

High-Speed Connections Version 1.0 Specification

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1 Introduction

[Informative]

In the ATM Traffic Descriptor and other information elements used in UNI Signalling 4.1, PNNI 1.1, AINI 1.1 and their predecessors, cell rates are encoded using three-octet fields. This represents a maximum rate of approximately 7.1 Gigabits per second. Devices with 10 Gigabits-per-second interfaces based on af-phy-0133.001 can potentially require the establishment of a connection that exceeds the maximum rate that can be signalled with the three-octet encoding scheme in the ATM Traffic Descriptor.

This specification defines the method for encoding cell rates in the ATM Traffic Descriptor and other information elements, using a four-octet value in place of the three-octet value when any of the cell rates exceed 2^{24} cells per second. This represents a maximum rate of approximately 1.8 Terabits per second. The three-octet encoding scheme is still used when all of the cell rates are below 2^{24} cells per second, in order to maintain backwards compatibility.

1.1 Applicability

[Normative]

This specification is an optional addendum to UNI Signalling 4.1, PNNI 1.1, as amended by PNNI 1.1 Errata, and AINI 1.1.

1.1.1 Applicability to PNNI 1.0

Devices supporting PNNI 1.0 may implement the functionality defined in this addendum by treating this addendum as if it were an optional addendum to the PNNI 1.0 specification and the PNNI 1.0 Errata and PICS addendum. No new PNNI 1.1 features are required for support of high-speed connections.

1.1.2 Applicability to UNI Signalling 4.0

Devices supporting UNI Signalling 4.0 may implement the functionality defined in this addendum by treating this addendum as if it were an optional addendum to the UNI Signalling 4.0 specification. No new UNI Signalling 4.1 features are required for support of high-speed connections.

1.1.3 Applicability to AINI

Devices supporting AINI may implement the functionality defined in this addendum by treating this addendum as if it were an optional addendum to AINI. No new AINI features are required for support of high-speed connections.

2 References

- [Q.2931] Broadband Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling System No. 2 (DSS 2) – User-Network Interface (UNI) Layer 3 Specification for Basic Call/Connection Control, February 1995
- [Q2931a4] Digital Subscriber Signalling System No. 2 User-Network Interface (UNI) Layer 3 specification for basic call/connection control Amendment 4, ITU-T Recommendation Q.2931 – Amendment 4, December 1999
- [Q.2961.1] Broadband Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling System No. 2 (DSS 2) – Additional Traffic Parameters, October 1999
- [Q.2963.1] Digital Subscriber signalling system No. 2 – Connection modification: Peak cell rate modification by the connection owner, December 1999
- [Q.2963.2] Digital Subscriber signalling system No. 2 – Connection modification: Modification procedures for sustainable cell rate parameters, September 1997
- [Q.2963.3] Digital Subscriber signalling system No. 2 – Connection modification: ATM traffic descriptor modification with negotiation by the connection owner, May 1998
- [af-sig-0061.000] ATM User-Network Interface (UNI) Signalling Specification Version 4.0, July 1996
- [af-sig-0061.002] ATM User-Network Interface (UNI) Signalling Specification Version 4.1, April 2002
- [af-cs-0147.000] UBR with MDCR Addendum to UNI Signalling 4.0, PNNI 1.0 and AINI, July 2000
- [af-cs-0148.001] Modification of Traffic Parameters for an Active Connection Signalling Specification, July 2000
- [af-cs-0167.000] Guaranteed Frame Rate (GFR) Signalling (PNNI, AINI and UNI) Version 1.0, August 2001
- [af-pnni-0055.000] Private Network-Network Interface Specification Version 1.0 (PNNI 1.0), March 1996
- [af-pnni-0081.000] PNNI v1.0 Errata and PICs, July 1997
- [af-pnni-0055.002] Private Network-Network Interface Specification Version 1.1 (PNNI 1.1), April 2002
- [af-pnni-0205.000] PNNI 1.1 Errata Version 1.0, July 2005
- [af-sig-0125.000] ATM Inter-Network Interface (AINI) Specification, July 1999
- [af-sig-0125.002] ATM Inter-Network Interface (AINI) Specification Version 1.1, September 2002

3 Information Element Coding for High-Speed Connections

3.1 ATM Traffic Descriptor Information Element

Modify Figure 4-13/Q.2931 to add an “*” to octet groups 7 and 8.

The following octet groups and notes are added to Figure 4-13/Q.2931, as modified by Figure 1/Q.2961.1.

High rate forward peak cell rate identifier (CLP = 0)								25*
1	1	0	0	0	0	1	0	(Note 1,5)
High rate forward peak cell rate identifier (CLP = 0)								25.1*
								25.2*
								25.3*
								25.4*
High Rate Backward peak cell rate identifier (CLP = 0)								26*
1	1	0	0	0	0	1	1	(Note 1,5)
High Rate Backward peak cell rate identifier (CLP= 0)								26.1*
								26.2*
								26.3*
								26.4*
High Rate Forward peak cell rate identifier (CLP= 0 + 1)								27*
1	1	0	0	0	1	0	0	(Note 1,5)
High Rate Forward peak cell rate identifier (CLP = 0 + 1)								27.1*
								27.2*
								27.3*
								27.4*
High Rate Backward peak cell rate identifier (CLP = 0 + 1)								28*
1	1	0	0	0	1	0	1	(Note 1,5)
High Rate Backward peak cell rate identifier (CLP = 0 + 1)								28.1*
								28.2*
								28.3*
								28.4*

High Rate Forward Sustainable Cell Rate identifier (CLP = 0)								29*
1	1	0	0	1	0	0	0	(Note 2,5)
								29.1*
								29.2*
High Rate Forward Sustainable cell rate identifier (CLP = 0)								29.3*
								29.4*
High Rate Backward Sustainable Cell Rate identifier (CLP = 0)								30*
1	1	0	0	1	0	0	1	(Note 2,5)
								30.1*
								30.2*
High Rate Backward Sustainable cell rate identifier (CLP = 0)								30.3*
								30.4*
High Rate Forward Sustainable Cell Rate identifier (CLP = 0 + 1)								31*
1	1	0	1	0	0	0	0	(Note 2,5)
								31.1*
								31.2*
High Rate Forward Sustainable cell rate identifier (CLP = 0 + 1)								31.3*
								31.4*
High Rate Backward Sustainable Cell Rate identifier (CLP = 0 + 1)								32*
1	1	0	1	0	0	0	1	(Note 2,5)
								32.1*
								32.2*
High Rate Backward Sustainable cell rate identifier (CLP = 0 + 1)								32.3*
								32.4*

High Rate Forward Maximum Burst Size identifier (CLP = 0)								33*
1	1	1	0	0	0	0	0	(Note 2,5)
_____								33.1*
_____								33.2*
High Rate Forward Maximum Burst Size identifier (CLP = 0)								33.3*
_____								33.4*
High Rate Backward Maximum Burst Size identifier (CLP = 0)								34*
1	1	1	0	0	0	0	1	(Note 2,5)
_____								34.1*
_____								34.2*
High Rate Backward Maximum Burst Size identifier (CLP = 0)								34.3*
_____								34.4*
High Rate Forward Maximum Burst Size identifier (CLP = 0 + 1)								35*
1	1	1	1	0	0	0	0	(Note 2,5)
_____								35.1*
_____								35.2*
High Rate Forward Maximum Burst Size identifier (CLP = 0 + 1)								35.3*
_____								35.4*
High Rate Backward Maximum Burst Size identifier (CLP = 0 + 1)								36*
1	1	1	1	0	0	0	1	(Note 2,5)
_____								36.1*
_____								36.2*
High Rate Backward Maximum Burst Size identifier (CLP = 0 + 1)								36.3*
_____								36.4*
High Rate Forward Minimum Cell Rate identifier (CLP = 0 + 1)								37*
1	1	0	1	0	0	1	0	(Note 3,5)
_____								37.1*
_____								37.2*
High Rate Forward Minimum Cell Rate identifier (CLP = 0 + 1)								37.3*
_____								37.4*
High Rate Backward Minimum Cell Rate identifier (CLP = 0 + 1)								38*
1	1	0	1	0	0	1	1	(Note 3,5)
_____								38.1*
_____								38.2*
High Rate Backward Minimum Cell Rate identifier (CLP = 0 + 1)								38.3*
_____								38.4*

High Rate Forward Burst Cell Tolerance								39*
1	1	1	1	1	0	1	0	(Note 4,5)
								41.1*
								41.2*
High Rate Forward Burst Cell Tolerance								41.3*
								41.4*
High Rate Backward Burst Cell Tolerance								40*
1	1	1	1	1	0	1	1	(Note 4,5)
								42.1*
								42.2*
High Rate Backward Burst Cell Tolerance								42.3*
								42.4*

NOTES

- 1 Encoding of octet groups 25-28 shall use the encoding rules for octet groups 5-8, as specified in 4.5.6/Q.2931, using four octets in place of three octets.
- 2 Encoding of octet groups 29-36 shall use the encoding rules for octet groups 9-16, as specified in 1.9.1/Q.2961.1, using four octets in place of three octets.
- 3 Encoding of octet groups 37-38 shall use the encoding rules for octet groups 19-20, as specified in 10.1.2.3/af-cs-0061.002, using four octets in place of three octets.
- 4 Encoding of octet groups 39-40 shall use the encoding rules for octet groups 21-22, as specified in af-cs-0167.000, using four octets in place of three octets.
- 5 If any of octet groups 25-40 are present, then octet groups 5-16 and 19-24 shall not be present.

Replace the note in Figure 1/Q.2961.1 with the following:

NOTE – Inclusion of a Forward Peak Cell Rate (for CLP = 0 + 1) and a Backward Peak Cell Rate (for CLP = 0 + 1) is mandatory if the ATM traffic descriptor information element is included in the SETUP message. The Forward Peak Cell Rate (for CLP = 0 + 1) and Backward Peak Cell Rate (for CLP = 0 + 1) shall be encoded using either octet groups 7 and 8, or octet groups 27 and 28. Inclusion of a Forward Peak Cell Rate (for CLP = 0 + 1) and a Backward Peak Cell Rate (for CLP = 0 + 1) is optional if the ATM Traffic Descriptor information element is included in the CONNECT message.

3.2 ATC Setup Parameters Information Element

Modify the figure in section 10.1.2.2/af-sig-0061.002 so octet groups 5-8 refer to Note 3 instead of Note 1.

The following octet groups and notes are added to the figure in section 10.1.2.2/af-sig-0061.002:

Bits								Octets
8	7	6	5	4	3	2	1	
High Rate Forward ABR Initial Cell Rate identifier (CLP = 0 + 1)								14*
1	1	1	0	0	0	1	0	(Note 2,3)
High Rate Forward ABR Initial Cell Rate identifier (CLP = 0 + 1)								14.1*
High Rate Forward ABR Initial Cell Rate identifier (CLP = 0 + 1)								14.2*
High Rate Forward ABR Initial Cell Rate identifier (CLP = 0 + 1)								14.3*
High Rate Forward ABR Initial Cell Rate identifier (CLP = 0 + 1)								14.4*
High Rate Backward ABR Initial Cell Rate identifier (CLP = 0 + 1)								15*
1	1	1	0	0	0	1	1	(Note 2,3)
High Rate Backward ABR Initial Cell Rate (CLP = 0 + 1)								15.1*
High Rate Backward ABR Initial Cell Rate (CLP = 0 + 1)								15.2*
High Rate Backward ABR Initial Cell Rate (CLP = 0 + 1)								15.3*
High Rate Backward ABR Initial Cell Rate (CLP = 0 + 1)								15.4*
High Rate Forward ABR Transient Buffer Exposure identifier (CLP = 0 + 1)								16*
1	1	1	0	0	1	0	0	(Note 2,3)
High Rate Forward ABR Transient Buffer Exposure (CLP = 0 + 1)								16.1*
High Rate Forward ABR Transient Buffer Exposure (CLP = 0 + 1)								16.2*
High Rate Forward ABR Transient Buffer Exposure (CLP = 0 + 1)								16.3*
High Rate Forward ABR Transient Buffer Exposure (CLP = 0 + 1)								16.4*
High Rate Backward ABR Transient Buffer Exposure identifier (CLP = 0 + 1)								17*
1	1	1	0	0	1	0	1	(Note 2,3)
High Rate Backward ABR Transient Buffer Exposure (CLP = 0 + 1)								17.1*
High Rate Backward ABR Transient Buffer Exposure (CLP = 0 + 1)								17.2*
High Rate Backward ABR Transient Buffer Exposure (CLP = 0 + 1)								17.3*
High Rate Backward ABR Transient Buffer Exposure (CLP = 0 + 1)								17.4*

2 Encoding of octet groups 14-17 shall use the encoding rules for octet groups 5-8, as specified in 10.1.2.2/af-sig-0061.002, using four octets in place of three octets.

3 Inclusion of a Forward ABR Initial Cell Rate, a Backward ABR Initial Cell Rate, a Forward ABR Transient Buffer Exposure and a Backward ABR Transient Buffer Exposure is optional in the user-to-network direction in a SETUP message, mandatory in the network-to-user direction in a SETUP message, and mandatory in both directions in a CONNECT message. These shall be encoded using either octet groups 5-8 or octet groups 14-17. If any of octet groups 14-17 are present, then octet groups 5-8 shall not be present.

Change the text in Section 6.4.5.6 of af-pnni-0055.002 to the following:

See Section 10.1.2.2 of the UNI Signalling 4.1 specification, as modified by **Error! Reference source not found.**, with the following changes:

- Octet groups 9 – 13 are required
- Either octet groups 5-8 or 14-17 shall be present. If octet groups 14-17 are present, then octet groups 5-8 shall not be present.

3.3 MDCR Information Element

The following octet groups and notes are added to Figure 3.1/af-cs-0147.000:

Bits								Octets
8	7	6	5	4	3	2	1	
High Rate Forward Minimum Desired Cell Rate Identifier (CLP=0+1)								8*
1	1	0	0	0	0	0	1	(Note 1,2)
_____								8.1*
_____								8.2*
High Rate Forward Minimum Desired Cell Rate value								8.3*
_____								8.4*
High Rate Backward Minimum Desired Cell Rate Identifier (CLP=0+1)								9*
1	1	0	0	0	0	1	0	(Note 1,2)
_____								9.1*
_____								9.2*
High Rate Backward Minimum Desired Cell Rate value								9.3*
_____								9.4*

NOTES

- 2 Encoding of octet groups 8-9 shall use the encoding rules for octet groups 6-7, as specified in Figure 3.1/af-sig-0147.000, using four octets in place of three octets.
- 3 If any of octet groups 8-9 are present, then octet groups 6-7 shall not be present.

3.4 Alternative ATM traffic descriptor

Replace the last row in Figure 8-1/af-sig-0061.002 with the following:

Further octets as contents of ATM Traffic Descriptor (Figure 4-13/Q.2931 and Figure 1/ Q.2961.1, as modified by section 2 § 4.5.6/Q.2931 and section 3.1/ Error! Reference source not found.)	5-18* and 25-40*
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3.5 *Minimum acceptable ATM traffic descriptor*

Replace the last row in Figure 8-2/af-sig-0061.002 with the following:

<p>Octet groups 5 through 8 are encoded as octet groups 5 through 8 specified in Figure 4-13/Q.2931 and Table 4-7/Q.2931</p> <p>Octet groups 9 through 16 are encoded as octet groups 9 through 16 specified in Figure 1/Q.2961.1 and Table 2/Q.2961.1</p> <p>Octet groups 17 and 18 are encoded as octet groups 19 and 20, respectively, specified in section 10.1.2.3/af-sig-0061.002.</p> <p>Octet groups 19 through 22 are encoded as octet groups 21 through 24 specified in Figure 2-1/af-cs-0167.000</p> <p>Octet groups 23 through 38 are encoded as octet groups 25 through 40, as specified in section 3.1/Error! Reference source not found.)</p>	5-38*
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4 UNI Support of High Rate Traffic Parameters [Normative]

4.1 Changes to UNI Signalling Messages

4.1.1 Basic Point-to-Point Call at the UNI

Change the following in section 2.0/af-sig-0061.002 Basic point-to-point call:

3.1.3/Q.2931 CONNECT:

Change the references and lengths of the indicated information elements in Table 3-4/Q.2931:

Information Element	Reference	Direction	Type	Length
ATM Traffic Descriptor	3.1/ Error! Reference source not found.	both	M	12-40
Alternative ATM Traffic Descriptor	Section 3.4/ Error! Reference source not found.	both	O	12-40
Minimum acceptable ATM Traffic Descriptor	Section 3.5/ Error! Reference source not found.	both	O	12-38
ATC Setup Parameters	Section 3.2/ Error! Reference source not found.	both	O	6-36

3.1.7/Q.2931 SETUP:

Change the references and lengths of the indicated information elements in Table 3-8/Q.2931:

Information Element name	Reference	Direction	Type	Length
ATM Traffic Descriptor	Section 3.1/ Error! Reference source not found.	both	M	12-40
Alternative ATM Traffic Descriptor	Section 3.4/ Error! Reference source not	both	O	12-40

	found.			
Minimum acceptable ATM Traffic Descriptor	Section 3.5/ Error! Reference source not found.	both	O	12-38
ATC Setup Parameters	Section 3.2/ Error! Reference source not found.	both	O	6-36
Minimum Desired Cell Rate	Section 3.3/ Error! Reference source not found.	both	O	15

4.1.2 Point-to-Multipoint calls at the UNI

Add the following to section 5/UNI 4.1 Point-to-Multipoint Calls:

8.1.2.1/Q.2971 ADD PARTY:

Change the references and lengths of the indicated information elements in Table 8-10/Q.2971:

Information Element name	Reference	Direction	Type	Length
ATM Traffic Descriptor	Section 3.1/ Error! Reference source not found.	both	M	12-40
Alternative ATM Descriptor	Section 3.4/ Error! Reference source not found.	both	O	12-40
Minimum acceptable ATM Traffic Descriptor	Section 3.5/ Error! Reference source not found.	both	O	6-36
Minimum Desired Cell Rate	Section 3.3/ Error! Reference source not found.	both	O	15

4.1.3 Active Connection Modify

Change the references and lengths of the indicated information elements in section 2.1.1/af-cs-0148.003 § 8.1.1/Q.2963:

Information Element	Reference	Direction	Type	Length
Minimum Desired Cell Rate	Section 3.3/ Error! Reference source not found.	both	O	15

Add the following to section 2.1.1/af-cs-0148.001:

8.1.1/Q.2963.1 MODIFY REQUEST:

Change the references and lengths of the indicated information elements in Table 8-1/Q.2963.1:

Information Element	Reference	Direction	Type	Length
ATM Traffic Descriptor	Section 3.1/ Error! Reference source not found.	both	M	12-40
Minimum Desired Cell Rate	Section 3.3/ Error! Reference source not found.	both	O	15

8.1.1/Q.2963.3 MODIFY REQUEST:

Change the references and lengths of the indicated information elements in Table 8-1/Q.2963.3:

Information Element	Reference	Direction	Type	Length
Alternative ATM Traffic Descriptor	Section 3.4/ Error! Reference source not found.	both	O	12-40
Minimum acceptable ATM Traffic Descriptor	Section 3.5/ Error! Reference source not found.	both	O	12-38

8.1.2/Q.2963.3 MODIFY ACKNOWLEDGE:

Change the references and lengths of the indicated information elements in Table 8-2/Q.2963.3:

Information Element	Reference	Direction	Type	Length
ATM Traffic Descriptor	Section 3.1/ Error! Reference source not found.	both	M	12-40

4.2 Procedures at the UNI

When the user or network needs to encode a cell rate that is greater than or equal to 2^{24} cells per second in the ATM traffic descriptor, the Alternative ATM traffic descriptor, the Minimum acceptable ATM traffic descriptor, the ATC setup parameters, or the Minimum desired cell rate information element, the high-rate values defined in Section 3 for that information element shall be used.

When all cell rates are less than 2^{24} cells per second in the ATM traffic descriptor, the Alternative ATM traffic descriptor, the Minimum acceptable ATM traffic descriptor, the ATC setup parameters, or the Minimum desired cell rate information element, the high-rate values defined in Section 3 for that information element should not be used.

The user or network shall process the High Rate version of the traffic parameters in a manner identical to the processing of the normal version of these parameters.

4.3 Guidelines on the use of Bearer Class, Traffic Parameters, and QoS

UNI4.1, Annex 9, specifies valid combinations of traffic parameters using the field name for each parameter. With implementation of this specification, the field names in these tables shall be interpreted to mean either the normal version of the traffic parameter or the high-rate version.

5 PNNI support of High-Rate Traffic Parameters

[Normative]

5.1 Changes to PNNI Signalling Messages

5.1.1 SETUP

Change the references and lengths of the indicated information elements in Figure 6-8 in 6.3.1.6/af-pnni-0055.002:

Information Element	Reference	Type	Length
ATM Traffic Descriptor	Section 3.1/ Error! Reference source not found.	M	12-40
Alternative ATM Traffic Descriptor	Section 3.4/ Error! Reference source not found.	O	12-40
Minimum acceptable ATM Traffic Descriptor	Section 3.5/ Error! Reference source not found.	O	12-38
ABR Setup Parameters	Section 3.2/ Error! Reference source not found.	O	6-36
Minimum Desired Cell Rate	Section 3.3/ Error! Reference source not found.	O	15

5.1.2 ADDPARTY

Change the references and lengths of the indicated information elements in Figure 6-19 in 6.3.4.1.6/af-pnni-0055.002:

Information Element	Reference	Type	Length
Minimum acceptable ATM Traffic	Section	O	12-38

Descriptor	3.5/ Error! Reference source not found.		
Minimum Desired Cell Rate	Section 3.3/ Error! Reference source not found.	O	15

5.1.3 CONNECT

Change the references and lengths of the indicated information elements in Figure 6-5 in 6.3.1.3/PNNI 1.1:

Information Element	Reference	Type	Length
ATM Traffic Descriptor	Section 3.1/ Error! Reference source not found.	M	12-40
Alternative ATM Traffic Descriptor	Section 3.4/ Error! Reference source not found.	O	12-40
Minimum acceptable ATM Traffic Descriptor	Section 3.5/ Error! Reference source not found.	O	12-38
ABR Setup Parameters	Section 3.2/ Error! Reference source not found.	O	6-36

5.1.4 MODIFY REQUEST

Change the references and lengths of the indicated information elements in Table 2-1/af-cs-0148.003:

Information Element	Reference	Type	Length
ATM Traffic Descriptor	Section 3.1/ Error! Reference source not found.	M	12-40
Alternative ATM Traffic Descriptor	Section	O	12-40

	3.4/ Error! Reference source not found.		
Minimum acceptable ATM Traffic Descriptor	Section 3.5/ Error! Reference source not found.	O	12-38
Minimum Desired Cell Rate	Section 3.3/ Error! Reference source not found.	O	15

5.1.5 MODIFY ACKNOWLEDGE

Change the references and lengths of the indicated information elements in Table 2-2/af-cs-0148.003:

Information Element	Reference	Type	Length
ATM Traffic Descriptor	Section 3.1/ Error! Reference source not found.	M	12-40

5.2 Signalling Procedures for High-Rate Traffic Parameters

The PNNI node shall process the high-rate version of the traffic parameters in a manner identical to the processing of the normal version of these parameters.

6 AINI support of High-Rate Traffic Parameters

[Normative]

Section 5 of this document applies to AINI.

7 Compatibility with Nodes Not Supporting This Feature

Upon receiving a message containing the high-rate version of the Traffic Parameters, nodes not supporting this feature shall treat the information element as a mandatory/non-mandatory information element content error.

For this reason, normal encoding should be used for rates less than 2^{24} cells per second.

***** END OF DOCUMENT *****