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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Communication procedures

Gateway control protocol: Transport mode indication package

Recommendation ITU-T H.248.67

ITU-T H-SERIES RECOMMENDATIONS

AUDIOVISUAL AND MULTIMEDIA SYSTEMS

CHARACTERISTICS OF VISUAL TELEPHONE SYSTEMS	H.100–H.199
INFRASTRUCTURE OF AUDIOVISUAL SERVICES	
General	H.200–H.219
Transmission multiplexing and synchronization	H.220–H.229
Systems aspects	H.230–H.239
Communication procedures	**H.240–H.259**
Coding of moving video	H.260–H.279
Related systems aspects	H.280–H.299
Systems and terminal equipment for audiovisual services	H.300–H.349
Directory services architecture for audiovisual and multimedia services	H.350–H.359
Quality of service architecture for audiovisual and multimedia services	H.360–H.369
Supplementary services for multimedia	H.450–H.499
MOBILITY AND COLLABORATION PROCEDURES	
Overview of Mobility and Collaboration, definitions, protocols and procedures	H.500–H.509
Mobility for H-Series multimedia systems and services	H.510–H.519
Mobile multimedia collaboration applications and services	H.520–H.529
Security for mobile multimedia systems and services	H.530–H.539
Security for mobile multimedia collaboration applications and services	H.540–H.549
Mobility interworking procedures	H.550–H.559
Mobile multimedia collaboration inter-working procedures	H.560–H.569
BROADBAND, TRIPLE-PLAY AND ADVANCED MULTIMEDIA SERVICES	
Broadband multimedia services over VDSL	H.610–H.619
Advanced multimedia services and applications	H.620–H.629
IPTV MULTIMEDIA SERVICES AND APPLICATIONS FOR IPTV	
General aspects	H.700–H.719
IPTV terminal devices	H.720–H.729
IPTV middleware	H.730–H.739
IPTV application event handling	H.740–H.749
IPTV metadata	H.750–H.759
IPTV multimedia application frameworks	H.760–H.769
IPTV service discovery up to consumption	H.770–H.779

For further details, please refer to the list of ITU-T Recommendations.

Recommendation ITU-T H.248.67

Gateway control protocol: Transport mode indication package

Summary

Gateway control signalling traffic is carried over a transport connection between the media gateway controller (MGC) and media gateway (MG). Recommendation ITU-T H.248 supports multiple, different transport technologies. Each possible protocol stack variant is called ITU-T H.248 transport mode.

Recommendation ITU-T H.248.67 contains an ITU-T H.248 package to determine the supported transport modes by a MG and the indication of a preferred mode. The package enables an MGC to audit and change the transport mode. Transport mode changes may be driven by network evolution, i.e., transitioning from IP version 4 to IP version 6 environments. The added value of this package is given by the capability to support online transport mode changes.

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T H.248.67	2009-12-14	16

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

CONTENTS

Recommendation ITU-T H.248.67

Gateway control protocol: Transport mode indication package

1 Scope

ITU-T H.248 is a "transport technology independent" or "bearer-independent" signalling protocol. This means it may be carried over multiple, different transport technologies. There is no tight coupling to a single, specific underlying protocol stack. Such a protocol design satisfies multiple protocol engineering requirements like: a) the signalling protocol is independent of network infrastructure, b) the signalling protocol may be used in present network infrastructures that are very heterogeneous concerning deployed bearer technologies, and c) the signalling protocol can be used in network infrastructures that evolve over time.

The choice of a particular transport technology, either due to an initial negotiation process or due to a later change procedure, may benefit from correspondent signalling elements.

This Recommendation provides functionality for the indication and negotiation of an ITU-T H.248 *transport mode* (see clause 3.1.1).

1.1 Examples for typical transport mode changes

The transport mode is tightly coupled to the concept of the ITU-T H.248 control association (CA). A static, never changing transport mode may be considered as *a priori* knowledge, i.e., a provisioning subject. There would be then configuration management actions, on the MG and MGC sides, before any registration attempt would be issued by the MG.

This might be sufficient for some use cases, but the lack of flexibility has shortcomings in regard to evolving networks, multi-transport mode capable ITU-T H.248 entities and/or high service availability requirements.

The transport mode may be characterized by two protocol stack segments (see also definition in clause 3.1.1): "network and lower layers" and "transport and higher layers", represented in the x- and y-axis in Figure 1.

Figure 1 shows some typical transport mode changes:

1) ATM network replacement by IP infrastructure: e.g., from "*MTP-3b/AAL5/ATM*" to "*SCTP/IPv4*".

2) Introduction of IP version 6 in an IPv4 infrastructure: e.g., from "*UDP/IPv4*" to "*UDP/IPv6*".

3) Replacement of an inappropriate transport technology by an optimized protocol for signalling transport: e.g., from "*TCP/IPv4*" to "*SCTP/IPv4*".

4) Combination of 2) and 3) in one step: e.g., from "*UDP/IPv4*" to "*SCTP/IPv6*".

Examples:

No.	From	To
1)	MTP-3b/AAL5/ATM	SCTP/IPv4
2)	UDP/IPv4	UDP/IPv6
3)	TCP/IPv4	SCTP/IPv4
4)	UDP/IPv4	SCTP/IPv6

H.248.67(09)_F01

Transport mode for ITU-T H.248 protocol data units ("signalling transport")

Transport mode changes examples
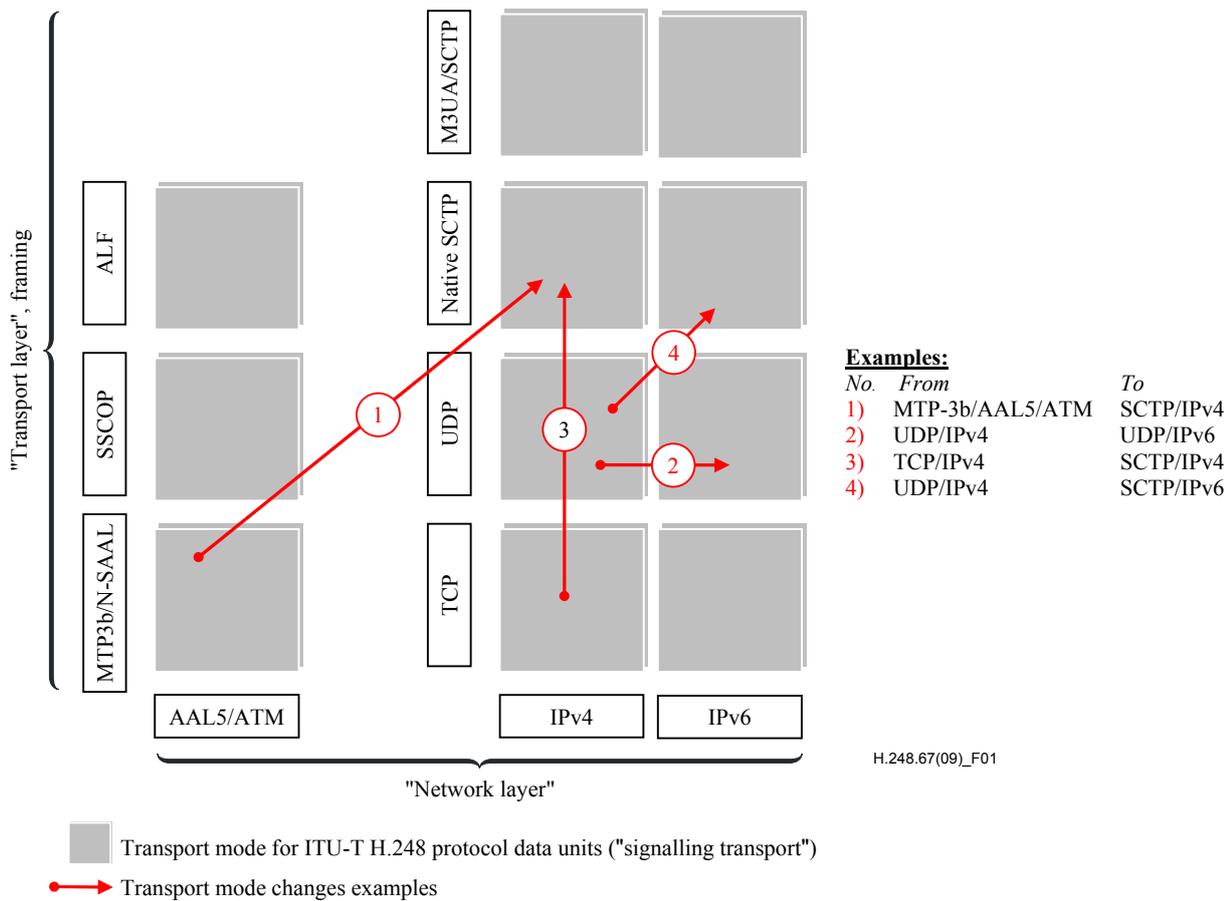
Figure 1 – Example typical transport mode changes for ITU-T H.248 control associations

1.2 Applicability

1.2.1 Online versus offline transport mode changes

It may be noted that any transport mode change does not necessarily require the application of the (*ServiceChange* based) procedures defined by this Recommendation. Transport mode changes could be completely "controlled" by management plane activities, i.e., via configuration management. Such a procedure implies the transition of all involved ITU-T H.248 entities (MGC and associated MG(s)) in a particular management state in order to execute the configuration changes. Such a management state correlates with an "Out-of-Service" phase, the ITU-T H.248 entities are therefore entirely "offline". The ITU-T H.248 control association does not exist anymore during the "provisioned" transport mode change.

In order to minimize such network "Out-of-Service" periods, it may be beneficial for *ServiceChange* based (termed "online" here) transport mode change support. The coordination and synchronization of transport mode changes via such ITU-T H.248 "call-independent" procedures might be a further advantage of the application of the *trm* package.

1.2.2 Supported attributes of transport mode

Figure 2 summarizes the IPv4 based transport modes. The usage of an encryption protocol for ITU-T H.248 traffic may be considered as third dimension of the transport mode. Figure 3 illustrates possible transport modes with encryption on network (L3) or transport (L4) protocol layer (see also [IETF RFC 3788]).

1.1) IPv4 (unsecured)

H.248		H.248		H.248		H.248	
UDP		TCP		SCTP		M3UA/SCTP	
IPv4		IPv4		IPv4		IPv4	
L2		L2		L2		L2	
L1		L1		L1		L1	

Figure 2 – Overview of major transport modes with IP version 4 and without encryption protocol

1.2) IPv4 (L3 secured)

H.248	H.248	H.248	H.248
UDP	TCP	SCTP	M3UA/SCTP
IPv4	IPv4	IPv4	IPv4
IPsec	IPsec	IPsec	IPsec
L2	L2	L2	L2
L1	L1	L1	L1

1.3) IPv4 (L4 secured)

H.248	H.248	H.248	H.248
DTLS	TLS	TLS	M3UA / TLS
UDP	TCP	SCTP	SCTP
IPv4	IPv4	IPv4	IPv4
L2	L2	L2	L2
L1	L1	L1	L1

Figure 3 – Overview of major transport modes with IP version 4 and security support on network or transport layer

Figure 4 provides an overview of major transport modes with IP version 6 as network layer protocol. Figure 5 provides an overview of major transport modes for ATM networks.

2.1) IPv6 (unsecured)

H.248	H.248	H.248	H.248
UDP	TCP	SCTP	M3UA/SCTP
IPv6	IPv6	IPv6	IPv6
L2	*L2*	*L2*	*L2*
L1	*L1*	*L1*	*L1*

2.2) IPv6 (L3 secured)

H.248	H.248	H.248	H.248
UDP	TCP	SCTP	M3UA/SCTP
IPv6	IPv6	IPv6	IPv6
IPsec	IPsec	IPsec	IPsec
L2	*L2*	*L2*	*L2*
L1	*L1*	*L1*	*L1*

2.3) IPv6 (L4 secured)

H.248	H.248	H.248	H.248
DTLS	TLS	TLS	M3UA / TLS
UDP	TCP	SCTP	SCTP
IPv6	IPv6	IPv6	IPv6
L2	*L2*	*L2*	*L2*
L1	*L1*	*L1*	*L1*
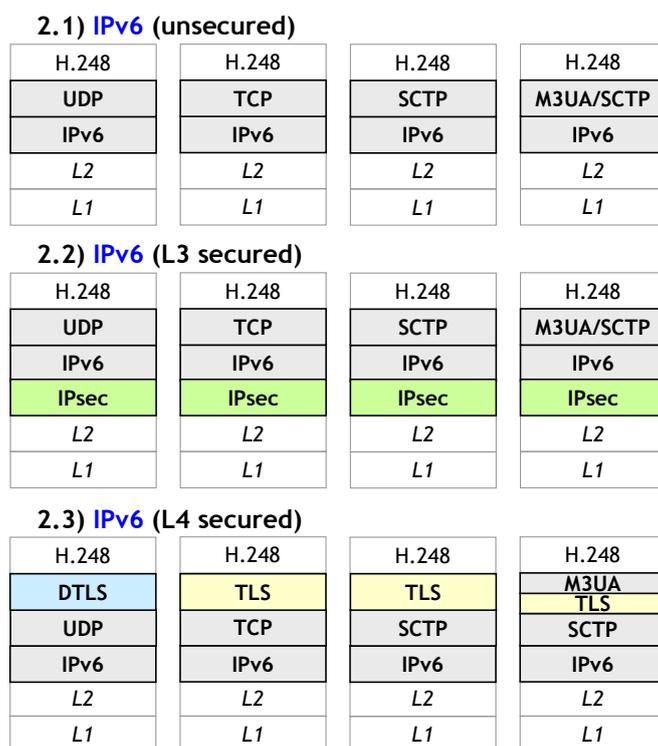
**Figure 4 – Overview of major transport modes with IP version 6
(unsecured and secured transport)**

3.1) AAL5/ATM (unsecured)

H.248	H.248	H.248
MTP3b/N-SAAL	SSCOP	ALF
AAL5/ATM	AAL5/ATM	AAL5/ATM
L1	*L1*	*L1*
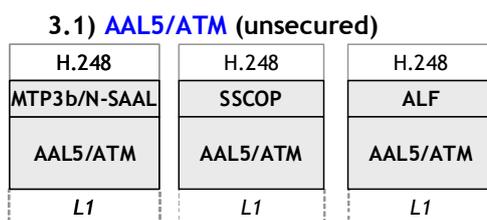
Figure 5 – Overview of major transport modes for ATM networks

2   References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T H.248.1]   Recommendation ITU-T H.248.1 (2005), *Gateway Control Protocol: Version 3*, plus Amendment 2 (2009), *New Appendix IV, plus corrections and clarifications*.

[ITU-T H.248.4]   Recommendation ITU-T H.248.4 (2009), *Gateway control protocol: Transport over Stream Control Transmission Protocol (SCTP)*.

[ITU-T H.248.5]   Recommendation ITU-T H.248.5 (2009), *Gateway control protocol: Transport over ATM*.

[ETSI TS 129 202]   ETSI TS 129 202 (2009), *Universal Mobile Telecommunications System (UMTS); Signalling System No. 7 (SS7) signalling transport in core network; Stage 3 (3GPP TS 29.202 version 8.1.1 Release 8)*.

[IETF RFC 3788]   IETF RFC 3788 (2004), *Security Considerations for Signaling Transport (SIGTRAN) Protocols*.

[IETF RFC 4301]   IETF RFC 4301 (2005), *Security Architecture for the Internet Protocol*.

[IETF RFC 4347]   IETF RFC 4347 (2006), *Datagram Transport Layer Security*.

[IETF RFC 5246]   IETF RFC 5246 (2008), *The Transport Layer Security (TLS) Protocol Version 1.2*.

3   Definitions

3.1   Terms defined elsewhere

None.

3.2   Terms defined in this Recommendation

3.2.1   transport mode: The actual *protocol stack* below the ITU-T H.248 protocol layer. This protocol stack may be divided into two main portions: a) transport protocol (L4) and higher layers, and b) network protocol (L3) and lower layers. Any transport mode may also provide encryption on network (L3) or transport (L4) protocol layer.

NOTE – See also clauses 5.3.1, 10 and 11 of [b-ITU-T H.Sup7] concerning IP-based transport connections.

4   Abbreviations and acronyms

This Recommendation uses the following abbreviations:

AAL5   ATM Adaptation Layer type 5

ALF   Application Level Framing

ATM   Asynchronous Transfer Mode

CA   (H.248) Control Association

DTLS   Datagram Transport Layer Security

IP   Internet Protocol

IPsec   IP security

IPv4   IP version 4

IPv6   IP version 6

L1   (Protocol) Layer 1

L2   (Protocol) Layer 2

M3UA   Signalling System No. 7 (SS7) Message Transfer Part 3 (MTP3) – User Adaptation Layer

MG   Media Gateway

MGC   Media Gateway Controller

mID   (H.248) Message Identifier

MTP-3b   Message Transfer Part level 3 using ITU-T Q.2140

NNI   Network-to-Network Interface

N-SAAL   NNI Signalling ATM Adaptation Layer

SCTP   Stream Control Transmission Protocol

SSCOP   Service Specific Connection-Oriented Protocol

UDP   User Datagram Protocol

TCP   Transmission Control Protocol

TLS   Transport Layer Security

5   Conventions

None.

6   Gateway control protocol transport mode indication package

Package name: Gateway Control Protocol Transport Mode Indication Package

Package ID: trm (0x00d3)

Description: This package allows the indication of supported transport modes for an ITU-T H.248 control association and the indication of a preferred mode. This package may be for example useful for multi-mode capable ITU-T H.248 entities, for a transport mode change of an existing control association, or for changeover procedures between ITU-T H.248 entities.

Version: 1

Extends: None.

6.1   Properties

6.1.1   Supported ITU-T H.248 transport modes

Property name: Supported transport modes

Property ID: stm (0x0001)

Description: This property is used to determine which transport modes are supported by the MG. It is also used to determine the current mode in use.

                   The MGC may perform an *AuditCapabilities* to determine which transport modes are supported by the MG. The MGC may perform an *AuditValue* to determine the transport mode that is in current use.

Type: Enumeration

Possible values: A value representing an ITU-T H.248 transport mode protocol stack combination (see Table 1).

Default: Provisioned or defined by a profile specification.

Defined in: TerminationState (Root Termination only)

Characteristics: Read only

Table 1 – Property values for ITU-T H.248 transport modes

	Text codepoint	Binary Codepoint	Protocol Stack	Reference
IPv4	UDP|IP4	0x0000	UDP/IPv4	Annex D of [ITU-T H.248.1]
	UDP|IP4-IPS	0x0001	UDP/IPsec/IPv4	+ [IETF RFC 4301]
	UDP|IP4-DTLS	0x0002	UDP/DTLS/IPv4	+ [IETF RFC 4347]
	TCP|IP4	0x0003	TCP/IPv4	Annex D of [ITU-T H.248.1]
	TCP|IP4-IPS	0x0004	TCP/IPsec/IPv4	+ [IETF RFC 4301]
	TCP|IP4-TLS	0x0005	TCP/TLS/IPv4	+ [IETF RFC 5246]
	SCTP|IP4	0x0006	SCTP/IPv4	[ITU-T H.248.4]
	SCTP|IP4-IPS	0x0007	SCTP/IPsec/IPv4	+ [IETF RFC 4301]
	SCTP|IP4-TLS	0x0008	SCTP/TLS/IPv4	+ [IETF RFC 5246]
	M3UA/SCTP|IP4	0x0009	M3UA/SCTP/IPv4	[ETSI TS 129 202]
	M3UA/SCTP|IP4-IPS	0x000a	M3UA/SCTP/IPsec/IPv4	+ [IETF RFC 4301]
	M3UA/SCTP|IP4-TLS	0x000b	M3UA/SCTP/TLS/IPv4	+ [IETF RFC 5246]
IPv6	UDP|IP6	0x000c	UDP/IPv6	Annex D of [ITU-T H.248.1]
	UDP|IP6-IPS	0x000d	UDP/IPsec/IPv6	+ [IETF RFC 4301]
	UDP|IP6-DTLS	0x000e	UDP/DTLS/IPv6	+ [IETF RFC 5246]
	TCP|IP6	0x000f	TCP/IPv6	Annex D of [ITU-T H.248.1]
	TCP|IP6-IPS	0x0010	TCP/IPsec/IPv6	+ [IETF RFC 4301]
	TCP|IP6-TLS	0x0011	TCP/TLS/IPv6	+ [IETF RFC 5246]
	SCTP|IP6	0x0012	SCTP/IPv6	[ITU-T H.248.4]
	SCTP|IP6-IPS	0x0013	SCTP/IPsec/IPv6	+ [IETF RFC 4301]
	SCTP|IP6-TLS	0x0014	SCTP/TLS/IPv6	+ [IETF RFC 5246]
	M3UA/SCTP|IP6	0x0015	M3UA/SCTP/IPv6	[ETSI TS 129 202]
	M3UA/SCTP|IP6-IPS	0x0016	M3UA/SCTP/IPsec/IPv6	+ [IETF RFC 4301]
	M3UA/SCTP|IP6-TLS	0x0017	M3UA/SCTP/TLS/IPv6	+ [IETF RFC 5246]
ATM	MTP3b|ATM	0x0018	MTP-3b/N-SAAL/AAL5/ATM	clause 6 of [ITU-T H.248.5]
	SSCOP|ATM	0x0019	SSCOP/AAL5/ATM	clause 7 of [ITU-T H.248.5]
	ALF/AAL5|ATM	0x001a	ALF/AAL5/ATM	clause 8 of [ITU-T H.248.5]

6.1.1.1 Encoding examples

6.1.1.1.1 Text encoding

Example 1 – An ITU-T H.248 MG supports UDP for both IP versions. IPv4 is the preferred mode and thus the default configuration:

```
trm/stm=[UDP|IP4,UDP|IP6]
```

Example 2 – Additional SCTP support. SCTP via IPv6 is here the preferred mode:

```
trm/stm=[SCTP|IP6,UDP|IP4,SCTP|IP4,UDP|IP6]
```

Example 3 – An ITU-T H.248 MG with ATM and IP support (e.g., prepared for an ATM-to-IP network evolution):

```
trm/stm=[MTP3b|ATM,SCTP|IP4]
```

6.2 Events

None.

6.3   Signals

None.

6.4   Statistics

None.

6.5   Error codes

6.5.1   Alternate transport mode preferred

Error code #:   507

Name: Alternate Transport Mode Preferred

Definition: As a result of the reception of a *ServiceChange* request command containing a transport mode extension parameter, the MGC has decided to use an alternate transport mode. This alternate mode is included in the error text. Optionally an address that the MG can subsequently use to contact the MGC with the new transport may be provided.

Error text in the   A string of type *transportInformation* defined by:
error descriptor:
```
transportInformation = transportMode [COMMA mId]
; mId is encoded as per Annex B/H.248.1
transportMode = VALUE
; Value is encoded with a single text codepoint from Table 1
```

Comment: None.

6.6   Procedures

6.6.1   ServiceChange – Transport mode determination

A particular transport mode is tightly coupled with the ITU-T H.248 control association concept. Any changes of particular "attributes" of a control association (e.g., like ITU-T H.248 protocol version, profile, etc.) are related to *ServiceChange* procedures.

This package defines a parameter that is used in the *ServiceChangeExtension* parameter. It may be used by MGs/MGCs to negotiate the transport to be used in the initial *ServiceChange* exchange. For more information regarding the definition of parameters in the *ServiceChangeExtension* parameter see clause 7.2.8.1.8 of [ITU-T H.248.1]. The package also defines a property which may be audited by the MGC to determine the available transport modes on the MG.

6.6.1.1   Transport mode extension parameter definition

Name: transmode

Type: Sub-list of enumeration

Possible values: As per Table 1.

6.6.2   Initial transport mode determination

The establishment of the very first control association between a MGC-MG tandem shall be denoted as bootstrapping. The MG must select a transport mode for the very first ITU-T H.248 message issued by the MG (which carries a *ServiceChange.request* command). This selection implies prior knowledge and relates to a provisioning (configuration management) activity of the values for the property defined in this package.

Transport mode negotiation is initiated by the MG. Where the MG supports multiple transport modes it may include the supported transports in the Service Change extension parameter containing a "Transport mode" parameter. The transports are provided in a preferential list. The first

in the list is the highest preference. This preference is unrelated to the transport being used to send the transport mode extension; i.e., the MG may prefer to use a transport other than the one currently being used.

NOTE 1 – According to clause 7.2.8.1.8 of [ITU-T H.248.1] an "X-SC" coded ExtensionParameter is only used with ITU-T H.248.1 version 1 coded messages. As such, the use of a ServiceChange extension parameter containing a "Transport mode" parameter is only applicable to a ServiceChange command from a MG that registers with an MGC. As per clause 11.3 of [ITU-T H.248.1], this ServiceChange request shall always be encoded with a version equal to 1.

On reception of a ServiceChange extension parameter containing the "transport mode" parameter, the MGC may take one of two actions. If it does not understand the parameter, it will be ignored and the *ServiceChange.response* is issued as normal. On reception of the *ServiceChange.response*, the MG will continue to use the same transport as the initial *ServiceChange.request*.

If the MGC does support the transport mode parameter, it shall then examine the transport modes and determine if a new transport mode is to be used. If so, the MGC shall respond with a *ServiceChange* response containing error code 507 "*Alternate Transport Mode Preferred*". The error descriptor shall contain both the error code and error text as described in clause 6.5.1. The error text shall contain the transport mode that the MGC requires the MG to use. It may also contain the address (*mId*) where the MG should send a subsequent *ServiceChange.request* to using the indicated transport. A subsequent *ServiceChange.request* is needed as the error response will terminate the initiation of a control association.

NOTE 2 – The used ServiceChangeMethod and ServiceChangeReason are independent of the use of the "transport mode" parameter. These are dependent on the required MG action. If the MG action is purely to change the transport mode of an ongoing control association ServiceChangeReason 917 "Capability Change" should be used.

On reception of a *ServiceChange* response with error code 507, the MG should resend the initial *ServiceChange* command to the MGC using the new transport mode. The MG should use the new address from the MGC if provided, otherwise the destination may be determined via provisioning or other means. The "transport mode" ServiceChange extension parameter is not needed in this request.

6.6.3   Auditing and changing the transport mode

The MGC may use an *AuditCapabilities* command to audit the Supported Transport modes (*trm/stm*) property to determine which transport the MG supports. In response to an AuditCapabilities command, the MG shall return the transport modes in a preferential list with the first element being the most preferred (or default). The MGC may use an *AuditValue* command to determine the transport currently in use.

If the MGC requires that a transport from the list of those supported is to be used, it shall issue a "MGC initiated MG Re-Registration" or "MGC Initiated Service Restoration" procedure (as defined in clauses F.3.8 and F.3.9 of [ITU-T H.248.1]). As the MG supports the *trm* package, it shall provide the list of supported transports as per clause 6.6.2. The MGC may then indicate the transport to be used as per clause 6.6.2.

6.6.4   Transport modes with encryption

Any usage of, or any change to, a transport mode with encryption may require additional information (e.g., encryption keys) to be exchanged between the MGC and MG. This aspect is out of scope of this Recommendation.

6.6.5   Examples

6.6.5.1 MGC supports the initial transport

In this example, the MG sends a list of supported transports. The MG uses the preferred transport and the MGC also prefers this.

1)   An MG registers with an MGC using the *ServiceChange* command. The ITU-T H.248 MG supports UDP for both IP versions, however IPv4 is the preferred mode.

```
MG1 to MGC:

MEGACO/1 [124.124.124.222]
Transaction = 9998 {
    Context = - {
        ServiceChange = ROOT {Services {
            Method=Restart,
            Reason="901",     ; example of 'Cold Boot'
            Version=3,
            ServiceChangeAddress=55555,
                                  ; Indication of IP port redirection
            Profile=ResGW/1,
            X-SC="transmode=[UDP|IP4,UDP|IP6]"} ; Note
        }
    }
}
```

NOTE – The mID (message identifier) value is omitted here, indicating that the address of the (MG local) UDP transport interface will not change.

2)   The MGC sends a reply:

```
MGC to MG1:
MEGACO/1 [123.123.123.4]:55555
Reply = 9998 {
    Context = - {
        ServiceChange = ROOT {
      Services {
        ServiceChangeAddress=55555} ; Confirmation of IP port redirection
        }
    }
}
```

6.6.5.2   MGC prefers an alternate transport

In this example, the MG sends a list of supported transports. The MG has used the preferred transport "UDP/IP4" for the initial message, however the MGC prefers the use of "UDP|IP6".

1)   An MG registers with an MGC using the *ServiceChange command*. The ITU-T H.248 MG supports UDP for both IP versions, however IPv4 is the preferred mode.

```
MG1 to MGC:

MEGACO/1 [124.124.124.222]
Transaction = 9990 {
    Context = - {
        ServiceChange = ROOT {Services {
            Method=Restart,
            Reason="901",  ; example of 'Cold Boot'
            Version=3,
            ServiceChangeAddress=55555,
```

```
                        Profile=ResGW/1,
                        X-SC="transmode=[UDP|IP4,UDP|IP6]"}
                    }
                }
            }
```

2)   The MGC prefers the use of UDP|IP6. Therefore it sends an error reply indicating this and
      an address for subsequent communications.

```
MGC to MG1:
MEGACO/1 [123.123.123.4]:55555
Reply = 9990 {
    Context = - {
        ServiceChange = ROOT {
            Error=507{"UDP|IP6,[2001:db8:85a3:0:0:8a2e:370:7334]"}
        }
    }
}
```

3)   As no control association is established, the MG resends the initial *ServiceChange*
      registration using the new transport and the address indicated in step 2).

```
MG1 to MGC:

MEGACO/1 [2001:db8:85a3:0:0:8a2e:370:7335]; NOTE
Transaction = 9991 {
    Context = - {
        ServiceChange = ROOT {Services {
            Method=Restart,
            Reason="901",
            Version=3,
            ServiceChangeAddress=55555,
            Profile=ResGW/1}
        }
    }
}
```

      NOTE – The mID (message identifier) value of MG1 changes in this example (see steps 1 and 3)
      due to the chosen mID format ("IP transport address"). However, a transport mode may not
      necessarily lead to a mID change.

4)   The MGC sends a reply confirming the control association:

```
MGC to MG1:
MEGACO/1 [2001:db8:85a3:0:0:8a2e:370:7334]:55555
Reply = 9991 {
    Context = - {
        ServiceChange = ROOT {
          Services {ServiceChangeAddress=55555}
        }
    }
}
```

Bibliography

[b-ITU-T H.Sup7]   ITU-T Supplement H.Sup7 (2008), *Gateway control protocol: Establishment procedures for the H.248 MGC-MG control association*.

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