

ATP

TCP

Reducing the Latency-Tail of Short-Lived Flows: Adding Forward Error Correction in Data Centers

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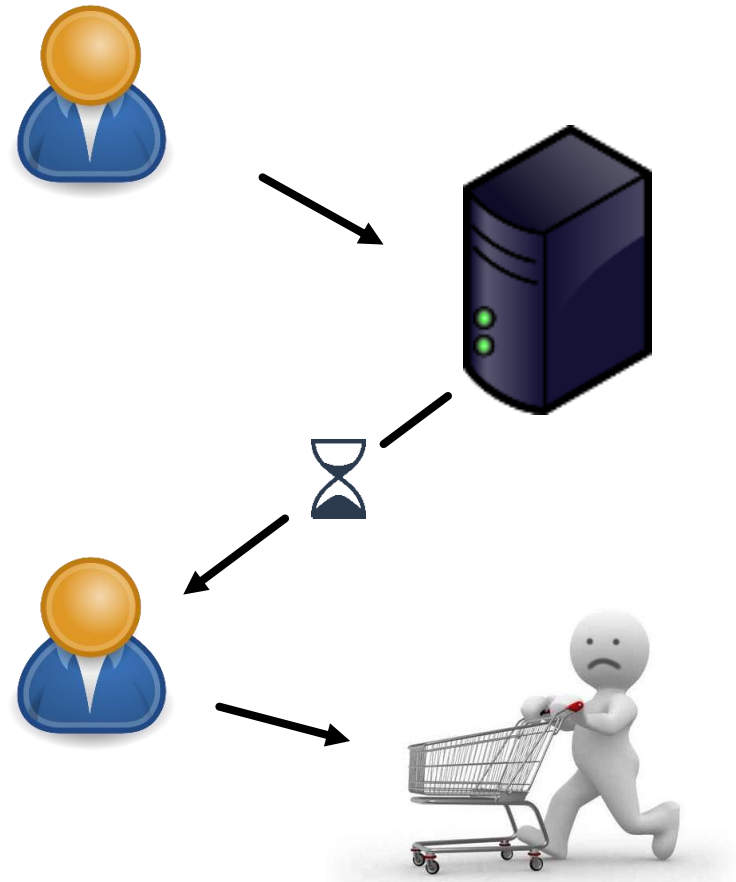
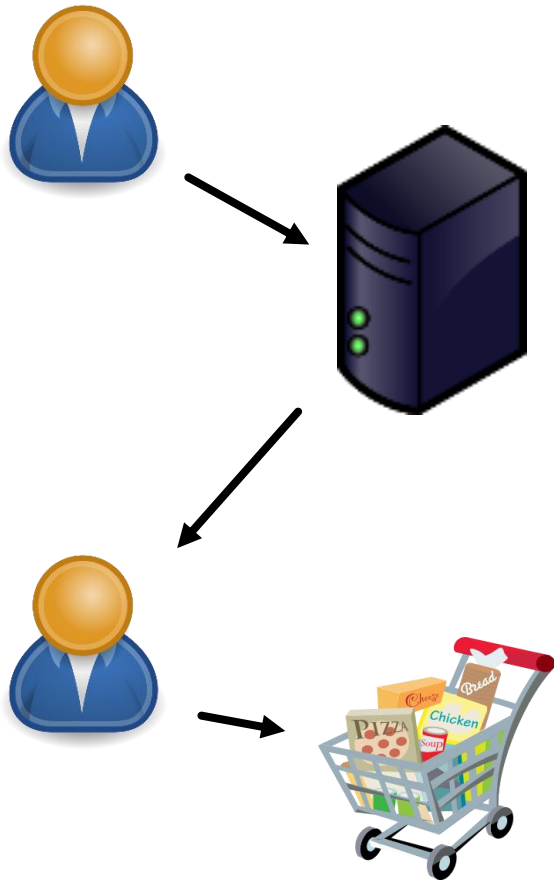
Demian Jaeger

David Stolz

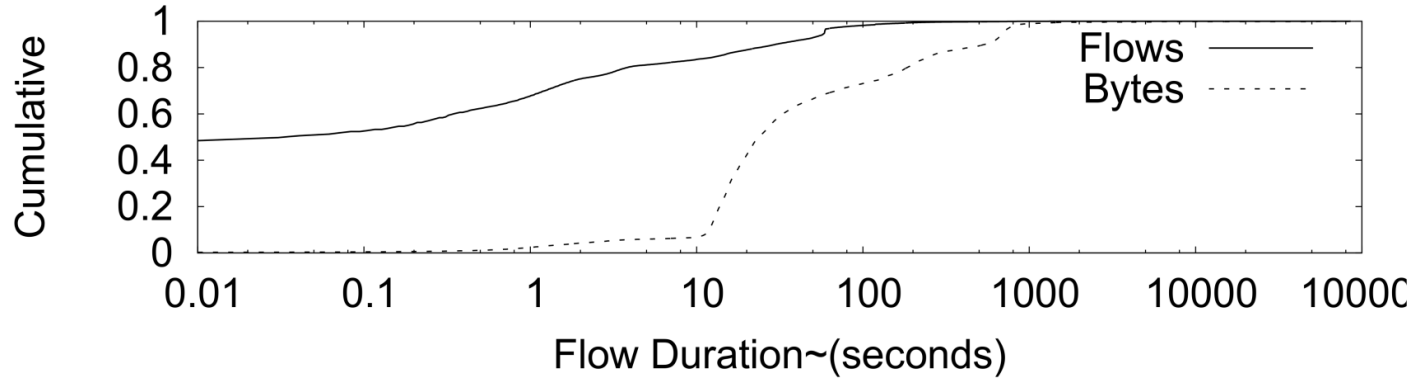
Roger Wattenhofer

ETH Zurich

Time is Money

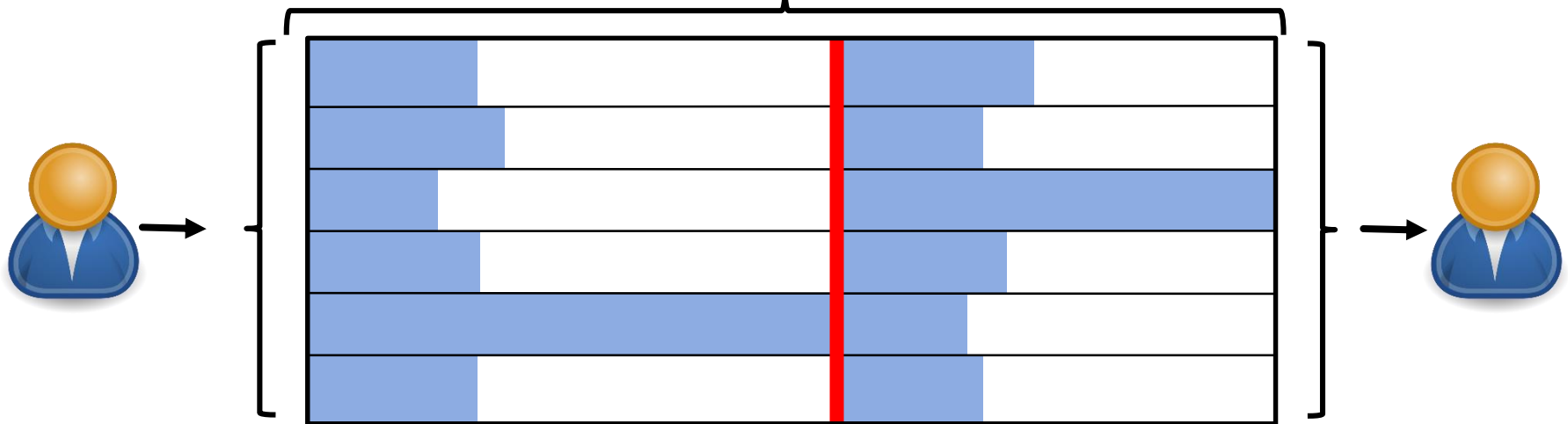


Datcenter Traffic



S. Kandula et al., The Nature of Datacenter Traffic. IMC 2009

Time in Datacenter



Overview

Problem

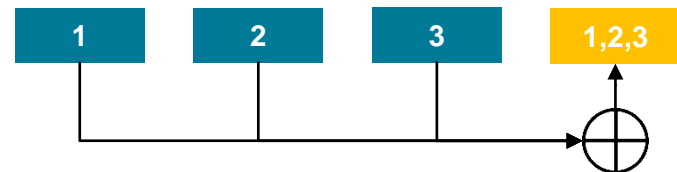
- TCP is sensitive to retransmissions
 - Induces latency-tail in congested networks
- **Goal**

Prior Work

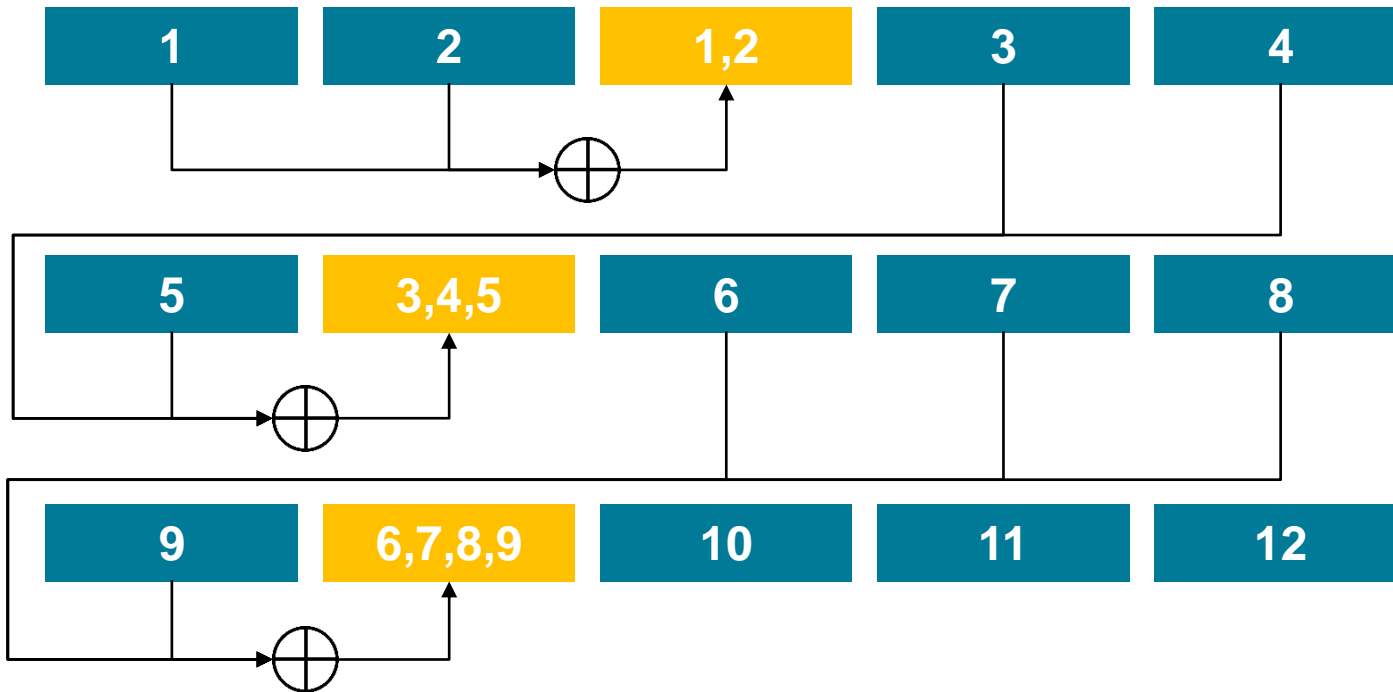
- Add forward error correction (FEC) at link layer
 - Wireless networks
- Add general overhead
- Reserve capacity

Our Approach

- Adaptive FEC on packet level



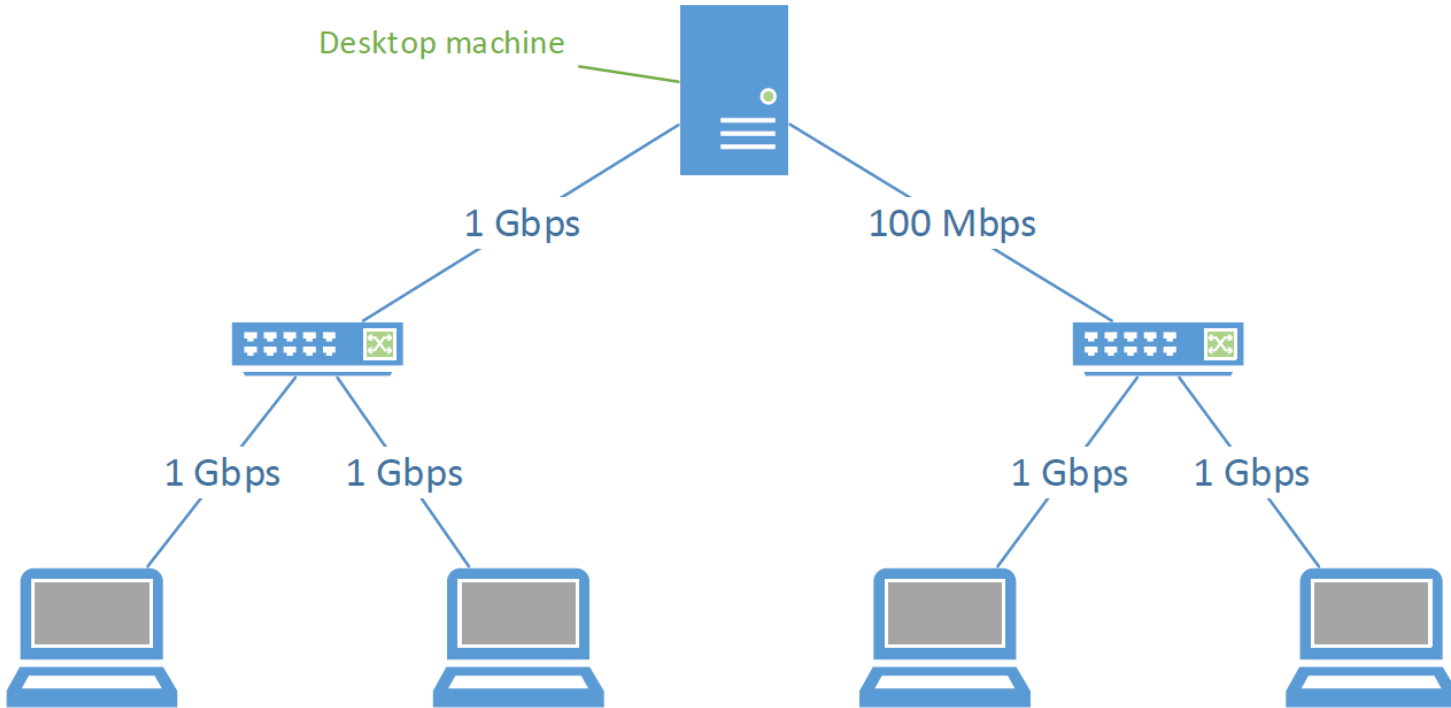
ATP: A Protocol with Error Correction



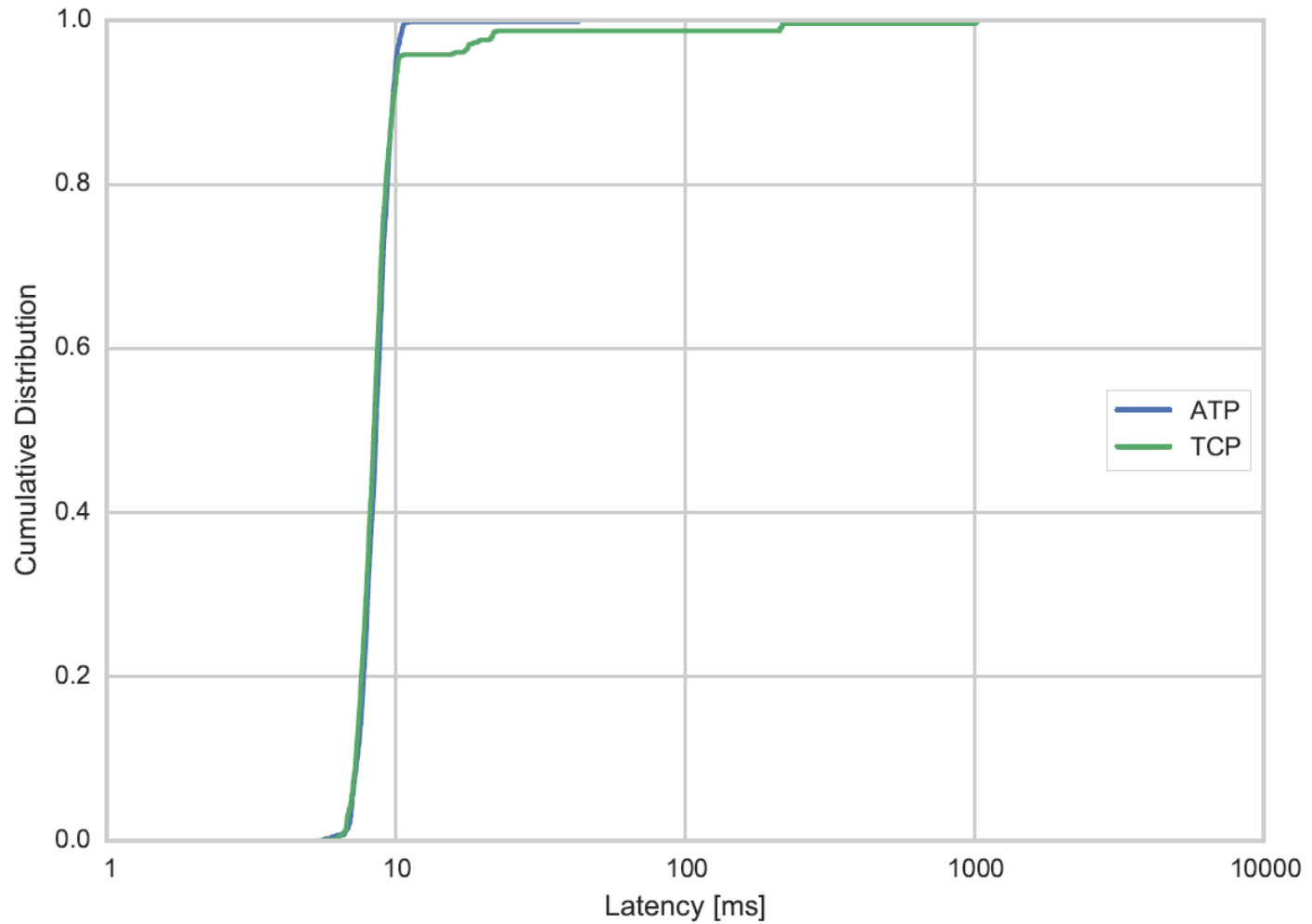
Results

Evaluation

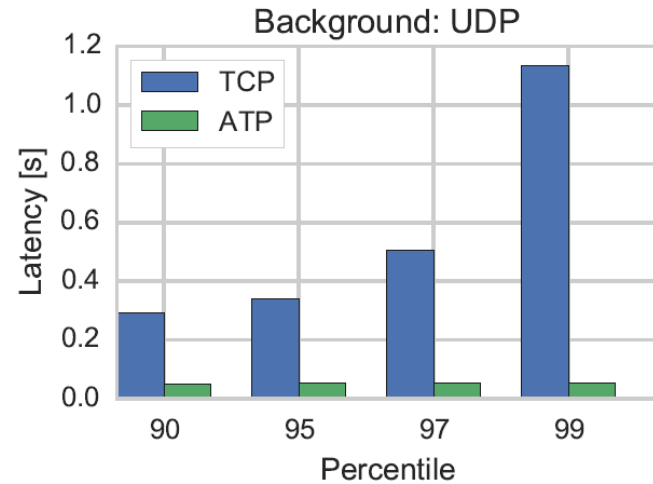
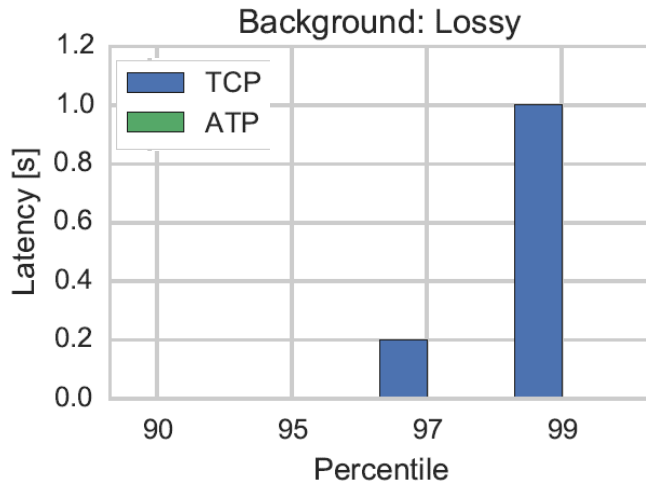
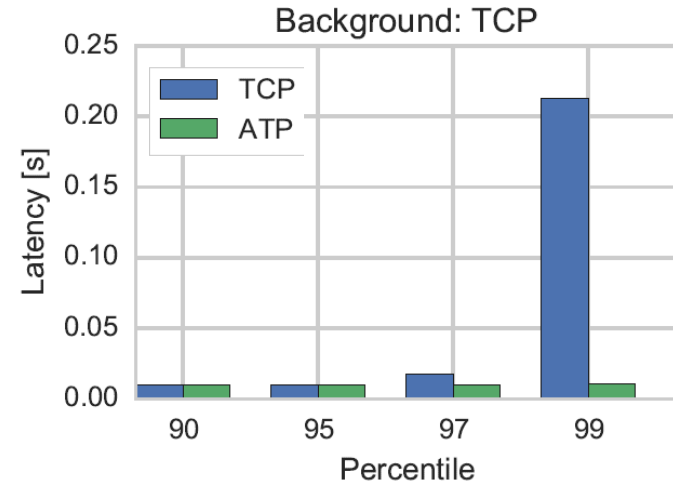
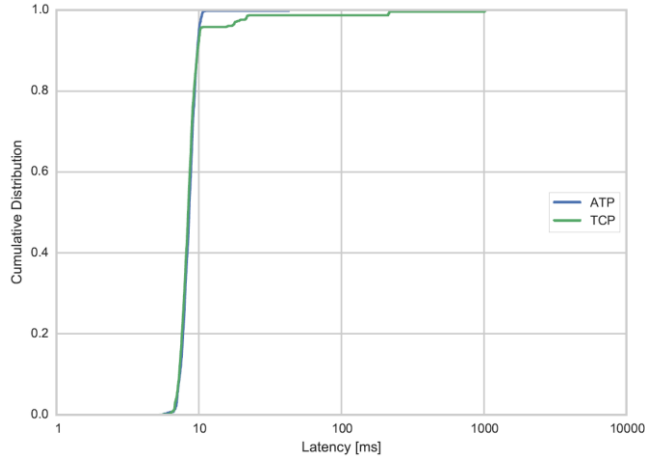
Testbed



TCP - Background Traffic



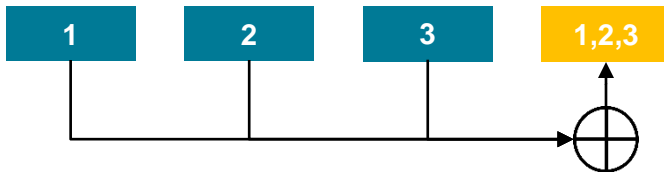
Tail Latency



Conclusion

ATP

- Transport Layer Protocol for Datacenters
- Improve Latency of Small Flows by using variable FEC



Evaluation

- Fairness to TCP and other ATP Streams
- Similar to TCP in not Congested Network
- **20 Times smaller** Tail Latency compared to TCP in busy Network