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TSVWG Working Group

FEC Streaming Framework

draft-watson-tsvwg-fec-sf-00

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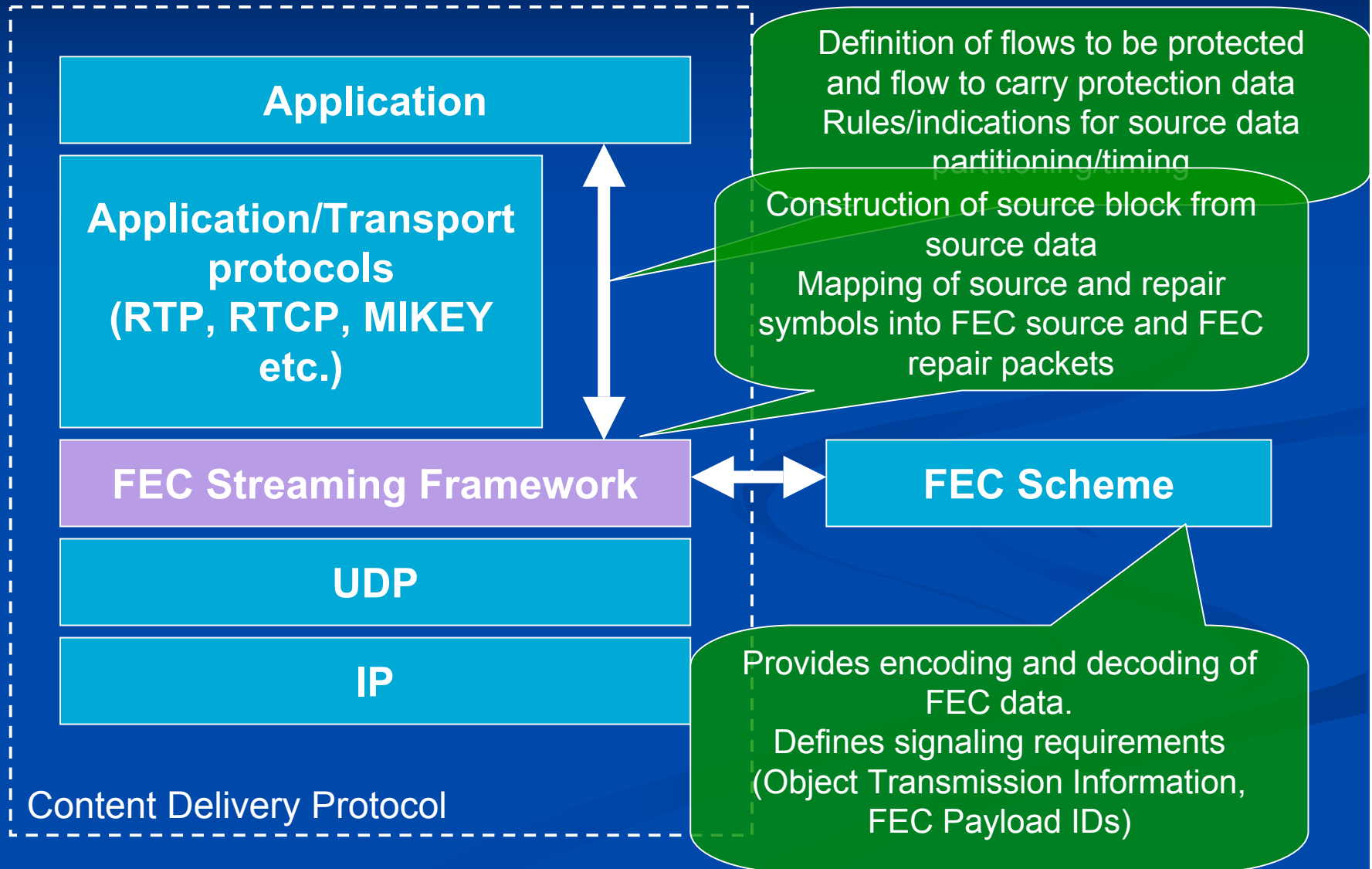
Objectives

- Extend RMT FEC Building Block concepts to streaming
 - FEC Building Block update accommodates streaming
 - Generic framework for FEC for streaming, without assumption of a particular FEC code
 - “FEC Schemes” define particular FEC codes and their application in separate specifications
- Build on recent 3GPP work
- Desirable to minimize number of different FEC codes, but good reasons exist for specifying more than one.
 - RMT FEC Building Block allows multiple FEC codes in an interoperable way (similar to using different RTP codecs)

Proposal

- FEC Streaming Framework layer above UDP
- Provides FEC protection for a “bundle” of UDP flows
 - No dependence on protocol over UDP. E.g. RTP, RTCP, SRTP, MIKEY etc.
- Framework does *not* define:
 - Specific FEC code
 - Application layer signaling (may provide tools)
 - Source data partitioning, interaction with source coding (if any)
 - Timing

Protocol stack



FEC Streaming Configuration Information

- Information provided by application to FEC Streaming Framework at encoder and decoder
- Defines:
 - The set of UDP flows to be protected
 - The UDP flow that will carry the repair data
- Draft defines SDP tools for applications to signal this information
 - Uses SDP defined by **draft-li-mmusic-fec-grouping-00** and **draft-mehta-rmt-flute-sdp-03**

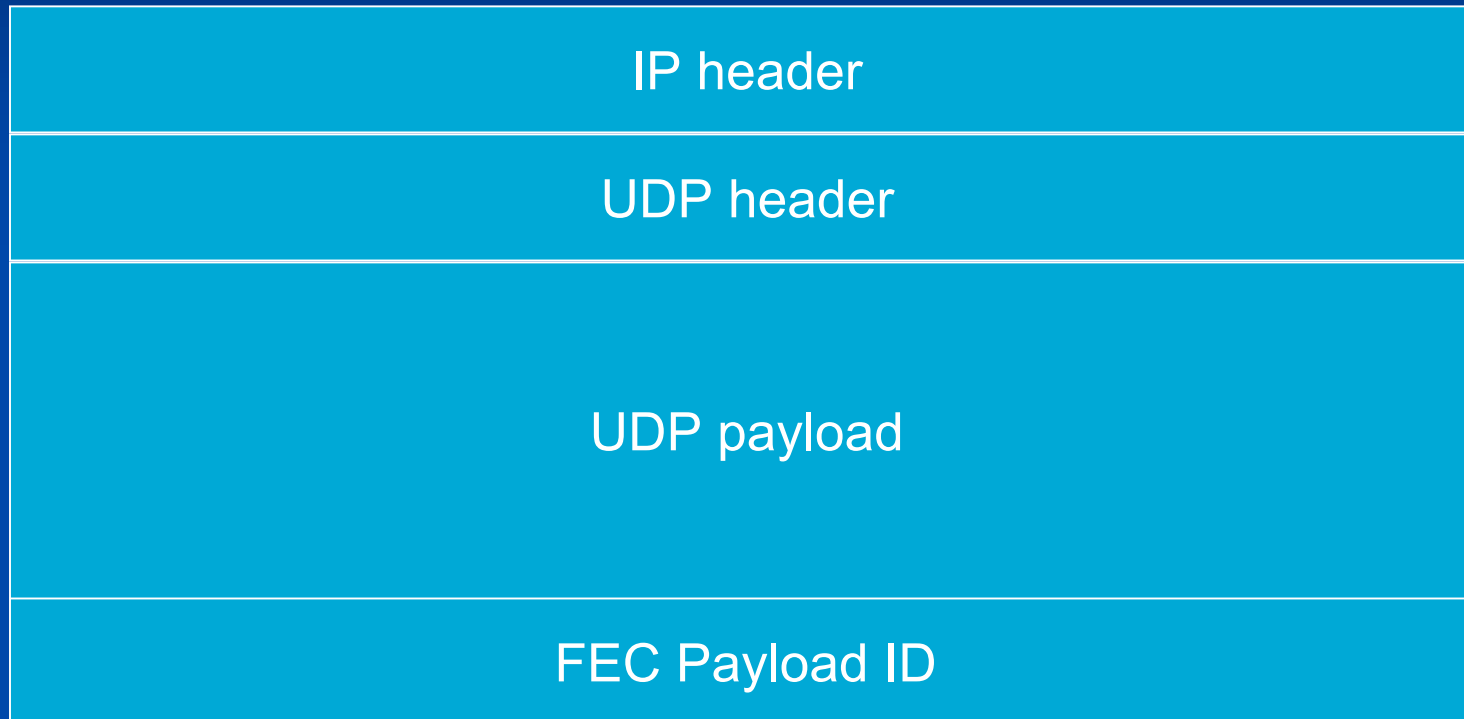
Source Block construction

- FEC codes calculated over a logical 'source block'
- Source Block consists of concatenated 'source packet information' (SPI) for each packet
- Source Packet Information consists of
 - UDP flow identifier (1 byte)
 - UDP Packet Length (2 bytes)
 - UDP Payload
 - Padding bytes
- SPI always starts on an FEC Symbol Boundary within the source block (symbols can be any size, but within a source block they are all the same size)

Source Packet Tagging

- Source Packets are tagged with an FEC Payload ID, indicating
 - The source block number for the packet
 - The source symbol the SPI for the packet starts at
- FEC Payload ID field defined by FEC Scheme and appended to the packet by the FEC Streaming Framework
 - FEC Schemes can define 'zero-byte' FEC Payload ID field, if the information above can be derived some other way. This supports backwards compatibility with receivers not supporting the FEC Streaming Framework

Source packet format



FEC Payload ID placed at end of packet so that ROHC will still compress RTP headers in the case of RTP packets.

Repair packets

- Repair packets contain FEC repair symbols
 - Assumption of systematic FEC code!
- FEC Payload ID in repair packets identifies the repair symbols
 - Format of this field defined by FEC Schemes

Repair packet format

IP header

UDP header

FEC Payload ID

FEC Symbols

Questions for TSVWG

- Do we need a generic (i.e. not FEC-code-specific) approach to FEC for streaming ?
 - 3GPP evaluated RFC2733 and ULP and decided they were not appropriate for MBMS streaming
- Is this proposal the right way to go ?
 - One alternative could be to run over RTP rather than below
- Relationship with ULP work ?
- Venue for further work ?
 - AVT, RMT or TSVWG