ALTO Deployment Considerations: Configuration and Monitoring by ISPs

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Motivation & Objective

• Motivation:
  – Many Telecom Operators have shown interests in deploying ALTO
  – China Telecom experiences issues during ALTO trials in network

• Objective
  – A reference to highlight key issues that an ISP should consider when considering ALTO deployment
Four Issues in ALTO Deployment

1. How does an ISP deploy and configure its ALTO servers? Specifically, an ALTO Server provides the Network Map and the Cost Map. How does an ISP configure these maps? Where does an ISP deploy ALTO servers?

2. Which application entities fetch ALTO information?

3. How does an application integrate ALTO information into its decision process?

4. How does an ISP (potentially with collaboration from applications) monitor the deployment of ALTO, so that the ISP can better understand the status as well as the policy impacts of its ALTO deployment?

This document focuses more on the ISP perspective, and focuses more on the first and the fourth issues.
Document Structure/Content

• ALTO Server Placement and Configuration
  – Server Placement
  – Network and Cost Map Configuration

• ALTO Deployment Monitoring
  – Monitoring Metrics
  – Monitoring Data Sources
  – Application/ISP Monitoring Integration
Concept: Optimization Area

• We define a network area for which traffic need be optimized using the ALTO service as an optimization area.

• We found it helpful that an ISP defines Optimization Areas:
  – One Access Network (AN)
  – One MAN
  – Large network with multiple AN or MAN

• A large ISP may partition its network into multiple optimization areas.
Network and Cost Map Configuration

• Network Map and Cost Map definition and Configuration are very important in deploying ALTO service

• There are tradeoffs when a large ISP defines its Network Map. If the partition of the network in the Network Map is too fine-grained, it may lead to higher complexity and overhead. On the other hand, a too coarse-grained Network Map may lead to suboptimal optimization

• Case1: (ADSL or Ethernet based access network with BAS server)
  – In this case, each such access network can use one PID. It is generally unnecessary to further divide such access networks. Also, it can be beneficial to combine several such access networks into a single PID

• Case2: (MAN including several access networks)
  – ISP can define one or several MANS as one PID. It is also possible that the ISP deploys ALTO independently in some MANs.
ALTO Deployment Monitoring

• Objectives
  – Assess the benefits of ALTO deployment
  – Adjust its ALTO configuration and policies

• To build a monitoring infrastructure for ALTO service, ISP should:
  a) Define the performance metrics to be monitored
  b) Identify and deploy devices to collect data to compute the performance metrics.
## Network Metrics

<table>
<thead>
<tr>
<th>Network metric</th>
<th>Application metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-domain ALTO-Integrated Application Traffic</td>
<td>Application download rate</td>
</tr>
<tr>
<td>Total Inter-domain Traffic</td>
<td></td>
</tr>
<tr>
<td>Intra-domain ALTO-Integrated Application Traffic</td>
<td></td>
</tr>
<tr>
<td>Network hop count</td>
<td></td>
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</tbody>
</table>

The metrics are defined based on:

a) Comcast's ISP Experiences in a Proactive Network Provider Participation for P2P (P4P) Technical Trial (RFC5632)
b) draft-lee-alto-chinatelecom-trial-01
# Monitoring Data Sources

<table>
<thead>
<tr>
<th>Data Sources</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Log Server</td>
<td>Application provider</td>
</tr>
<tr>
<td>P2P Clients</td>
<td>Application provider (to P2P application)</td>
</tr>
<tr>
<td>OAM</td>
<td>ISP</td>
</tr>
<tr>
<td>DPI</td>
<td>ISP</td>
</tr>
</tbody>
</table>
Integrated Application/ISP Monitoring

Highly beneficial when an ISP and an Application can collaborate.
Monitoring Report Protocol

A useful tool is to define a standard format for Application and ISP to exchange data.

HTTP/1.1 200 OK
Content-Length: [TODO]
Content-Type: application/alto
{
  "meta": {
    "version": 1,
    "status": {
      "code": 1
    }
  },
  "metric1 name": "value",
  "metric2 name": "value",
}
Thanks!!

Q&A