Preemption simulations

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Overview

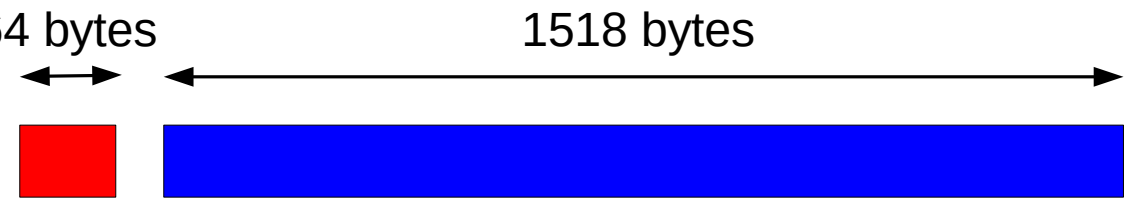
- Definition and goal
- Initial preemption simulations
- Future plans

Definition and goal

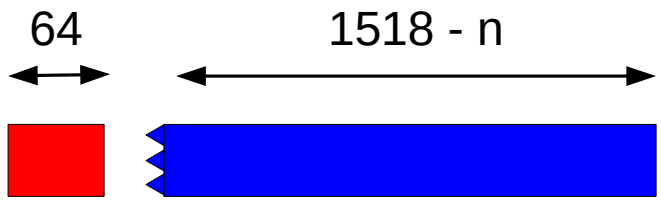
- What is preemption?
  - The ability to suspend the transmission of a lower priority frame for the transmission of a higher priority frame.
- What is the goal of preemption?
  - To increase the performance of the network by reducing the latency of high priority frames and helping to alleviate congestion caused by low priority traffic.

Types of preemption

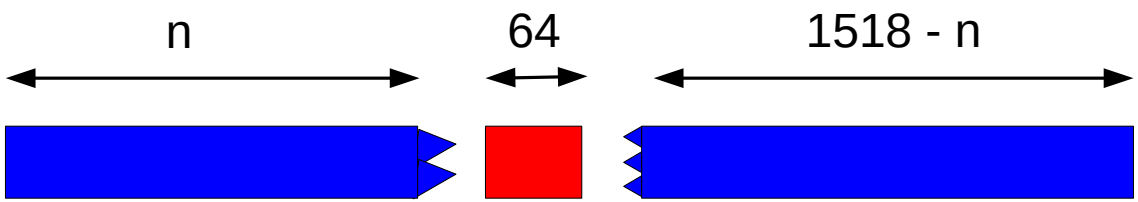
- No preemption (default)



- Preemption with no continuation (sub optimal)



- Preemption with continuation (optimal)

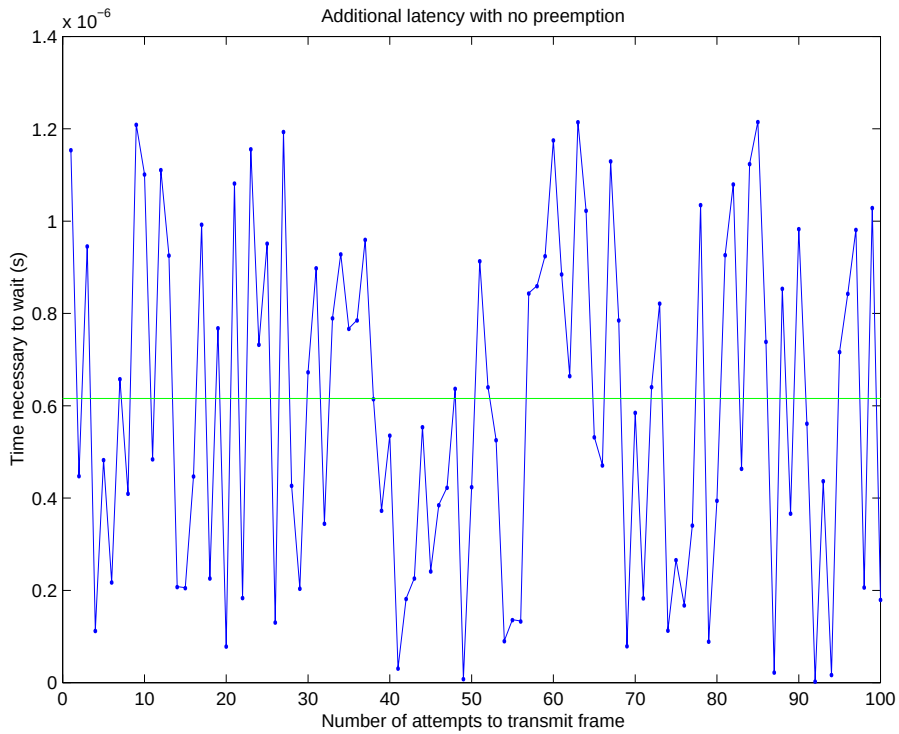


Preemption simulations

- Low priority traffic = 1518 byte frames
- High priority traffic = 64 byte frames
- All frames are sent with a minimum IFG of 12 bytes, using a data rate of 10 Gbps.
- You are allowed to preempt at any point during the frame (this may be something we would want to restrict).

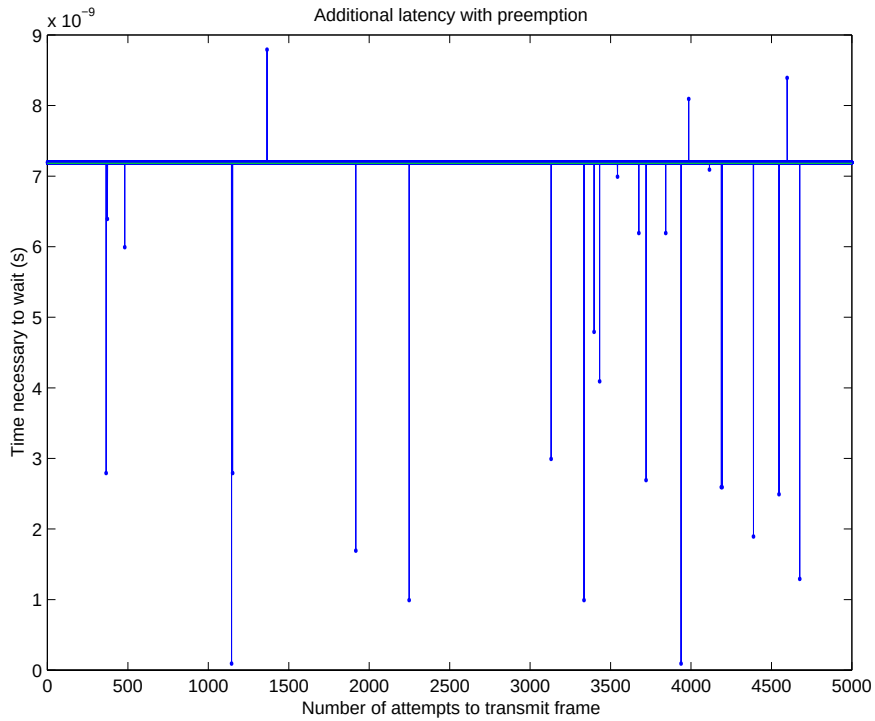
Latency with no preemption

- Delay you would incur if you were not using preemption and you wanted to send a 64 byte frame during a 1518 byte frame.
- Mean = 600 ns



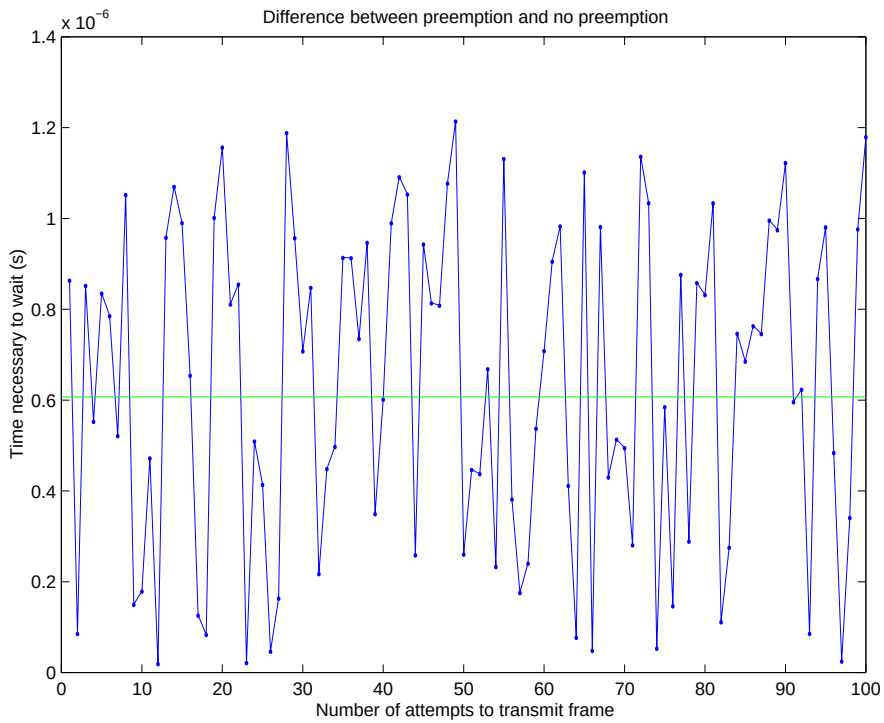
Latency with preemption

- Delay you would incur if you were using preemption and you wanted to send a 64 byte frame during a 1518 byte frame.
- Mean = 72 ns



Benefit of preemption

- Amount of time you would save by using preemption compared to not using it.
- Mean = 600 ns



Preemption observations

- The additional latency you incur when you use preemption is fairly stable at approximately 72ns, regardless of the size of the frame you are preempting.
- The larger the frame size, the more benefit preemption brings to the table.
- Preemption offers a significant reduction in latency when you need to transmit high priority traffic through a congested pipe.

What comes next

- Discussion on whether the study group should consider, or at least not rule out, preemption as one of its objectives.
- Further simulations considering:
  - Number of hops
  - Number of priority levels
  - Performance across different applications