

IP-VPN with IP/UDP-payload-transportation

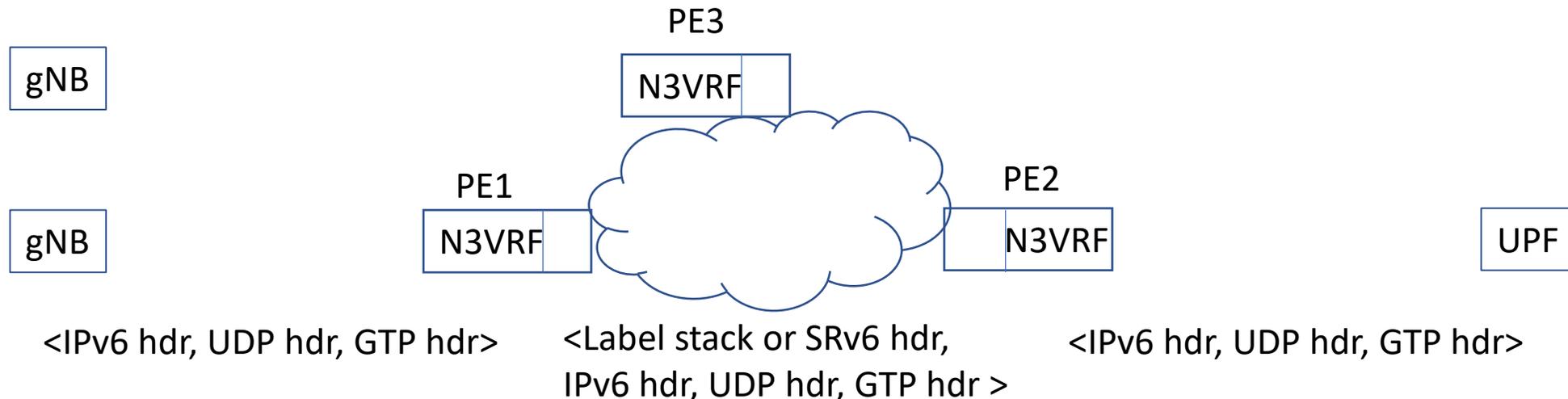
draft-zhang-bess-ipvpn-payload-only
draft-zhang-pals-pw-for-ip-udp-payload

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IETF114

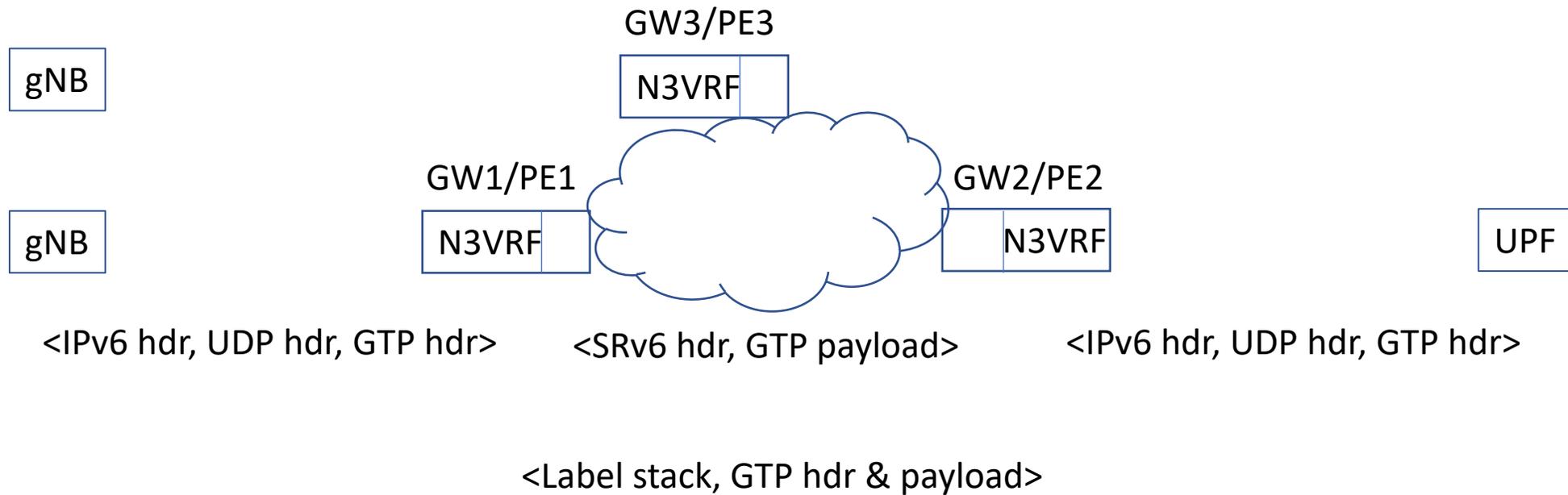
Use Case: Mobile User Plane Transportation

- For 5G, user (data) plane is via GTP-U tunneling over an IP VPN
 - Referred to as N3VPN in this document/presentation
 - IP VPN is used so that a converged transport infrastructure can be used for:
 - N3 and other mobile related transportation, and,
 - Non-mobile related transportation (e.g., wireline IP/E-VPN including mobile DN)
- The transport infrastructure is MPLS or SRv6
 - MPLS/SRv6-transporting-GTP



SRv6-replacing-GTP

- Draft-ietf-dmm-srv6-mobile-uplane replaces GTP with SRv6
 - Based on N2/N4-signaled GTP parameters – “under the hood”
 - Between NFs (e.g., gNB/UP), or,
 - Between GWs attached NFs
 - N3VPN PEs are natural GWs
 - GTP traffic reconstructed by the N3VPN PEs
 - <IPv6 header, UDP header, GTP header> replaced with SRv6 header or vice versa
 - This is acceptable to some operators because all elements are under the same operator control
- Advantages
 - Traffic steering for SR-TE, SFC purposes
 - BW savings
 - No <IPv6 header, UDP header, GTP header> needed in the transport infrastructure



- Information in GTP header is moved into SRv6 header
- SRv6 header could be an MPLS label stack as well
 - In this case, GTP header is transported as is
 - For MPLS operators
 - SR-TE, SFC, even more BW savings

MPLS-replacing-GTP

- For the same consideration, GTP-U can be replaced by MPLS tunnels
 - MPLS-replacing-GTP
- A GW removes the <IP header, UDP header> and transport the GTP header (plus its payload) with a label stack
- Inner label has the semantics of “put on <IPv6 hdr, UDP hdr> and route in a VRF”
 - A PW that only transports UDP payload
 - A control word is used to prevent transit routers from mistaking payload as IP

Transport IP/UDP payload-only in IP-VPN

- Generalized from “PW transporting UDP payload”
 - It could be that only IP header is removed (and then re-added)
- Applicable for the following situations
 - Traffic are mostly among certain hosts
 - It's acceptable for packets to be reconstructed by transit devices
- An IP-VPN can transport traffic in both ways
 - Some traffic transported the traditional way with original IP/UDP header
 - Some traffic transported with just IP header removed
 - Some traffic transported with both IP/UDP header removed

BGP Signaling

- New SAFI
 - NLRI encodes $\langle \text{Label}, \text{RD}, \text{DST addr}, \text{SRC addr}, \text{DST UDP}, \text{SRC UDP} \rangle$
 - RD could be the same as the RD for VPN-IP routes
 - Trailing fields of $\langle \text{SRC addr}, \text{DST UDP}, \text{SRC UDP} \rangle$ can be wildcards
 - Updates carry the same RTs as for VPN-IP routes
- Advertised by egress PEs
 - Egress PEs create forwarding state to reconstruct IP header for incoming traffic with matching label
 - If advertised SRC UDP/addr is wildcard, locally configured SRC UDP/addr is used
 - Ingress PEs create forwarding state to strip the IP/UDP header from matching traffic and send with corresponding label
 - If DSP UDP is wildcard, only IP header is stripped

Next steps

- Comments appreciated!
- Do we want to consider other IP payload types?
 - Not just UDP