Adaptive FEC for Congestion Control

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tools.ietf.org/html/draft-singh-rmcat-adaptive-fec
CONCEPT

(A) Adding FEC

(B) Swapping FEC with media

(C) Partially swapping FEC with media

Available Capacity

STAY state
PROBE state
UP state
STAY state
DOWN state
STAY state
PROBE state
UP state

Throughput

RTCP Interval

time

media rate

media rate

FEC

FEC
CC Framework

- Media Encoder
- Rate Controller
- RTP Packets
- RTCP FB
- Pacing Buffer
- Transport Layer (UDP)
- IP
RFC 6363: FEC Framework
State Machine

STAY

Good conditions, probe network

No more bandwidth available

Unstable conditions

Stable conditions

DOWN

UP

INCREASE

PROBE

Unstable conditions

Stable conditions

Unstable conditions

DECREASE

Good conditions, probe network
RTCP Feedback

- RLE of loss packets (RFC3611)
- RLE of discarded packets (RFC7097)
- Packet count of lost and repaired packets (RFC7509)
Applicability

• Implemented over a delay-based congestion control
  • See paper for details
  • Code: (coming soon) → https://github.com/multipath-rtp/

• Implemented in OpenWebRTC
  • Implemented by github.com/balazskreith

Test case 1

Throughput (KBits)

- **OWD: 50ms**
- **OWD: 150ms**
- **OWD: 300ms**
Test case 2

- **OWD: 50ms**
- **OWD: 150ms**
- **OWD: 300ms**

Path Capacity
Test case 4 (a): 50ms
Test case 4 (b): 150ms
Test case 4 (c): 300ms
Test case 6(a): 50ms
Test case 6(c): 300ms
Test case 7(a): 50ms
Test case 7(b): 150ms
Test case 7(c): 300ms
Next Steps

• Generalized mechanism?
• Specific mechanism?