Quality Measurement Requirements for Tunneling Protocols

draft-kikuchi-tunnel-measure-req-01.txt
(draft-kikuchi-passive-measure-00.txt)

OPSAWG
69th IETF
Chicago, IL

2007.07.24
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  – The requirements
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Background

• TSPs:
  – Transport Service Providers who provide transports to users using tunneling technology

• Who needs requirements?
  – TSPs want to know their tunnels’ quality
    • No sufficient monitoring way
      – no SNMP, no syslog, no CLI, …
TSP service model

user A

ISP

ISP

ISP

TSP

SLA

SLA

user B

ISP

ISP

ISP
Motivations

• TSP
  – needs to know tunnels’ quality,
  – may need to show the quality to their users according to SLA,
    • i.e. service quality of customers’ real traffic
  – and may want to chose a better tunnel when they use two or more tunnels
About the -req-00.txt

- Aims to describe both
  - requirements for tunneling protocols, and
  - a passive measurement method
- Presented in 68th IETF in Czech
  - OPS area open meeting
Comments in 68th IETF

- Why is the I-D tunnel specific?
- Seq # may cause fragmentation?
- should discuss in IPPM or BMWG?
Update

• splitting the original I-D into two I-Ds
  – focus on the Requirements
    • as -reqs-01.txt
  – Metrics and Algorithm
    • as a new I-D
    • should discuss in APM WG?
      – APM WG will come near future?
Update (cont’d)

• Comment #1
  – Why is the I-D tunnel specific?

• Answer
  – specially needed by TSPs

• Action
  – append a new paragraph explicitly
    • in the section 3 `motivation'"
Update (cont’d)

• Comment #2
  – Seq # may cause fragmentation?
• Answer
  – measurement and overhead are trade-off
• Action
  – a new section ``overhead consideration”
    • as the section 4.4
Update (cont’d.)

• Comment #3
  – should discuss in IPPM or BMWG?

• Answer
  – Neither IPPM nor BMWG is applicable
    • BMWG is for laboratory environments
    • IPPM does not intend to specific protocols

• Action
  – will attend APM BOF
Other updates to -01.txt

• distinguish the requirements into
  – general requirements
  – requirements with sequence numbering

• use of the keywords
  – according to RFC2119
General Requirements

- active v.s. passive
  - passive measurement SHOULD be supported

- quality evaluation
  - MUST define ``what'' and ``how''
    - in-sequence/out-of-sequence (REQUIRED)
    - lost, duplication and reordering (SHOULD)
    - delay and jitter (MAY)

- getting quality information
  - MUST define ``how'', e.g. via SNMP
Requirements with seq #

• if sequence number is used...
  • MUST indicate enabled or not
    – by a indication flag or
    – `0" for the meaning "disabled"
      • additional steps are needed
  • the length of the field SHOULD be long enough
    – trade-off to the overhead
-passive-measure-00.txt

• Title:
  – One-way Passive Measurement of End-to-End Quality

• A solution for the -req-01.txt
  – passive measurement
  – metrics (what) and algorithm (how)
    • less resource consumption and less accurate
Metrics

• in-sequence/out-of-sequence for each packet
• # of irregular packets since a tunnel appeared
• irregular types
  – lost: does not arrive in-sequence
    • except duplication
  – duplication: identical packet arrival uninterruptedly
  – reordering: arrival after successive packets
Measure how?

• Passive measurement
  – impose sequence numbers at tunnel ingress
  – expose them and measure at tunnel egress

• Monitor how?
  – not specified here
Detecting packet loss

Diagram showing sequence numbers and counts for packet loss, duplication, and reordering.
Detecting duplication

- **send**
  - 0
  - 1
  - 2
  - 3
  - 4
  - 5

- **recv**
- **loss**
- **dup**
- **reod**
  - 0
  - 0
  - 0
  - 0
  - 0
  - 0
  - 0
  - 0
  - 0
  - 0

Diagram showing the process of detecting duplication with arrows connecting send and recv, and the numbers indicating losses, duplicates, and reorders.
## Detecting reordering

<table>
<thead>
<tr>
<th>send</th>
<th>recv</th>
<th>loss</th>
<th>dup</th>
<th>reod</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
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<tr>
<td>7</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

Note: The diagram illustrates the process of detecting reordering in a network transmission. Each step shows the sequence of events where `send` and `recv` are indices indicating when packets are sent and received, respectively. The columns `loss`, `dup`, and `reod` indicate the occurrences of loss, duplicate, and reordering events, respectively.
Complex situations
An Implementation Example

• GRE header extension (RFC2890)
  – according to the draft
  – Can get quality information via SNMP
    • using private MIBs of inetcore.com
A sample of real quality
Next steps

• getting comments
• attending APM BoF
• to revise the I-Ds
• to find suitable WGs if necessary
• to publish the docs as RFCs
• to write related docs, e.g. MIBs.
Thank you!

- Any comments, questions and advice
Acknowledgements

• Useful discussions in TEReCo Research Project
• Sponsored in part by MIC Japan
  – SCOPE 072309007