

RTP Payload Format for Uncompressed Video:
Additional Colour Sampling Modes

Status of This Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

Copyright Notice

Copyright (C) The Internet Society (2006).

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.

Author's Address

Colin Perkins
University of Glasgow
Department of Computing Science
17 Lilybank Gardens
Glasgow G12 8QQ
UK

EMail: csp@csperkins.org

Full Copyright Statement

Copyright (C) The Internet Society (2006).

This document is subject to the rights, licenses and restrictions contained in BCP 78, and except as set forth therein, the authors retain all their rights.

This document and the information contained herein are provided on an "AS IS" basis and THE CONTRIBUTOR, THE ORGANIZATION HE/SHE REPRESENTS OR IS SPONSORED BY (IF ANY), THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIM ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Intellectual Property

The IETF takes no position regarding the validity or scope of any Intellectual Property Rights or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; nor does it represent that it has made any independent effort to identify any such rights. Information on the procedures with respect to rights in RFC documents can be found in BCP 78 and BCP 79.

Copies of IPR disclosures made to the IETF Secretariat and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementers or users of this specification can be obtained from the IETF on-line IPR repository at <http://www.ietf.org/ipr>.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights that may cover technology that may be required to implement this standard. Please address the information to the IETF at ietf-ipr@ietf.org.

Acknowledgement

Funding for the RFC Editor function is provided by the IETF Administrative Support Activity (IASA).

