Content & History

• guidelines to the designers of applications and application-layer protocols that use unicast UDP

• presented at IETF-68, adopted as WG item shortly thereafter

• list discussion has resulted in three revisions since IETF-68

• contents
  (1) congestion control
  (2) message sizes
  (3) reliability
  (4) checksum use
  (5) middlebox traversal

new since IETF-68
Baseline Guideline

- apps SHOULD use TCP, SCTP or DCCP whenever they can
- congestion control, message size determination and reliability are difficult to get right
- if used correctly, more featureful transports aren’t as heavyweight as often claimed
- if you can’t use those transports, use UDP according to the rest of these guidelines
Congestion Control Guidelines

- apps doing UDP bulk transfers ➔
  SHOULD use TFRC or TCP-like windowing

- apps that send a small number of messages ➔
  SHOULD maintain an RTT estimate and limit themselves to 1 outstanding message per RTT
  • loss looks like long RTT sample
Congestion Control Guidelines (2)

• apps that can’t maintain an RTT estimate ➔ SHOULD use a conservative fixed timer and exponentially back it off under loss
  • e.g., 500ms, such as SIP & GIST

• apps that can’t detect loss ➔ SHOULD use a more conservative fixed timer
  • e.g., 3 seconds, such as TCP SYN retransmit
Message Size Guidelines

• apps SHOULD NOT send messages larger than the path MTU

• either implement path MTU discovery

• or use IP-layer path MTU information

• or don’t send anything larger than the minimum path MTU
  • IPv6 ➔ 1280 bytes
  • IPv4 ➔ min(1st-hop-MTU, 576 bytes)
Reliability Guidelines

• apps should be aware that UDP does not provide
  • reliability
  • duplication protection
  • reordering protection

• apps SHOULD be robust in the presence of such events
Checksum Guidelines

- IPv4 apps SHOULD use checksums (they’re optional in RFC 793)
  - IPv6 apps MUST use checksums anyway

- if data integrity is of importance, SHOULD use stronger checksums on the transmitted data object

- apps that can tolerate data corruption MAY use UDP-Lite (RFC 3828)
Middlebox Traversal Guidelines

• apps should implement robust session handling that lets them recover from disappearing middlebox state

• apps MAY in addition send periodic keepalives every 2 minutes
  • keepalives don’t invalidate the need for robust session handling
  • keepalive transmission is governed by congestion control

NEW SINCE IETF-68
Status

• authors think -02 is reasonably complete, modulo two issues
  (1) guideline for keepalive recommendation – what value?
  (2) congestion control over the entire traffic to a destination

• would like to forward this for early review to other areas,
  once the WG has come to consensus on these two issues