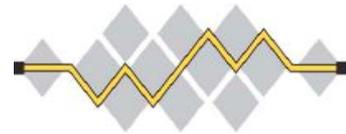


# IPv6 VPN Context Information Option

`<draft-bonica-6man-vpn-dest-opt-00>`



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# Virtual Private Networks



- VPNs allow network providers to emulate private networks with shared infrastructure
  - Red and blue VPNs connect to shared infrastructure
  - Red nodes can communicate with red nodes
  - Blue nodes can communicate with blue nodes
  - Red nodes cannot communicate with blue nodes
- Over the years, the IETF has standardized many VPN technologies
  - L3VPN, L2VPN, VPLS, EVPN, Pseudo-wires

# Common VPN Components

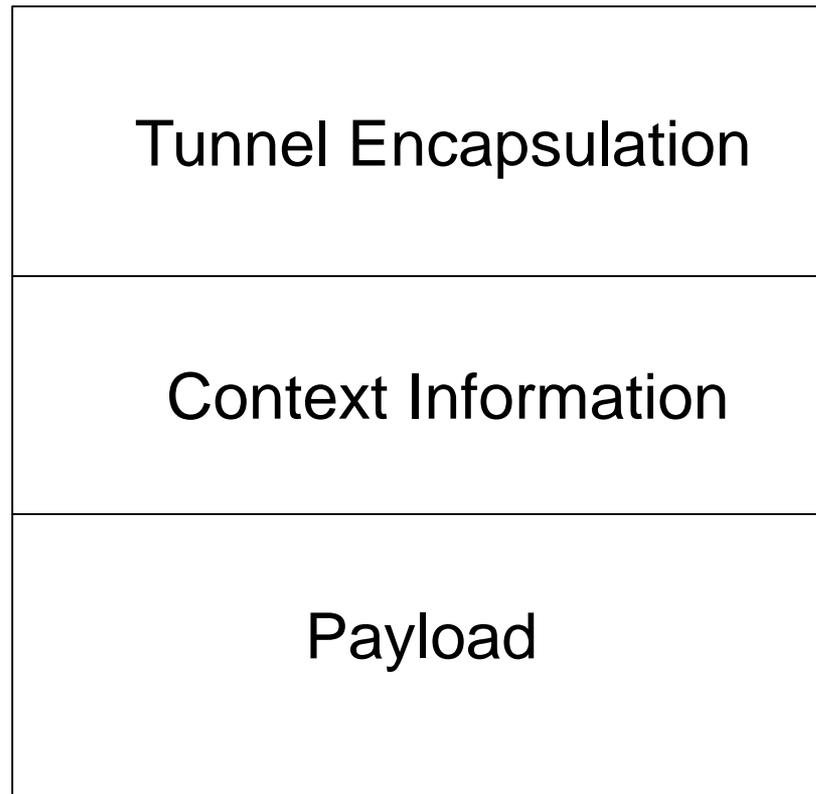


- Customer Edge (CE) devices
  - Participate in VPNs
  - Connect to Provider Edge (PE) devices
- Provider Edge (PE) devices
  - Maintain one VPN Routing/Forwarding (VRF) instance per VPN
  - A VRF is a VPN-specific Forwarding Information Base
- VPN Context Information
- Transport Tunnels
  - Connect PE devices to one another

# Ingress PE Procedures

- Receive a packet from the CE
- Look up the packet's destination address in the VRF that is associated with the ingress interface
  - VPN context information
  - Next-hop (another PE, via a transport tunnel)
- Prepend VPN context information to the packet
- Forward the packet to its next-hop
  - Prepend tunnel encapsulation
  - Forward the packet through the transport tunnel

# The Encapsulated Packet



# Egress PE Procedures

- Receive a packet from the ingress PE
- Remove the transport tunnel header
- Remove the VPN context information
- Execute forwarding procedure specified by the VPN context information
- For example:
  - Forward through the interface specified by the VPN context information
  - Look up payload's destination address in the VRF specified by the VPN context information



# Transport Tunnel Options

- MPLS
- GRE
- IP-in-IP
- IPSec
- VXLAN
- And more....

# VPN Context Information Options



- Currently, context information is always encoded in an MPLS label stack entry
  - Label (20 bits, used)
  - TTL (8 bits, not used)
  - QoS (3 bits, not used)
  - Bottom of stack indicator (1 bit, used)
- Some devices that might otherwise serve as PE's cannot process MPLS label
  - Servers
  - SOHO routers

# VPN Context Information Destination Option



- Carried in IPv6 Destination Option extension header
- Option Type – TBD by IANA
  - Act bits (10) – If option is not recognized by the destination node, discard packet and send ICMP Parameter Problem message to the Ingress PE
  - Chg bit (0) – Option data cannot be changed on route
- Opt Data Len – Variable
- Option Data – VPN context information

# Next Steps



- Adopt as 6man WG item



# QUESTIONS / COMMENTS?