Coding and congestion control in transport
draft-kuhn-coding-congestion-transport-00

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Introduction

- [RFC5681] : TCP is a loss-based congestion control
- Coding mechanisms could:
  - Hide congestion signals to the sender
  - Deal with tail losses or with networks with non-congestion losses efficiently

- This memo :
  - Simple best practices on how coding and congestion control could coexist

- [DISCLAIMER] The proposed recommendations apply for coding at the transport layer (coding for tunnels is out-of-the scope of the document)

Base solution

- The receiver MUST indicate to the sender that one or multiple packets have been recovered using a coding scheme
  - Such "repaired packet signal" could be based
    - on existing signals (even if the existing signal was not designed for that purpose, such as ECN) or
    - on new type of signals (such as a RECOVERED frame in QUIC)
- The sender MUST be able to detect the "recovered packet signal"
  - The base solution does not describe how the sender reacts to such signal

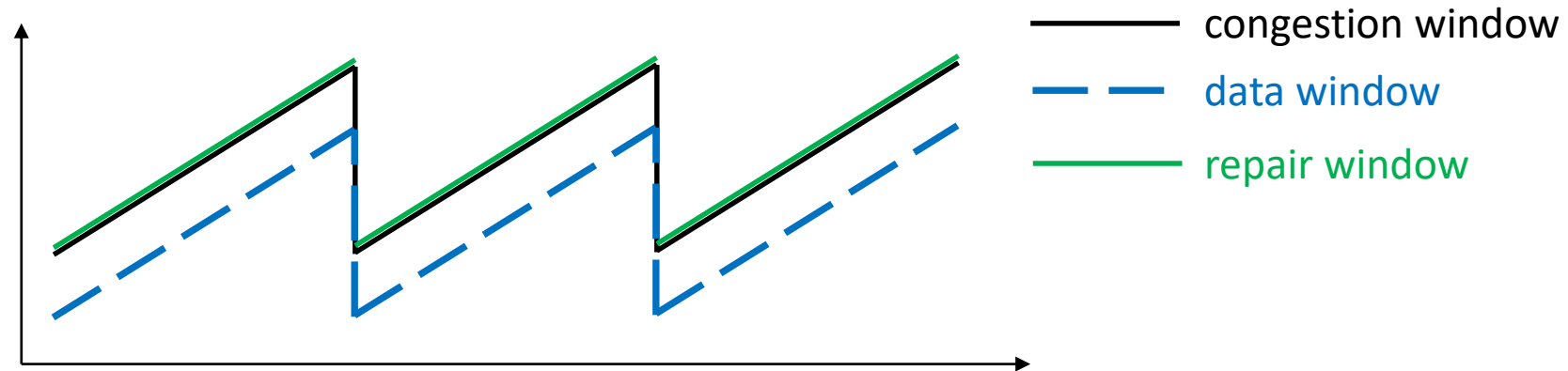# Sender-side coding solutions

- Coded packets without considering CWND progression
- Ex:
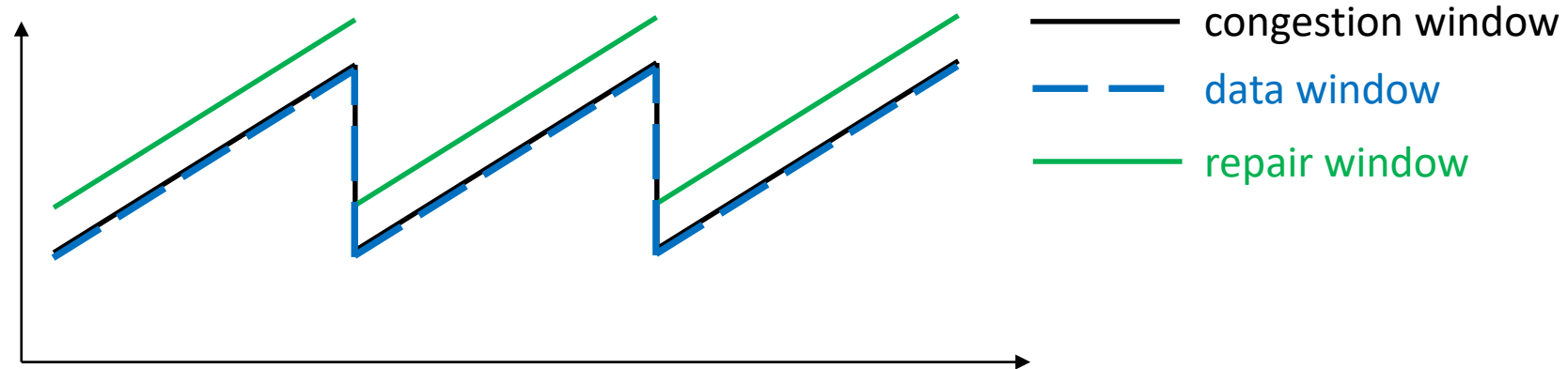
- Repair window can be fixed or based on another CC
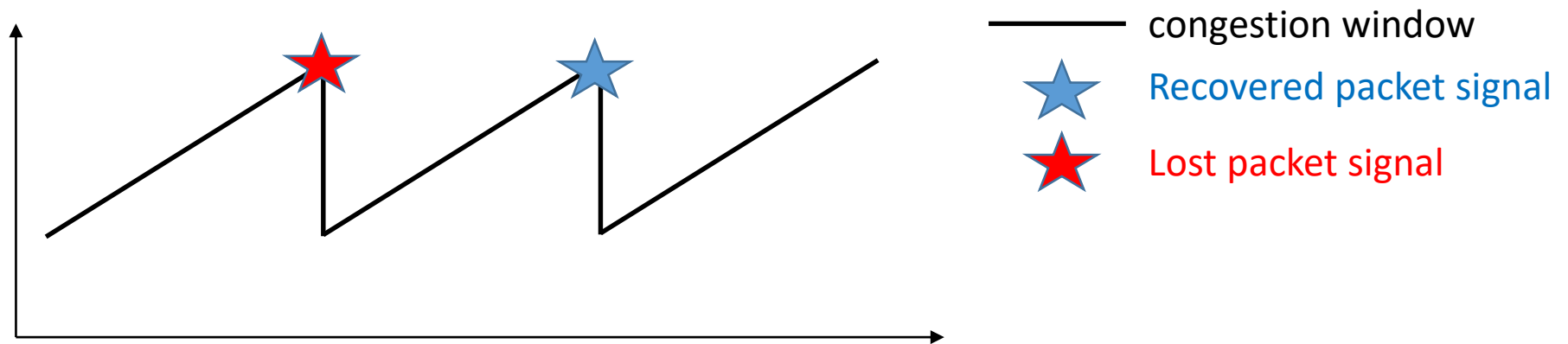
Sender-side coding solutions

- Coded packets driven by CWND progression
- Ex:

congestion window
data window
repair window

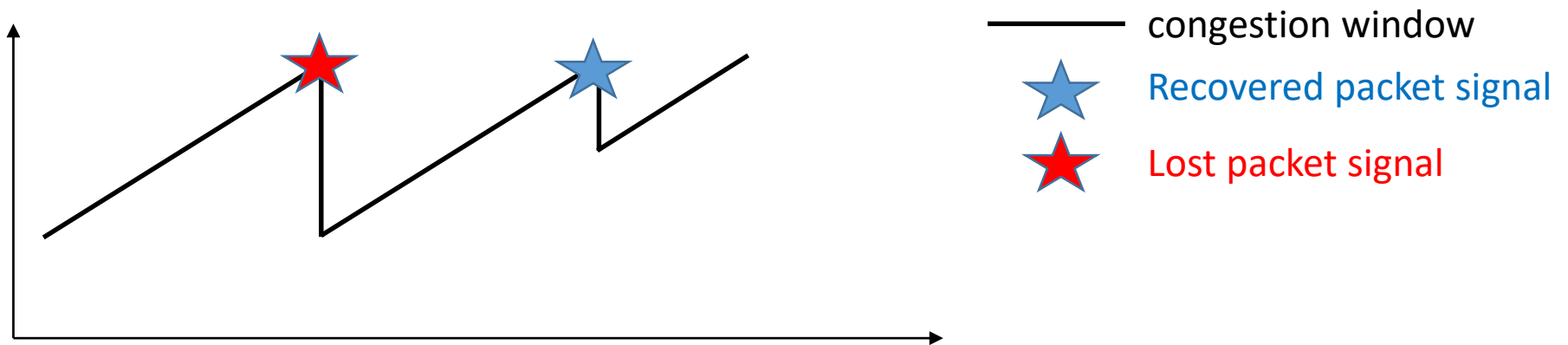- Repair window can be fixed or based on another CC

Sender-side reaction to recovered packet signals

- The sender congestion control considers recovered packet signals as congestion-implied packet losses
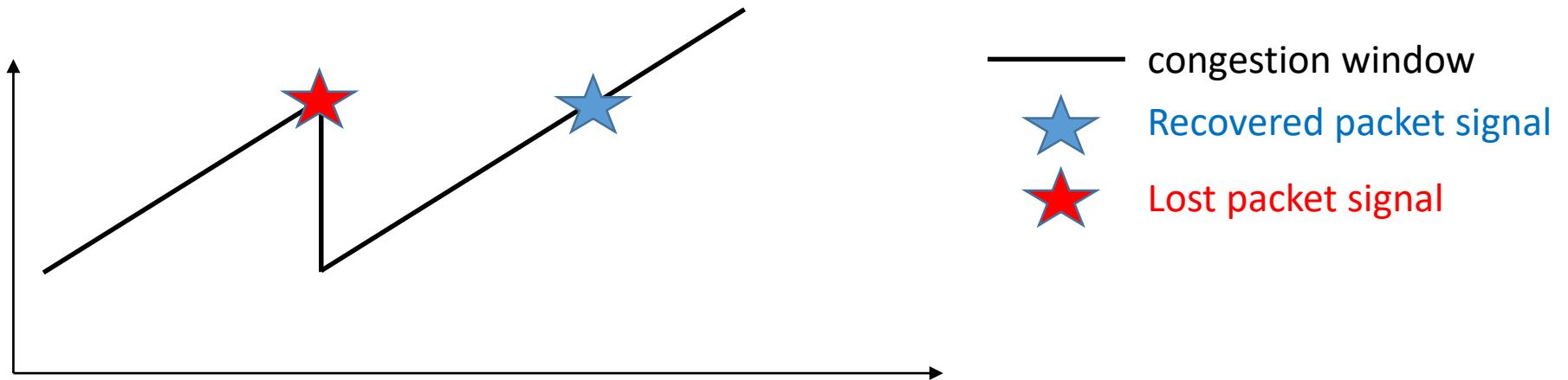
Sender-side reaction to recovered packet signals

- The sender adapts its window reduction to recovered packet signals (eg RFC 8511 for ECN signals)

Sender-side reaction to recovered packet signals

- The sender ignores recovered packet signals

Summary

Sender-side reaction to recovered packet signals	Sender-side coding solutions	
	Coded packets without considering CWND progression	Coded packets driven by CWND progression
React as loss	Fairness : ~ Real-time : + Bulk : ~	Fairness : ++ Real-time : + Bulk : -
Adapt window reduction	Fairness : ~ Real-time : + Bulk : +	Fairness : + Real-time : + Bulk : -
Ignore signals	Fairness : - Real-time : + Bulk : +	Fairness : - Real-time : + Bulk : -

Questions

- Do we need this kind of work in the IRTF ? IETF ?
- Any comments ?