AVTCORE WG
IETF 121

Hybrid Meeting
November 4, 2024
Dublin, Ireland
09:30 - 11:30
Monday Session I

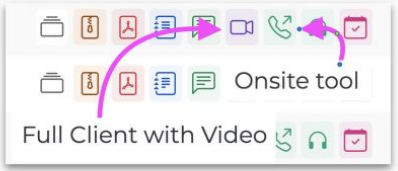
Mailing list: avtcore@ietf.org
Notes: https://notes.ietf.org/notes-ietf-121-avtcore
MeetEcho link: Meetecho (ietf.org)

This session is being recorded

IETF 121 Meeting Tips

In-person participants

- Make sure to sign into the session using the Meetecho (usually the “Meetecho lite” client) from the Datatracker agenda
- Use Meetecho to join the mic queue
- *Keep audio and video off if not using the onsite version*



Remote participants

- Make sure your audio and video are off unless you are chairing or presenting during a session
- Use of a headset is strongly recommended

This session is being recorded

IETF 121 Remote Meeting Tips

- Enter the queue with  , leave with 
- When you are called on, you need to enable your audio to be heard.
- Audio is enabled by unmuting  and disabled by muting 
- Video can also be enabled, but it is separate from audio.
- Video is encouraged to help comprehension but not required.

Resources for IETF 121

- Information about IETF 121
  https://www.ietf.org/how/meetings/121
- Agenda
  https://datatracker.ietf.org/meeting/agenda
- If you need technical assistance, see the Reporting Issues page:
  http://www.ietf.org/how/meetings/issues/

About this meeting

- Agenda: https://datatracker.ietf.org/doc/agenda-121-avtcore/
- Notes: https://notes.ietf.org/notes-ietf-121-avtcore
- WG Chairs
  - Remote: Bernard Aboba
  - Onsite: Jonathan Lennox
- Zulip Scribe: Jonathan Lennox
- Note takers: TBD

Note well

This is a reminder of IETF policies in effect on various topics such as patents or code of conduct. It is only meant to point you in the right direction. Exceptions may apply. The IETF's patent policy and the definition of an IETF "contribution" and "participation" are set forth in BCP 79; please read it carefully.

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Definitive information is in the documents listed below and other IETF BCPs. For advice, please talk to WG chairs or ADs:

- BCP 9 (Internet Standards Process)
- BCP 25 (Working Group processes)
- BCP 25 (Anti-Harassment Procedures)
- BCP 54 (Code of Conduct)
- BCP 78 (Copyright)
- BCP 79 (Patents, Participation)
- https://www.ietf.org/privacy-policy/(Privacy Policy)

Participant Obligations

- When starting a presentation you MUST say if:
  - There is IPR associated with your draft
- When asking questions or commenting on a draft:
  - You MUST disclose any IPR your employer controls relating to the technology under discussion
- RFC 6701 “Sanctions Available for application to Violators of IETF PR Policy”
  - Describes potential consequences of violating these policies.

Note really well

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- If you believe you have been harassed, notice that someone else is being harassed, or have any other concerns, you are encouraged to raise your concern in confidence with one of the Ombudspersons.

Draft Status

- Published
  - RFC 9071: was draft-ietf-avtcore-multi-party-rtt-mix
  - RFC 9134: was draft-ietf-payload-rtp-jpegxs
  - RFC 9328: was draft-ietf-avtcore-rtp-vvc
  - RFC 9335: was draft-ietf-avtcore-cryptex
  - RFC 9443: was draft-ietf-avtcore-rfc7983bis
  - RFC 9584: was draft-ietf-avtcore-rtp-evc
  - RFC 9607: was draft-ietf-avtcore-rtp-scip
- RFC Editor Queue
  - draft-ietf-avtext-lrr (AUTH48)
  - draft-ietf-payload-vp9 (AUTH48)
  - draft-ietf-avtext-framemarking (AUTH48)
  - draft-ietf-avtcore-rtp-payload-registry

Draft Status (cont'd)

- Completed WGLC (ended September 17, 2024)
  - draft-ietf-avtcore-rtp-j2k-scl (WGLC Summary)
- In WGLC (ended October 22, 2024)
  - draft-ietf-avtcore-rtcp-green-metadata
- Adopted
  - draft-ietf-avtcore-rtp-haptics
  - draft-ietf-avtcore-rtp-over-quic
  - draft-ietf-avtcore-hevc-webrtc
  - draft-ietf-avtcore-rtp-volumetric-media-roi (CFA summary)
- Expired
  - draft-ietf-avtcore-rtp-sframe

Action Items

1. draft-ietf-avtcore-rtcp-green-metadata
   a. Authors: *move this draft into the AVTCORE organization*
   b. Chairs: Summary of WGLC (ended October 22)
2. draft-ietf-avtcore-rtp-j2k-scl (completed WGLC)
   a. Chairs & authors: find a document shepard
3. draft-ietf-avtcore-rtp-v3c
   a. Authors: *move this draft into the AVTCORE organization*
   b. Chairs: start 2nd WGLC before IETF 121
4. draft-alvestrand-avtcore-abs-capture-time
   a. Participants: Comment in github
   b. Chairs: Call for adoption after IETF 121

AVTCORE GitHub Setup

- Organization created: https://github.com/ietf-wg-avtcore
- Recently adopted drafts can create or transfer repositories within the new hierarchy
  - Done:
    - draft-ietf-avtcore-rtp-haptics
    - draft-ietf-avtcore-rtp-j2k-scl
    - draft-ietf-avtcore-hevc-webrtc
  - Still to be transferred:
    - draft-ietf-avtcore-rtp-v3c
    - draft-ietf-avtcore-rtcp-green-metadata
    - draft-ietf-avtcore-rtp-sframe
    - draft-ietf-avtcore-rtp-volumetric-media-roi
- Once transferred, they should added to the “Activity this week” e-mail
  - A pull request against Mark Nottingham’s repo

Agenda

1. Preliminaries (Chairs, 15 min)
   Note Well, Note Takers, Agenda Bashing, Draft status, Action items
2. HEVC Profile for WebRTC (B. Aboba, 10 min)
   https://datatracker.ietf.org/doc/html/draft-ietf-avtcore-hevc-webrtc
3. RTP over QUIC (M. Engelbart, J. Ott, S. Dawkins, 15 min)
   https://datatracker.ietf.org/doc/html/draft-ietf-avtcore-rtp-over-quic
4. RTP Payload for V-DMC (H. Yang, 15 min)
   https://datatracker.ietf.org/doc/html/draft-hsyang-avtcore-rtp-vdmc
5. Absolute Capture Time RTP Header Extension (H. Alvestrand, 10 min)
   https://datatracker.ietf.org/doc/html/draft-alvestrand-avtcore-abs-capture-time
6. SDP Fingerprints for Raw Public Keys in (D)TLS (J. Lennox, 20 min)
   https://datatracker.ietf.org/doc/html/draft-lennox-sdp-raw-key-fingerprints
7. Wrapup and Next Steps (Chairs, 10 min)

H.265 Profile for WebRTC

draft-ietf-avtcore-hevc-webrtc

B. Aboba

P. Hancke

Start time: 09:45
End time: 09:55

For Discussion Today

- **Open Issues (https://github.com/ietf-wg-avtcore/draft-ietf-avtcore-hevc-webrtc/issues)**
  - **Issue 27: Clarify requirement of handling symmetric/asymmetric levels of HEVC Offer/Answer**
    - **Chrome bug tracker**
    - **SDP demo page**

Issue 27: Clarify requirement of handling symmetric/asymmetric levels of HEVC Offer/Answer

- RFC 7798, Section 7.2.2 (Offer/Answer Model)
  - “The parameters identifying a media format configuration for HEVC are profile-space, profile-id, tier-flag, **level-id**, interop-constraints, profile-compatibility-indicator, and tx-mode. These media configuration parameters, except level-id, MUST be used symmetrically when the answerer does not include recv-sub-layer-id in the answer for the media format (payload type) or the included recv-sub-layer-id is equal to sprop-sub-layer-id in the offer.”
  - Problems:
    - O/A will fail if the Offer/Answer don’t include compatible “media formats”.
      - level-id can be asymmetric. So why is it included in the “media format”? Is this an errata?

Issue 27: Clarify requirement (cont'd)

- RFC 7798, Section 7.2.2:
  - "The Answerer MUST:

    1) maintain all configuration parameters with the values remaining the same as in the offer for the media format (payload type), with the exception that the value of level-id is changeable **as long as the highest level indicated by the answer is not higher than that indicated by the offer;**"
- Comment:
  - Makes sense for sendonly/recvonly and recvonly/sendonly, but for sendrecv?
    - Why can't an Answerer indicate higher receive capability than an Offerer?
      - Offerer might be able to encode/send higher level-id than it can decode/receive

Issue 27: Clarify requirement (cont'd)

- With a fixed profile/tier, if the offerer is able to decode/encode up to level 3.1, and the answerer is able to decode/encode up to level 5.2, what level/levels should answer include for sendonly/sendrecv/recvonly?
- **sendrecv Offer**
  - Offer: 3.1 (maximum it can encode and decode)
    Answer: 3.1 (constrained by the Offer, 5.2 > 3.1)
  - Result: Offerer would send 3.1 to the Answerer, Answerer will send 3.1 to the Offerer.
- **sendonly Offer**
  - Offer: 3.1 (maximum it can encode)
    Answer: 3.1 (constrained by the Offer, 5.2 > 3.1)
  - Result: Offerer would send 3.1 to the Answerer.
- **recvonly Offer**
  - Offer: 3.1 (maximum it can decode)
    Answer: 3.1 (constrained by the Offer, 5.2 > 3.1)
  - Result: Answerer would send 3.1 to the Offerer.

Issue 27: Clarify requirement (cont'd)

- With a fixed profile/tier, if the offerer is able to decode/encode up to level 5.2, and the answerer is able to decode/encode up to level 3.1, what level/levels should answer include for sendonly/sendrecv/recvonly?
- **sendrecv Offer**
  - Offer: 5.2 (maximum it can encode and decode)
    Answer: 3.1 (maximum it can encode and decode)
  - Result: Offerer would send 3.1 to the Answerer, Answerer will send 3.1 to the Offerer.
- **sendonly Offer**
  - Offer: 5.2 (maximum it can encode)
    Answer: 3.1 (maximum it can decode)
  - Result: Offerer would send 3.1 to the Answerer.
- **recvonly Offer**
  - Offer: 5.2 (maximum it can decode)
    Answer: 3.1 (maximum it can encode)
  - Result: Answerer would send 3.1 to the Offerer.

Issue 27: Clarify requirement (cont'd)

- RFC 7798, Section 7.2.2 Table 1:

```
                                    sendonly --+
       answer: recvonly, recv-sub-layer-id --+  |
         recvonly w/o recv-sub-layer-id --+  |  |
  answer: sendrecv, recv-sub-layer-id --+  |  |  |
    sendrecv w/o recv-sub-layer-id --+  |  |  |  |
                                     |  |  |  |  |
  profile-id                         C  D  C  D  P
  tier-flag                          C  D  C  D  P
  level-id                           D  D  D  D  P
  tx-mode                            C  C  C  C  P
  max-recv-level-id                  R  R  R  R  -
Legend:
   C: configuration for sending and receiving bitstreams
   D: changeable configuration, same as C except possible
      to answer with a different but consistent value (see the
      semantics of the six parameters related to profile, tier,
      and level on these parameters being consistent)
   P: properties of the bitstream to be sent
   R: receiver capabilities
   O: operation point selection
   X: MUST NOT be present
   -: not usable, when present MUST be ignored
```

RTP over QUIC

https://datatracker.ietf.org/doc/html/draft-ietf-avtcore-rtp-over-quic

https://datatracker.ietf.org/doc/draft-dawkins-avtcore-sdp-rtp-quic/

https://datatracker.ietf.org/doc/draft-dawkins-avtcore-sdp-rtp-quic-issues/

Mathis Engelbart, Jörg Ott, Spencer Dawkins

Start time: 09:55

End time: 10:10

RTCP in RoQ (#226, #227, #229)

- Added considerations for sending RTCP over streams or datagrams
- Recommend to include IP, UDP and QUIC header size estimations in overhead when calculating overhead
  - New Appendix C: *Header overhead considerations* provides an example calculation for header overhead including QUIC packet and frame headers
- Queueing considerations for RTCP and implications on timestamps and RTT measurements: Applications need to be aware, that RTT measurements may differ from RTT measured by QUIC due to queueing in the QUIC stack
  - Added a hint for callback API to send RTCP packets without queueing

RoQ and Interop Tests (Details in Wiki)

Client \ Server	mengelbart/roq	bbc/gst-roq	Lorenzo
mengelbart/roq	1,2,3,4,5,6	1,2,3,4,5,6	2,4,6 *
bbc/gst-roq	1,2,3,4,5,6	1,2,3,4,5,6 ?	
Lorenzo	1,3,5 *		1,2,3,4,5,6

1. C-S Datagrams
2. S-C Datagrams
3. C-S Single RTP packet per stream
4. S-C Single RTP packet per stream
5. C-S Multiple RTP packets per stream
6. S-C Multiple RTP packets per stream

*: QUIC interop issue after key update

Next Steps

- Continue Interop tests
  - Add Lorenzo’s implementation to the interop section in the draft
  - Please let us know of any other implementation and if you want to participate or be listed in the draft
- SDP
  - Will actually be moving forward between now and IETF 122

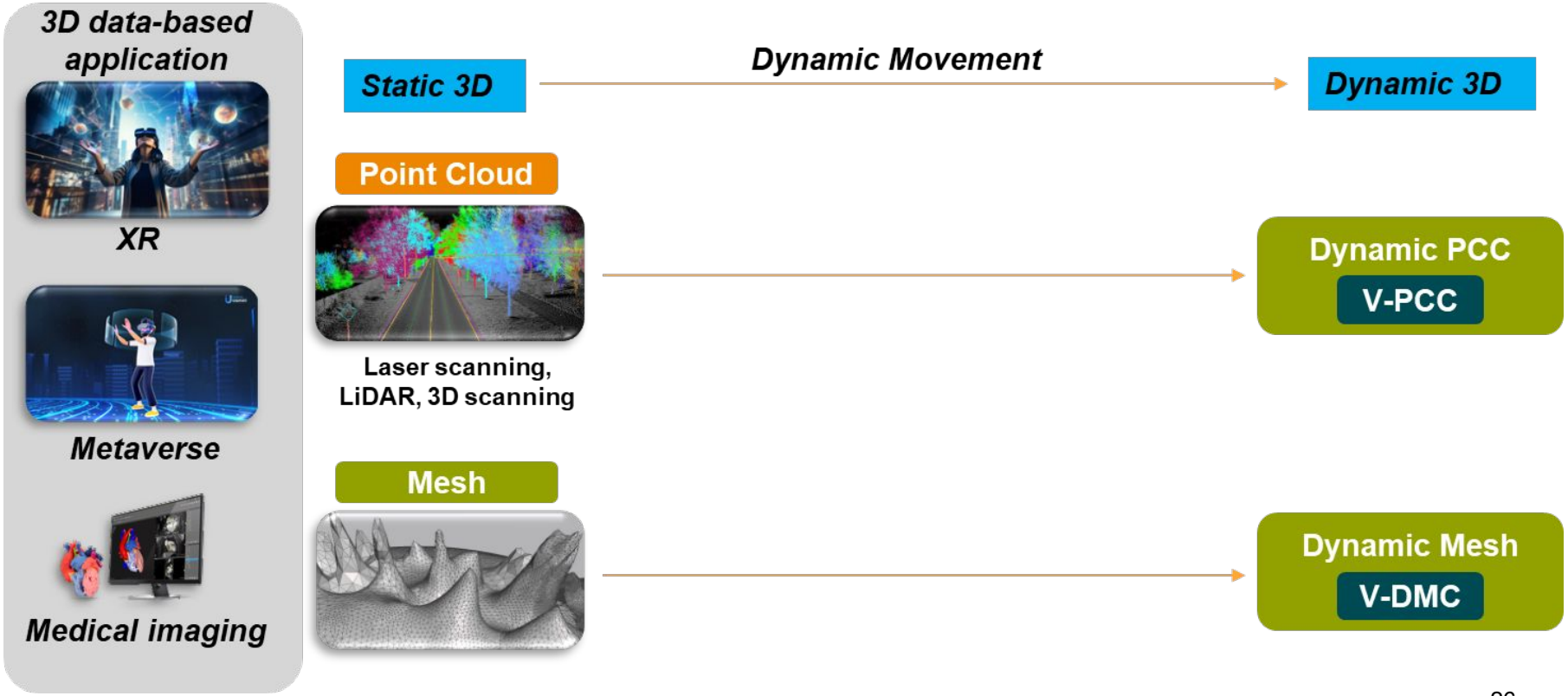
RTP Payload for V-DMC

https://datatracker.ietf.org/doc/html/draft-hsyang-avtcore-rtp-vdmc

H. Yang

Start time: 10:10
End time: 10:25

What is Video-based Dynamic Mesh Coding (V-DMC)?



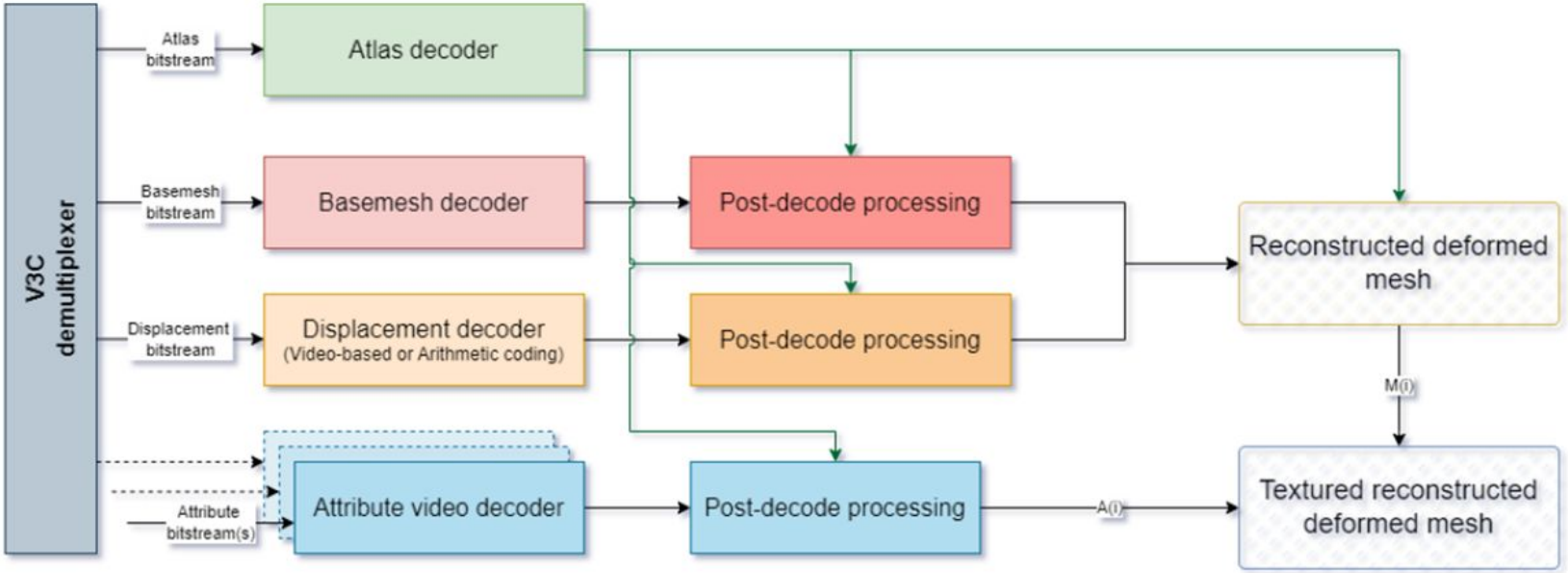
MPEG standard status

MPEG Standard

- ***Information technology — Coded representation of immersive media — Part 29: Video-based dynamic mesh coding (V-DMC) ISO 23090-29:2024(E) – Ongoing (DIS stage)***
  - ***MPEG standard ISO/IEC 23090-29CfP04-2022***
  - ***Project started 06-2022 and it planned for 36 months***
  - ***Planned finalization 2025***
- ***Extending V3C ISO/IEC 23090-5***

Overall architecture of V-DMC

- ***Overall decoding architecture***
  - ***Existing RTP Payload can be used for : Atlas, Attribute, Displacement (with video codec)***
  - ***New RTP payload is required for : Basemesh, Displacement (with Arithmetic coding)***

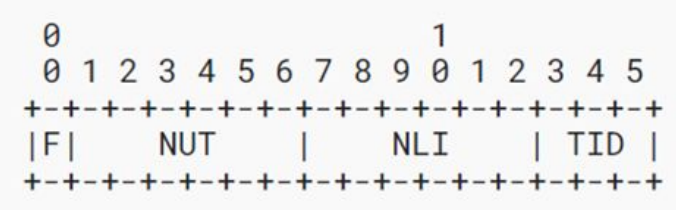


RTP Payload for V-DMC

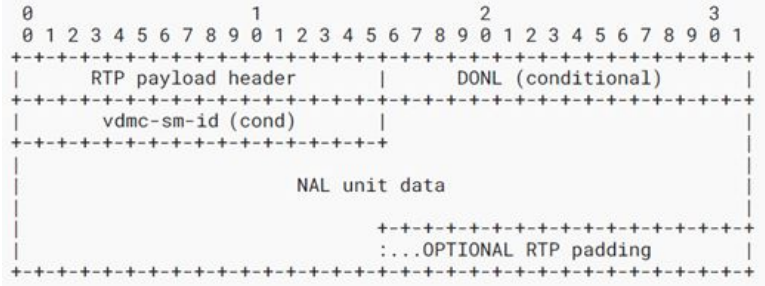
- ***Basemesh : RTP payload (which is defined in this draft)***
- ***Displacement :***
  - ***RTP payload (which is defined in this draft)***
  - ***RTP payload of specific codec (e.g., RTP Payload Format for H.264 Video / High Efficiency Video Coding)***
- ***Attribute : 2d video codec RTP Payload***
- ***Atlas : RTP payload for V3C atlas***

Proposal Overview

- ***Define RTP Payload format for Basemesh***
  - ***Define RTP payload header***



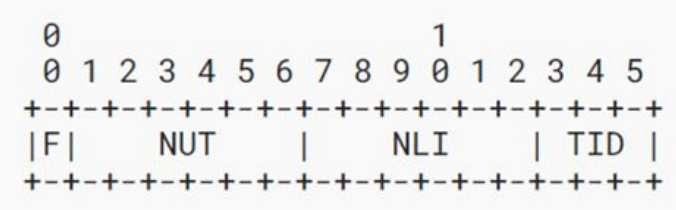
- ***Define Single NAL unit packet for Base Mesh***



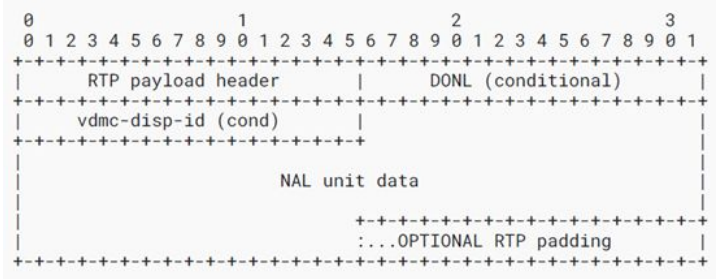
- F : bmesh_nal_forbidden_zero_bit MUST be equal to 0.
- NUT : bmesh_nal_unit_type specifies the type of the RBSP data structure contained in the NAL unit as specified in [ISO.IEC.23090-29]. In particular, the base mesh NAL unit types supported are specified in Table H-1 of [ISO.IEC.23090-29].
- NLI : bmesh_nal_layer_id specifies the identifier of the layer to which an BMCL NAL unit belongs or the identifier of a layer to which a non-BMCL NAL unit applies. The value of nal_layer_id shall be in the range of 0 to 62, inclusive.
- TID : bmesh_nal_temporal_id_plus1 minus 1 specifies a temporal identifier for the NAL unit. The value of nal_temporal_id_plus1 shall not be equal to 0.
- dmc-sm-id field, when present, specifies the 16-bit submesh identifier for the NAL unit, as signaled in bash mesh header defined in [ISO.IEC.23090-29].

Proposal Overview

- ***Define RTP Payload format for Displacement(AC-coding)***
  - ***Define RTP payload header***



- ***Define Single NAL unit packet for Displacement***



- F: displ_nal_forbidden_zero_bit MUST be equal to 0.
- NUT : displ_nal_unit_type specifies the type of the RBSP data structure contained in the NAL unit as specified in [ISO.IEC.23090-29]. In particular, the displacement NAL unit types supported are specified in Table J-1 of [ISO.IEC.23090-29].
- NLI : displ_nal_layer_id specifies the identifier of the layer to which an DCL NAL unit belongs or the identifier of a layer to which a non-DCL NAL unit applies. The value of displ_nal_layer_id shall be in the range of 0 to 62, inclusive.
- TID : displ_nal_temporal_id_plus1 minus 1 specifies a temporal identifier for the NAL unit. The value of nal_temporal_id_plus1 shall not be equal to 0.
- The vdmc-disp-id field, when present, specifies the 16-bit displacement identifier for the NAL unit, as signaled in displacement header defined in [ISO.IEC.23090-29].

Proposal Overview

- ***Media type registration for Basemesh***
  - Type name: application
  - Subtype name: mpgbm
  - Required parameters : N/A

- ***Optional parameters definition***

  Optional parameters: sprop-v3c-unit-header, sprop-v3c-unit-type, sprop-v3c-vps-id, sprop-v3catlas-id, sprop-v3c-attr-idx, sprop-v3c-attr-part-idx, sprop-v3c-map-idx, sprop-v3c-aux-video-flag, sprop-max-don-diff, sprop-v3c-parameter-set, v3c-ptl-level-idc, v3c-ptl-tier-flag, v3c-ptl-codec-idc, v3c-ptl-toolset-idc, v3c-ptl-rec-idc, disp-seq-set, disp-codec, disp-level-idc, disp-tier-flag, dispcodec-idc, disp-toolset-idc, disp-level-idc,vdmc-mdu-sub-idc, vdmc-afmi-sub-idc, vdmc-lod.

Proposal Overview

- *The media name in the "m=" line of SDP MUST be application.*
- *The encoding name in the "a=rtpmap" line of SDP MUST be mpgbm*
- *The clock rate in the "a=rtpmap" line may be any sampling rate, typically 90000.*
- *The OPTIONAL parameters (defined in section 6.2), when present, MUST be included in the "a=fmtp" line of SDP. This is expressed as a media type string, in the form of a semicolon-separated list of parameter=value pairs.*

- ***An example of media representation corresponding to the vdmc RTP payload in SDP is as follows:***
  - *m=application 49170 RTP/AVP 98*
  - *a=rtpmap:98 MPGBM/90000*
  - *a=fmtp:98 sprop-vdmc-sm-id=0,1*
  - *a=v3cfmtp:sprop-v3c-unit-header=GAAAAA==;*

Next step

- *Making the MPEG specifications 23090-29 available for reviewers*
- *Suggestions and feedback are welcome*
- *We are looking for people interested in reviewing or participating in the draft*

Absolute Capture Timestamp RTP Header Extension

draft-alvestrand-avtcore-abs-capture-time

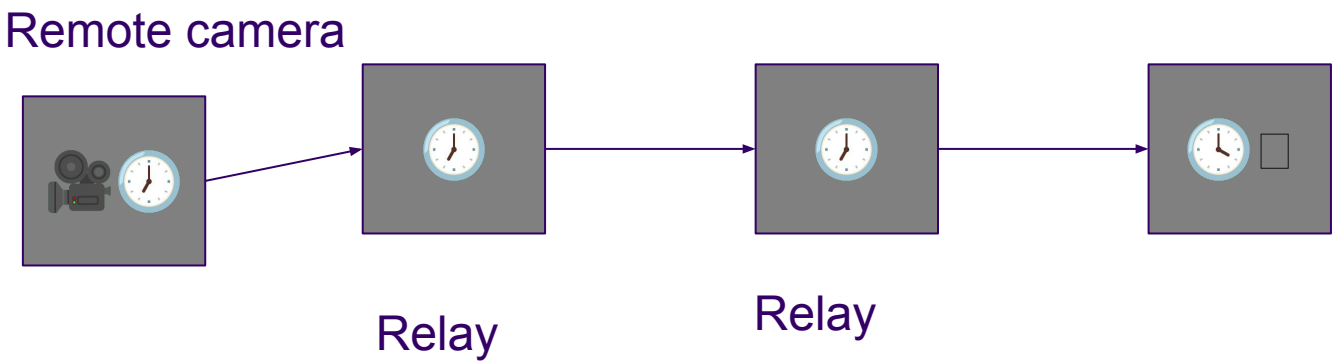
Harald Alvestrand

Start time: 10:25
End time: 10:35

Problem to be solved

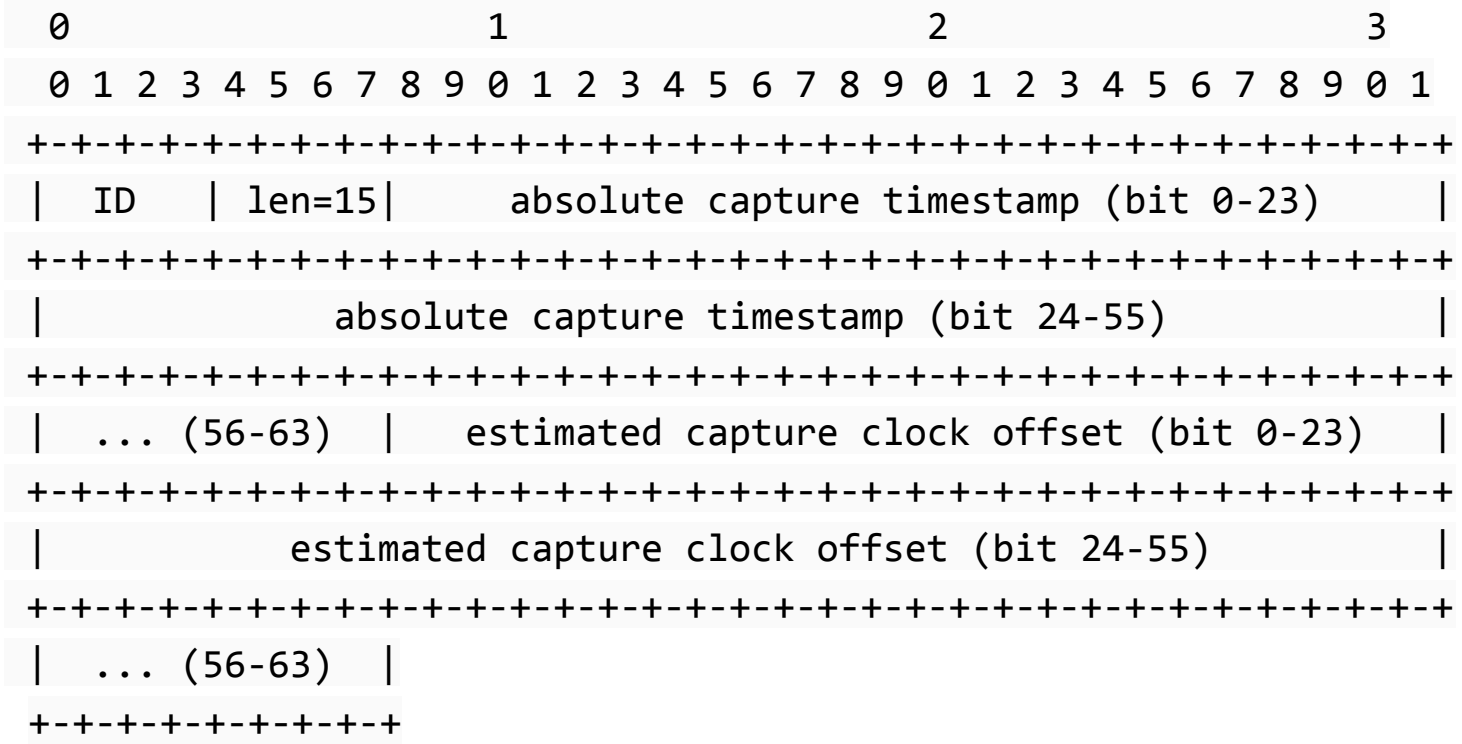
- How does the displaying system know the time at which a frame was captured?
  - The clocks may be out of sync
  - There may be delay before sending the media
  - There may be network delays
  - There may be multiple hops in the path
- Solution proposed: Abs-capture-timestamp
  - draft-alvestrand-avtcore-abs-capture-time

Designed for multihop systems



Each element terminates the RTP session.
Each element can estimate delay and clock skew for one hop.
No element has the full picture.

Abs-capture-timestamp!



Each hop updates the “clock offset” to its own estimate.

Present and imagined usage

- A/V sync (millicast, google)
- Statistics on end-to-end delay (google)
- Multi-source synchronization (multiple mikes in same room)

Issues already raised

- Need to mention how Y2032 wrap is handled
- Need to describe how stored media is handled

So far, no changes suggested.

Ready for adoption?

SDP Fingerprints for Raw Public Keys in (D)TLS

https://datatracker.ietf.org/doc/html/draft-lennox-sdp-raw-key-fingerprints

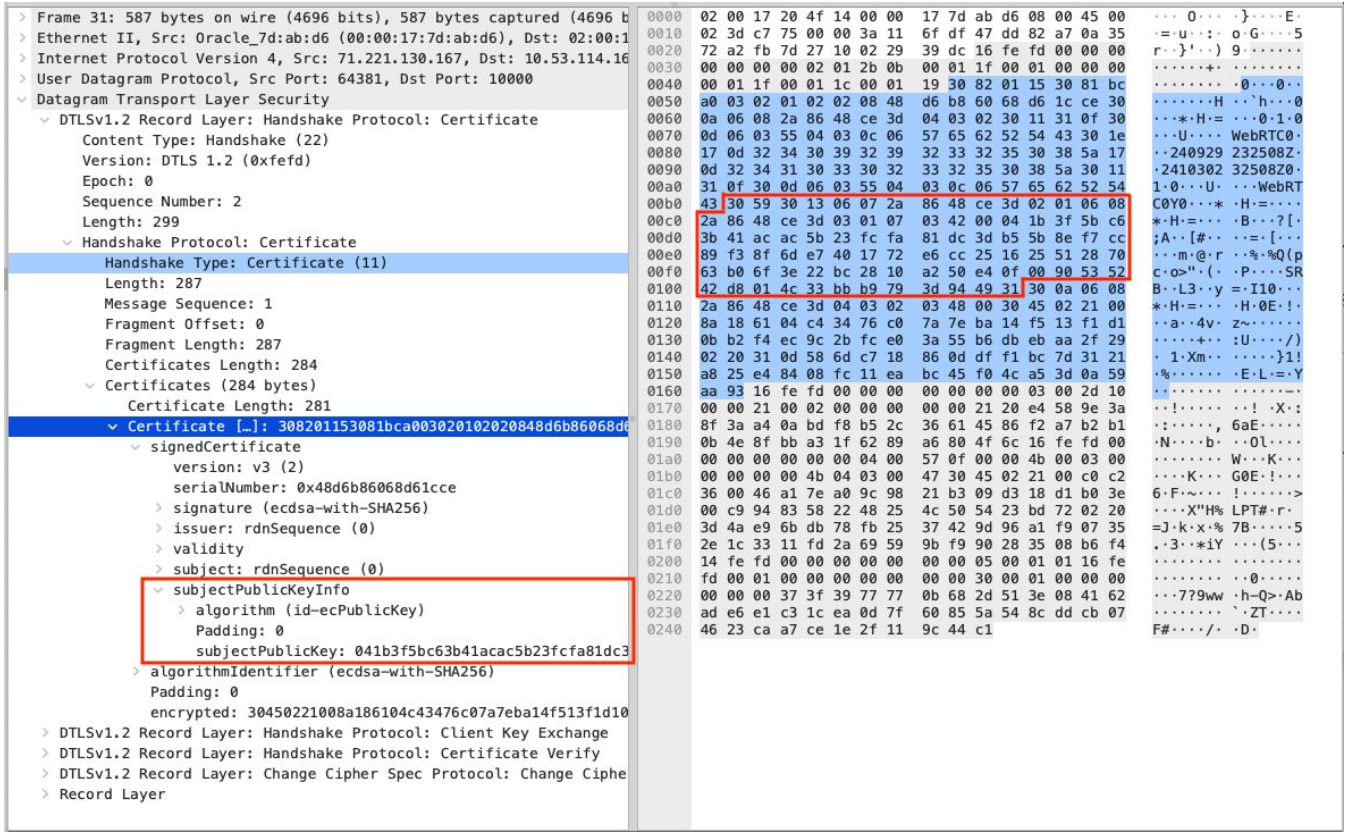
Jonathan Lennox

Start time: 10:35
End time: 10:55

Self-signed certs waste space

- In TLS/DTLS negotiated using SDP (e.g. notably DTLS/SRTP), we use self-signed certificates, verified using fingerprints
- Self-signing a cert doesn't give any new information
- We also ignore all the "subject" and "issuer" metadata
- Only useful information in the cert is the subjectPublicKeyInfo
- This is somewhat of a waste of space today; when we transition to post-quantum it will be terrible

DTLS cert from recent Chrome



RFC 7250 Solves This

- RFC 7250 was written to solve this problem
  - “Using Raw Public Keys in Transport Layer Security (TLS) and Datagram Transport Layer Security (DTLS)”
- Need to negotiate it in SDP

SDP Attributes

- Offerer: offers both old and new fingerprints

```
a=fingerprint:SHA-256 \
   E3:B0:C4:42:98:FC:1C:14:9A:FB:F4:C8:99:6F:B9:24:27:AE:41:E4:64:9B:93:4C:A4:95:99:1B:78:52:B8:55
a=raw-key-fingerprint:SHA-256 \
   A5:91:A6:D4:0B:F4:20:40:4A:01:17:33:CF:B7:B1:90:D6:2C:65:BF:0B:CD:A3:2B:57:B2:77:D9:AD:9F:14:6E
```

- Answerer: can reply with just raw key fingerprint

```
a=raw-key-fingerprint:SHA-256 \
55:9A:EA:D0:82:64:D5:79:5D:39:09:71:8C:DD:05:AB:D4:95:72:E8:4F:E5:55:90:EE:F3:1A:88:A0:8F:DF:FD
```

TLS Procedures

- TLS/DTLS client sends ClientCertTypeExtension and ServerCertTypeExtension lists including RawPublicKey.
  - May also include X509
- TLS/DTLS Server responds with CertTypeExtensions of RawPublicKey
  - Note: these extensions are lists from the client, single values from the server
- Both ends, when they receive a raw key, compare it to the a=raw-key-fingerprint they received in SDP

Alternative attribute spelling

- Could also define the attribute as

```
a=fingerprint:raw-key-SHA-256 \
  55:9A:EA:D0:82:64:D5:79:5D:39:09:71:8C:DD:05:AB:D4:95:72:E8:4F:E5:55:90:EE:F3:1A:88:A0:8F:DF:FD
```

- This would let us re-use existing specifications and code that use the fingerprint
- But it makes the IANA registry somewhat more complicated, and is arguably ugly
- To be determined wherever this gets standardized

Where to do this?

- MMUSIC is being closed down
- Not clear that it's in charter for any other WGs

Wrapup and Next Steps

- Action Items
- Next Steps (authors)

Start time: 10:55
End time: 11:10

Thank you

Special thanks to:

The Secretariat, WG Participants & ADs