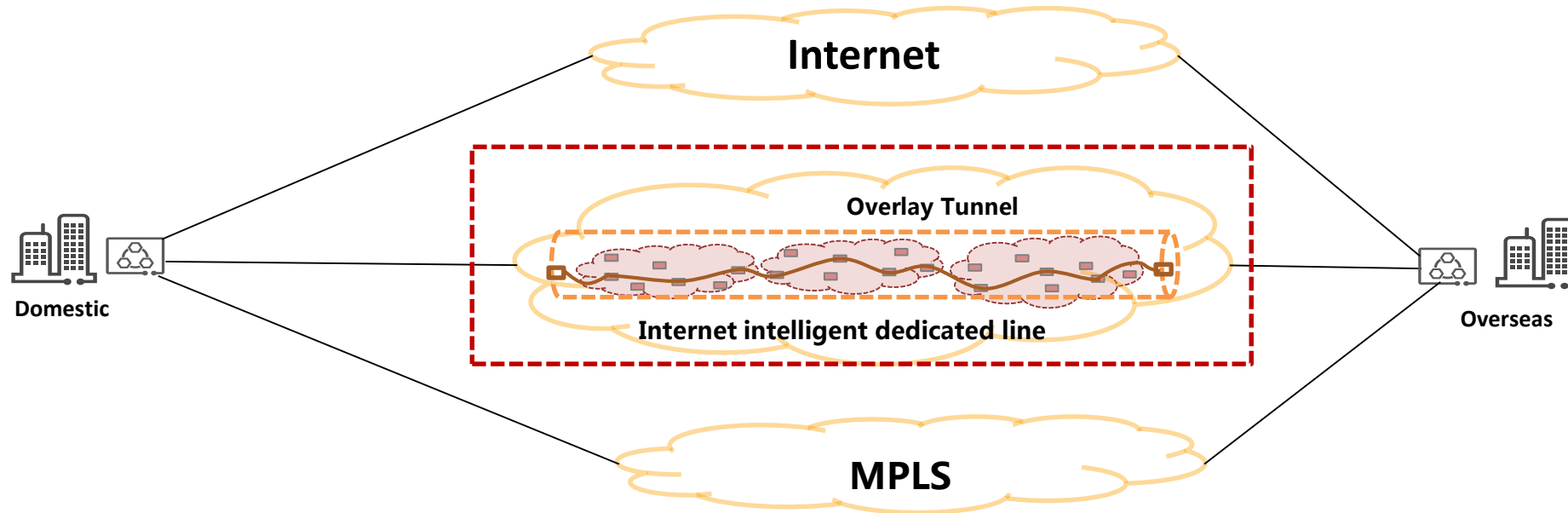# Localized Optimizations
On Path Segment (LOOPS)

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Motivation: Leverage cloud router nodes for best path selection to provide performance closer to leased lines

Internet

Overlay Tunnel

Domestic

Internet intelligent dedicated line

Overseas

MPLS

- Default path does not always give the best latency and throughput
- Now practical: Build a better path via nodes in different geographic sites in the cloud (inexpensive, easy provisioning and scaling,
  instances with "enhanced network performance" available from cloud provider)
- Experiments: 71% chance of finding a better overlay path based on 37 cloud routers globally

Take this opportunity to do **Localized Optimizations On Path Segment (LOOPS)** for better reliability and throughput

ON - Overlay node
UN - Underlay node
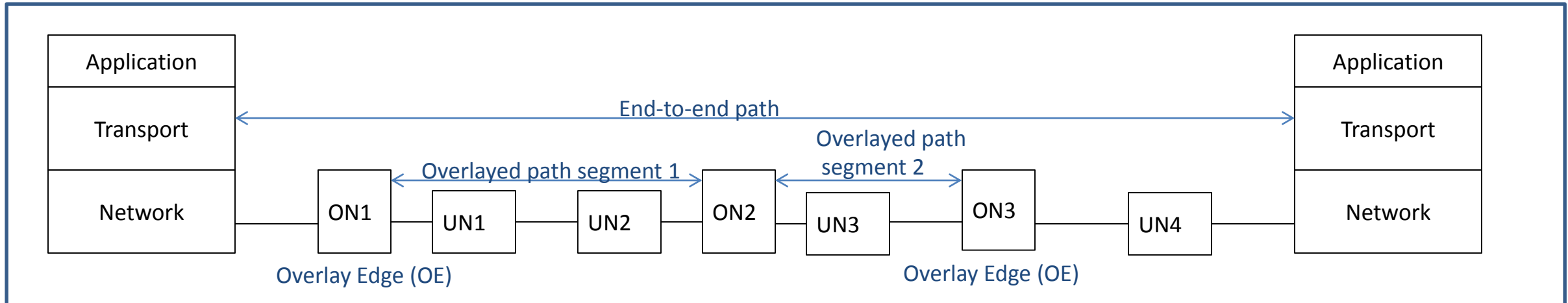
Problems/opportunities:
- Slow recovery over long haul
- Microburst/non-congestive losses cause unnecessary decrease of sending rate
- Temporary impairment of virtual hop
- Limited capacity of virtual nodes

Potential methods:
- Local recovery: combine local retransmission, FEC or replication/elimination
- Traffic splitting/recombining for capacity; replicating over multiple paths

Elements of a solution
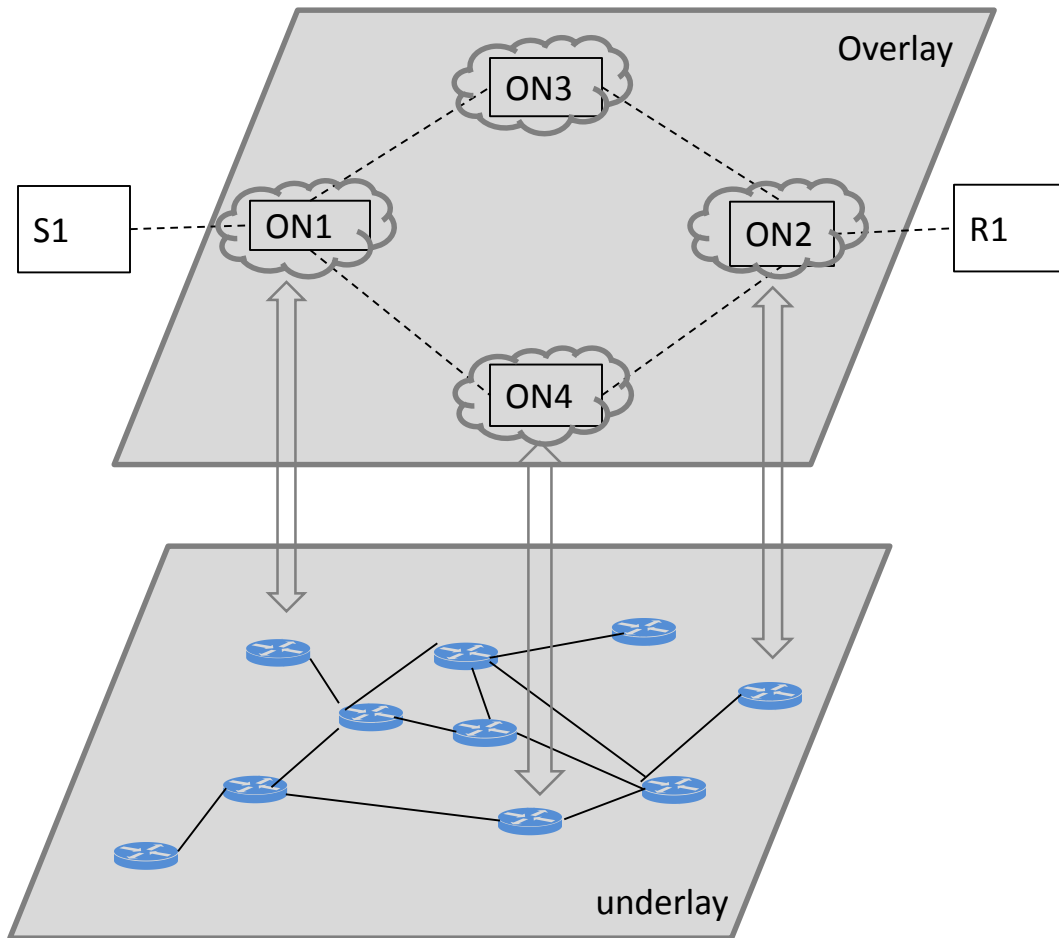
1. Local recovery
   - For entire tunnel
     (rather than individual flow)
   - Loss detection/indication
   - Limited retransmission attempts
   - Measure segment RTT
   - Control FEC/replication intensity
2. Congestion control interaction
   - Export appropriate CC signaling
     from LOOPS to e2e transport
   - Support ECN
3. Traffic splitting/recombining
   - Virtual edge to virtual edge

Side meeting

- Title: Localized Optimizations On Path Segment (LOOPS) Discussion
- Time: Tuesday (Nov 6) 18:30-19:30 (19:30-20:00 as buffer)
- Room: "Meeting 5"
- Purpose: discuss use cases and problems, potential solution ideas, what should and could be done in IETF
- Related drafts:
  - Overlayed Path Segment Forwarding (OPSF) Problem Statement
    (https://tools.ietf.org/html/draft-li-overlayed-path-segment-forwarding-ps-00)
  - Sub-path Transport Layer Problem Statement (https://tools.ietf.org/html/draft-herbert-sub-path-ps-00)