IP-VPN with IP/UDP-payload-transportation

draft-zzhang-bess-ipvpn-payload-only

draft-zzhang-pals-pw-for-ip-udp-payload

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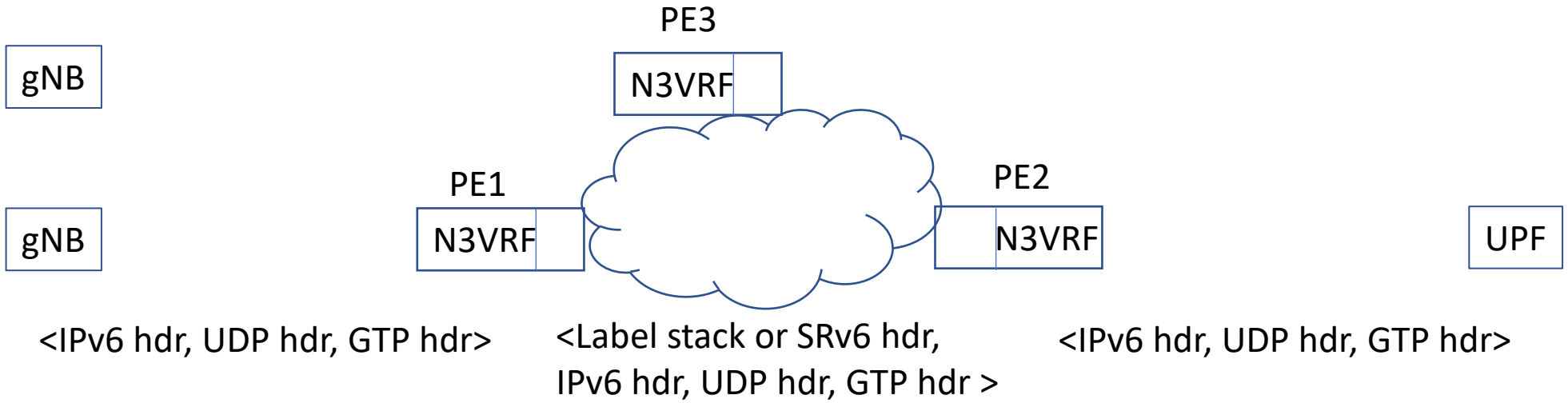
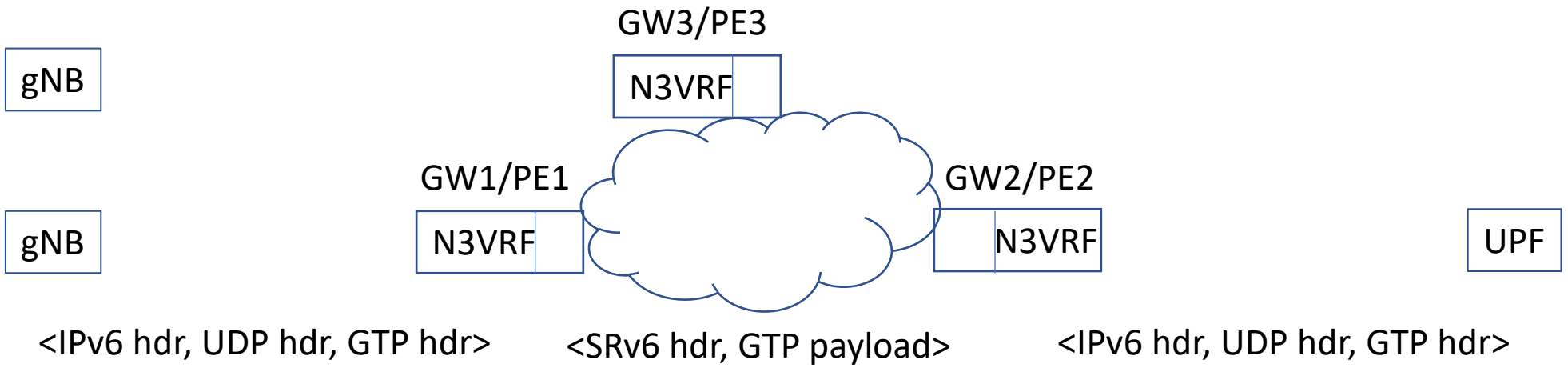
Use Case: Mobile User Plane Transportation

- 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 <Label, RD, DST addr, *SRC addr, DST UDP, SRC UDP*>
    - RD could be the same as the RD for VPN-IP routes
    - Trailing fields of <*SRC addr, DST UDP, SRC UDP*> 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