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OF ITU

Amendment 1
X.440
(11/95)

DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

MESSAGE HANDLING SYSTEMS

MESSAGE HANDLING SYSTEMS: VOICE MESSAGING SYSTEM

ANNEX H: MAPPING OF G.721 (1988) AND G.728 (1992) INTO THE DATA COMPONENT OF A VOICE BODY PART

Amendment 1 to
ITU-T Recommendation X.440

(Previously "CCITT Recommendation")

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

Amendment 1 to ITU-T Recommendation X.440, was prepared by ITU-T Study Group 7 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 21st of November 1995.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

ITU-T X-SERIES RECOMMENDATIONS

DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

(February 1994)

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ABSTRACT

This amendment contains the proposed technical revisions to Recommendation X.440 (1992) that:

1) Resolve the "For further study" item contained in Recommendation X.440 (1992) by specifying a mapping between the 4-bit per word encoding of 32 kbit/s ADPCM as defined in G.721 (1988) and X.440's 8-bit per word encoding of OCTETS. It also specifies rules for mapping G.728's 16 kbit/s LD-CELP 10-bit per word encoding onto X.440's 8-bit per word encoding.

2) Officially integrate the resolved defect report changes contained in the MHS Implementors Guide version 12.

MESSAGE HANDLING SYSTEMS: VOICE MESSAGING SYSTEM

1 Add the following sentence to the end of 8.2.1:

This Recommendation identifies two encoding for voice object. Annex H provides guidelines for mapping these encodings, 32K ADPCM and 16K LDCLP, onto MHS protocol. It is provided to assist developers in creating a consistent way of mapping between the two environments.

2 Renumber the existing "Annex H" as "Annex I"

3 Insert the following text as a new "Annex H"

Annex H

(to Recommendation X.440)

Mapping of G.721 (1988) and G.728 (1992) into the data component of a voice body part

H.1 Illustrative mapping of the analogue/digital converted data

The mapping of the analogue/digital converted data specified in Recommendations G.721 (1988) and G.728 onto the octet structure of OSI was left for further study in Recommendation X.440. This amendment proposes the appropriate mapping of the voice communications data elements onto an 8-bit OCTET structure defined in OSI.

H.1.2 Support for Recommendation G.721 – 32K ADPCM

Recommendation X.440 is defined to convey voice encoded objects conforming to Recommendation G.721 by reference. However, a reference to this Recommendation was omitted from the initial publication.

H.1.2.1 References for Recommendation G.721 – 32K ADPCM

Subclause 2.2 is amended to include the following references for 32K ADPCM:

- CCITT Recommendation G.721 (1988), *32 kbit/s Adaptive Differential Pulse Coding Modulation (ADPCM)*.
- CCITT Recommendation G.726 (1990), *40, 32, 24, 16 kbit/s Adaptive Differential Pulse Coding Modulation (ADPCM)*.

H.1.2.2 Bit mapping for Recommendation G.721 – 32K ADPCM

Recommendation G.721 specifies that the digital encoding of the voice data is to be represented in 4-bit per word. OSI's octet structure is an 8-bit per word encoding. To achieve adequate economy of data exchange over OSI's voice messaging protocols specified in Recommendations X.440 and X.420, the following mapping shall be followed between the MHS user and the MHS user agent when building a voice body part by mapping a pair of juxtaposed G.721 words onto (or from) one OSI OCTET. To achieve octet alignment, the last OCTET unit shall be padded with zeros. See Figure H.1

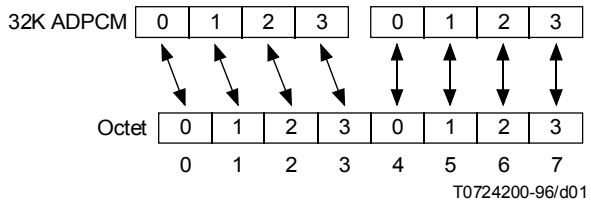

FIGURE H.1/X.440

32K ADPCM/OSI mapping

NOTE – The significance of the OSI high or low bits is not considered in this mapping. The intention is to convey the voice encoded 4-bit words in an 8-bit word. If the packing is not performed, then the number of octets it takes to move a 32K ADPCM message will be equivalent to exchanging 64K voice encodings.

H.1.3 Support for Recommendation G.728 – 16K LD-CELP

Recommendation X.440 is to be extended to convey voice encoded objects conforming to Recommendation G.728 by reference.

H.1.3.1 References for Recommendation G.728 – 16K LD-CELP

Subclause 2.2 is amended to include the following reference for 16K LD-CELP:

– CCITT Recommendation G.728 (1992), *Coding of speech at 16 kbit/s using low-delay code excited linear prediction*.

H.1.3.2 Object identifier assignment for 16K LD-CELP

Annex A is amended to include the following object identifier assignment for 16 kbit/s LD-CELP:

```
id-bp-g728-16k-ld-celp ID ::= {id-bp 3}          -- Recommendation G.728
                                                 -- 16K LD-CELP encoding
```

H.1.3.3 Bit mapping for Recommendations G.728 – 16K LD-CELP

G.728 16 kbit/s using low-delay code excited linear prediction (LD-CELP) specifies that the digital encoding of the voice data is to be represented in 10-bit per word. OSI's octet structure is an 8-bit per word encoding. To achieve an adequate economy of data exchange over OSI's voice messaging protocols specified in Recommendations X.440 and X.420, the following mapping shall be followed between the MHS user and the MHS user agent when using a voice body part by mapping four (4) G.728 words onto (or from) five (5) OSI octets. Additionally, a new object identifier needs to be defined to indicate that the data portion of the voice body part contains 16K LD-CELP encoded data. To achieve OCTET alignment, the last five octet unit shall be padded with zeros. See Figure H.2.

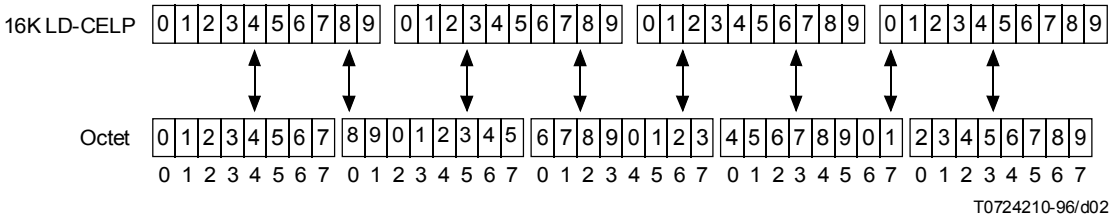

FIGURE H.2/X.440

16K LD-CELP/OSI mapping

NOTE – The significance of the OSI high or low bits is not considered in this mapping. The intention is to convey the voice encoded 10-bit words in an 8-bit world. If this kind of blocking is not performed, then the number of octets it takes to move a 16K LD-CELP message will be equivalent to exchanging 64K voice encodings.

H.2 Resolved defects

H.2.1 Modify 7.3, and Annex B, to align with the general principle in MHS of removing all use of the ASN.1 encoding "ANY".

In "-- Spoken Name", replace:

"SpokenName ::= ANY (SIZE (0..ub-vmg-spoken-name)) -- *defined by*
-- *VoiceEncodingType or VNVoiceEncodingType"*

by:

"SpokenName ::= OCTET STRING
-- *Encoding is defined by voice-encoding-type*
-- *or vn-voice-encoding-type.*
-- *Maximum 10 seconds.*

NOTE – The value is padded to end on an octet boundary."

H.2.2 Modify 8.1.5, and Annex B, to align with the general principle in MHS of removing all use of the ASN.1 encoding "ANY".

In "Heading fields", replace:

"SpokenSubject ::= ANY"

and the following two lines by:

"SpokenSubject ::= OCTET STRING
-- *Encoding is defined by voice-encoding-type;*
-- *Maximum 20 seconds.*

NOTE – The value is padded to end on an octet boundary."

H.2.3 Modify 8.2.1, and Annex B, to align with the general principle in MHS of removing all use of the ASN.1 encoding "ANY".

In "-- VM body part", replace:

"VoiceData ::= ANY -- *defined by VoiceEncodingType"*

by:

"VoiceData ::= OCTET STRING -- *defined by VoiceEncodingType"*

NOTE – The value is padded to end on an octet boundary."

H.2.4 Modify 9.1.10, and Annex B, to align with the general principle in MHS of removing all use of the ASN.1 encoding "ANY".

In "Voice Notification Supplementary Information", replace:

"SpokenSupplementaryInfo ::= ANY (SIZE (0..ub-vmg-spoken-supplemental-Info))"

and the following two lines by:

"SpokenSupplementaryInfo ::= OCTET STRING

-- *Encoding is defined by vn-voice-encoding-type;*
-- *Maximum 20 seconds.*

NOTE – The value is padded to end on an octet boundary."

H.2.5 Modify 9.3.2, and Annex B, to correct several minor spelling mistakes, and to reset the lower limit in service notification reason codes.

In the production of SNReasonField:

- replace "BITSTRING" by "BIT STRING";
- replace "SIZE (2..ub-sn-reasons)" by "SIZE (1..ub-sn-reasons)".

H.2.6 Modify Annex G to correct the upper limit size constraint for service notification reason codes from 4 to 32, and remove several abandoned upper limits whose use has been deprecated by the above changes.

Replace "**ub-sn-reasons INTEGER ::= 4**" por "**ub-sn-reasons INTEGER ::= 32**".

Delete the following upper bounds:

- "**ub-vmg-spoken-name**";
- "**ub-vmg-spoken-subject**";
- "**ub-vmg-spoken-supplemental-info**".

Geneva, 1996