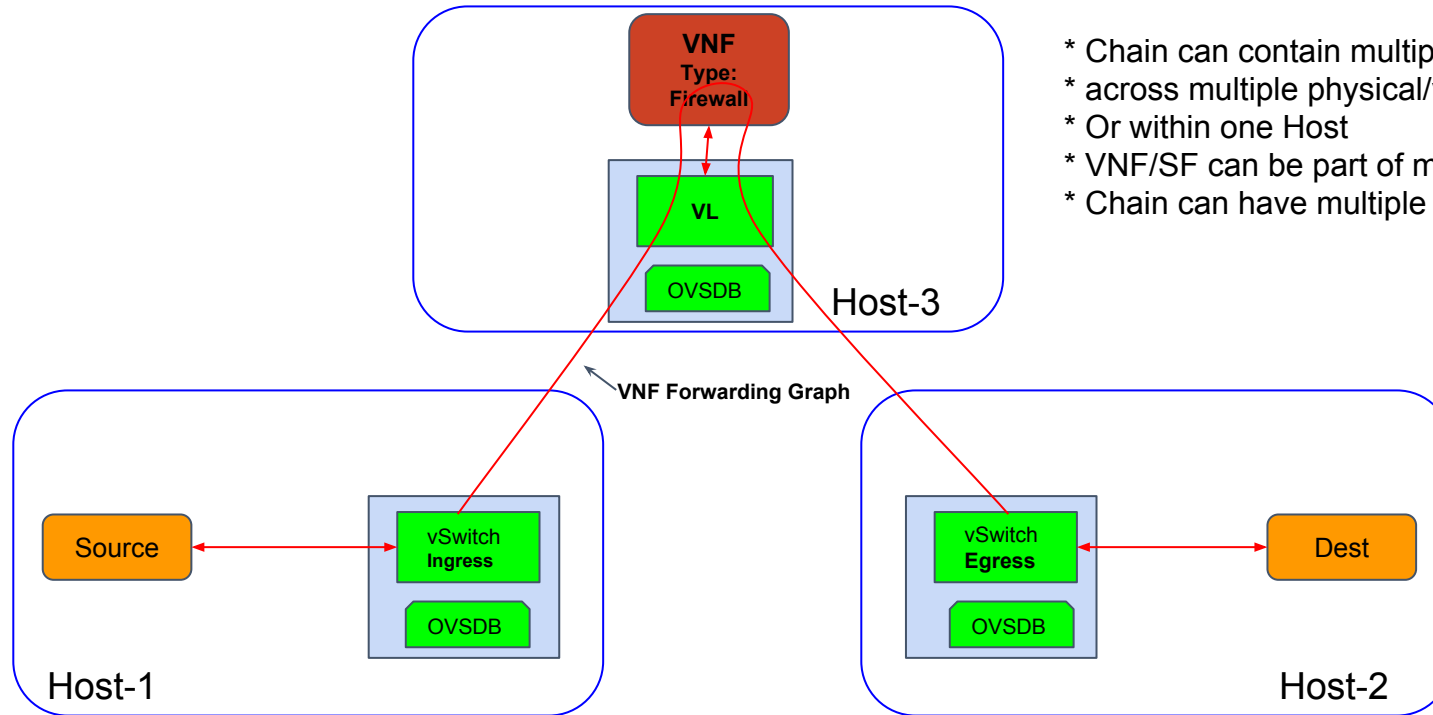




# Service Function Chaining (ETSI)



# Service Function Chaining



- \* Chain can contain multiple VNF/SF.
- \* across multiple physical/virtual host
- \* Or within one Host
- \* VNF/SF can be part of multiple chain
- \* Chain can have multiple classifiers

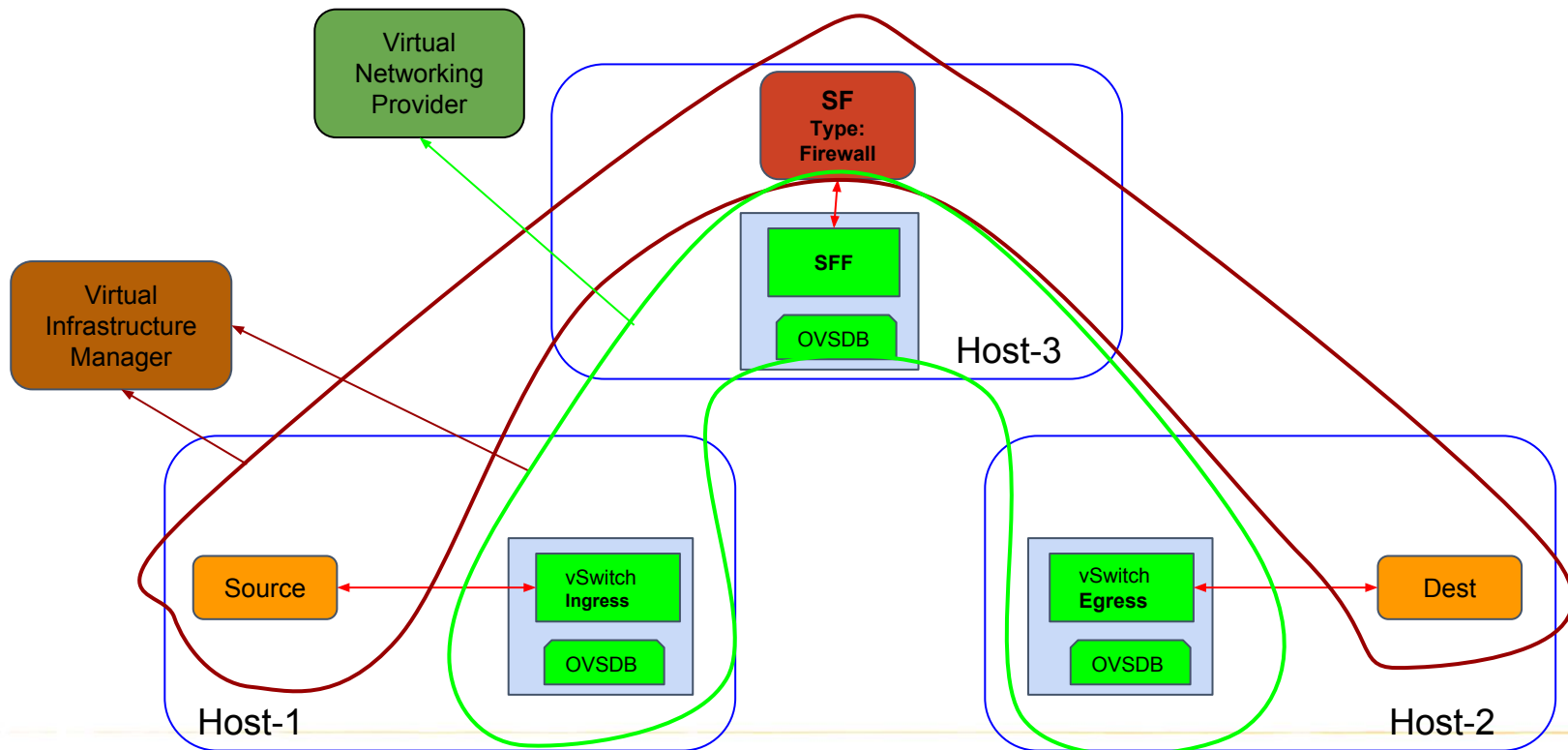
# Components of Service Function Chaining?



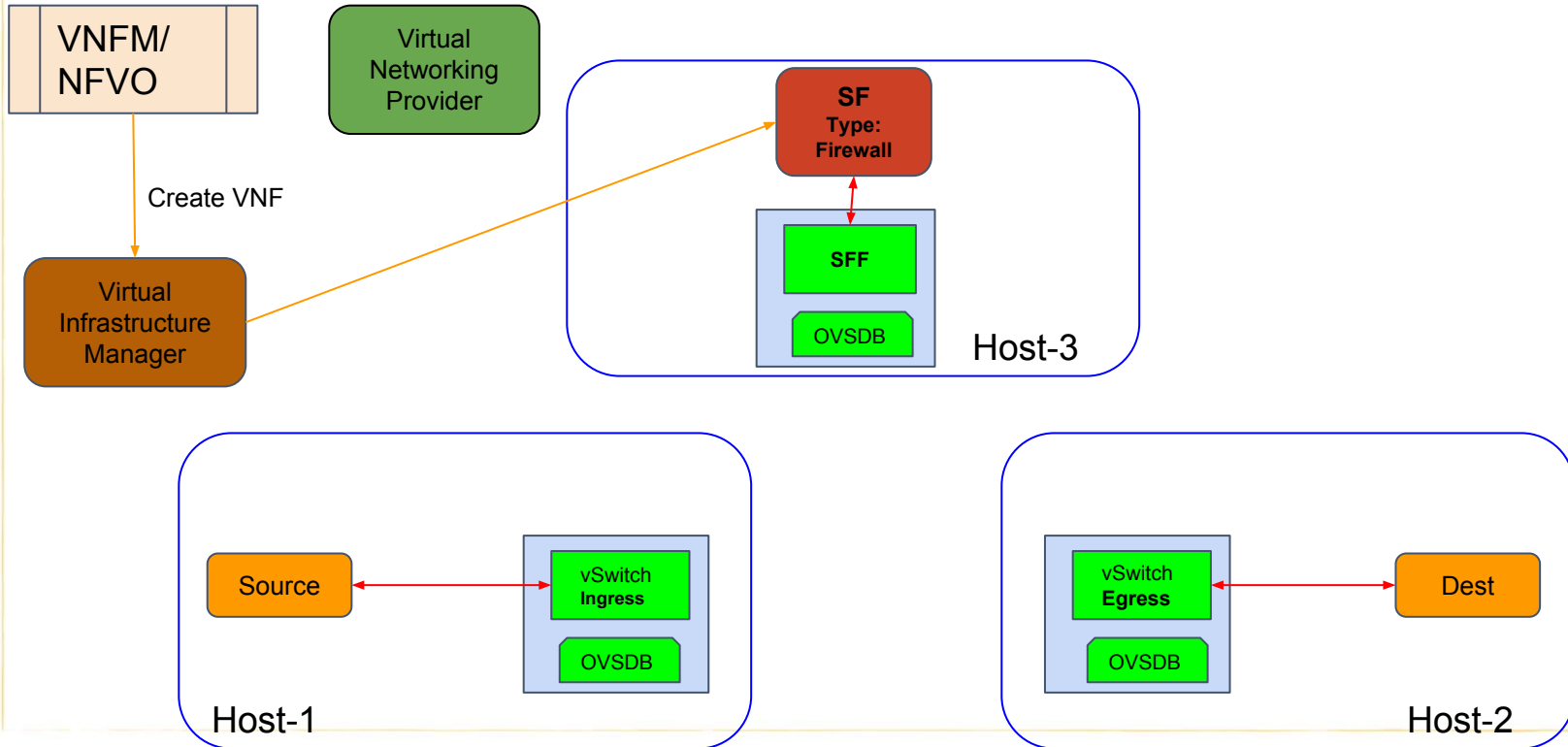
- **Classification** - Policy-based function to identify / select / match traffic flow with a specific service function chain
- **Service Function Chain (SFC)** - An ordered set of service functions (SF) and ordering constraints that must be applied to packets and/or frames selected as a result of Classification
- **Service Function Forwarder (SFF)** - Forward traffic to one or more connected SF(s)



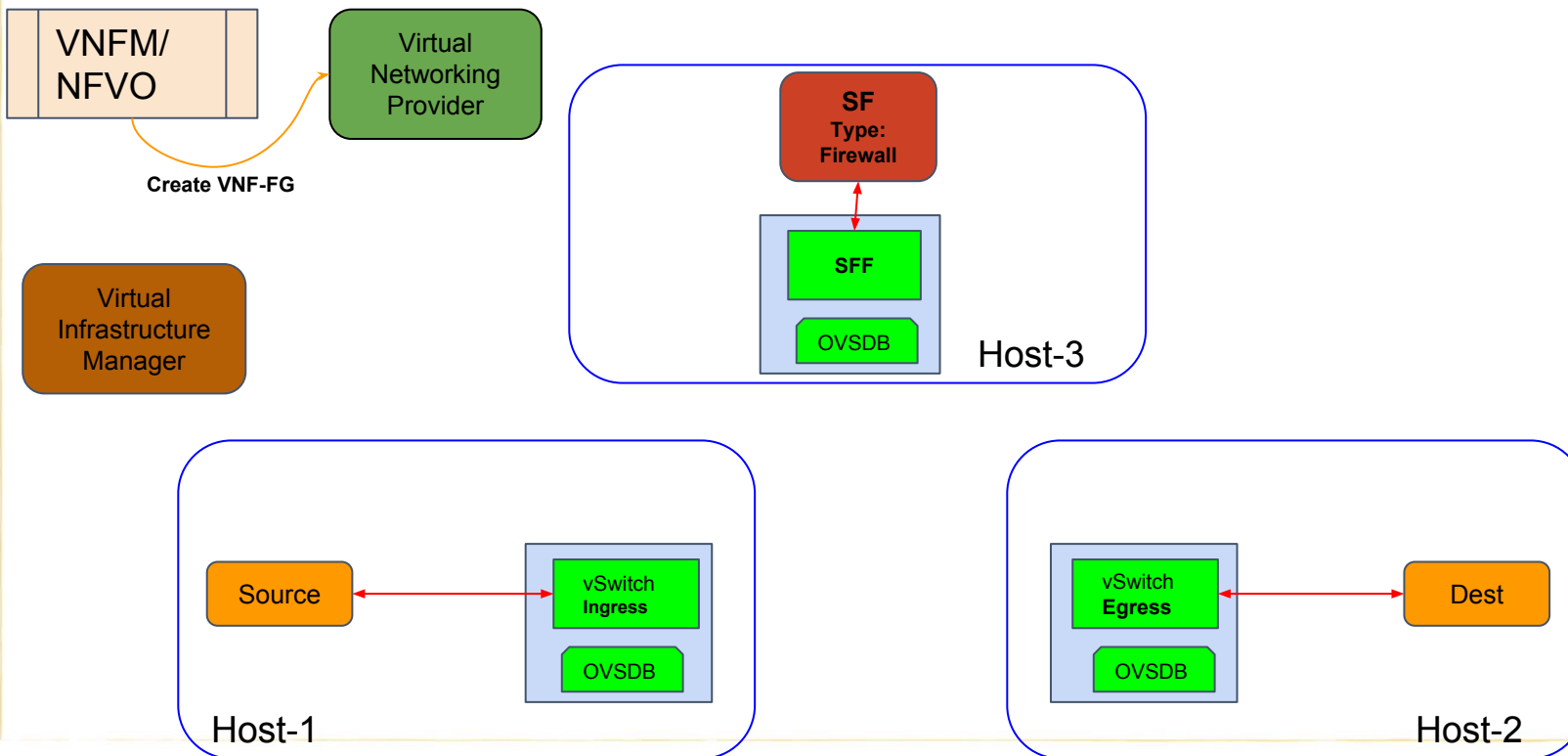
# Service Function Chaining



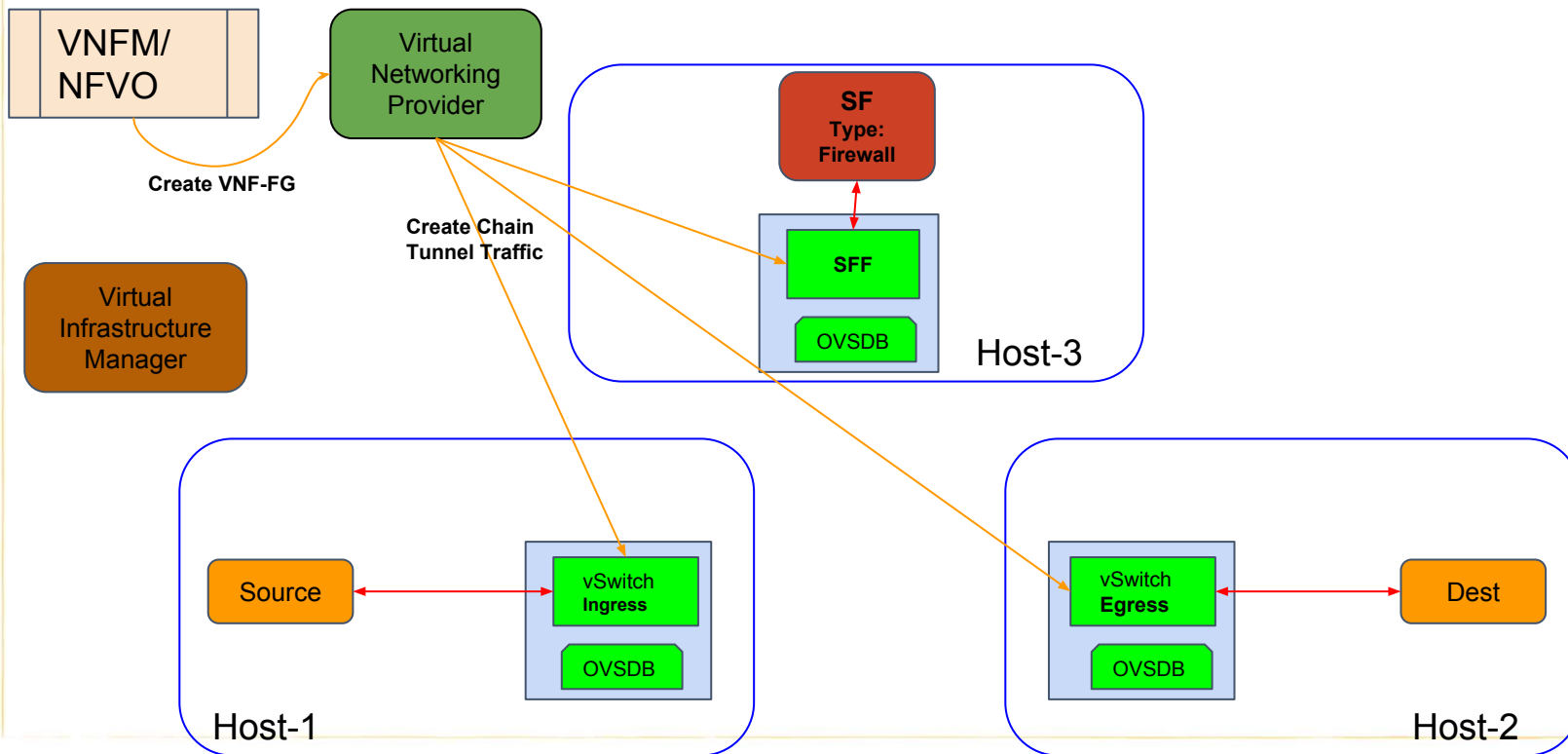
# Service Function Chaining



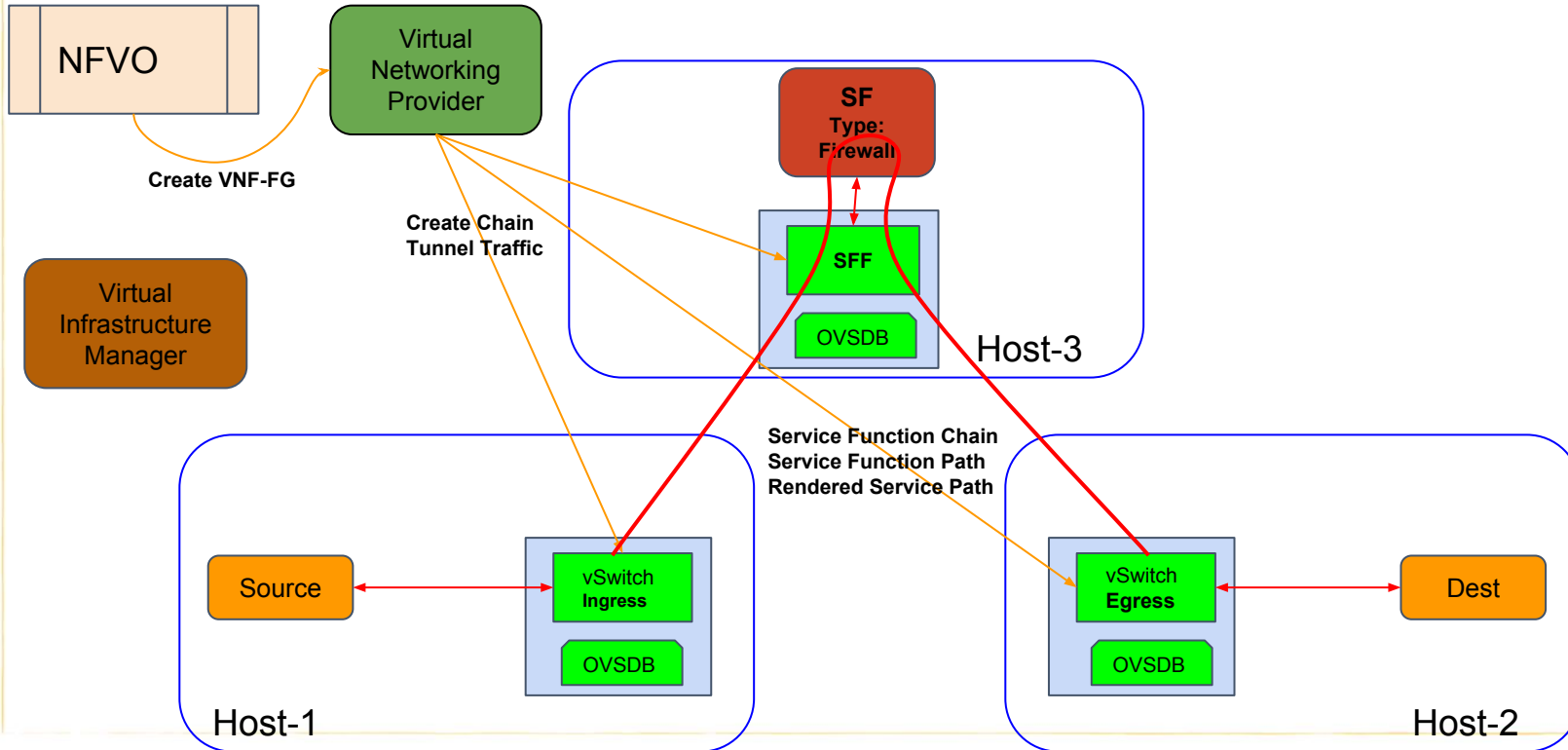
# Service Function Chaining



# Service Function Chaining

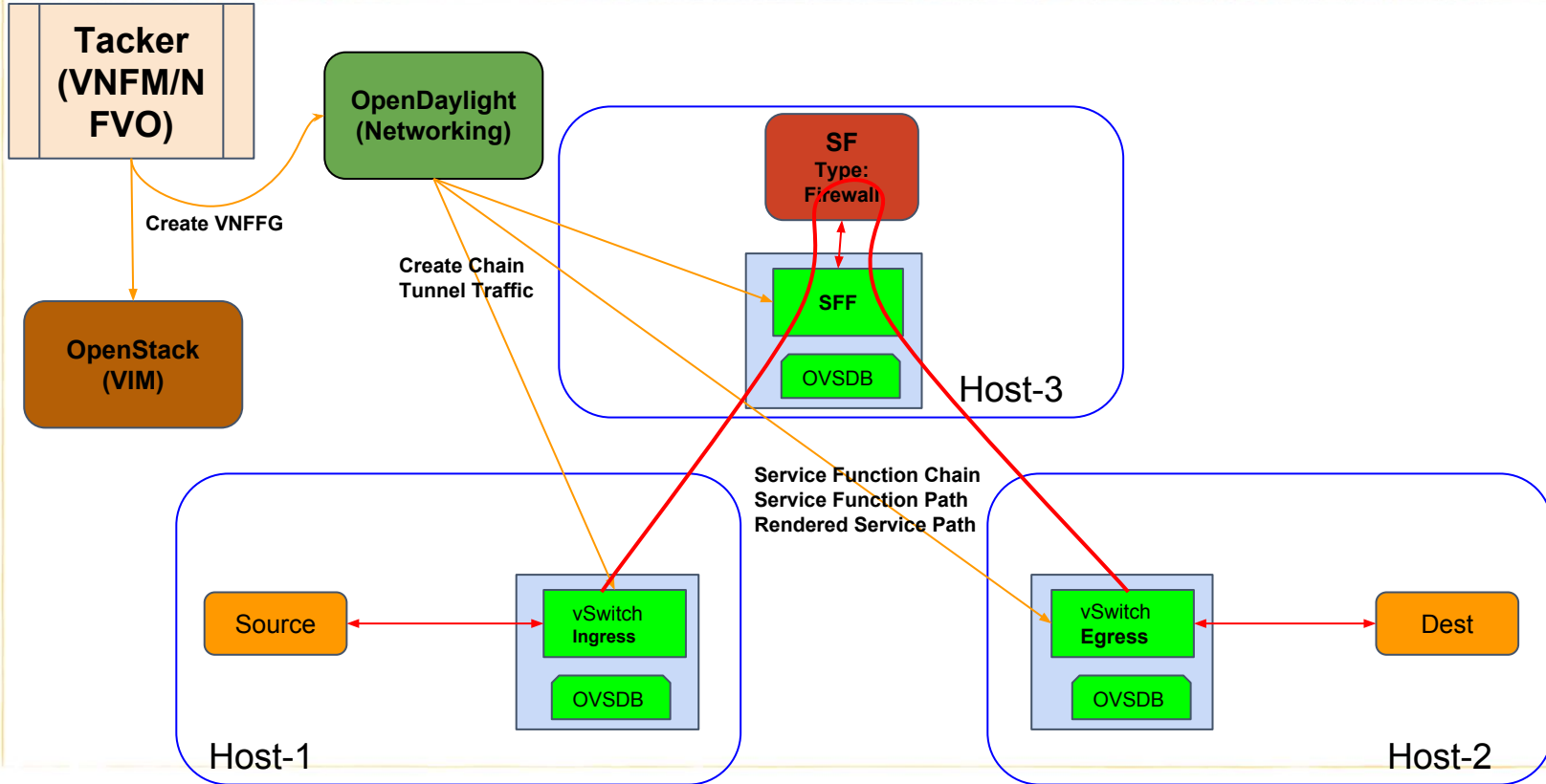


# Service Function Chaining





# Components in the Context



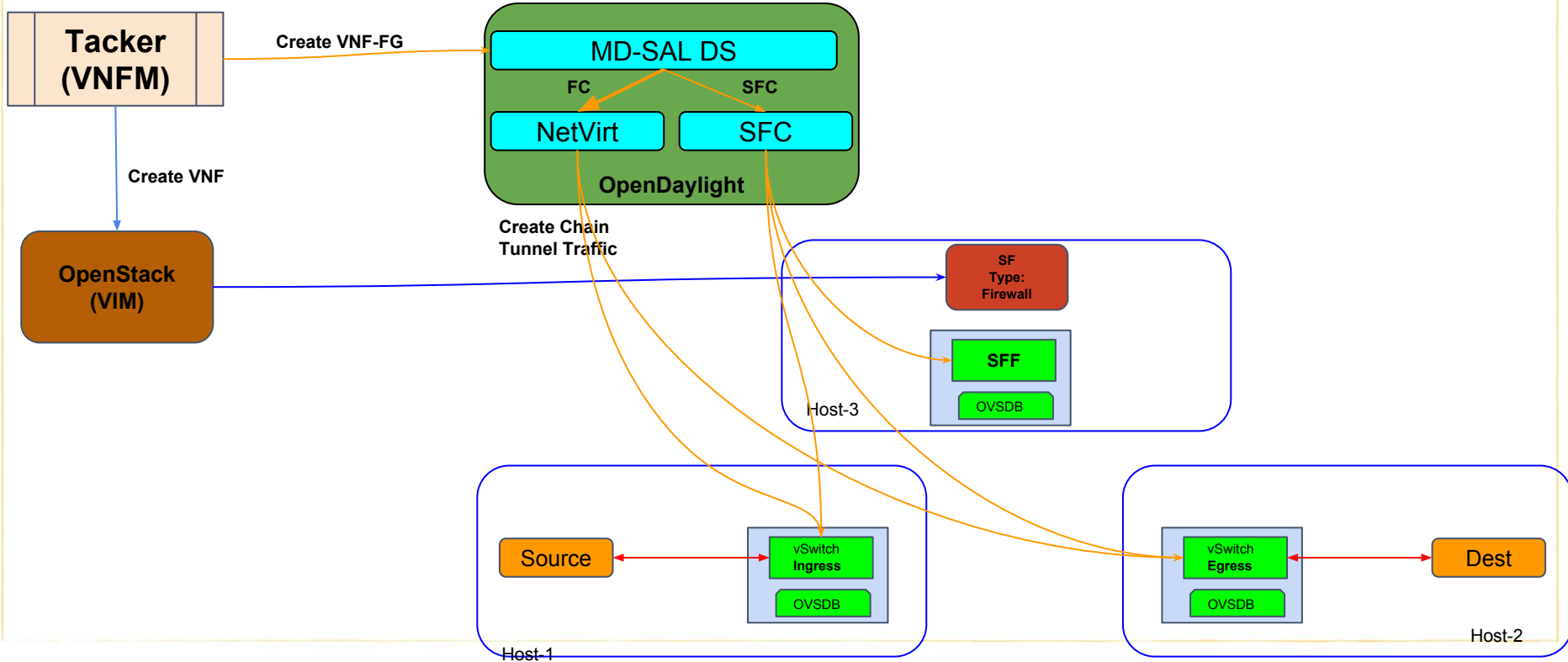
# ETSI MANO

- VNF and Network Service Orchestration (NSO)
- NSO built upon VNF Forwarding Graphs (VNFFG)
- VNF Forwarding graphs can be realized as multiple Service Function Chains and classifiers compiled to form a graph
- TOSCA templates - yaml templates used to define ETSI MANO orchestration

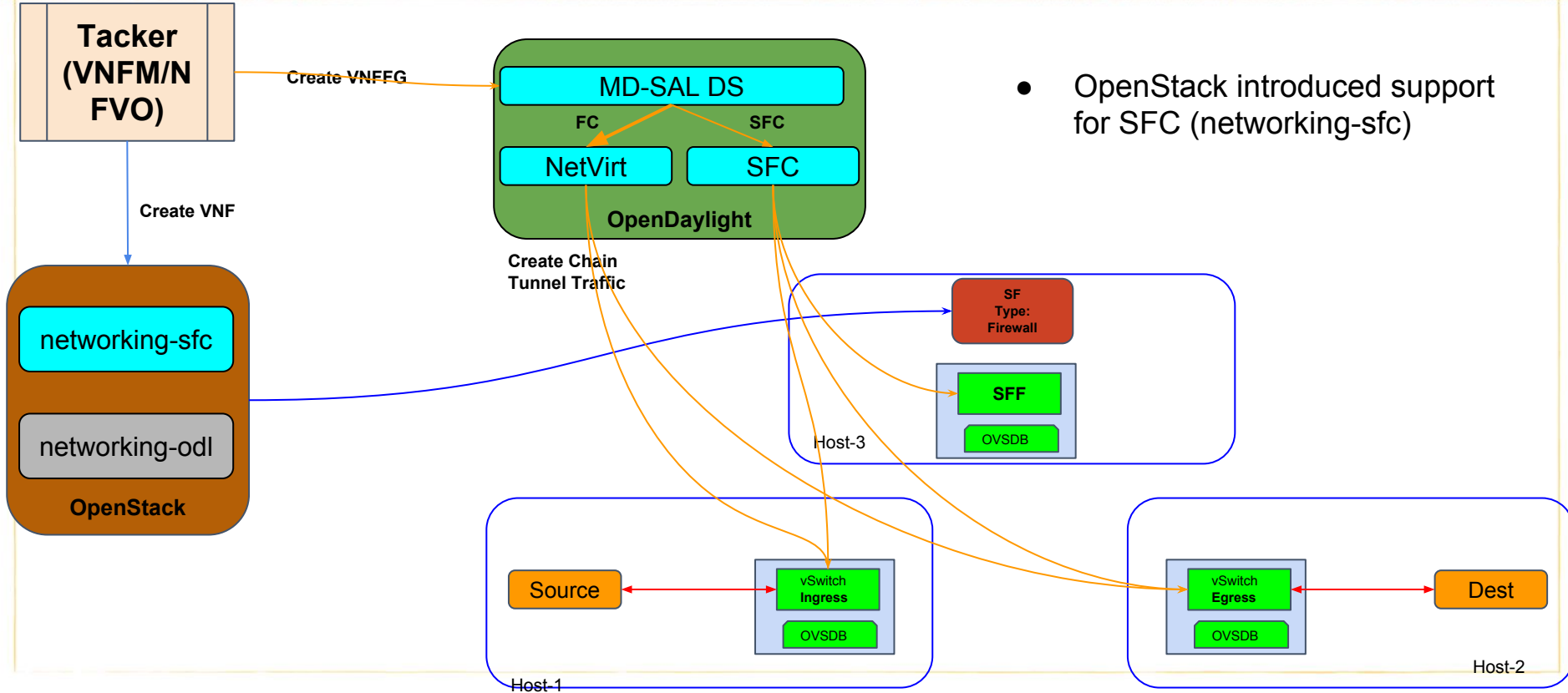
# Service Chain Example



# Existing OpenDaylight SFC support



# OpenDaylight SFC support : Latest Changes



- OpenStack introduced support for SFC (networking-sfc)



# OpenStack Networking SFC API



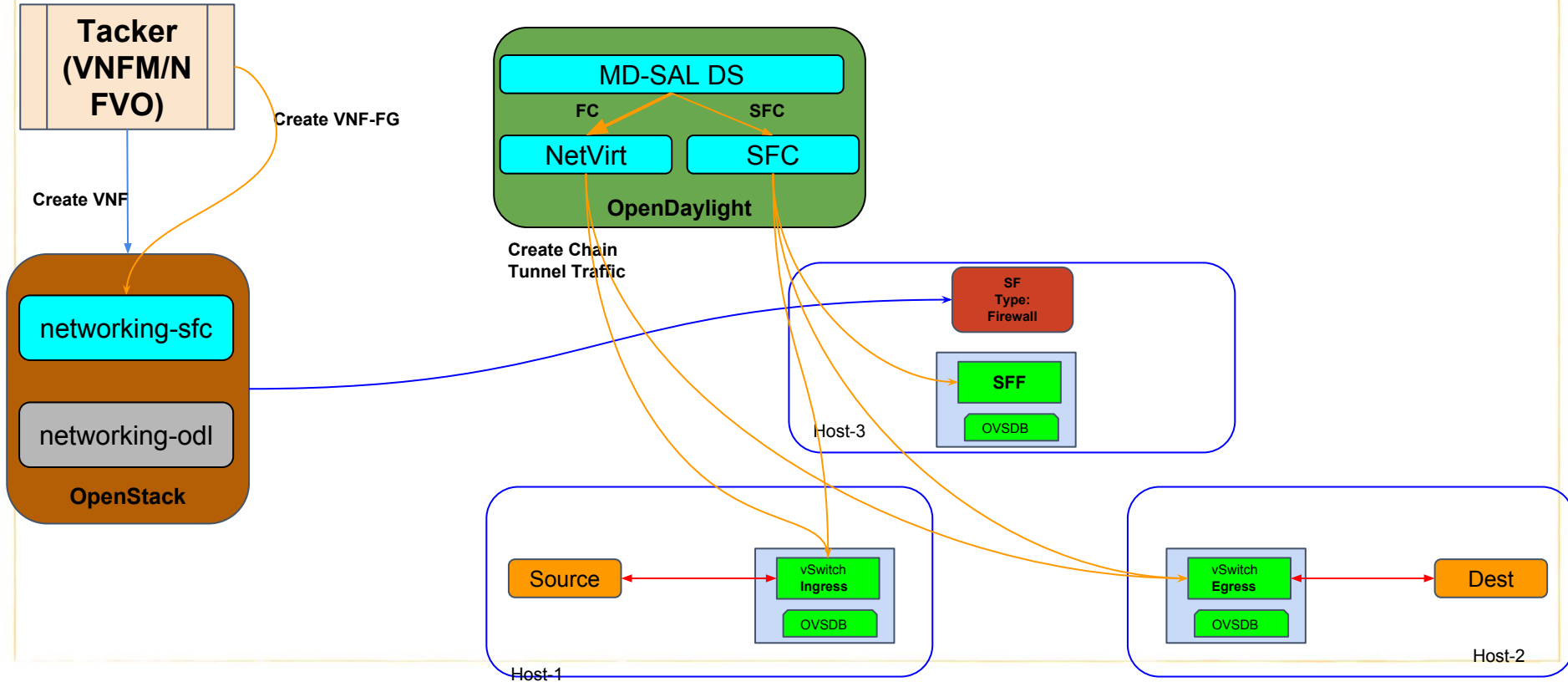
```
neutron port-pair-create [-h]
  [--description <description>]
  --ingress <port-id>
  --egress <port-id>
  [--service-function-parameters <parameter>] PORT-PAIR-NAME
```

```
neutron port-pair-group-create [-h]
  [--description <description>]
  --port-pair ingress=<port-id> egress=<port-id> PORTGROUP-NAME
```

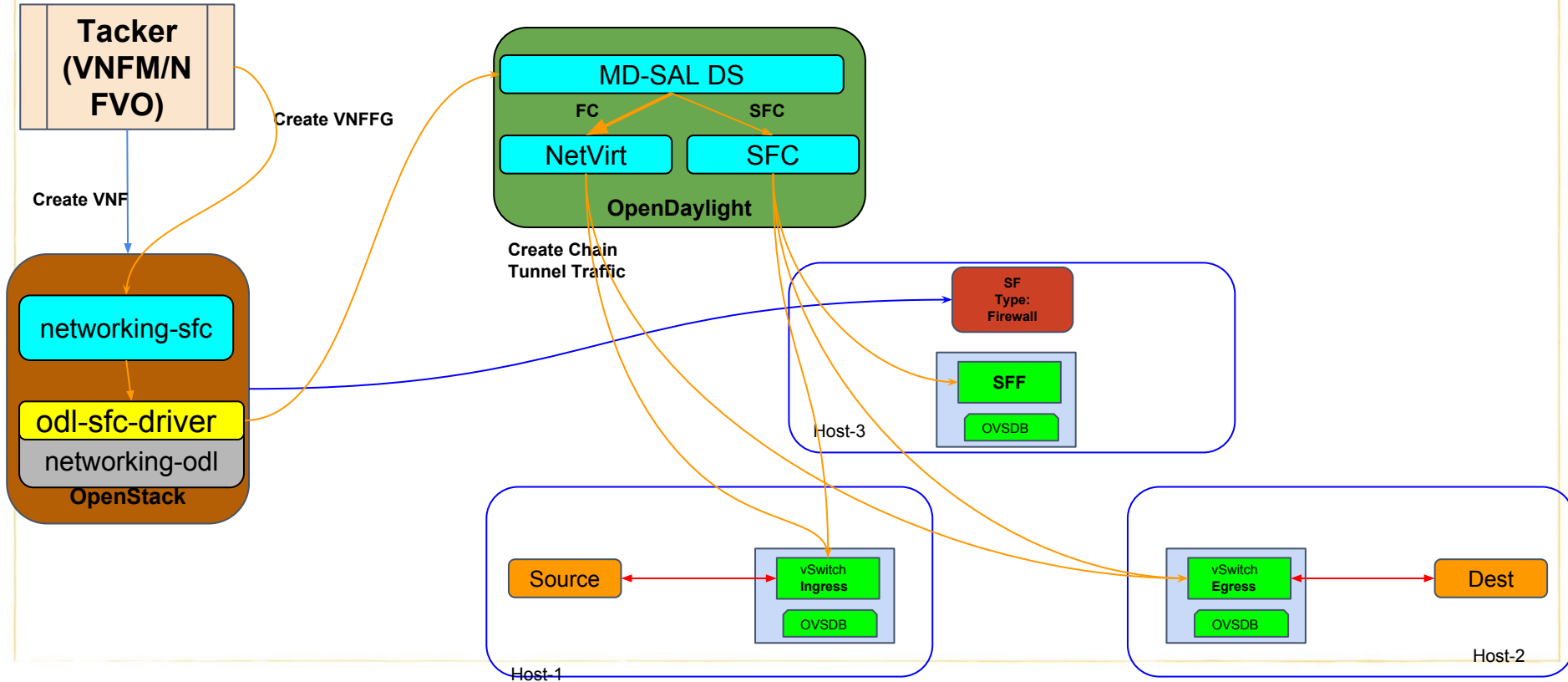
```
neutron flow-classifier-create [-h]
  [--description <description>]
  [--protocol <protocol>]
  [--ethertype <Ethertype>]
  [--source-port <Minimum source protocol port>:<Maximum source protocol port>]
  [--destination-port <Minimum destination protocol port>:<Maximum destination protocol port>]
  [--source-ip-prefix <Source IP prefix>]
  [--destination-ip-prefix <Destination IP prefix>]
  [--logical-source-port <Neutron source port>]
  [--logical-destination-port <Neutron destination port>]
  [--l7-parameters <L7 parameter>] FLOW-CLASSIFIER-NAME
```

```
neutron port-chain-create [-h]
  [--description <description>]
  --port-pair-group <port-pair-group-id>
  [--flow-classifier <classifier-id>]
  [--chain-parameters <chain-parameter>] PORT-CHAIN-NAME
```

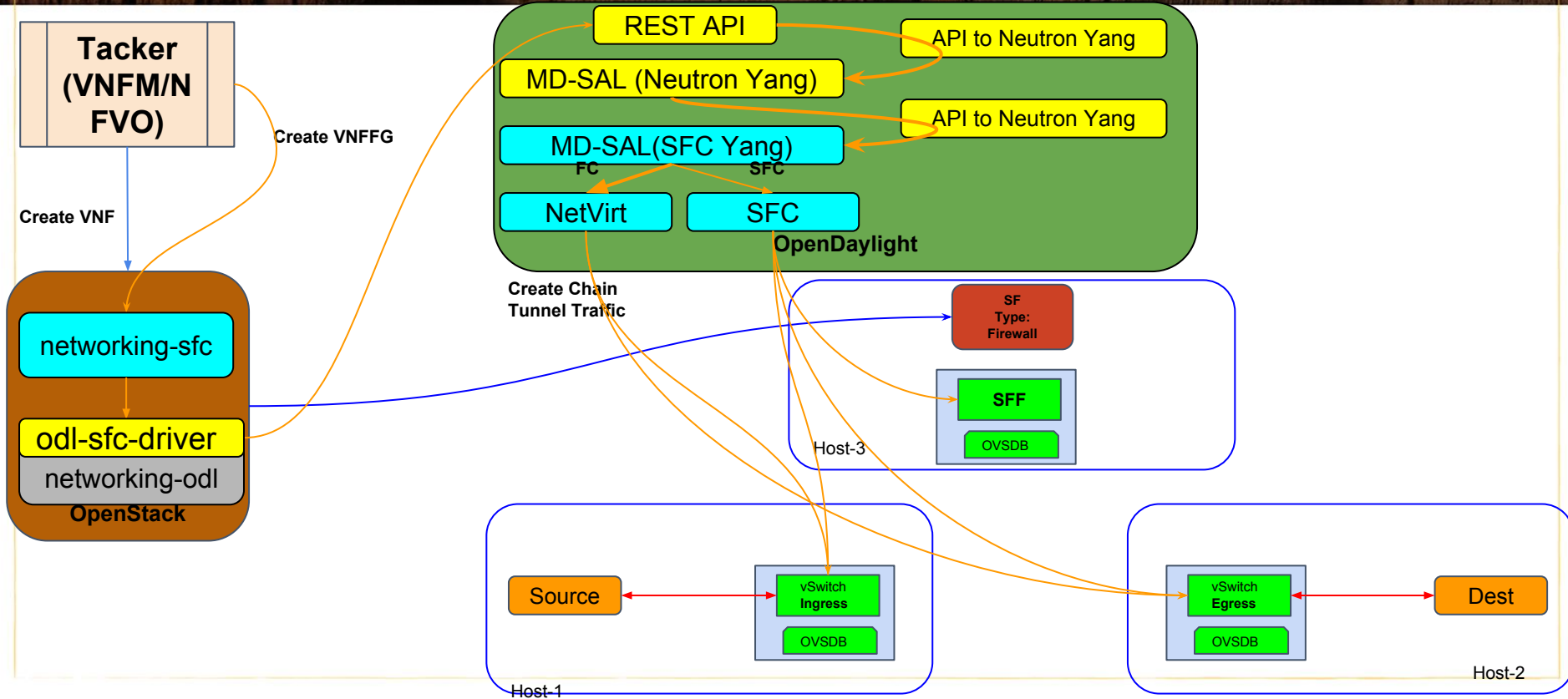
# OpenDaylight SFC support : Latest Changes



# OpenDaylight SFC support : Latest Changes



# SFC - Opendaylight Boron, OpenStack Newton



# OpenStack SFC to OpenDaylight SFC Mapping



<b>OpenStack Networking SFC</b>	<b>OpenDaylight SFC</b>
Port Pair	SF/SFF
Port Pair Group	SF/SFF
Port Pair Chain	SFC/SFP/RSP
Flow Classifiers	ACL

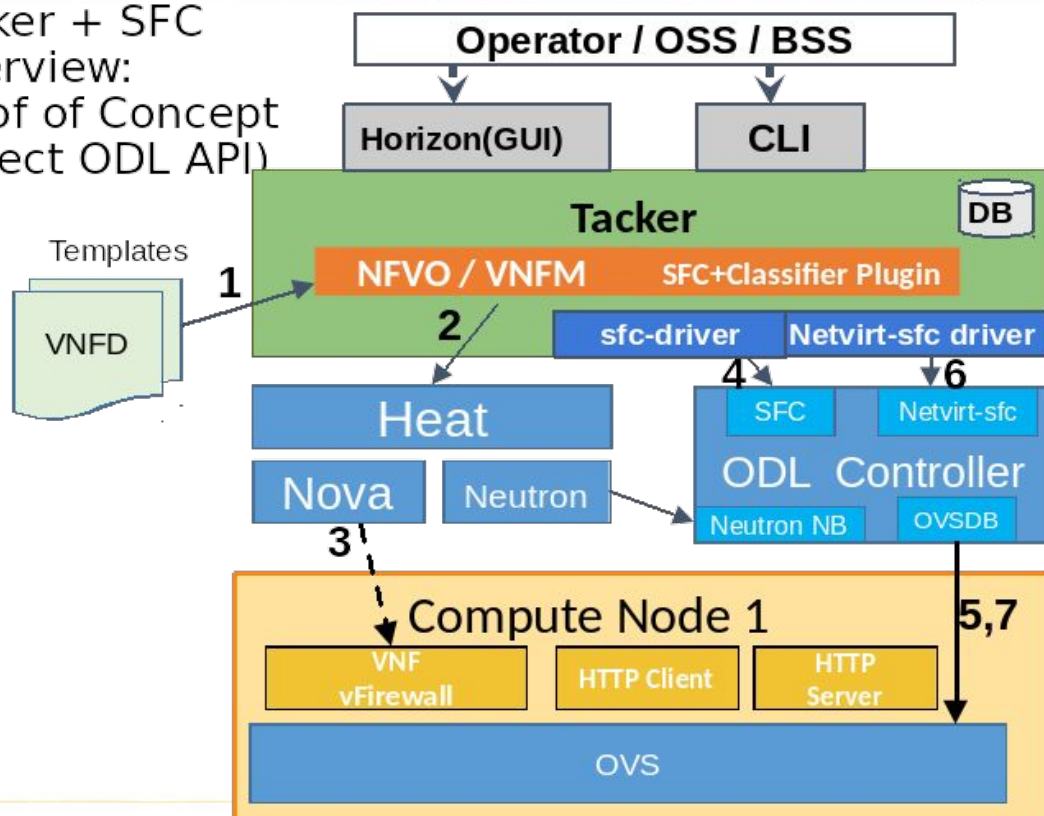


# OPNFV SFC

- Uses OVS 2.5.90 (Intel Patch)
- OpenDaylight Boron
- OpenStack Mitaka
- OpenStack Tacker project (customized)
- Direct API communication between Tacker and OpenDaylight
- Latest release: Colorado

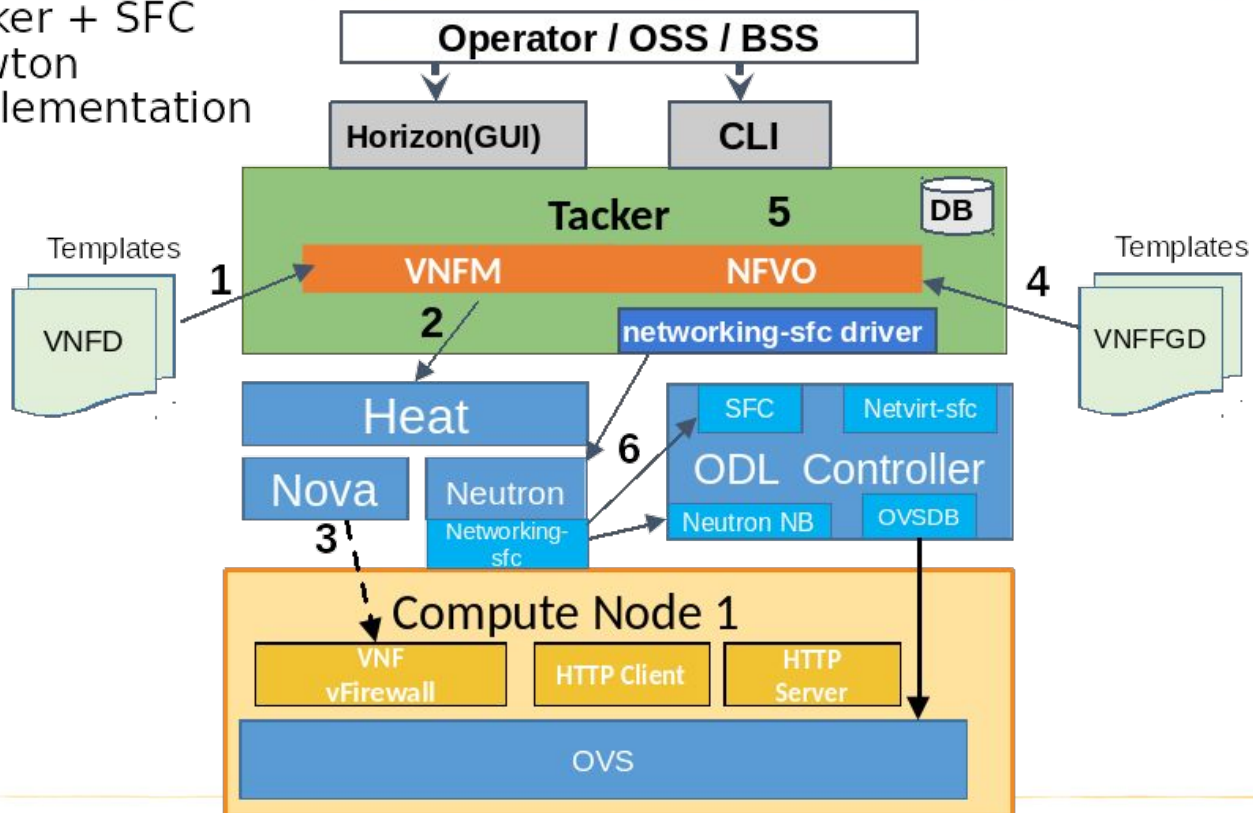
# OPNFV Colorado Architecture

Tacker + SFC  
Overview:  
Proof of Concept  
(Direct ODL API)



# New OpenStack + ODL Implementation

Tacker + SFC  
Newton  
Implementation



# OpenStack SFC Support in OpenDaylight

## Formal Integration



- OpenDaylight has a mature implementation of SFC (OpenDaylight SFC Project)
- Formal Integration of OpenStack SFC and OpenDaylight requires
  - Networking-odl passthrough driver for passing networking-sfc API calls to OpenDaylight - Done (V2 driver is in progress)
  - Yang model definition for flow classification and SFC in OpenDaylight Neutron Northbound project - Done
  - Translation layer to translate these yang models to specific flow classifier and SFC provider models - Done



# References



- ETSI MANO : [http://www.etsi.org/deliver/etsi\\_gs/NFV-MAN/001\\_099/001/01.01.01\\_60/gs\\_nfv-man001v010101p.pdf](http://www.etsi.org/deliver/etsi_gs/NFV-MAN/001_099/001/01.01.01_60/gs_nfv-man001v010101p.pdf)
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- Tacker VNF-FG Driver Code : <https://review.openstack.org/#/c/344522/>
- Tacker SFC Driver Spec: <https://specs.openstack.org/openstack/tacker-specs/specs/newton/tacker-networking-sfc.html>
- Tacker SFC Driver Code : <https://review.openstack.org/#/c/347568>
- OPNFV SFC Project : <https://wiki.opnfv.org/display/sfc/Service+Function+Chaining+Home>
- OpenDaylight SFC Models: <https://github.com/opendaylight/sfc/tree/master/sfc-model/src/main/yang>
- OpenDaylight SFC Project : [https://wiki.opendaylight.org/view/Service\\_Function\\_Chaining:Main](https://wiki.opendaylight.org/view/Service_Function_Chaining:Main)
- Networking-sfc API : <http://docs.openstack.org/developer/networking-sfc/api.html>
- OpenDaylight Neutron Northbound Models :
  - <https://github.com/opendaylight/neutron/blob/master/model/src/main/yang/neutron-sfc-flow-classifier.yang>
  - <https://github.com/opendaylight/neutron/blob/master/model/src/main/yang/neutron-sfc.yang>
- OpenDaylight Neutron Northbound Transcriber :  
<https://github.com/opendaylight/neutron/tree/master/transcriber/src/main/java/org/opendaylight/neutron/transcriber>
- OpenDaylight Netvirt SFC Classifier : <https://github.com/opendaylight/netvirt/tree/master/openstack/net-virt-sfc>
- OpenDaylight Netvirt SFC Translation Layer : <https://github.com/opendaylight/netvirt/tree/master/openstack/sfc-translator>
- Yi Yang NSH Patch : [https://github.com/yayang13/ovs\\_nsh\\_patches](https://github.com/yayang13/ovs_nsh_patches)