IP/MPLS VPN Protocol GAP Analysis For NVO3

draft-hy-nvo3-vpn-protocol-gap-analysis-02

Lucy Yong Susan Hares

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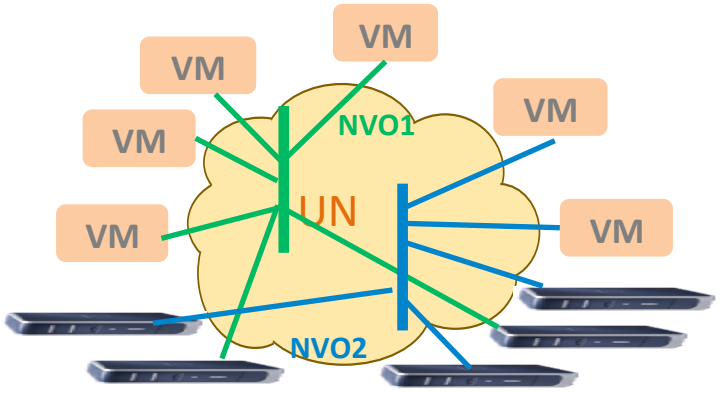
About this Draft

- Analyze IP MPLS L2/L3VPN protocol applicability and gaps for NVO3
- Intend to stay at neutral regarding
  - Should extend and/or simplify the VPN protocols or
  - Develop a new protocol solution for NVO3
- The document is organized:
  - IP/MPLS L2/L3 VPN Highlight
  - L2/L3 VPN for NVO3
  - L2/L3 VPN for DCI when NVO3 is used
  - Operator Aspects

NVO3 Requirements

- Many NVOs are built on a common infrastructure with:
  - Traffic isolation among one another
  - Independent address space in each and isolated from infrastructure's
  - Flexible VM placement and move from one server to another without physical network limitation (no change on VM addresses when move)
  - No Communication b/w an end system in an overlay and a transport underlay
  - Scalability and security support
- An NVO may be L2 or L3 based where:
  - The Tenant System (TS) may be VM or Server
  - Network Virtual Edge (NVE) may be on Server or ToR
  - Server may run as a host or a network overlay edge in DC underlying network
- Interwork with other NVO instances
- Allow external user to access an NVO

NVO3 Model



DC Site

Quick Comparison

Assumption: TS <-> CE, NVE <-> PE , Tunnel b/w NVEs <-> Tunnel b/w PEs

Notation: Support (√), May Support (≤) , Not Support(×) , Not Apply (≠)

NVO3 Requirements	VPN	Clarification
Traffic Isolation	√	
Own Address Space	√	
Be L2 or L3 based	√	
Decouple from underlying transport	√	VPN traffic is decoupled from underlay transport
VM Mobility	×	support cold move in L2VPN, but not hot move
Flexible VM placement operation	≠	host placement is at CE site, VPN has no visibility to it
NVE on ToR	√	when ToR supports VPN PE function
TS and NVE on a Server	≠	PE and CE are physically separated
VM as Tenant System	≤	via hypervisor
Server as Tenant System	√	like CE as a host
NVE is on a server that is a host in UN	≠	use tunnel? need /32 host routing
VNI Table	≤	support well if NVE is on ToR, may not if NVE on Server
Reachbility advertisement	√	Via control/data plane protocol, or static configuration
Tunneling	≤	VPN uses MPLS LSP Tunnel, rarely others

Quick Comparison Cont.

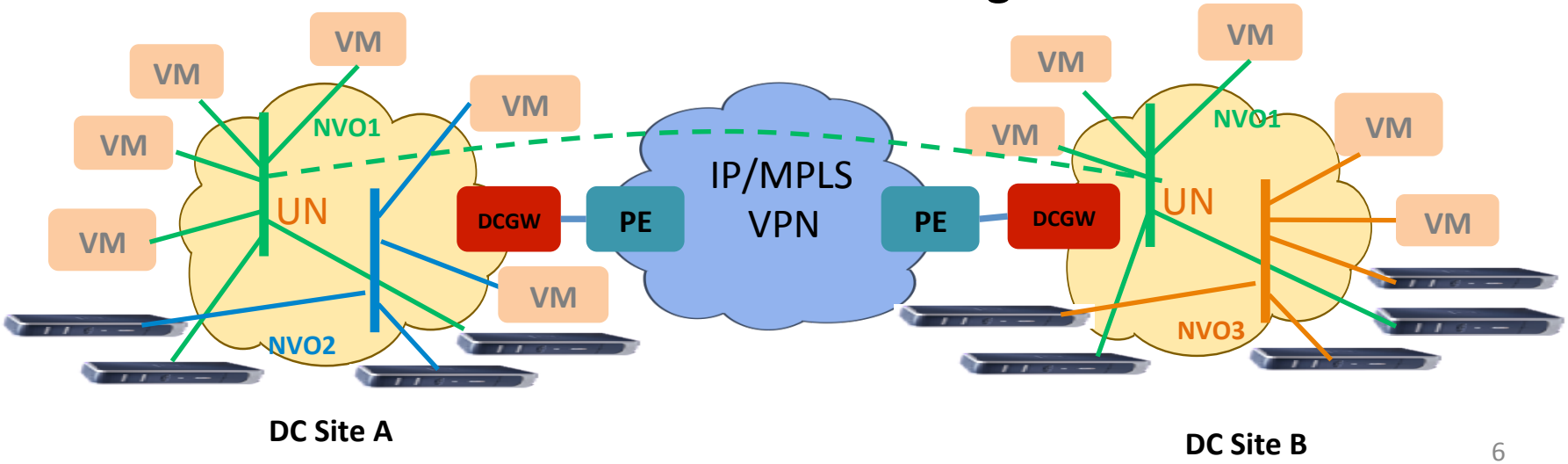
Notation: Support (√), May Support (≤) , Not Support(×) , Not Apply (≠)

NVO3 Requirements	VPN	Clarification
Auto discovery	√	NVE discovery
Load Balancing	≤	ECMP function in WAN may not be sufficient for NVO3
Broadcast or Multicast	√	May not good enough
Underlying Network Design	≤	DC network design may or may not be same as WAN's
Gateway	≤	L3VPN GW may not be sufficient for NVO3, L2VPN has no
Multi data plane interworking	×	Only support one data plane schema
Inter ASs	×, √	L3VPN support, not L2VPN
NVO Access externally	×, √	L2VPN does not have it, L3VPN supports extranet access
Scalability	≤	Depend on the configuration, i.e. NVE is on ToR or on server.
Operation Aspect	×	DC operation model may be very different from SP model
SDN controller management	x	this is new to VPN

Clearly, commons and gaps exist between IP/MPLS VPN and NVO3 requirements Sum: √ (11), ≤ (7), × (6), ≠ (3)

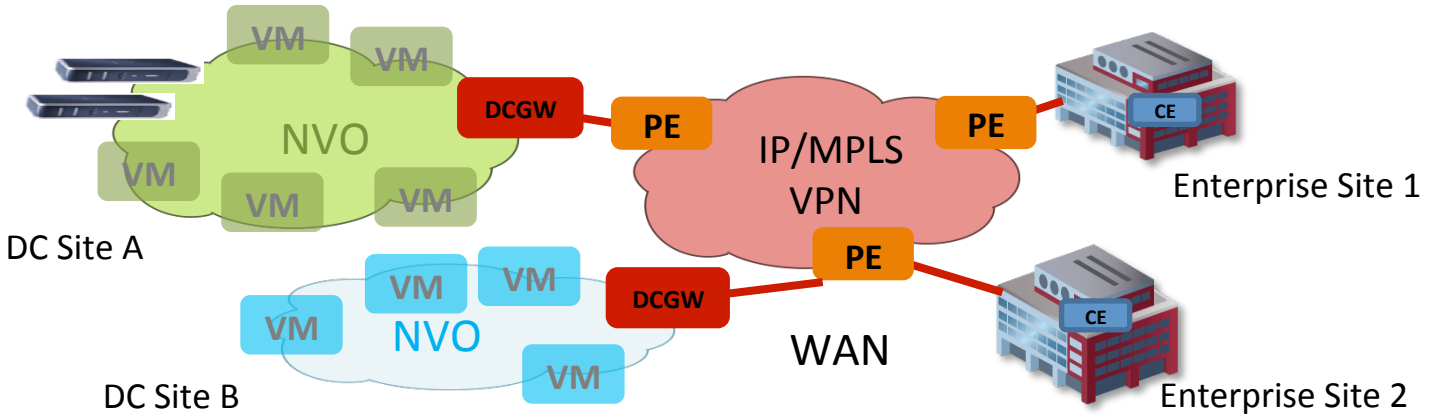
VPN Interconnect DC Underlay Networks

- IP/MPLS VPN interconnects DC underlay networks
  - VPN does not have the visibility of any network virtual overlays
  - PE connects to DCGW (as CE) via a local interface or sub-interface
  - PE may run OSPF, eBGP, etc, DCGW peers with PE only, not remote GW
- An NVO span across DC sites w/o PE/DCGW awareness
  - Overlay tunnels are built between any pair of NVEs directly
  - NVO control plane runs independently from WAN VPN control plane
- VPN for NVO and VPN for DCI are orthogonal in this case



DC NVO Access via a WAN VPN

- DC NVO may be accessed via an IP/MPLS VPN
  - VPN connects to both DC NVO and Enterprise sites
    - PE may peer with Enterprise sites
    - VPN CP needs to interwork with NVO CP and Enterprise CP
  - An NVO GW entity is necessary on the DCGW
    - Be the member of DC NVO and terminate NVO tunnels
    - May perform routing, NAT, policy, firewall functions
  - PE may perform some gateway function too
- DCGW may be configured with many NVO GW entities for diff. customers
- If NVO uses VPN solution, this will be like inter-AS scenario in RFC4364
- This may require VPN enhancement
  - Interwork with NVO Control Plane, support VM mobility, optimize traffic path, etc



Next Step

- Welcome comments and suggestions
- Ask chair suggestion for the next

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