Mtrace Version 2: Traceroute Facility for IP Multicast

draft-asaeda-mboned-mtrace-v2-00

Hitoshi Asaeda
Tatsuya Jinmei
Bill Fenner
Steve Casner
Outline

• Overview
• Mtrace messages
• Open issues (incl. IANA issues)
• Next step
Overview

• Multicast “traceroute” facility
  – Trace an IP multicast routing path
  – Implemented in multicast routers
  – Accessed by diagnostic programs

• Integrate mtrace and mtrace6 drafts
  – Named “mtrace version 2 (mtrace2)”
  – Both IPv4 and IPv6 supported
  – Need to clarify the requirements of new functions, revise old functions …
Aim of This I-D

• Get the first part of the effort started
• Work on the effort to get the other stuff going
• Provide an RFC on the existing, refined, and new stuff
  – Fix IANA issues (especially for ICMPv6 types)
Query, Request, Response
### Mtrace2 Header

<table>
<thead>
<tr>
<th>IGMP Type</th>
<th># hops</th>
<th>Checksum</th>
<th>IPv4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multicast Address</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source Address</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Destination Address</td>
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<tr>
<td>Response Address</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Resp TTL</td>
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<td></td>
<td>Query ID</td>
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</table>

<table>
<thead>
<tr>
<th>ICMP Type</th>
<th># hops</th>
<th>Checksum</th>
<th>IPv6</th>
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<tr>
<td>Reserved</td>
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<tr>
<td>Multicast Address</td>
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<tr>
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<tr>
<td>Destination Address</td>
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<td></td>
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<tr>
<td>Response Address</td>
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<tr>
<td>Resp Hop Limit</td>
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<td></td>
<td>Query ID</td>
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</tbody>
</table>
Mtrace2 Type Field

- **Protocol**
  - IPv4
    - IGMP Type
  - IPv6
    - ICMPv6 Type

- **Type**
  - Query and request
    - IPv4: 0x1F
    - IPv6: MTRACE6_QRYREQ (TBD)
  - Response
    - IPv4: 0x1E
    - IPv6: MTRACE6_RESP (TBD)
# Mtrace2 Response Data

<table>
<thead>
<tr>
<th>Query Arrival Time</th>
<th>Incoming Interface Address</th>
<th>Outgoing Interface Address</th>
<th>Previous-Hop Router Address</th>
<th>Input packet count on incoming interface</th>
<th>Output packet count on outgoing interface</th>
<th>Total number of packets for this source-group pair</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Rtg Protocol</th>
<th>Fwd TTL</th>
<th>M</th>
<th>B</th>
<th>Z</th>
<th>Src Mask</th>
<th>Forwarding Code</th>
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</thead>
<tbody>
<tr>
<td>IPv4</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Query Arrival Time</th>
<th>Incoming Interface ID</th>
<th>Outgoing Interface ID</th>
<th>Local Address</th>
<th>Remote Address</th>
<th>Input packet count on incoming interface</th>
<th>Output packet count on outgoing interface</th>
<th>Total number of packets for this source-group pair</th>
</tr>
</thead>
<tbody>
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<td>IPv6</td>
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</table>

<table>
<thead>
<tr>
<th>Rtg Protocol</th>
<th>Fwd Hop Limit</th>
<th>MBZ</th>
<th>S</th>
<th>Src Prefix Len</th>
<th>Forwarding Code</th>
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<tbody>
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</table>

<table>
<thead>
<tr>
<th>Forwarding Code</th>
<th>Reserved</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPv6</td>
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</tbody>
</table>
Mtrace2 Response: IIF/OIF

- **Local Address**
  - IPv4
    - Incoming/Outgoing Interface addresses
  - IPv6
    - Local address
      - Local address: Global IPv6 address
        » Uniquely identifies the router
      - TODO: If no global IPv6 address, link-local address can be filled in?
Mtrace2 Response: Remote Addr.

• Previous-Hop Router / Remote Address
  – IPv4
    • Address of Previous-Hop Router
  – IPv6
    • Address of Previous-Hop Router
    • Interface IDs + Remote address
      – Interface ID: InterfaceIndex of IF-MIB
      – Link-local unicast address if PIM is used
      – TODO: Global address can be known even with PIM?
Inserted Addresses

Mtrace2 query (G,S,R,R)

Mtrace2 request (G,S,R,R)(g-Rt[12],l-Rt3%2)

Mtrace2 response (G,S,g-R,g-R)(g-Rt[12],l-Rt3%2)(g-Rt[34],[TBD]%3)
Open Issues

• Supported routing protocols?
  – Historical routing protocols (e.g. DVMRP, CBT) should be kept?
  – Bidir PIM support
    • What kind of information needed?

• Packet format change?
  – Variable length packet format to extend the function?

• …
IANA Issues

- Mtrace2 query and request
  - ICMPv6: MTRACE6_QRYREQ
- Mtrace2 response data
  - ICMPv6: MTRACE6_RESP
Next Step

• Current condition
  – Motivation is clear
  – Protocol requirement exists
  – Protocol definition (incl. IANA definition) is needed

• Next step
  – Clarify the requirements
  – Revise the draft (fix TODO, fix several bugs and present the new draft at the next IETF
  – Move forward as a WG draft?