FECFRAMEv2
Adding Sliding Encoding Window Capabilities to the FEC Framework: Problem Position

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https://datatracker.ietf.org/doc/draft-roca-nwcrg-fecframev2-problem-position/

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Note well

- **we, authors, didn't try to patent** any of the material included in this presentation
- **we, authors, are not reasonably aware** of patents on the subject that may be applied for by our employer
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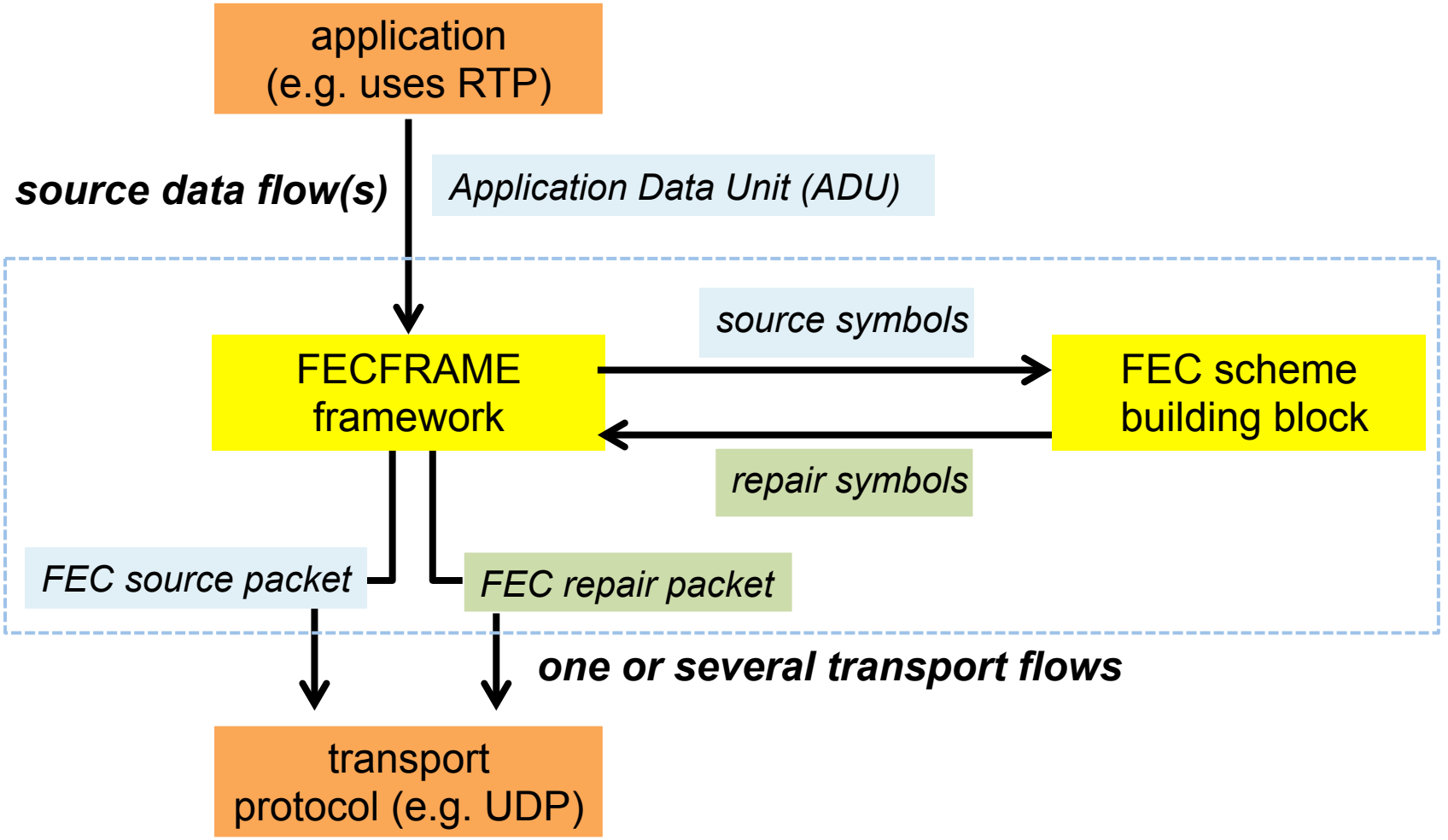
  http://irtf.org/ipr

What this I-D is about

- a follow-up of the “Forward Error Correction (FEC) Framework”, A.K.A. FECFRAME
  - RFC 6363, M. Watson, A. Begen, V. Roca, October 2011
    - **produced by the FECFRAME IETF WG**
    - **goal of FECFRAME is to add AL-FEC protection to real-time unicast or multicast flows in a flexible way**
  - also part of **3GPP MBMS** standards

FECFRAME (RFC 6363) principles

- a shim layer to add reliability to real-time flows in a flexible way



FECFRAME principles… (2)

- flexibility is the key
  - **can be one or more repair flows that protect one or more source flows**
    - many mappings possible
  - **can work with unicast, multicast or broadcast flows**
  - **can be backward compatible in particular situations**
  - **can be deployed in end-hosts or in middle-boxes**
- most of the details are in the FEC Schemes
- two constraints in RFC 6363
  - a **single** encoding and single decoding points
  - limited to **block AL-FEC codes**
    - **e.g. Raptor(Q), Reed-Solomon, LDPC-Staircase, 2D XOR**

Do the same with convolutional codes!

- we propose a **backward compatible** extension
  - **add a sliding window encoding mode, using convolutional FEC codes**
  - **block codes can still be used whenever appropriate**
    - e.g., with legacy receivers

- motivations
  - **with RFC 6363, the block creation time at the source is the minimum decoding latency any receiver experiences in case of erasures** ☹
    - no repair symbol for the current block can be received before
    - protection against long erasure bursts is an incentive to increase this delay
  - **this delay is avoided with convolutional codes that can encode immediately** ☺

3 comments and 1 question

- no fundamental issue in updating RFC 6363
  - **most changes will be in the new FEC schemes**
- single/multi flows and intra/inter flows coding
  - **everything is supported since the beginning (see RFC 6363)**
- single versus multi-paths
  - **supported since the beginning (see RFC 6363)**
- should FECFRAMEv2 support in-network recoding?
  - **not considered in FECFRAME use-cases and not possible with initial block codes**
  - **possible with convolutional codes (as with Tetrys). Is it worth?**

⇒ To Be Decided

How does it compare to Tetrys?

- similar coding techniques
  - **(elastic) sliding encoding window**
- signaling is totally different
  - **major differences for historical reasons**
    - shim layer (FECFRAME) versus protocol instantiation (Tetrys)
- there's no feedback at FECFRAME level…
  - …whereas Tetrys can use feedback in **unicast or small multicast groups**
    - **e.g., to identify packets received/recovered**
  - with **large multicast** groups, Tetrys does not use feedback either and both are pretty similar

Next steps…

- decide for the “in-network recoding” capability
- work on RFC 6363 update
  - **technically speaking not a big deal**
- work on FEC scheme(s) in parallel
  - **to identify potential issues…**