

Use cases, Problem Statement and Gap Analysis of Online Data Express Service(ODES)

IETF 120

draft-du-tsvwg-odes-problem-statement-01

draft-zhao-tsvwg-odes-gap-analysis-01

Hongwei Yang, Zhiqiang Li, Guangyu Zhao, Zongpeng Du, Kehan Yao

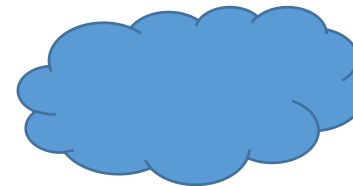
China Mobile

Use cases

- Transferring huge amount of data(10TB ~ 10PB) over long distance(over 1000km) is required in many emerging applications
- Use cases
 - Inter-Cloud Backup and Disaster Recovery(1TB ~ 10TB)
 - Film and Television Editing(10TB ~ 100TB)
 - Scientific Computing(100TB ~ 1PB)
 - Gene Sequencing(~100TB)



“FAST”, in Guizhou



over 2200km



National Astronomical
Observation, in Beijing

Problem Statement

- Transferring huge amount of data(100TB ~ 100PB) over long distance(over 1000km) is still challenging
- Current Solutions
 - Manual handling
 - using hard disks, high labor cost, not safe
 - OTT
 - deploy private network as close to customers as possible, direct traffic to their high capacity DCI network
 - need to care about deployment strategy
 - ISP
 - Inter-DC traffic and Internet traffic sharing the same underlay network
 - offer premium link, high cost

Problem Statement

- **Why is it still a problem, especially for ISPs?**
 - High effective throughput or goodput is hard to achieve in the Internet considering the **combination of many constraints**
 - Packet loss is sensitive over longer distance, and retransmission brings too much redundancy
 - Internet traffic contention exacerbates the deterioration of goodput and flow completion time
 - Going through different type of devices, CPE, PE, firewalls, gateways, etc., which may make the problem worse
 - Lower cost is hard to achieve, considering using normal Internet forwarding, rather than premium link
 - Security is hard to guarantee, considering sharing underlay network devices with normal Internet traffic
 - ...

Gap Analysis

- **Choosing what transport?**

- TCP-based transmission can not guarantee the effective throughput
 - Single stream throughput is very low
 - Multiple concurrent streams will decrease the average throughput of each stream, not efficient
- QUIC-based transmission
 - Not widely deployed in commodity software
- RDMA-based transmission
 - needs hardware support
 - flow control, retransmission, and packet loss recovery need careful design over long distance

- **Forwarding plane load balancing**

- Network should be aware of the service SLA
- ECMP does not work well for these elephant flow, this is similar to Data Center Networking
- Network Slicing

Q&A

- Is this problem well recognized by IETF?
- Is there a place in IETF to work on the problem? RTG, WIT, or INT?