Steinwurf

Latency for block and sliding window codes

IETF 110 / NWCRG
Introduction

One of the key reasons for using ECC/FEC is to minimize latency.

ARQ Recovery latency: 1 RTT per retransmission

ECC/FEC Recovery latency: Distance to the repair packet
Block ECC/FEC

Case #1
- Source
- Four blocks of 4 symbols

Case #2
- Source
- One block of 16 symbols

Timeline

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Block ECC/FEC

Timeline

- Case #1
- Case #2

Distance to repair is minimized with small blocks...

Repair rate is the same 33%

5 Mbit/s stream 1280 byte packets: > 500 block size equals 1 s of latency
Comparison

Reed-Solomon (6,4) vs. (24, 16)

Small blocks are good for latency but bad for loss

Large blocks are good for loss but bad for latency
Sliding window codes

Minimizing distance to repair but offering better packet loss protection
Comparison

Rely (6,4) vs. Reed-Solomon (24, 16)

Using sliding window we get good loss recovery and latency properties!
Conclusions

- Consider sliding window codes when latency matters
- Sliding window codes worst case is block coding

More about sliding window coding:
- https://rely.steinwurf.com/docs/latest/

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