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Technical Specification

Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 4; Interface Protocol Requirements Definition; Implementation of TIPHON using H.248/MEGACO



Reference

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Foreword

This Technical Specification (TS) has been produced by ETSI Project Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON).

1 Scope

The present document describes how the H.248/MEGACO protocol ([1] to [21]) can be used to implement the architecture, defined in TS 101 314 [24] and the primitives, information elements and behaviours, defined in TS 101 882-4 [22] and TS 101 882-5 [23].

The present document defines the mapping of the Media Control meta-protocol.

The document is applicable to all equipments and entities within a network that are necessary to support TIPHON Release 4 architecture.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

- [1] ITU-T Recommendation H.248.1 (2002): "Gateway control protocol Version 2".
- [2] ITU-T Recommendation H.248.2: "Gateway control protocol: Facsimile, text conversation and call discrimination packages".
- [3] ITU-T Recommendation H.248.3: "Gateway control protocol: User interface elements and actions packages".
- [4] ITU-T Recommendation H.248.4: "Gateway control protocol: Transport over Stream Control Transmission Protocol (SCTP)".
- [5] ITU-T Recommendation H.248.5: "Gateway control protocol: Transport over ATM".
- [6] ITU-T Recommendation H.248.6: "Gateway control protocol: Dynamic Tone Definition package".
- [7] ITU-T Recommendation H.248.7: "Gateway control protocol: Generic announcement package".
- [8] ITU-T Recommendation H.248.8: "Gateway control protocol: Error code and service change reason description".
- [9] ITU-T Recommendation H.248.9: "Gateway control protocol: Advanced media server packages".
- [10] ITU-T Recommendation H.248.10: "Gateway control protocol: Media gateway resource congestion handling package".
- [11] ITU-T Recommendation H.248.11: "Gateway control protocol: Media gateway overload control package".
- [12] ITU-T Recommendation H.248.12: "Gateway control protocol: H.248.1 packages for H.323 and H.324 interworking".
- [13] ITU-T Recommendation H.248.13: "Gateway control protocol: Quality Alert Ceasing package".
- [14] ITU-T Recommendation H.248.14: "Gateway control protocol: Inactivity timer package".
- [15] ITU-T Recommendation H.248.15: "Gateway control protocol: SDP H.248 package attribute".

- [16] ITU-T Recommendation H.248.16: "Gateway control protocol: Enhanced digit collection packages and procedures".
- [17] ITU-T Recommendation H.248.17: "Gateway control protocol: Line test package".
- [18] ITU-T Recommendation H.248.18: "Gateway control protocol: Package for support of multiple profiles".
- [19] ITU-T Recommendation H.248.20: "Gateway control protocol: The use of local and remote descriptors with H.221 and H.223 multiplexing".
- [20] IETF RFC 3525: "Gateway Control Protocol Version 1".
- [21] draft-ietf-megaco-h248v2: "The Megaco/H.248v2 Gateway Control Protocol, version 2".
- [22] ETSI TS 101 882-4 (V4.1.1): "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 4; Protocol Framework Definition; Part 4: Media control meta protocol".
- [23] ETSI TS 101 882-5 (V4.1.1): "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 4; Protocol Framework Definition; Part 5: Transport control service".
- [24] ETSI TS 101 314 (V4.1.1): "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 4; Abstract Architecture and Reference Points Definition; Network Architecture and Reference Points".
- [25] ETSI TS 101 332 (V4.1.1): "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 4; Interface Protocol Requirements Definition; TIPHON Extended H.248/MEGACO Package (EMP) Specification; ICF Control over Reference Point".
- [26] ETSI TS 102 108 (V4.1.1): "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 4; H.248/MEGACO Profile for TIPHON reference point I3; InterConnect Function (ICF) control over reference point I3".
- [27] ETSI TS 102 229 (V4.1.1): "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 4; Aggregate Bearer Load Control - H.248 Package".
- [28] IETF RFC 3551: "RTP Profile for Audio and Video Conferences with Minimal Control".
- [29] IETF RFC 2327: "SDP: Session Description Protocol".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

Aggregate Bearer: logical association of functional entities in an IP Telephony application and Transport Network, which creates one or more concurrent end-to-end media, flows and which is not limited to the duration of a single call

Aggregate Bearer Admission Control (ABAC) function: Functional Entity (FE) that determines whether or not a flow is to be admitted as part of an established Aggregate Bearer

Aggregate Bearer Measurement (ABM) function: function that determines the capacity used and remaining in an Aggregate Bearer as a result of measuring the actual media flows after taking into account what flows were requested

codec: combined speech encoder and decoder

flow: single data stream, identified by a tuple of characteristic values (source address, source port, destination address, destination port, protocol number)

functional entity: entity in a system that performs a specific set of functions

functional group: collection of functional entities within a domain

InterConnection function (ICF): functional entity connecting two networks having differing administrative policy such as Quality of Service (QoS) or addressing policy but employing the same signalling protocol, and transport technology, at the point of interconnect

IP address: each network unit connected to an IP network must have a unique Internet or IP address

IP endpoint: device that originates or terminates the IP based part of a call

IP network: packet transport network comprising one or more transport domains each employing the IP protocol

network: telecommunications network that provides telecommunications services

protocol: set of semantics, syntax and procedures, which govern the exchange of information across an interface

Quality of Service (QoS): quality specification of a telecommunications channel, system, virtual channel, computer-telecommunications session, etc.

Switched Circuit Network (SCN): telecommunications network, e.g. Public Switched Telephone Network (PSTN), Integrated Services Digital Network (ISDN), and General System for Mobile communications (GSM), that uses circuit-switched technologies for the support of voice calls

terminal: endpoint within the user equipment on which signalling and media flows originate and/or terminate

TIPHON compliant: entity that complies with the mandatory requirements identified in the TIPHON requirements documents together with compliance to the parts of the TIPHON specifications in which these requirements are embodied

Transport Resource Manager (TRM): Functional Entity (FE) that applies a set of policies and mechanisms to a set of transport resources to ensure that those resources are allocated such that they are sufficient to enable transport flows with QoS guarantees across the domain of control of the TRM

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ABAC	Aggregate Bearer Admission Control
ABM	Aggregate Bearer Measurement
BC	Bearer Control
CC	Call Control
CFE	simple Call Functional Entity
FE	Functional Entity
GSM	General System for Mobile communications
ICF	InterConnection Function
IP	Internet Protocol
ISDN	Integrated Services Digital Network
MC	Media Control
MG	Media Gateway
MGC	Media Gateway Control
PSTN	Public Switched Telephone Network
QoS	Quality of Service
SCN	Switched Circuit Network
TRM	Transport Resource Manager

4 General mapping considerations

4.1 Overview

The present document describes an implementation of the meta-protocol described in TS 101 882-4 [22] and TS 102 229 [27] for reference point Nx, described in TS 101 882-5 [23] for reference point Tx and described in TS 101 332 [25] and TS 102 108 [26] for reference point I3, producing an interoperable profile of H.248/MEGACO protocol ([1] to [21]).

Figure 1 shows the relationship between TIPHON architecture and H248/MEGACO.

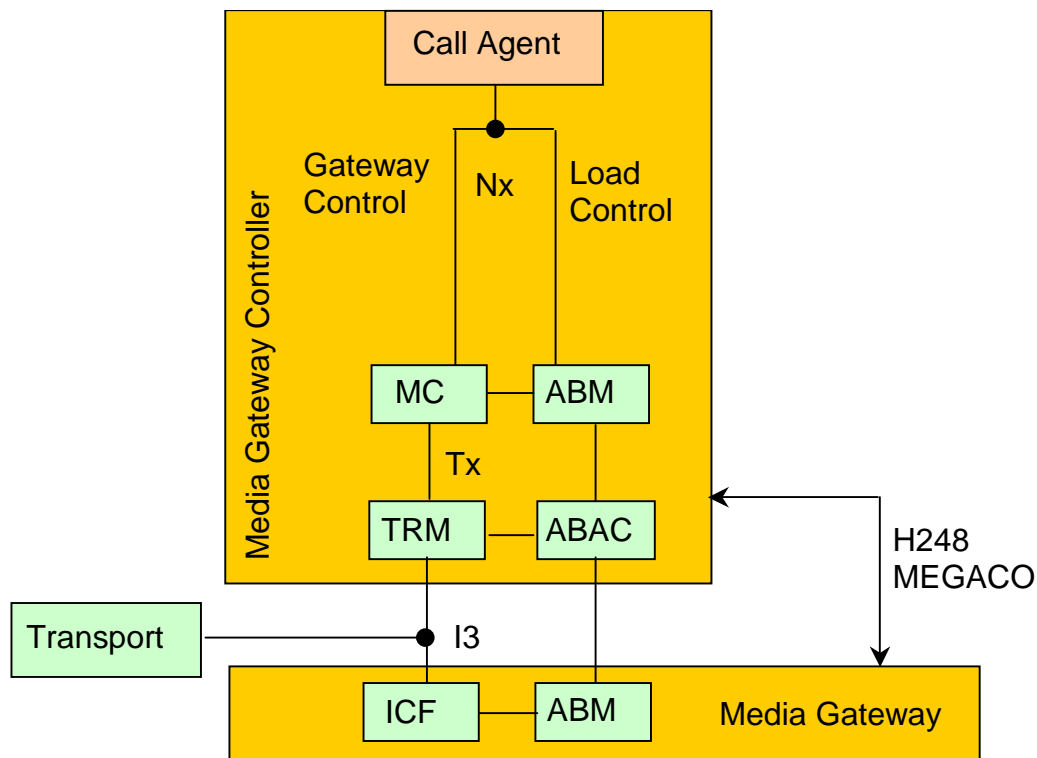


Figure 1: Relationship between TIPHON architecture and H248/MEGACO

H.248/MEGACO protocol ([1] to [21]) has been created to control a range of media devices. It describes the exchanges and behaviours of messages between a Media Gateway Controller (MGC) and a Media Gateway (MG). Functionally, the H248/MEGACO MGC is included as part of the MC, TRM, ABM, ABAC functional entities of the TIPHON architecture as shown in figure 1. Functionally the H248/MEGACO MG is included in the ICF, ABM functional entities of the Transport entity of the TIPHON architecture as shown in figure 1.

The implementation of H248/MEGACO as distributed parts included in TIPHON functional entities or as unique piece interfaced by the functional entities is out of scope of the present documents and is implementation specific of TIPHON architecture.

Behaviour of a compliant implementation of a H.248/MEGACO protocol ([1] to [21]) within the TIPHON architecture when an H.248/MEGACO information element is received (descriptor or parameter), which is not within the context of the present document is out of scope of the present specification and is implementation specific.

4.2 Identifiers mapping

H248/MEGACO protocol ([1], [20], [21]) defines some concepts linked to identifiers such as ContextId, TerminationID and StreamID.

TIPHON meta-protocol ([22], [23]) defines also some concepts linked to identifiers such as mediaResourceHandle, flowDescriptorHandle and BearerIdentifier.

To permit a clear interaction between TIPHON meta-protocol ([22], [23]) and H248/MEGACO protocol ([1], [20], [21]) an association between identifiers of the two sides shall be provided conforming to the following text.

A two-way relation shall be established between H248/MEGACO ([1], [20], [21]) ContextId and TIPHON meta-protocol ([22], [23]) BearerIdentifier, such that it is always possible to obtain the value of one by providing the value of the other. Depending of the behaviour of the two protocols it is possible that, for a short duration, the two identifiers are not known at the establishment of the corresponding process. Due to the fact that the Media Gateway assigns the ContextID, the two-way relation is only valid after the answer of the MG to an ADD command sent by the MGC (usage of CHOOSE value). The mechanisms or algorithms for implementing this two-way relation is out of scope of the present document and is implementation specific.

A two-way relation shall be established between H248/MEGACO ([1], [20], [21]) TerminationID and TIPHON meta-protocol ([22], [23]) mediaResourceHandle, such that it is always possible to obtain the value of one by providing the value of the other. Depending on the behaviour of the two protocols it is possible that, for a short duration, the two identifiers are not known at the establishment of the corresponding process. Due to the fact that the Media Gateway assigns the TerminationID, the two-way relation is only valid after the answer of the MG to an ADD command sent by the MGC (usage of CHOOSE value). The mechanisms or algorithms for implementing this two-way relation is out of scope of the present document and is implementation specific.

A two-way relation shall be established between H248/MEGACO ([1], [20], [21]) StreamID and TIPHON meta-protocol ([22], [23]) flowDescriptorHandle, such that it is always possible to obtain the value of one by providing the value of the other. Depending of the behaviour of the two protocols it is possible that, for a short duration, the two identifiers are not known at the establishment of the corresponding process. Due to the fact that the Media Gateway Controller assigns the StreamID, the two-way relation is valid before sending an ADD command to the MG. The mechanisms or algorithms for implementing this two-way relation is out of scope of the present document and is implementation specific.

4.3 TIPHON meta-protocol media flow resource reservation

During media reservation phase or transport reservation phase for the reference point considered, a H248/MEGACO ([1], [20], [21]) TransactionRequest.Add command shall be generated for reservation of the physical path. The ContextId parameter and the TerminationId parameters shall be specified as CHOOSE value according to the H248/MEGACO ([1], [20], [21]) protocol. The StreamId parameter shall be assigned before the transmission of the transactionRequest.Add and maintained according to clause 4.2.

After the reception of the TransactionReply.Add response the meta-protocol process for media reservation or transport reservation shall continue according to the relevant specifications defined in TS 101 882-4 [22] and TS 101 882-5 [23], and depending on the result of the H248/MEGACO transaction for acceptance or rejection of the reservation. If the result of the H248/MEGACO transaction is positive, the value of the ContextId and TerminationIds given by the MG shall be stored and maintained according to clause 4.2.

For H248/MEGACO ([1], [20], [21]) the concept of reservation is not known. To align the behaviour of H248/MEGACO ([1], [20], [21]) with this concept one of the following options shall be implemented:

- the ServiceStates property of a Termination State Descriptor shall declare the Terminations as "out of service"; or
- in a topology descriptor the Terminations shall be declared isolated; or
- the mode property of LocalControl descriptor shall be coded as inactive.

4.4 TIPHON meta-protocol media flow activation

During media activation phase or transport activation phase according to the reference point considered, a H248/MEGACO ([1], [20], [21]) TransactionRequest.Modify command shall be generated for covering the activation of the physical path. The ContextId, TerminationId and StreamId parameters allocated during the reservation phase shall be used for generating the transaction.

After the reception of the TransactionReply.Modify response, the meta-protocol process for media activation or transport activation shall continue in accordance with specifications defined in TS 101 882-4 [22] and TS 101 882-5 [23], and depending of the result of the H248/MEGACO transaction for acceptance or rejection of the activation.

Depending of the option choose during the reservation phase the TransactionRequest.Modify command shall indicate one of the following modifications:

- the Terminations shall be declared "in service" if declared "out of service" during reservation; or
- a topology descriptor shall connect the Terminations when declared isolated during reservation; or
- the mode property of LocalControl descriptor shall be coded as needed when declared inactive during reservation.

4.5 TIPHON meta-protocol media flow release

During media release phase or transport release phase according to the reference point considered, a H248/MEGACO ([1], [20], [21]) TransactionRequest.Subtract command shall be generated to cover the release of the physical path. The ContextId, TerminationId and StreamId parameters allocated during the reservation phase shall be used for generating the transaction.

After the reception of the TransactionReply.Subtract response, the meta-protocol process for media release or transport release shall continue according to the relevant specifications defined in TS 101 882-4 [22] and TS 101 882-5 [23] and depending on the result of the H248/MEGACO transaction for acceptance or rejection of the release.

4.6 H248/MEGACO descriptor

For the purpose of the present document, the following descriptors are mandatory:

- ContextRequest;
- TerminationState descriptor;
- Stream descriptor;
- Local descriptor;
- Remote descriptor;
- LocalControl descriptor;
- Topology descriptor;
- Events Descriptor.
- ObservedEvents Descriptor.

4.7 H248/MEGACO properties

For the purpose of the present document, the support of H248/MEGACO properties defined in H248/MEGACO version 2 [1] annex C, and used in the present document shall be implemented.

For the purpose of the present document the support of H248/MEGACO properties defined in Base Root package (For H248/MEGACO version 2 see H.248.1 [1] annex E.2.1) shall be implemented.

For the purpose of the present document the support of H248/MEGACO properties defined in Network package (For H248/MEGACO version 2 see H.248.1 [1] annex E.11.1) shall be implemented.

For the purpose of the present document the support of H248/MEGACO properties defined in TDM circuit package (For H248/MEGACO version 2 see H.248.1 [1] annex E.13.1) shall be implemented.

For the purpose of the present document the support of H248/MEGACO properties defined in EMP package (TS 101 332 [25] clause 4.1) shall be implemented.

Support of H248/MEGACO properties defined in H248/MEGACO package not explicitly mentioned in this clause is out of scope of the present document.

Table 1 summarizes the H248/MEGACO properties, which shall be implemented to be compliant with TIPHON release 4.

Table 1: H248 packages and properties list

Package		Property			
ID	Tag	ID	Tag	Type	Defined in
annex C	0x0000	Sampling rate	0x1004	Unsigned Integer	LocalRemote
		ACodec	0x1006	OctetString	LocalRemote
		Samplepp	0x1007	Unsigned Integer	LocalRemote
		Silencesupp	0x1008	Boolean	LocalRemote
		Jitterbuff	0x100D	Unsigned Integer	LocalRemote
		PropDelay	0x100E	Unsigned Integer	LocalRemote
root	0x0002	maxNumberOfContexts	0x0001	Double	TerminationState
		maxTerminationsPerContext	0x0002	Integer	TerminationState
		normalMGExecutionTime	0x0003	Integer	TerminationState
		normalMGCExecutionTime	0x0004	Integer	TerminationState
		ProvisionalResponseTimer	0x0005	Integer	TerminationState
nt	0x000B	jit	0x0007	Integer	LocalControl
tdmc	0x000D	ec	0x0008	Boolean	LocalControl
		gain	0x000A	Enumeration	LocalControl
EMP	0x????	iface	0x0001	Integer	TerminationState
		tokenrate	0x0002	Integer	TerminationState
		phttl	0x0003	32bit Integer	LocalControl

4.8 H248/MEGACO events

For the purpose of the present document, the support of H248/MEGACO events defined in Generic Package (For H248/MEGACO version 2 see H.248.1 [1] annex E.1.2) shall be implemented.

For the purpose of the present document the support of H248/MEGACO events defined in Network package (For H248/MEGACO version 2 see H.248.1 [1] annex E.11.2) shall be implemented.

For the purpose of the present document the support of H248/MEGACO events defined in RTP package (For H248/MEGACO version 2 see H.248.1 [1] annex E.12.2) shall be implemented.

For the purpose of the present document the support of H248/MEGACO events defined in Aggregate Bearer Load Control - H.248 Package (TS 102 229 [27] clause A.1) shall be implemented.

For the purpose of the present document the support of H248/MEGACO events defined in EMP package (TS 101 332 [25] clause 4.2) shall be implemented.

Support of H248/MEGACO events defined in H248/MEGACO package not explicitly mentioned in this clause is out of scope of the present document.

Table 2 summarizes the H248/MEGACO events, which shall be implemented to be compliant with TIPHON release 4.

Table 2: H248 packages and events list

Package		Event						
ID	Tag	ID	Tag	In descriptor	Parameter	Tag	Type	
g	0x0001	cause	0x0001	ObservedEvents	Generalcause	0x0001	Enumerated	
					Failurecause	0x0002	OCTET STRING	
		sc	0x0002	ObservedEvents	SigID	0x0001	List	
					Meth	0x0002	Enumeration	
nt	0x000B	netfail	0x0005	Event	-			
				ObservedEvents	cs	0x0001	String	
		qualert	0x0006	Event	th	0x0001	Integer	
				ObservedEvents	th	0x0001	Integer	
rtp	0x000C	pltrans	0x0001	Event	-			
				ObservedEvents	rtppltype	0x0001	List of enumerated types	
aggr	0xYYYY	CapacityAlarm	0x0001	Event	mediaproperty	0x0001	Enumeration	
					highthcap	0x0002	Integer	
					lowthcap	0x0003	Integer	
				ObservedEvents	mediatype	0x0001	Enumeration	
					Capacity	0x0004	Enumeration	
		CapacityReport	0x0003	Event	0x0003	earlythcap	0x0002	Integer
						normalthcap	0x0003	Integer
				ObservedEvents	avcapacity	0x0010	Integer	
					peakcapacity	0x0011	Integer	
		aggrQoS	0x0002	Event	0x0002	aggprovbw	0x0012	Integer
						maxdelay	0x0005	Integer
						maxdelay	0x0006	Integer
						maxpacketloss	0x0007	Double
ObservedEvents	qosalarm			0x0008	Enumeration			
	maxdelay			0x0005	Integer			
	maxdelay			0x0006	Integer			
	maxpacketloss			0x0007	Double			
EMP	0x????	phtoexp	0x000A	ObservedEvents	-			

4.9 H248/MEGACO signals

For the purpose of the present document the support of H248/MEGACO signals is not mandated.

4.10 H248/MEGACO statistics

For the purpose of the present document the support of H248/MEGACO statistics defined in Network package (For H248/MEGACO version 2 see H.248.1 [1] annex E.11.4) shall be implemented.

For the purpose of the present document the support of H248/MEGACO statistics defined in RTP package (For H248/MEGACO version 2 see H.248.1 [1] annex E.12.4) shall be implemented.

For the purpose of the present document the support of H248/MEGACO statistics defined in Aggregate Bearer Load Control - H.248 Package (TS 102 229 [27] clause A.2) shall be implemented.

For the purpose of the present document the support of H248/MEGACO statistics defined in EMP package (TS 101 332 [25] clause 4.4) shall be implemented.

Support of H248/MEGACO statistics defined in H248/MEGACO package not explicitly mentioned in this clause is out of scope of the present document.

Table 3 summarizes the H248/MEGACO statistics, which shall be implemented to be compliant with TIPHON release 4.

Table 3: H248 packages and statistics list

Package		Statistic		
ID	Tag	ID	Tag	Type
nt	0x000B	dur	0x0001	Double
		os	0x0002	Double
		or	0x0003	Double
rtp	0x000C	ps	0x0004	Double
		pr	0x0005	Double
		pl	0x0006	Double
		jit	0x0007	Double
		delay	0x0008	Double
aggr	0xYYYY	avcapacity	0x000A	Integer
		peakcapacity	0x000B	Integer
		aggprovw	0x000C	Integer
		maxdelay	0x000D	Integer
		maxdelay	0x000E	Integer
		maxpacketloss	0x000F	Double
EMP	0x????	pd	0x0001	UINT64
		od	0x0002	UINT64

4.11 H248/MEGACO procedures

For the purpose of the present document the support of H248/MEGACO procedures defined in EMP package (TS 101 332 [25] clause 4.5) shall be implemented.

Support of H248/MEGACO procedures defined in H248/MEGACO package not explicitly mentioned in this clause is out of scope of the present document.

4.12 H248/MEGACO errors

The present document describes a profile that mandates certain optional parts of the H.248/MEGACO protocol ([1] to [21]) and does not mandate certain other options. General use of the error codes can be found in clause 5.3.

If an unknown H.248/MEGACO protocol ([1] to [21]) command or an information element is received, the receiver shall ignore the received item and send an appropriate error (443 - unsupported or unknown command or 444 - unsupported or unknown descriptor, 445 - unsupported or unknown property, 446 - unsupported or unknown parameter).

If a H.248/MEGACO protocol ([1] to [21]) command with a necessary information element missing is received, the receiver shall act as if the information element was received carrying the default values, or reject with the appropriate error message if there is no default value specified in the H.248/MEGACO protocol ([1] to [21]).

If an H.248/MEGACO protocol ([1] to [21]) information element is received with syntactically invalid contents the receiver shall:

- for an optional information element: ignore the information element;
- for mandatory information element and if there is default value specified in the H.248/MEGACO protocol ([1] to [21]): act as if the information element was received correctly coded carrying the default values;
- for mandatory information element and if there is no default value specified in the H.248/MEGACO protocol ([1] to [21]): reject the information element with the appropriate error message.

If an H.248/MEGACO protocol ([1] to [21]) information element is received with a value not allowed within the context of the present document, the receiver shall:

- for an optional information element: ignore the information element and pass on;
- for a mandatory information element: reject the information element with the appropriate error message.

4.13 MGC-MG control interface

For TIPHON Release 4 clause 11 of H248/MEGACO ([1], [20], [21]) shall apply without restrictions.

4.14 Management operations

TIPHON release 4 does not prescribe any management operations on MG. Behaviour regarding ServiceChange and Restart shall therefore be as specified by H248/MEGACO ([1], [20], [21]).

4.15 Supported bearer types

According to TIPHON release 4 architecture the present document describes the mapping for basic and QoS bearer.

4.16 Supported packages

The following H.248/MEGACO protocol ([1] to [21]) packages shall be supported:

- Generic package - For H248/MEGACO version 2 see H.248.1 [1] annex E.1.
- Base Root package - For H248/MEGACO version 2 see H.248.1 [1] annex E.2.
- Network package - For H248/MEGACO version 2 see H.248.1 [1] annex E.11.
- RTP package - For H248/MEGACO version 2 see H.248.1 [1] annex E.12.
- SDP H.248 package attribute - For H248/MEGACO version 2 see H.248.15 [15].
- For N3 reference point only: TDM circuit package - For H248/MEGACO version 2 see H.248.1 [1] annex E.13.
- Aggregate Bearer Load Control - H.248 Package - TS 102 229 [27].
- EMP package - TS 101 332 [25].

4.17 General note on compliance

Any options in the H.248/MEGACO protocol ([1] to [21]) not mentioned in the present document may be supported by MG, MGC or Middle box, however are outside the scope of the present document.

5 TIPHON meta-protocol to H248/MEGACO mapping

5.1 General notes

The TIPHON semantics require that when the MG returns multiple alternatives to the MGC for a termination the MG shall support whichever one the MGC chooses. Failure to support parameters for a termination offered earlier shall be considered as a fault.

To align the semantics of H.248/MEGACO protocol ([1] to [21]) and TIPHON meta-protocol, ReserveGroup field of the H.248/MEGACO LocalControl descriptor shall be set for all alternative media flow descriptions that are requested from the TIPHON functional entity and ReserveValue field of the H.248/MEGACO LocalControl descriptor shall be set for all requests where the TIPHON functional entity is given the choice to provide flow descriptions.

The optional H248/MEGACO ([1], [20], [21]) information elements: ModemDescriptor, MuxDescriptor, DigitMapDescriptor and AuditDescriptor not prescribed by the TIPHON specifications TS 101 882-4 [22], TS 101 882-5 [23], TS 101 332 [25], TS 102 108 [26] and TS 102 229 [27] are out of scope of the present document.

5.2 Code point mapping

5.2.1 Primitives mappings

As shown in figure 1, The H248/MEGACO MGC is globally part of more than one TIPHON functional entities. Moreover TIPHON functional entities described in TS 101 882-4 [22] and TS 101 882-5 [23] are themselves composed by more than one functional entity interfaced by primitives. For these reasons, it is not possible to map TIPHON primitives used for one sub functional entity to H248/MEGACO command.

TIPHON sub functional entity contained in MC, TRM, ICF, ABM, and ABAC entities shall store value of information element and fields received in their corresponding primitives. When enough information for creating a H248/MEGACO command are stored and according to the behaviours described in clauses 4.1 to 4.17, the H248/MEGACO command shall be generated and sent.

5.2.2 Binary Encoding

Tables 4 to 9 show the mapping between the TIPHON meta-protocol parameters and H248/MEGACO ([1], [20], [21]) parameters for binary encoding format.

Table 4: Metaprotocol MediaResource descriptor

Metaprotocol MediaResource descriptor		H248 StreamDescriptor	
Field	Type and/or Comments	Field	Type and/or Comments
mediaResourceHandle	INTEGER	TerminationID	See clause 4.2
rxFlowDescriptor	See table 5	LocalDescriptor	See table 5
txFlowDescriptor	See table 5	RemoteDescriptor	See table 5
connectionPriority	Normal, emergency	Emergency parameter of contextRequest	BOOLEAN

Table 5: Metaprotocol FlowDescriptor

Metaprotocol FlowDescriptor		H248 LocalRemoteDescriptor	
Field	Type and/or Comments	Field	Type and/or Comments
flowDescriptorHandle	INTEGER	StreamID	See clause 4.2
flowPriority	Normal, emergency	-	See connectionPriority field of table 4
codecDescriptor	See table 6	H248 Media Stream Properties	See table 6
transportDescriptors	See table 7	Not directly mapped	See table 7

Table 6: Metaprotocol codecDescriptor

Metaprotocol codecDescriptor		H248 Media Stream Properties		
Field	Type	PropertyID	Property tag	Type
codecId	VisibleString(SIZE(1..15))	ACodec	1006	OctetString - First part
framesPerPacket	INTEGER(0..maxFrameCount) maxFrameCount 32	Samplepp	1007	Unsigned Integer
silenceSuppressionEnabled	BOOLEAN	Silencesupp	1008	BOOLEAN
codecSpecificParameters	VisibleString	ACodec	1006	OctetString - Second part

Table 7: Metaprotocol transportDescriptor

Metaprotocol transportDescriptor		H248	
Field	Type and/or Comments	Field	Type and/or Comments
transportQoSParams	See table 8	-	See table 8
trafficDescr	See table 9	-	See table 9
ingressAddress	e164Number, e212Number, ip4Address, ip6Address	-	Not mapped
destTransportDomain	e164Number, e212Number, ip4Address, ip6Address	-	Not mapped

Table 8: Metaprotocol transportQoSParams

Metaprotocol TransportParams		H248 Media Stream Properties		
Field	Type and/or Comments	Property ID	Property tag	Type and/or Comments
maximumDelay	MicroSeconds	PropDelay	100E	Unsigned Integer
maxDelayVariation	MicroSeconds	Jitterbuff	100D	Unsigned Integer
maxMeanPacketLoss	PercentX1000	maxpacketloss	0007	Double - See TS 102 229 [27].

Table 9: Metaprotocol trafficDescriptor

Metaprotocol TrafficDescr		H248 Media Stream Properties		
Field	Type and/or Comments	Property ID	Property tag	Type and/or Comments
peakFrameRate	INTEGER(1..255)	Sampling rate	1004	Unsigned Integer
framesPerPacket	INTEGER(0..maxFrameCount) maxFrameCount 32	Samplepp	1007	Unsigned Integer

5.2.3 Text Encoding

SDP [29] is a description language for media sessions used for H248/MEGACO ([1], [20], [21]) text encoding format. The mapping therefore has no states just the code points.

Table 10 shows the SDP [29] parameters related to H248/MEGACO ([1], [20], [21]) text encoding format.

Table 10: SDP fields

Item	Line	Field Name and/or Value		Reference and/or comments
Protocol Version	v=	0		page 8 of SDP [29]
Origin field	o=	According to reference column		page 8 of SDP [29]
Session Field	s=	According to reference column		page 9 of SDP [29]
connection Field	c=	-		contain the address value of the destination
Bandwidth field	b=	modifier	CT	Conference total - Not used
			AS	Application specific
		bandwidth-value	X- Value	Extension - Not used Derived from meta-protocol fields
time field	t=	According to reference column		page 14 of SDP [29]
Media field	m=	media	audio	U-plane
			video	Not used yet
			application	Not used yet
			data	Not used yet
			control	C-plane - see TS 102 108 [26]
		port	value	Port number of the transport
		transport	RTP/AVP	U-plane
			UDP	C-plane
			Specific	Not used yet
		fmt list	value	According to the transport protocol - RTP/AVP see RFC 3551 [28]. - UDP see TS 102 108 [26]
m=h248item:	<package name>/<property name> =<value>		For H248/MEGACO version 2 see H.248.15 [15]. For code point see clause 5.2 Code point mapping	
Attribute field	a=rtptime: Applicable only if transport in preceding m line is RTP/AVP	payload type	value	identical to fmt list
		encoding name	value	see RFC 3551 [28]
		clock rate	value	Derived from meta-protocol fields
		encoding parameters	value	page 21 of SDP [29]
	a=ptime:	value		Derived from meta-protocol framesPerPacket
	a=fmtp:	format	value	identical to fmt list
		format specific parameters	value	Derived from meta-protocol codecSpecificParameters
	a=	recvonly sendonly sendreceive		See corresponding TIPHON document - TS 101 882-4 [22], TS 101 882-5 [23], TS 101 332 [25], TS 102 108 [26], TS 102 229 [27]
a=X-ToS:	value		When DiffServ is used	

5.3 Error reasons

Table 11 provides a list of H.248 error reasons that an MG shall use and their corresponding TIPHON meanings.

Table 11: Error reasons mapping

TIPHON error reason		H.248 error reason	
Reason	diagnostic	Value	Reason
NA		400	Bad Request
NA		401	Protocol Error
NA		402	Unauthorized
NA		403	Syntax Error in Transaction
NA		406	Version Not Supported
NA		410	Incorrect identifier
NA		411	The transaction refers to an unknown ContextId
NA		412	No ContextIDs available
NA		421	Unknown action or illegal combination of actions
NA		422	Syntax Error in Action
Unable to allocate resource		430	Unknown TerminationID
Unable to allocate resource		431	No TerminationID matched a wildcard
Media Resource not available		432	Out of TerminationIDs or No TerminationID available
NA		433	TerminationID is already in a Context
NA		440	Unsupported or unknown Package
NA		441	Missing RemoteDescriptor
NA		442	Syntax Error in Command
NA		443	Unsupported or Unknown Command
NA		444	Unsupported or Unknown Descriptor
NA		445	Unsupported or Unknown Property
NA		446	Unsupported or Unknown Parameter
NA		447	Descriptor not legal in this command
NA		448	Descriptor appears twice in a command
NA		450	No such property in this package
NA		451	No such event in this package
NA		452	No such signal in this package
NA		453	No such statistic in this package
NA		454	No such parameter value in this package
NA		455	Parameter illegal in this Descriptor
NA		456	Parameter or Property appears twice in this Descriptor
NA		471	Implied Add for Multiplex failure
NA		500	Internal Gateway Error
Media Resource not supported		501	Not Implemented
NA		502	Not ready
Media Resource not available		503	Service Unavailable
NA		504	Command Received from unauthorized entity
NA		505	Command Received before Restart Response
Media Resource not available		510	Insufficient resources
Media Resource not supported		512	Media Gateway unequipped to detect requested Event
Media Resource not supported		513	Media Gateway unequipped to generate requested Signals
Media Resource not supported		514	Media Gateway cannot send the specified announcement
Media Resource not supported		515	Unsupported Media Type
Media Resource not supported		517	Unsupported or invalid mode
Media Resource not available		518	Event buffer full
Media Resource not available		519	Out of space to store digit map
Media Resource not		520	Media Gateway does not have a digit map

TIPHON error reason		H.248 error reason	
Reason	diagnostic	Value	Reason
supported			
NA		521	Termination is "ServiceChangeing"
Media Resource not available		526	Insufficient bandwidth
NA		529	Internal hardware failure
NA		530	Temporary Network failure
NA		531	Permanent Network failure
NA		581	Does Not Exist

NOTE: The entries NA are stage 3 protocol error messages which do not map to TIPHON Meta-protocol (stage 2).

Annex A (informative): Bibliography

ETSI TS 101 329-3 (V2.1.2): "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; End-to-end Quality of Service in TIPHON systems; Part 3: Signalling and control of end-to-end Quality of Service (QoS)".

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History

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