High performance transmission over shared and public network (HP-WAN)

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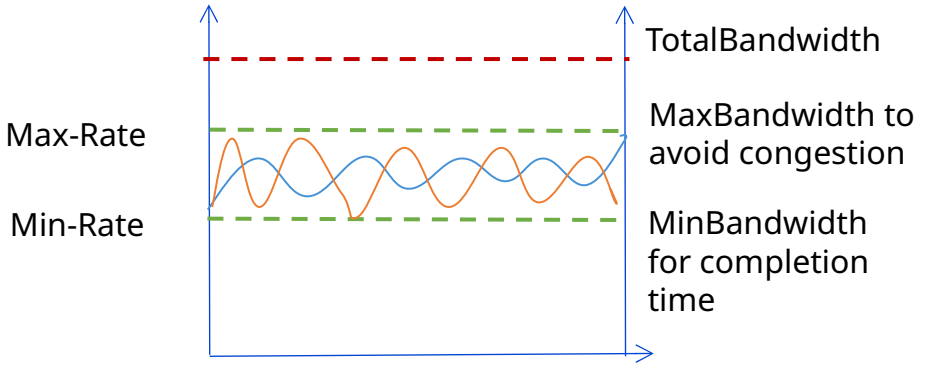
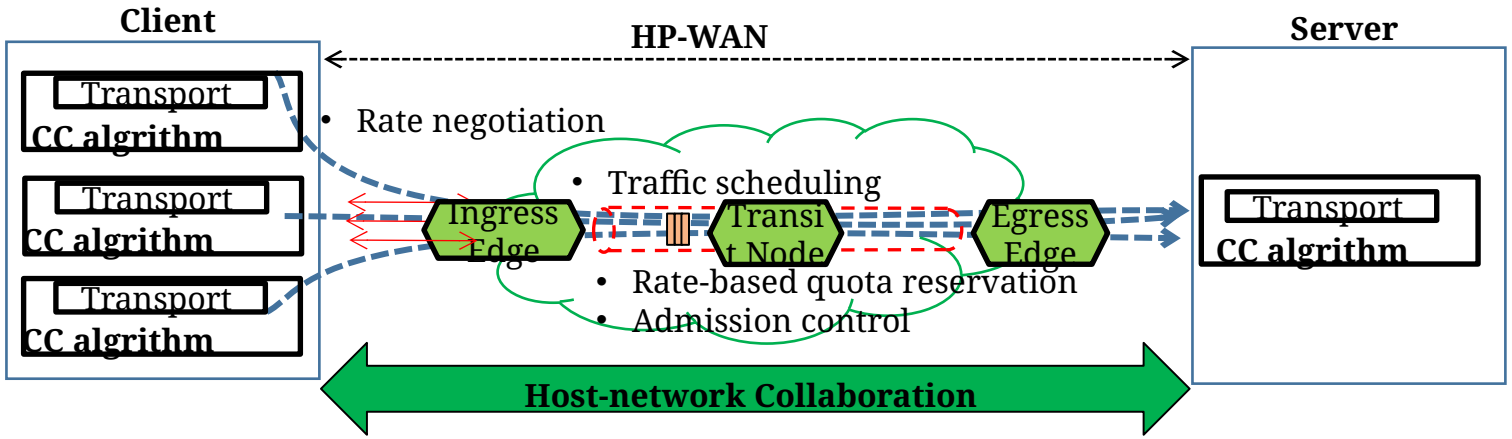
HP-WAN Problem and Scope

HP-WAN (High Performance Wide Area Networks) Definition: A type of Wide Area Network (WAN) designed specifically to meet the *high-speed, low-latency, and high-capacity* needs of scientific research, education, and data-intensive applications.
Scope: *NRENs and large dedicated backbones supporting data-intensive* science, distributed AI training, and HPC. Examples: GÉANT, ESnet, Janet, Internet2, CANARIE, CERNET.
Requirements: Multi-petabyte data transmission across WANs demands *high throughput, low latency, high reliability within a completion time.*
Problem: The exisiting congestion control algorithms such as BBR and CUBIC, and transport-related technologies such as RDMA, iWARP, and RoCEv2, may not be sufficient facing the challengies such as *poor convergence speed, unscheduled traffic, long feedback loop and concurrent multi-flows transmission*.
Data movement enablers: *Scheduled low-latency and bandwidth guarantees,*

HP-WAN Framework

- The framework for HP-WAN enables the *host-and-network collaboration* and particularly *enhances the congestion control* and facilitates the functionalities for the host to collaborate with the network to perform rate negotiation, such as quota-based resource reservation, admission control and traffic scheduling.

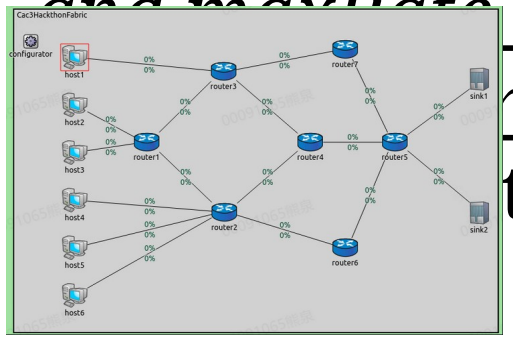


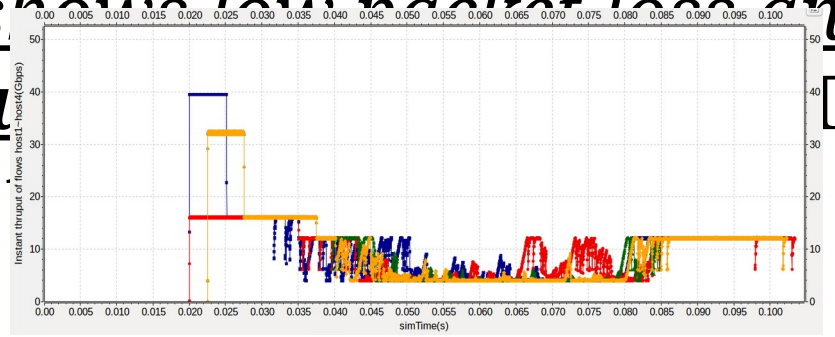


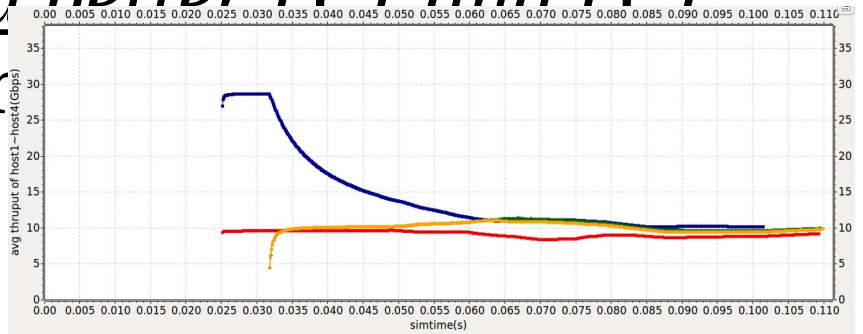
HP-WAN Prototyping Results

- **IETF125 Hackathon**
  - HPWAN integration and *simulation on topologies for public networks* and service scenarios based on the *HP-WAN framework and related functions*, such as the rate negotiation, admission control, traffic scheduling, and resource reservations with distributed signaling (IETF RSVP-TE).

- **Results**
  - The result of RSVP signaling with *rate negotiation of minRate and maxRate shows low packet loss and better FCT and FCT*







- **Thanks !**
- **Comments and suggestions are welcome.**
- **Please feel free to reach out to huang.guangping@zte.com.cn for any comments, feedback and thoughts.**