VSF JPEG XS Technical Recommendations and File Exchange Report

John Dale, Media Links. VSF JPEG XS Activity Group Chair

IP SHOWCASE

Introductions

VSF JPEG XS Technical Recommendations and File Exchange Report

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Presentation Outline

1. TR Objective/Output Review
2. Liaison & Industry Standards
3. File Exchange Status
4. Document Status
5. Next Steps

1. Objective/Output Review

- Create a technical recommendation primarily focused on WAN applications which utilizes JPEG XS coding and MPEG2TS/SMPTE 2022-2 Encapsulation (TR-07)

- Create technical recommendation focused on LAN/WAN applications for JPEG XS coding utilizing SMPTE 2110-22 Encapsulation (TR-08)

1. Objective/Output Review

- Develop interoperable capability sets which include multiple interoperability points for specific target applications/conformance levels
  - Applications/conformance levels include typical broadcast 2K formats, frame rates, sampling
  - Applications/conformance levels for 4K & 8K resolutions inc. WCG and HDR
  - Applications/conformance levels for multi-media extensions including RGB, 4:4:4 sampling. 8bit and 12bit depth
- Includes applicable recommendations for a complete system including video, audio ancillary data, and robust transmission
- Liaise with other organizations as needed
- Organize file exchange online workshop

2. Liaison & Industry Standards

Collaborate Liaison with other standards organizations to support the work

- IETF for the JPEG XS RTP Specification
  "RTP Payload Format for ISO/IEC 21122 (JPEG XS)" moved to a standard RFC, which is **RFC-9134**

- ISO/IEC for JPEG XS Level/SubLevel
  Request specific level for 720p; **1K-1**, also sublevel of **4bpp** and allow **4:2:0 in High444.12 Level**

- ISO/IEC for MPEG2TS Clarifications
  Some clarifications at the MPEG2TS layer for header boxes

Coordinate with other VSF Activity Groups via participation

3. File Exchange Status

TR-07 File Exchange and TR-08 File Exchange has been completed

- 1080p & 1080i JPEG XS Encoded streams were provided

- Files were posted to a common area and other participants were able to review and analyze the files

- The file exchange activity is complete

- Input from reviewer's comments has been considered for TR revisions

3. File Exchange Status

TR-07 File Exchange has 6 participants with 90% of the file reviews completed

Participating: Appear, Artel, Evertz, Media Links, Net Insight, Riedel
Most files were capable of being analyzed with decodable JPEG XS Codestreams
Some header inconsistencies

- Most files (almost all) were capable of being analyzed and had decodable JPEG XS Codestreams

- Would judge file exchange as a success

- Revisions of TR-08 to address referenced documents conflicting input on field/frame RTP timestamping

- Revisions of TR-07 & TR-08 should help to address header issues with more clarity around header definition and reference to updated MPEG and JPEG documents

3. File Exchange Status

TR-08 File Exchange has 9 participants with 76% of the file reviews completed

Participating: Appear, AWS/Elemental, Evertz, Imagine, IntoPix, Media Links, Nevion, Riedel, Sumavision

- Most files (almost all) were capable of being analyzed and had decodable JPEG XS Codestreams

- Would judge file exchange as a success

- Some Timestamping inconsistencies

- Some header inconsistencies

4. Document Status

TR-07 & TR-08

- 2022 Revisions of TR-07 and TR-08 have been completed and published on VSF's web site

4. Document Status

TR-07 2022 Revision Highlights

- ISO/IEC 21122-1:**2019** "Information technology — JPEG XS Low-latency Lightweight Image Coding System — Part 1, Part 2, Part 3" moved to **2022** revised document

- Amongst other items there will now be a 4bpp sublevel

- Color Specification & Dynamic Range table now includes examples of Wide Color Gamut

- Implementers should note that table 2-132 of Rec. ITU-T H.222.0 defining the JXS_video_descriptor contains an error. This error will be addressed in ISO/IEC 13818-1 (2021)/AMD1 by removing the descriptor_tag and descriptor_length fields from the table. We anticipate AMD1 will be published in 2022.

4. Document Status

TR-08 2022 Revision Highlights

- ISO/IEC 21122-1:**2019** "Information technology — JPEG XS Low-latency Lightweight Image Coding System — Part 1, Part 2, Part 3" moved to **2022** revised document

- Amongst other items there will now be a High 4:2:0 profile and 4bpp sublevel

- Color Specification & Dynamic Range table now includes examples of Wide Color Gamut

- New wording: For interlaced signals, the Interlace_Mode of the frat field of all JPEG XS picture segments shall be set to '1' (note: indicating that the first picture of a frame is the first video field, and the second picture of a frame is the second video field). For progressive signals, the Interlace_Mode of the frat field shall be set to '0'

- Appendix A, SDP Example was corrected for prior rate error

5. Next Steps

1. 2022 Revisions of TR-07 & TR-08 Published on VSF web site

2. Live Interop Demonstrations at Video Service Forum planned for VidTrans 2022 in June

2. Potential SDP File Exchange and NMOS Workshops

Thank You

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JPEG XS is ISO/IEC standard, 21122, (JPEG XS), designed for latency-critical real time applications and offering near lossless and visually lossless quality with low complexity

- Applicable to SD, HD, UHD, and HDR/WCG content

- 1.4-4 bpp compression (7:1 - 2.5:1)

- Robust over multiple coding cycles

- Low power consumption (less processing and memory needed)

- Both Ground and Cloud Friendly (ground thrower/cloud catcher)