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Infrastructure of audiovisual services – Supplementary services for multimedia

Multiple-message release sequence capability within H.323 systems

ITU-T Recommendation H.460.16

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Multiple-message release sequence capability within H.323 systems

Summary

This Recommendation specifies a mechanism that allows H.323 endpoints to negotiate and use a multiple-message release sequence.

FOREWORD

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ITU-T Recommendation H.460.16

Multiple-message release sequence capability within H.323 systems

1 Scope

This Recommendation specifies a mechanism, using the generic extensibility framework defined in ITU-T Rec. H.460.1, which allows endpoints to use a multiple-message release sequence rather than the single release complete message procedure defined in ITU-T Rec. H.225.0. It includes the capability for one endpoint to inform the other that it supports and will use the alternate multiple-message release sequence.

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 Recommendation H.225.0 (2003), *Call signalling protocols and media stream packetization for packet-based multimedia communication systems*.

– ITU-T Recommendation H.323 (2003), *Packet-based multimedia communications systems*.

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

3 Introduction

The call control signalling defined in ITU-T Rec. H.225.0 is based on Q.931 signalling. ITU-T Rec. Q.931 defined a multiple-message sequence to be used between the user and the network to control release of a connection. This used the disconnect message from the user as a request to release a connection, and then the release and release complete messages to actually release the connection. This allowed additional information to be passed in both directions during the disconnect process and allowed the initiator of the disconnect to supervise the operation and to retransmit the request in case of failure.

ITU-T Rec. H.225.0 does not use the disconnect and release messages and, therefore, depends on a single message without acknowledgement by the application. While this suffices for many cases, some applications require the functionality of a multiple-message sequence for release of a connection. Further, an occasional loss of the release complete message could cause significant problems.

This Recommendation, using the generic extensibility framework, provides the capability with H.225.0 of performing the multiple-message release sequence of a connection in a way that is analogous to Q.931. The H.225.0 facility message is used for the additional messages of the sequence, with the addition of the GEF parameter defined herein to distinguish its place and function in the sequence.

The multiple-message release sequence may be used to provide additional capabilities such as:

1) supervision of acknowledgement of release and repetition in case of failure;

2) inclusion of supplemental information in both directions during the release procedure;

3)   provision of in-band tones and announcements;

4)   full coordination of release of resources;

5)   called user release control.

4   Feature description

4.1   H.501 signalling

When a Gatekeeper uses the H.501 access request procedures to request that another gatekeeper perform address resolution, it may indicate the requirement for support of the MMRS feature by inclusion of the MMRS parameters. The responding gatekeeper shall use this information in the selection of a location, which matches the address and complies with any MMRS support requirement.

4.2   RAS signalling

4.2.1   Registration

Support for the MMRS feature shall be indicated by the endpoint in an RRQ when the endpoint initially attempts to register. This shall indicate that MMRS will be supported by the endpoint if requested and it may indicate if support for MMRS is required for all calls to and from this endpoint. A gatekeeper may reject a registration due to the lack of support for MMRS by inclusion of **neededFeatureNotSupported** in the **rejectReason** in the RRJ, for example, if the gatekeeper knows that all calls in the network must use the MMRS procedures. The **desiredFeatures** field shall not be used to carry the MMRS parameter in an RRQ.

4.2.2   Location request

When an endpoint sends an LRQ to the gatekeeper for address resolution, it may indicate the requirement or desire for MMRS support by inclusion of the MMRS indication in either the **neededFeatures** or the **desiredFeatures** field. The gatekeeper shall use this information for the selection of a location, which matches the address and complies with any MMRS support requirement.

4.2.3   Admission request

Support for the MMRS feature for an individual call is negotiated between an endpoint and gatekeeper at call set-up time as part of the admission request procedure. For this purpose, an endpoint that supports this feature shall include the feature descriptor defined in 5.1 in **supportedFeatures** and may include the **neededFeatures** in the ARQ message in order to indicate whether the endpoint requires support for MMRS for the calls for which admission is being requested. If support for the feature is not indicated, a gatekeeper may reject an ARQ due to the lack of support for MMRS by the endpoint by inclusion of **neededFeatureNotSupported** in the **rejectReason** in the ARJ, for example, if the network or destination endpoint requires the use of MMRS.

The MMRS parameter shall not be including in the **desiredFeatures** field in RAS admission request signalling, since support either is or is not required. Further, the "MMRS Sse Required" parameter shall not be used, since support always implies that it can be used if required by call signalling.

4.3   Call signalling – negotiation

The required or optional use of the MMRS procedure shall be negotiated by the two ends exchanging call-signalling messages using the Setup message and the first positive response to that

setup. Positive responses are the setup acknowledge, alerting, call proceeding, progress, and connect messages.

4.3.1 Setup

If the calling endpoint supports the MMRS feature, but does not require the called endpoint to support it, it shall include the MMRS feature identifier in the **supportedFeatures** field in the setup to indicate its support for the feature. If the calling endpoint requires that the called party supports the MMRS feature as a condition for setting up the call, it shall include the MMRS feature identifier in the **neededFeatures** field. The MMRS feature identifier shall not be including in the **desiredFeatures** field since support either is or is not required.

In addition, the setup may also include the "MMRS Use Required" parameter to indicate that the feature must be used by the responder if the responder initiates release of this call.

In summary, the following combinations of supported, needed, and use required are possible in the setup message:

Case	Supported (by sender)	(Support) needed (by responder)	Use required
1	Yes	No	No
2	Yes	Yes	No
3	Yes	Yes	Yes

4.3.2 Response

Depending on the contents of the setup messages, the response shall be as follows:

• If the setup indicated that support for MMRS by the responder is not required, the first positive response to setup may contain the **supportFeatures** field indicating that the responder supports the feature. In addition, the response message may include the "MMRS Use Required" parameter to indicate that the feature must be used by the other endpoint if the other endpoint initiates release of this call.

Otherwise, the absence of the MMRS feature indication in the **supportedFeatures** field indicates that the responder does not support MMRS. The originator and responder shall continue to set up the call as normal.

• If the setup indicated that support for MMRS is needed (required) but that use of the feature is not required for this call, the first positive response to setup may contain the **supportFeatures** field indicating that the responder supports the feature. In addition, the response message may include the "MMRS Use Required" parameter to indicate that the responder requires that the feature be used by the other endpoint if the other endpoint initiates release of this call.

Otherwise, the absence of the MMRS feature indication in the **supportedFeatures** field indicates that the responder does not support MMRS. The responder shall continue to set up the call as normal, however the originator may decide to release the call setup.

• If the setup indicated that MMRS must be used for this call, the first positive response to setup may contain the MMRS feature indication in the **supportedFeatures** to indicate that the responder supports the feature and will use it to release calls. Otherwise, the absence of the MMRS feature indication in the **supportedFeatures** field indicates that the responder does not support MMRS or cannot use it for this call, in which case the originator may release the call setup.

4.4 Call signalling – release

4.4.1 Facility message encoding

The function of the Q.931 disconnect and release messages are provided by the H.225.0 facility message. The corresponding fields of the facility message shall be used to carry the information normally in the disconnect and release messages. Those additional fields, which are not defined in H.225.0 as being included in the facility message but are required in the release sequence shall be encoded in the "MMRS Additional IEs" parameter.

4.4.2 Facility message procedures

The "MMRS Procedure" parameter shall be used in facility messages between endpoints and gatekeepers and between endpoints to indicate the procedure to be used to release the connection.

Either end may initiate the release procedure, independent of which one originally established the call. The "originator" in the following description refers to the end, which initiates the release.

When sending the first facility message of the MMRS, the originator shall include the "MMRS procedure" parameter to indicate one of the following:

1)   "treat as Q.931 Disconnect message", that is, it is a request for the other end to begin a release procedure which may include delays or time-outs before the actual release occurs. The originator shall set T305 or T306.

2)   "treat as Q.931 Release message", that is, it must be responded to immediately with the release complete message, and if not, the originator will repeat the message. The originator shall set T308.

It should be noted that, as in ITU-T Rec. Q.931, the use of the first "treat as Q.931 Disconnect message" is optional and the procedure functions properly if the first message sent is the "treat as Q.931 Release message". When the MMRS parameters exchanged indicates that MMRS must be used for this call, the "treat as Q.931 Disconnect message" is optional and its use depends on other factors such as the need to provide in-band tones and announcements.

The action taken by the responder shall be as follows:

Upon receipt of a facility message indicated as "treat as Q.931 Disconnect message", the responder may apply timeouts, or other feature specific procedures, before sending the response. Upon completion of such specific procedures, the responder shall send a facility message indicated as "treat like Q.931 Release message" and shall set T308.

Upon receipt of a facility message indicated as "treat as Q.931 Release message", the responder shall immediately return a release complete message.

Upon receipt of a release complete message, the responder shall clear all resources and not return any message, that is, it shall operate as defined in ITU-T Rec. H.225.0.

Further procedures for timeouts, message repetition, and treatment of glare shall be as defined in ITU-T Rec. Q.931. In addition, upon time-out of T308 the second time, the endpoint shall send a release complete message.

4.5 Call signalling timers

In addition to the timers defined in ITU-T Rec. H.225.0, the following additional timers are used with the MMRS feature (see Tables 9-1/Q.931 and 9-2/Q.931):

1)   T305 defines how long the sender of a facility message marked as "treat as Q.931 Disconnect message" should wait for a response facility message before taking other action. It is set when facility marked as "treat as Q.931 Disconnect message" without progress indicator No. 8 is sent. Its default value is 30 seconds.

2)   T306 defines how long the sender of a facility message marked as "treat as Q.931 Disconnect message" should wait for a response facility message before taking other action. It is set when facility marked as "treat as Q.931 Disconnect message" with progress indicator No. 8 is sent. Its default value is 30 seconds (see 7.2.2.23/H.225.0 and 4.5.23/Q.931).

3)   T308 defines how long the sender of a facility message marked as "treat as Q.931 Release message" should wait for a response release complete message before taking other action, either resending the facility message or entering failure procedures. Its default value is 4 seconds.

5   Generic data usage

When sending the MMRS parameter in H.501 access request and service request messages, it shall be coded in the **common.genericData** field of the message.

When sending the MMRS parameter in H.225.0 RAS messages, the parameter shall be coded in the **genericData** field in the request parameter of the H.225.0 **RasMessage**.

When sending the MMRS parameter in the H.225.0 call signalling messages, it shall be coded in the **genericData** field in the H.225.0 H323-UU-PDU in the user-user information element.

The **genericData** parameter indicates the MMRS feature and contains the MMRS parameters.

5.1   Multiple-message release sequence feature

Table 1 defines the multiple-message release sequence feature.

Table 1/H.460.16 – Multiple-message release sequence feature

Feature name	Multiple-message release sequence
Feature Description	This feature allows one end to inform the other that it intends to use the multiple-message release sequence procedure or that it is using it.
Feature identifier type	Standard
Feature identifier value	16

5.2   Multiple-message release sequence parameters

Tables 2 to 4 define the multiple-message release sequence parameters.

Table 2/H.460.16 – Multiple-message release sequence use parameter

Parameter name	MMRS use required
Parameter description	This parameter is sent in H.225.0 call signalling setup/response messages to indicate that the MMRS procedures must be used for this call.
Parameter identifier type	Standard
Parameter identifier value	1
Parameter type	No content
Parameter cardinality	Zero or one

Table 3/H.460.16 – Multiple-message release sequence procedure parameter

Parameter name	MMRS procedure
Parameter description	This parameter is sent in the H.225.0 facility message to indicate how this message should be interpreted in supporting the MMRS procedures.
Parameter identifier type	Standard
Parameter identifier value	2
Parameter type	number8
Parameter valid values	1 = treat as Q.931 disconnect message 2 = treat as Q.931 release message
Parameter cardinality	Zero or one.

Table 4/H.460.16 – Multiple-message release sequence additional IEs parameter

Parameter name	MMRS additional IEs
Parameter description	This parameter is sent in the H.225.0 call signalling facility message to pass additional information elements not defined in facility which are contained in the Q.931 disconnect and release messages.
Parameter identifier type	Standard
Parameter identifier value	3
Parameter type	raw
Parameter cardinality	Zero or one
NOTE – The MMRS additional IEs parameter is used to pass the cause, progress, and signal information elements defined in the Q.931 disconnect and release messages. The binary representation of the required IEs shall be contained in the raw parameter (similar to the procedure defined in ITU-T Rec. H.460.5).	

6 Message flows

This clause provides message flows for the use of the MMRS procedure. In each case, the originating endpoint in the figure is the one, which initiates the release, not the one, which sets up the call.

6.1 Three-message sequence

When the signalling during call setup has determined that both endpoints support the MMRS procedure, the message flow for call release using three messages is as shown in Figure 1.
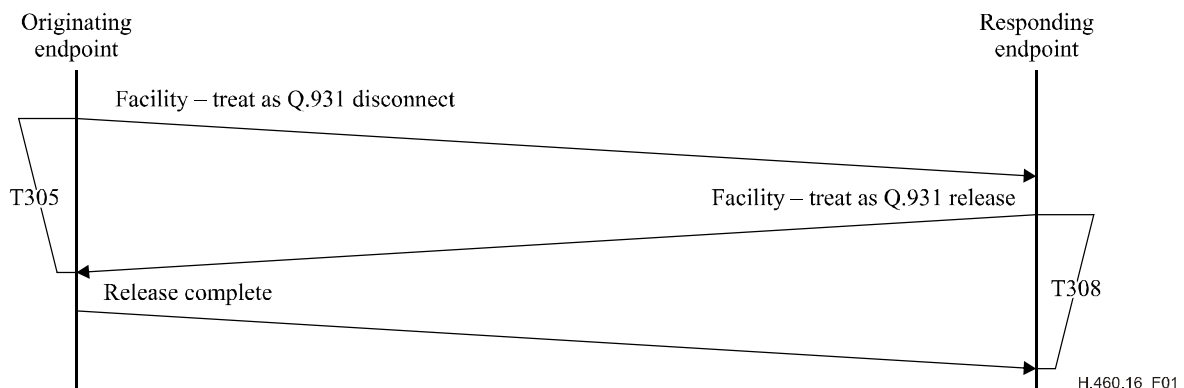

Figure 1/H.460.16 – Message flow for three-message sequence

6.2 Time-outs

If a time-out occurs while waiting for the response facility or release complete message, the appropriate message is repeated or a new message is sent. Figure 2 shows the case of the three-message procedure when all messages from the responding endpoint are lost, causing multiple time-outs at the originating endpoint. (Since T308 is generally much less than T305, several timeouts may also occur at the responding endpoint in this example.)
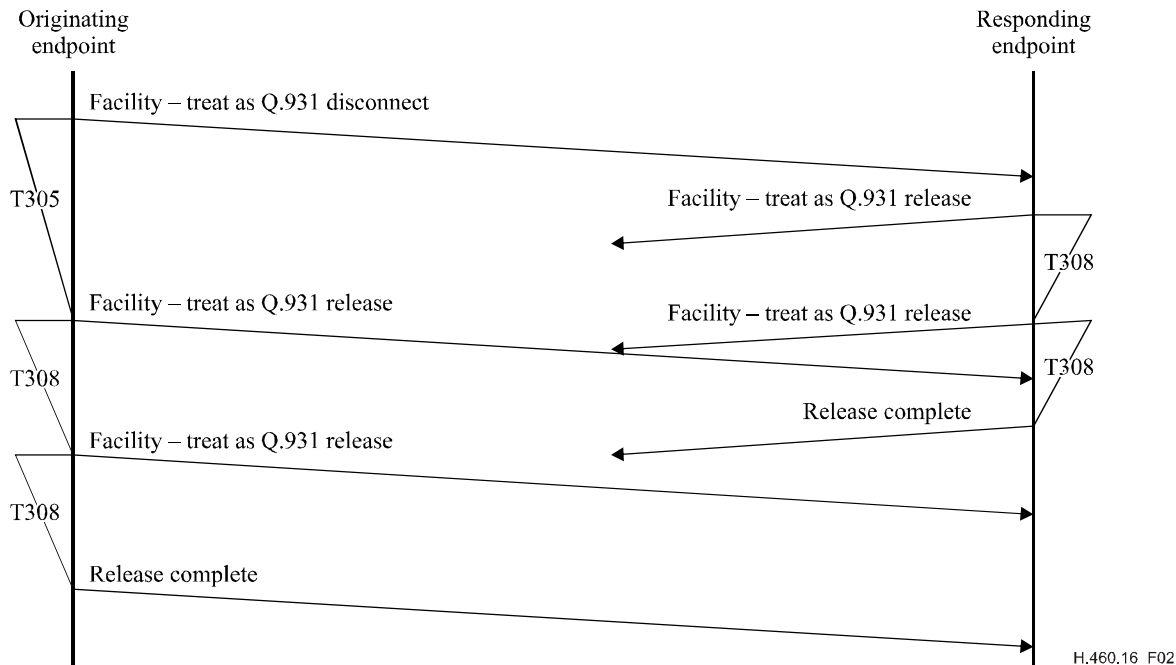

Figure 2/H.460.16 – Time-outs

6.3 Two-message sequence

When the signalling during call setup has determined that both endpoints support the MMRS procedure, the message flow for call release using two messages is as shown in Figure 3. In this case, the originating endpoint does not use the optional "treat as Q.931 Disconnect" message.
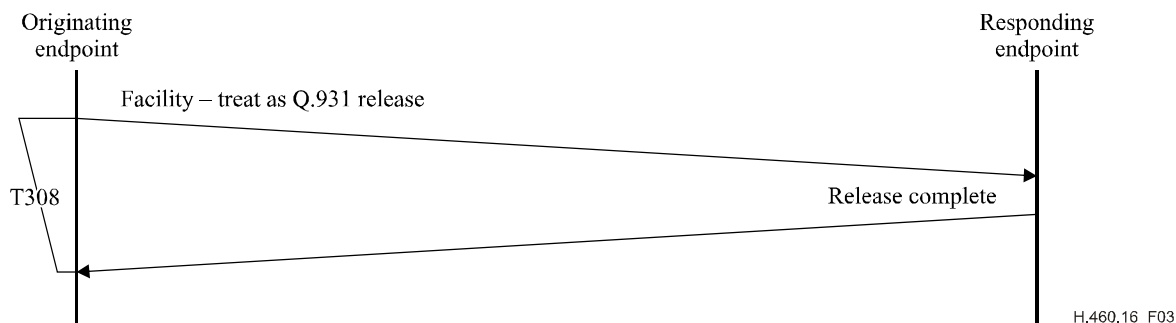

Figure 3/H.460.16 – Message flow for two-message sequence

6.4 Simultaneous initiation of two-message MMRS procedure

When the signalling during call setup has determined that both endpoints support the MMRS procedure, if both endpoints initiate call release at the same instant, the messages will cross. The resulting message flow is shown in Figure 4.
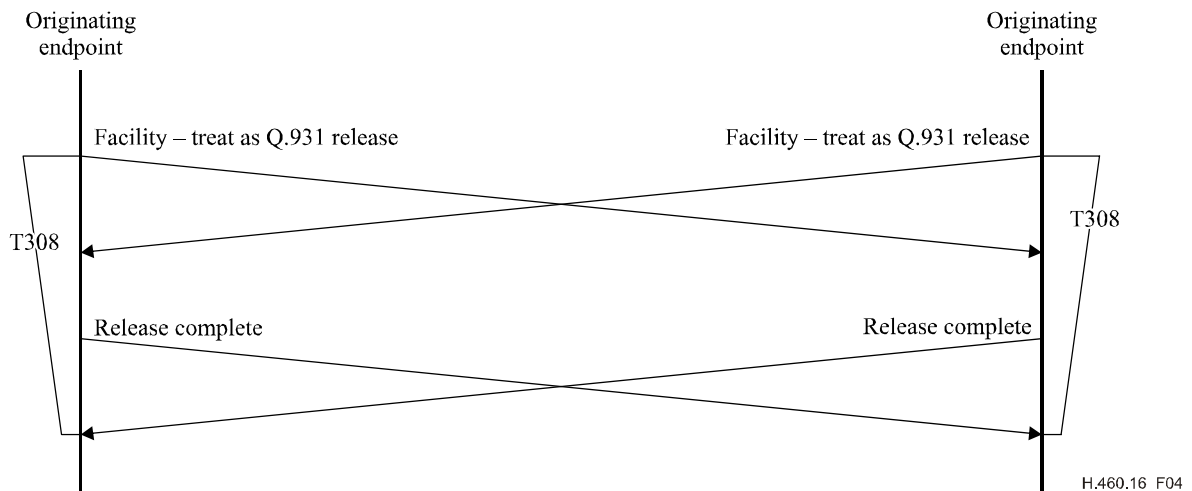

**Figure 4/H.460.16 – Message flow for simultaneous initiation
of two-message MMRS procedure**

6.5 Simultaneous initiation of two- and three-message MMRS procedures

When the signalling during call setup has determined that both endpoints support the MMRS procedure, if both endpoints initiate call release at the same instant, the messages will cross. If one initiates the two-message sequence and the other the three-message sequence, the resulting message flow is shown in Figure 5.
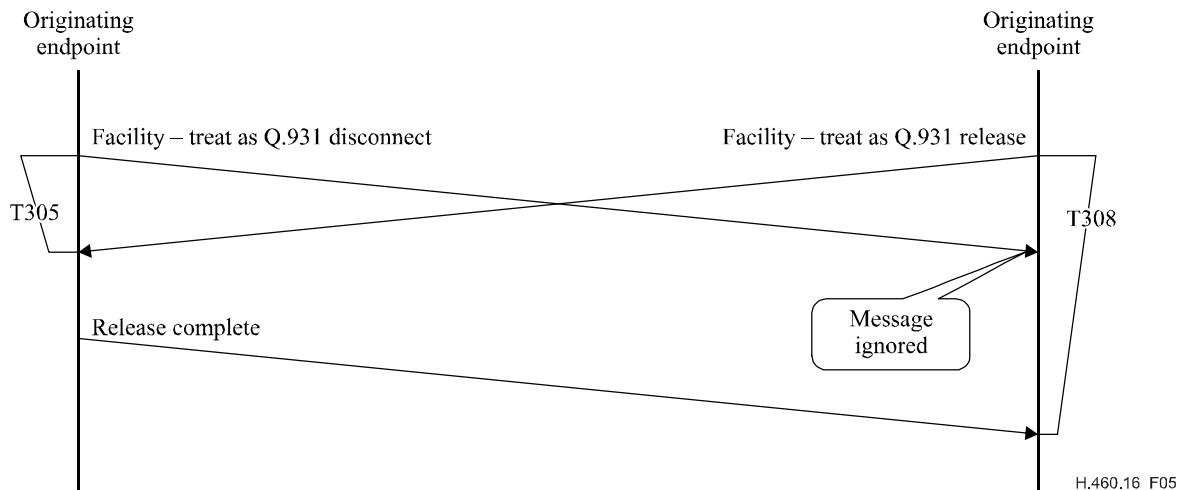

**Figure 5 /H.460.16 – Message flow for simultaneous initiation
of two-message MMRS procedure**

6.6 Simultaneous initiation of MMRS and H.225.0 procedures

When the signalling during call setup has determined that both endpoints support but do not require that the MMRS procedure be used, if both endpoints initiate call release using different procedures at the same instant, the different messages will cross. The resulting message flow is shown in Figure 6. In this case, the endpoint, which initiated the three-message sequence, will receive the normal H.225.0 release complete message in response and treat it as the proper response. The endpoint, which initiated the H.225.0 single message sequence, will receive the facility, which it will ignore.
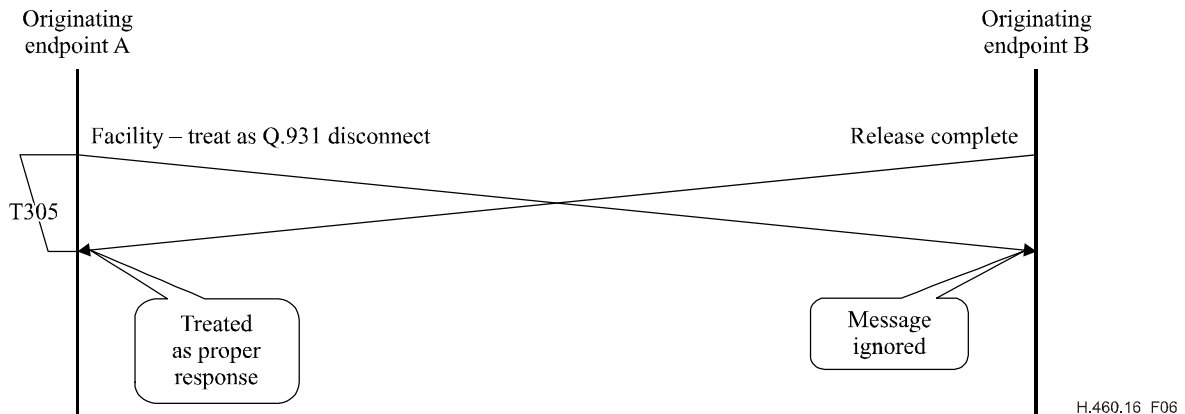

Figure 6/H.460.16 – Message flow for simultaneous initiation of both procedures

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