draft-ietf-ippm-6man-pdm-option-01
IPv6 PDM Destination Option

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Comments from Prague

We have added two new sections to address the comments from the WG session in Prague:

1. Comment: Indicate that PDM will not work when using IPv6 transition technologies

Action: Section 1.6 IPv6 Transition Technologies added.

2. Comment: Indicate that PDM must be placed BEFORE the ESP header.

Action: Section 3.3 "Header Placement" revised. New section 3.4 "Header Placement Using IPSec ESP Mode" added to further clarify header placement.
Testing

Used our implementation on FreeBSD

- Same subnet (cable) ✔
- Same administrative domain (TBD)
- Different administrative domains ✔
- Internet ✔
Implementation on Internet

- **Frame 37**: 110 bytes on wire (880 bits), 110 bytes captured (880 bits)


- 0110 .... = Version: 6

- .... 0000 0000 .... .... .... .... .... .... .... = Traffic class: 0x00000000

- .... .... 0111 1100 0010 0110 0010 = Flowlabel: 0x0007c262

- Payload length: 56

- Next header: IPv6 destination option (60)

- Hop limit: 50


- [Source SA MAC: Hewlett--7a:78:86 (78:e3:b5:7a:78:86)]


- [Destination GeoIP: Unknown]

- [Destination GeoIP: Unknown]

- IPv6 Destination Option Header

  - Next Option: 6

  - Option Header Length: 16

- Performance and Diagnostic Metrics protocol

  - Option Type: 30

  - Option Payload Length: 12

  - 10... .... = Time Base: nanoseconds (0x02)

  - 00 0000 0... .... = Scale of Delta Time Last Received: 0

  - .... .... 0000 0000 = Scale of Delta Time Last Sent: 0

  - Packet Sequence Number This Packet: 31715

  - Packet Sequence Number Last Received: 0

  - Delta Time Last Received: 0x0000 (scaled = 0 nanoseconds)

  - Delta Time Last Sent: 0x1040 (scaled = 4160 nanoseconds)

  - Padding: 0000

- Transmission Control Protocol, Src Port: 61944 (61944), Dst Port: 1234 (1234), Seq: 2451907301, Len: 0
Geolocate Addresses

- Obviously need more data points
- Working on that
- Fighting with VMs
Implementation on Stacks

• Request for Enhancement (RFE) submitted to IBM by large U.S. corporation

• Discussions held with IBM TCP/IP Chief Architect
Issues: Control Blocks

• What is in control blocks today (IP / TCP)
  – TCP CB do not know IP address
  – IP CB do not know other end IP address. Do not know port
  – Netstat commands have all info (see 5-tuple below) clearly that is in some control block

| TCP | 10.0.0.3:52987 | 67.217.64.244:https | TIME_WAIT |
| TCP | 10.0.0.3:52988 | 54-249-66-39:https  | TIME_WAIT |
| TCP | 10.0.0.3:52989 | 67.217.64.244:https | TIME_WAIT |
Issues : Seq Number Calculation

• How is sequence number for IPv4 (IPID) calculated?
  – Some do global counter
  – Some do counter per 5-tuple
  – For the stacks who do global counter, this will mean a big change
Issues: API

• Should (new) API be provided?

• Where does code to do PDM stats really belong?

• Our current proof-of-concept implementation intercepts each packet at interface
Issues: IPSec Diagnostics

• This is a big problem for users

• PDM may be a big help

• PDM Destination Option travels in the clear, even when using ESP mode
MTU Discussion: Need to Add

- Potential problem: “Packets become too large when adding the PDM header and results in <IPv6-fragmentation-required> to the sending host” - Joachim

- Potential problem: “Size increase with PDM header makes stream exceed a network threshold and trigger channel capacity re-allocation” - Joachim

- Add caveat: When using hybrid modes, it becomes critical to not trigger such network events by careful implementation and planning. One thing that I have seen network operators do, when they know that they may have extra headers potentially added, is to "leave room". For example, send a packet with data payload of 1,430 rather than 1,480. With a packet that has a payload of 1,480 on a network with a 1,500 MTU, then just about anything you add is going to lead to fragmentation.
Comments?

• Thoughts?

• Issues?

• Questions?