BCP 145 Recap
Unicast UDP Usage Guidelines for Application Designers

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11 revisions in 1.75 years
History & motivation

- Written during 2\textsuperscript{nd} term as AD
- Saw many I-Ds in IESG Review with issues
- Often needed to rehash previous discussions
- Idea: document best practices for using UDP

- Few MUSTs in the document, mostly SHOULDs
- SHOULD = MUST, unless really good documented reason
Contents

• Congestion control guidelines
• Message size guidelines
• Reliability guidelines
• Checksum guidelines
• Middlebox traversal guidelines
• Programming guidelines
• ICMP guidelines
Guideline summary

Taken from BCP145, Table 1: “Summary of recommendations”
General
(Section 3)

• **MUST** tolerate a wide range of Internet path conditions
• **SHOULD** use a full-featured transport (TCP, SCTP, DCCP)
Congestion control
(Section 3.1)

• **SHOULD** control rate of transmission
• **SHOULD** perform congestion control over all traffic
Bulk transfer applications
(Section 3.1.1)

• For bulk transfers,
  – **SHOULD** consider implementing TFRC
  – Else, **SHOULD** in other ways use bandwidth similar to TCP
Low data-volume applications  
(Section 3.1.2)

• For non-bulk transfers
  – **SHOULD** measure RTT and transmit max. 1 datagram/RTT
  – Else, **SHOULD** send at most 1 datagram every 3 seconds
  – **SHOULD** back-off retransmission timers following loss
UDP tunnels
(Section 3.1.3)

• For tunnels carrying IP Traffic, **SHOULD NOT** perform congestion control
• For non-IP tunnels or rate not determined by traffic, **SHOULD** perform congestion control
Message size guidelines
(Section 3.2)

• **SHOULD NOT** send datagrams that exceed the PMTU, i.e.,

• **SHOULD** discover PMTU or send datagrams < minimum PMTU
Reliability guidelines
(Section 3.3)

• **SHOULD** handle datagram loss, duplication, reordering
• **SHOULD** be robust to delivery delays up to 2 minutes
Checksum guidelines
(Section 3.4)

• **SHOULD** enable IPv4 UDP checksum
• **MUST** enable IPv6 UDP checksum*
• Else, **MAY** use UDP-Lite with suitable checksum coverage

* Since BCP 145 (RFC 5405) predates RFC 6935
Middlebox traversal guidelines
(Section 3.5)

• **SHOULD NOT** always send middlebox keepalives
• **MAY** use keepalives when needed
  (min. interval 15 sec)
Programming guidelines
(Section 3.6)

• **MUST** check IP source address
• And, for client/server applications, **SHOULD** send responses from source address matching the request
ICMP Guidelines*
(Section 3.7)

• **SHOULD** validate that an inbound ICMP is for a datagram the app actually sent

* Omitted from Table 1
Security considerations

(Section 4)

• **SHOULD** use standard IETF security protocols when needed