A BGP L3VPN based data-center overlay with VXLAN/NVGRE
(draft-drao-bgp-l3vpn-virtual-network-overlay)

Dhananjaya Rao
John Mullooly
Rex Fernando
Cisco

IETF 85, November 2012
Atlanta
Problem Statement

- IP virtual network overlays are being deployed in data centers
- New encapsulations being defined – VXLAN, NVGRE
  - Supported on servers (hypervisors) and on physical devices (TORs)
  - Currently defined for Layer-2 overlay
- Customers want support for Layer-3 service
  - And leverage the same encapsulations
- BGP L3VPN – mature, widely deployed virtualization solution
  - Well-known routing and forwarding models
  - Eminently applicable to support Layer-3 services in data center
- Draft describes how BGP L3VPN can be used along with VXLAN, NVGRE like NVO encapsulations
Goals of draft

• Integrate BGP L3VPN control plane with virtual network overlay encapsulations
  – Both encapsulations support 24-bit identifier (VN-ID)
  – Identifies a tenant’s virtual network
  – Drives forwarding table lookup and forwarding at edge

• Define VN-ID signaling in BGP updates

• Extend VN-ID semantics to enable more flexible and efficient interworking with an MPLS L3VPN
MPLS L3VPN Interworking

Encapsulation end-points (NVE)

Intra-DC: TOR/vPE – TOR/vPE
TOR/vPE – DC Edge Router (-MPLS)

Inter-DC: TOR/vPE – TOR/vPE
TOR/vPE – DC Edge Router (-MPLS)
BGP/L3VPN changes

• Signal virtual-network identifier in Layer-3 BGP updates

• Options
  – Define a new extended community
  – Reuse existing NLRI to signal VN-ID

• BGP VPN NLRI (safi 128) already supports label encoding
  – Encode VN-ID in label field
  – Indicate this is a VN-ID
  – Use capability to identify capable peers

• Signal encapsulation type, parameters
  – Use encaps safi attribute sub-TLV
  – VN-ID interpreted and used in conjunction with encapsulation attribute
VN-ID semantics

- VN-IDs can have local forwarding scope
  - Emulate forwarding semantics similar to MPLS VPN labels
  - DC Edge router can switch to an MPLS LSP based on VN-ID lookup
  - Allows support for seamless MPLS, IAS models
Next Steps

• -01 version will have more detailed procedures, restructured text
• Include additional interworking scenarios
• Incorporate feedback
Thank You