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

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

Vincent Roca (Inria), Jonathan Detchart (ISAE-Supaéro)

Cédric Adjih (Inria), M. Pedersen (Aalborg University)

I. Swett (Google)

NWCRG, IETF100, Singapore

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 used in research projects**
  - ○ **(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…