

Guidelines for Adding Congestion Notification to Protocols that Encapsulate IP (draft-ietf-tsvwg-ecn-encap-guidelines-04)

Bob Briscoe (Simula Research Lab)

John Kaippallimalil (Huawei)

Pat Thaler (Broadcom)

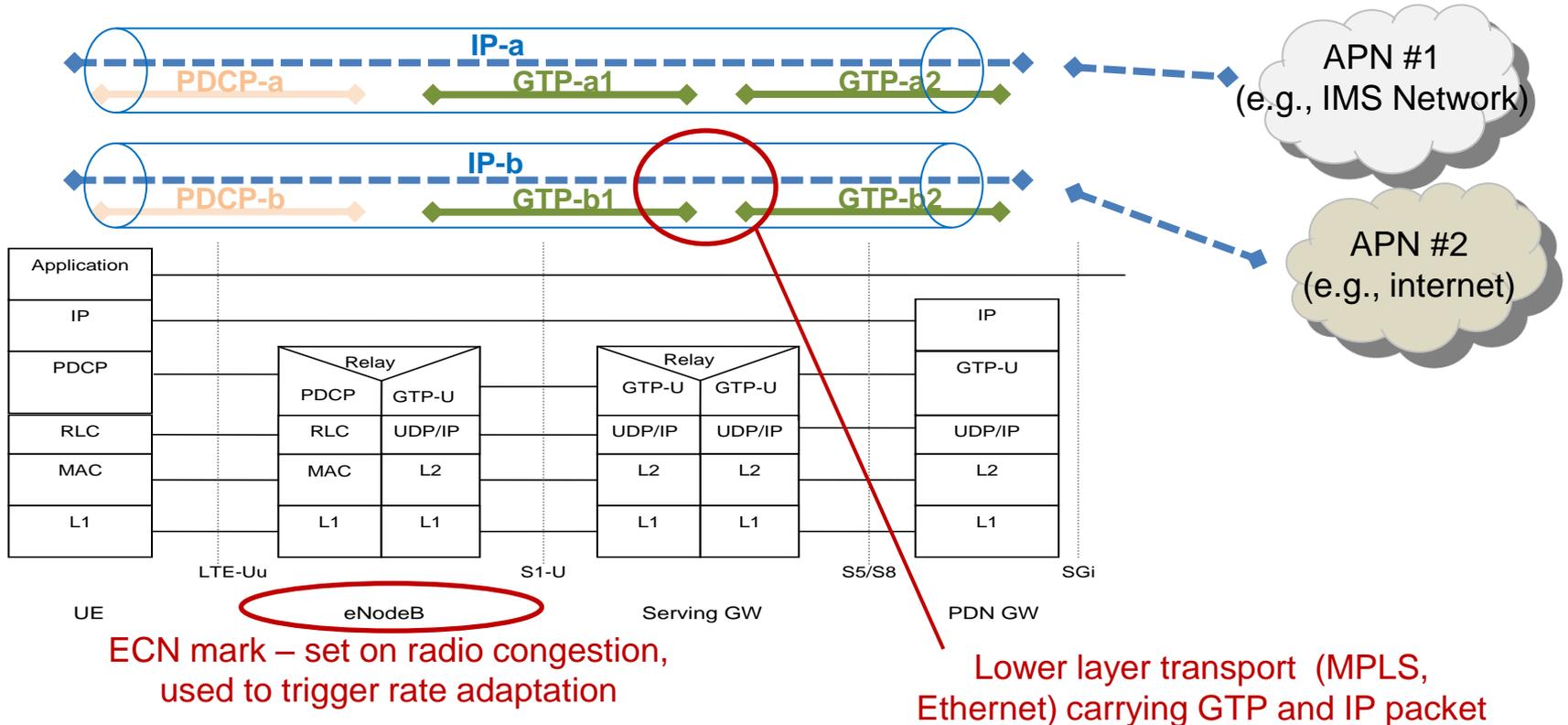
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Renewed relevance of this draft

- Apple's recent ECN deployment experience:
 - Unity Media (German ISP) is marking all packets CE
 - Apple VPN's diligent compliance with ECN tunnels [RFC6040]
 - (correctly) dropped all non-ECN packets with CE outer
 - see presentation in HOPSRG
- Purpose of this draft and recent liaisons:
 - catch systemic ECN layering problems:
 - IEEE: <https://datatracker.ietf.org/liaison/1364/>
 - 3GPP: <https://datatracker.ietf.org/liaison/1424/>

Context



Snippets from liaison statement to 3GPP

" However, ECN is now being used in a number of environments including coder selection and rate adaptation, where 3GPP protocols such as PDCP encapsulate IP. As active queue management (AQM) and ECN become widely deployed in 3GPP networks and interconnected IP networks, it could be incompatible with the standardized use of ECN across the end-to-end IP transport [draft-ietf-aqm-recommendation]."

"The IETF is now considering new uses of ECN for low latency [draft-welzl-ecn-benefits] that would be applicable to 5G mobile flows. However, the IETF has realized that it has given little if any guidance on how to add explicit congestion notification to lower layer protocols or interfaces between lower layers and ECN in IP."

#1: ECN in 3GPP TS 36.300

Evolved Universal Terrestrial Radio Access (E-UTRA)... Overall description

This motivates use of ECN for Voice over LTE (VoLTE) and video

“11.6 Explicit Congestion Notification”

The eNB and the UE support of ... ECN is specified in Section 5 of [RFC3168] This enables the eNB to control the initial codec rate selection and/or to trigger a codec rate reduction. Thereby the eNB can increase capacity (e.g., in terms of number of accepted VoIP calls), and improve coverage (e.g. for high bit rate video sessions).

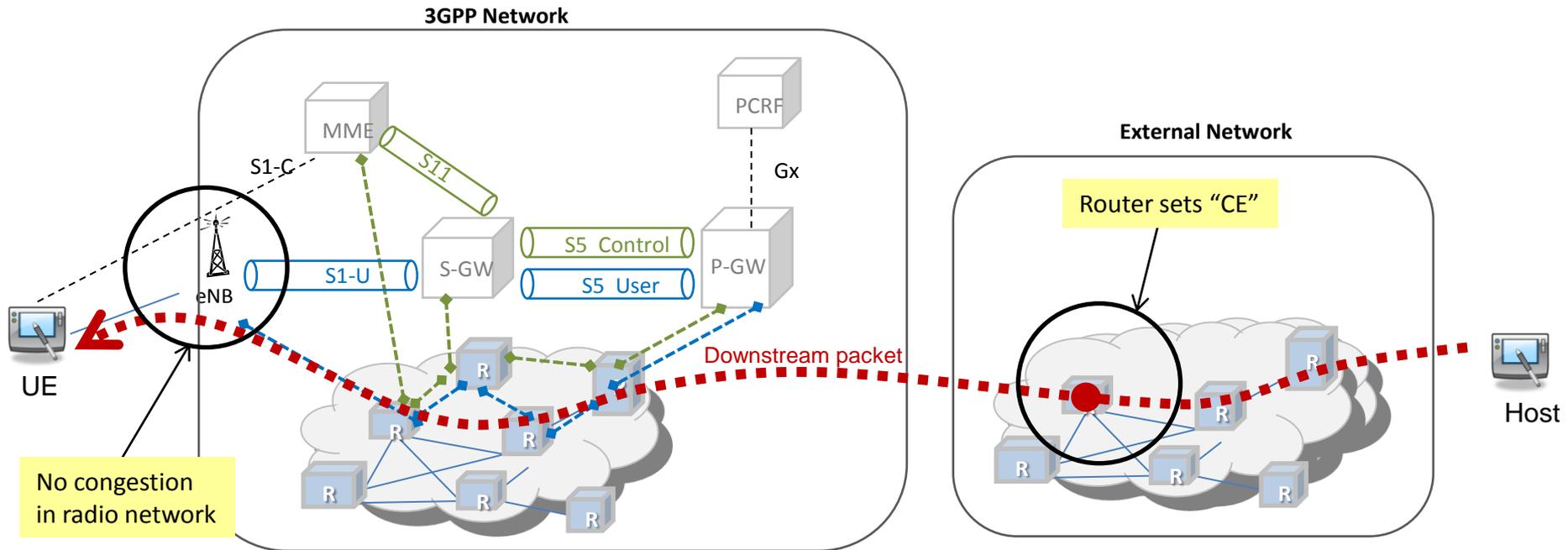
The eNB **should** set the Congestion Experienced (CE) codepoint (‘11’) in PDCP SDUs in the downlink direction to indicate downlink (radio) congestion if those PDCP SDUs have one of the two ECN-Capable Transport (ECT) codepoints set. The eNB **should** set the Congestion Experienced (CE) codepoint (‘11’) in PDCP SDUs in the uplink direction to indicate uplink (radio) congestion if those PDCP SDUs have one of the two ECN-Capable Transport (ECT) codepoints set.

”

This gives normative specification of base station behaviour

□ 3GPP needs to clarify that this does not imply “all or nothing” marking...

#1: ECN in 3GPP TS 36.300 (cont)



...otherwise incompatibility between

“all-or-nothing” and “loss-equivalent” [RFC3168] marking

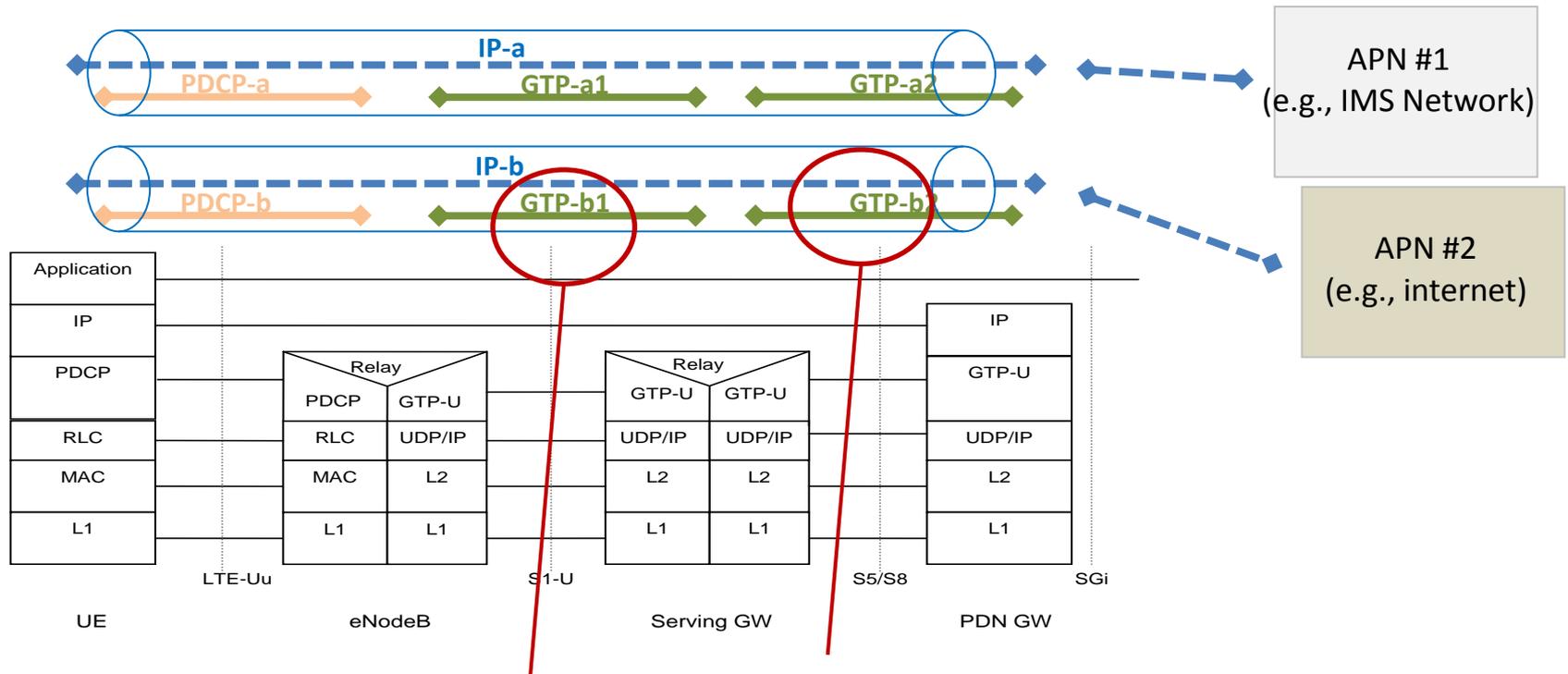
- Should codec rate reduction be triggered on a single “CE” mark?
- Should codec rate reduction be triggered on multiple “CE” marks?

•The liaison has highlighted the difficulty of understanding RFC3168

•3GPP still has to address the subject of the ECN-encap liaison:

- how does the PDCP layer propagate marking to the IP header it encapsulates?

#2: Ethernet Backhaul in 3GPP Networks



Ethernet backhaul for S1 and S5

Expected behavior:

- If congestion experienced, unlike in MPLS (feed-forward-and-up), the Ethernet backhaul network should set “CE” in IP (feed-up-and-forward)

Next Steps

- milestones
 - 28-Oct-15: IETF 3GPP liaison deadline
 - 3GPP promises response by 1-Dec-15
 - Chair of 3GPP SA has volunteered to gather liaison responses
- outcomes unlikely to impact ecn-encap draft itself
 - hoped-for outcome is for 3GPP to clarify their tech specs
- tsvwg could WGLC ecn-encap-guidelines 1-Dec-15