In-Network Congestion Notification

IETF 121

RTGWG (Routing Area Working Group)

draft-du-rtgwg-in-network-congestion-notification-00

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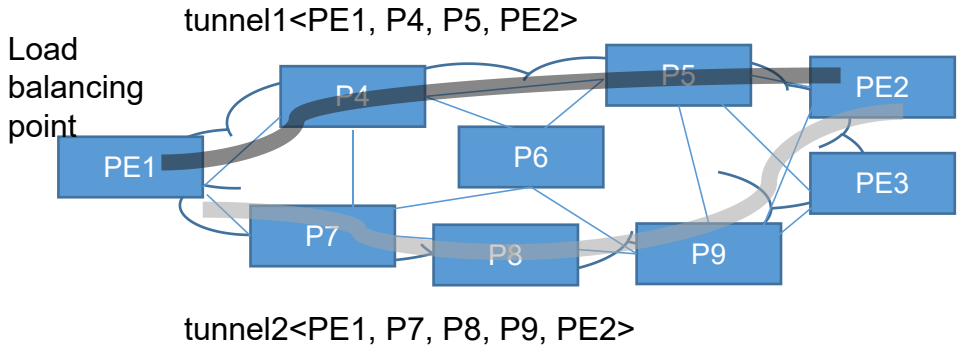
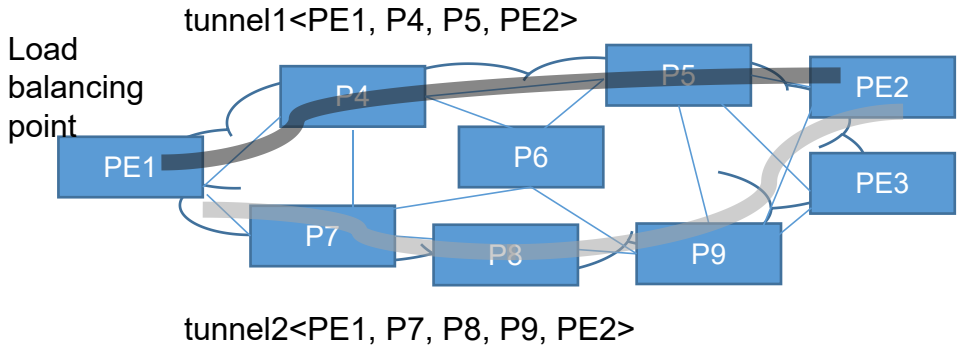
TTE （real-time Tactical Traffic Engineering ）

- During IETF 118, a TTE mechanism is introduced in draft-li-rtgwg-tte-00
- In the mechanism, when a link is nearing congestion, some traffic can be steered to a backup path
  - For example, an upper limit link utilization rate is detected between P4 and P6
- However, it is a local policy for two adjacency nodes
- In the provider network, the traffic usually is bared by some tunnels between the PE nodes
- This document wants to enable TTE in the provider network, to make the network load more balanced



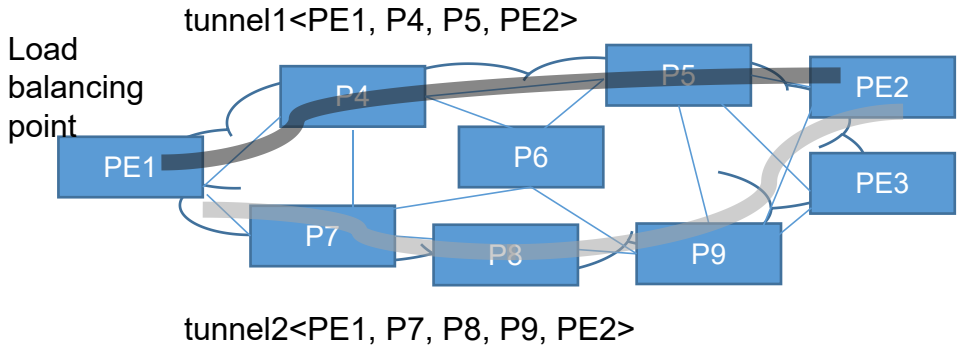
TTE for tunnels

- We assume that there are two tunnels between PE1 and PE2
  - The primary path: tunnel1<PE1, P4, P5, PE2>
  - The backup path: tunnel2<PE1, P7, P8, P9, PE2>
- If the link between the PE1 and P4 is nearing congestion
  - The normal procedure of TTE can trigger a part of the traffic following tunnel1 to be steered to the tunnel 2, so as to avoid potential congestion
  - However, if the link between P4 and P5 becomes congested, we need a notification method to announce the PE1 to do the traffic steering because the tunnel may based on the source routing method such as SRv6



In-Network Congestion Notification

- If the link between P4 and P5 is nearing congestion
  - Step 1: the P4 marks the packets in the tunnel1 as ECN(11) in the outlayer IP header
  - Step 2: the PE2 receives the ECN(11), and returns a ECN(01) to the PE1
  - Step 3: the PE1 receives the ECN(01), and triggers the TTE for the tunnel1
- The above ECN(11) and ECN(01) are all on the outlayer IP header, which is invisible to the client and the server, so we call it in-network congestion notification
  - The ECN(11) is on the forwarding path with the <SA,DA> = <PE1, PE2>
  - The ECN(01) is on the related reverse path, for example tunnel3, with the <SA,DA> = <PE2, PE1>



IPv4 header format

Offsets	Octet	0							1							2								3							
Octet	Bit	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
0	0	Version				IHL				DSCP						ECN		Total Length															
4	32	Identification																Flags				Fragment Offset											
8	64	Time To Live								Protocol								Header Checksum															
12	96	Source IP Address																															
16	128	Destination IP Address																															

Next step

- Call for comments and contributions

Thanks and welcome for comments