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SERIES Q: SWITCHING AND SIGNALLING

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

Interworking between selected signalling systems (PSTN access, DSS1, C5, R1, R2, TUP) and the Bearer Independent Call Control protocol

ITU-T Recommendation Q.1912.2

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Interworking between selected signalling systems (PSTN access, DSS1, C5, R1, R2, TUP) and the Bearer Independent Call Control protocol

Summary

This Recommendation defines the signalling interworking between the Bearer Independent Call Control (BICC) protocol and selected signalling systems (PSTN access, DSS1, C5, R1, R2 and TUP) for which the interworking is defined with the ISDN User Part (ISUP) protocol of Signalling System No. 7.

FOREWORD

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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

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.1912.2

**Interworking between selected signalling systems (PSTN access, DSS1,
C5, R1, R2, TUP) and the Bearer Independent Call Control protocol**

1   Scope

This Recommendation defines the signalling interworking between the Bearer Independent Call Control (BICC) protocol and narrow-band signalling systems for which the interworking is defined with the ISDN User Part (ISUP) protocol of Signalling System No. 7.

BICC is the protocol defined in ITU-T Q.1902.1 to Q.1902.4 [23]. ISUP is the protocol defined in ITU-T Q.761 to Q.764 [21].

This Recommendation builds upon:

−   The signalling interworking between selected signalling systems (PSTN access, DSS1, C5, R1, R2 and TUP) and the ISDN User Part (ISUP) protocol of Signalling System No. 7 as defined in various ITU-T Recommendations.

−   The signalling interworking between the Bearer Independent Call Control (BICC) protocol and the ISDN User Part (ISUP) protocol of Signalling System No. 7 as defined in ITU-T Q.1912.1 [24].

The interworking between the selected signalling systems for which the interworking is defined with ISUP and BICC takes place via ISUP. The scope of this Recommendation is thus as shown in Figure 1.
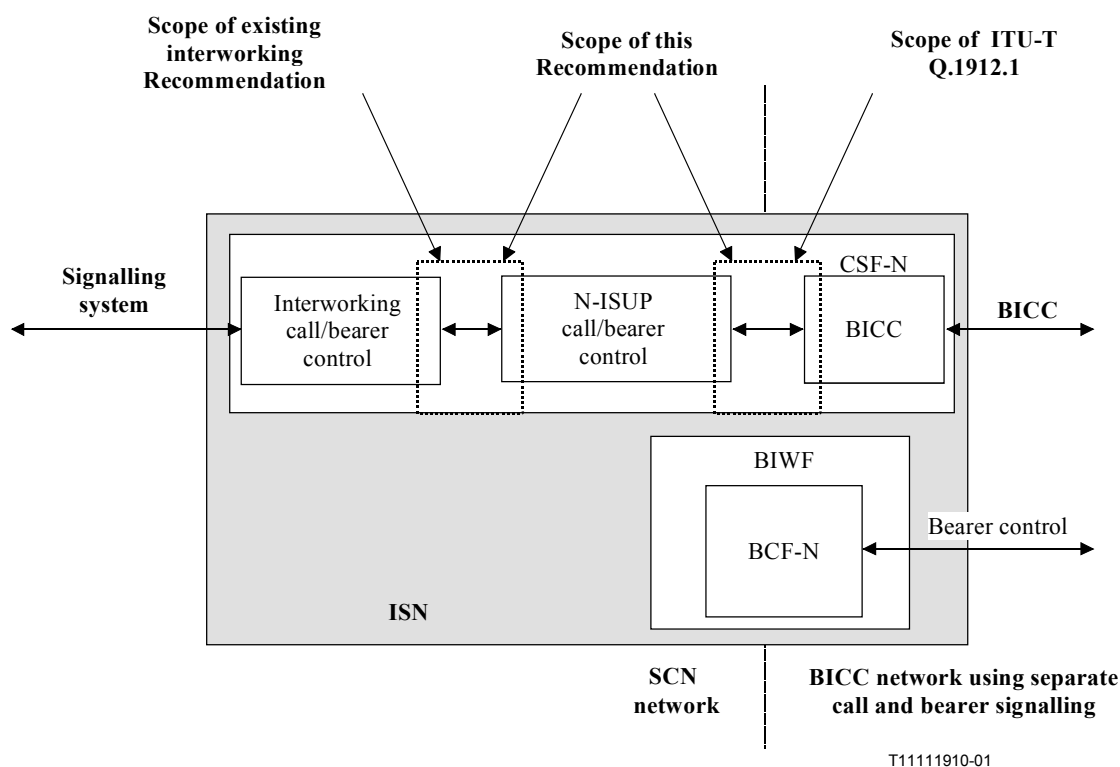

Figure 1/Q.1912.2 − Scope of this Recommendation

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 revisions; 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 the currently valid ITU-T Recommendations is regularly published.

[1]   ITU-T G.964 (1994), *V-Interfaces at the digital local exchange (LE) – V5.1-interface (based on 2048 kbit/s) for the support of access network (AN).*

[2]   ITU-T G.965 (2001), *V-Interfaces at the digital local exchange (LE) – V5.2 Interface (based on 2048 kbit/s) for the support of access network (AN).*

[3]   ITU-T G.995.1 (2001), *Overview of digital subscriber line (DSL) Recommendations.*

[4]   ITU-T Q.118 (1997), *Abnormal conditions – Special release arrangements.*

[5]   ITU-T Q.140 to Q.164 (1988), *Specifications of Signalling System No. 5.*

[6]   ITU-T Q.310 to Q.332 (1988), *Specifications of Signalling System R1.*

[7]   ITU-T Q.400 to Q.490 (1988), *Specifications of Signalling System R2.*

[8]   ITU-T Q.543 (1993), *Digital exchange performance design objectives.*

[9]   ITU-T Q.617 (1993), *Logic procedures for incoming Signalling System No. 7 (ISUP).*

[10]   ITU-T Q.627 (1993), *Logic procedures for outgoing Signalling System No. 7 (ISUP).*

[11]   ITU-T Q.646 (1993), *Logic procedures for interworking of Signalling System No. 5 to Signalling System No. 7 (ISUP).*

[12]   ITU-T Q.667 (1993), *Logic procedures for interworking of Signalling System No. 7 (TUP) to Signalling System No. 7 (ISUP).*

[13]   ITU-T Q.675 (1993), *Logic procedures for interworking of Signalling System R1 to No. 7 (ISUP).*

[14]   ITU-T Q.686 (1993), *Logic procedures for interworking of Signalling System R2 to Signalling System No. 7 (ISUP).*

[15]   ITU-T Q.690 (1993), *Logic procedures for interworking of Signalling System No. 7 (ISUP) to No. 5.*

[16]   ITU-T Q.692 (1993), *Logic procedures for interworking of Signalling System No. 7 (ISUP) to No. 7 (TUP).*

[17]   ITU-T Q.694 (1993), *Logic procedures for interworking of Signalling System No. 7 (ISUP) to R1.*

[18]   ITU-T Q.695 (1993), *Logic procedures for interworking of Signalling System No. 7 (ISUP) to R2.*

[19]   ITU-T Q.699 (1997), *Interworking between ISDN access and Non-ISDN access over ISDN user part of Signalling System No. 7.*

[20]   ITU-T Q.721 to Q.725 (1988), *Specifications of the Signalling System No. 7 – Telephone user part (TUP).*

[21]   ITU-T Q.761 to Q.764 (1999), *Specifications of Signalling System No. 7 – ISDN user part.*

[22]   ITU-T Q.931 (1998), *ISDN user-network interface layer 3 specification for basic call control.*

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

[24]   ITU-T Q.1912.1 (2001), *Interworking between Signalling System No. 7 ISDN user part (ISUP) and the Bearer Independent Call Control protocol.*

3   Definitions

For BICC specific terminology, the reader is referred to ITU-T Q.1902.1 [23].

4   Abbreviations

This Recommendation uses the following abbreviations:

ACM   Address Complete Message

BCF-N   Bearer Control Nodal Function

BICC   Bearer Independent Call Control

BIWF   Bearer InterWorking Function

C5   Signalling System No. 5

CSF-N   Call Service Nodal Function

DSL   Digital Subscriber Line

DSS1   Digital Subscriber Signalling System No. 1

ISDN   Integrated Services Digital Network

ISN   Interface Serving Node

ISUP   ISDN User Part

PSTN   Public Switched Telephone Network

R1   Signalling System R1

R2   Signalling System R2

SCN   Switched Circuit Network

SDL   Specification and Description Language

TMR   Transmission Medium Requirement

TUP   Telephone User Part

V5   Family of V-interfaces for connection of ANs to the LE, e.g. V5.1 and V5.2

5   General considerations

This Recommendation specifies interworking principles between BICC and signalling systems for which the interworking is defined with ISUP. This refers to the signalling systems that are available in the SCN at the access or within the networks. This interworking takes place at the ISN. Figure 2 shows the signalling systems covered.
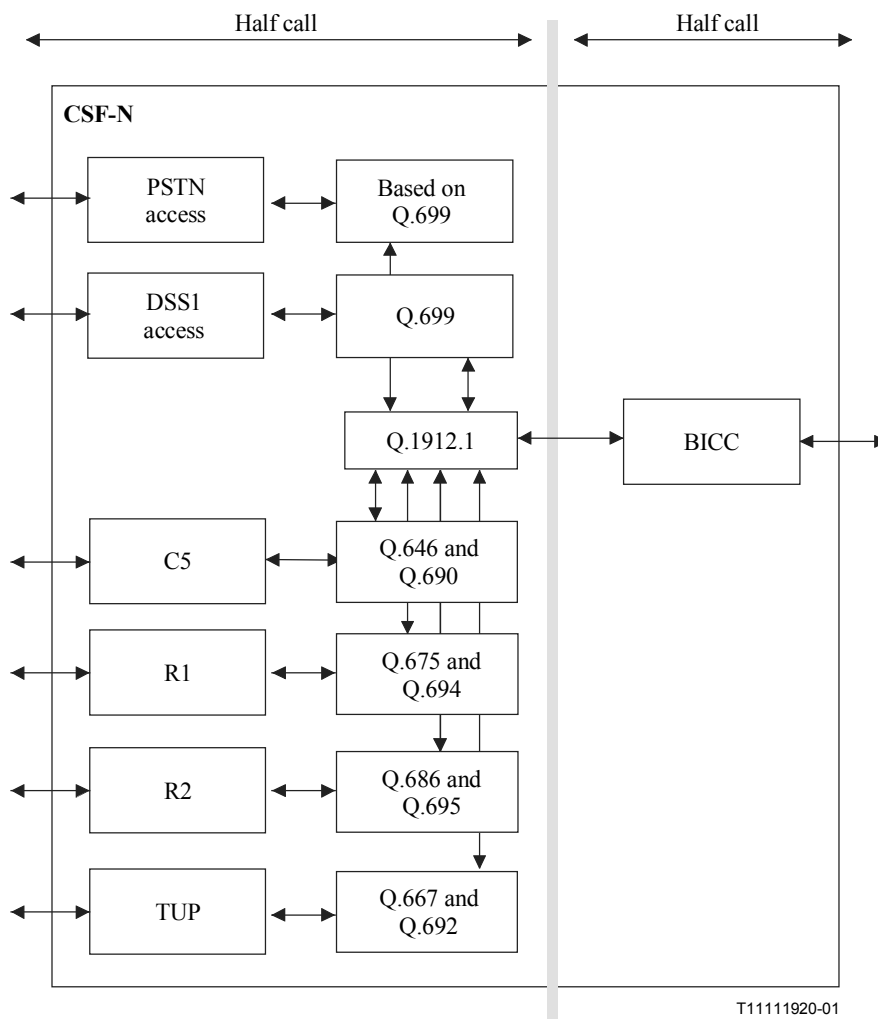
Figure 2/Q.1912.2 – Coverage of signalling interworking cases

6 Interworking with access signalling systems

6.1 PSTN access signalling system

PSTN access signalling systems are implemented based on national regulations or operator specifications. The interworking between a specific PSTN access signalling protocol and BICC shall act according to the interworking between the PSTN access signalling protocol and ISUP with the guidance provided in ITU-T Q.699 [19] and the additional interworking considerations in ISUP [21], concatenated with the interworking between ISUP and BICC in ITU-T Q.1912.1 [24]. The details of the PSTN access signalling protocols are outside the scope of the ITU-T Recommendations.

If an incoming BICC call indicates the TMR value 64 kbit/s preferred, the procedures for fallback (6.3.1.3.1.2/Q.1912.1 [24]) shall be initiated because the PSTN access signalling system does not support this TMR value.

6.2 ISDN access signalling system DSS1

The ISDN access signalling DSS1 is specified in ITU-T Q.931 [22]. The interworking between DSS1 and BICC shall act according to the interworking between ISUP and DSS1 in ITU-T Q.699 [19] and the additional interworking considerations in ISUP [21], concatenated with the interworking between ISUP and BICC in ITU-T Q.1912.1 [24].

6.3 Multiplexed access signalling systems

The same interworking considerations as in 6.2 apply when the signalling of multiple access lines is multiplexed (e.g. over a V5 transmission system as defined in ITU-T G.964 [1] and G.965 [2] or an DSL type of transmission system as defined in G.995.1 [3]). In these situations, the non-ISDN access signalling system or the ISDN access signalling system is extracted by the transmission system. From a signalling perspective the access line is terminated as indicated in Figure 2 for a single access line.

7 Interworking with network signalling systems

7.1 General

7.1.1 Interworking specifications

ITU-T Q.617 [9], Q.627 [10], Q.646 [11], Q.667 [12], Q.675 [13], Q.686 [14], Q.690 [15], Q.692 [16], Q.694 [17] and Q.695 [18] provide interworking specifications for ISUP using Specification and Description Language (SDL) diagrams.

7.1.2 Return of address complete message in interworking situations

An address complete message will not be sent until the cross-office check is made, if applicable (see ITU-T Q.543 [8]). If the succeeding network does not provide electrical called-party's-line-condition indications the CSF at the ISN shall originate and send an address complete message when the end of address signalling has been determined:

a) by receipt of an end-of-pulsing (ST) signal; or

b) by receipt of the maximum number of digits used in the national numbering plan; or

c) by analysis of the national (significant) number to indicate that a sufficient number of digits has been received to route the call to the called party; or

d) by receipt of an end-of-selection signal from the succeeding network (e.g. number received signal in Signalling System No. 5); or

e) exceptionally, if the succeeding network uses overlap signalling and number analysis is not possible, by observing that timer (timer T10 in ITU-T Q.764 [21]) has elapsed since the last digit was received, and that no fresh information has been received; in such circumstances, transmission to the national network of the last digit received must be prevented until the end of the waiting period which causes an address complete message to be sent backward. In this way, it is ensured that no national answer signal can arrive before an address complete message has been sent.

If in normal operation, a delay in the receipt of an address complete signal from the succeeding network is expected, the CSF at the ISN will originate and send an address complete message 15 to 20 seconds (timer T11 in ITU-T Q.764 [21]) after receiving the latest address message. The time-out condition is an upper limit considering the subclauses of 2.9.8.3/Q.764 [21] (20 to 30 seconds waiting for address complete message timer (T7)).

When timer T11 expires, an ACM is sent to the preceding CSF. CSFs that run timer T11 do not run timer T7. In addition, the wait for answer timer (4.3.1/Q.118 [4]) shall be started at the sending of ACM.

7.2 Interworking with network signalling system C5

The network signalling system C5 is defined in ITU-T Q.140 to Q.164 [5]. The interworking between C5 and BICC shall act according to the interworking between C5 and ISUP in ITU-T Q.646 [11] and ITU-T Q.690 [15], and the additional interworking considerations in ISUP [21], concatenated with the interworking between ISUP and BICC in ITU-T Q.1912.1 [24].

7.3 Interworking with network signalling system R1

The network signalling system R1 is defined in ITU-T Q.310 to Q.332 [6]. The interworking between R1 and BICC shall act according to the interworking between R1 and ISUP in ITU-T Q.675 [13] and ITU-T Q.694 [17], and the additional interworking considerations in ISUP [21], concatenated with the interworking between ISUP and BICC in ITU-T Q.1912.1 [24].

7.4 Interworking with network signalling system R2

The network signalling system R2 is defined in ITU-T Q.400 to Q.490 [7]. The interworking between R2 and BICC shall act according to the interworking between R2 and ISUP in ITU-T Q.686 [14] and ITU-T Q.695 [18], and the additional interworking considerations in ISUP [21], concatenated with the interworking between ISUP and BICC in ITU-T Q.1912.1 [24].

7.5 Interworking with network signalling system TUP

The network signalling system TUP is defined in ITU-T Q.721 to Q.724 [20]. The interworking between TUP and BICC shall act according to the interworking between TUP and ISUP in ITU-T Q.667 [12] and ITU-T Q.692 [16], and the additional interworking considerations in ISUP [21], concatenated with the interworking between ISUP and BICC in ITU-T Q.1912.1 [24].

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