

Network Working Group  
Request for Comments: 2422  
Obsoletes: 1911  
Category: Standards Track

G. Vaudreuil  
Lucent Technologies  
G. Parsons  
Northern Telecom  
September 1998

## Toll Quality Voice - 32 kbit/s 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 (1998). All Rights Reserved.

### Overview

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.

### 1. Abstract

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 refines an earlier sub-type registration in RFC 1911.

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  
Glenn.Parsons@Nortel.ca

Gregory M. Vaudreuil  
GregV@Lucent.Com

Intended usage: COMMON

Author/Change controller:

Glenn W. Parsons & Gregory M. Vaudreuil

## 5. Authors' Addresses

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

Phone: +1-613-763-7582  
Fax: +1-613-763-4461  
EMail: Glenn.Parsons@Nortel.ca

Gregory M. Vaudreuil  
Lucent Technologies  
17080 Dallas Parkway  
Dallas, TX 75248-1905  
United States

Phone/Fax: +1-972-733-2722  
EMail:GregV@Lucent.Com

## 6. 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).
- [MIME4] Freed, N., Klensin, J., and J. Postel, "Multipurpose Internet Mail Extensions (MIME) Part Four: Registration Procedures", RFC 2048, November 1996.
- [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.
- [REQ] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

## 7. Full Copyright Statement

Copyright (C) The Internet Society (1998). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the Internet Society or other Internet organizations, except as needed for the purpose of developing Internet standards in which case the procedures for copyrights defined in the Internet Standards process must be followed, or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by the Internet Society or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIMS 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."

