

Network Working Group
Request for Comments: 3802
Obsoletes: [2422](#)
Category: Standards Track

G. Vaudreuil
Lucent Technologies
G. Parsons
Nortel Networks
June 2004

Toll Quality Voice - 32 kbit/s Adaptive Differential Pulse Code
Modulation (ADPCM) MIME Sub-type Registration

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 (2004).

Abstract

This document describes the registration of the MIME sub-type audio/32KADPCM Adaptive Differential Pulse Code Modulation for toll quality audio. This audio encoding is defined by the ITU-T in Recommendation G.726.

1. Introduction

This document describes the registration of the MIME sub-type audio/32KADPCM for toll quality audio. This audio encoding is defined by the ITU-T in Recommendation G.726. This document obsoletes an earlier sub-type registration contained in [RFC 1911](#). This document also obsoletes [RFC 2422](#).

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 [\[REQ\]](#).

2. ITU-T Definition

Recommendation G.726 [G726] defines the characteristics that are recommended for the conversion of a 64 kbit/s A-law or m-law pulse code modulation (PCM) channel at 8000 samples/second to and from a 40, 32, 24 or 16 kbit/s channel. The conversion is applied to the PCM bit stream using an adaptive differential pulse code modulation (ADPCM) transcoding technique. This Recommendation obsoletes G.721 which only defined the 32 kbit/s characteristics.

Recommendation G.726 was prepared by Study Group 15 of the Telecommunications Standardization Sector of the International Telecommunication Union (ITU-T) and was approved under the ITU's Resolution No. 2 procedure on the 14 of December 1990.

3. MIME Definition

3.1. audio/32KADPCM

CCITT Recommendation G.726 [G726] describes the algorithm recommended for conversion of a 64 kbit/s A-law or u-law PCM channel to and from a 32 kbit/s channel (this is the same algorithm as described in the deprecated G.721). The conversion is applied to the PCM stream using an Adaptive Differential Pulse Code Modulation (ADPCM) transcoding technique.

The MIME sub-type audio/32KADPCM is defined to hold binary audio data encoded in 32 kbit/s ADPCM exactly as defined by ITU-T Recommendation G.726. No header information shall be included as part of the audio data. The content transfer encoding is typically either binary or base64.

An additional consideration that this document defines for clarity is the choice of little endian ordering of the four bit code words. This default ordering is defined in ITU-T Recommendation X.420 [X420] for the equivalent X.400 body part, but is also detailed below in the IANA Registration.

3.2. VPIM Usage

The audio/32KADPCM sub-type is a primary component of the VPIM specification [VPIM]. In this context, the Content-Description and Content-Disposition headers are used to succinctly describe the contents of the audio body. As well, only the little endian bit ordering is valid. Refer to the VPIM Specification for proper usage.

4. IANA Registration

To: ietf-types@iana.org
Subject: Registration of MIME media type audio/32KADPCM

MIME media type name: audio

MIME subtype name: 32KADPCM

Required parameters: none

Optional parameters: none

Encoding considerations:

Binary or Base-64 generally preferred

Security considerations:

There are no known security risks with the sending or playing of raw audio data. Audio data is typically interpreted only by an audio codec. Unintended information introduced into the data stream will result in noise.

Interoperability considerations:

The four bit code word ordering within a byte may differ between existing implementations of G.726 codecs. Since this content only permits the little endian ordering, codecs that support the opposite ordering must reorder the code words before storing to or retrieving from this content type.

Published specification:

ITU-T G.726 with little endian ordering

Applications which use this media type:

Primarily voice messaging

Additional information:

Magic number(s): ? File extension(s): .726 Macintosh File Type
Code(s): APCM

Little Endian Ordering:

The 4-bit code words of the G.726 encoding MUST be packed into octets/bytes as follows: the first code word (A) is placed in the four least significant bits of the first octet, with the least significant bit (LSB) of the code word (A0) in the least significant bit of the octet; the second code word (B) is placed in the four most significant bits of the first octet, with the most significant bit (MSB) of the code word (B3) in the most significant bit of the octet. Subsequent pairs of the code words shall be packed in the same way into successive octets, with the first code word of each pair placed in the least significant four bits of the octet. It is preferred that the voice sample be extended with silence such that the encoded value comprises an even number of code words. However, if the voice sample comprises an odd number of code words, then the last code word shall be discarded.

```

+---+---+---+---+---+---+---+
| B3 | B2 | B1 | B0 | A3 | A2 | A1 | A0 |
+---+---+---+---+---+---+---+
MSB -> | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |   <- LSB
+---+---+---+---+---+---+---+

```

32K ADPCM / Octet Mapping

Person & email address to contact for further information:

Glenn W. Parsons gparsons@NortelNetworks.com

Gregory M. Vaudreuil GregV@ieee.org

Intended usage: COMMON

Author/Change controller:

Glenn W. Parsons & Gregory M. Vaudreuil

5. Security Considerations

There are no known security risks with the sending or playing of raw audio data. Audio data is typically interpreted only by an audio codec. Unintended information introduced into the data stream will result in noise.

6. References

6.1. Normative References

- [G726] CCITT Recommendation G.726 (1990), General Aspects of Digital Transmission Systems, Terminal Equipment - 40, 32, 24,16 kbit/s Adaptive Differential Pulse Code Modulation (ADPCM).
- [VPIM2R2] Vaudreuil, G., and G. Parsons, "Voice Profile for Internet Mail - version 2 (VPIMv2)", [RFC 3801](#), June 2004.
- [REQ] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.

6.2. Informative References

- [RFC 3023] Murata, M., St. Laurent, S. and D. Kohn, "XML Media Types", [RFC 3023](#), January 2001.
- [VPIM1] Vaudreuil, G., "Voice Profile for Internet Mail", [RFC 1911](#), February 1996.
- [VPIM2] Vaudreuil, G., and G. Parsons, "Voice Profile for Internet Mail - version 2", [RFC 2421](#), September 1998.
- [X420] ITU-T Recommendation X.420 (1996) - ISO/IEC 10021-7:1996, Message handling systems: Interpersonal messaging.

7. Changes from [RFC 2422](#)

Only editorial and boilerplate changes from [RFC 2422](#) have been made to this document.

8. Authors' Addresses

Gregory M. Vaudreuil
Lucent Technologies
7291 Williamson Rd
Dallas, TX 75214
United States

E-Mail: gregv@ieee.org

Glenn W. Parsons
Nortel Networks
P.O. Box 3511, Station C
Ottawa, ON K1Y 4H7
Canada

Phone: +1-613-763-7582
Fax: +1-613-763-2697
E-Mail: gparsons@nortelnetworks.com

9. Full Copyright Statement

Copyright (C) The Internet Society (2004). 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 currently provided by the Internet Society.