Transmission of IPv6 Extension Headers

draft-carpenter-6man-ext-transmit-00

Brian Carpenter
Sheng Jiang

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Motivation

- It is known that the Internet is not transparent to some IPv6 extension headers.

- That is partly due to defects in the IPv6 specifications.

- 6man can fix this part of the problem.

The trouble with RFC 2460

- To allow for new extension headers, RFC 2460 says:

  `"...extension headers are not examined or processed by any node along a packet's delivery path, until the packet reaches the... Destination Address"`

- However, some firewalls treat unknown extension header types as suspect and drop packets containing them.

  – This especially, but not exclusively, affects extension headers defined since RFC 2460

What we can't do (in 6man)

- We can't prevent firewalls and other middleboxes from performing deep packet inspection and sometimes breaking connectivity.

What we can do

- Clarify the specifications to minimise breakage.

Steps to take

- Define a uniform format for future extension headers (Done by RFC 6564)

- Clarify that the RFC 2460 requirement applies to all extension headers (this draft)

  - Document the problem

  - Make some changes to normative language

  - Enumerate the current list of extension headers

- Properly document the list of extension headers for the future (IANA)

  - At the moment there is no definitive list

Requirement to handle Hop-by-Hop options

- The Hop-by-Hop Options header SHOULD be processed by intermediate nodes as in [RFC2460].

- However, designers are warned that some routers will ignore it, or put it on a slow path.

Requirement to transmit other extension headers

- Any node that forwards IPv6 packets SHOULD do so regardless of extension headers.

- Exceptionally, if a node is designed to examine extension headers, e.g. for firewalling, it MUST recognise all valid IPv6 extension header types.

- If a firewall discards a packet containing a valid IPv6 extension header, it MUST be due to an explicit firewall policy, and not just the result of failing to recognise the header.

IANA Considerations

- IANA is requested to replace the empty IPv6 Next Header Types registry by an IPv6 Extension Header Types registry, subsidiary to the existing Protocol Numbers registry.

  - It will contain only those protocol numbers which are also IPv6 Extension Header types.

- Future IPv6 Extension Header types will be added to this registry as well as the Protocol Numbers registry.

Current values

- 0, Hop-by-Hop Options, [RFC2460]
- 43, Routing, [RFC2460], [RFC5095]
- 44, Fragment, [RFC2460]
- 50, Encapsulating Security Payload, [RFC4303]
- 51, Authentication, [RFC4302]
- 58, ICMPv6, [RFC2460]
- 59, No Next Header, [RFC2460]
- 60, Destination Options, [RFC2460]
- 135, MIPv6, [RFC6275]
- 139, HIP, [RFC5201]
- 140, shim6, [RFC5533]

Questions? Discussion?

- Does 6man want to work on this topic?