Advanced Unidirectional Route Assessment (AURA)

draft-amf-ippm-route-01

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Background & Inputs

• Route Metric developed, then Introduced before IETF-99
• Rüdiger Geib’s comments became our initial To Do List (7 items), replies, p/o -99 slides.
• Interim: Ext. comments: Carlos Pignataro
  – Many [CMP] comments addressed
  – Several remain: discuss TODAY! (Expand Scope)
• Off-list comments from Frank Brockners
• THANKS to reviewers so far
• https://tools.ietf.org/rfcdiff?url2=draft-amf-ippm-route-01.txt
Major Update: Hops!

• Each Route represented as an ordered graph:

  \[ \text{Src} = h(0,1), h(1,1), h(2,1), h(3,1), \ldots \ h(N1,1) = \text{Dst} \]

• \( h(i,j) \) was a host, but we can learn more...
  – Now, it’s a HOP
  – MUST include Host Identity
  – Arrival Interface ID
  – Departure Interface ID
  – Arrival Timestamp
  – Round-trip Delay Measurements
Foundation of New Components

• Host Identity:
  – (IP) Address(es) host reveals when communicating
  – Normal communication and Error conditions

• Discoverable Host:
  – (IP) sends ICMP Time Exceeded when discarding
  – (IP) RFC 1122 and RFC 1812

• Cooperating Host:
  – MUST respond with Identity to interrogation,
    SHOULD provide other info (RFC 2119 terms)

• Can generalize beyond IP as needed
Questions for the IPPM WG

• Expand Scope beyond IP? MPLS Ping & Tracert
  – RFC 8029 Deterministic Multipath & Timestamps
  – Can be applied to IP (already in IPv6 Datacenter)
  – <Open Mic Now>

• IF MPLS is in, where do we draw the line?
  – Downstream mapping proposed: nvo3; Facebook UDP
  – Segment Routing allows delay meas. from NetMgtSys

• Reporting the Metric: suggestions? (@ANRW)
Methods of Measurement

• Two Classes, with likely different scopes
  – Active & Multiple Domain
  – Hybrid & Single Domain (at first?)
• Added 2119 Req’s to Paris-Traceroute (active)
• Clarified Checksum calculations
• New Subsection on combining diff Methods
  – Ingress Hosts BOTH Discoverable and Cooperating
  – Key is overlapping Host Identities
Discussion/Development Areas

• Interaction between Host Identity and ability to discern Subpaths
• Temporal Composition for Route Metrics
  – Past measurements influence current measure
• Assessment at IP-layer reveals the Route Ensemble for “IP and Higher”
• Hop/Route treats a Class C of Packets equally
  – very useful to know, incorporate as a Parameter
  – a concept of RFC 2330 & RFC 7799
To Do

• CMP: Packet Fields can ID a Flow (RFC 6438)
• CMP: Interface name and MTU (RFC 5837)
  – Use with Traceroute
• CMP: Add Cautions for Methods
  – Try to avoid good measurements used badly
• CMP: Paris Tracert covers IPv6 & Flow Label?
• FB: Method using IOAM Loopback bit (UDP pinger)
• If +MPLS, mention TTL Propagate RFC 4950
Next Steps

• Please Read and send your Review to the list
• WG adoption of this draft?
  – (Now that we have a clearer view of the scope)
  – *Metric side* of the Telemetry Data (IOAM)
• WG could create a milestone for this work, if IPPM wants it on our charter...
  – Dec 2018 –
BACKUP
Route Ensemble (not showing \( \text{Src}=h(0,j) \) )

\[
\text{Route Ensemble} = \{ \\
\{ h(1,1), h(2,1), h(3,1), \ldots h(N1,1) = \text{Dst} \} , \\
\{ h(1,2), h(2,2), h(3,2), \ldots, h(N2,2) = \text{Dst} \} , \\
\ldots \\
\{ h(1,m), h(2,m), h(3,m), \ldots h(Nm,m) = \text{Dst} \}
\}
\]