Numbered HTTP Datagrams

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Adding Numbers to Datagrams

DG-Sequence: ?1

REGISTER_SEQUENCE_CONTEXT Capsule {
  Type (i) = REGISTER_SEQUENCE_CONTEXT,
  Length (i),
  Context ID (i),
  Payload Context ID (i),
  [Representation (8)]
}

Sequence Number Datagram {
  Context ID (i),
  Sequence Number (8..64),
  Payload (...)}

Indicate support

Register the use of sequence numbers.

Datagram format.
Why?
**Datagram mode 2**: This transport mode is the mode defined in RFC 9298

... and provides unreliable transport with no sequence numbering and no packet reordering / deduplication.

**Datagram mode 1**: This transport mode is an extension of the mode defined in RFC 9298

... but with sequence numbering and with packet reordering / deduplication.

... The details of the datagram mode 1, including the potential use of a Context ID (…), are considered in stage-3 specifications.

**Default Mode**

**Optional Mode**
Reordering

• With the ATSSS “Load Balancing Steering Mode” traffic is simultaneously transmitted over 3GPP and non-3GPP paths.

• Default transport mode (Datagram mode 2): use plain HTTP Datagrams, let endpoints deal with out-of-sequence data.

• Optional transport mode, use HTTP datagrams with sequence numbers.
  – Alternative to encode datagrams over capsules streams.
  – Delay incoming out-of-sequence datagrams by some time e.g., estimated path delay difference.
  – Reduced packet delay variation and out-of-sequence data at the expense of increased minimum delays.
Deduplication

- ATSSS Redundant Steering Mode
  - Duplicate data over multiple accesses.
  - Various triggers and strategies for packet duplication, such as network quality estimates.
  - Receiver must be able to identify and discard duplicates.
  - Sequence numbers allow for simple duplicate packet detection.
Use Cases

• Campus where existing Wi-Fi coverage is augmented with 5G radio.
  – Single management plane for subscribers.
  – Steering modes depends on application.
    • Traffic aggregation and redundancy useful for e.g., remote controlled devices.

• Emergency response teams, simultaneously connected over multiple accesses.

• ...
Exercise in Extensibility

- Should this type of extension be able to work with multiple payload formats?
- What is the best way of realizing layered contexts?

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