UDP Options

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-14 updates from interim 9/3/21

- **OCS option changed to fixed location at first 4-byte boundary**
  - No longer using TLV; contents are zero if not used, zero-fill before if not aligned

- **UNSAFE option**
  - Simpler format of reserved block of 32 KIND values rather than cascaded single kind/unsafe kind
  - Used for options that are “critical and elective” (can't be ignored when they appear)
  - Update draft to make it clear that zero length data is OK
  - Treatment of errors
  - Remind that UNSAFE always comes behind FRAG so hidden from legacy

- **FRAG option**
  - Support required
  - MRSS at least 2x1500 bytes (see next slide)
  - Immediately after OCS, with post-reassembly options after last frag
  - User control of per-frag and per-segment options, but no control over order within each set
Review of FRAG format

• FRAG is first option after OCS
  – Early location reduces TLV chain for offload
  – Requires field to point to front of frag data

• Each fragment includes includes per-frag opts BEFORE data/segment opts
  – i.e., OCS, FRAG, opt1, opt2, data

• Per-segment opts appear at the end
  – Starts after final data fragment
  – Can continue in zero-data fragments (if per-segment frags are larger than 1 frag)
  – Per-frag/per segment options as per socket settings, CAN be per-packet e.g., using cmsgs

• Reassembles into legacy format
  – i.e., OCS, FRAG, opt1, opt2, data, opt3, opt4
  – Reassembles to “data, OCS/0, opt3, opt4”
  – Same per-segment option proc as unfragmented segment, both pre-frag (xmit) and post-reassy (recv)
  – No limit on segment option length by allowing zero-length frags that consist of only segment options
UDP Frag and MRSS

• **MRSS**
  – Defined like TCP MSS, i.e., IP MTU – (fixed IP header + fixed UDP header)
    • Indicates largest UDP payload that can be received, assuming no IP or UDP options
  – Receivers MUST support MRSS of at least 3000 bytes
    • To accommodate 2 1500B IP packet’s worth of data
    • Should be 2944 for IPv4 or 2904 for IPv6, but easier to round up to 3000 bytes for both cases

• **FRAG**
  – Receivers MUST support reassembly of 2 fragments per UDP datagram
    • Receivers capable of larger MRSS or more than 2 frags/datagram will indicate that by sending MRSS

  – Each frag size depends on size of per-frag and per-segment options
    • Including IP options, UDP fragment options, and UDP segment options
    • See equations in next slide
FRAG size calculation

• Definitions:
  – IPovh = IPfixed + IPopts  *IP per packet overhead*
  – UDPsegovh = UDPfixed + UDPsegopts  *UDP per segment overhead*
  – UDPfragovh = UDPfixed + UDPfragopts  *UDP per fragment UDP overhead*
  – MRSSmax = MRSS – IPovh – UDPsegovh  *MRSS max UDP data in 1 segment*
  – perFRAGmax = IPmtu – IPovh – UDPfragovh  *max UDP data in 1 fragment*

• Max UDPdata for 2 fragments
  – MIN(MRSSmax, 2 * perFRAGmax - UDPsegopts)

• Number of frags for a given MRSS, once received (allows >2 frags)
  – CEILING(MRSSmax / perFRAGmax)
Pending issues

• Consensus check on UDP MRSS
  – Proposing 3000 bytes
  – Send up to 2 frags or up to 3000 bytes total, whichever is smaller, until MRSS is received (then up to MRSS total)

• At least one more consistency pass
  – Feedback appreciated