The IPv6 Tunnel Payload Forwarding (TPF) Option

Draft-bonica-6man-vpn-dest-opt

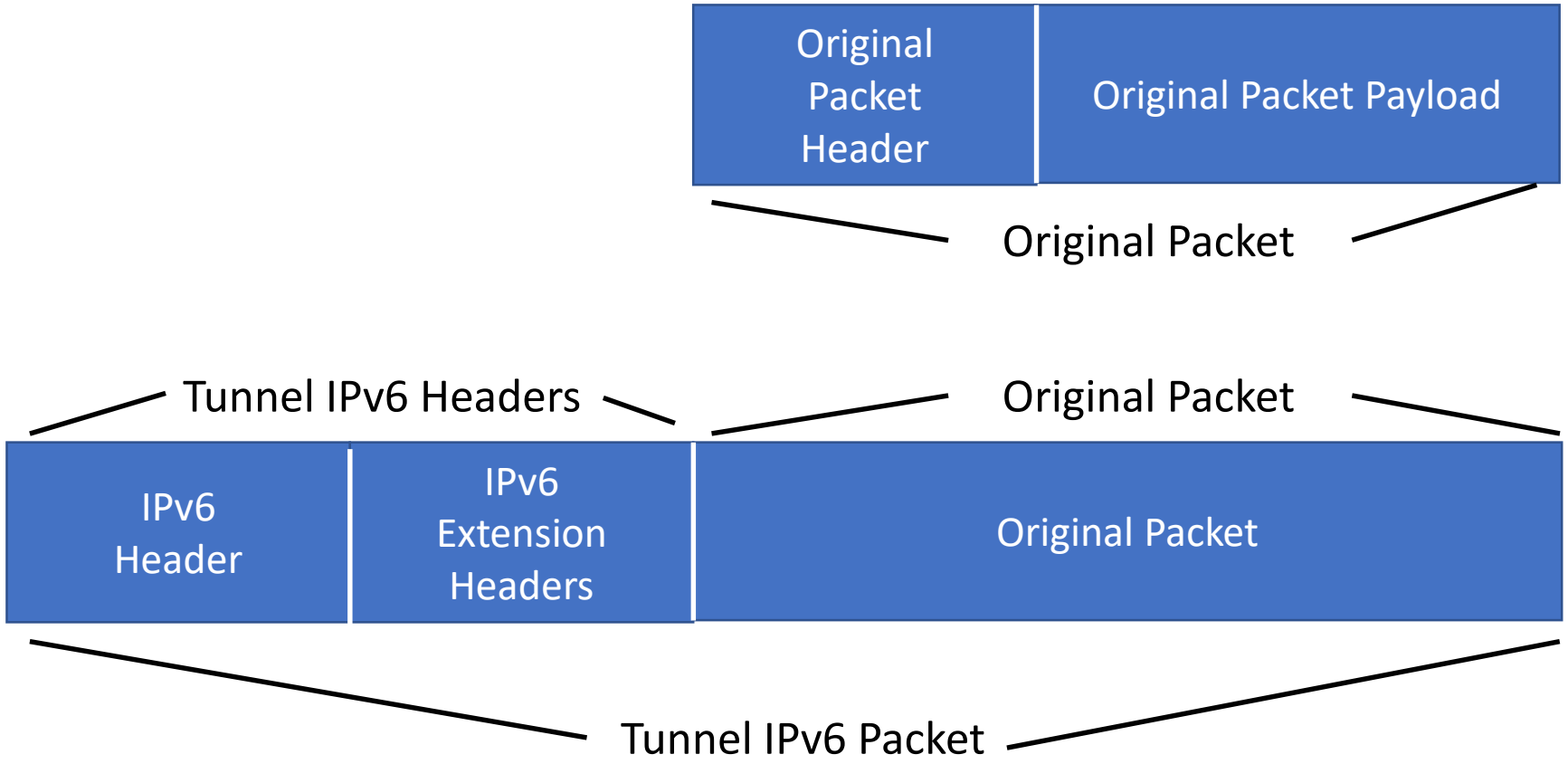
Generic Packet Tunneling in IPv6 [RFC 2473]

- Tunnel entry-point encapsulates an original packet in IPv6
  - Original packet can be any protocol
  - Examples: IPv4, IPv6, Ethernet
- Tunnel entry-point sends Tunnel IPv6 packet to tunnel exit-point

RFC 2473 Tunnel Entry-Point Processing

- Prepend the IPv6 Tunnel headers
  - IPv6 Header
  - IPv6 Extension headers, as required
- Send

Tunnel IPv6 Packet



RFC 2473 Tunnel Exit-Point Processing

- Process the IPv6 Tunnel headers
  - IPv6 Header and IPv6 Extension headers
- Remove the IPv6 Tunnel headers
  - Exposing the original packet
- Submit the original packet to next-protocol engine

The Next-Protocol Engine

- Each next-protocol engine can execute a default procedure
  - Standard IPv4 forwarding
  - Standard IPv6 forwarding
- When provided with additional information, each next-protocol engine can execute special procedures
  - Forward a packet through the specified interface
  - Forward a packet using the specified routing table

The IPv6 Tunnel Payload Forwarding (TPF) Option

- Used by the tunnel entry-point to send additional information to the next-protocol engine on the tunnel exit-point
- Contained by a Destination Options header
  - Contained by the Tunnel IPv6 headers
  - Immediately precedes the original packet

TPF Format

- Option Type: 8-bit selector. TPF option. See Note.
- Opt Data Len - 8-bit unsigned integer. Length of the option, in octets, excluding the Option Type and Option Length fields. This field MUST be set to 4.
- Option Data - 32-bits. Tunnel Payload Forwarding (TPF) Information.

Note: The highest-order two bits of the Option Type (i.e., the "act" bits) are 01. These bits specify the action taken by a destination node that does not recognize the option. The required action is to discard the packet. The third highest-order bit of the Option Type (i.e., the "chg" bit) is 0. This indicates that Option Data cannot be modified along the path between the packet's source and its destination.

Incremental Improvements

- Upon RFC 4797
  - Eliminates need for MPLS service label
  - Eliminates need for GRE header
- Upon RFC 7432
  - Eliminates need for VLAN header
  - Eliminates need for UDP header

Independence From Segment Routing

- The TPF Option is a generic IPv6 feature
- While it is available for use by SR, it is also available for use by non-SR applications
- Many operators who have expressed interest in TPF
  - Are not interested in any other SR features
  - Are not interested in the SR control plane
  - Are averse to encoding instructions in an IPv6 addresses
  - Are averse to deploying the OAM extensions required when instructions are encoded in IPv6 addresses

Next Steps

- Call for WG Adoption