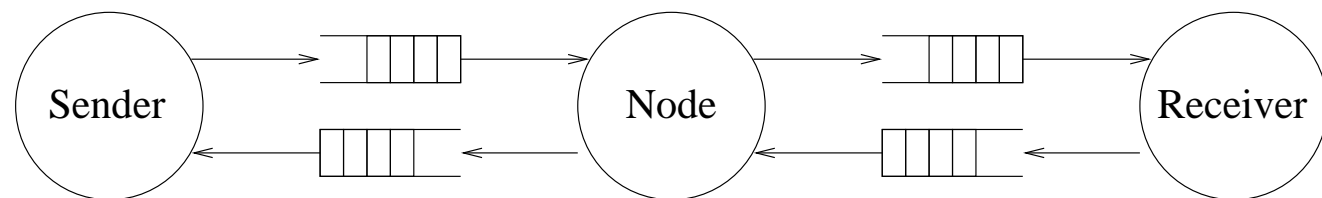# Timed PGM: condition for recovering all losses

Marc Boyer
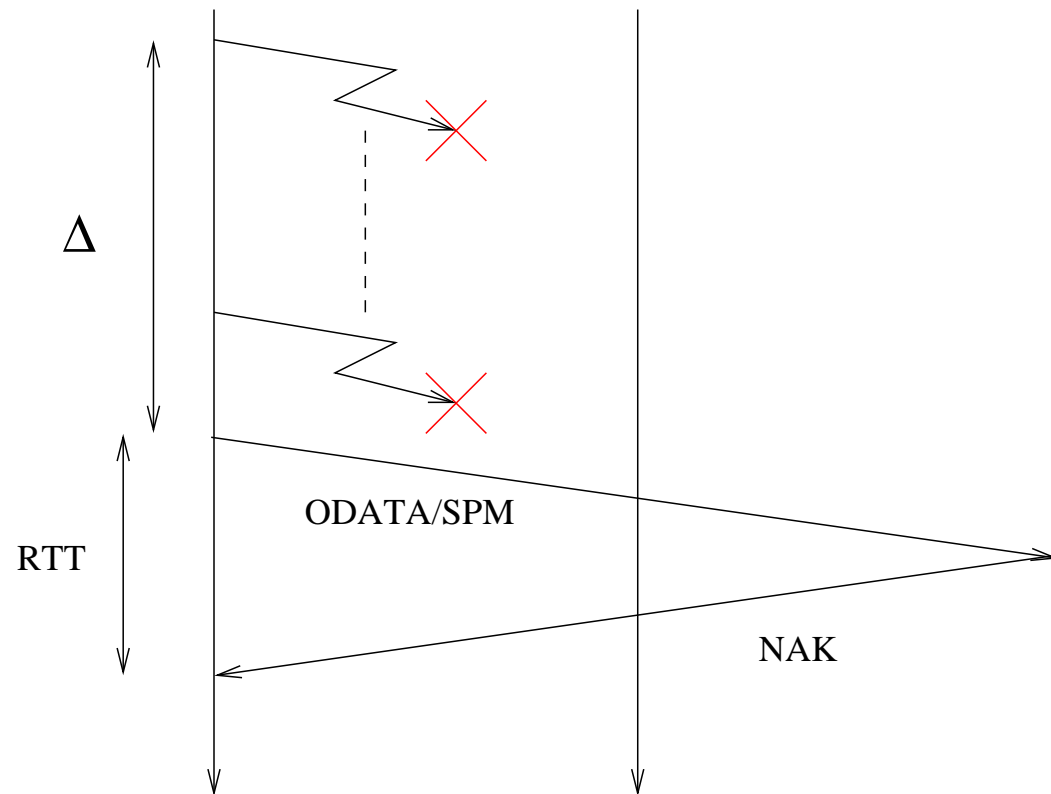
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The model

- topology S-N-R

- FIFO channels with delays

- only ODATA can be lost

- no NAK repeat

- SPM rate linked to the advance of the window

Recovering a loss

Did the NAK arrives "in time"?

Duration $\triangle$

$$\Delta = \min(\Delta_{SPM}, \Delta_{ODATA})$$

$$\Delta_{ODATA} \leq \text{LOSS\_MAX} * \text{PROD\_RATE}$$

$$\Delta_{SPM} \leq \big(\max(0, \text{Window Size} - \text{Mess seq. num.})$$

$$+ \text{AMB\_RATE}\big) * \text{PROD\_RATE}$$

Note: Δ_{ODATA} false for the last message
$(\max(\text{LOSS\_MAX}, \text{Window Size}))$

Lifetime of messages in transmit window

- nothing specified in the RFC
  a sender can drop each message once send

- our model:
  - try to keep the max. numb. of packets
  - constant rate fom producer

$$Lt \approx (\text{Window Size} - 1) * \text{PROD\_RATE}$$

Experiments

Recovering all losses, except first and last window:

$$\text{Window Size} - 1 - \min\left(\text{LOSS\_MAX}, \text{AMB\_RATE}\right) \geq \frac{RTT}{\text{PROD\_RATE}}$$

see `ProdRateVsLosses.pdf`
see `WindowVsLosses.pdf`
see `AmbRateVsLosses.pdf`