The Multicast Application Ports

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draft-karstens-pim-multicast-application-ports
Working Group: pim
Demultiplexing for Unicast Traffic

- In IP transport protocols, port numbers are used to demultiplex traffic destined to different applications on a host (RFC 7605 §5)
- Traditionally, each application protocol has been assigned a unique port from the IANA registry
- Port assignments are a relatively scarce resource
- When running two copies of the same application on a host, static port assignment struggles
- Using a dynamic port and advertising it using DNS-SD has reduced the need for static port assignments
Demultiplexing for Multicast Traffic

• Multicast is more complicated because all hosts in the multicast group must have the same port available
• Hard to coordinate without global static port assignment
• But...
  • Multicast applications don’t need ports for demultiplexing!
  • The multicast group destination address already identifies the receiving application
• For multicast traffic the destination port field is redundant
  • If a multicast packet arrives at a host, the host should use it!
Multicast Addresses

• Fixed addresses
  • IANA IPv4 & IPv6 Multicast Address Space Registries

• Dynamic addresses
  • RFC 2730 (MADCAP)
  • draft-ietf-pim-ipv6-zeroconf-assignment
  • draft-ietf-pim-gaap
Proposed Solution

• Assign UDP ports specifically for use with multicast applications
  • 49150, 49151 (0xBFFE, 0xBFFF, last two ports of the “user” port range)
  • Consecutive ports to support RTP/RTCP (RFC 3550 §11)
• Conformant applications set SO_REUSEADDR or SO_REUSEPORT socket options to share the port with other applications
  • Therefore, host stacks do not need to be updated, though it would be beneficial
• Conformant hosts always act as if these ports are shared
socat Demo

• Transmitter, Terminal 1:
  socat STDIN UDP4-DATAGRAM:239.0.0.1:49151,ip-multicast-if=172.16.6.100

• Transmitter, Terminal 2:
  socat STDIN UDP4-DATAGRAM:239.0.0.2:49151,ip-multicast-if=172.16.6.100

• Receiver, Terminal 1:
  socat UDP4-RECVFROM:49151,bind=239.0.0.1,ip-add-membership=239.0.0.1:172.16.1.132,fork STDOUT

• Receiver, Terminal 2:
  socat UDP4-RECVFROM:49151,bind=239.0.0.2,ip-add-membership=239.0.0.2:172.16.1.132,fork STDOUT

239.0.0.1
239.0.0.2

Receive multiple messages without terminating
How you can help...

• We are interested if there are any application protocols that require more than two ports (consecutive or otherwise) at the same multicast destination address
• Any general feedback is always appreciated
• Attend pim session
  Wednesday Session II (1300-1500) Plaza A