

BCP 145 Recap

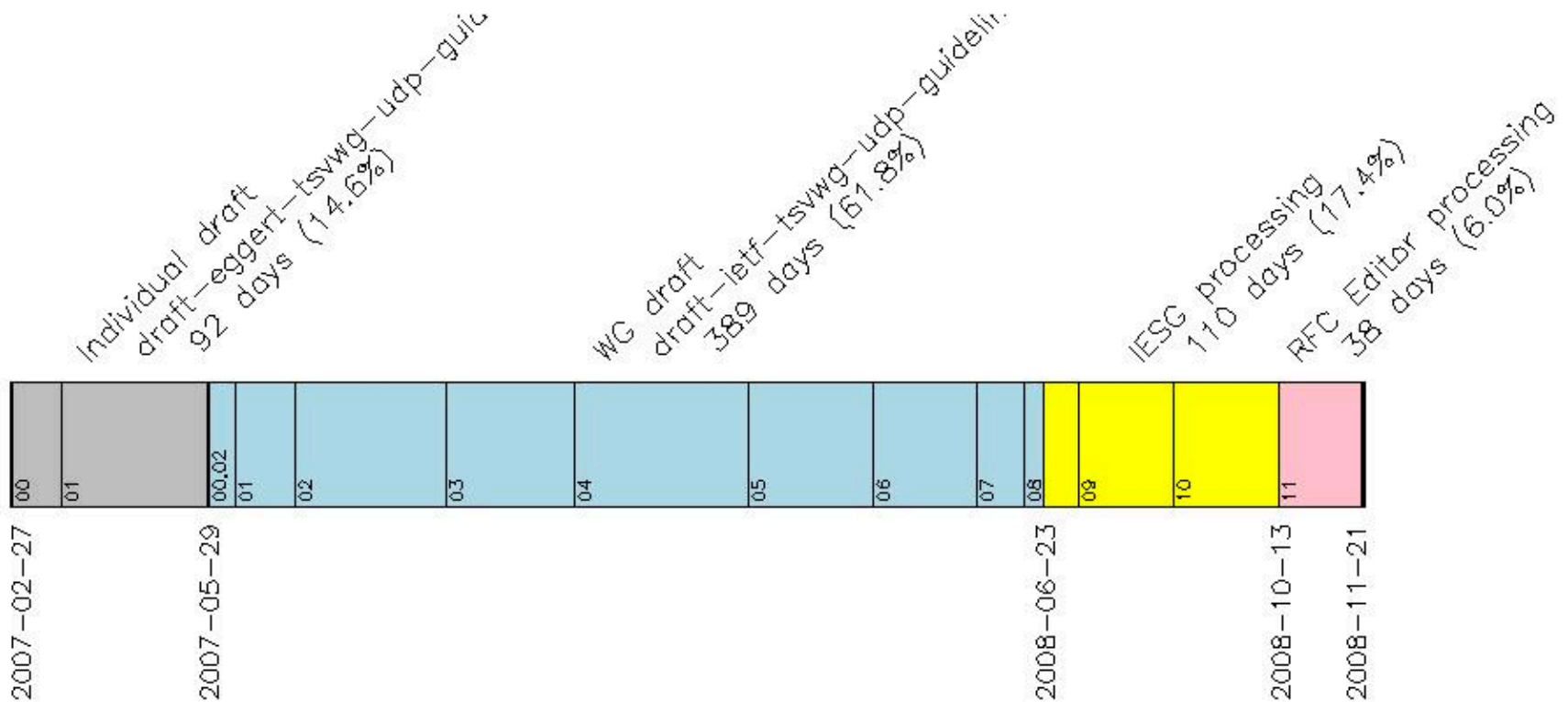
Unicast UDP Usage Guidelines for Application Designers

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11 revisions in 1.75 years



History & motivation

- Written during 2nd 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