

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

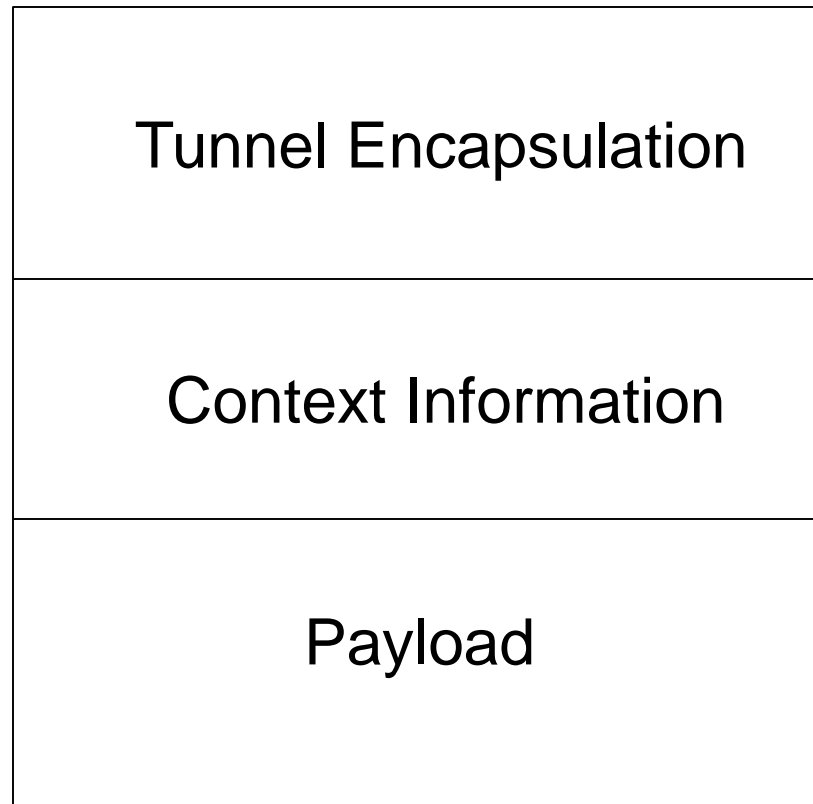


- Customer Edge (CE) devices
 - Participate in VPNs
 - Connect to Provider Edge (PE) devices
- Provider Edge (PE) devices
 - Maintain one VPN Routing/Forwarding (VRF) instance per VPN
 - A VRF is a VPN-specific Forwarding Information Base
- VPN Context Information
- Transport Tunnels
 - Connect PE devices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