Generic Application Programming Interface (API) for Window-Based Codes

draft-roca-nwcrg-generic-fec-api-01

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Status of the work

- I-D updated (yesterday)
  - includes **3 APIs for sliding window codes**
    - **from Vincent/Jonathan/Morten**
    - **independently developed**
    - **there's running code behind each of them**
  - plus link to an open-source, freely usable, C-language, sliding window codec + protocol
    - **Cédric (GardiNet): https://gitlab.inria.fr/GardiNet/liblc/**
    - **implemented differently (not as a standalone codec)**
- A few comments after analyzing these APIs…

Which API? Reminder…

- the codec is a component of a much larger software

memory management

tunnel management

congestion control

selective ACK creation / parsing

code rate adaptation management

signaling header creation / parsing

transmission / reception

packet management

out of scope for this I-D

← codec API → low level codec

```
session management()
encoding/decoding window()
set/get coding coefficient()
build coded symbol()
decode with rcvd src/rep symbol()
```

Question 1: what type of FEC codes?

- API compatible with **different** codes?
  - **our position: YES**
- API compatible with ~~**block and**~~ **sliding window** codes?
  - **our position: ONLY sliding window codes**
  - **detail: 2 APIs out of 3 restrict themselves to sliding window. The 3rd one addresses both but result is not fully satisfying. Comes from largely different approaches that could make API way more complex…**
- API compatible with **end-to-end and in-network recoding** use-cases?
  - **our position: YES**

Question 2: should the ADU to source symbols mapping be done by the codec?

- background:
  - it is FEC Scheme dependent
  - useful to address variable size ADUs
  - it has major impacts (parameters, implementation complexity especially at a receiver)

- question: should it be hidden in the codec?
  - **our position: leave it to the caller**
  - **consequence: API only handles source and repair symbols**

Question 3: should the codec initialize and process the source/repair headers?

- background:
  - e.g., an additional buffer filled by the codec upon encoding
  - hides more details inside the “codec”…
  - but it makes the “codec” do more than just the coding part… It’s more a FEC Scheme (code + signalling)

- question: should it be hidden in the codec?
  - **our position: leave it to the caller**
  - **the codec focusses on what matters: coding/decoding only**

Question 4: should the codec bother with timing aspects?

- background:
  - the source flow can have timing requirements (e.g., limited validity period). Should the codec know about it?
  - e.g., decoding window vs. linear system size distinction

- question: should the codec consider timing req.?
  - **our position: leave it to the caller**
  - **let the codec be agnostic of any timing aspect… Timing is an application concept**

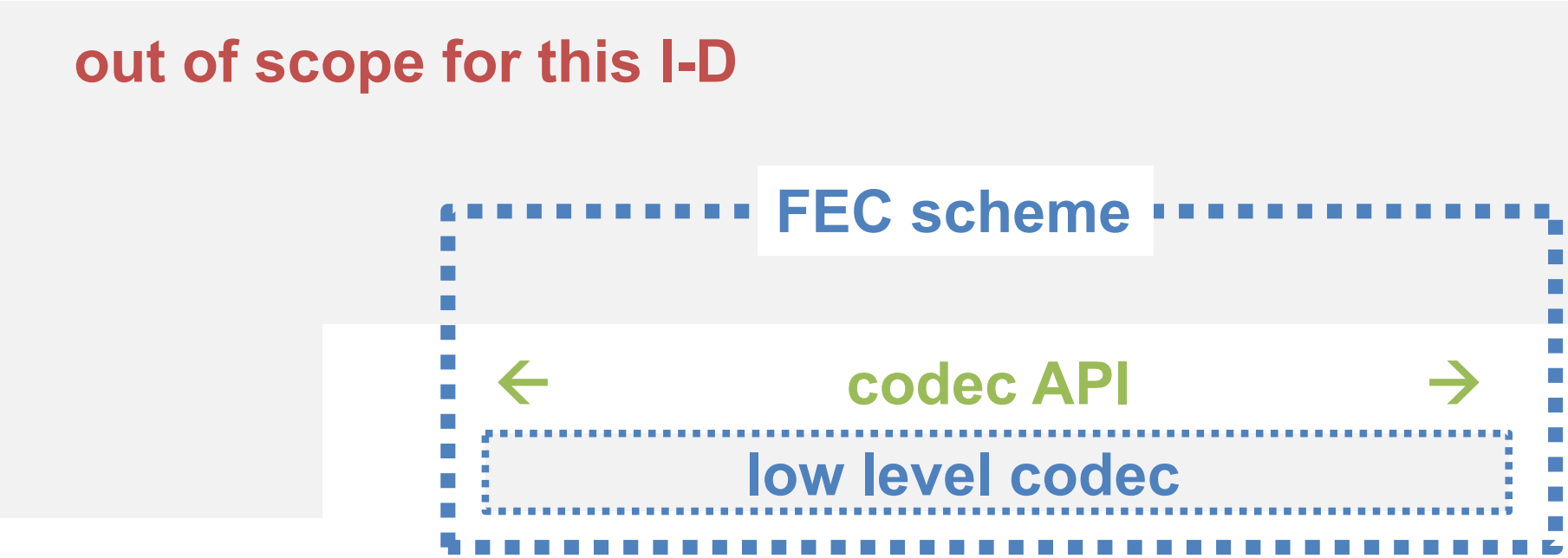
Question 5: about hardware requirements

- is there any specificity to hardware codecs (e.g., FPGA) that should be considered?
  - it was a good IETF 100 comment...
  - …but none of us has any experience

- any opinion?

To sum up

- choosing where to place API is not trivial
  - we design an API to a low level codec, not to a FEC Scheme



- next step…
  - start with actual design