INTERNATIONAL TELECOMMUNICATION UNION

ITU-T Q.2965.1

(03/99)

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

SERIES Q: SWITCHING AND SIGNALLING

Broadband ISDN – B-ISDN application protocols for access signalling

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Digital subscriber signalling system No. 2 – Support of Quality of Service classes

ITU-T Recommendation Q.2965.1

(Previously CCITT Recommendation)

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ITU-T RECOMMENDATION Q.2965.1

DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 2 – SUPPORT OF QUALITY OF SERVICE CLASSES

Summary

This Recommendation is part of the DSS2 family of ITU-T Recommendations. It specifies the revision of the Quality of Service (QoS) parameter information element coding from that which was specified in the first edition of Recommendation Q.2931 (1995) in order to enable the signalling of Quality of Service (QoS) classes defined in Recommendation I.356 (1996).

Source

ITU-T Recommendation Q.2965.1 was prepared by ITU-T Study Group 11 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 15th of March 1999.

FOREWORD

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The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 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

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As of the date of approval of this Recommendation, the ITU had not 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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Recommendation Q.2965.1

DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 2 – SUPPORT OF QUALITY OF SERVICE CLASSES

(Geneva,1999)

1 Scope

The Q.2965-series Recommendations covers the support of quality of service indication 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 Recommendation I.413 [10] by means of the Digital Subscriber Signalling System No. 2 (DSS2). This Recommendation defines DSS2 protocol formats and procedures that support the indication of Quality of Service-related capabilities.

This Recommendation is part of the DSS2 family of ITU-T Recommendations. It specifies the revised coding of the Q.2931 [2] Quality of Service parameter information element specifically to enable the identification of the QoS class (see Recommendation I.356 [1]).

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 addition 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.356 (1996), *B-ISDN ATM layer cell transfer performance.*

[2] ITU-T Recommendation Q.2931 (1995), *Digital subscriber signalling system No. 2 – User-Network Interface (UNI) layer 3 specification for basic call/connection control, plus Amendment 1*.

[3] ITU-T Recommendation Q.2971 (1995), *Digital subscriber signalling system No. 2 – User-Network Interface (UNI) layer 3 specification for point-to-multipoint call/connection control*.

[4] ITU-T Recommendation Q.2961.2 (1997), *Digital subscriber signalling system No. 2 – Additional traffic parameters*: *Support of ATM transfer capability in the broadband bearer capability information element*.

[5] ITU-T Recommendation I.371 (1996), *Traffic control and congestion control in B-ISDN*.

[6] ITU-T Recommendation Q.2961.3 (1997), *Digital subscriber signalling system No. 2 – Additional traffic parameters*: *Signalling capabilities to support traffic parameters for the available bit rate (ABR) ATM transfer capability*.

[7] ITU-T Recommendation Q.2961.4 (1997), *Digital subscriber signalling system No. 2 – Additional traffic parameters*: *Signalling capabilities to support traffic parameters for the ATM Block Transfer (ABT) ATM transfer capability*.

[8] ITU-T Recommendation Q.2961.6 (1998), *Digital subscriber signalling system No. 2 – Additional traffic parameters*: *Additional signalling procedures for the support of the SBR 2 and the SBR 3 ATM transfer capabilities*.

[9] ITU-T Recommendation Q.2934 (1998), Digital subscriber signalling system No. 2 – Switched virtual path capability.

[10] ITU-T Recommendation I.413 (1993), *B-ISDN user-network interface*.

3 Definitions

The definitions in Annex J/Q.2931[2] apply. In addition, the definitions of QoS classes as defined in clause 8/I.356 [1] apply.

4 Abbreviations

The abbreviations in Annex J/Q.2931 [2] apply. In addition, this Recommendation uses the following abbreviations:

ABR	Available Bit Rate
ABT-DT	ATM Block Transfer with Delayed Transmission
ABT-IT	ATM Block Transfer with Immediate Transmission
ATC	ATM Transfer Capability
BTC	Broadband Transfer Capability
DBR	Deterministic Bit Rate ATM transfer capability
FR	Frame Relay
MBS	Maximum Burst Size
MCR	Minimum Cell Rate
PCR	Peak Cell Rate
RM	Resource Management
SBR1	SBR configuration 1 ATM transfer capability
SBR2	SBR configuration 2 ATM transfer capability
SBR3	SBR configuration 3 ATM transfer capability
SCR	Sustainable Cell Rate

5 Description

This clause specifies the revision of the Quality of Service (QoS) parameter information element coding as specified by Recommendation Q.2931 [2] in order to enable the identification of the Quality of Service (QoS) classes as defined in Recommendation I.356 [1]).

While establishing a new ATM connection (VP or VC), the calling user can signal a QoS class from among those presented in Table 1. As the connection is established, the network commits to support the requested QoS class by progressing the call towards the called user. If the network is unable to support the requested QoS class, the network shall clear the call. As long as the user complies with the traffic contract, the network should support the requested QoS characteristics for the duration of the call (see clause 8/I.356 [1]).

This Recommendation extends the capabilities described in the Q.2961-series Recommendations in that the QoS class is explicitly requested during call establishment whereas in the Q.2961 series, the QoS class is requested using QoS class value 0 and therefore the QoS class is implicitly requested by

the selected parameters of the Broadband bearer capability information element and the ATM traffic descriptor information element.

6 Operation requirements

6.1 Provision and withdrawal

The QoS class indication shall be included in signalling messages by the user as specified in this Recommendation.

6.2 Requirements at the originating network side

The procedures according to clause 9 shall apply.

6.3 Requirements at the terminating network side

The procedures according to clause 9 shall apply.

7 Primitives

No new primitives are required to support this capability.

8 Coding requirements

8.1 Quality of Service parameter

The purpose of the Quality of Service (QoS) parameter information element is to indicate a requested QoS class to be provided by the network. The use of the Quality of Service parameter information element in relation to compatibility checking is described in Annex B/Q.2931 [2].

The Quality of service parameter information element is coded as shown in Figure 1 and Table 1. The maximum length of this information element is 6 octets.

8	7	6	5	4	3	2	1	Octets
Quality of Service parameter information element identifier								1
0	1	0	1	1	1	0	0	
1	Coding		IE instruction field					2
ext.	standard		Flag	Res.	IE action ind.			
								3
Length of Quality of Service parameter information element contents								4
QoS class for the forward direction								5
QoS class for the backward direction								6 (Note)

NOTE – Not significant in the case of point-to-multipoint connections (Q.2971 [3]).

Figure 1/Q.2965.1 – QoS parameter information element

Table 1/Q.2965.1 – QoS parameter information element

QoS class forward (Octet 5)

Bits

8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 0	No specific QoS class explicitly requested (Note 1)
0 0 0 0 0 0 0 1	Class 1 (Stringent class) (Note 2)
0 0 0 0 0 0 1 0	Class 2 (Tolerant class) (Note 2)
0 0 0 0 0 0 1 1	Class 3 (Bi-level class) (Note 2)
0 0 0 0 0 1 0 0	U Class (Unbounded class) (Note 2)
1 1 1 1 1 1 1 1	Reserved (Note 3)

All other values are reserved.

QoS class backward (Octet 6)

Bits

8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 0	No specific QoS class explicitly requested (Note 1)
0 0 0 0 0 0 0 1	Class 1 (Stringent class) (Note 2)
0 0 0 0 0 0 1 0	Class 2 (Tolerant class) (Note 2)
0 0 0 0 0 0 1 1	Class 3 (Bi-level class) (Note 2)
0 0 0 0 0 1 0 0	U Class (Unbounded class) (Note 2)
1 1 1 1 1 1 1 1	Reserved (Note 3)

All other values are reserved.

NOTE 1 – When used, the network shall provide and guarantee a quality of service compatible and consistent with the requirements indicated in the Broadband bearer capability. In this case, the QoS to be provided is the implicitly requested QoS class associated to the requested ATM transfer capability (e.g. see Recommendations Q.2961.2 [4], Q.2961.3 [6], Q.2961.4 [7], Q.2961.6 [8] or Q.2934 [9]).

NOTE 2 – This QoS class is defined in Recommendation I.356 [1].

NOTE 3 – This value is reserved to promote backward compatibility with the first edition of Recommendation Q.2931 (1995).

9 Signalling procedures at the coincident S_B and T_B reference point

The procedures for basic call/connection control as defined in clause 5/Q.2931 [2] shall apply. Only additional procedures to handle the signalling of QoS classes (see Recommendation I.356 [1]) are described in the following subclauses.

9.1 Connection establishment at the originating interface

The procedures in 5.1.3/Q.2931 [2] shall apply, modified by the following additional procedures.

The parameters specified in the Broadband bearer capability information element, the ATM traffic descriptor information element and the QoS parameter information element of the SETUP message shall be consistent. Annex A specifies the valid combination of the bearer class, broadband transfer capability, ATM traffic descriptor parameters and QoS classes.

The forward QoS class and the backward QoS class shall be the same.

If the network receives a SETUP message with a valid combination of traffic parameters but with a QoS class which the network is unable to support, it shall reject the call by returning a RELEASE COMPLETE message with cause #49, *"Quality of service unavailable"*.

If a SETUP message is received with a combination of traffic parameters and QoS class, excluding the tagging field, which is not a valid combination specified in Annex A, a RELEASE COMPLETE message shall be returned with cause #73, *"Unsupported combination of traffic parameters"*.

9.2 Call/Connection establishment at destination interface

The procedures in 5.2.4/Q.2931 [2] and B.3.2/Q.2931 [2] shall apply, modified by the following additional procedures.

The parameters specified in the Broadband bearer capability information element, the ATM traffic descriptor information element and the QoS parameter information element of the SETUP message shall be consistent. Annex A specifies the valid combination of the bearer class, broadband transfer capability, ATM traffic descriptor parameters and QoS classes.

The forward QoS class and the backward QoS class shall be the same.

If the user receives a SETUP message with a valid combination of traffic parameters but with a QoS class which the user is unable to support, it shall reject the call by returning a RELEASE COMPLETE message with cause #49, *"Quality of service unavailable"*.

If a SETUP message is received with a combination of traffic parameters and QoS class, excluding the tagging field, which is not a valid combination specified in Annex A, a RELEASE COMPLETE message shall be returned with cause #73, *"Unsupported combination of traffic parameters"*.

10 Signalling procedures at T_B reference point for interworking with private B-ISDNs

The signalling procedures defined in clause 9 apply. No specific procedures are defined at T_B reference point.

ANNEX A

Valid combinations of bearer class, broadband transfer capability, ATM traffic descriptor parameters and QoS classes

The parameters specified in the Broadband bearer capability information element, the ATM traffic descriptor information element, and the QoS parameter information element of the SETUP message shall be consistent.

Recommendations Q.2961.2 [4], Q.2961.3 [6], Q.2961.4 [7], Q.2961.6 [8] and Q.2934 [9] specify the valid combinations of bearer class, broadband transfer capability and ATM traffic descriptors when the requested QoS class value is 0 ("No specific QoS class explicitly requested").

In addition and for each of the I.371 [5] ATM transfer capability, Table A.1 shows the valid combinations of bearer class, broadband transfer capability, ATM traffic descriptor parameters when the requested QoS class value is different from 0 (i.e. when an I.356 [1] QoS class is explicitly requested).

Table A.1 covers the recommended association of I.371 [5] ATM transfer capabilities with I.356 [1] QoS classes as described in Table 4/I.356 [1].

Table A.1/Q.2965.1 – DBR: Valid combinations of traffic and QoS-related parameters in the SETUP message *(part 1 of 5)*

Broadband bearer capability			
Bearer class	A, X, FR or VP	A, X, FR or VP	A, X, FR or VP
BTC (value)	7	7	7
Traffic descriptor for a given direction			
PCR (CLP = 0)			
PCR (CLP = 0 + 1)	S	S	S
{SCR, MBS} (CLP = 0)			
{SCR, MBS} (CLP = 0 + 1)			
Signalled QoS class	1	2	4
Requested I.371 [5] ATC	DBR	DBR	DBR
Explicitly requested I.356 [1] QoS class	Class 1	Class 2	U Class

Table A.1/Q.2965.1 – SBR1: Valid combinations of traffic and QoS-related parameters in the SETUP message *(part 2 of 5)*

Broadband bearer capability			
Bearer class	C, X, FR or VP	C, X, FR or VP	C, X, FR or VP
BTC (value)	11	11	11
Traffic descriptor for a given direction			
PCR (CLP = 0)			
PCR (CLP = 0 + 1)	S	S	S
{SCR, MBS} (CLP = 0)			
{SCR, MBS} (CLP = 0 + 1)	S	S	S
Signalled QoS class	1	2	4
Requested I.371 [5] ATC	SBR1	SBR1	SBR1
Explicitly requested I.356 [1] QoS class	Class 1	Class 2	U Class

Table A.1/Q.2965.1 – ABT: Valid combinations of traffic and QoS-related parameters in the SETUP message *(part 3 of 5)*

Broadband bearer capability						
Bearer class	A, C, X, FR or VP	A, C, X, FR or VP	A, C, X, FR or VP	A, C, X, FR or VP	A, C, X, FR or VP	A, C, X, FR or VP
BTC (value)	16	16	16	17	17	17
Traffic descriptor for a given direction						
PCR (CLP = 0)						
PCR (CLP = 0 + 1)	S	S	S	S	S	S
{SCR, MBS} (CLP = 0)						
{SCR, MBS} (CLP = 0 + 1)	Note	Note	Note	Note	Note	Note
PCR (RM)	S	S	S	S	S	S
Signalled QoS class	1	2	4	1	2	4
Requested I.371 [5] ATC	ABT-DT	ABT-DT	ABT-DT	ABT-IT	ABT-IT	ABT-IT
Explicitly requested I.356 [1] QoS class	Class 1	Class 2	U Class	Class 1	Class 2	U Class
NOTE – Optional. When not specified, SCR (CLP = 0 + 1) is equal to 0 and MBS (CLP = 0 + 1) is equal to 1.						

Table A.1/Q.2965.1 – ABR: Valid combinations of traffic and QoS-related parameters in the SETUP message *(part 4 of 5)*

Broadband bearer capability		
Bearer class	C, X, FR or VP	C, X, or FR or VP
BTC (value)	12	12
Traffic descriptor for a given direction		
PCR (CLP = 0)		
PCR (CLP = 0 + 1)	S	S
{SCR, MBS} (CLP = 0)		
{SCR, MBS} (CLP = 0 + 1)		
ABR MCR	Note	Note
Signalled QoS class	3	4
Requested I.371 [5] ATC	ABR	ABR
Explicitly requested I.356 [1] QoS class	Class 3	U Class
NOTE – Optional in the user-to-network direction. Mandatory in the network-to-user direction and at the T_B reference point.		

Table A.1/Q.2965.1 – SBR2/SBR3: Valid combinations of traffic and QoS-related parameters in the SETUP message *(Part 5 of 5)*

Broadband bearer capability				
Bearer class	C, X, FR or VP	C, X, FR or VP	C, X, FR or VP	C, X, FR or VP
BTC (value)	20	20	21	21
Traffic descriptor for a given direction				
PCR (CLP = 0)				
PCR (CLP = 0 + 1)	S	S	S	S
{SCR, MBS} (CLP = 0)	S	S	S	S
{SCR, MBS} (CLP = 0 + 1)				
Signalled QoS class	3	4	3	4
Requested I.371 [5] ATC	SBR2	SBR2	SBR3	SBR3
Explicitly requested I.356 [1] QoS class	Class 3	U Class	Class 3	U Class

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