Broadband ISDN – Overview of ANSI B-SIDN NNI Signaling Capability Set 2, Step 1

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American National Standard
for Telecommunications

Broadband ISDN – Overview of ANSI B-ISDN NNI Signaling Capability Set 2, Step 1

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Alliance for Telecommunications Industry Solutions

Approved October 20, 1997

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Contents

Foreword   (This foreword is not part of American National Standard T1.665-1997.)

This standard is based on ITU-T 1996 Recommendations of Signaling System No. 7 for international use issued by the ITU Study Group 11, and additional recommendations meeting specific needs of U.S. networks. This standard is based on, and uses wherever applicable, the same procedures as ITU-T Recommendation Q.2721.1, *B-ISDN User Part – Overview of B-ISDN NNI Capability Set 2, Step 1*. It is suited for anticipated needs and applications within and between U.S. networks. This specification is the result of extensive work by the members of the T1S1.3 Working Group on U.S. standards for common channel signaling.

This standard is intended for use in conjunction with *American National Standard for Telecommunications – Signaling System Number 7 (SS7) – Broadband Integrated Services Digital Network (B-ISDN) User Part (B-ISUP)*, ANSI T1.648-1995.

There are two informative annexes in this standard. They contain information that is not considered part of the standard, but is rather auxiliary to the standard. Similarly, footnotes are not considered part of the standard.

Suggestions for improvement of this standard are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, 1200 G Street, NW, Suite 500, Washington, DC 20005.

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American National Standard
for Telecommunications –

Broadband ISDN –
Overview of ANSI B-ISDN
NNI Signalling Capability Set 2, Step 1

1 Overview of ANSI B-ISDN NNI Signaling Capability Set 2, Step 1

1.1 Scope

This standard provides an overview of the capabilities of the ANSI Broadband ISDN Network Node Interface (B-ISDN NNI) for the Broadband ISDN Signaling Capability Set 2, Step 1 (B-ISDN NNI CS 2.1). This standard should thus be seen as an increment to ANSI T1.648, Section 1 which provides an overview of the B-ISUP for Signaling Capability Set 1.

The B-ISDN NNI CS 2.1 builds upon the B-ISUP defined for Signaling Capability Set 1. The B-ISUP for CS 1 provides call control for point-to-point single connection calls using ISDN bearer classes BCOB-A and BCOB-X. B-ISDN NNI CS 2.1 adds further call control capabilities, additional bearer types, additional connection topologies, and some dynamic re-arrangement of these.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

[1]   ITU-T Recommendation Q.2721.1, *B-ISDN User Part – Overview of B-ISDN NNI Capability Set 2, Step 1* [1)]

[2]   ITU-T Recommendation Q.2722.1*, B-ISDN User Part – Point-to-Multipoint Call/Connection Control* [1)]

[3]   ITU-T Recommendation Q.2723.1, *B-ISDN User Part – Support of Additional Traffic Parameters for Sustainable Cell Rate (SCR) and Quality of Service (QoS)* [1)]

[4]   ITU-T Recommendation Q.2724.1*, B-ISDN User Part – Look-Ahead without State Change for the NNI* [1)]

[5]   ITU-T Recommendation Q.2725.1*, B-ISDN User Part – Support of Negotiation During Connection Setup* [1)]

[6]   ITU-T Recommendation Q.2725.2*, B-ISDN User Part – Modification Procedures* [1)]

[7]   ITU-T Recommendation Q.2726.1*, B-ISDN User Part – ATM End System Address* [1)]

[8]   ITU-T Recommendation Q.2726.2, *B-ISDN User Part – Call Priority* [1)]

[9]   ITU-T Recommendation Q.2726.3, *B-ISDN User Part – Network Call Correlation ID* [1)]

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A "|" indicates a change from ITU-T Recommendation Q.2721.1. Strictly editorial differences are not noted.

[1)]   Available from American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

[10]   ITU-T Recommendation Q.2727, *B-ISDN User Part – Support of Frame Relay* [1]

[11]   ANSI T1.648-1995, *Telecommunications – Signalling System No. 7 (SS7) – Broadband Integrated Services Digital Network User Part (B-ISUP)*

[12]   ANSI T1.658-1996, *Telecommunications – Broadband Integrated Services Digital Network (B-ISDN) User Part – Additional Traffic Parameters for Sustainable Cell Rate (SCR) and Quality of Service (QoS)*

[13]   ANSI T1.662-1996, *Telecommunications – Broadband ISDN ATM End System Address for Calling and Called Party*

[14]   ANSI T1.664-1997, *Telecommunications – Broadband ISDN – Point-to-Multipoint Call/Connection Control*

[15]   ANSI T1.663-1996, *Telecommunications – Broadband ISDN – Network Call Correlation Identifier*

3   Abbreviations

AE   Application Entity

ASE   Application Service Element

BCC   Bearer Connection Control

CC   Call Control

CS   B-ISDN Signaling Capability Set

E-E   Edge-to-Edge

L-L   Link-by-Link

LA   Look-Ahead

MC   Maintenance Control

NI   Network Interface

NNI   Network Node Interface

SACF   Single Association Control Function

SAO   Single Association Object

SCCP   Signaling Connection Control Part

TCAP   Transaction Capabilities Application Part

UI   Unrecognized Information

4   B-ISDN NNI CS 2.1 content

The following capabilities are added to the capabilities of B-ISUP CS 1:

   – Point-to-multipoint calls (multi-party calls) (ITU-T Recommendation Q.2722.1, ANSI T1.664)

   – Additional traffic parameters (ITU-T Recommendation Q.2723.1, ANSI T1.658)

   – Look-ahead capability (ITU-T Recommendation Q.2724.1)

   – Negotiation of traffic characteristics during call set-up (ITU-T Recommendation Q.2725.1)

   – Modification of traffic characteristics during the active phase of the call (ITU-T Recommendation Q.2725.2)

   – ATM End System Address (ITU-T Recommendation Q.2726.1, ANSI T1.662)

2

– Call Priority (ITU-T Recommendation Q.2726.2)

– Network Call Correlation Identifier (ITU-T Recommendation Q.2726.3, ANSI T1.663)

– Frame relay (ITU-T Recommendation Q.2727)

The following subclauses give a summary of these capabilities.

4.1 Point-to-multipoint calls

Procedures are provided for the set-up and release of a call consisting of a single point-to-multipoint (uni-directional) connection. The characteristics of this connection, from the originator (root party) to the destinations (leaf parties) are all identical. Procedures are provided for the addition and removal of leaf parties from the call. Addition of leaf parties can only be done by the root party. Removal of a leaf can be from either the root or the affected leaf party. Additionally an "en-block" release of the whole point-to-multipoint connection from the root party is provided. [2]

For U.S. networks, T1.664 references ANSI T1.648 (point-to-point basic call/connection procedures) rather than ITU-T Recommendation Q.2764 for basic call set-up and clear down. ANSI T1.664 includes additional procedures for handling the Exit message, and other national specific parameters and procedures supported in ANSI T1.648. [14]

4.2 Additional traffic parameters

Procedures are provided to the support of the Sustainable Cell Rate parameter set.

A procedure for the support of the Quality of Service parameter is also provided. [3]

For U.S. networks, codepoints for identifying four Quality of Service classes are defined for inclusion in the Quality of Service parameter, using national-specific coding. In addition, the coding for the best effort indicator is also defined. [12]

4.3 Look-ahead

Procedures are provided for edge-to-edge Look Ahead that allows a network to perform called-terminal availability and compatibility checking without any commitment of network resources. This is an optional capability that can be employed to optimize network resource usage in combination with other CS 2.1 capabilities. [4]

For U.S. networks, no procedure currently specified.

4.4 Negotiation of traffic characteristics during call set-up

Two cases of negotiation are allowed:

1) *Alternative ATM Cell Rate:*

If the bandwidth requirements in the connection request cannot be supported by the network, alternative bandwidth requirements contained in the Alternative ATM Cell Rate may be used instead, provided that these can be supported.

The alternative bandwidth requirements must be reduced compared to those originally requested.

2) *Minimum ATM Cell Rate:*

If the bandwidth requirements in the connection request cannot be supported by the network, a reduced bandwidth allocation may be substituted, provided that this still satisfies a specified Minimum ATM Cell Rate.

Only negotiation of peak cell rates is supported using the Minimum ATM Cell Rate procedure.

In both cases (1) and (2), the final bandwidth used is returned in the ATM Cell Rate parameter and Additional ATM Cell Rate parameter (if applicable) in the Answer Message. If this differs from the bandwidth allocation supported by the network, the network must modify the bandwidth allocation for

the connection accordingly. The network passes the final bandwidth information back to the calling user. [5]

For U.S. networks, no procedure currently specified.

4.5 Modification of traffic characteristic during the active phase of the call

Procedures are provided for the modification of the peak cell rate (forward, backward, or both) of a point-to-point connection. Only the user that originally requested set-up of the connection can request the modification. No rerouting of the connection is attempted during the connection modification. [6]

For U.S. networks, no procedure currently specified.

4.6 ATM End System Address

Procedures are provided for the transport of the ATM End System Address (AESA). The E.164 format of AESA is accepted at the originating exchange, and used to derive the E.164 number to be carried within the Called Party Number, and used for routing purposes. The AESA is transferred across the network and delivered to the called user. AESA for Calling Party and AESA for Connected Party are also supported. [7]

For U.S. networks, the AESA for Calling and Called Party procedures have been extended to support the transport and use of non-E.164 AESAs, as well as E.164 AESAs. AESA for Connected Party is not supported. [13]

4.7 Call Priority

Priority call handling is provided for single connection point-to-point calls. [8]

For U.S. networks, no procedure currently specified.

4.8 Network Call Correlation ID

A network generated identifier is provided to enable the network to correlate records at multiple exchanges for nonreal time purposes, e.g., accounting. [9]

No changes have been made to the Network Call Correlation ID procedures for U.S. networks. [15]

4.9 Frame Relay

Procedures are provided for the set-up and release of a call/connection supporting the Frame Relay service. [10]

For U.S. networks, no procedure currently specified.

5 Functional limitations of B-ISDN NNI CS 2.1

The following limitations of CS 2.1 should be noted.

1) In a point-to-multipoint call only the root party can add additional parties.

2) Only the user that originally requested set-up of a connection can request modification of that connection.

3) The following capabilities are not applicable for calls employing Narrowband emulation service:

   a) Point-to-multipoint calls (multi-party calls)

   b) Additional traffic parameters

   c) Negotiation of traffic characteristics during call set-up

   d) Modification of traffic characteristics during the active phase of the call

4) Priority call handling is provided only for single connection point-to-point calls.

5) Table 1 summarizes the allowed combinations of the capabilities that are supported within a single CS 2.1 call.

4

CAPABILITY	Network Call Correlation ID	Frame Relay*	AESA	Call Priority*	Modification*	Negotiation*	Look ahead*	Traffic parameters
Point-multipoint	✓	✗	✓	✗	✗	✓ (see note 2)	✓	✓ (see note 1)
Traffic parameters	✓	✓	✓	✓	✗	✓	✓	
Look ahead*	✓	✓	✓	✓	✓ (see note 3)	✓		
Negotiation*	✓	✓	✓	✓	✓			
Modification*	✓	✓	✓	✓				
Call Priority*	✓	✓	✓					
AESA	✓	✓						
Frame Relay*	✓							

key

✗ Not allowed

✓ Allowed

* No procedure currently specified for U.S. networks

NOTES:

1 The traffic parameters for the first party shall apply for all parties.

2 This capability shall apply only for the first leaf.

3 Look ahead is only applied at call set-up, it is not applied for a modification request.

Table 1 – CS 2.1 allowed capability combinations

6 Common protocol principles for B-ISDN NNI CS 2.1

The B-ISDN NNI CS 2.1 builds upon the B-ISUP CS1 in three ways:

1) It enhances the point-to-point call control application process and protocol, for the transfer of additional information, and for additional procedural functions, such as the procedures used during the active phase of the call to effect a modification of the bandwidth being used. This can be seen as an enhanced use of the model defined for B-ISUP CS 1 (ANSI T1.648, annex A).

2) It enhances the modeling of the functionality within the call control application process: A B-ISUP CS 1 call consists of one incoming, and one outgoing Application Entity Instance (AEI) protocol machine, coordinated by the call control application process. For one B-ISDN NNI CS 2.1 call the call control application process may have to coordinate many AEIs relating to the multiple connections/parties that may exist in the call. Information modeling techniques are used in the description of this complexity.

3) It enhances the signaling methods available: B-ISUP CS 1 signaling associations are always link-by-link (L-L), following the path of the connection through the network. In B-ISDN NNI CS 2.1 an additional signaling mode is introduced – Edge-to-edge (E-E). This technique provides direct signaling transactions between the nodes at the edges of the public B-ISDN, typically the originating, destination local and/or gateway exchanges. B-ISDN NNI CS 2.1 makes use of this capability to provide a look-ahead capability; checking the acceptability of the potential call at the called user interface before allocating network resources for the call/connection.

This uses the TCAP and SCCP capabilities of Signaling System No. 7.

6.1 General specification model

Figure 1 shows the general protocol architecture model for B-ISDN NNI in CS 2.1. The L-L AE is architecturally the same as the AE used in CS 1, the E-E AE is new for CS 2.1. In addition to this architecture is an information model for the Call Control Application Process. Figure 2 shows the general information model for B-ISDN NNI in CS 2.1. This figure shows the complete set of all the object classes. For any exchange acting as a particular exchange type, (originating/intermediate/branching/destination exchange), for the support of a specific CS 2.1 capability the appropriate object instances are created. Objects of all object classes are not necessarily employed in each case.

Illustration of the application of these models for the support of the CS 2.1 capabilities is given in the following subclauses.
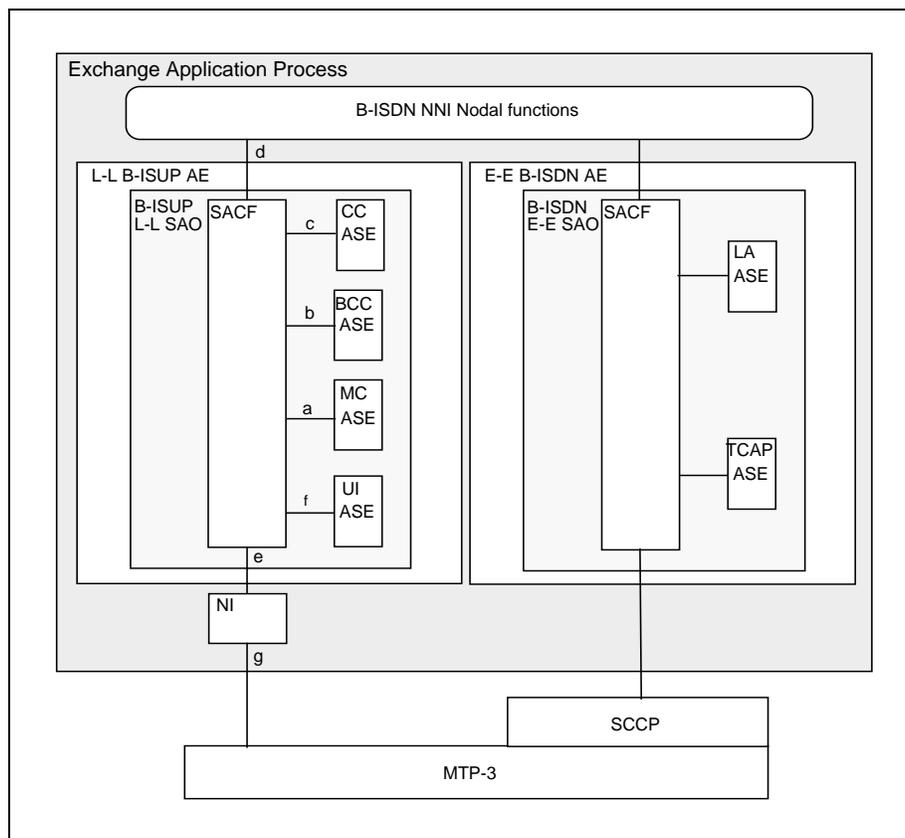
Figure 1 – B-ISDN NNI protocol architecture model for CS 2.1

Abbreviations:

AE	Application Entity	LA	Look-Ahead
SACF	Single Association Control Function	MC	Maintenance Control
ASE	Application Service Element	NI	Network Interface
CC	Call Control	SAO	Single Association Object
BCC	Bearer Connection Control	UI	Unrecognized Information
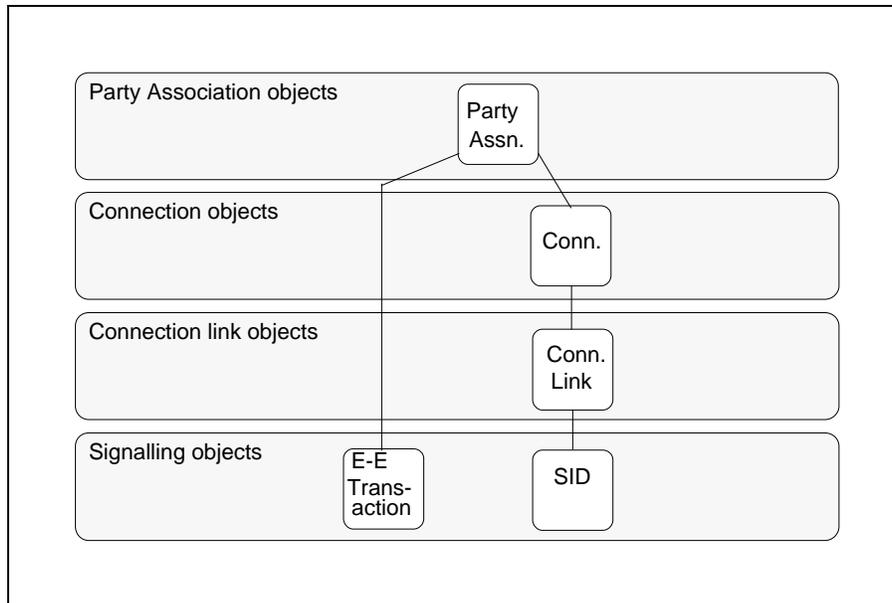
Figure 2 – B-ISDN NNI Application Process generalized information model for CS 2.1

Instances of objects from the object classes in this model represent logical entities that are created when a call or connection is set-up, referred to during the existence of the call or connection, and deleted when the call or connection is released.

The lines between the objects in this model represent logical associations maintained by the Application Process logic between these objects.

Signaling objects relate one-to-one to AEIs in the protocol model.

Connection Link objects relate one-to-one to the virtual circuits being controlled.

The Signaling and Connection Link objects can be directly addressed with identifier values included in the B-ISUP messages. The Connection and Party Association objects cannot be directly addressed.

Connection objects represent the connection through the exchange, e.g., via a branching function, i.e., via its associations with the Incoming and Outgoing Connection Link objects. It is created when a new Incoming Connection Link object is created, and deleted when the last associated Connection Link object is deleted.

Party objects are used to associate all connections relating to one party. Party objects are only instantiated at nodes where the B-ISDN Users are directly connected, i.e., at local exchanges where the call/connection originates/terminates at a coincident Tb/Sb interface. Where the UNI interface is via a Tb interface the Party object is in the attached private network.

6.2   Modeling examples for CS 2.1

6.2.1   A simple point-to-multipoint call

Figure 3 shows a simple point-to-multipoint call from node A, via a multi-cast function at node B to two parties on nodes C and D. The following figures show the protocol architecture that apply at the nodes in this example. It should be noted that multiple instances of the B-ISUP L-L AEI are used to set-up separate signaling associations to each party. In this case there is no instantiation of the E-E AE as Look-Ahead is assumed not to be used in this example.
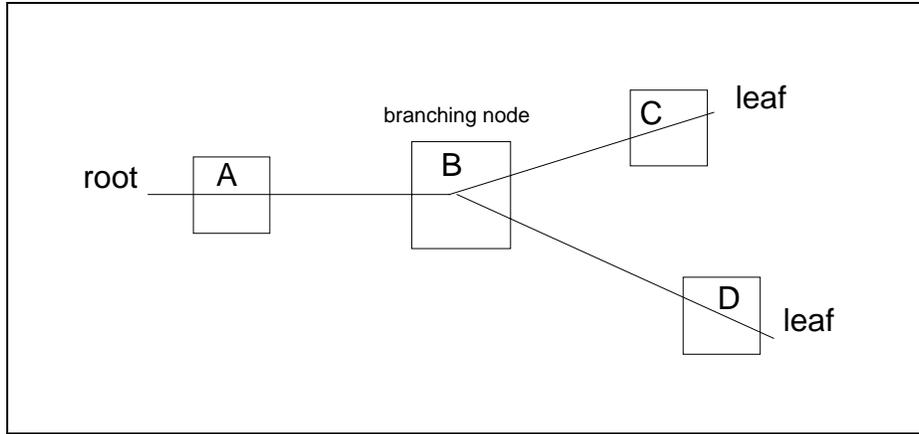
Figure 3 – Example point-to-multipoint connection configuration

Figure 4 shows the protocol architecture at exchange A. Exchange A has one outgoing virtual circuit toward exchange B, and has two signaling associations (B-ISUP AEIs); one for each leaf party.

Figure 5 shows the corresponding application process information model.
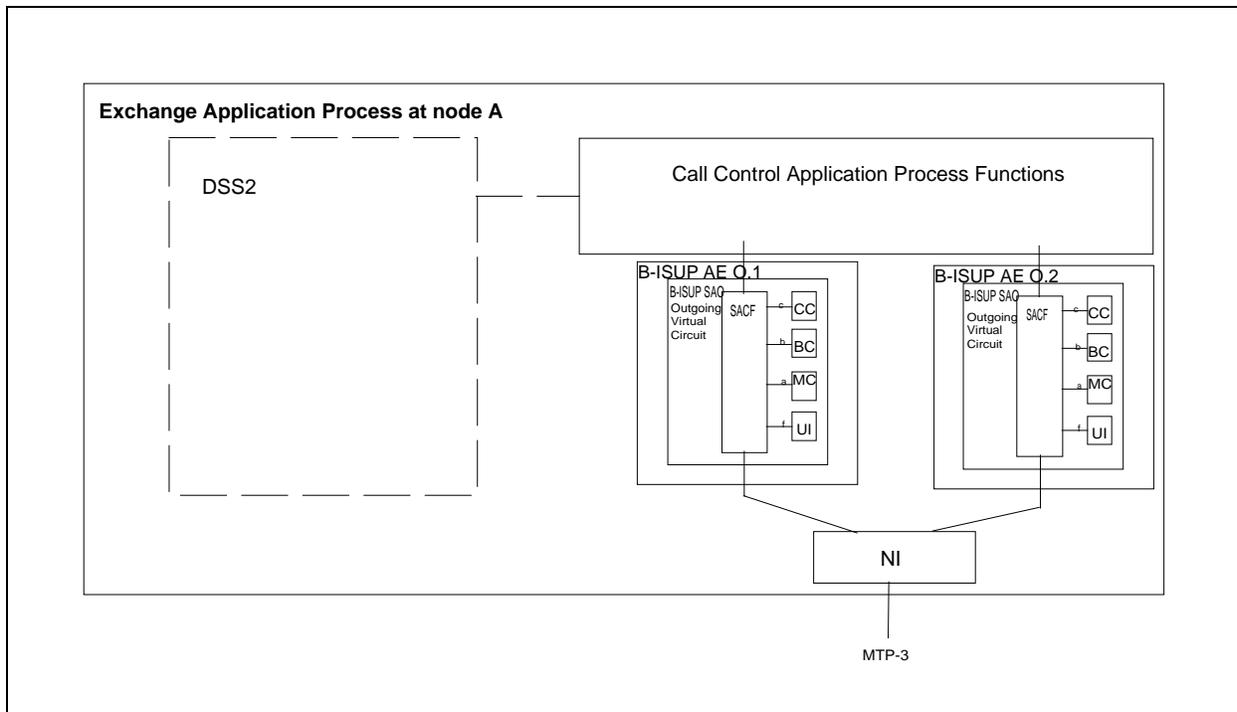
Figure 4 – Protocol architecture at exchange A
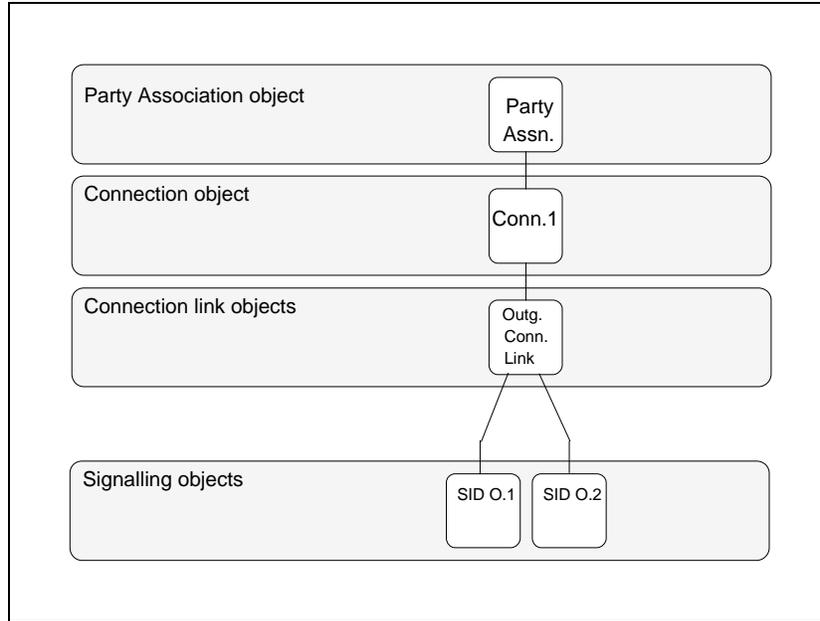
Figure 5 – Application Process information model relating to figure 4

At exchange B there are two B-ISUP AEI's, I.1 and I.2, that relate to the one Incoming Virtual Circuit and two B-ISUP AEI's, O.1 and O.2, that each relate to one of the Outgoing Virtual Circuits. Figure 6 shows the information model for this case.
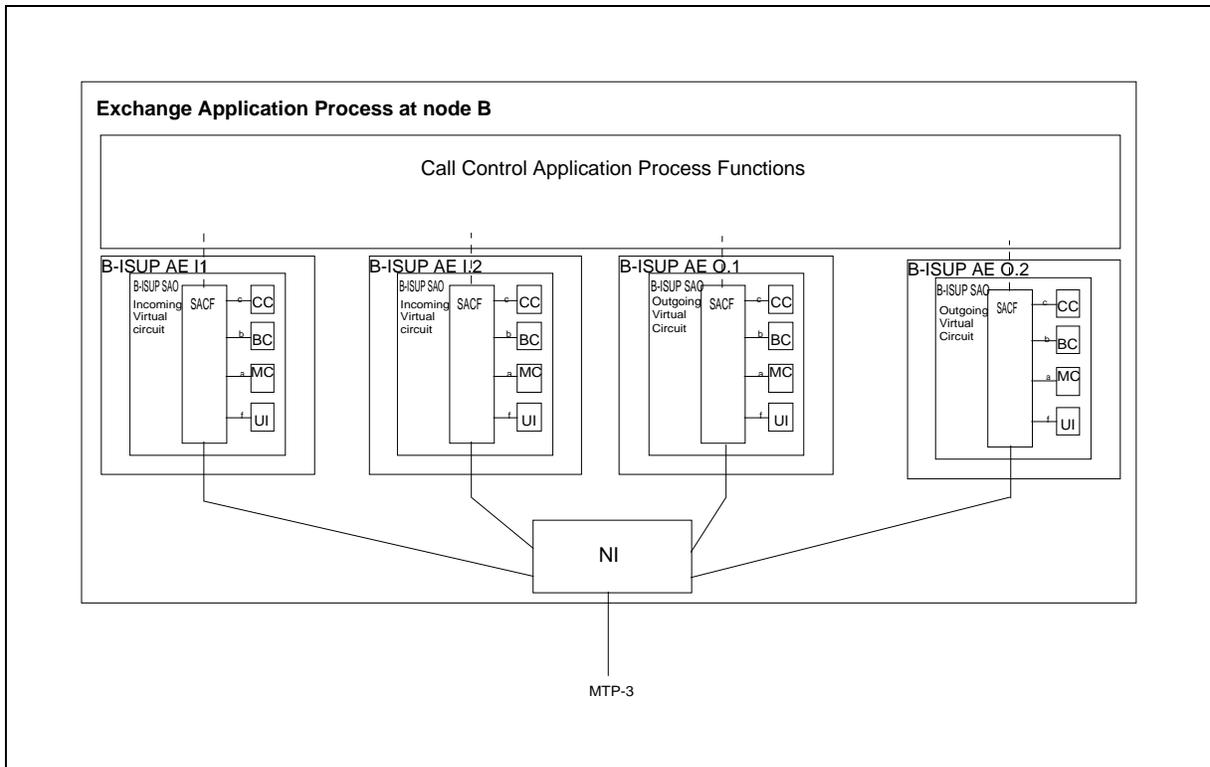
Figure 6 – Protocol architecture at exchange B
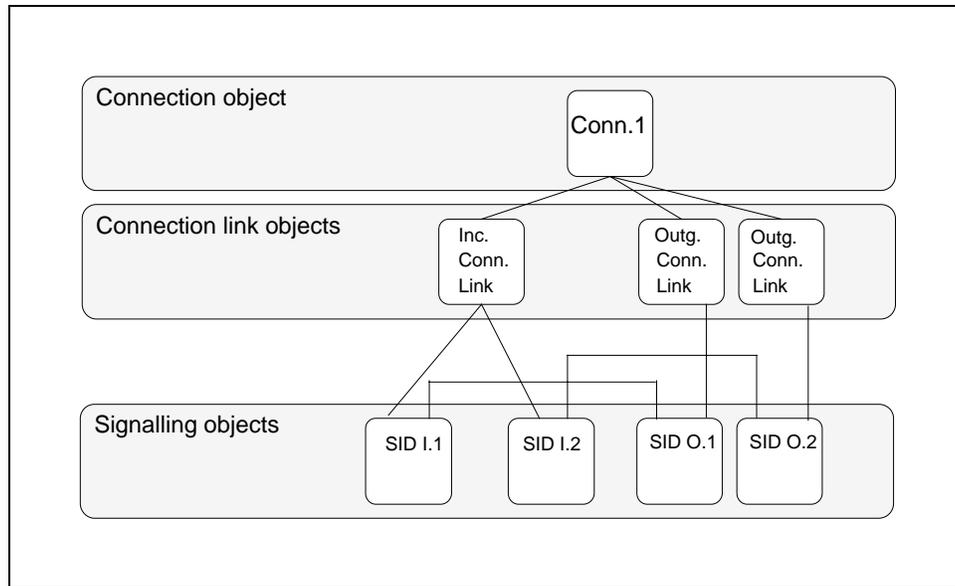
Figure 7 – Application Process information model relating to figure 6

The associations SID I.1 ↔ SID O.1 and SID I.2 ↔ SID O.2 represent the 1:1 relationships between incoming and outgoing signaling associations at an intermediate exchange. This association is used, for example, when the root party sends a release toward one of the leaf parties – it provides the linkage for passing the release on to the correct signaling association toward that leaf party.

At the leaf exchanges a single incoming virtual circuit and a corresponding single signaling association are instantiated.
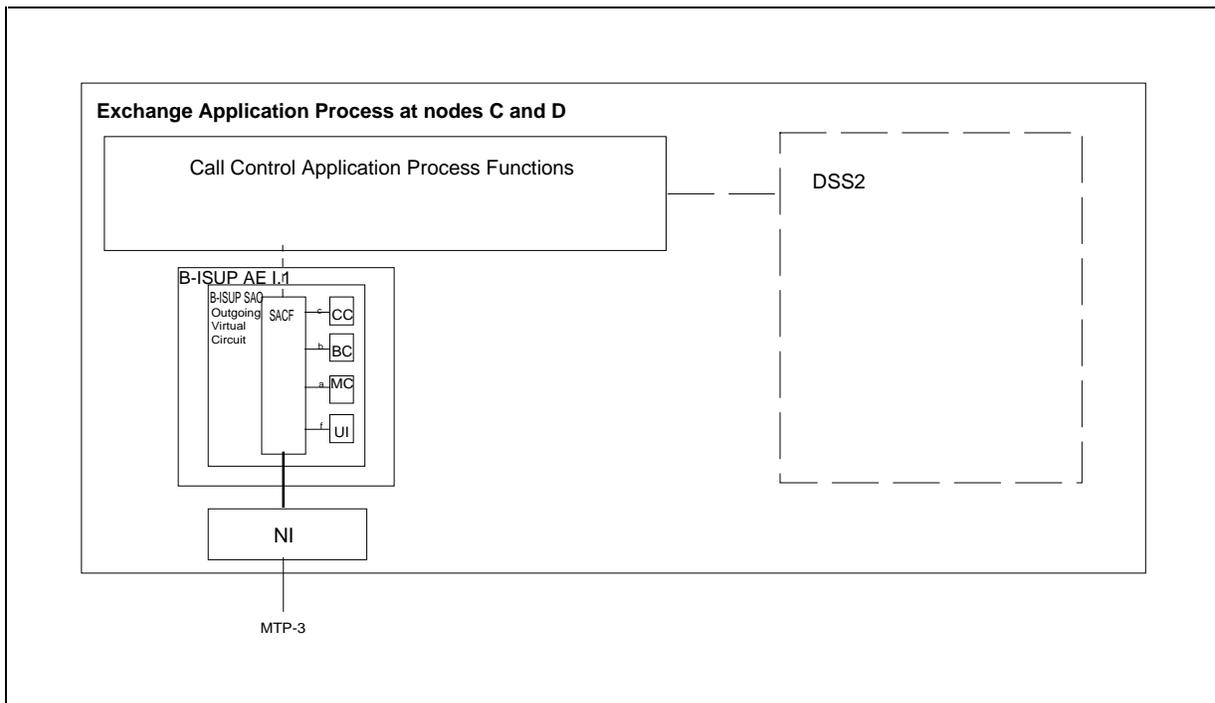
Figure 8 – Protocol architecture at exchanges C and D
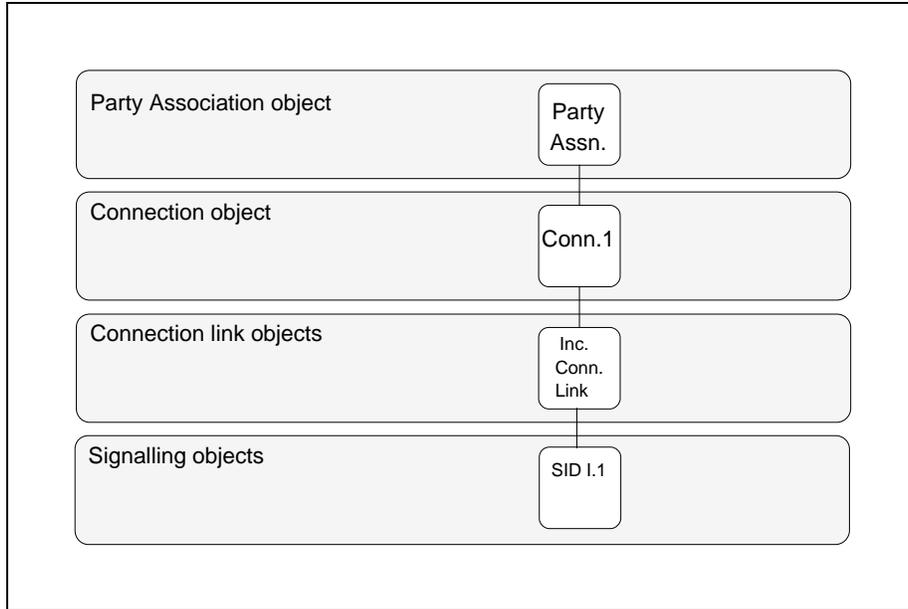
Figure 9 – Application Process information model relating to figure 8

6.2.1.1 Dynamic modeling aspects

The "dynamic" aspects of the model are considered to be the mechanisms by which instances of the B-ISUP objects are created, and deleted, as required to provide a particular service.

6.2.1.1.1 Object creation initiated by this exchange

When a function in the Exchange Application Process decides that B-ISUP is required, e.g., B-ISUP is selected as the signaling system to be used to support an outgoing point-to-multipoint call/connection, the B-ISUP nodal functions will create an Outgoing Connection Link object instance relating to each of the branching legs of the multicast connection. The Application Process will also create an instance of B-ISUP AE for each signaling association required.

6.2.1.1.2 Object creation initiated by another exchange

The distribution of messages received at the MTP-3 Service Access Point, and the creation of B-ISUP AEIs happens as in B-ISUP CS 1; see ANSI T1.648. Processing in the Call Control Application Process continues with an analysis of received Connection Link identifiers.

   – If the message does not contain a Destination Connection Link identifier parameter, but it does contain an Origination Connection Link identifier parameter, a new instance of Incoming Connection Link object will be created by the B-ISUP Nodal functions. This new instance is allocated a new Connection Link identifier value.

   – If the message contains a Destination Connection Link identifier that corresponds to an existing Connection Link object the message is handled by the Application Process as being related to that object.

   – If the Destination Connection Link identifier does not correspond to an existing Incoming Connection Link object instance, an error has occurred.

   – If the message contains neither an Origination or a Destination Connection Link identifier then handling shall continue as for a B-ISUP CS 1 exchange.

6.2.1.1.3 Object deletion

When a B-ISUP operation is complete, e.g., a connection branch to one remote party is released, the associated AEI is deleted, and the associated Connection Link object instance will be deleted if it has no remaining associated AEIs. When deletion of a Connection Link object instance causes its parent Connection object instance to have no associated Connection Link objects the Connection object instance is also deleted. Similarly, when a Party Association object instance has no remaining Connection objects it is deleted.

7 Interworking with CS 1 exchanges

Exchanges supporting CS 1 procedures can be used for the establishment of calls employing capabilities introduced by CS 2.1 as described in the following subclauses.

7.1 Point-to-multipoint calls (multi-party calls)

A CS 1 exchange can act as an intermediate or destination exchange for a Point-multipoint call.

7.2 Additional traffic parameters

A CS 1 exchange can act as an intermediate exchange for a call using additional traffic parameters.

7.3 Look-ahead capability

This capability is not currently supported for U.S. networks.

7.4 Negotiation of traffic characteristics during call set-up

This capability is not currently supported for U.S. networks.

7.5 Modification of traffic characteristics during the active phase of the call

This capability is not currently supported for U.S. networks.

7.6 ATM End System Address

A CS 1 exchange can act as an intermediate exchange for a call using ATM End System Address.

7.7 Call Priority

This capability is not currently supported for U.S. networks.

7.8 Network Call Correlation ID

A CS 1 exchange can act as an intermediate or destination exchange for a call using Network Call Correlation ID.

7.9 Frame Relay

This capability is not currently supported for U.S. networks.

Annex A
(informative)

The following tables show the B-ISUP message name codes and parameter name codes used in the B-ISUP Standards. It also shows the N-ISUP codes as a reference.

This information is informative; the normative information is in the individual protocol standards/recommendations.

Table A.1 – N-ISUP & B-ISUP message name codes

Code	N-ISUP (ANSI T1.113-1995)	B-ISUP (ANSI T1.648-1995)
0000 0000	*not used*	*not used*
0000 0001	Initial address	Initial address
0000 0010	Subsequent address (note)	Subsequent address (note)
0000 0011	Information request	*Reserved (used in N-ISUP)*
0000 0100	Information	*Reserved (used in N-ISUP)*
0000 0101	Continuity	Consistency check request
0000 0110	Address complete	Address complete
0000 0111	Connect (note)	*Reserved*
0000 1000	Forward transfer	Forward transfer
0000 1001	Answer	Answer
0000 1010	*Reserved by ITU-T*	IAM acknowledgement
0000 1011	*Reserved by ITU-T*	IAM reject
0000 1100	Release	Release
0000 1101	Suspend	Suspend
0000 1110	Resume	Resume
0000 1111	*Reserved by ITU-T*	Reset acknowledgement
0001 0000	Release complete	Release complete
0001 0001	Continuity check request	Consistency check request acknowledgement
0001 0010	Reset circuit	Reset
0001 0011	Blocking	Blocking
0001 0100	Unblocking	Unblocking
0001 0101	Blocking acknowledgement	Blocking acknowledgement
0001 0110	Unblocking acknowledgement	Unblocking acknowledgement
0001 0111	Circuit group reset	Consistency check end
0001 1000	Circuit group blocking	Consistency check end acknowledgement
0001 1001	Circuit group unblocking	*Reserved (used in N-ISUP)*
0001 1010	Circuit group blocking acknowledgement	*Reserved (used in N-ISUP)*
0001 1011	Circuit group unblocking acknowledgement	*Reserved (used in N-ISUP)*
0001 1100	Call modification request (note)	*Reserved*
0001 1101	Call modification completed (note)	*Reserved*
0001 1110	Call modification reject (note)	*Reserved*
0001 1111	Facility request (note)	*Reserved*
0010 0000	Facility accepted (note)	*Reserved*
0010 0001	Facility reject (note)	*Reserved*
0010 0010	Facility deactivated (note)	*Reserved*
0010 0011	Facility information (note)	*Reserved*

(continued)

Table A.1 *(continued)*

Code	N-ISUP (ANSI T1.113-1995)	B-ISUP (ANSI T1.648-1995)
0010 0100	Loop back acknowledgement	*Reserved (used in N-ISUP)*
0010 0101	Closed user group selection and validation request (note)	*Reserved*
0010 0110	Closed user group selection and validation response (note)	*Reserved*
0010 0111	Delayed release (note)	*Reserved*
0010 1000	Pass-along	*Reserved (used in N-ISUP)*
0010 1001	Circuit group reset acknowledgement	*Reserved (used in N-ISUP)*
0010 1010	Circuit query	*Reserved (used in N-ISUP)*
0010 1011	Circuit query response	*Reserved (used in N-ISUP)*
0010 1100	Call progress	Call progress
0010 1101	User-to-user information (note)	User-to-user information (note)
0010 1110	Unequipped CIC	*Reserved (used in N-ISUP)*
0010 1111	Confusion	Confusion
0011 0000	Overload (note)	*Reserved*
0011 0001	Charge information (note)	*Reserved*
0011 0010	Network resource management (note)	Network resource management (note)
0011 0011	Facility	*Reserved (used in N-ISUP)*
0011 0100	User Part test (note)	User part test
0011 0101	User Part available (note)	User part available
0011 0110	Identification request (note)	*Reserved*
0011 0111	Identification response (note)	*Reserved*
0011 1000	Segmentation (note)	Segmentation
0011 1001	*Reserved (used in B-ISUP)*	reserved for ECT
0011 1010	*Reserved*	Modify acknowledge (note)
0011 1011	*Reserved*	Modify reject (note)
0011 1100	*Reserved*	Modify request (note)
0011 1101	*Reserved*	Modify confirm (note)
0011 1110		
0011 1111		
0100 0000	Loop prevention (note)	*Reserved*
0100 0001		
0100 0010		
0100 0011		
0100 0100		
0100 0101		
to		
0111 1111		
1000 0000	*reserved for future expansion*	*Reserved (used in N-ISUP)*
1000 0001		
to		
1101 1111		
1110 0000		
to		
1110 1000		

(continued)

Table A.1 *(concluded)*

Code	N-ISUP (ANSI T1.113-1995)	B-ISUP (ANSI T1.648-1995)
1110 1001	Circuit reservation acknowledgement	*Reserved (used in N-ISUP)*
1110 1010	Circuit reservation	*Reserved (used in N-ISUP)*
1110 1011	Circuit validation response	*Reserved (used in N-ISUP)*
1110 1100	Circuit validation test	*Reserved (used in N-ISUP)*
1110 1101	Exit	Exit
1110 1110		
to		
1111 1110		
1111 1111		*reserved for extension of name code*

NOTE – No procedure specified for U.S. networks.

Table A.2 – N-ISUP & B-ISUP parameter name codes

Code	N-ISUP (ANSI T1.113-1995)	B-ISUP (ANSI T1.648-1995)
0000 0000	End of optional parameters	*Reserved (used in N-ISUP)*
0000 0001	Call reference	*Reserved (used in N-ISUP)*
0000 0010	Transmission medium requirement (note)	Origination signaling identifier
0000 0011	Access transport	Destination signaling identifier
0000 0100	Called party number	Called party number
0000 0101	Subsequent number (note)	Subsequent number (note)
0000 0110	Nature of connection indicators	Connection element identifier
0000 0111	Forward call indicators	Maximum end-to-end transit delay
0000 1000	Optional forward call indicators (note)	ATM cell rate
0000 1001	Calling party's category	Calling party's category
0000 1010	Calling party number	Calling party number
0000 1011	Redirecting number	Redirecting number
0000 1100	Redirection number (note)	Redirection number (note)
0000 1101	Connection request	*Reserved (used in N-ISUP)*
0000 1110	Information request indicators	*Reserved (used in N-ISUP)*
0000 1111	Information indicators	*Reserved (used in N-ISUP)*
0001 0000	Continuity indicators	Additional calling party number (note)
0001 0001	Backward call indicators	Additional connected number (note)
0001 0010	Cause indicators	Cause indicators
0001 0011	Redirection information	Redirection information
0001 0100	*Reserved by ITU-T*	Backward narrowband interworking indicator
0001 0101	Circuit group supervision message type indicator	Called party subaddress
0001 0110	Range and status	Calling party subaddress
0001 0111	Call modification indicators (note)	Called party's indicators
0001 1000	Facility indicator (note)	*Reserved*
0001 1001	Facility information indicators (note)	Charge indicator
0001 1010	Closed user group interlock code (note)	Closed user group information (note)
0001 1011	Index (note*)*	Connected line ID request (note)
0001 1100	Closed user group check response indicators (note)	Forward narrowband interworking indicator
0001 1101	User service information	Narrowband bearer capability

(continued)

15

Table A.2 *(continued)*

Code	N-ISUP (ANSI T1.113-1995)	B-ISUP (ANSI T1.648-1995)
0001 1110	Signaling point code (note)	*Reserved*
0001 1111	*Reserved by ITU-T*	In-band information indicator
0010 0000	User-to-user information	User-to-user information
0010 0001	Connected number (note)	Connected number (note)
0010 0010	Suspend/Resume indicators	Suspend/resume indicators
0010 0011	Transit network selection	Transit network selection
0010 0100	Event information indicators	Connected subaddress (note)
0010 0101	Circuit assignment map	Narrowband low layer compatibility
0010 0110	Circuit state indicator	Call diversion may occur (note)
0010 0111	Automatic congestion level	Automatic congestion level
0010 1000	Original called number	Original called number
0010 1001	Optional backward call indicators	National/international call indicator
0010 1010	User-to-user indicators	User-to-user indicators
0010 1011	Origination ISC point code (note)	Origination ISC point code (note)
0010 1100	Generic notification (note)	Notification (note)
0010 1101	Call history information (note)	Call history information
0010 1110	Access delivery information (note)	Access delivery indicator (note)
0010 1111	Network specific facilities (note)	*Reserved*
0011 0000	User service information prime	*Reserved (used in N-ISUP)*
0011 0001	Propagation delay counter (note)	Propagation delay counter
0011 0010	Remote operations	*Reserved (used in N-ISUP)*
0011 0011	Service activation	*Reserved (used in N-ISUP)*
0011 0100	User teleservice information (note)	Narrowband high layer compatibility
0011 0101	Transmission medium used	Progress indicator
0011 0110	Call diversion information (note)	Call diversion information (note)
0011 0111	Echo control information (note)	Echo control information
0011 1000	Message compatibility information (note)	*Reserved*
0011 1001	Parameter compatibility information (note)	Resource identifier
0011 1010	Precedence	MLPP precedence
0011 1011	MCID request indicators (note)	*Reserved*
0011 1100	MCID response indicators (note)	*Reserved*
0011 1101	Hop counter	*Reserved (used in N-ISUP)*
0011 1110	Transmission medium requirement prime (note)	Segmentation indicator
0011 1111	Location number (note)	Location number (note)
0100 0000	Redirection number restriction (note)	Redirection number restriction (note)
0100 0001	Freephone indicators (note)	*Reserved*
0100 0010	Generic reference (note)	*Reserved*
0100 0011	Call transfer reference (note)	*Reserved*
0100 0100	Loop prevention indicators (note)	*Reserved*
0100 0101	Call transfer number (note)	*Reserved*
0100 0110	*Reserved (used in B-ISUP)*	Broadband high layer information
0100 0111	*Reserved (used in B-ISUP)*	AAL parameters
0100 1000	*Reserved (used in B-ISUP)*	OAM Traffic Descriptor
0100 1001	*Reserved (used in B-ISUP)*	MLPP user information
0100 1010	*Reserved (used in B-ISUP)*	Consistency check result information

(continued)

Table A.2 *(continued)*

Code	N-ISUP (ANSI T1.113-1995)	B-ISUP (ANSI T1.648-1995)
0100 1011	CCBS (note)	*Reserved*
0100 1100	Forward GVNS (note)	*Reserved*
0100 1101	Backward GVNS (note)	*Reserved*
0100 1110	Re-route indicator (note)	*Reserved*
0100 1111	*Reserved (used in B-ISUP)*	Broadband low layer information
0101 0000	*Reserved (used in B-ISUP)*	Broadband bearer capability
0101 0001	*Reserved (used in B-ISUP)*	Reserved for Freephone
0101 0010	*Reserved*	Minimum ATM cell rate (note)
0101 0011	*Reserved (used in B-ISUP)*	Quality of service
0101 0100	*Reserved (used in B-ISUP)*	Destination connection link identifier
0101 0101	*Reserved (used in B-ISUP)*	Origination connection link identifier
0101 0110	*Reserved (used in B-ISUP)*	Leaf party type
0101 0111	*Reserved*	Alternative ATM cell rate (note)
0101 1000	*Reserved (used in B-ISUP)*	AESA for called party number
0101 1001	*Reserved (used in B-ISUP)*	AESA for calling party number
0101 1010	*Reserved (used in B-ISUP)*	Additional ATM cell rate
0101 1011	Network management controls (note)	*Reserved*
0101 1100		
0101 1101		
0101 1110	*Reserved*	Look result (note)
0101 1111	*Reserved*	Network look ahead indicator (note)
0110 0000		
0110 0001		
0110 0010		
0110 0011		
0110 0100	*Reserved*	Report type (note)
0110 0101	Correlation id (note)	*Reserved*
0110 0110	SCF id (note)	*Reserved*
0110 0111	*Reserved*	Priority (note)
0110 1000	*Reserved (used in B-ISUP)*	Network Call Correlation identifier
0110 1001	*Reserved (used in B-ISUP)*	Connection identifier
0110 1010		
0110 1011	*Reserved*	Link layer core parameters (note)
0110 1100	*Reserved*	Link layer protocol parameters (note)
0110 1101	*Reserved*	AESA for connected party (note)
0110 1110		
0110 1111		
0111 0000 to 0111 1111		
1000 0000	*reserved for future expansion*	*Reserved (used in N-ISUP)*
1000 0001 to 1011 1111		
1100 0000	Generic address	Generic address
1100 0001	Generic digits	Generic digits
1100 0010	Operator services information	*Reserved (used in N-ISUP)*
1100 0011	Egress	Egress service

(continued)

Table A.2 *(concluded)*

Code	N-ISUP (ANSI T1.113-1995)	B-ISUP (ANSI T1.648-1995)
1100 0100	Jurisdiction	Jurisdiction information
1100 0101	Carrier identification	Carrier identification
1100 0110	Business group	*Reserved (used in N-ISUP)*
1100 0111	Generic name	Generic name
1100 1000	*Reserved (used in B-ISUP)*	Outgoing facility identifier
1100 1001	*Reserved (used in B-ISUP)*	User-network interaction
1110 0001	Notification indicator	Notification indicator
1110 0011	Transaction request	*Reserved (used in N-ISUP)*
1110 0101	Circuit group characteristics indicator	*Reserved (used in N-ISUP)*
1110 0110	Circuit validation response indicator	*Reserved (used in N-ISUP)*
1110 0111	Outgoing trunk group number	*Reserved (used in N-ISUP)*
1110 1000	Circuit identification name	*Reserved (used in N-ISUP)*
1110 1001	COMMON LANGUAGE location identification (CLLI) code	*Reserved (used in N-ISUP)*
1110 1010	Originating line information	Originating line information
1110 1011	Charge number	Charge number
1110 1100	Service code indicator	*Reserved (used in N-ISUP)*
1110 1101	Special processing request	Special processing request
1110 1110	Carrier selection information	Carrier selection information
1110 1111	Network transport	*Reserved (used in N-ISUP)*
1111 0000		
to		
1111 1110		
1111 1111		*reserved for extension of name code*

NOTE – No procedure specified for U.S. networks.

Annex B
(informative)

Bibliography

ANSI T1.113-1995, *Telecommunications – Signalling System No. 7 (SS7) – Integrated Services Digital Network (ISDN) User Part*