



I E T F<sup>®</sup>

# The IPv6 Unrecognized Option

<draft-bonica-6man-unrecognized-01>

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# Problem Statement



- Many applications rely on the network
  - To deliver packets that contain Destination options in the forward direction
  - To deliver ICMP Parameter Problem messages in the reverse direction
- Example
  - Draft-6man-leddy-truncate
- Many networks filter
  - Packets that contain Destination options
  - ICMP Parameter Problem messages

# Solution: Application Probes The Network Path



- Source node probes the path between itself and the destination node
  - Probe contains an unrecognized destination option
  - First two bits of the Option type are “10”
  - Probe elicits an ICMP Parameter Problem message
- If the source node receives the ICMP Parameter Problem message, the network can
  - Deliver packets that contain Destination options in the forward direction
  - Deliver ICMP Parameter Problem messages in the reverse direction

# Choosing An Unrecognized Destination Option



- When writing software that probes the path, the software developer must choose a destination option that is guaranteed not to be recognized by the destination
  - Not Today
  - Not Tomorrow
  - Not Ever !!
- This means reserving an Option Type

# The Unrecognized Option

- Option Type – TBD by IANA
  - “Act” bits are “10”
  - “Chg” bit is “0”
- Opt Data Len – Variable
- Opt Data – Must be zero
- Behavior when recognized – Send ICMP Parameter Problem message
- Behavior when unrecognized – Send ICMP Parameter Problem message

# Good Enough Results



- False positives are possible
  - Due to Equal Cost Multipath (ECMP)
- False negatives are possible
  - Due to ECMP
  - Due to transient packet loss
- Accurate enough for most applications
  - Both false positives and false negatives can be mitigated by clever crafting of the probe packet and probe repetition

# Use Case



- Source sends packet with Unrecognizable option and receives one of the following:
  - ICMP Parameter Problem
    - Good
    - Continue
  - Nothing
    - Bad
    - Retry or Stop
- Another ICMP message
  - Maybe good, maybe bad
  - Depends on ICMP message type

# Use Case (continued)



- Source sends a packet with another destination option and receives one of the following:
  - ICMP Parameter Problem
    - Bad
    - Destination node does not recognize option
  - Nothing
    - Good
    - Destination node probably processed the packet
- Another ICMP message
  - Depends upon ICMP message type

# Next Steps



- Adopt as 6man WG item



# QUESTIONS / COMMENTS?