

RTP Payload Format for Uncompressed Video: Additional Colour Sampling Modes

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Abstract

The RFC Payload Format for Uncompressed Video, RFC 4175, defines a scheme to packetise uncompressed, studio-quality, video streams for transport using RTP. This memo extends the format to support additional colour sampling modes.

1. Introduction

The RTP Payload Format for Uncompressed Video [1] defines a scheme to packetise uncompressed, studio-quality, video streams for transport using RTP [2]. A range of standard and high-definition video formats is supported, and parameters are defined so sender and receiver can negotiate the image size, colour space, pixel depth, and colour sampling mode.

A limitation of the signalling is that the number of bits per sample is assumed to be the same for each colour component. For example, it is possible to signal video using RGB colour sampling with 8 bits for each of the Red, Green, and Blue components (24 bits per pixel), but not video using RGB colour sampling with 5 bits each for the Red and Blue components, but 6 bits for the Green component (16 bits per pixel). Such video formats can easily be transported by the payload format, but cannot be signalled using the parameters defined. This memo extends [1] with additional colour sampling modes, to signal such video formats.

2. Conventions Used in this Document

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 RFC 2119 [3].

3. Payload Format Parameters

This memo defines six new colour sampling modes that MAY be signalled for use with [1]. The new modes are "RGB+", "RG+B", "R+GB", "BGR+", "BG+R", and "B+GR". These sampling modes use the same packing order of samples as do the RGB and BGR colour sampling modes, respectively (Section 4.3 of [1]), except that an additional bit per sample of colour depth MUST be used for the component marked by the + symbol. The mandatory parameter "depth=N" indicates that N bits per sample are used by the unmarked components, but N+1 bits are used by the marked component. All other features of the payload format are as defined in [1].

The primary use of these colour sampling modes is to enable efficient packing of data into small pixel groups ("pgroups"). The most common use case is expected to be video with "depth=5", where the additional bit of colour depth for the marked component enables a single pixel to fit into two octets without padding. The new colour sampling modes MAY be used for other depths, however, should that prove useful.

4. Example

A common uncompressed video format is RGB with 5 bits for the Red and Blue components and 6 bits for the Green component, for a total of 16 bits per pixel. Using the sampling modes defined in this memo, this can be signalled in Session Description Protocol (SDP) according to the following example:

```
v=0
o=jdoe 2890844526 2890842807 IN IP4 192.0.2.5
s=-
c=IN IP4 192.0.2.6
t=2873397496 2873404696
m=video 51372 RTP/AVP 99
a=rtpmap:99 raw/90000
a=fmtp:99 sampling=RG+B; width=1024; height=768; depth=5;
    colorimetry=SMPTE240M
```

The last line has been wrapped due to formatting constraints of this memo, and forms one complete line in the SDP file.

5. Security Considerations

The security considerations of [1] apply. No additional security considerations are introduced by support for new colour sampling modes.

6. IANA Considerations

The video/raw media type is extended with six new values for the "sampling" parameter according to the rules defined in Section 6.2 of [1]. The new values are "RGB+", "RG+B", "R+GB", "BGR+", "BG+R", and "B+GR" as described in this memo.

7. Acknowledgements

Thanks to Jeremy Searle and Andrew Lee at Westland Helicopters.

8. Normative References

- [1] Gharai, L. and C. Perkins, "RTP Payload Format for Uncompressed Video", RFC 4175, September 2005.
- [2] Schulzrinne, H., Casner, S., Frederick, R., and V. Jacobson, "RTP: A Transport Protocol for Real-Time Applications", STD 64, RFC 3550, July 2003.
- [3] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

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