Use-cases for Traffic Steering in Operator Networks
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Background

- Topic involves to a traditional technology used in MPLS network
- But how to implement TE in large scale native IP network is still a challenge
  - Locally
  - Limited Flows
  - SDN
- In SDN context, Traffic Steering means locally scheduling selected traffics from whole network in terms of operator’s dedicated task or requirement
Motivation

- Traffic steering needs do exist in operators’ networks
- It is becoming a challenge today in IP network
  - Comparing to requirements, network resources are always limited
  - Differentiated requirements and SLA co-exist at the same time
  - How to configure forwarding route/path automatically

- Try to demonstrate typical use-cases to facilitate traffic steering solution in future
  - Temporary case
  - Persistent case
Use-cases for ISP(1)

EoS-oriented Steering

• Three prioritized users in Sydney, saying Gold, Silver and Bronze, wish to visit website located in HongKong.

• Three different paths with different experiences according to users' priority.

• Gold users/services: Less latency and loss

• Silver users/services: Less latency and some congestion.

• Bronze users/services: Some latency and loss.
Use-cases for ISP(2)

Load Balancing Oriented Steering

- Traffic from Aggregation C to Aggregation D follows the path AGG C->Core B->AGG D as the primary path.

- Some traffic will be reload to less utilized path AGG C->Core A->AGG D when the primary path CBD has congestion.

Load balancing between Aggregation and Core
Use-cases for ISP(3)

Load Balancing Oriented Steering

- Traffic from Core C to WAN area usually passes through link CA in Core area.
- Part of traffic should be transferred to link CBA when link CA congested.

Load balancing in Core
Use-cases for ISP(4)

Load Balancing Oriented Steering

- A long distance inter-ISP link existed between City C and City A from IXP C1 to IXP A2.

- Usually traffic from IXP C1 to Core A passes through the long distance link IXP C1->IXP A2->Core A.

- Part of traffic should be transferred to link IXP C1->IXP B1->IXP A1->IXP A2->A when primary link congested.
Use-cases for ISP(4)

Load Balancing Oriented Steering

- Traffic to destination in AS Z1 from ISP IP core network (AS C1) has two choices on transit, saying Transit A and Transit B.

- Transit A will be preferred when the QoS of Transit B gets worse. As a result, the same traffic will go through Transit A instead.
Use-cases for OTTSP

- **QoS-Oriented Steering**
  - An OTTSP has 3 exits with its ISP in City A, City B and City C. Based on network conditions, this OTTSP may choose different exits to steer its traffic into ISP's networks.

- **Business-Oriented Steering**
  - An OTTSP may make its steering strategy based on different business.

- **Inbound Traffic Steering**
  - An OTTSP may wish to have choices on entrances for inbound traffic.
  - An ISP may choose to ignore or even prohibit an OTTSP's attempt to affect traffic paths.
  - A negotiation mechanism is needed here.
Derived Requirements for a Solution

- **REQ01**: A classification mechanism/system is REQUIRED to exist to identify users' traffic and the correspond priority respectively.
- **REQ02**: A decision procedure/mechanism for path selection is REQUIRED to exist to decide traffic forwarding strategy based on the input from a classification mechanism.
- **REQ03**: A resource monitoring mechanism/system is REQUIRED to exist for dynamically report the resource usage of target subnets.
- **REQ04**: A decision procedure/mechanism for path selection is REQUIRED to exist to decide traffic forwarding strategy based on the input from a resource monitoring mechanism.
- **REQ05**: A QoS monitoring mechanism/system is REQUIRED to exist for dynamically report the QoS conditions of those transits.
- **REQ06**: A decision procedure/mechanism for path selection is REQUIRED to exist to decide traffic forwarding strategy based on the input from a QoS monitoring mechanism.
- **REQ07**: A decision distribution mechanism/system is REQUIRED to exist to populate the adjustment behavior accordingly.
- **REQ08**: The three mechanisms above are RECOMMENDED to be automatic ones.
- **REQ09**: A mechanism/system exists to identify different businesses from traffic flow.
- **REQ10**: An interactive mechanism/system is REQUIRED to exist for negotiation between OTT and ISP to solve the scenario of inbound traffic steering.
Summary

• What we need is to schedule flows automatically with fine granularity
• We need a new policy control plane and related policy for end-to-end traffic scheduling is very complex in IP network
• Details in requirement continue to be collected
Question