TCP Relay Selection for Peer-to-Peer Networks

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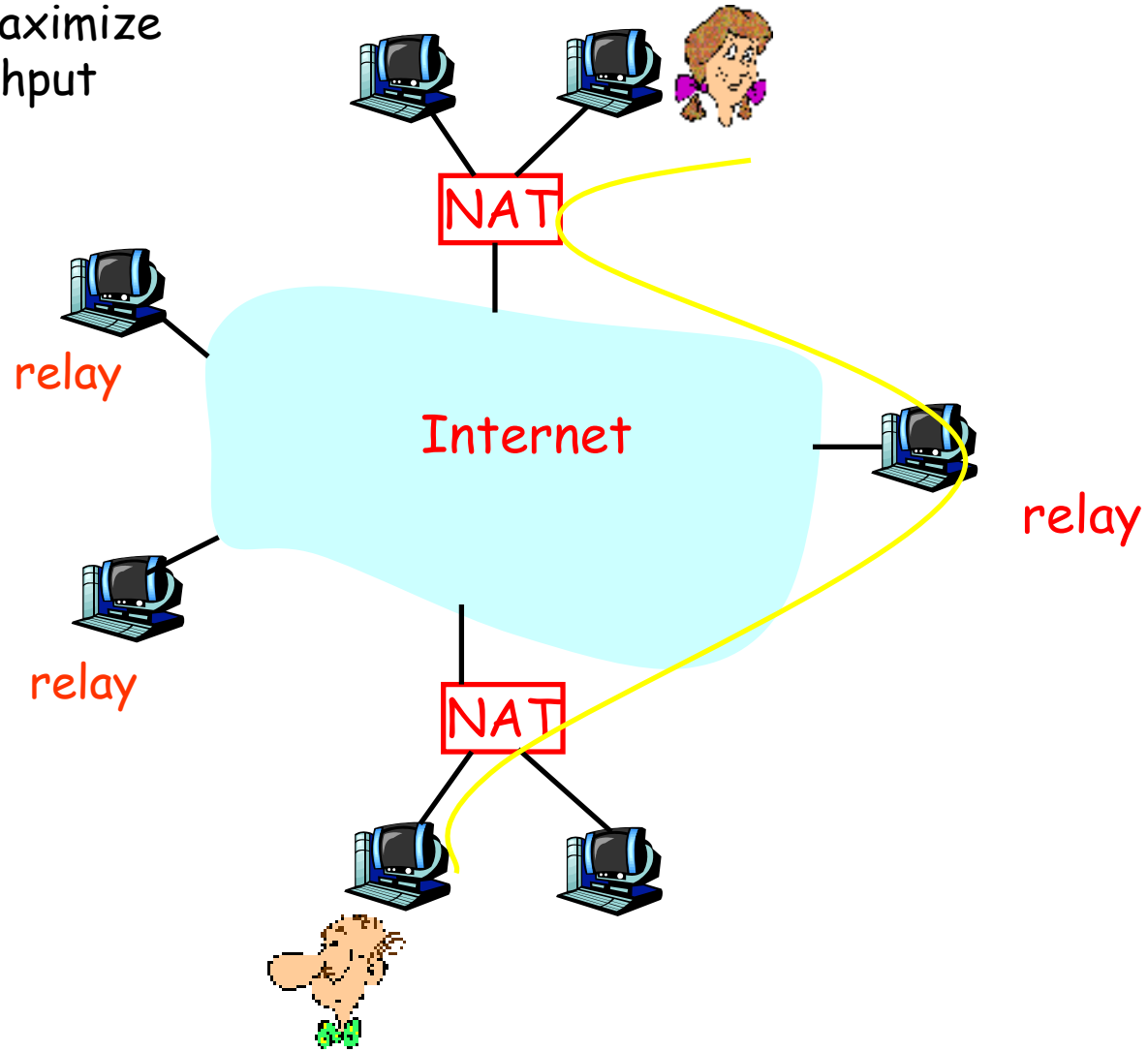
Why Use TCP Relay?

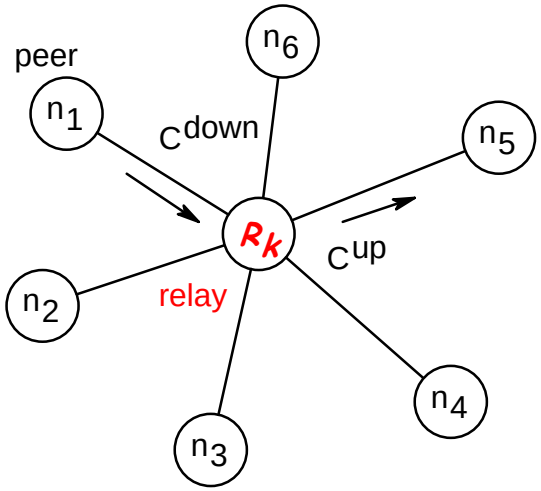
- NAT traversal
- Improve end-to-end performance
  - Decrease end-to-end delay
  - Decrease end-to-end loss rate
  - Increase end-to-end throughput:

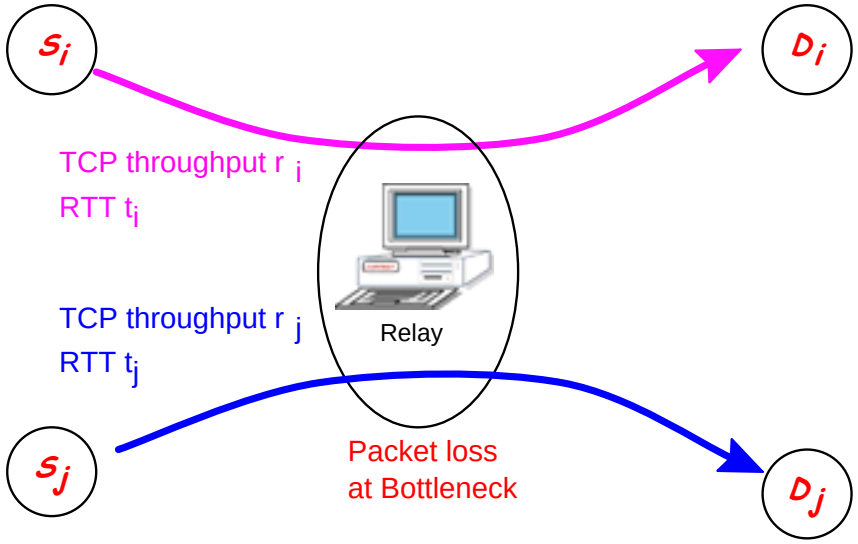
P2P network using TCP Relay

- Select relay node to maximize end-to-end TCP throughput
- Or minimize delay



Bandwidth sharing at relays





- Problem structure:
  - TCP flows share the upload/download capacity of the relay node
  - TCP throughput ∝ 1/RTT

Relay Selection Algorithms

- Simple random selection algorithm: randomly select relay node from set of potential relays.
- Minimum delay algorithm: select relay node such that delay sum from source to relay to destination is min.
- Maximal rate algorithm: new flow selects relay such that its throughput after joining is maximized.
- Max-min rate algorithm: new flow selects relay such that minimum throughput across all flows is maximized after joining.

Project Progress

- Simulation evaluation on relay selection algorithms using a flow-level simulator
- Relay implementation in Planetlab