Automatic Multicast Tunneling

DCOS/Linux Interoperability Testing

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Test Topology

Multicast enabled

No Multicast

DCOS Gateways

Linux AMT GW Host

AMT tunnel

DCOS Relay

Multicast enabled

Video Server
AMT Gateway Types

• DCOS gateway opens AMT tunnel on Mroute state creation
  – on receipt of IGMPv3 Report
  – on receipt of PIM (S,G) join
• UT Linux host AMT (amtgwd/gproxy)
  – UofT implementation
Multiple Relays

Relay failed, Gateways switched
Changes Implemented

• AMT now uses IGMP QQIC
• AMT can include both INCLUDE and EXCLUDE reports in the same AMT message
Open Questions

• Serialization of AMT requests and queries
• Should an AMT gateway RPF only to the AMT relay?
• Which IP address is used in the encapsulated IGMP report?
• What address is used for the Linux tunnel interface?
• Should a proxied report also be sent out the interface the application has joined?
• AMT reserved address space
Overlapping Request Problem

- IGMPv3 says send `<robust>` unsolicited reports separated (0, robust-interval) apart
- Application may join the group, then join the (S,G)
- Short intervals results in back-to-back requests at the Relay
- Back-to-back requests skew the Request NONCE
Overlapping Request Problem

Gateway

Request: Nonce 1

Request: Nonce 2

Query: Nonce 1

Query: Nonce 2

Membership Update: Nonce 1

Membership Update: Nonce 2

Relay
Combined Gateway & Router

- AMT Gateway can only RPF to the AMT Relay or internally -- Not both.
- Internal Receiver cannot receive internal video

Diagram:

- Internal Video
- External Receiver
- Internal Receiver

RPF
Which IP Address?

- Linux amtgwd allocates TUN0 address from 154.17.0.0 by default.
- AMT Query encapsulates an IGMP Query and uses the same source address for both headers.
- Linux amtgwd encapsulates the IGMP report, but may use the source address of -any- interface.
- When do you ignore the source address?
Proxy Reports

- Linux correctly proxies IGMP reports over the AMT tunnel, but also sends reports out the interface the application joins.
- Is this OK?
- Potentially receive duplicate data
AMT Relay address

• Is the AMT Relay address always 154.17.0.1?
• What is the rest of this address space used for?
Linux Multi-home host

• Assuming that a route to default cannot be used:
  – Install route to AMT relay address: 157.14.0.1
  – Install route to AMT tunnel endpoint address