Federated SDN-based Controllers for NVO3

draft-sb-nvo3-sdn-federation
Authors

Nabil Bitar, Kenichi Ogaki, Dimitri Stiliadis, Marc Lasserre, Wim Henderickx, Florin Balus
Scope

• Pull together an end2end solution view
  • Point to existing work, describe missing pieces and solution where it makes sense

• Generate discussion about solution gaps

• Create awareness about required work in other forums
DC Network Virtualization Framework

Tenant Systems

Physical or virtual system that can play the role of a host, or a forwarding element (e.g., router, switch).

Examples: VMs, Bare Metal servers, Networks Appliances (FW, LB).

Network Virtualization Edge (NVE)

- Handle L2/L3 service instances
- Hide tenant addressing information
- Map tenant traffic into tunnel
- Perform NVO3 tunnel encapsulation

DC IP Underlay Network

Utilize L3 networking to interconnect NVEs

NVE GW

Non-NVO3 domains

Overlay Module

VN ID

VNI

VAPs

Tenant Systems

NVEs
Control, Data & Management Plane for one DC domain

Management Plane
- CMS (e.g. Openstack/Cloudstack)
- APIs

Control Plane
- Controller
- Data Plane
- IP Core

DC domain 1 (NVE forwarding)

Agents
- Discovery of TS States & required Service Profile
  - CMS driven: e.g. Openstack quantum API
  - NVE driven: local procedure or server2nve
  - Server, CMS software dictating choice of protocols

Tenant Systems
- Tenant System States
  - Derived from VM lifecycle management
  - Generalization required for different type of TS
  - From VMs to HW Appliances, BMS etc...

Controller functions
- Learns about the TS events and profile
- Populates TS addresses in its RIB, generates FIB
- Provides required FIB, ARP entries to NVEs
- Address advertisements to other domains (WAN/DC)
- Underlay awareness

CMS functions
- TS instantiation, management: e.g. compute and related applications, appliances
- Open source or proprietary systems
Extending the model across DC domains and to VPN WAN

- **Management Plane**
  - CMS (e.g. Openstack)
  - APIs

- **Control Plane**
  - MP-BGP
  - Controllers

- **Data Plane**
  - IP Core
  - Gateway

- **DC domain 1**
  - NVE forwarding

- **DC domain n**
  - NVE forwarding

- **Enterprise Sites**
  - MPLS VPN Services (PEs)
  - SP OSS

**Controllers**

**MP-BGP**

**NVE forwarding**
What’s covered and what’s missing?

• Tenant System States
  – Get down to the minimum set
  – Generalization to non-VM TS

• CMS driven TS state discovery
  – Common information model between CMS & Controller

• NVE driven TS State discovery
  – Openflow extensions to send TS events & profile
  – ToR NVE Server2NVE signalling: covered in NVO3 proposals

• Controller to NVE with Openflow
  – Re-use existing hypervisor capability to accelerate adoption

• MP-BGP advertisements between Controllers and PEs
  – Re-use EVPN for L2: base spec in L2VPN + NVO3 proposal
  – Re-use IP VPN for L3: L3VPN specifications
Next steps

• **Open discussion on the missing pieces**
  – Where should they be addressed?
• **Decide on the modules NVO3 takes on**
  – Update the charter, schedule
• **Collaborate with external organizations**
  – about missing pieces we would like to see addressed
• **WG contributions welcome**