

# DATA UNIT GROUPS FOR DETNET ROUTERS

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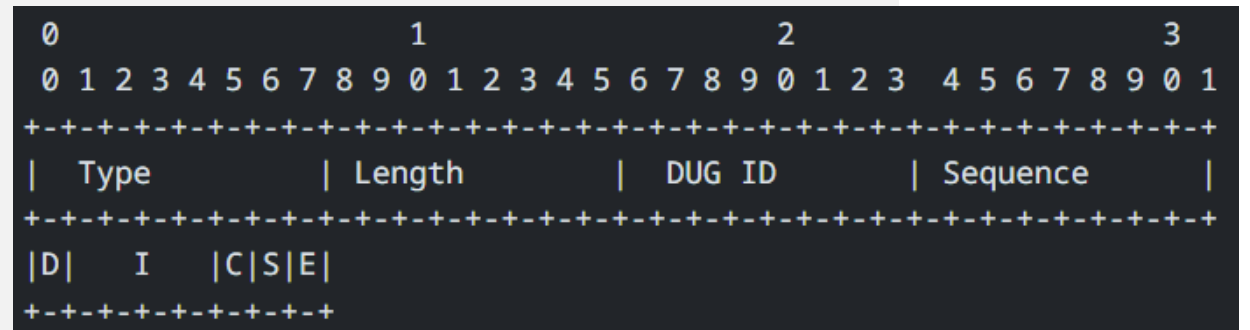
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# MOTIVATION

- Applications often send data which does not fit into a single IP packet
- Results in single Application Data Units (ADUs) to be fragmented into smaller chunks, determined by the MTU of the underlying computer network
- Set of IP packets carrying a single ADU is defined as Data Unit Group (DUG)
- For high throughput and/or low-latency applications (XR or monitoring data for Network DTs), loss of a single packet means entire ADU is unusable → high likelihood in wireless networks
- In 5G, the concept of PDU Sets has been defined where the network can drop entire PDU Sets in case of congestions → PDU Sets only work for RTP traffic

# PROPOSED IPV6 HEADER EXTENSION

- A new IPv6 TLV is proposed (see figure)
- Main purpose is for intermediate DetNet routers to read DUG header values and perform DetNet queuing, shaping, scheduling, ordering or dropping actions
- DUG ID: Integer number identifying the DUG
- Sequence: Integer number indicating the order of packets within a DUG, starting from 0 and increased by 1 for each packet in the DUG.
- D: This bit indicates the end of the DUG.
- I: These four bits indicate the importance of this packet against other packets in the same DUG
- C: A 1-bit field to indicate higher layer control plane packets, e.g. TCP or TLS
- S: 1-bit field indicating the start of a burst of packets within a DUG.
- E: 1-bit field indicating the end of a burst of packets within a DUG.



# POSSIBLE DETNET ROUTER BEHAVIOUR

- A DetNet router can use DUG metadata to process packets belonging to the same traffic flow
- For increased reliability, DetNet routers may use one or more DUG header options to apply frame replication or different queuing techniques
- In case of congestion, the importance flag can be used to determine which packets to drop
  - Can include a subset of the entire DUG, identified by their DUG ID, within a DetNet flow
- Scheduling operations can use importance or other DUG metadata to determine which packet to send on which link
  - For example, the scheduler may forward packets on the same link used for other packets of the same DUG, to provide a consistent treatment
  - In another example, packets of higher importance may be forwarded over higher quality links.

# THANK YOU



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