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SERIES Q: SWITCHING AND SIGNALLING

Specifications of Signalling System No. 7 – ISDN user part

Signalling system No. 7 – Application transport mechanism: Bearer Independent Call Control (BICC)

ITU-T Recommendation Q.765.5

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ITU-T Recommendation Q.765.5

Signalling system No. 7 – Application transport mechanism: Bearer Independent Call Control (BICC)

Summary

This Recommendation describes the extensions required for the transport of bearer-related information associated with the Bearer Independent Call Control (BICC) as defined in ITU-T Rec. Q.1902.1. The BICC is used to manage the call control instance that has been separated from the bearer control instance. The BICC needs to transport bearer-related information between call control instances. The Application Transport Mechanism (APM) (see ITU-T Recs Q.1902.5 and Q.1902.1) will be used for this purpose. This Recommendation specifies the APM-user to support the transport of the bearer-related information for the BICC.

Source

ITU-T Recommendation Q.765.5 was approved on 13 April 2004 by ITU-T Study Group 11 (2001-2004) under the ITU-T Recommendation A.8 procedure.

FOREWORD

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ITU-T Recommendation Q.765.5

Signalling system No. 7 – Application transport mechanism: Bearer Independent Call Control (BICC)

1 Scope

This Recommendation describes the extensions required for the transport of bearer-related information associated with the Bearer Independent Call Control (BICC) [3]. The BICC is used to manage the call control instance that has been separated from the bearer control instance. The BICC needs to transport bearer-related information between call control instances. The Application Transport Mechanism (see [1] and [3]) will be used for this purpose. This Recommendation specifies the APM-user to support the transport of the bearer-related information for the BICC.

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 the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [1] ITU-T Recommendation Q.1902.5 (2001), *Bearer Independent Call Control protocol (Capability Set 2): Exceptions to the application transport mechanism in the context of BICC*.
- [2] ITU-T Recommendation Q.1400 (1993), *Architecture framework for the development of signalling and OA&M protocols using OSI concepts*.
- [3] ITU-T Recommendation Q.1902.1 (2001), *Bearer Independent Call Control protocol (Capability Set 2): Functional description*.
- [4] ITU-T Recommendation X.213 (2001) | ISO/IEC 8348:2002, *Information technology – Open Systems Interconnection – Network service definition, plus Amendment 1 (1997): Addition of the Internet protocol address format identifier*.
- [5] ITU-T Recommendation Q.1990 (2001), *BICC bearer control tunnelling protocol*.
- [6] ITU-T Recommendation E.182 (1998), *Application of tones and recorded announcements in telephone services*.
- [7] ITU-T Recommendation Q.1902.3 (2001), *Bearer independent call control protocol (Capability Set 2) and Signalling System No. 7 ISDN user part: Formats and codes*.

3 Definitions

This Recommendation defines the following terms:

3.1 bearer independent call control (BICC): The term Bearer Independent Call Control is used to refer to the application of the narrow-band ISDN User Part as defined in the Scope of ITU-T Rec. Q.1902.1 [3].

3.2 call mediation node (CMN): A functional entity which provides call service functionality without an associated bearer control function entity.

3.3 gateway serving node (GSN): A functional entity which provides gateway functionality between two network domains. This functional entity contains the call service gateway function, and one or more bearer interworking functions. GSNs interact with other GSNs, in other backbone network domains, and other ISNs and TSNs within its own backbone network domain.

3.4 interface serving node (ISN): A functional entity which provides the interface with SCNs. This functional entity contains the call service nodal function, and one or more bearer interworking functions which interact with the SCN and its peers within the backbone network.

3.5 serving node (SN): A functional entity that is either an ISN, a GSN or a TSN.

3.6 switched circuit network (SCN): Generic term for any network that uses circuit switching technology, i.e., ISDN, PSTN, PLMN, etc.

3.7 transit serving node (TSN): A functional entity which provides transit functionality between two SNs. This functional entity contains the call service transit function, and supports one or more bearer interworking functions. TSNs interact with other TSNs, GSNs and ISNs within their own backbone network domain.

4 Abbreviations

This Recommendation uses the following abbreviations:

AAL	Asynchronous Transfer Mode Adaptation Layer
AE	Application Entity
AEI	Application Entity Invocation
AP	Application Process
APM	Application Transport Mechanism
APM-user	Application Transport Mechanism User Application
APP	Application Transport Parameter
ASE	Application Service Element
ATII	Application Transport Instruction Indicator
BAT	Bearer Association Transport
BICC	Bearer Independent Call Control
CMN	Call Mediation Node
DTMF	Dual Tone Multi-Frequency
EH	Errors Handling
GSN	Gateway Serving Node
IAM	Initial Address Message
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ISN	Interface Serving Node
ISUP	ISDN User Part
LE	Local Exchange
LSB	Least Significant Bit

M/O	Mandatory/Optional
MACF	Multiple Association Control Function
MSB	Most Significant Bit
NI	Network Interface
NNI	Network Node Interface
PAN	Public Addressed Node
PIN	Public Initiating Node
RTP	Real time Transport Protocol
SACF	Single Association Control Function
SAO	Single Association Object
SCN	Switched Circuit Network
SN	Serving Node
TE	Transit Exchange
TSN	Transit Serving Node

5 Conventions

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

- 1) The name of each element of the following classes of terms is capitalized:
 - indicators;
 - parameters;
 - identifiers;
 - information elements;
 - methods/functions.

Example: Backbone Network Connection Identifier information element.

- 2) For the name and the type of a service primitive, the following applies:
 - the name is capitalized;
 - the type is separated from the name by "."

Example: BICC_Data.request primitive.

- 3) The definition of a parameter value is written in *italics* and is put between quotation marks.
Example: "*BAT ASE*".

6 Recommendation structure

The description of the BICC procedures in this Recommendation is structured according to the model described in 7.2. The description is thus divided into two main parts:

- Protocol functions.
- Non-protocol functions, i.e., exchange nodal functions; this is referred to as the "Application Process".

This Recommendation describes only the part of the total Application Process and Protocol functions in the exchange that relates to NNI enhancements for the support of the transport of bearer-related information for BICC.

The signalling association is subdivided into three parts: Bearer Association Transport (BAT ASE), Application Transport Mechanism (APM ASE) and BICC ASE. These are coordinated by the Single Association Control Function (SACF).

The Application Process (AP) contains all Call Control functions; however, this Recommendation will only describe the enhancements required to support the Bearer Independent Call Control. The Application Process relevant BICC functionality can be found in [3].

The service primitive technique, used to define the ASEs and the SACF specific to the application's signalling needs is a way of describing how the services offered by an ASE, or SACF, the provider of (a set) of service(s), can be accessed by the user of the service(s), the SACF or the Application Process (AP), respectively.

The service primitive interface is a conceptual interface and is not a testable or accessible interface. It is a descriptive tool. The use of service primitives at an interface does not imply any particular implementation of that interface, nor does it imply that an implementation must conform to that particular service primitive interface to provide the stated service. All conformance to the BICC specifications is based on the external behaviour at a node, i.e., on the generation of the correct message structure (as specified in [1] and [3])/operation structure (as specified in this Recommendation) and in the proper sequence (as specified in [3] and in this Recommendation).

The structure and examples of its usage are illustrated in 7.2.

The relationship between the existing ISDN network functionality and the Application Transport Mechanism service provided by the public NNI (BICC) is described as a network model in 7.1.

7 Modelling

The models described in this clause introduce concepts and terminology used in this specification of the BICC use of the capability of the Application Transport Mechanism (APM).

7.1 Network model

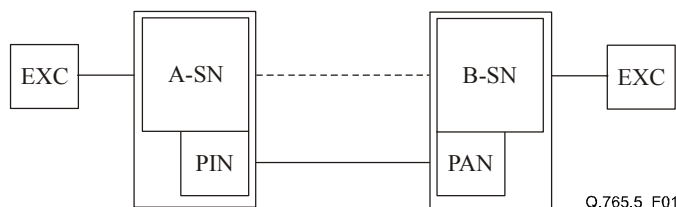


Figure 1/Q.765.5 – BICC network topology

This clause provides an illustration of the use of the APM in the support of BICC. The APM provides the means to transport BICC specific information needed for the establishment of bearer connections across a core bearer network and the binding between the call control instance and the bearer control instance(s).

Figure 1 shows an example of a network topology for the BICC (additional configurations are possible that include CMNs). A-SN is the incoming SN and B-SN is the outgoing SN. The SN exchanges are connected to other network exchanges (EXC) which may be ISDN exchanges within the existing narrow-band PSTN network with an ISUP interface to the SN or other SNs with a BICC interface.

The Public Initiating Node (PIN) and Public Addressed Node (PAN) concept is introduced in [1] to assist in the description of the APM. The PIN represents the point in the network where an APM-user, in this case BICC, wishes to initiate communications towards a peer APM-user. Since

the APM implicit addressing mechanism (see [1]) is used for the BICC, the Public Addressed Node (PAN) is the next node in the call path supporting the BAT-ASE.

The call flow examples that illustrate the use of the APM may be found in ITU-T Rec. Q.1902.1 [3].

7.2 Specification model

7.2.1 Introduction

The model used to structure the description of BICC application procedures is based on the OSI Application Layer Structure (ALS) model (see [2]). This clause presents the model, gives a general description of its operation and shows the generalized model for the "Exchange Application Process" for the support of BICC. It shows how the application makes use of the Application Transport Mechanism (APM) which is described in detail in [1] and [3].

7.2.2 General model

The generalized model for the BICC Process is shown in Figure 2. This figure does not represent the situation at any specific point during a call but, instead, shows the full picture of the architecture. The specific application of this model is discussed below. Figure 2 shows the primitive interfaces between the functional blocks, as used in the body of this Recommendation for calls using BICC.

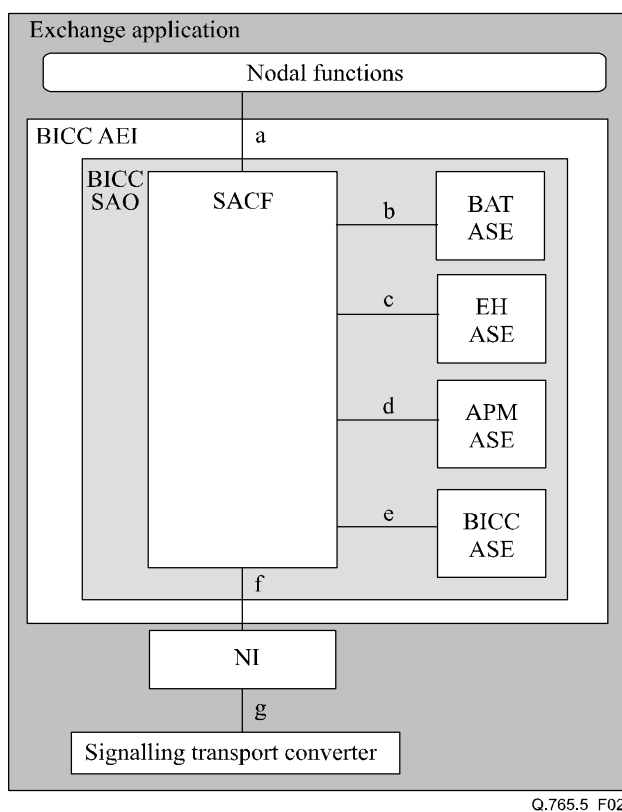


Figure 2/Q.765.5 – BICC specification model

With respect to Figure 2, all functions also have an interface to a "Maintenance application"; this is not defined as a formal primitive interface.

The term "Exchange Application Process" is used to describe all the Application functionality in an exchange. BICC is a part of the Exchange Application Process. Thus the BICC Nodal functions