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CURATED BY VSF VIDEO SERVICES FORUM

RIST

RELIABLE INTERNET STREAM TRANSPORT

Merrick Ackermans - MVA Broadcast Consulting
Chair VSF RIST Activity Group.

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IP SHOWCASE THEATRE AT IBC – SEPT. 14-18, 2018

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What is RIST

- RIST is a Technical Recommendation for interoperable low latency contribution quality video via the internet.
- It is being developed by members of the Video Services Forum Reliable Internet Stream Transport Activity Group.

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What is RIST

- R.I.S.T. is a Video Services Forum effort to define and promote an interoperable technical recommendation for the transport of live, real time, low latency video over unmanaged networks, including the Internet.

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Why do we need RIST.

- There are lots of great products for moving contribution video at IBC. I just saw them in the halls.
  - Correct !!
  - However there is no interoperation between most of these products.

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The industry does not accept non interoperation from satellite uplinks.

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RIST Membership

- There are currently 22 companies actively involved in RIST development.
- These companies include:

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RIST Members Include *:

* Note: Some additional members including recent additions are not listed due to logo clearance issues.

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The individuals who have been the primary RIST contributors to date:

Merrick Ackermans (MVA Broadcast Consulting)	Sergio M Ammirata (DVEO)	Paul Atwell (Media Transport Solutions)
Uri Avni (Zixi)	John Beer (QVidium)	Ghislain Collette (Haivision)
Magnus Danielson (NetInsight)	Israel Drori (Zixi)	Eric Fankhauser (Evertz)
Ronald Fellman (QVidium)	Michael Firth (Nevion)	Rafael Fonseca (Artel)
Oded Gants (Zixi)	Peter Keys (Charter Communications)	Holger Klaas (Nevion)
Brian Matherly (Sencore)	Ciro Noronha (Cobalt Digital)	Andy Rayner (Nevion)
Steve Riedl (Turner)	David Robison (CenturyLink)	Adi Rozenberg (VideoFlow)
Bob Ruhl (VSF)	Wes Simpson (Telecom Product Consulting)	Adam Yellen (Haivision)

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RIST Membership

- The RIST Activity Group meets on Wednesdays from 11 AM-12 Noon Eastern Time via Go to Meeting.
- Additional members are always welcome.
- RIST AG member must be members of the Video Services Forum.

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How is RIST Development Structured ?

- The development of RIST has been divided into four parts.
- RIST will have multiple operational profiles, corresponding to increasing levels of complexity and functionality.
- Higher profiles will include all the features and functionality of the preceding profiles.
- The descriptions for profiles 2, 3 and 4 are preliminary as of 18 September 2018 and are likely to undergo changes as development continues.

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How is RIST Development Structured

- Profile 1 – Simple Profile
- Profile 2 – Main Profile
- Profile 3 – Enhanced Profile
- Profile 4 – Scalable Profile

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Profile 1 - Simple Profile

User Requirements	Sender Features	Receiver Features
Point-to-Point Unicast	Fixed bit rate coding	User selectable buffer size
Single packet loss recovery	User-controlled settings	User-controlled settings
Burst loss recovery	Multiple live unicast destinations	Hitless protection switch
Network link aggregation (bonded)		
Redundant transmission paths		

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Profile 2- Main Profile

(preliminary and subject to change)

User Requirements	Sender Features	Receiver Features
Point-to-Multipoint Unicast	Stream negotiation/Auto Config	Negotiated buffer size
Stream Encryption	In-band signaling	FEC Decoder
VPN/Tunneling + NAT Traversal	Forward Error Correction (FEC)	
Null Packet Suppression		

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Profile 3- Enhanced Profile

(preliminary and subject to change)

User Requirements	Sender Features	Receiver Features
Variable network bandwidth	Adjustable bitrate coding	Bandwidth estimation
Common channel session management	Network bandwidth probe	Adaptive buffer
Centralized DHCP Server (Phone Home)		

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Profile 4- Scalable Profile

(preliminary and subject to change)

User Requirements	Sender Features	Receiver Features
>100 Mbps/Uncompressed streams IGMP (IPv4), MLD (IPv6) multicasting	Scalable video coding (H.264 Annex G)	Scalable decoder

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A look at Profile-1 “Simple Profile”:

- The final draft specification of Profile 1 “Simple Profile” has been approved by the Activity Group and is being submitted to the VSF board for approval.
- Profile 1 draft is identified as TR-06-1

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A look at Profile 1

- Profile 1 only deals with the transport stream specifications. No video compression codec specifications are made in profile 1.
- Profile 1 provides only basic interoperability and packet loss recovery.
- All configuration is manual and done outside the protocol.
- Unicast transmission is used when transmitted over the internet.
- RTP is used as the baseline protocol for media transport.

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A look at Profile 1

- In order to ensure a level of interoperability between RIST and non-RIST implementations, RTP shall be used as the baseline protocol for media transport.
- If an RTP standard exists for a certain media type, that standard shall be used as the definition of the RTP header fields. For example, if the media to be transported is in the format of an MPEG-2 Transport Stream, SMPTE-2022-1/2 shall be used for the baseline stream.

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A look at Profile 1

- RIST will augment the baseline RTP transmission with mechanisms to recover from packet loss.
- Feedback/control messages shall use RTCP, as specified in RFC 3550.

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Profile 1: Packet Loss

- Profile 1 contains no FEC.
- RIST uses a NACK-based Selective Retransmission protocol to recover from packet loss.
- The general operation is as follows:
  - Once packet loss is detected, receivers will request a retransmission of the lost packet or packets.
  - Receivers will implement a buffer to accommodate one or more network round-trip delays and packet re-ordering.
  - Packets may be requested multiple times.

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Profile 1: Packet Loss

- RIST senders and receivers shall implement a minimal subset of RTCP
- For receivers, RTCP is used primarily to request lost packet retransmissions.
- For senders, RTCP is used primarily to keep state on NAT devices along the path.
- The additional information included in the RTCP packet may be used sender and receiver devices to achieve better network performance.

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A look at Profile 1

- Multicast can be used in compatible environments, such as private networks, or networks connected with multicast-capable tunnels.
- In a multicast environment, RIST will follow the standard UDP port assignments as per RFC 3550.
- Feedback/control messages shall use RTCP, as specified in RFC 3550.

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A look at Profile 1: Bonding Support

- RIST Simple Profile supports bonding of multiple transmission channels (such as WiFi, LTE, etc.), as follows:
  - An individual RTP media stream can be split between multiple channels in order to combine their bandwidths.
  - An individual RTP media stream can be replicated between multiple channels in order to increase reliability.
  - Both techniques can be used simultaneously. In these cases, receivers will need to combine the packets in order to reconstruct the original media stream.

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A look at Profile 1:

- So does it work.

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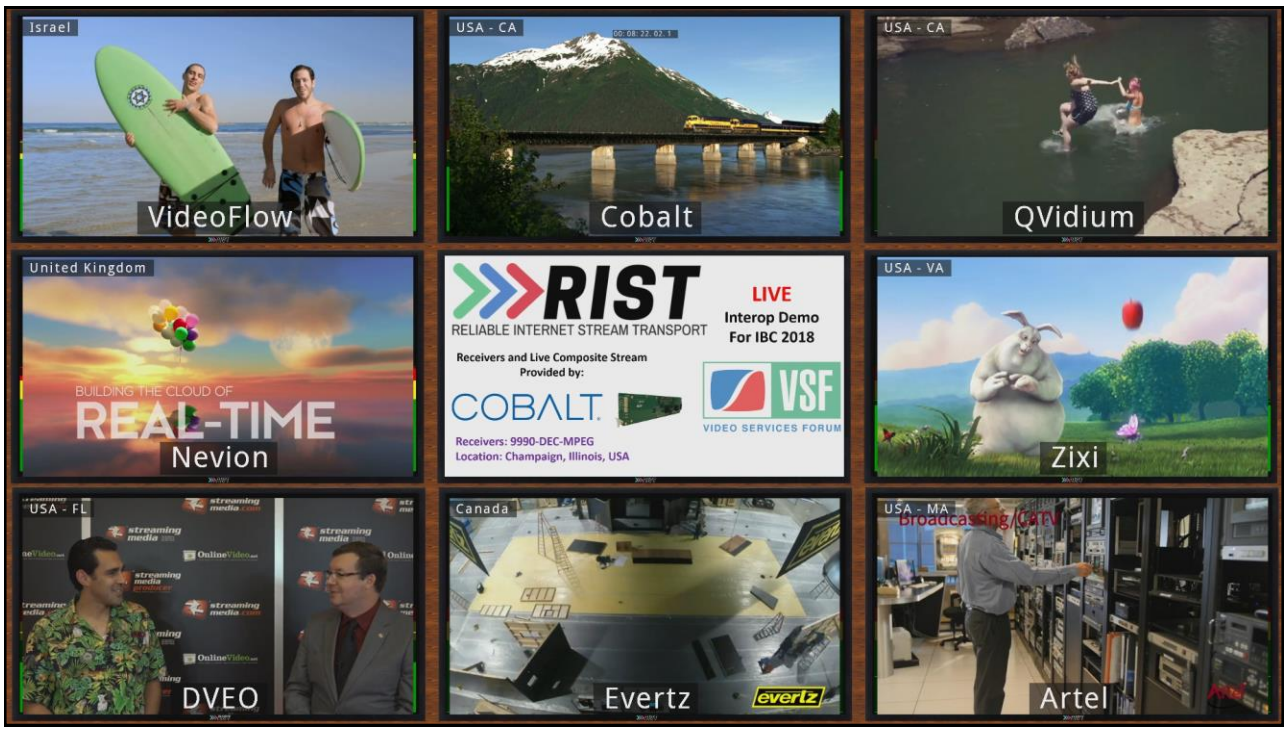

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RIST on display at IBC.

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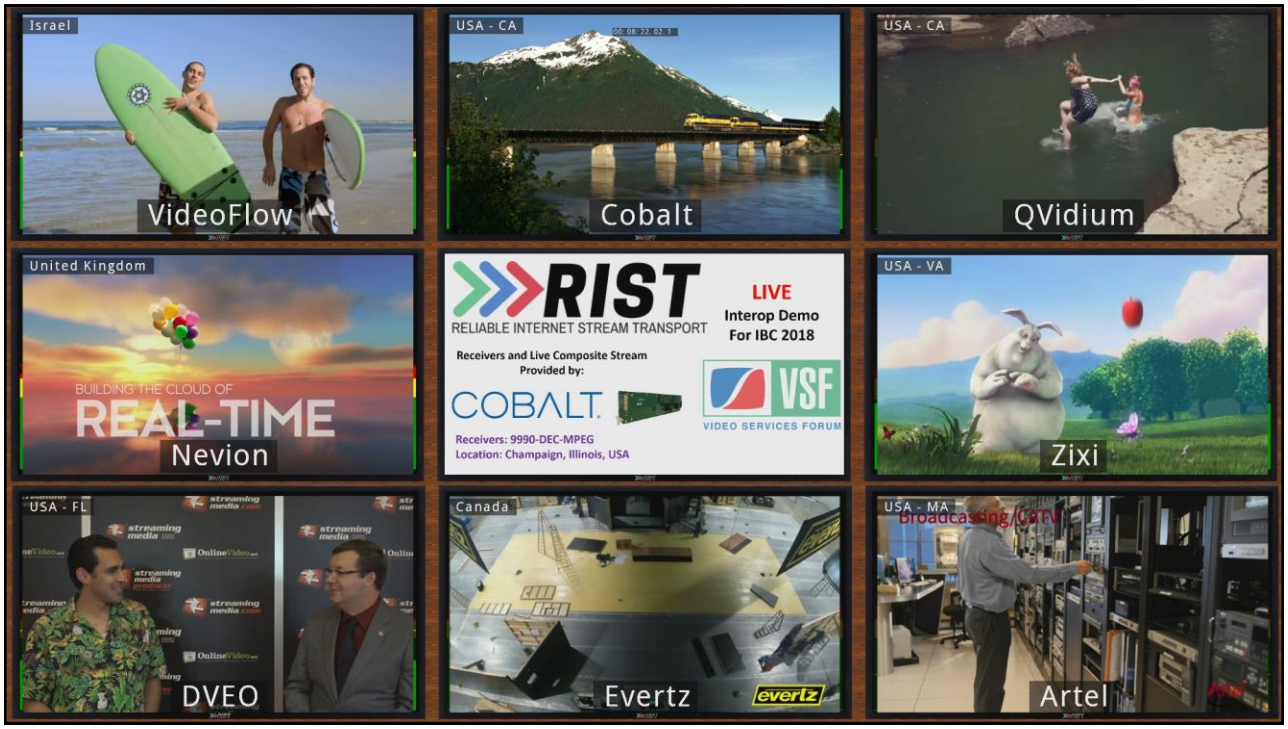

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Thank you

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