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SERIES Q: SWITCHING AND SIGNALLING

Broadband ISDN – B-ISDN application protocols for
access signalling

Digital subscriber signalling system No. 2 – Connection modification: Peak cell rate modification by the connection owner

ITU-T Recommendation Q.2963.1

(Formerly CCITT Recommendation)

ITU-T Q-SERIES RECOMMENDATIONS
SWITCHING AND SIGNALLING

SIGNALLING IN THE INTERNATIONAL MANUAL SERVICE	Q.1–Q.3
INTERNATIONAL AUTOMATIC AND SEMI-AUTOMATIC WORKING	Q.4–Q.59
FUNCTIONS AND INFORMATION FLOWS FOR SERVICES IN THE ISDN	Q.60–Q.99
CLAUSES APPLICABLE TO ITU-T STANDARD SYSTEMS	Q.100–Q.119
SPECIFICATIONS OF SIGNALLING SYSTEMS No. 4 AND No. 5	Q.120–Q.249
SPECIFICATIONS OF SIGNALLING SYSTEM No. 6	Q.250–Q.309
SPECIFICATIONS OF SIGNALLING SYSTEM R1	Q.310–Q.399
SPECIFICATIONS OF SIGNALLING SYSTEM R2	Q.400–Q.499
DIGITAL EXCHANGES	Q.500–Q.599
INTERWORKING OF SIGNALLING SYSTEMS	Q.600–Q.699
SPECIFICATIONS OF SIGNALLING SYSTEM No. 7	Q.700–Q.849
DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 1	Q.850–Q.999
PUBLIC LAND MOBILE NETWORK	Q.1000–Q.1099
INTERWORKING WITH SATELLITE MOBILE SYSTEMS	Q.1100–Q.1199
INTELLIGENT NETWORK	Q.1200–Q.1699
SIGNALLING REQUIREMENTS AND PROTOCOLS FOR IMT-2000	Q.1700–Q.1799
BROADBAND ISDN	Q.2000–Q.2999
General aspects	Q.2000–Q.2099
Signalling ATM adaptation layer (SAAL)	Q.2100–Q.2199
Signalling network protocols	Q.2200–Q.2299
Common aspects of B-ISDN application protocols for access signalling and network signalling and interworking	Q.2600–Q.2699
B-ISDN application protocols for the network signalling	Q.2700–Q.2899
B-ISDN application protocols for access signalling	Q.2900–Q.2999

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

Digital subscriber signalling system No. 2 – Connection modification: Peak cell rate modification by the connection owner

Summary

This ITU-T Recommendation defines the operation of the Digital Subscriber Signalling System No. 2 (DSS2) for the handling of the Connection characteristics modification feature that may be supported, as a network option, at the T_B or at the coincident S_B and T_B reference point of the User-to-Network Interface of the Broadband Integrated Services Digital Network (B-ISDN). This edition of ITU-T Recommendation Q.2963.1 has been prepared to align the inconsistencies in ITU-T Recommendation Q.2963.1 (07/96), and to be consistent with ITU-T Recommendation Q.2931 by which the encoding of the Broadband report type information element is aligned in conjunction with Amendment 4/Q.2931.

Source

ITU-T Recommendation Q.2963.1 was revised by ITU-T Study Group 11 (1997-2000) and approved under the WTSC Resolution 1 procedure on 3 December 1999.

FOREWORD

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The World Telecommunication Standardization Conference (WTSC), 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 WTSC 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.

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CONTENTS

Page

1	Scope.....	1
2	References.....	1
3	Definitions	1
4	Abbreviations.....	2
5	Description.....	2
5.1	Modifiable connections.....	2
5.2	Modification of a point-to-point connection.....	2
5.3	Increasing or decreasing the Peak Cell Rate	3
6	Operational requirements.....	3
6.1	Provision and withdrawal	3
6.2	Requirements on the originating network side	3
6.3	Requirements on the destination network side	3
7	Primitive and state definitions	3
7.1	Primitive definitions	3
7.2	State definitions	3
8	Coding requirements.....	4
8.1	Messages.....	4
8.1.1	MODIFY REQUEST.....	4
8.1.2	MODIFY ACKNOWLEDGE.....	5
8.1.3	MODIFY REJECT	5
8.2	Coding of specific message types and specific information elements.....	5
8.2.1	Coding of specific message types.....	5
8.2.2	Coding of specific information elements.....	6
9	Signalling procedures at the coincident S_B and T_B reference point.....	6
9.1	Modification procedures at the requesting entity.....	6
9.1.1	Modification request.....	6
9.1.2	Modification acknowledgement	6
9.1.3	Indication of modification rejection	7
9.1.4	Response to STATUS messages while in the modify request state	7
9.1.5	No response to modification request	8
9.2	Modification procedures at the responding entity.....	8
9.2.1	Modification indication	8
9.2.2	Modification acceptance.....	8
9.2.3	Modification confirmation.....	9
9.2.4	Modification rejection	9

	Page
9.2.5 Exceptional procedures.....	9
9.3 Transit entity conveyance of CONNECTION AVAILABLE messages.....	10
10 Procedures at the T _B reference point for interworking with private B-ISDNs	10
11 Interworking with other networks.....	10
12 Interworking with supplementary services	10
13 Parameter values	10
13.1 Timers at the requesting entity.....	10
13.2 Timers at the responding entity.....	11
13.3 Timers at the transit entity	11
14 Dynamic description SDLs	11
Annex A – Message flow diagrams for modification	28
Appendix I – Example configuration of user and network behaviour uring modification procedures	30
Appendix II – Guidelines for the use of Instruction indicators.....	32

ITU-T Recommendation Q.2963.1

Digital subscriber signalling system No. 2 – Connection modification: Peak cell rate modification by the connection owner

1 Scope

This ITU-T Recommendation specifies the signalling protocol for peak cell rate modification for the Broadband Integrated Services Digital Network (B-ISDN) at the T_B reference point or coincident S_B and T_B reference point (as defined in ITU-T Recommendation I.413 [1]) by means of the Digital Subscriber Signalling System No. 2 (DSS2). It is the initial Recommendation in a family of Recommendations that concern the modification of ATM traffic parameters in B-ISDN connections.

In addition, this ITU-T Recommendation specifies the protocol requirements at the T_B reference point where the service is provided to the user via a private B-ISDN.

The capability described in this ITU-T Recommendation enables the connection owner to modify the peak cell rate for call/connections that have already been established.

Peak cell rate modification is applicable to all connection-oriented telecommunication services that are based on single point-to-point calls/connections. The peak cell rate modification for point-to-multipoint calls/connections is outside the scope of this ITU-T Recommendation.

This ITU-T Recommendation is applicable to equipment, supporting peak cell rate modification, to be attached at either side of a T_B reference point or coincident S_B and T_B reference point when used as an access to the public B-ISDN.

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, 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 Recommendation I.413 (1993), *B-ISDN user-network interface*.
- [2] ITU-T Recommendation Q.2931 (1995) plus Amd.1 (06/97), Amd.2 (03/99), Amd.3 (03/99), and Amd.4 (12/99), *Digital Subscriber Signalling System No. 2 – User-Network Interface (UNI) layer 3 specification for basic call/connection control*.
- [3] ITU-T Recommendation Q.2961.1 (1995), *Additional signalling capabilities to support traffic parameters for the tagging option and the sustainable cell rate parameter set*.

3 Definitions

This ITU-T Recommendation defines the following terms:

3.1 addressed user: The end user involved in the call that is the recipient of the connection modification request.

3.2 connection modification: The alteration of the characteristics of an established connection with regard to its traffic parameters under the control of the user (connection owner).

3.3 connection owner: One who initiates a connection is the connection owner. There is only one connection owner per connection.

3.4 initiating user: The end user involved in the call that requests the modification of the connection.

3.5 terminating entity: An end user that terminates the modification procedure.

3.6 transit entity: An entity that does not terminate the modification procedure.

3.7 requesting entity: An entity that requests modification. A requesting entity may be a terminating entity or a transit entity.

3.8 responding entity: An entity that receives a modifications request. A responding entity may be a terminating entity or a transit entity.

4 Abbreviations

The abbreviations of Annex J/Q.2931 [2] apply. For the purposes of this ITU-T Recommendation, no new abbreviations are required in addition.

5 Description

The basic capabilities supported by this ITU-T Recommendation are applicable for:

- 1) In a given direction, all the specified traffic parameters must be requested to be modified either for increase or decrease. Increase of traffic parameters in one direction and decrease of traffic parameters in the other direction is possible within a single modification request.
- 2) Increasing the PCR.
- 3) Decreasing the PCR.
- 4) Modifying a point-to-point connection (Type 1).
- 5) Modifications may be initiated only by the connection owner for a call/connection that is already established (i.e. in the active state). Call/connections that are in the process of being established or cleared cannot be modified.

The following subclauses describe each capability in more detail.

5.1 Modifiable connections

Modification can only be requested by the connection owner for connections which are already established. Therefore, connections which are being established, modified, or cleared cannot be modified.

In the case where clearing is requested of a connection which is being modified, the clearing operation has priority. This results in termination of the modification procedure, i.e. no more messages related to the modification procedure are sent across the user-network interface.

Modification shall not be requested for emulated N-ISDN services; however, a transit entity shall not reject any request for this reason.

5.2 Modification of a point-to-point connection

This ITU-T Recommendation only supports the modification of the attributes of a point-to-point connection (Type 1).

5.3 Increasing or decreasing the Peak Cell Rate

In this ITU-T Recommendation, only the increase or decrease of the Peak Cell Rate (PCR) is specified. When increasing or decreasing PCR, the following rule applies:

- the modification initiating user is prepared to receive based on an ATM traffic descriptor for which the backward parameters are the greater of the existing backward traffic parameters and of the requested modified backward traffic parameters; and
- the modification initiating user transmits based on an ATM traffic descriptor for which the forward traffic parameters are the lesser of the existing forward traffic parameters and of the requested modified forward traffic parameters.

In a given direction, the PCR for CLP = 0 and the PCR for CLP = 0 + 1 can be modified in the same modification request. In this case, the modified parameters in the given direction shall all be increased or all be decreased. In a given direction, a given parameter can only be modified if that parameter was specified for that direction during call establishment.

During the operation of modifying the ATM traffic parameters of a connection, the service application supported by the affected connection remains active.

NOTE – During the modification the connection remains usable for the application, with the above constraints.

When the OAM traffic descriptor information element is included at call/connection establishment, the allocation of bandwidth for OAM flows is based on the ATM traffic descriptor agreed. Since the OAM F5 flow allocation is bidirectional, the available user cell rate in one direction can be affected by modification of bandwidth in the other direction.

6 Operational requirements

The provision of the connection modification capability is a service provider option.

6.1 Provision and withdrawal

It is a user and a network option to provide the procedures described in this ITU-T Recommendation. If implemented, the procedures of this ITU-T Recommendation may be provided as a subscription option to the served user on the origination side.

6.2 Requirements on the originating network side

See 6.1 above.

6.3 Requirements on the destination network side

See 6.1 above.

7 Primitive and state definitions

7.1 Primitive definitions

Clause 8/Q.2931 [2] shall apply. No additional primitives between DSS2 layer 3 and the Signalling ATM Adaptation Layer are defined for the purpose of this ITU-T Recommendation.

7.2 State definitions

The call/connection states listed in 2.1/Q.2931 [2] shall apply with the following additions:

7.2.1 modify requested (U/N 13): A MODIFY REQUEST message has been sent to the other side of the interface.

7.2.2 modify received (U/N 14): A MODIFY REQUEST message has been received from the other side of the interface.

7.2.3 State values

The call state values listed in Table 4-11/Q.2931 [2] shall apply with the following additions:

Bit

6 5 4 3 2 1	User state	Network state
0 0 1 1 0 1	U13-Modify requested	N13-Modify requested
0 0 1 1 1 0	U14-Modify received	N14-Modify received

8 Coding requirements

8.1 Messages

For the establishment/clearing of call/connections, the messages described in ITU-T Recommendation Q.2931 [2] as modified by ITU-T Recommendation Q.2961.1 [3] remain valid, and do not have to be enhanced. In order to support the modification of the connections, the following messages should be supported:

MODIFY REQUEST

MODIFY ACKNOWLEDGE

MODIFY REJECT

8.1.1 MODIFY REQUEST

This message is sent from the modification requesting entity to the modification responding entity to request modification of a single connection. See Table 8-1.

Table 8-1/Q.2963.1 – MODIFY REQUEST message content

Message type: MODIFY REQUEST Significance: Global Direction: Both				
Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	8.2.1/Q.2963.1	Both	M	2
Message length	4.4/Q.2931	Both	M	2
ATM traffic descriptor (Notes 3, 4)	4.5/Q.2931	Both	M	8-20 (Note 2)
Notification indicator	4.5/Q.2931	Both	O (Note 1)	4-*
NOTE 1 – This indicator may be present whenever notification is delivered. NOTE 2 – All four peak cell rate parameters are optional but at least one shall be present. NOTE 3 – In a given direction, the PCR for CLP = 0 and the PCR for CLP = 0 + 1 can be modified in the same modification request. In this case, the modified parameters in the given direction shall all be increased or all be decreased. NOTE 4 – In a given direction, a given parameter can only be specified if that parameter was specified for that direction during call establishment.				

8.1.2 MODIFY ACKNOWLEDGE

This message is sent by the modification responding entity to indicate that the modify request is accepted. See Table 8-2.

Table 8-2/Q.2963.1 – MODIFY ACKNOWLEDGE message content

Message type: MODIFY ACKNOWLEDGE Significance: Global Direction: Both				
Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	8.2.1/Q.2963.1	Both	M	2
Message length	4.4/Q.2931	Both	M	2
Notification indicator	4.5/Q.2931	Both	O (Note 1)	4-*
Broadband report type	4.5.25/Q.2931	Both	O (Note 2)	5
NOTE 1 – This indicator may be present whenever notification is delivered.				
NOTE 2 – Included when the addressed user requires confirmation of the success of modification in the addressed user to initiating user direction.				

8.1.3 MODIFY REJECT

This message is sent by the modification responding entity to indicate that the modify connection request is rejected. See Table 8-3.

Table 8-3/Q.2963.1 – MODIFY REJECT message content

Message type: MODIFY REJECT Significance: Global Direction: Both				
Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	8.2.1/Q.2963.1	Both	M	2
Message length	4.4/Q.2931	Both	M	2
Notification indicator	4.5/Q.2931	Both	O (Note)	4-*
Cause	4.5/Q.2931	Both	M	6-34
NOTE – This indicator may be present whenever notification is delivered.				

8.2 Coding of specific message types and specific information elements

8.2.1 Coding of specific message types

Table 8-4 shows message type (octet 1) code points for the messages defined in 8.1. These are in addition to the values shown in Table 4-4/Q.2931 [2].

Table 8-4/Q.2963.1 – Specific connection modification message types

Message type (octet 1)												
Bits												
8	7	6	5	4	3	2	1					
1	0	0	0	1	0	0	0	MODIFY REQUEST				
1	0	0	0	1	0	0	1	MODIFY ACKNOWLEDGE				
1	0	0	0	1	0	1	0	MODIFY REJECT				

8.2.2 Coding of specific information elements

For the establishment/clearing of call/connections, the information elements described in ITU-T Recommendations Q.2931 [2] and Q.2961.1 [3] remain valid, and do not have to be enhanced.

9 Signalling procedures at the coincident S_B and T_B reference point

The procedures for modification of connection characteristics are specified between modification requesting and responding entities. A requesting entity or a responding entity may be a terminating entity (i.e. end user at the coincident S_B and T_B reference point) or a transit (i.e. network) entity.

These procedures are additional to those specified in ITU-T Recommendation Q.2931 [2].

An illustration of the resource reservation and allocation procedures is given in Appendix I.

9.1 Modification procedures at the requesting entity

9.1.1 Modification request

To request modification of a call/connection in the active state the entity shall:

- if a terminating entity:
 - reserve corresponding resources if increase of ATM traffic parameters is requested;
 - reduce the transmitting ATM traffic parameters when decrease is requested;
- if a transit entity:
 - reserve corresponding resources if increase of ATM traffic parameters is requested;
- send a MODIFY REQUEST message with the call reference of the active call/connection including an ATM traffic descriptor information element describing the requested connection characteristics;
- start Timer T360; and
- enter the modify requested state (U/N 13).

9.1.2 Modification acknowledgement

On reception of a MODIFY ACKNOWLEDGE message in the modify requested state, the requesting entity shall:

- if a terminating entity:
 - allocate corresponding resources (i.e. the connection defined by the requested ATM traffic descriptor is available for use);
 - send a CONNECTION AVAILABLE message if the MODIFY ACKNOWLEDGE message contains a broadband report type information element indicating that confirmation of modification is required;