

I E T F[®]

IPv6 Minimum Path MTU Hop-by-Hop Option

<draft-hinden-6man-mtu-option-02>

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Background



- Current RFC8201 PMTUD isn't working well.
- This hop-by-hop option came from the idea that it will be more reliable for the Destination to send Path MTU feedback to the Source.
 - Better trust relationship than RFC8201 PMTUD.
- It may not work in all places [RF7872] etc., but we suggest it can help some places.

Path MTU HBH Option



Option Type	Option Data Len	Option Data
BBCTTTTT	00000100	Min-PMTU Rtn-PMTU R

Option Type:

- BB 00 Skip over this option and continue processing.
- C 1 Option data can change en-route to the packet's final destination.

TTTTT 10000 Option Type assigned from IANA [IANA-HBH].

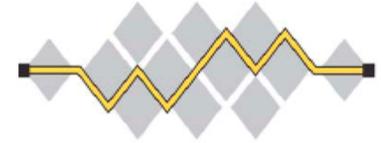
Length: 4 Note the size of the each value field in Option Data field supports Path MTU values from 0 to 65,535 octets.

Min-PMTU: n 16-bits. The minimum PMTU in octets, reflecting the smallest link MTU that the packet experienced across the path. This is called the Reported PMTU. A value less than the IPv6 minimum link MTU [RFC8200] should be ignored.

Rtn-PMTU: n 15-bits. The returned minimum PMTU, carrying the 15 most significant bits of the latest received Min-PMTU field. The value zero means that no Reported MTU is being returned.

R n 1-bit. R-Flag. Set by the source to signal that the destination should include the received Reported PMTU in Rtn-PMTU field.

Changes Since IETF105



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- Adopted as working group draft after IETF105
- First w.g. version published
 - draft-ietf-6man-mtu-option-00
 - Changed to request IANA assignment
- Requested early IANA allocation
- IANA assigned 10000 Option Type
- New version published with new Option Type and text clarifications
 - draft-ietf-6man-mtu-option-01

Wireshark Dissector



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- Code submitted and accepted in Wireshark

The screenshot shows the Wireshark interface with a packet list table and a detailed view of the selected packet. The packet list table has the following columns: No., Time, Source, Destination, Protocol, Length, and Info. The first packet is at time 0.000000, source fd01:1::2, destination fd01:2::2, protocol UDP, length 70, and info 1234 → 1234 Len=0.

The packet details pane shows the following structure:

- Packet comments
 - Frame 1: 70 bytes on wire (560 bits), 70 bytes captured (560 bits) on interface unknown, id 0
 - Ethernet II, Src: MS-NLB-PhysServer-01_ff:02 (02:01:00:00:ff:02), Dst: 02:fe:2b:1b:ba:7a (02:fe:2b:1b:ba:7a)
 - Internet Protocol Version 6, Src: fd01:1::2, Dst: fd01:2::2
 - 0110 = Version: 6
 - 0000 0000 = Traffic Class: 0x00 (DSCP: CS0, ECN: Not-ECT)
 - 0000 0000 0000 0000 = Flow Label: 0x000000
 - Payload Length: 16
 - Next Header: IPv6 Hop-by-Hop Option (0)
 - Hop Limit: 64
 - Source: fd01:1::2
 - Destination: fd01:2::2
 - IPv6 Hop-by-Hop Option
 - Next Header: UDP (17)
 - Length: 0
 - [Length: 8 bytes]
 - Path MTU Option
 - Type: Path MTU Option (0x30)
 - Length: 4
 - Minimum Reported PMTU: 9000
 - Return Minimum PMTU: 1500
 - Return Flag: True
 - User Datagram Protocol, Src Port: 1234, Dst Port: 1234

The packet bytes pane shows the following hex and ASCII representation:

```
0000 02 fe 2b 1b ba 7a 02 01 00 00 ff 02 86 dd 60 00  ..+..z..`..
0010 00 00 00 10 00 40 fd 01 00 01 00 00 00 00 00 00  ..@..
0020 00 00 00 00 00 02 fd 01 00 02 00 00 00 00 00 00  .....
0030 00 00 00 00 00 02 11 00 30 04 23 28 05 dd 04 d2  .....0#(..
0040 04 d2 00 08 fc 2f  ...../
```

Experiment Status



- Probes currently deployed
 - 2 in USA: normal MTU, IPv6
 - 1 in Sweden: large MTU, IPv6
 - 1 in UK Academic Core (JANET NOC): large MTU, IPv6
 - 1 in UK Academic Edge at Aberdeen: normal MTU, IPv6
- Looking for more people who have IPv6 ***AND*** a larger MTU!
 - Please contact us

Data Needed



- What PMTU can be used across (parts of) the Internet?
 - How often is the PMTU smaller than “normal”?
 - How often can you use a larger PMTU?
 - Are IPv4 and IPv6 equivalent?
- Can PMTU HBH Option be sent over a path?
 - From where to where?
 - What is the pathology? (loss / remove /etc.)
 - Does the assigned option type traverse the path?

Next Steps



- Continue experiments (please talk to us).



QUESTIONS / COMMENTS?