TSG-CN Plenary # 11 **Tdoc NP-0100170**
?th – ?th March 2001
Palm Springs, California, USA

Agenda Item :8.3 Enable bearer independent CS architecture
Subject: Encoding of Codec information on the (G)MSC Server – MGW interface (3GPP TS 29.232)
Source: Nortel Networks, Tellabs

Abstract :

Currently binary encoding of the codec parameters of the UMTS packages of TS29.232 is defined while text encoding is not. Based on the assumption that text encoding of the packages within TS29.232 will be required, this contribution seeks to define the technical details of the text encoding for these codec parameters. In particular the document clarifies how text encoding of codec parameters will be implemented and in parallel demonstrates how this approach may be considered equivalent to the current binary encodings. Indeed while introducing the text encodings the proposal also clarifies technical ambiguities in the binary encodings.
Detailed text change documentation is also provided to indicate how TS29.232 may be changed to implement this proposal.

1. Introduction

A number of the UMTS packages specified within TS29.232 have parameters that list codecs. (e.g. TFO Codec list property, Optimal Codec observed event descriptor and Distant codec list (all from TFO Package)). Under the current binary encoding these parameters are encoded using an octet string that identifies particular codec(s) by using strings detailed in Q.765.5. It is proposed that for the text encoding of such codec parameters TS29.232 shall adopt a similar approach to Q.1950. In this approach, while the binary encoding references Q.765.5, the text encoding uses IANA registered codec names to identify different codecs. This approach to text encoding is extensible and does not restrict which codecs may be used since any one may register a codec with IANA and IANA will not allow multiple registrations of the same codec. Section 2 provides a technical discussion of how the text and binary encoding of this proposal will work while section 3 provides detailed text changes that implement the proposal.

2. Text encoding of Codec parameters

It is proposed that text encoding of the codec parameters used within the UMTS packages should be based on the use of IANA registered codec names. To illustrate how the text encoding works consider the TFO package Codeclist property. This property is currently defined as follows:

PropertyID: codeclist (0x0002)

Description: List of codecs for use in TFO protocol, the active codec is always the first entry in the list.

Type: Octet string

Possible Values:

List ofcodec types; each entry:

As defined in Q.765.5 [11], or

As defined by an appropriate regional standards development organisation, identified by an Organisational Identifier in Q.765.5 [11].

Defined in: Local Control descriptor

Characteristics: Read/Write

Note that the binary encoding of this property is itself ambiguous because the contents of codeclist could be interpreted in 3 different ways:

- The Octet String contains a single instance of the Codec List information element from Q.765.5 (including IE Identifier, length and compatibility octet).
- The Octet String contains a multiple concatenated instances of the 'Single Codec' IE, each including IE identifier, length and compatibility octet).
- The Octet String contains multiple concatenated instances of the contents of the 'Single Codec' information element.

The proposal of this contribution (see section 3 – detailed text changes) also clarifies exactly what the binary encoding means as well as defining its relationship with the text encoding. The actual working of the text encoding (for the specific example of the TFO Codeclist) is described below:

The TFO codeclist property is defined as having possible values of the set of <codec , configuration> pairs where the possible values of configuration are dependent on the value of codec. Under this scenario the binary encoding of a single <codec, configuration> pair is the contents of a "Single Codec" information element from Q.765.5 while the text encoding of a single <codec, configuration> pair is specified by:

'<IANA registered Codec identifier> (<Hex configuration string> | "-")'.

The hex configuration string is optional and is only included in circumstances whereby additional information is required to distinguish the actual bit rates that the codec is using (as per Q.765.5). When not included the string may be set to "-". In both the text and binary encoding the type of the Codeclist parameter is a "sub-list". This type is defined within H.248[i]. Using the sub-list type ensures that the lists of <codec, configuration> pairs are well defined in terms of where one pair ends and another begins for both text and binary encodings.

3. Detailed text changes

****First Modified Section ***

15.1.3 TFO package

PackageID: 3gtfoc (0x####)
[Editor's note: PackageID to be allocated by IANA]
Version: 1
Extends: None
This package defines events and properties for Tandem Free Operation (TFO) control. TFO uses inband signalling and procedures for Transcoders to enable compressed speech to be maintained between a tandem pair of transcoders. This package allows an MGW which has inserted a transcoder to support TFO.

15.1.3.1 Properties

TFO Activity Control

PropertyID: tfoenable (0x0001)

Description: Defines if TFO is enabled or not.

Type: Enumeration

Possible Values:

"on" (0x0001): TFO is enabled, TFO protocol is supported

"off" (0x0002): TFO is not enabled, TFO protocol is not initiated or terminated

Defined in: Local Control descriptor

Characteristics: Read/Write

TFO Codec List

PropertyID: codeclist (0x0002)

Description: List of codecs for use in TFO protocol, the active codec is always the first entry in the list.

Type: ~~Octet string~~Sub List

Possible Values:

~~List ofcodec types; each entry:~~

The set of { codec, configuration } pairs a~~A~~s defined in Q.765.5 or

The set of { codec, configuration } pairs a~~A~~s defined by an appropriate regional standards development organisation, identified by an Organisational Identifier in Q.765.5

Defined in: Local Control descriptor

Characteristics: Read/Write

Text encoding:

The text encoding of an individual { codec , configuration } pair within the codeclist property is as follows:

```
<codec Identifier> <codec config>
```

where :

<codec Identifier> = The IANA registered codec name as specified in RFC 1890.

<codec config> = Configuration parameters relating to this codec type. (These configuration parameters specify what modes of operation of the codec are supported as per Q.765.5. This field may optionally be set to " – " should configuration parameters be irrelevant for this particular codec.) The codec configuration field is text encoded using 2 hex digits which, combined, represent the codec configuration octet as defined (for codecs which may be configured) in Q.765.5. The first hex digit represents the 4 most significant bits of the octet while the second hex digit represents the 4 least significant bits of the octet.

For example the codec/configuration pair "G726 0C" indicates that the G726 codec only supports rates of 32 or 40 kbps.

For the text encoding of the codeclist property itself please see the text encoding for a sub list as defined in H.248.

Binary encoding:

The binary encoding of an individual codec/configuration pair within the codeclist property is an octet string defined according to the contents of the 'Single Codec' information element in Q.765.5.

15.1.3.2 Events

Optimal Codec Event

EventID: codec_modify (0x0010)

Description:

The event is used to notify the MGC that TFO negotiation has resulted in an optimal codec type being proposed.

EventsDescriptor Parameters: None

ObservedEventsDescriptor Parameters:

Optimal Codec Type

ParameterID: optimalcodec (0x0011)

Description: indicates which is the proposed codec type for TFO

Type: Octet string

Possible Values:

Codec Type:

A single {codec, configuration } pair aAs defined in Q.765.5, or

A single {codec, configuration } pair aAs defined by an appropriate regional standards development organisation, identified by an Organisational Identifier in Q.765.5

Text encoding

The text encoding of optimalcodec shall be as follows:

Optimalcodec = "<codec Identifier> <codec config>"

Where :

<codec Identifier> = The IANA registered codec name as specified in RFC 1890.

<codec config> = Configuration parameters relating to this codec type. (These configuration parameters specify what modes of operation of the codec are supported as per Q.765.5. This field may optionally be set to " – " should configuration parameters be irrelevant for this particular codec.) The codec configuration field is text encoded using 2 hex digits which, combined, represent the codec configuration octet as defined (for codecs which may be configured) in Q.765.5. The first hex digit represents the 4 most significant bits of the octet while the second hex digit represents the 4 least significant bits of the octet.

A single codec (along with its' configuration parameters (if any)) may be listed within the optimalcodec observed event as shown by the example below:

```
3gtfoc/optimalcodec = "G726 0C"
```

In this example the proposed codec type for TFO is G726 with the specific restriction that the codec may only support rates of 32 or 40 kbps.

Binary Encoding

The binary encoding shall be as defined for the contents field of the 'Single Codec' information element of Q.765.5.

Codec List Event

EventID: distant codec_list (0x0012)

Description: The event is used to notify the MGC of the distant TFO partner's supported codec list..

EventsDescriptor Parameters: None

ObservedEventsDescriptor Parameters:

Distant Codec List

ParameterID: distlist(0x0013)

Description: indicates the codec list for TFO

Type: Sub List~~Octet string~~

Possible Values:

~~List of codecs of type Codec Type:~~

The set of {codec, configuration} pairs a~~A~~s defined in Q.765.5 plus

The set of {codec, configuration} pairs a~~A~~s defined by an appropriate regional standards development organisation, identified by an Organisational Identifier in Q.765.5

The first Codec Type in the list is the one proposed for use (Optimal Codec Type).

Text encoding

The text encoding of an element of distlist shall be as follows :

The encoding of an individual codec / configuration pair within the distlist observed event parameter is as follows:

```
<codec Identifier> <codec config>
```

where :

<codec Identifier> = The IANA registered codec name as specified in RFC 1890.

<codec config> = Configuration parameters relating to this codec type. (These configuration parameters specify what modes of operation of the codec are supported as per Q.765.5. This field may optionally be set to " – " should configuration parameters be irrelevant for this particular codec.) The codec configuration field is text encoded using 2 hex digits which, combined, represent the codec configuration octet as defined (for codecs which may be configured) in Q.765.5. The first hex digit represents the 4 most significant bits of the octet while the second hex digit represents the 4 least significant bits of the octet.

For example the codec/configuration pair "G726 0C" indicates that the G726 codec only supports rates of 32 or 40 kbps.

For the text encoding of the distlist observed event parameter itself please see the text encoding for a sub list as defined in H.248.

15.1.3.3 Signals

None

15.1.3.4 Statistics

None

15.1.3.5 Procedures

For the procedures for TFO see 3GPP TS 28.062

The use of the properties in this package is applicable only when the MGW Termination to which the package properties are applied has the media stream property for Codec Type set to ITU-T G.711 (see Annex C of ITU-T Recommendation H.248). Furthermore, the package properties are applicable only if the Codec Type property of the media stream at the opposing MGW Termination is not set to ITU G.711.

****Last Modified Section ***

[i] "H.248 – Gateway Control protocol" – ITU-T pre-published version (06/00).