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

draft-roca-nwcrg-generic-fec-api-00

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Which API?

- **core sliding window codec API**
  - ○ **a component of a much larger software**

memory management

code rate adaptation management

tunnel management

signaling header creation / parsing

out of scope for this I-D

congestion control

transmission / reception

selective ACK creation / parsing

packet management

← codec API →

low level codec

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

What does generic API mean?

- API compatible with **different** codes

- API compatible with ~~block and~~ **sliding window** codes

- ~~API compatible with MDS and non-MDS codes~~

- API compatible with **fixed-rate and rateless** codes

- API compatible with codes for **end-to-end and in-network re-encoding** use-cases

KEY question: why should we do that?

- ease software development that rely on window-based codes
    - an API provides guidelines
    - a common API reduces dependencies, making it easier to remove a codec and plug another one

- ease benchmarking
    - of codes, of codecs, of full solutions

- ease development of a future reference FEC codec
    - (see discussion, later)

- because it's feasible
    - within NWCRG several of us already did it

This ID

- gathers 3 existing APIs for sliding window codes
  - ○ **(Inria)   private version of OpenFEC.org, extended to sliding window codes**
  - ○ **(ISAE-Supaéro)   private codec, part of Tetrys**
  - ○ **(Inria)   GardiNet project's API for embedded devices**
    https://gitlab.inria.fr/GardiNet/liblc/

- additional API expected
  - ○ **in particular from Morten V. P.**

Next steps

- next steps
  - ○ **finish to gather APIs in the I-D**
  - ○ **analyze all the APIs**
  - ○ **agree on a generic API version**

- update I-D accordingly
  - ○ **replace existing APIs with the proposed API**

About our future reference codec…

- develop an open-source, free window-based codec
  - ○ C or C++
  - ○ sufficiently generic to enable specialization (if needed)
  - ○ meant to facilitate Proof-of-Concepts

- existing candidate open-source, free codecs
  - ○ GardiNet project (C++). Targets embedded devices.

    https://gitlab.inria.fr/GardiNet/liblc/

    (see: 09-adjih-network-coding-and-multihop-wireless-networks)
  - ○ if anybody is aware of another interesting project, tell us…