

# Guidelines for Adding Congestion Notification to Protocols that Encapsulate IP

(draft-ietf-tsvwg-ecn-encap-guidelines-08)

Bob Briscoe (Simula Research Lab)

John Kaippallimalil (Huawei)

Pat Thaler (Broadcom)

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# Status of this draft

- Ready for WGLC since July 2016.
- Recent ECN deployment experience:
  - reports of ISPs marking all packets CE
  - Host 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/>

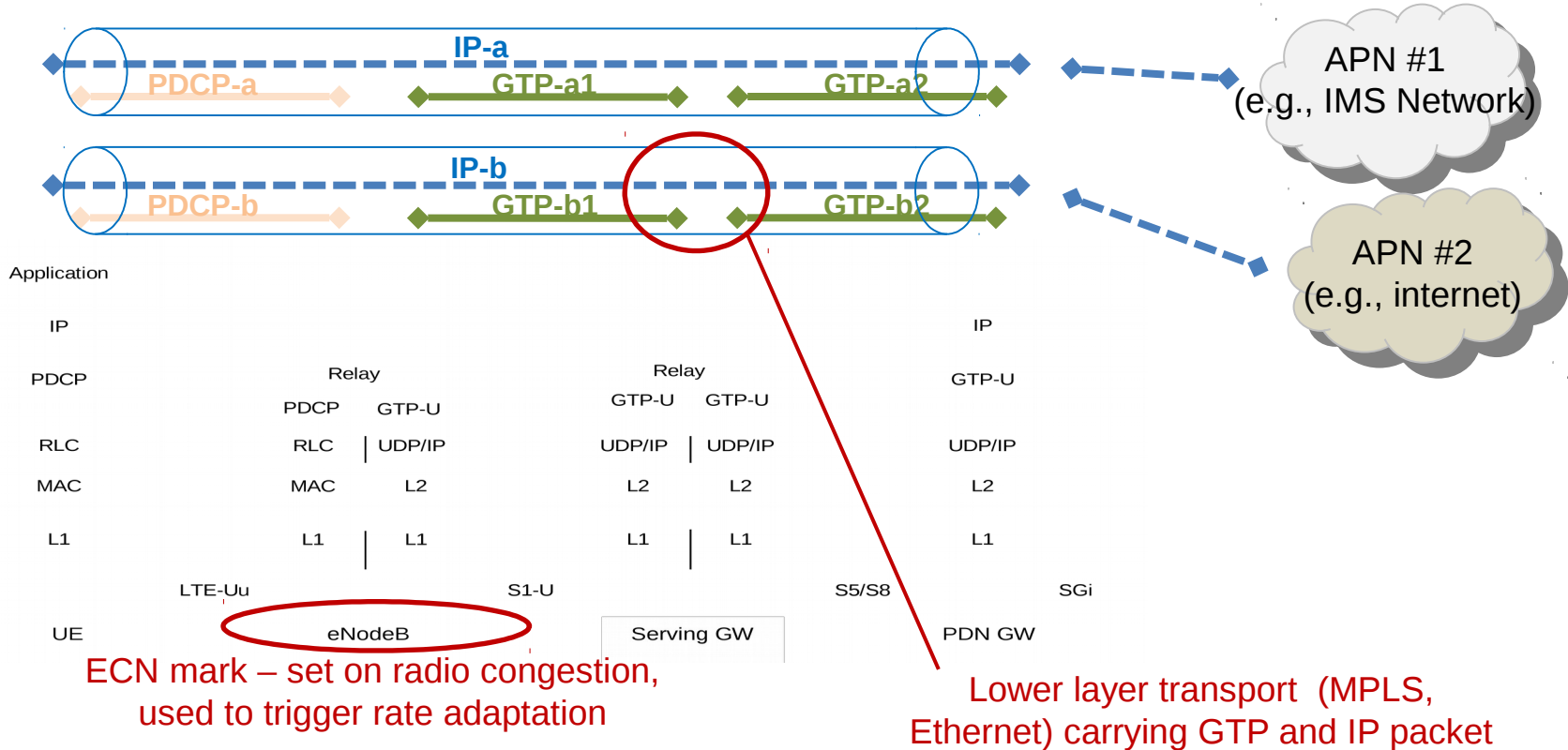
# Next Steps

For the last two IETFs, this draft has been ready for WGLC:

- draft-ietf-trill-ecn-support depends on this draft:  
Should both proceed to WGLC together?

**BACKUP**

# 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).

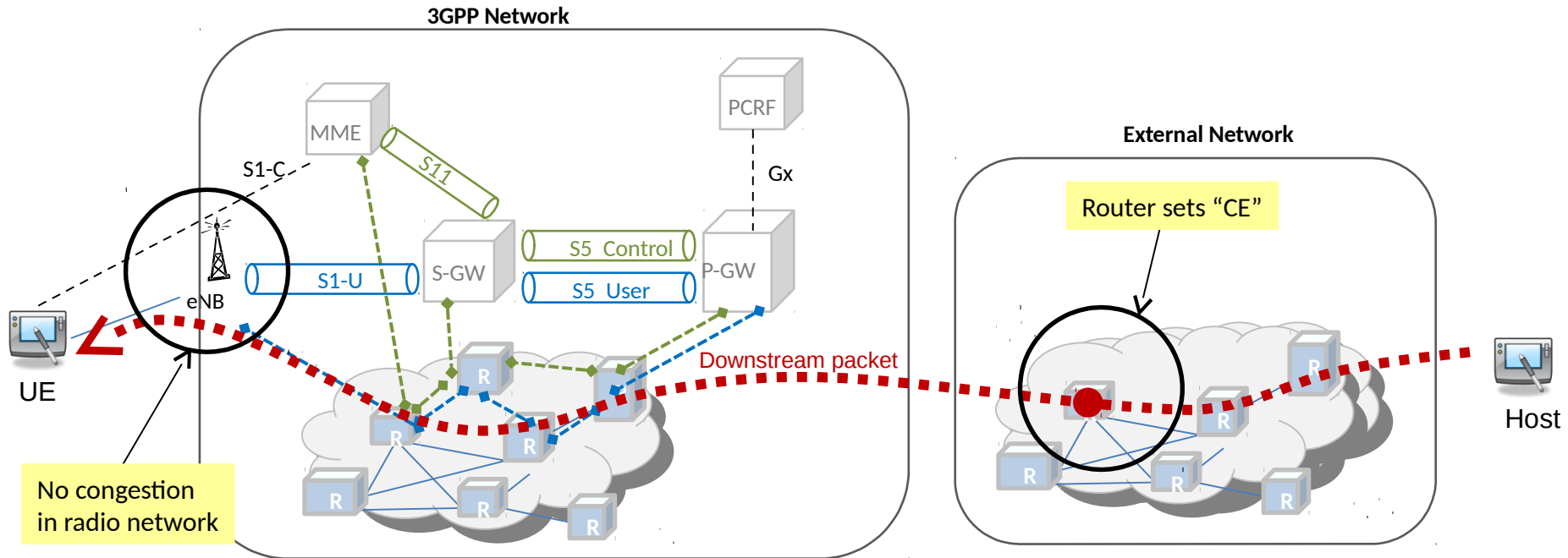
The eNB **should** set the Congestion Experienced (CE) codepoint ('11') in PDCP SDUs in the downlink direction to indicate downlink (radio) congestion if those PDCP SDUs have one of the two ECN-Capable Transport (ECT) codepoints set. The eNB **should** set the Congestion Experienced (CE) codepoint ('11')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

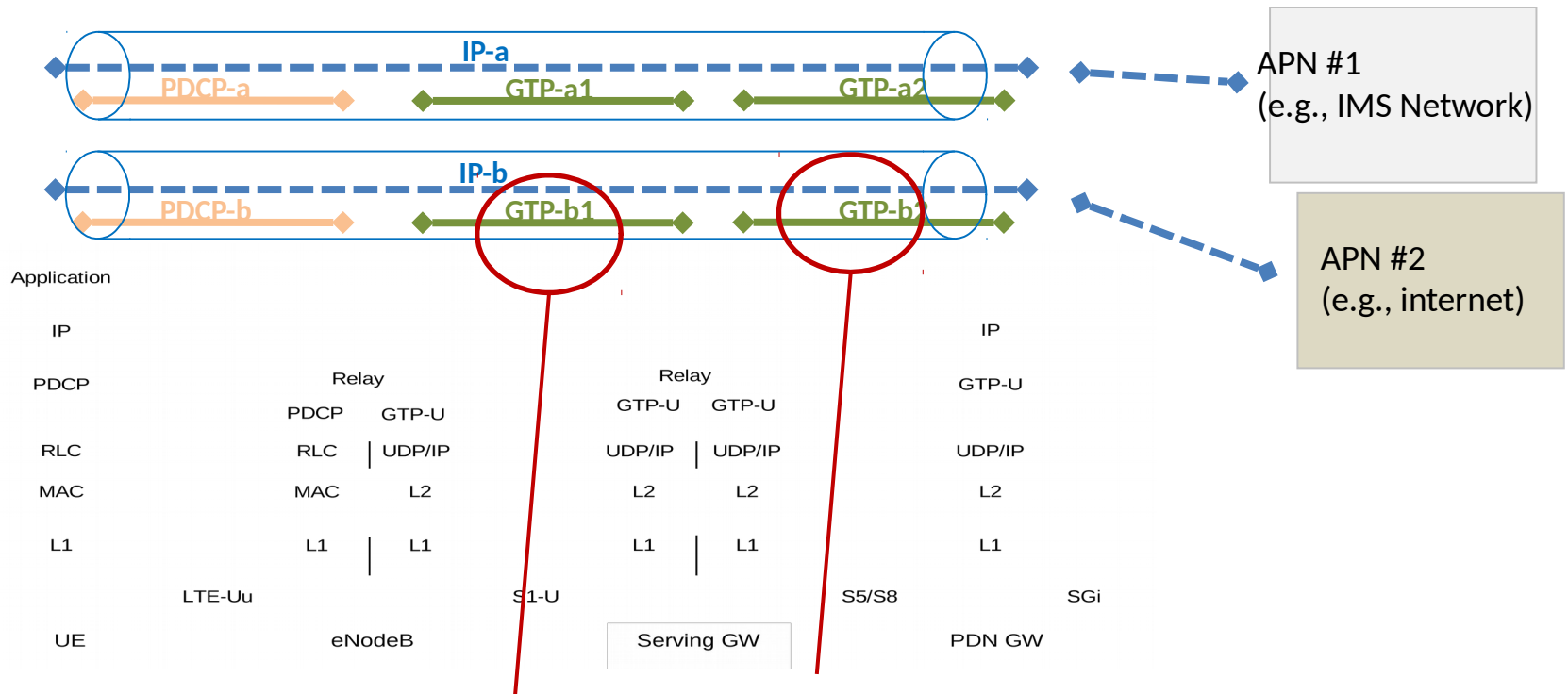
- Should codec rate reduction be triggered on a single “CE” mark?
- Should codec rate reduction be triggered on multiple “CE” marks?

•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)