Usecases for IPv6 Extension Headers - Let's Do Some Marketing

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IPv6 Working Group
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The Problem

• IPv6 Extension Headers get filtered
  – In Transit Networks
  – In Destination Networks

• Presentation by Jen Linkowa @RIPE69

• Work by Fernando Gont
  – draft-ietf-v6ops-ipv6-ehs-in-real-world
The Problem

- We do not know why
- Lack of Knowledge
- Security concerns
  - Real
  - Bad Feeling
- Business requirement
The Problem

• We do not know why

• Slow Hardware
  – IPv6 is not processed in hardware

• RFC 6564 defines a uniform format for EH
  – Maybe this helps in the future
  – Hardware Forwarding
The Problem

• We do not know why

• Middleboxes
  – Loadbalancer
  – Security appliances
  – Firewalls
    • some do not know about IPv6 EH (RFC 7045)
IPv6 Extension Headers

• 2 Groups of Header

• Obvious Usecases

• Not so Obvious Usecases
Fragmentation

• Pretty obvious
• Everyone understands the use case
• Just one use case
Fragmentation

- Pretty obvious
- Everyone understands the use case
- Just one usecase

- Today we need fragmentation
- Potential Security Issue
ESP and AH

- Used for IPSec
- Encryption is fundamentally important
- Business
- Trust
- Data Protection
Hop-By-Hop Header

• RSVP

• As a Provider, I would filter this
• My customers may not reserve Bandwith
Hop-By-Hop Header

- RSVP
- As a Provider, I would filter this
- My customers may not reserve bandwidth
- The customers of my customer may not reserve bandwidth
- ISP can choose to ignore the header
Hop-By-Hop Header

- Multicast

- Used by MLD in the local network
Destination Option Header

• Mobile IPv6

• Transit ISP should not care, just forward

• Filtering is extra work

• If no mobile IPV6 is deployed, destination AS could filter
Routing Header

• Option 0 was deprecated

• Option 2 is for mobile IPv6
  – As a Provider, I would filter this

• Option 4 is for Segmentation Routing
  – As a Provider, I would filter this today
  – Wait for further development
Extension Headers

• Many usecases are internal for a network

• Bandwidth reservation
• Multicast
• Mobile IPv6

• Don’t expect them for be forwarded
More Usecases?

- Usecases have to solve a business case
- Providers run a business
- If we cannot provide a usecase, everyone will filter
Conclusion

• Many Extension Headers are mostly unused

• They are used internally

• Providers filter, but should just forward

• We need more usecases, then the ISPs will learn to use EH