Practice of deploying SDN and VNFs in the data center

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Introduction

- **SDN** decouples the network control from forwarding and makes the network programmable. **NFV** uses the technologies of IT virtualization to virtualize entire classes of network node functions as the VNF.
- Deploying SDN and VNFs in the data center can make the network more flexible and increase the network utilization.
- First introduces a practice of deployment of SDN and VNFs in the data center, and then discusses how SDN and VNFs can be combined in the data center.
1. OVS implements:
   - Switching
   - Security Group for access control
   - Rate limitation

2. VNF implements:
   - Routing
   - NAT, floatingIP
   - Firewall
   - Load Balance
   - VPN

Deployment of SDN and VNFs
Interfaces

• Interface between SDN controller and OVS  (well standardization)
  OVSDB: protocol for configuring the OVS.
  OPENFLOW: protocol for setting flow entry to OVS, which takes charge of data forwarding.

• Interface between SDN controller and VNFM  (not well standardization)
  NETCONF/RESTCONF/REST API: Yang model extension is defined and the REST API is vendor specific.
Example: Step 1, create a virtual Router

1. Create a Router
2. Create a vRouter
3. Create a virtual Router
4. Response vRouter Address, login info...
5. Configure vRouter via NETCONF

New created
Example: Step 2, create a VM

1. VM attach to OVS
2. create Port
3. VM attached via OVSDB
4. Create vxlan tunnel to OVS via NETCONF
5. Create vxlan tunnel to vRouter via OpenFlow
6. configure VM's routing via OpenFlow

Data Center

NFV
SDN

DC Router
Internet

Vxlan Tunnel
Combinations of SDN controller and VNFs

Option 1: Openstack -> SDN controller -> VNFM

- OPENSTACK sends all events to the SDN controller
- SDN controller interworks with VNFM to handle VNF related events.
- Easy to deploy.

Note that our current deployment (SDN controller connects to VNF) is slightly different from the option 1. We will move to option 1 in our next deployment.
Combinations of SDN controller and VNFs

Option 2: Openstack -> VNFM -> SDN controller

- OPENSTACK sends all events to the VNFM
- VNFM interworks with SDN controller to handle VNF related events
- VNFM forwards VM-related events to SDN controller
- VNFM more complex and inefficient (handling the OVS related events makes no sense to VNFM)
Combinations of SDN controller and VNFs

Option 3: Openstack -> 1. SDN controller   2. VNFM

- OPENSTACK sends VM-related events to the SDN controller, sends VNF-related events to the VNFM
- VNFM interworks with SDN controller to handle VNF related events
- Needs a good cooperation (standardization) between Openstack, SDN controller and VNFM
- Currently hard to deploy since SDN controller and VNFM from different vendors and there is no good standardization interface between SDN controller and VNFM
Thank you