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8 [[]HJbc`ca fYy`Y`n]bhY[f]fUb]a]ghcf]hj Ua]fIG8 Bk!`Dfcltc_c`X][]HJbY`bUfc b]y_Y
g][bU]nUWY`yH`r%fB GG%k!`; YbYf] b]Z b_WYg_]dfcltc_c`nUdcXdcfc`Xcdc`b]b]\
ghcf]Hj] j]ghc db]lc _]V`ghcf]hj Y`nU`Ud`]_UWY`bUj]X`YnbY[UnUgYVbY[Uca fYy`U
fU DBk!`%`XY.`GdYWZ_UWY`Udfcltc_c`U

Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Generic functional protocol for the support of supplementary services at the b service entry point for Virtual Private Network (VPN) applications; Part 1: Protocol specification

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**Integrated Services Digital Network (ISDN);
Digital Subscriber Signalling System No. one (DSS1) protocol;
Generic functional protocol for the support of
supplementary services at the "b" service entry point for
Virtual Private Network (VPN) applications;
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ETSI

Postal address

F-06921, Sophia Antipolis Cedex - FRANCE

Office address

650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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Internet

secretariat@etsi.fr
<http://www.etsi.fr>
<http://www.etsi.org>

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Signalling Protocols and Switching (SPS).

The present document is part 1 of a multi-part European Standard (Telecommunications series) covering the Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Generic functional protocol for the support of supplementary services for Virtual Private Network (VPN) applications, as identified below:

Part 1: "Protocol specification";

Part 2: "Protocol Implementation Conformance Statement (PICS) proforma specification";

Part 3: "Test Suite Structure and Test Purposes (TSS&TP), user";

Part 4: "Abstract Test Suite (ATS), user";

Part 5: "Test Suite Structure and Test Purposes (TSS&TP), network";

Part 6: "Abstract Test Suite (ATS), network";

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1 Scope

The present document specifies the generic functional protocol for the pan-European Integrated Services Digital Network (ISDN) applicable at the "b" service entry point (as defined in EN 301 060-1 [3]). It is part of the Digital Subscriber Signalling System No. one (DSS1) protocol.

The generic functional protocol is based on the Facility information element and the FACILITY message, as well as on other specific functional messages. The protocol is symmetrical, and it is applicable to both basic and primary rate interfaces.

The generic functional protocol defined in the present document provides the means to exchange signalling information for the control of supplementary services over a Virtual Private Network (VPN). It does not by itself control any supplementary service but rather provides generic services to specific supplementary service control entities.

The application of the present document to individual supplementary services is outside the scope of the present document and is defined in those standards which specify the individual supplementary services.

Further part(s) of the present document specify the method of testing required to identify conformance to the present document.

The present document is applicable only to point-to-point access configurations.

NOTE 1: The exchange of signalling information relating to the "b" service entry point is distinguished from the exchange of signalling information that is used to access public network services at the T reference point. The generic functional protocol applicable in a public network context is supported in accordance with the requirements of EN 300 196-1 [1]. The generic functional protocol specifically applicable in a VPN context is supported in accordance with the present document. The requirements have been defined such that both contexts can coexist on the same access, and this is expected to be a typical implementation. There is no requirement that when the provisions of the present document are implemented, the exchange of signalling information relating to the T reference point also need to be implemented on the same access. Where both contexts are implemented, the access resources are common to both contexts.

NOTE 2: A service provider may support supplementary services applicable for public network calls in a VPN context. In this case the applicability of the individual public network supplementary services to a call in a VPN context is beyond the scope of the present document.

2 Normative references

References may be made to:

- a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or
- b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or
- c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or
- d) publications without mention of a specific version, in which case the latest version applies.

A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] EN 300 196-1: "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".
- [2] EN 300 403-1: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 1: Protocol specification [ITU-T Recommendation Q.911 (1993), modified]".

- [3] EN 301 060-1: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Basic call applications: enhancement at the "b" service entry point for Virtual Private Network (VPN) applications; Part 1: Protocol specification".
- [4] ETS 300 402-2: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Data link layer; Part 2: General protocol specification [ITU-T Recommendation Q.921 (1993), modified]".
- [5] ISO/IEC 11582 (1995): "Information technology - Telecommunication and information exchange between systems - Private Integrated Services Network - Generic functional protocol for the support of supplementary services - Inter-exchange signalling procedures and protocol".
- [6] ITU-T Recommendation X.219 (1988): "Remote operations: Model, notation and service definition".
- [7] ITU-T Recommendation X.229 (1988): "Remote operations: Protocol specification".
- [8] ISO/IEC 15056 (1997): "Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Transit counter additional network feature".

3 Definitions and abbreviations

3.1 Definitions

Clause 3 of EN 300 196-1 [1] shall apply with the following addition:

Corporate telecommunication Network (CN): Consists of sets of equipment (Customer Premises Equipment and/or Customer Premises Network) which are located at geographically dispersed locations and are interconnected to provide networking services to a defined group of users.

NOTE 1: The ownership of the equipment is not relevant to this definition.

NOTE 2: In the present document, even equipment which is not geographically dispersed (e.g. a single Private Integrated services Network eXchange (PINX) or Centrex-provided services to users at a single location) may form a CN.

Call control message: A message as defined in EN 301 060-1 [3], subclause 7.1, which on sending or receipt causes a change of the call state at either the network or the user. Call control messages also include the INFORMATION message and PROGRESS message.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ACSE	Association Control Service Element
BC	Bearer Capability
CN	Corporate telecommunication Network
DSE	Dialogue Service Element
DSS1	Digital Subscriber Signalling System No. one
GFT	Generic Functional Transport
ISDN	Integrated Services Digital Network
NCICS	Networked Call Independent, Connection-oriented Signalling
NFE	Network Facility Extension
NT2	Network Termination 2 <Editor's note to ETSI secretariat - please cross-check this abbreviation>
PINX	Private Integrated services Network eXchange
PSS1	Private Signalling System No. One
TE	Terminal Equipment
VPN	Virtual Private Network

4 Coexistence of generic protocols for the control of supplementary services

4.1 Support of various generic protocols

Subclause 5.1 of EN 300 196-1 [1] shall apply.

4.2 Coexistence of generic protocols

Subclause 5.2 of EN 300 196-1 [1] shall apply.

In addition, the protocol described in the present document incorporates the functionality of the generic functional protocol described in EN 300 196-1 [1].

4.3 Arrangements by which coexistence of protocols may be supported by a network

Subclause 5.3 of EN 300 196-1 [1] shall apply.

5 General principles applied for the functional control of supplementary services

5.1 Introduction

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This subclause specifies the general principles applied for the functional control of supplementary services at the "b" service entry point (as defined in EN 301 060-1 [3]). The generic protocol utilizes functions and services provided by EN 300 403-1 [2] basic call procedures, as extended by EN 301 060-1 [3], and the functions of the data link layer as defined in ETS 300 402-2 [4].

5.2 Scope of the procedures

The procedures defined in the present document specify the basic methodology for the control (e.g. invocation, notification, deactivation, etc.) of supplementary services. The procedures are independent of whether or not the user-network interface is at a basic or primary rate access.

5.3 Categories of procedures

Two categories of procedures are defined.

The first category deals with the control of supplementary services in a public network context. For this category, subclause 6.3 of EN 300 196-1 [1] shall apply.

The second category deals with the control of supplementary services in a VPN context.

The entity that establishes a signalling relation shall indicate by means of the presence or absence of the VPN indicator information element in which context the signalling information is to be interpreted. The VPN indicator information element and the associated procedures are described in EN 301 060-1 [3] and in subclause 7.1.3 of the present document.

5.4 VPN services in the context of CN

See subclause 5.1 of EN 301 060-1 [3].

6 Control of supplementary services using the separate message approach

These procedures shall be used only in a public network context. Clause 7 of EN 300 196-1 [1] shall apply.

7 Control of supplementary services using the common information element approach

7.1 General

7.1.1 Introduction

In the common information element approach, the Facility information element is used to transport information for the control of supplementary services, conveying components as application-oriented elements complemented by the necessary procedures for operations and transport mechanisms. Operations and transport mechanisms may either be related to a connection or may be used independently of a connection.

The common information element approach is modelled as remote operations as specified in ITU-T Recommendations X.219 [6] and X.229 [7]. According to this model, one entity requests that a particular operation be performed whilst the responding entity attempts to perform the operation and responds to the invoking entity. Therefore an operation of the common information element approach is regarded as a request/reply interaction, supported by the application function and carried out within the context of an application association.

An error is used to report the unsuccessful outcome of an operation. For each operation the appropriate errors, if required, need to be indicated.

7.1.2 Scope of the procedures

Subclause 8.1.2 of EN 300 196-1 [1] shall apply.

7.1.3 Distinction between public network and VPN context

An indication is necessary to distinguish between a public network or a VPN context.

If an entity sends a message that establishes a call reference in a VPN context, it shall include a VPN indicator information element in this message. If an entity sends such a message in a public network context, it shall not include a VPN indicator information element in this message.

If an entity receives a message that establishes a call reference, and this message contains a VPN indicator information element, then the procedures for signalling in a VPN context shall apply for all messages that use this call reference.

If an entity receives a message that establishes a call reference, and this message does not contain a VPN indicator information element, then the procedures for signalling in a public network context shall apply for all messages that use this call reference.

If an entity receives a FACILITY message with the dummy call reference, and this message does not contain a VPN indicator information element, then the procedures for signalling in a public network context shall apply.

If an entity receives a FACILITY message with the dummy call reference, and this message contains a VPN indicator information element, then the procedures for signalling in a VPN context shall apply.

NOTE: The present document does not specify the use of the dummy call reference in the FACILITY message. The receipt of a FACILITY message with the dummy call reference in a VPN context is an error, and error handling procedures are applied.

7.2 Procedures applicable for signalling in a VPN context

7.2.1 Transport of components

7.2.1.1 Bearer-related transport mechanism

7.2.1.1.1 Protocol control requirements

This subclause defines the transport of components using the messages for the establishment and the clearing of calls. The procedures for basic call control are described in EN 301 060-1 [3]. These procedures are not influenced by the components carried. Bearer-related transport procedures and operations shall follow the specified procedures and transport capabilities of bearer connections according to EN 301 060-1 [3]. The SETUP message shall contain the VPN indicator information element.

For bearer-related transport of components, the call state of the bearer connection shall be in a state (or about to enter a state) other than the Null state (U0, N0). For transport, any call control message as defined in EN 301 060-1 [3] (except the STATUS and STATUS ENQUIRY messages), or the FACILITY message defined in subclause 11.1.1.1 of the present document, may be used to carry the components in a Facility information element. These messages shall use the call reference of the bearer connection.

NOTE: If the call establishment request has not reached the addressed PINX, the component included in the FACILITY message may not reach its intended destination. There is no requirement for any entity to avoid this by storing the information.

For general rules, format and coding of call reference values, subclause 4.3 of EN 300 403-1 [2] shall apply.

The call reference provides the means to correlate messages belonging to the same signalling transaction of a connection. When a supplementary service affects more than one connection, different call references are used to identify each connection individually. This implies the use of different messages in order to manage each connection separately.

The implicit call-control association provided by an EN 300 403-1 [2] call reference shall always be cleared when a connection is released.

The Cause information element shall only be used to report information element content errors outside the component portion of the Facility information element (octets 1 - 3). When no protocol error outside the component portion is found, the Cause information element shall convey cause #31, "normal unspecified". For protocol errors in the component portion of the Facility information element (octets 3.1, etc) see subclauses 7.2.1.1.2 and 9.1.

7.2.1.1.2 Generic Functional Transport (GFT)-Control requirements

For those nodal entities that terminate the GFT-Control protocol, subclause 7.1.2 of ISO/IEC 11582 [5] shall apply.

NOTE: For those nodal entities that do not terminate the GFT-Control protocol, the Facility information element will be transferred to the next entity regardless of the contents of the destinationEntity element of the Network Facility Extension (NFE). Examples of this type of nodal entity include a Transit PINX with reduced functionality as well as a Relay Node.