Two Years of RIST Around the World: What Have We Learnt?

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Who we are?

- Company specialising in software-based encoders and decoders for Sport, News and Channel contribution (B2B)
- Based in Central London
- Build everything in house:
  - Hardware, firmware, software
- Not to be confused with:

Open Broadcaster Software

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What are the problems that RIST solves?

- Large push in last 5-10 years to use unmanaged connectivity for B2B video transport
  - Increased growth of good quality internet access
  - Commercial drives to reduce costs
  - Some end-users are OTT and Internet-native
- Use of FEC, not really designed for this
  - Burst loss limited by matrix size, interoperability issues
- Growth of proprietary solutions
  - Creates incompatible “islands” in many facilities
- How to reach the cloud?
  - Inherently lossy place
  - Discussed later

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Where did we start?

- Used FEC for many years
  - Some still use it (good enough)
- First implemented RFC 4585 (retransmissions)
- 2018 RIST Simple Profile released
- Subsequently implemented RIST Simple Profile
  - Minor differences
- RIST on air early 2019
  - Fast feedback process
  - Nothing beats reality

Network Working Group
Request for Comments: 4585
Category: Standards Track

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Map of our deployments

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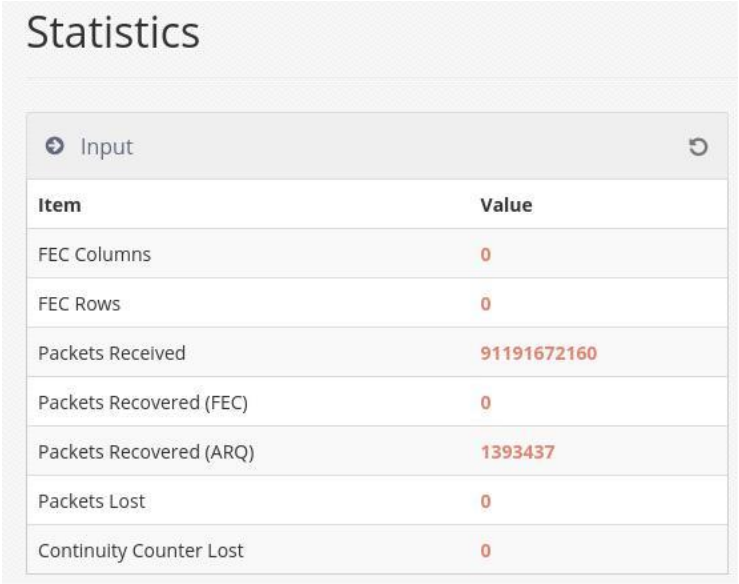
Doing it for real

- 24/7 Linear channels for satellite uplink from playout
- Interactive (two-way) talking heads news interviews
- Live events
- Long-form studio programmes as primary path(s) to air
- Reverse vision lines

- Millions of viewers daily

Why did we go RIST?

- Key driver was having dual connection support from day 1
  - ISPs do have individual issues
- Some protocols now setup two independent connections
  - RIST approach allows retransmissions on both links for maximum recovery potential
- 9 months between London and New York over two ISPs



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Site design

- Usually sites with existing IT traffic
  - Often competing with broadcast traffic
- Firewall/VPN to access IPMI (out-of-band)
  - Even more important today, nobody technical on site
  - Handles encryption (control and video)
- Important to think about security
  - IP receive or handoff from/to third-party

Simple to debug

- Really simple for IP engineers to debug (tcpdump, Wireshark)
  - Fault find quickly
- Also able to fault find in 3rd party implementations:
  - https://newweaver.com/a-first-look-at-aws-media-connect-and-rist/

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The three-letter Elephant in the Room

- Lots of things RIST can learn from the SRT Alliance:

- Active community on Slack
- libsrt library relatively mature
  - Easy to integrate, many products as a result

- Much easier to get started both as a user or manufacturer

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We need increased support for LibRIST

- For the majority of the world LibRIST **is** RIST
- It is the de-facto library for ingesting of cloud streams
  - Yet limited interoperability tests between vendors
- LibRIST needs increased support from RIST Community
- Personally spent last 6 months doing weekly testing
  - Fixed a lot of issues, libRIST team is responsive
  - But this could be improved much faster with more vendors
  - Also sponsored libRIST support in FFmpeg
- **Currently limits the growth of cloud ecosystem**
- **A Rising Tide Lifts All Ships**

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What can you do?

- Many things that you can do to improve LibRIST and improve the RIST ecosystem:

- Do regular, long-term tests to/from other RIST implementations
  - The libRIST team are quick to resolve any problems
- Write documentation, whitepapers
- Write more about use-cases
- **This is as important, if not more, than producing documents such as VSF TRs**

lib RIST

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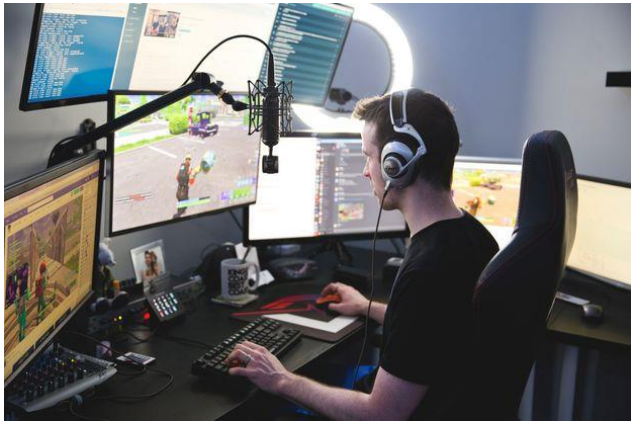
Non-broadcast uses of RIST

- Web streaming industry in desperate need for reliable UDP protocol
  - To support superior delivery than RTMP (TCP)
  - Failover/bonding between Wired and 4G Internet
- But, web streaming industry does not have circuit-based architecture
  - Hundreds of thousands or millions of streams
- Also non-technical users



twitch

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Non-broadcast uses of RIST (2)

SRT and RIST have a common problem

- With RTMP, we can give everyone the same hostname, and route on stream key:
  - rtmp://global-live.mux.com:5222/app/{stream_key} (Mux)
  - rtmp://live-lhr03.twitch.tv/app/{stream_key} (Twitch)
- This is much less complete in SRT and RIST
  - RIST: SSRC (32 bit 😬) + passphrase in main profile?
  - SRT: "Stream ID"
- Commercial tooling starting to address this
  - Softvelum: SRT PASSet

MUX

Phil Cluff (Mux), Mile High Video

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Conclusions

- RIST has provided a high quality solution for professional video transport over the last two years
- But community needs to provide increased support libRIST as de-facto cloud ingest/egress solution
  - Will lead to wider ecosystem
- Also more thought about how non-technical end-users without circuit-switched infrastructure can benefit from RIST

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