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SERIES Q: SWITCHING AND SIGNALLING

Specifications of signalling related to Bearer Independent Call Control (BICC)

BICC bearer control tunnelling protocol

ITU-T Recommendation Q.1990

ITU-T Q-SERIES RECOMMENDATIONS

SWITCHING AND SIGNALLING

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

ITU-T Recommendation Q.1990

BICC bearer control tunnelling protocol

Summary

This Recommendation defines the BICC bearer control tunnelling protocol. The BICC bearer control tunnelling protocol is a generic tunnelling mechanism for the purpose of tunnelling Bearer Control Protocols (BCP) over the "horizontal" BICC interface between CCUs and over the "vertical" CBC interface between CCU and BCU.

This Recommendation defines the BICC bearer control tunnelling protocol, describing the coding and procedures for identification of the tunnelled bearer control protocol.

FOREWORD

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The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

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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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As of the date of approval of this Recommendation, 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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ITU-T Recommendation Q.1990

BICC bearer control tunnelling protocol

1 Scope

The purpose of this Recommendation is to define the BICC bearer control tunnelling protocol. The BICC bearer control tunnelling protocol is a generic tunnelling mechanism for the purpose of tunnelling Bearer Control Protocols (BCP) over the "horizontal" BICC interface between CCUs and the "vertical" CBC interface between CCU and BCU.

This Recommendation defines the BICC bearer control tunnelling protocol, which transports the tunnelled protocol data units (PDU) of the bearer control protocols supported. It describes the coding and procedures for the identification of the tunnelled bearer control protocol.

This Recommendation references the specific bearer control protocols that are tunnelled.

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; 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 currently valid ITU-T Recommendations is regularly published.

[1]   ITU-T Q.765.5 (2000), *Signalling system No. 7 − Application transport mechanism: Bearer Independent Call Control (BICC)*.

[2]   ITU-T Q.1902.1 to Q.1902.4 (2001), *Specifications of the Bearer Independent Call Control Protocol (BICC)*.

[3]   ITU-T Q.1950 (2001), *Bearer independent call bearer control protocol*.

[4]   ITU-T Q.1970 (2001), *BICC IP bearer control protocol*.

3 Terms and definitions

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

3.1   tunnelling PDU generating entity: The entity that populates and transmits the tunnelled PDUs.

3.2   tunnelling PDU receiving entity: The entity that receives and interprets the tunnelled PDUs.

4 Abbreviations

This Recommendation uses the following abbreviations:

APM   Application Transport Mechanism

BCP   Bearer Control Protocol

BCTP   Bearer Control Tunnelling Protocol

BCU   Bearer Control Unit

BICC	Bearer Independent Call Control
BIWF	Bearer Interworking Function
BVEI	BCTP Version Error Indicator
CBC	Call Bearer Control protocol
CCU	Call Control Unit
CSF	Call Serving Function
IPBCP	IP Bearer Control Protocol
MMSF	Media Mapping/Switching Function
PCI	Protocol Control Information
PDU	Protocol Data Unit
TPEI	Tunnelled Protocol Error Indicator

5 Overview

This Recommendation assumes a reliable, sequenced, point-to-point signalling transport service between peer tunnelling PDU generating and receiving entities.

This Recommendation supports the tunnelling of Bearer Control Protocols (BCP) over the following protocols:

• BICC protocol. BICC tunnelling makes use of the BICC APM Mechanism, as defined in ITU-T Q.765.5 [1] and 6.4/Q.1902.4 [2].

• CBC protocol. CBC tunnelling makes use of the H.248 tunnelling package, as defined in 6.9.5/Q.1950 [3].

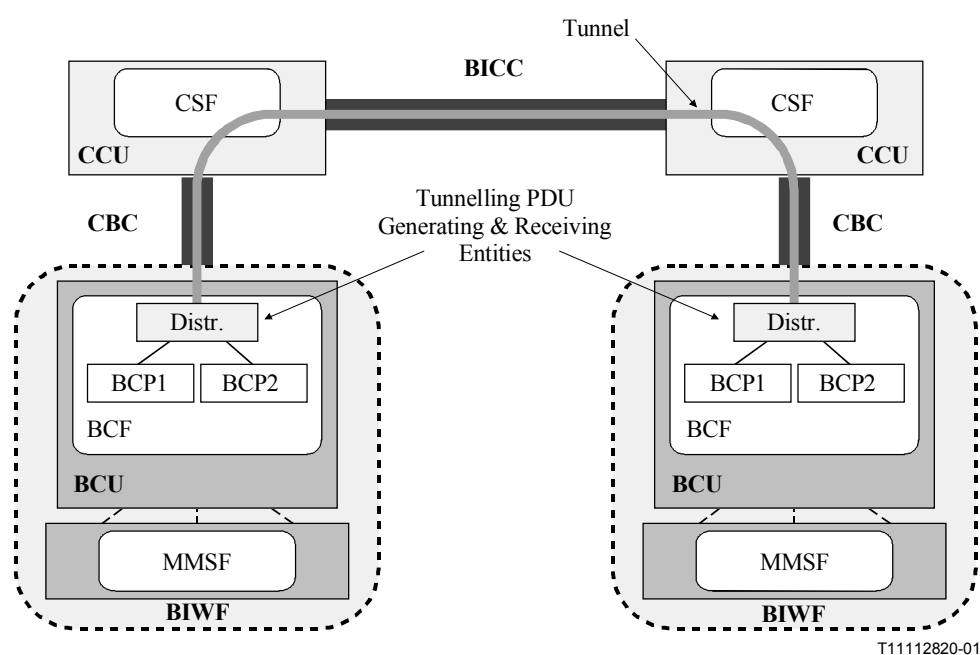The operation of the tunnelling mechanism is illustrated in Figure 1.

Figure 1/Q.1990 – Operation of the BCTP tunnelling mechanism

6 Tunnelling of bearer control protocols by Q.1990 Protocol

6.1 Supported Bearer Control Protocols

The Bearer Control Protocols (BCP) supported by ITU-T Q.1990, are provided in Table 1.

Table 1/Q.1990 – Supported bearer control protocols

Supported BCP	Reference
IPBCP	ITU-T Q.1970 [4]

6.2 Coding of BCTP PDUs

The bearer control tunnelling protocol has a binary encoded Protocol Control Information (PCI) field of 2 octets in front of every tunnelled 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 Tunnelled Protocol Error Indicator (TPEI) field and a six-bit tunnelled protocol indicator field.

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

Table 2/Q.1990 – BCTP Indicator field

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

The Tunnelled Protocol Error Indicator (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 Tunnelled 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 1 − The proper transport of BCTP, be it binary or text encoded, is the responsibility of the protocol carrying BCTP. Bit No. 6 may be used to differentiate between the two cases, if needed. See for example Annex A.7/Q.1950: Bearer Control Tunnelling Package.

The BCTP Version Error Indicator (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:

<u>5 4321</u>

0 0000   Version 1 of the BCTP protocol (this Recommendation)

0 0001   spare

0 0010   not used

0 0011

  to } spare

1 1111

NOTE 2 – Bits 8 and 6 of BCTP indicator octet 1 always have the values "0" and "1", respectively.

NOTE 3 – Bit 8 of BCTP indicator octet 2 always has the value "0".

7   Procedures

7.1   Normal Procedures

The Tunnelling 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 Tunnelled 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 tunnelled PDU, the Tunnelling 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 Tunnelling PDU Receiving Entity receives a tunnelled 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 the "Version Error Indication, BCTP version not supported" value. The Tunnelled Protocol Indicator is set to the same value as the Tunnelled Protocol Indicator value received. The BCTP Version Indicator field contains the version number of the version supported;

•   it sends this PDU back to the Tunnelling PDU Generating Entity that sent it; and

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

If the Tunnelling PDU Receiving Entity receives a tunnelled PDU with a known value of the BCTP Version Indicator, but an unknown value of the Tunnelled Protocol Indicator:

- it generates a two-octet PDU back into the tunnel only containing the BCTP Indicator field. The Tunnelled Protocol Error Indicator is set to the "Protocol Error Indication, bearer control protocol not supported" value. The Tunnelled Protocol Indicator is set to the same value as the Tunnelled Protocol Indicator value received;

- it sends this PDU back to the Tunnelling PDU Generating Entity that sent it; and

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

If the Tunnelling PDU Receiving Entity receives a tunnelled PDU with the Tunnelled Protocol Error Indicator value "Protocol Error Indication, Bearer Control Protocol not supported", and/or if the Tunnelling PDU Receiving Entity receives a tunnelled 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. The error message in the CBC protocol that carries the tunnel shall apply cause code "Interworking unspecified". However, the control logic in the BIWF is out of the scope of this Recommendation. Procedures for version negotiation and protocol negotiation are for further study.

7.3   Policing of maximum length tunnelled PDUs

The tunnelling PDU generating entity shall police the maximum length of the tunnelled PDUs in order to ensure that the maximum data transfer capabilities of the tunnelling mechanisms in BICC and CBC are not exceeded. These maximum transfer capabilities depend on the capabilities of the underlying signalling transport network supporting the BICC [2] and CBC [3] interfaces.

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