

# Inflight Removal of IPv6 Hop-by-Hop Options and Routing Headers

draft-ietf-herbert-eh-inflight-removal-01  
IETF 118

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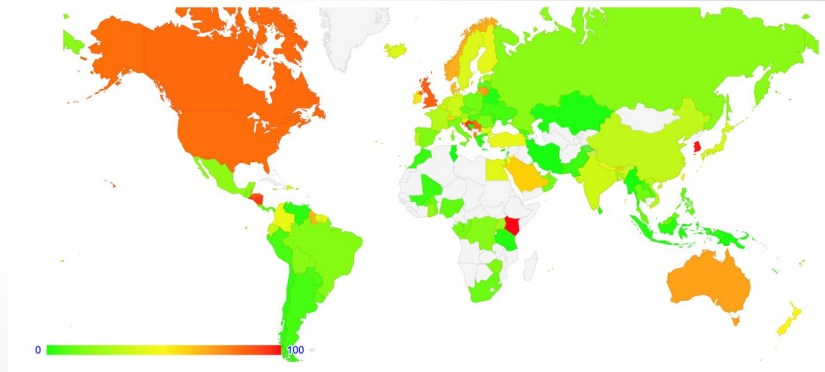
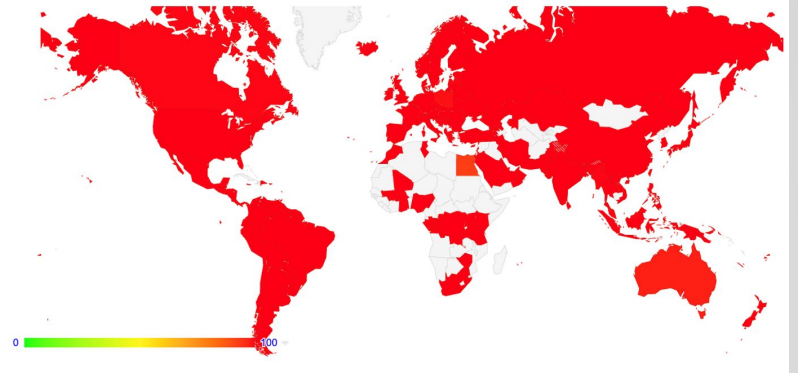
# Motivation: Drop rates of HBH

Data shows >99% drop rate for HBH

Other EHs have high drop rates also, but not as high as HBH. What's the difference?

HBH Options target routers in provider's infrastructure, hence drop is security policy

**Unlikely this practice will change soon!**



# A way forward

Assume HBH Options are only useful in limited domains

Logically, if some routers in a limited domain process HBH Options for service then HBH is viable in limited domain

Q: How to limit HBH Options to limited domains?

(this isn't so easy!)

# A1: Don't use HBH if packets leave LD

- Determine by destination address prefix  
**Downside:** Doesn't scale, complexity in app
- Do a type of “Happy Eyeballs” probing to see if EH is viable to a destination  
**Downside:** Complexity of implementation
- Apply a priori information, like from routing  
**Downside:** Hosts participate in routing protocols

## A2: Tunneling

- IPinIP encap packets from source with HBH  
**Downside:** How to set a tunnel destination?
- Encapsulate packets with HBH at egress  
**Downside:** All destinations decapsulate,  
increases packet size
- In either case  
**Downside:** Tunnel overhead has cost

# Proposal: Remove HBH (RH) in flight

- At egress router of limited domain
- At ingress router of limited domain

## Benefits

- Packets with HBH Options reach destination
- HBH useful up until the point its removed
- Efficient implementation: copy, scatter/gather

# Consequences

- RFC8200 clearly says not to do this
  - HBH is best effort, maintain correctness with removal
- Removing HBH decreases packet size
  - Decreasing packet size is safe with with PMTU
- Destination doesn't see HBH
  - If the packet was dropped they wouldn't see it either
- ICMP errors wouldn't match what was sent
  - Not worse than getting ICMP error for NAT'ed packet
- Bugs may allow packets w/o HBH removed
  - Not a MUST, likely consequence is packet is dropped

# Next steps

- Please comment on draft
- PoC implementation
- Ask for WG adoption



Thank you!