INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

H.323

Annex M3

(07/2001)

SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Systems and terminal equipment for audiovisual services

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Packet-based multimedia communications systems

Annex M3: Tunnelling of DSS1 through H.323

ITU-T Recommendation H.323 – Annex M3

(Formerly CCITT Recommendation)

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ITU-T Recommendation H.323

Packet-based multimedia communications systems

ANNEX M3

Tunnellig of DSS1 through H.323

Summary

The purpose of this annex is to give guidance on tunnelling DSS1 over H.323 networks.

This annex requires ITU-T H.323 and ITU-T H.225.0 versions 4 or later. Version 4 products can be identified by H.225.0 messages containing a **protocolIdentifier** = {itu-t (0) recommendation (0) h (8) 2250 version (0) 4} and H.245 messages containing a **protocolIdentifier** = {itu-t (0) recommendation (0) h (8) 245 version (0) 7}.

Source

Annex M3 to ITU-T Recommendation H.323 was prepared by ITU-T Study Group 16 (2001-2004) and approved under the WTSA Resolution 1 procedure on 29 July 2001.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. 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 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.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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ANNEX M3

Tunnelling of DSS1 through H.323

M3.1 Scope

The purpose of this annex is to give guidance on how the generic tunnelling mechanism described in 10.4/H.323 can be used to tunnel DSS1 (Q.931) over H.323 networks. Other groups may adapt this procedure to accommodate national variants of DSS1.

M3.2 Normative 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; all 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.

[1] ITU-T Q.931 (1998), *ISDN user-network interface layer 3 specification for basic call control*.

[2] ITU-T H.323 (2000), *Packet-based multimedia communications systems*.

[3] ITU-T H.225.0 (2000), *Call signalling protocols and media stream packetization for packet-based multimedia communication systems*.

[4] ITU-T H.450.1 (1998), *Generic functional protocol for the support of supplementary services in H.323*.

M3.3 Endpoint procedures

Endpoints supporting tunnelling of DSS1 information shall use the procedures of 10.4/H.323, with the following OBJECT IDENTIFIER used as the **TunnelledProtocol.id. tunnelledProtocolObjectID** in a H.225.0 call signalling message or in the H.225.0 RAS message:

- **{itu-t (0) recommendation (0) q (17) 931}**

  Endpoints supporting tunnelling of DSS1 information and then acting as DSS1 User entity shall use the procedures of 10.4/H.323, with the following value used as the **TunnelledProtocol.subIdentifier**:

- **"User"**

  Endpoints supporting tunnelling of DSS1 information and then acting as DSS1 network entity shall use the procedures of 10.4/H.323, with the following following value used as the **TunnelledProtocol.subIdentifier**:

- **"Network"**

  When sending a H.225.0 RAS message requesting a specific tunnelled protocol (see 10.4.2/H.323) in the **desiredTunnelledProtocol** field an endpoint has to include the OBJECT IDENTIFIER and subidentifier of the protocol it expects from the other side to ensure proper gatekeeper functionality.

DSS1 is an asymmetrical protocol and can only be used between one user and one network entity. By using different OBJECT IDENTIFIERS for user and network entities, the H.323 endpoints can ensure that no DSS1 tunnelling takes place between two user or two network entities.

H.225.0 messages tunnel the entire message, unchanged, starting with the Protocol discriminator field, and ending with the other information elements. The binary content of the DSS1 messages is encoded as an OCTET STRING in:

- **H323-UU-PDU.tunnelledSignallingMessage.messageContent**

Since the binary encoding of DSS1 messages is what is tunnelled, the integrity of the DSS1 messages is fully preserved, including any BER encoding of ASN.1 in Facility or Notification indicator information elements.

DSS1 messages can be tunnelled in the corresponding H.225.0 message or in H.225.0 FACILITY messages. For example, the DSS1 SETUP message may be tunnelled in a H.225.0 SETUP message, and the DSS1 RELEASE COMPLETE message may be tunnelled in an H.225.0 RELEASE COMPLETE message. For other messages, it is possible that the corresponding H.225.0 message may not be supported (e.g. a DSS1 CONNECT ACK message), not available because it has already been sent or not transparently transported end-to-end. In those cases, the DSS1 message shall be tunnelled in an H.225.0 FACILITY message. In particular, the H.225.0 SETUP ACKNOWLEDGE or CALL PROCEEDING messages shall not be used for tunnelling of a DSS1 message, because it may not reach the originating H.225.0 endpoint, if an intermediate Gatekeeper has already sent such a message. Instead, for tunnelling of a DSS1 SETUP ACKNOWLEDGE or CALL PROCEEDING message, first a H.225.0 SETUP ACKNOWLEDGE or CALL PROCEEDING message without a tunnelled DSS1 message shall be sent, followed by a H.225.0 FACILITY message tunnelling the DSS1 SETUP ACKNOWLEDGE or DSS1 CALL PROCEEDING message. Also, DSS1 STATUS and STATUS ENQUIRY messages shall be tunnelled in a H.225.0 FACILITY message, to ensure, that the DSS1 messages reach the H.225.0 endpoint.

DSS1 call clearing procedures may be supported by tunnelling the DSS1 DISCONNECT and RELEASE messages in the H.225.0 FACILITY message.

A single DSS1 call may be tunnelled in a single H.323 call. The DSS1 call reference is selected by the ingress endpoint and shall be the same in all tunnelled DSS1 messages for an H.323 call. However, the DSS1 call reference value in a TDM network is unique on a peer DSS1 entity basis. In an H.323 system, there is no peer DSS1 entity basis since any H.323 call may terminate on any endpoint. To ensure uniqueness, the H.323 call reference value should be used for identifying the H.323 call only.

The DSS1 tunnelling procedures shall not be used in conjunction with the H.450.1 procedures in the same call.

Table M3.1 illustrates the relationship between tunnelled DSS1 messages and enveloping H.225.0 messages.

Table M3.1/H.323 – Relationship between tunnelled DSS1 messages and enveloping H.225.0 messages

Q.931/Q.932 message	H.225.0 message	Remark
Call establishment messages		
ALERTING	ALERTING	
CALL PROCEEDING	FACILITY	
CONNECT	CONNECT	
CONNECT ACKNOWLEDGE	FACILITY	
INFORMATION	FACILITY	Support of H.225.0 INFORMATION message is optional
PROGRESS	FACILITY	Support of H.225.0 PROGRESS message is optional
SETUP	SETUP	
SETUP ACKNOWLEDGE	FACILITY	
Call clearing messages		
DISCONNECT	FACILITY	
RELEASE	FACILITY	
RELEASE COMPLETE	RELEASE COMPLETE	
Call Information messages		
RESUME	For further study	
RESUME ACKNOWLEDGE	For further study	
RESUME REJECT	For further study	
SUSPEND	For further study	
SUSPEND ACKNOWLEDGE	For further study	
SUSPEND REJECT	For further study	
USER INFORMATION	FACILITY	
Miscellaneous messages		
CONGESTION CONTROL	FACILITY	
NOTIFY	FACILITY	Support of H.225.0 NOTIFY message is optional
STATUS	FACILITY	
STATUS ENQUIRY	FACILITY	
FACILITY	FACILITY	
HOLD	FACILITY	
HOLD ACKNOWLEDGE	FACILITY	
HOLD REJECT	FACILITY	
RETRIEVE	FACILITY	
RETRIEVE ACKNOWLEDGE	FACILITY	
RETRIEVE REJECT	FACILITY	
NOTE – DSS1 messages with global call reference e.g. RESTART, RESTART ACK and STATUS may be treated by the endpoints and therefore they may not be tunnelled.		

M3.4 Tunnelling of bearer-independent DSS1 signalling

For tunnelling of the bearer-independent transport mechanisms of DSS1 as described in 6.3.2/Q.932, no H.245 control channel and no media channels are required.

The call signalling procedures of H.225.0 may be used to establish a call independent signalling connection between the peer endpoints, as described in 10.4/H.323. For details on this call independent signalling connection, see also 6.2/H.450.1.

M3.4.1 DSS1 connectionless transport

The DSS1 connectionless transport mechanism as described in 6.3.2.2/Q.932 is based on FACILITY messages using the dummy call reference value.

Each such DSS1 FACILITY message shall be transported in a separate H.225.0 connection, which shall be cleared immediately after reaching the terminating side.

In particular, a DSS1 FACILITY message shall be transported in a H.225.0 SETUP message, as described in 10.4/H.323 and 6.2/H.450.1. The terminating side (but no intermediate Gatekeeper) shall clear this connection immediately with a H.225.0 RELEASE COMPLETE message. Additionally, the entity sending the H.225.0 SETUP message shall clear the call after receiving expiry of an appropriately chosen timer which has been started after sending the H.225.0 SETUP message.

M3.4.2 DSS1 bearer-independent connection-oriented transport

The DSS1 bearer-independent connection-oriented transport mechanism as described in 6.3.2.1/Q.932 is based on connections initiated with REGISTER messages.

Here, the following message mapping shall apply:

Q.931/Q.932 message	H.225.0 message	Remark
REGISTER	SETUP	The H.225.0 SETUP message shall be used to set up a call-independent signalling connection as described in 6.2/H.450.1. The H.225.0 SETUP message shall be acknowledged with a H.225.0 CONNECT message in order to prevent call clearing after T303 expiry.
FACILITY	FACILITY	
RELEASE COMPLETE	RELEASE COMPLETE	

M3.5 Gatekeeper procedures

A gatekeeper participating in a call where DSS1 tunnelling is used between the endpoints should pass along tunnelled DSS1 messages unchanged unless it intends to participate in the DSS1 procedures and terminate the DSS1 protocol. This may be the case when a gatekeeper is offering DSS1 services.

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