



ATIS-1000677.2001(R2011)

BICC Bearer Control Tunneling Protocol

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## ATIS-1000677.2001(R2011), *BICC Bearer Control Tunneling Protocol*

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## **BICC Bearer Control Tunneling Protocol**

Secretariat

**Alliance for Telecommunications Industry Solutions**

Approved November 8, 2001

**American National Standards Institute, Inc.**

### **Abstract**

This standard defines the BICC Bearer Control Tunneling Protocol. The BICC Bearer Control Tunneling Protocol is a generic tunneling mechanism for the purpose of tunneling Bearer Control Protocols (BCP) over the "horizontal" BICC interface between CCUs. This standard defines the BICC Bearer Control Tunneling Protocol, describing the coding and procedures for identification of the tunneled Bearer Control Protocol.

## Foreword

The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. As such, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the standard. This Standard defines the BICC Bearer Control Tunneling Protocol. The BICC Bearer Control Tunneling Protocol is a generic tunneling mechanism for the purpose of tunneling Bearer Control Protocols (BCP) over the "horizontal" BICC interface between CCUs. For the BICC Bearer Control Tunneling Protocol, this standard describes the coding and procedures for identification of the tunneled Bearer Control Protocol.

This standard is based on the ITU-T Recommendation Q.1990, BICC Bearer Control Tunneling Protocol. It is suited for anticipated needs and applications within and between U. S. networks.

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, D.C., 20005.

This standard was processed and approved for submittal to ANSI by the Accredited Standards Committee on Telecommunications, T1. Committee approval of this standard does not necessarily imply that all committee members voted for its approval.

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American National Standard  
for Telecommunications –

# BICC Bearer Control Tunneling Protocol

## 0 Summary

This Standard defines the BICC Bearer Control Tunneling Protocol. The BICC Bearer Control Tunneling Protocol is a generic tunneling mechanism for the purpose of tunneling Bearer Control Protocols (BCP) over the "horizontal" BICC interface between CCUs.

This Standard defines the BICC Bearer Control Tunneling Protocol, describing the coding and procedures for identification of the tunneled Bearer Control Protocol.

## 1 Scope

The purpose of this Standard is to define the BICC Bearer Control Tunneling Protocol. The BICC Bearer Control Tunneling Protocol is a generic tunneling mechanism for the purpose of tunneling Bearer Control Protocols (BCP) over the "horizontal" BICC interface between CCUs.

This Standard defines the BICC Bearer Control Tunneling Protocol, which transports the tunneled protocol data units (PDU) of the Bearer Control Protocols supported. It describes the coding and procedures for the identification of the tunneled Bearer Control Protocol.

This Standard references the specific Bearer Control Protocols that are tunneled.<sup>1</sup>

## 2 References

The following standards, and other references contain provisions, which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards and other references are subject to revision; all users of this standard are therefore encouraged to investigate the possibility of applying the most recent edition of the standards and other references listed below.

ITU-T Recommendation Q.1990, *Bearer Independent Call Control Protocol*.<sup>2</sup>

T1.673-2002 - *Bearer Independent Call Control (BICC) CS 1+*.<sup>3</sup>

T1.676-2002 - *BICC IP Bearer Control Protocol (IPBCP)*.<sup>3</sup>

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<sup>1</sup> A "I" indicates a change from ITU-T Recommendation Q.1990. Strictly editorial changes are not shown.

<sup>2</sup> This document is available from the International Telecommunications Union.  
< <http://www.itu.int/ITU-T/> >

<sup>3</sup> This document is available from the Alliance for Telecommunications Industry Solutions, 1200 G Street N.W., Suite 500, Washington, DC 20005. <<http://www.atis.org>>

### 3 Terms and Definitions

For the purpose of this Standard, the following definitions apply:

**3.1 Tunneling PDU Generating Entity:** The entity that populates and transmits the tunneled PDUs.

**3.2 Tunneling PDU Receiving Entity:** The entity that receives and interprets the tunneled PDUs.

### 4 Abbreviations

This Standard uses the following abbreviations:

APM	Application Transport Mechanism
BCP	Bearer Control Protocol
BCTP	Bearer Control Tunneling Protocol
BCU	Bearer Control Unit
BICC	Bearer Independent Call Control
BIWF	Bearer Interworking Function
BVEI	BCTP Version Error Indicator
CCU	Call Control Unit
CSF	Call Serving Function
TPEI	Tunneled Protocol Error Indicator
IPBCP	IP Bearer Control Protocol
MMSF	Media Mapping/Switching Function
PCI	Protocol Control Information
PDU	Protocol Data Unit

### 5 Overview

This Standard assumes a reliable, sequenced, point-to-point signaling transport service between peer Tunneling PDU Generating and Receiving Entities.

This Standard supports the tunneling of BCP over the following protocol.

- BICC protocol - BICC tunneling makes use of the BICC APM Mechanism and BICC call control, as defined in T1.673-2002.<sup>3</sup>

The operation of the tunneling mechanism is illustrated in Figure 1.

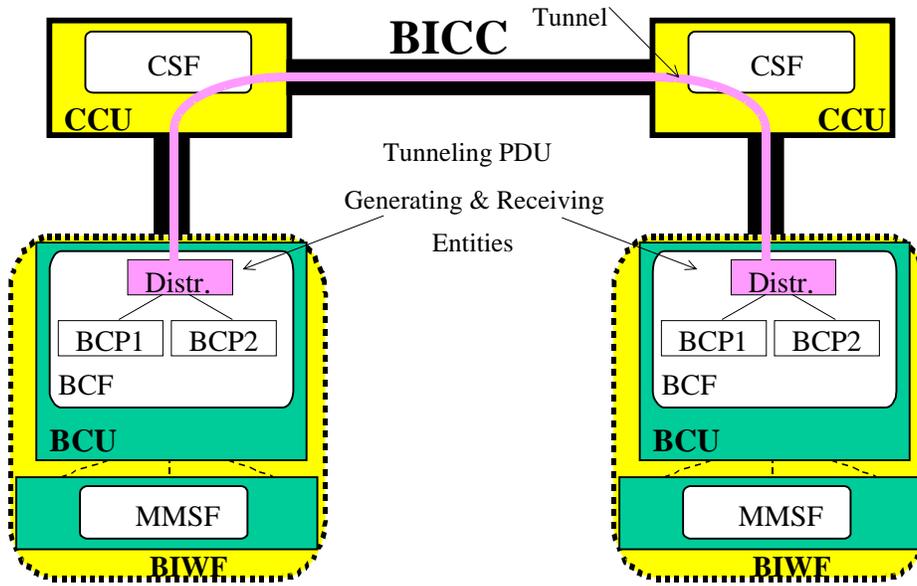


Figure 1 - Operation of the BCTP Tunneling Mechanism

## 6 Tunneling of Bearer Control Protocols

### 6.1 Supported Bearer Control Protocols

The BCP supported by this Standard, is provided in Table 1.

Table 1 - Supported Bearer Control Protocols

Supported BCP	Reference
IPBCP	Draft ANSI T1.IPBCP – BICC IP Bearer Control Protocol (IPBCP)

### 6.2 Coding of BCTP PDUs

The Bearer Control Tunneling Protocol has a binary encoded Protocol Control Information (PCI) field of 2 octets in front of each tunneled BCP PDU. The first octet of the BCTP Indicator field contains a 1-bit BCTP Version Error Indicator (BVEI) field and a five-bit BCTP Version Indicator field. The second octet of the BCTP Indicator field contains a 1-bit Tunneled Protocol Error Indicator (TPEI) field and a six-bit Tunneled Protocol Indicator field.

The format of the BCTP Indicator field is shown in Table 2.

Table 2 - BCTP Indicator Field

8	7	6	5	4	3	2	1	
0	BVEI	1	msb	BCTP Version Indicator			lsb	Octet 1
0	TPEI	msb	Tunneled Protocol Indicator				lsb	Octet 2

The TPEI field is coded as follows:

0	No indication
1	Protocol Error Indication, Bearer Control Protocol not supported

The following codes are used in the Tunneled Protocol Indicator field:

65 4321	
00 0000	}
to	{ spare (binary encoded protocols)
01 0111	}
01 1000	}
to	{ reserved for national use (binary encoded protocols)
01 1111	}
10 0000	IPBCP (text encoded)
10 0001	spare (text encoded protocol)
10 0010	not used
10 0011	}
to	{ spare (text encoded protocols)
11 0111	}
11 1000	}
to	{ reserved for national use (text encoded protocols)
11 1111	}

NOTE - The proper transport of BCTP, be it binary or text encoded, is the responsibility of the protocol carrying BCTP. Bit #6 differentiates between the two cases.

NOTE - Bit 8 of BCTP indicator octet 2 always has the value "0".

The BVEI field is coded as follows:

0	No indication
1	Version Error Indication, BCTP version not supported

The following codes are used in the BCTP Version Indicator field:

5 4321	
0 0000	Version 1 of the BCTP protocol (this Standard)
0 0001	spare
0 0010	not used
0 0011	}
to	{ spare
1 1111	}

NOTE - Bits 8 and 6 of BCTP indicator octet 1 always have the values "0" and "1," respectively.

## 7 Procedures

### 7.1 Normal Procedures

The Tunneling PDU Generating Entity populates the BCTP Indicator with the appropriate value to describe the Bearer Control Protocol that is transported in the tunnel and it adds this BCTP Indicator in front of every outgoing PDU. The Tunneled Protocol Error Indicator is set at the "No indication" value. The BCTP Version Indicator indicates the used version of the BCTP protocol. The BCTP Version Error Indicator is set at the "No indication" value.

Every outgoing PDU shall have the BCTP Indicator field as its first two octets.

Upon reception of a tunneled PDU, the Tunneling PDU Receiving Entity checks the value of the version indicator is supported and then distributes the incoming PDU to the appropriate Bearer Control Protocol handling entity, after inspection and removal of the BCTP Indicator octets.

### 7.2 Abnormal Procedures

If the Tunneling PDU Receiving Entity receives a tunneled PDU with an unsupported value of the BCTP Version Indicator:

- It generates a two-octet PDU back into the tunnel only containing the BCTP Indicator field. The BCTP Version Error Indicator is set to "Version Error Indication, BCTP version not supported" value. The Tunneled Protocol Indicator is set to the same value as the Tunneled Protocol Indicator value received, The BCTP Version Indicator field contains the version number of the version supported;
- It sends this PDU back to the Tunneling PDU Generating Entity that sent it; and
- It informs the control logic in the BIWF (see Note).

If the Tunneling PDU Receiving Entity receives a tunneled PDU with a known value of the BCTP Version Indicator, but an unknown value of the Tunneled Protocol Indicator:

- It generates a two-octet PDU back into the tunnel only containing the BCTP Indicator field. The Tunneled Protocol Error Indicator is set at the "Protocol Error Indication, bearer control protocol not supported" value. The Tunneled Protocol Indicator is set to the same value as the Tunneled Protocol Indicator value received;
- It sends this PDU back to the Tunneling PDU Generating Entity that sent it; and
- It informs the control logic in the BIWF (note).

If the Tunneling PDU Receiving Entity receives a tunneled PDU with the Tunneled Protocol Error Indicator value "Protocol Error Indication, Bearer Control Protocol not supported," and/or if the Tunneling PDU Receiving Entity receives a tunneled PDU with the BCTP Version Error Indicator value "Version Error Indication, BCTP version not supported":

- It informs the control logic in the BIWF (Note).

NOTE - It is the responsibility of the control logic in the BIWF to take appropriate release actions. However, the control logic in the BIWF is out of the scope of this Standard. Procedures for version negotiation and protocol negotiation are for further study.

### **7.3 Policing of Maximum Length Tunneled PDUs**

The tunneling PDU generating entity shall police the maximum length of the tunneled PDUs in order to ensure that the maximum data transfer capabilities of the tunneling mechanisms in BICC are not exceeded. These maximum transfer capabilities depend on the capabilities of the underlying signaling transport network supporting the BICC interface.