

WebRTC Video Processing and Codec Requirements
draft-ietf-rtcweb-video-00

Abstract

This specification provides the requirements and consideration for WebRTC applications to send and receive video across a network. It specifies the video processing that is required, codecs and their parameters, and types of RTP packetization that need to be supported.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of [BCP 78](#) and [BCP 79](#).

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at <http://datatracker.ietf.org/drafts/current/>.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on January 02, 2015.

Copyright Notice

Copyright (c) 2014 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to [BCP 78](#) and the IETF Trust's Legal Provisions Relating to IETF Documents (<http://trustee.ietf.org/license-info>) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Simplified BSD License text as described in [Section 4.e](#) of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

Table of Contents

1. Introduction	2
2. Terminology	2
3. Pre and Post Processing	2
3.1. Camera Source Video	3
3.2. Screen Source Video	3
4. Codec Considerations	3
4.1. VP8	3
4.2. H.264	3
4.3. VP9	4
4.4. H.265	4
5. Dealing with Packet Loss	4
6. Mandatory to Implement Video Codec	4
6.1. Temperature of Working Group	4
7. Security Considerations	5
8. IANA Considerations	5
9. Acknowledgements	6
10. References	6
10.1. Normative References	6
10.2. Informative References	7
Author's Address	7

1. Introduction

One of the major functions of WebRTC endpoints is the ability to send and receive interactive video. The video might come from a camera, a screen recording, a stored file, or some other source. This specification defines how the video is used and discusses special considerations for processing the video. It also covers the video-related algorithms WebRTC devices need to support.

2. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [[RFC2119](#)].

3. Pre and Post Processing

This section provides guidance on pre- or post-processing of video streams.

Unless specified otherwise by the SDP or Codec, the color space SHOULD be TBD.

TODO: What color space is our default?

3.1. Camera Source Video

To support a quality experience with no application level adjustment from the Javascript running in the browsers, WebRTC endpoints are REQUIRED to support:

- o Automatic focus, if applicable for the camera in use
- o Automatic white balance
- o Automatic light level control

TODO: What other processing should be specified here?

3.2. Screen Source Video

If the video source is some portion of a computer screen (e.g., desktop or application sharing), then the considerations in this section also apply.

TODO: What do we need to specify here?

4. Codec Considerations

WebRTC endpoints are not required to support all the codecs in this section.

However, to foster interoperability between endpoints that have codecs in common, if they do support one of the listed codecs, then they need to meet the requirements specified in the subsection for that codec.

All codecs MUST support at least 10 frames per second (fps) and SHOULD support 30 fps. All codecs MUST support a minimum resolution of 320X240.

TODO: These are strawman values. Are they adequate?

4.1. VP8

If VP8, defined in [\[RFC6386\]](#), is supported, then the endpoint MUST support the payload formats defined in [\[I-D.ietf-payload-vp8\]](#). In addition it MUST support the 'bilinear' and 'none' reconstruction filters.

4.2. H.264

If [H264] is supported, then the device MUST support the payload formats defined in [RFC6184]. In addition, they MUST support Constrained Baseline Profile Level 1.2, and they SHOULD support H.264 Constrained High Profile Level 1.3.

TODO: What packetization modes MUST be supported?

4.3. VP9

If VP9, as defined in [I-D.grange-vp9-bitstream], is supported, then the device MUST support the payload formats defined in TODO.

TODO: The grange-vp9-bitstream draft does not really specify VP9 at all, is there a better reference?

4.4. H.265

If [H265] is supported, then the device MUST support the payload formats defined in [I-D.ietf-payload-rtp-h265].

5. Dealing with Packet Loss

This section provides recommendations on how to encode video to be robust to packet loss.

TODO: What do we want to require in terms of FEC, RTX, interleaving, etc?

6. Mandatory to Implement Video Codec

Note: This section is here purely as a placeholder and there is not yet WG Consensus on Mandatory to Implement video codecs. The WG has agreed not to discuss this topic until September 29, 2014 so that the WG can focus on getting other work done. Please, save your comments on this topic until that time.

The currently recorded working group consensus is that all implementations MUST support a single, specified mandatory-to-implement codec. The remaining decision point is a selection of this single codec.

6.1. Temperature of Working Group

To capture the conversation so far, this section summarizes the result of a straw poll that the working group undertook in December 2013 and January 2014. Respondants were asked to answer "Yes," "Acceptable," or "No" for each option. The options were collected from the working group at large prior to the initiation of the straw poll.

	Yes	Acc	No
	---	---	---
1. All entities MUST support H.264	48%	11%	41%
2. All entities MUST support VP8	41%	17%	42%
3. All entities MUST support both H.264 and VP8	9%	38%	53%
4. Browsers MUST support both H.264 and VP8, other entities MUST support at least one of H.264 and VP8	11%	34%	55%
5. All entities MUST support at least one of H.264 and VP8	10%	16%	74%
6. All entities MUST support H.261	5%	23%	72%
7. There is no MTI video codec	12%	30%	58%
8. All entities MUST support H.261 and all entities MUST support at least one of H.264 and VP8	4%	28%	68%
9. All entities MUST support Theora	7%	26%	67%
10. All entities MUST implement at least two of {VP8, H.264, H.261}	5%	30%	65%
11. All entities MUST implement at least two of {VP8, H.264, H.263}	5%	25%	70%
12. All entities MUST support decoding using both H.264 and VP8, and MUST support encoding using at least one of H.264 or VP8	7%	20%	73%
13. All entities MUST support H.263	6%	19%	75%
14. All entities MUST implement at least two of {VP8, H.264, Theora}	6%	27%	67%
15. All entities MUST support decoding using Theora	1%	15%	84%
16. All entities MUST support Motion JPEG	1%	25%	74%

7. Security Considerations

This specification does not introduce any new mechanisms or security concerns beyond what the other documents it references. In WebRTC, video is protected using DTLS/SRTP. A complete discussion of the security can be found in [\[I-D.ietf-rtcweb-security\]](#) and [\[I-D.ietf-rtcweb-security-arch\]](#). Implementers should consider whether the use of variable bit rate video codecs are appropriate for their application based on [\[RFC6562\]](#).

8. IANA Considerations

This document requires no actions from IANA.

9. Acknowledgements

The authors would like to thank <GET YOUR NAME HERE - PLEASE SEND COMMENTS>. Thanks to Cullen Jennings for providing text and review. This draft includes text from [draft-cbran-rtcweb-codec](#).

10. References

10.1. Normative References

- [H264] ITU-T Recommendation H.264, "Advanced video coding for generic audiovisual services", April 2013.
- [H265] ITU-T Recommendation H.265, "High efficiency video coding", April 2013.
- [I-D.grange-vp9-bitstream]
Grange, A. and H. Alvestrand, "A VP9 Bitstream Overview", [draft-grange-vp9-bitstream-00](#) (work in progress), February 2013.
- [I-D.ietf-payload-rtp-h265]
Wang, Y., Sanchez, Y., Schierl, T., Wenger, S., and M. Hannuksela, "RTP Payload Format for High Efficiency Video Coding", [draft-ietf-payload-rtp-h265-04](#) (work in progress), May 2014.
- [I-D.ietf-payload-vp8]
Westin, P., Lundin, H., Glover, M., Uberti, J., and F. Galligan, "RTP Payload Format for VP8 Video", [draft-ietf-payload-vp8-11](#) (work in progress), February 2014.
- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC4175] Gharai, L. and C. Perkins, "RTP Payload Format for Uncompressed Video", [RFC 4175](#), September 2005.
- [RFC4421] Perkins, C., "RTP Payload Format for Uncompressed Video: Additional Colour Sampling Modes", [RFC 4421](#), February 2006.
- [RFC6184] Wang, Y.-K., Even, R., Kristensen, T., and R. Jesup, "RTP Payload Format for H.264 Video", [RFC 6184](#), May 2011.

- [RFC6386] Bankoski, J., Koleszar, J., Quillio, L., Salonen, J., Wilkins, P., and Y. Xu, "VP8 Data Format and Decoding Guide", [RFC 6386](#), November 2011.
- [RFC6562] Perkins, C. and JM. Valin, "Guidelines for the Use of Variable Bit Rate Audio with Secure RTP", [RFC 6562](#), March 2012.

10.2. Informative References

- [I-D.ietf-rtcweb-security-arch]
Rescorla, E., "WebRTC Security Architecture", [draft-ietf-rtcweb-security-arch-09](#) (work in progress), February 2014.
- [I-D.ietf-rtcweb-security]
Rescorla, E., "Security Considerations for WebRTC", [draft-ietf-rtcweb-security-06](#) (work in progress), January 2014.

Author's Address

Adam Roach
Mozilla
\
Dallas
US

Phone: +1 650 903 0800 x863
Email: adam@nostrum.com