



What can SDN do for NFV Cloud

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NovoNet – Our Vision of Future Network



New Network Architecture

- Virtualized Network Function
- Centralized Control
- Programmable Network



New Network Operation

- Auto Deployment
- Flexible Orchestration
- Maximal Usage



New Network Service

- More Open
- More Agile
- On-demand

Enabler Technology
NFV



Enabler Technology
SDN

5G is Driving Network Transformation

5G network is transformed as a soft network leveraging IT technology to provide agile and flexible architecture to be faced with diverse business scenarios

from “hardware” to soft

Centralized Intelligence and
Distributed Processing

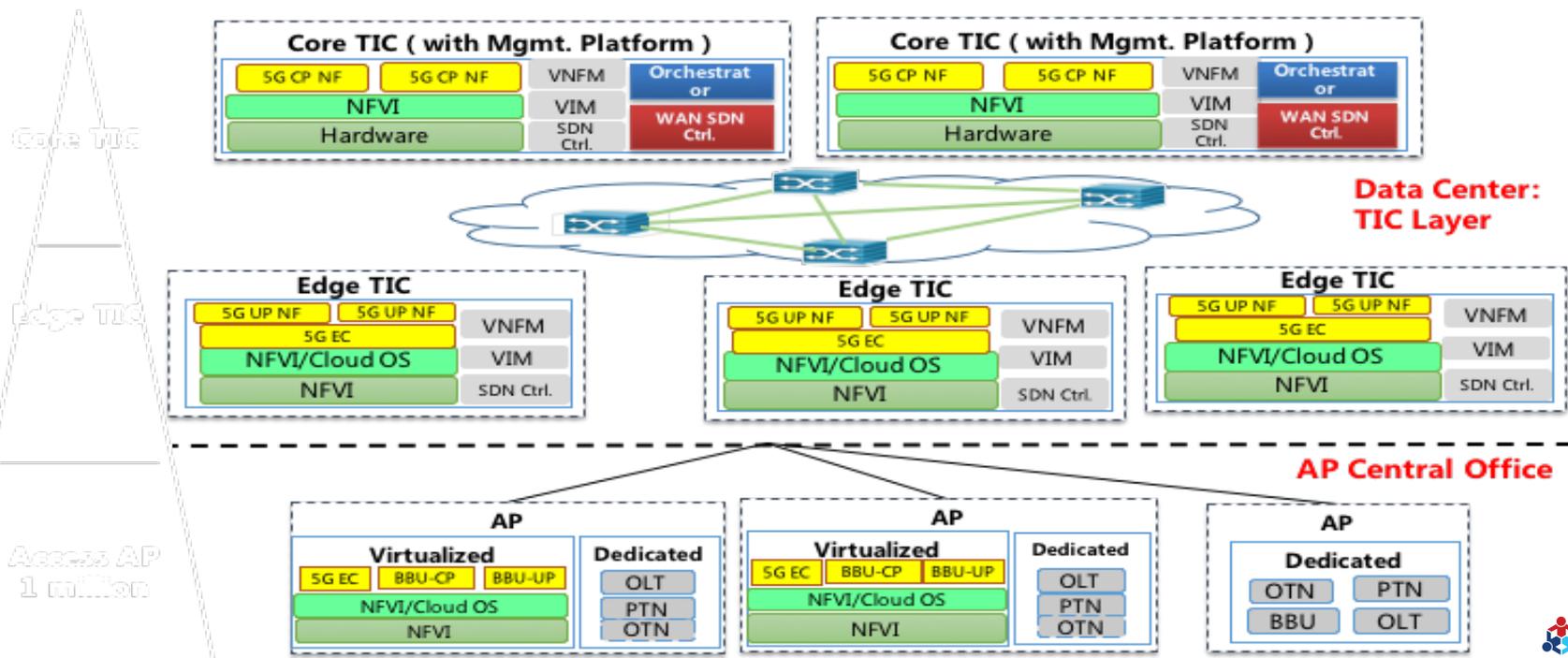
IP everywhere and IT
inside

4D Characteristics to guide Arch. Design

- **Customized Service**
 - o Network programmable and more agile
- **Modularized Function**
 - o Function modularization and composition on demand
- **Virtualized Infrastructure**
 - o Cloud basis
- **Centralized Management**
 - o Network services and functions unified orchestration

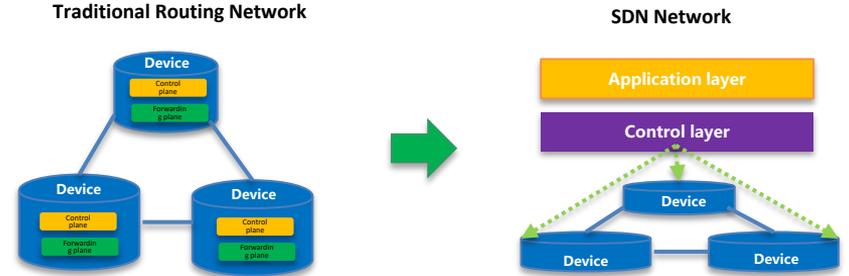
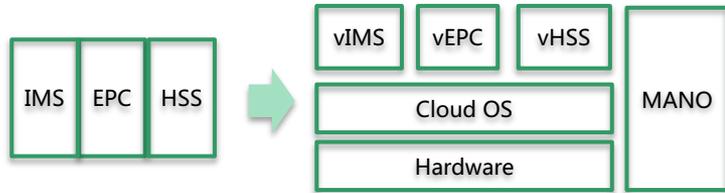
“Software” 5G based on NFV

- 5G NFs can be flexibly deployed in TIC+AP based on the service scenarios
- 5G leverages cloud technology to achieve network customization, openness, service-oriented, to support huge traffic, large connection and low latency capability to connect everything.



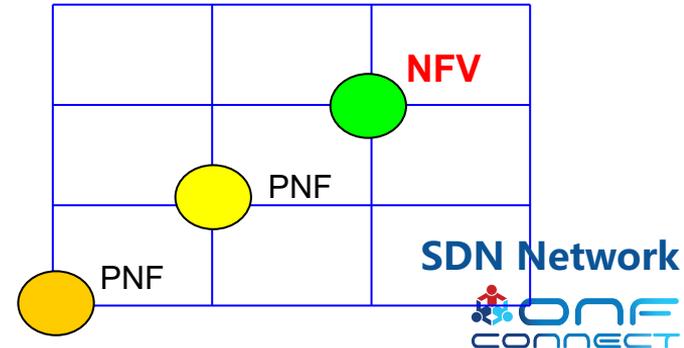
Relationship between SDN and NFV

SDN and NFV are different concept , SDN is an innovation of network architecture, NFV is an innovation of device form

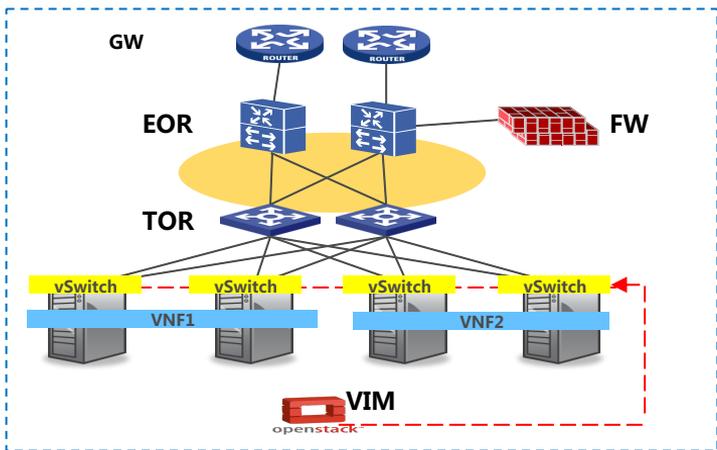


Different sources and targets. They can be developed independently. At the same time, They can complement each other and integrate each other to achieve the future development goals of the network

- The network is composed of network element functions and network connections.
- In essence, NFV implements network element functions, SDN implements network connections, and both form a future network.

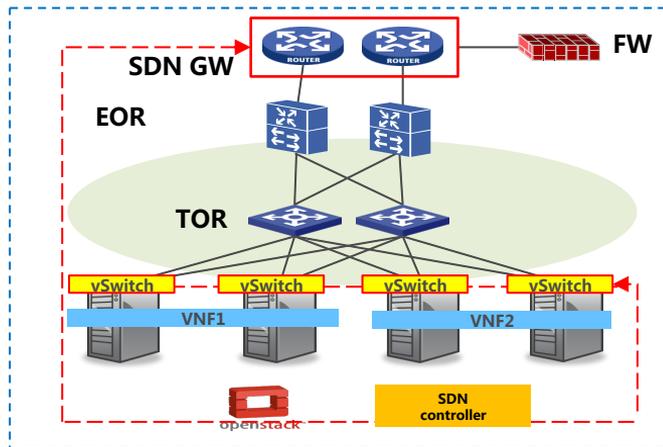


Traditional networking cannot meet the requirements for large-scale network cloud deployment



Manual, pre-planning, small scale

- ① large broadcast domain
- ② Manual configuration cannot meet the requirements for NFV services.
- ③ Centralized gateway is used, the capacity and capability are extremely high.
- ④ The network maintenance complexity and overall risks are increased.
- ⑤ VLAN Number only supports 4000 subnets



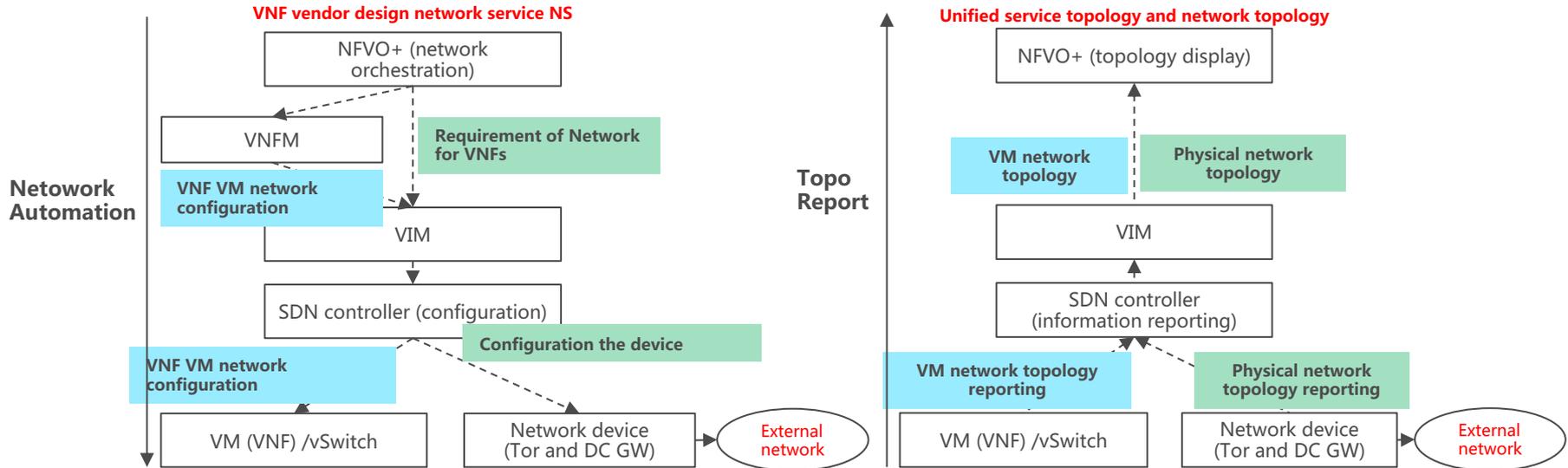
Automatic, flexible, large scale

- ① Underlying network implement Layer 3 interconnection
- ② Network can be automatically provisioned on demand.
- ③ Distributed gateway can reduce the pressure of centralized devices and reduce the network fault domain
- ④ Network configuration is canceled when the NFV lifecycle ends, and can be maintained by the controller
- ⑤ Number of subnets supported by the VXLAN is up to 100,000.

Break the barriers between the core network and IP network

The core network and IP network (data center) are developed independently. , As a result :

- Service requirements and network capabilities do not match.
- The lower-layer network forwarding is not associated with upper-layer service.



Service deployment and adjustment: Service application is orchestrated by VNF vendors. SDN is introduced just to configuration network

Network management : The SDN report the network topology to NFVO, which is very important for service adjustment and fault locating

SDN can effectively support new service applications of 5G slicing

Drive of network slicing: customized and differentiated service requirements

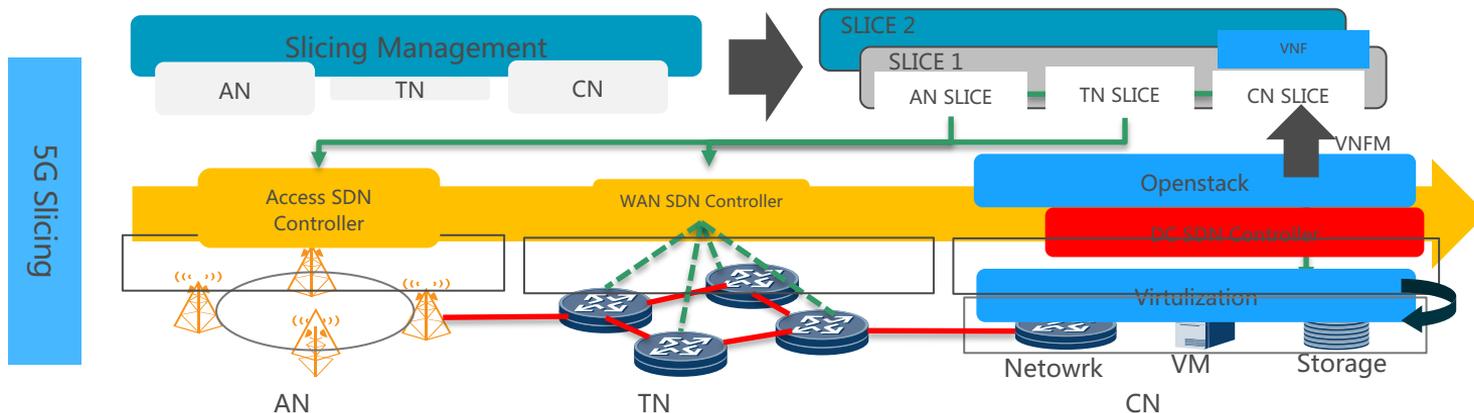
On-demand service customization

Flexible resource scaling

Logical isolation of resource sharing

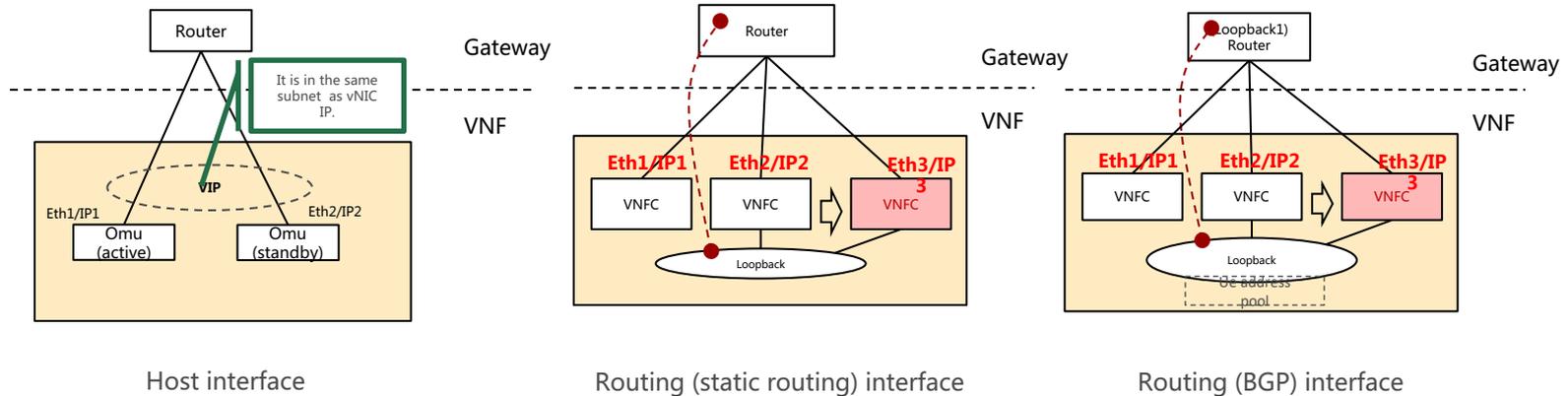
5G network slicing is end-to-end (E2E) synergy. SDN is a necessary module for implementing slicing network automation and dynamic policy configuration.

- Network automation is enabled for slicing
- Dynamic delivery of network policies



3 types of Service IP Address

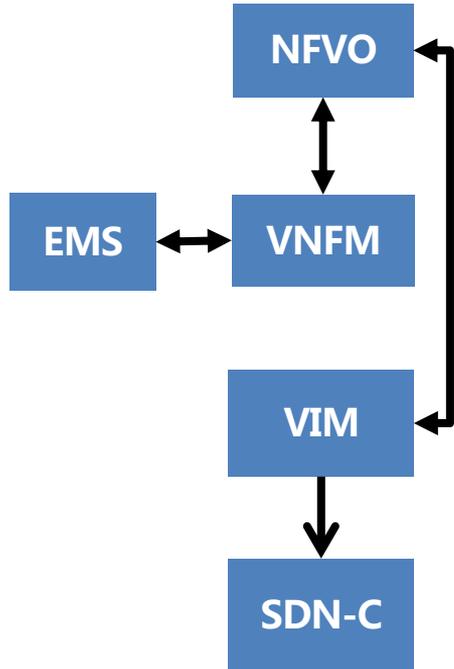
IP Type	Definition	Typical Application
vNIC IP	vNIC IP	VNF internal communication
VIP (Host type)	One or more vNICs share one IP address in active/standby mode.	OM interface/service interface
Loopback (Routing)	Multiple VMs share the IP address and reach the IP address through one or more vNIC IPs (load sharing).	BGP peer IP/ service interface



SDN needs to detect VNF service requirements and obtain the mapping between service addresses and VM interface IP addresses to implement automatic service network configuration

Introduce the upper-layer NMS to implement network orchestration

The VIM and SDN controller cannot obtain VNF interworking requirements and the mapping between service IP addresses and vNIC IPs. The MANO component needs to orchestrate the network requirements of VNF and deliver the network configurations to the SDN controller for network configuration



3 The NFVO can define VNF interworking requirements through the NSD and obtain the mapping between service IP addresses and VM vNIC IPs based on the VNF instantiation process.



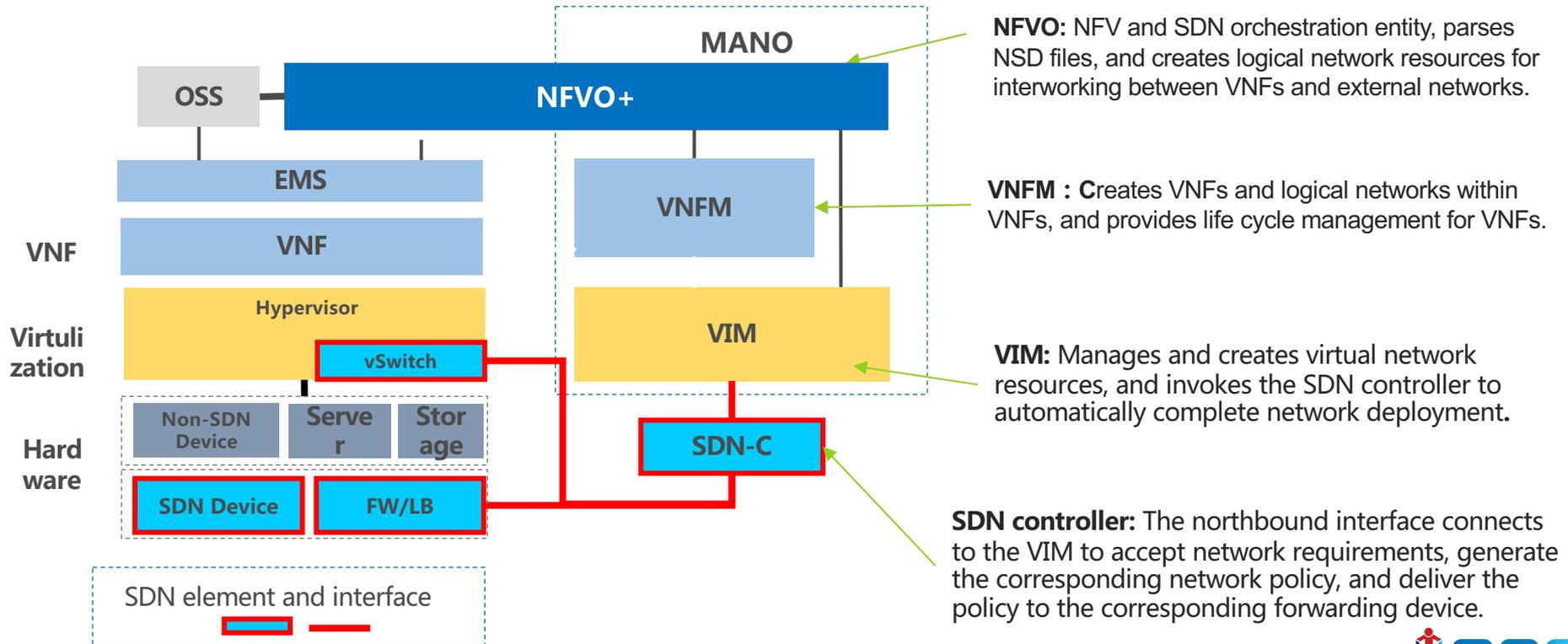
2 The VIM is only responsible for starting VM and vNIC IP address allocation. It cannot detect the mapping between VMs and specific VNF.



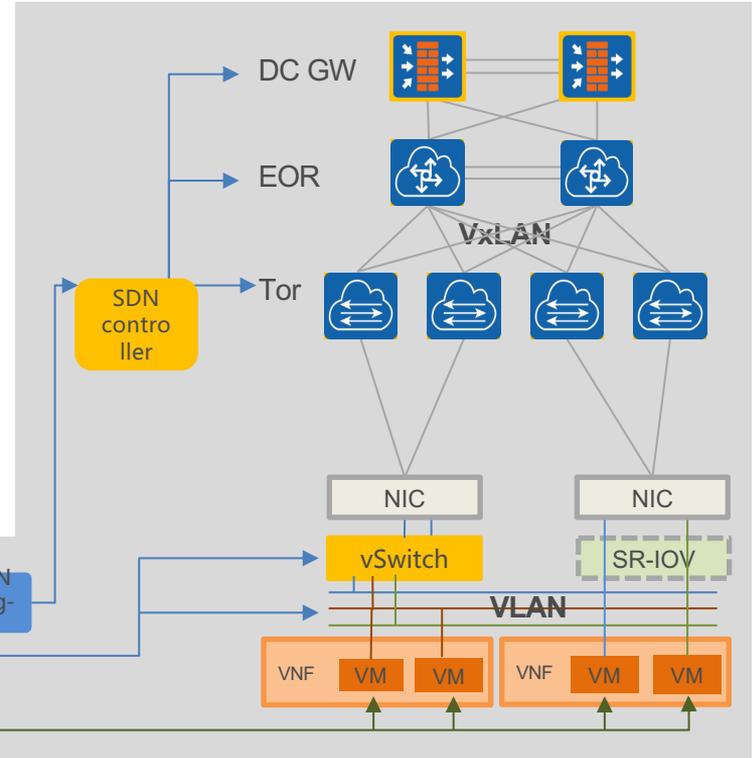
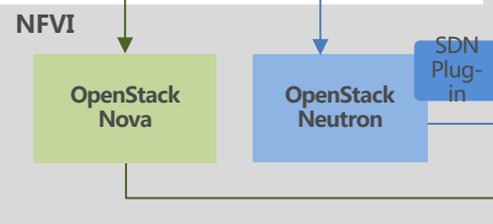
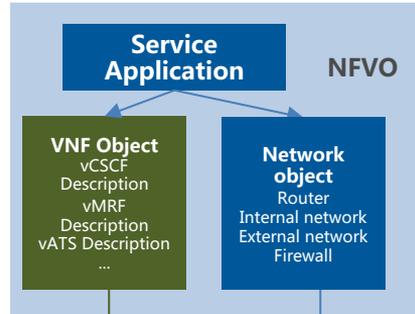
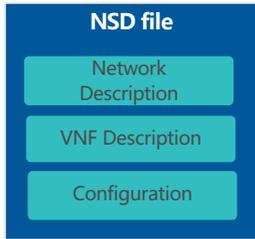
1 The SDN controller functions only as the network execution layer. The controller cannot obtain interconnection requirements and service IP addresses. Therefore, the upper-layer notification mechanism needs to be introduced.

NFV+SDN Logical Architecture of China Mobile Network Cloud

Based on the existing ETSI NFV architecture, the VIM is a key component of NFV and SDN convergence. The modules and interfaces related to NFVO and VIM are refined and extended



SDN Solution in the Existing NFV Architecture



NFVO: The core brain of cloud network association parses

NSD files and decomposes complex NEs into network

objects and VNF objects, implementing unified

orchestration and management of NE objects and network

services in the entire resource pool.

SDN controller: Based on the upper-layer network

orchestration model, interwork with VIM to automate the

network deployment

Some question to discuss

Q1: Centralized Routing or Distributed Routing

Q2: Options for Overlay termination

- Solution 1: VxLAN extended OVS and GW
- Solution 2: VxLAN extended TOR and GW

Q3: The significance of decoupling the interface between SDN controller and device



Thank You