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European Standard (Telecommunications series)

**Integrated Services Digital Network (ISDN);
Digital Subscriber Signalling System No. one (DSS1) protocol;
Basic call control;
Enhancement at the "b" service entry point for
Virtual Private Network (VPN) applications;
Part 1: Protocol specification**

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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 defines the Digital Subscriber Signalling System No. one (DSS1) extensions to the basic call to support the Private Signalling System No. one (PSS1) information flow (see ISO/IEC 11572 [7]) in Virtual Private Network (VPN) applications. The relevant requirements and other information that affect DSS1 are defined in the present document.

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; Basic call applications: enhancement at the "b" service entry point for Virtual Private Network (VPN) applications, as identified below:

Part 1: "Protocol specification";

Part 2: "PICS proforma specification"; [SIST EN 301 060-1:2000](https://standards.iteh.ai/catalog/standards/sist/27b2831-8fbb-41fa-9a86-)

Part 3: "Test Suite Structure and Test Purposes (TSS&TP), user"; <https://standards.iteh.ai/catalog/standards/sist/27b2831-8fbb-41fa-9a86->

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 extensions of the protocol for basic call control for the pan-European Integrated Services Digital Network (ISDN). These extensions are applicable at the "b" service entry point (as defined in clause 5 of the present document). It is part of the Digital Subscriber Signalling System No. One (DSS1) protocol. The present document contains only additional requirements to those in the main body of ETS 300 403-1 [2].

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

The present document specifies additional protocol elements and call control procedures for the handling of calls between users in a Corporate telecommunication Network (CN) at the "b" service entry point. The functionality provided by the public network may be:

- the emulation of an Originating Private Integrates services Network Exchange (PINX);
- the emulation of a Terminating PINX;
- the emulation of a Transit PINX;
- the emulation of a Relay Node;
- the emulation of an Incoming Gateway PINX;
- the emulation of an Outgoing Gateway PINX;
- the emulation of a combination of two or more of the above.

The support of these capabilities is a network option.

The present document does not cover the requirements for support of the "a" service entry point.

The specification included in the present document does not imply any specific implementation technology or platform.

NOTE: Calls/connections relating to the "b" service entry point are distinguished from calls that are accessing the public network at the T reference point. Calls relating to the T reference point are supported in accordance with the requirements of EN 300 403-1 [2]. Calls relating to the "b" service entry point are supported in accordance with the requirements of 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, calls at 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.

2 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.

2.1 Normative references

- [1] ITU-T Recommendation I.411 (1993): "ISDN user-network interfaces - reference configurations".
- [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".
- [3] ETS 300 097-1: "Integrated Services Digital Network (ISDN); Connected Line Identification Presentation (COLP) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".
- [4] ITU-T Recommendation I.210 (1993): "Principles of telecommunication services supported by an ISDN and the means to describe them".
- [5] ITU-T Recommendation I.112 (1993): "Vocabulary of terms for ISDNs".
- [6] ISO/IEC 11571 (1994): "Information technology -- Telecommunications and information exchange between systems -- Numbering and sub-addressing in private integrated services networks".
- [7] ISO/IEC 11572 (1996), plus Amendment 1 (1996) and Amendment 2 (1996): "Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit mode bearer services - Inter-exchange signalling procedures and protocol".
- [8] ISO/IEC 11579-1 (1994): "Information technology -- Telecommunications and information exchange between systems -- Private integrated services network -- Part 1: Reference configuration for PISN Exchanges (PINX)".
- [9] 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".

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2.2 Informative references

- [10] ITU-T Recommendation I.330: "ISDN numbering and addressing principles".
- [11] ETR 172 (1995): "Business Telecommunications (BTC); Virtual Private Networking (VPN); Services and networking aspects; Standardization requirements and work items".

3 Definitions

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

Corporate telecommunication Network (CN): Consists of sets of equipment (Customer Premises Equipment (CPE) and/or Customer Premises Network (CPN)) 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 PINX or Centrex-provided services to users at a single location) may form a CN.

end PINX functionality: Within the context of a call the functionality of a PINX required to provide attachment and servicing of terminals.

gateway PINX functionality: Within the context of a call the functionality of a PINX required to interconnect End PINXs or Transit PINXs with nodes of other public or private networks.

incoming Gateway PINX functionality: Gateway PINX functionality providing support of calls incoming to the CN.

integrated Services Digital Network (ISDN): See ITU-T Recommendation I.112 [5], definition 308.

originating PINX functionality: End PINX functionality providing support of the calling user.

outgoing Gateway PINX functionality: Gateway PINX functionality providing support of calls from the CN to other networks.

preceding PINX: In the context of a call, an entity with PINX functionality located in the direction towards the originating interface. A preceding PINX may be functionality provided by a physical PINX or may be an emulation of PINX functionality by the public network.

Private Integrated services Network eXchange (PINX): A PISN nodal entity that provides automatic switching and call handling functions used for the provision of telecommunication services. The nodal entity can be implemented by one or more pieces of equipment located on the premises of the private network administrator or by equipment co-located with, or physically part of, a public network.

NOTE 3: If applicable, a PINX provides to users of the same and/or other private integrated services network exchanges:

- telecommunication services within its own area; and/or
- telecommunication services from the public ISDN; and/or
- telecommunication services from other public or private networks; and/or
- within the context of a PISN, telecommunication services from other PINXs.

Relay Node functionality: Within the context of a call the functionality that identifies calls between users in the CN, and relays such calls to designated PINX functionality emulated by the public network, or to a designated terminating "b" service entry point. This may be via other Relay Nodes. Relay Node functionality includes transparent handling of private networking information (e.g. transit counter).

service; telecommunications service: See ITU-T Recommendation I.112 [5], definition 201.

subsequent PINX: In the context of a call, an entity with PINX functionality located in the direction towards the destination interface. A subsequent PINX may be functionality provided by a physical PINX or may be an emulation of PINX functionality by the public network.

supplementary service: See ITU-T Recommendation I.210 [4], subclause 2.4.

terminating PINX functionality: End PINX functionality providing support of the called user.

transit PINX functionality: Within the context of a call the functionality of a PINX required to interconnect End PINXs and/or other Transit PINXs and/or Gateway PINXs.

Virtual Private Network (VPN): That part of a CN that provides corporate networking using shared switched network infrastructures. This is split into VPN architecture and VPN services.

The VPN architecture is that part of a CN that provides corporate networking between customer equipment where:

- the shared switch network infrastructure takes the place of the traditional analogue or digital leased lines and the function of the transit node, irrespective of the network type, whether it be the Public Switched Telephone Network (PSTN), ISDN, mobile communication network, or a separate network;
- the customer premises may be served in terms of end node functionality with any combination of PBX, Centrex, Local Area Network (LAN) router, or multiplexer;
- the CN user may also be served by terminal equipment connected to end node functionality residing on customer premises, or provided by public network equipment; and
- the VPN architecture in one network, or multiple networks, comprises a part of the total national or international CN.

VPN services offered by the switched network infrastructure provide:

- VPN end-user services to CN users;
- VPN networking services to support the interconnection of PINXs;

- service interworking functionality;
- inter-VPN services to provide co-operation between the VPN services of two networks; and
- VPN management services to enable service subscribers to control and manage their VPN resources and capabilities.

4 Abbreviations

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

ANF-TC	Additional Network Feature - Transit Counter
BCD	Binary Coded Digit
CLIP	Calling Line Identification Presentation supplementary service
CLIR	Calling Line Identification Restriction supplementary service
CN	Corporate telecommunication Network
COLP	COConnected Line identification Presentation supplementary service
COLR	COConnected Line identification Restriction supplementary service
CPE	Customer Premises Equipment
CPN	Customer Premises Network
DSS1	Digital Subscriber Signalling System No. one
IA5	International Alphabet No. five
IVN	InterVening Network
ISDN	Integrated Services Digital Network
LAN	Local Area Network
PBX	Private Branch eXchange
PINX	Private Integrated services Network eXchange
PISN	Private Integrated Services Network
PSS1	Private Signalling System No. one
PSTN	Public Switched Telephone Network
SUB	SUBaddressing supplementary service
TE	Terminal Equipment
VPN	Virtual Private Network

5 Description

The present document specifies the extensions required to the basic call control signalling protocol defined in EN 300 403-1 [2] to support calls within a Corporate telecommunication Network (CN) and to support calls which enter or exit the CN via Gateway Private Integrated services Network eXchange (PINX) functionality performed by the public network. The protocol is applicable at the T reference points to which VPN services are provided. The support of these additional signalling capabilities is a network option. These Digital Subscriber Signalling System No. one (DSS1) extensions shall be made available to PINXs, on the basis of bilateral agreements at subscription time.

The additional basic call signalling capabilities identified in the present document are to provide information flows that are functionally identical to the information flows provided by the Private Signalling System No. 1 (PSS1) basic call control protocol (as defined by ISO/IEC 11572 [7]). In the context of the present document, the public network (providing VPN services) can be seen, from the private network perspective, as providing an interconnection between a PINX supporting the present document and another PINX supporting PSS1 information flows. This second PINX may be a physical PINX connected to the public network or may be an emulation of an End PINX functionality provided by the public network.

5.1 VPN services in the context of CN

The support of virtual private networking has been developed using the concept of "service entry points". This enables VPN services to be described without the need to identify impacts on particular protocols. Whilst the present document only relates to the "b" service entry point and to PINX type 2, the other service entry points are included for completeness. Items that are covered by the present document are specifically identified in the text.

Annex A provides more information on CN models.

In order to identify VPN services and the points where these services are offered (service entry points) the CN overview given in figure 1 has been produced. It reflects a CN overview in terms of services and service relations between:

- CPE/CPN;
- public networks;
- VPN service providers; and
- VPN service subscribers.

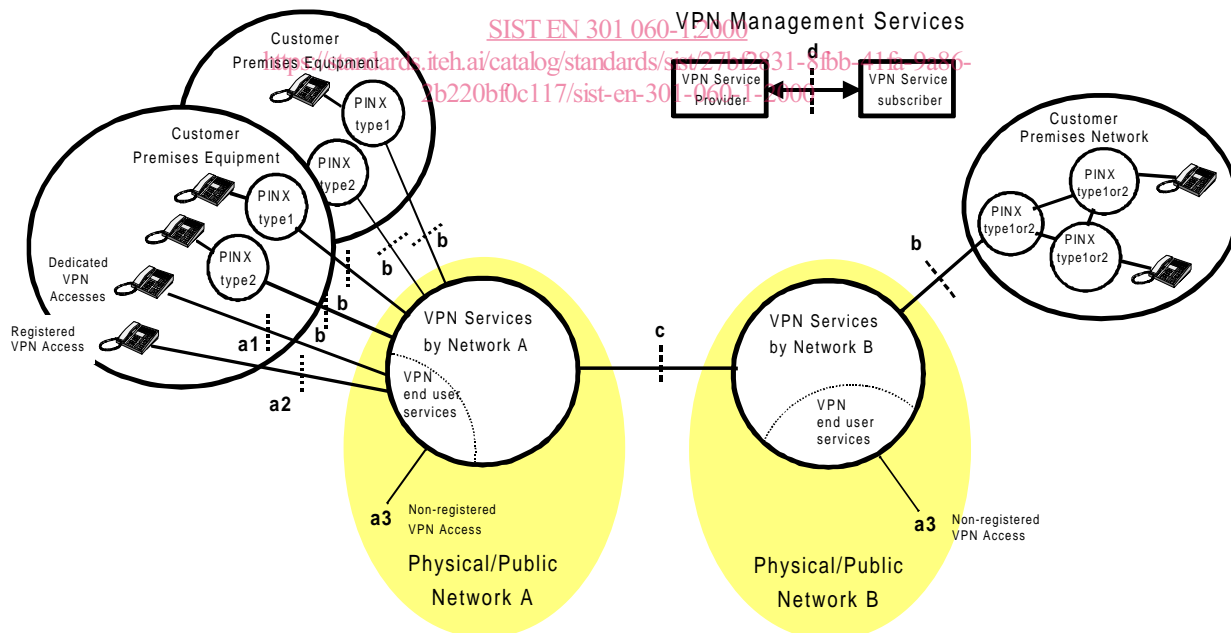
The following PINX types are defined:

PINX type 1: An implementation of a PINX outside the public network that supports services provided by the public ISDN and/or PSTN.

PINX type 2: An implementation of a PINX outside the public network that supports services based on PISN standards in addition to the services provided by the public ISDN and/or PSTN. The scope of the present document covers the support of PINX type 2.

Referring to figure 1, VPN services can be subdivided into four classes depending on the service entry point at which they are offered:

- VPN end-user services: services offered at the "a1", "a2" and "a3" service entry points;
- VPN networking services: services offered at the "b" service entry point;
- Inter-VPN services: services offered at the "c" service entry point; and
- VPN management services: services offered at the "d" service entry point.



NOTE: a2 is a registered VPN access operating in the CN mode.

Figure 1: VPN services in context of a CN

The following types of service entry points are identified:

a1: The "a1" service entry point for an access (within a specific CN) which is dedicated to the utilization of VPN services. This is referred to as "dedicated VPN access". At this service entry point, a pre-defined set of VPN end-user services is permanently available.