ALFI: Adaptation Layer Fragmentation Indication

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Fragmentation is bad

- IP-layer fragmentation (IPv4, IPv6)
  - usually mostly prevented by PMTUD
- Adaptation Layer Fragmentation (ALF)
  - “transparent”!
  - serious impact on packet delivery probability for 6LoWPAN etc.
Applications often have a choice

- E.g., application layer fragmentation
- CoAP: selecting the right block size
- But how to do this without information?
- Could try to detect step function in packet delivery probability
- Better: don’t hide ALF completely
Terms

• MUALTU: Maximum Unfragmented Adaptation Layer Transmission Unit

• IFMUALTU: Initial-Fragment MUALTU, the MUALTU for the initial adaptation layer fragment of an IP packet.

• FFMUALTU: Following-Fragment MUALTU, the estimated minimum MUALTU for all but the initial adaptation layer fragments of an IP packet.
Packet delivery vs. fragmentation

- IFMUALTU = 89
- FFMUALTU = 70

The graph shows the packet delivery probability (pdp(x)) against packet size.
Header compression

• … creates a difference between the IFMUALTU and the FFMUALTU

• … makes the MUALTUs variable
  • e.g., changing an address may change compression significantly

• hard to probe out-of-band
ALFI

- In-band probing
- Add to actual data packets
- Compensate for distortion
- Add hop-by-hop option:

```
+----------------------------------+
\|0 0 1 x x x x x x|       4       |
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<table>
<thead>
<tr>
<th>Initial-Fragment MUALTU</th>
<th>Following-Fragment MUALTU</th>
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Protocol

• Originator sets both MUALTUs to zero
• Each adaptation layer updates, if it understands the option

Receiving application:
• Still zero? Not worse off than before
• Send back application layer info to sender (e.g., CoAP: Block2 option)
TBD

• Socket interface?

• How steppy must the adaptation layer be to qualify for setting MUALTUs?
  • ATM vs. 6LoWPAN
  • e.g., DVB?

• Spend time on IPv4???
Do we want to do this?

• If yes: where?
  • 6LoWPAN is shutting down
  • 6MAN? intarea?
  • AD-sponsored?
  • Independent submission?