

# ISDN Glossary

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## Introduction

This document provides definitions for many common (Integrated Services Digital Networks) ISDN terms and abbreviations. Many terms are included that relate to specific ISDN technology topics such as reference points, switchtypes so forth and so on. Because comprehensive glossaries exist for these technologies elsewhere, and because including every term for all related technologies would prove unrealistic and burdensome, only those ISDN terms which are commonly used are included here.

## Before You Begin

### Conventions

For more information on document conventions, see the Cisco Technical Tips Conventions.

### Prerequisites

To effectively use this document, make sure that you know the specific term you need information on. It is also useful to know associated terms or synonyms of the term you are looking for.

For more information about ISDN, see Integrated Services Digital Network.

For a glossary of general networking terms, refer to the document Internetworking Terms and Acronyms.

### Components Used

This document is not restricted to specific software and hardware versions.

## Glossary

**2B+D:** The Basic Rate Interface (BRI) in ISDN. A single ISDN circuit is divided into two 64 kbps digital channels for voice or data and one 16 kbps channel for low speed data and signaling. In ISDN, 2B+D is carried on one or two pairs of wires (depending on the interface), the same wire pairs that today bring a single voice circuit into your home or office.

**Analog:** An electrical circuit that is represented by means of continuous, variable physical quantities (such as voltages and frequencies), as opposed to discrete representations (like the 0/1, off/on representation of digital

circuits).

**AT & T 5ESS:** A digital central office switching system made by AT & T see also switch-type

**B Channel:** An ISDN communication channel that bears or carries voice, circuit, or packet conversations. The Bearer channel is the fundamental component of ISDN interfaces. It carries 64,000 bits per seconds (64 kbps) in either direction.

**Basic Rate Interface:** See BRI

**Bearer Capability:** The layer 3 service indication which defines the characteristics of a given call. The Bearer Cap of a call is indicated by the telco in the q.931 SETUP messages. The Bearer cap is most often used to distinguish between voice and data calls. The most common bearer cap messages seen are:

- 0x8890 for an ISDN 64K call
- 0x8890218F for an ISDN 56K call
- 0x8090A2 for a Voice/Speech call (u-law)

**BRI (Basic Rate Interface):** A BRI contains 2 B channels, each with 64 kbps capacity, and a single D channel (16 kbps) which is used for signaling and call progress messages.

**Calling Line ID:** See CLID

**CAS (Channel Associated Signaling):** In-band signaling, when the signaling data is sent on the same channel as the data.

**CCS (Common Channel Signaling):** Out-of-band signaling, when the signaling data is sent on a channel separate from the data. A BRI or PRI uses CCS as it has a separate D-channel for signaling information.

**Central Office:** See CO

**Channel Associated Signaling:** See CAS

**CLID (Calling Line ID):** The ISDN number of the calling source. This is provided by the telco in the call setup messages. You can screen calls based on CLID for added security.

**CO (Central Office):** A facility that serves local telephone subscribers. In the CO, subscriber lines are joined to switching equipment that allows them to connect to each other for both local and long distance calls. The CO is the termination point of the local loop.

**Common Channel Signaling:** See CCS

**CPE:** Customer Provided Equipment, or Customer Premises Equipment. Originally, it refers to equipments on the customer's premises which has been bought from a vendor who was not the local phone company. In Europe, its now called CTE, which stands for Connected Telecommunications Equipment. It simply refers to telephone equipment that resides on the customer's premises.

**Custom:** If the Telco indicates that their switch-type is Custom, then configure the switchtype on the router as basic-5ess (for BRI with 5ess switch), primary-5ess (for PRI with 5ess), basic-dms (for BRI with DMS switch), or primary-dms (for PRI with DMS).

**D-Channel:** An ISDN communication channel used for sending information between the ISDN equipment and the ISDN central office switch. It carries the signaling and call progress messages. The D-channel can also carry "user" packet data at rates up to 9.6 kbps. On PRI it will be on the channel 16 for E1 and on the

channel 24 for T1.

**Data Over Voice:** see DOV

**Dialed Number Identification Services:** See DNIS

**Digital:** The use of a binary code to represent information, such as 0/1, or on/off.

**Digital Signaling Zero:** See DS0

**DNIS (Dialed Number Identification Services):** The ISDN number that is being dialed. This is provided by the telco in the call setup messages. DNIS can be used to provide differentiated service to dialin users.

**DS0 (Digital Signaling Zero):** A 64 kbps pipe used for data or signaling. The terms DS0 and channel are used synonymously.

**DOV (Data Over Voice):** Technology used primarily with local services or special customer premises PBXs for transmitting data and voice simultaneously over twisted-pair copper wiring. It can also allow you to send data over a voice call using an ISDN line which can be interesting for pricing purpose ( Based on the bearer Capability, both End-devices will know that it is a normal ISDN data call when the telco will switch it as a Voice call.)

**E series:** Series recommendations from the ITU for overall network operation, telephone service, service operation, and human factors.

**E.163:** ITU recommendation defining numbering plan for PSTN.

**E.164:** ITU recommendation for international telecommunication numbering especially ISDN, B-ISDN and SMDS. An evolution of the normal telephone numbers.

**E carrier:** Time-division multiplexed digital transmission facility operating at an aggregate data rate of 2.048 Mbps and above.

**E1:** A European standard digital facility with a transmission speed of 2.048 Mbps. For DS1 (digital signal level 1), 30 Bearer Channels ( which can be used for voice or Data at 64 Kbps ) are multiplexed onto one E1 channel. In the USA, a 1.544Mbps channel is used (T1).

**ET:** Exchange Termination is the ISDN Exchange where Layer 2 ( for example, LAPD ) information will be terminated

**ETSI:** Made up of national representatives from Conférence Européenne des Postes (CEPT) 26 European Post, Telephone, and Telegraph (PTT ) countries, the composition of which can include public and private telecommunication providers, and equipment manufacturers and users, subject to national determination.

**European Telecommunication Standards Institute:** See ETSI

**Glare:** Indication sent when the switch and router decide to seize the same trunk at the same time. Either the switch or the customer premises equipment (CPE), such as a router, must yield to the glare. In most instances the ideal setup is to have the CPE yield to glare. If the Access Server is not doing dial-out for data or voice, a glare is not encountered.

**Hunting:** Refers to the process by which the switch (for incoming calls) or the router (for outgoing calls) seizes a trunk. Cisco Routers, by default, hunt from high-to-low (descending order) when choosing a channel for dialout, hence the telco should hunt from low-to-high (ascending order) to minimize the possibility of

glare.

**Hunt group:** an arrangement of a group of telephone lines such that a single telephone number is listed in the directory. A person dialing that listed number is automatically connected by the the telephone switching equipment to an available line in the group.

**I series:** Series recommendations from the ITU (ISDN)

**I.430:** ITU recommendation for basic user network interface. ISDN physical layer ( basic interface – 144Kbps (  $2 \times 64 + 16$  ) ).

**I.431:** ITU recommendation for Primary rate ISDN interface ( 1544 for T1 / 2048Kbps for E1 ). Primary rate user network interface.

**I.441:** ITU defines ISDN LAPB

**I.451:** ITU defines ISDN network protocol : Signaling ( see Q.931 )

**Inside Wiring:** Wiring that is done from the point of demarcation to the jack in the wall where the line terminates.

**ISDN:** (Integrated Services Digital Network): Communication protocol offered by telephone companies that permits telephone networks to carry data, voice, and other source traffic. Reference Integrated Services Digital Network for more information

**ITU** (International Telecommunication Union): An organization established by the United Nations and having as its membership in virtually every government in the world. ITU objective is to set telecommunication standards, allocate frequencies to various uses and hold trade shows every four years ( Series recommendations for ISDN are E, I and Q ).

**Jack Type:** Different types of jacks (RJ–11, RJ–45, or RJ–48) can be used for an ISDN line. The RJ–11 is the most common and is most often used for analog phones, modems, and fax machines. RJ–48 and RJ–45 are essentially the same, as they both have the same 8–pin configuration. An RJ–11 jack can fit into an RJ–45/RJ–48 connector; however, an RJ–45/RJ–48 cannot fit into an RJ–11 connector.

**LAPD** (Link Access Protocol–D): The data link layer 2 protocol that manages the exchange of information to the ISDN network. LAPD is defined in Q.921.

**LATA** (Local Access and Transport Area): A geographic territory used primarily by local telephone companies to determine charges for intrastate calls. As a result of the Bell divestiture, switched calls that both begin and end at points within the LATA (intraLATA) are generally the sole responsibility of the local telephone company, while calls that cross outside the LATA (interLATA) are passed on to an Inter eXchange Carrier (IXC).

**LDN** (Local Directory Number): Used for call routing, the LDN is associated with a SPID and therefore with North American BRI interfaces. It is necessary for receiving incoming calls on the second B–channel.

**LEC** (Local Exchange Carrier): The local phone companies – either a Regional Bell Operating Company (RBOC) or an independent phone company– that provide local transmission services.

**Link Access Protocol–D:** See LAPD

**Local Access and Transport Area:** See LATA

**Local Directory Number:** See LDN

**Local Exchange Carrier:** see LEC

**Loop Qualification:** A test done by the phone company to make sure the customer is within the maximum distance of 18,000 feet from the central office that services that customer. Notice, however that ISDN service could be available at a longer distance than that with a mid-span repeater.

**LT (Line Termination):** This is part of the telco that interfaces with CPE. In Europe it would function as a NT-1, but in the US it would function as a termination for the U interface.

**Mid-span Repeater:** A device that amplifies the signal coming or going to the central office. This device is necessary for ISDN service if you are outside the 18,000 feet distance requirement from the central office.

**National:** Switchtype conforming to the NI-1 standard for BRI and NI-2 standard for PRI. If the telco informs you that the switchtype is National or ni-\*, then the Cisco router configuration should be basic-ni (for BRI) or primary-ni (for PRI).

**Network Termination 1:** See NT-1

**NFAS (Non-Facility Associated Signaling):** When a group of PRI interfaces are effectively bundled together, one D-channel can be used for the signaling data of all the combined B-channels, while the redundant D-channels can be used for data transmission. NFAS is only possible with a T1 PRI.

**Non-Facility Associated Signaling:** See NFAS

**NT-1: (Network Termination (type) 1):** This is a device that is required to connect ISDN terminal equipment to an ISDN line. The NT-1 connects to the two-wire line (twisted pair copper wiring) that your telephone company has assigned for your ISDN service. Your ISDN service (in North America) will not work if the NT-1 plug is not connected to a working electrical outlet. However if your router has a U-interface, the NT-1 is built-in to the hardware. Reference: ISDN Functions and Reference Points drawing at the end of this document.

**NT-2 (Network Termination (type) 2):** This is a more intelligent customer premise device which can perform switching and concentration, such as a digital PBX. It typically terminates primary rate access lines from the local ISDN switch. Reference: ISDN Functions and Reference Points drawing at the end of this document.

**PBX (Private Branch Exchange):** This is a small version of the phone company's larger central switching office. A PBX is a private telephone switch. It is connected to groups of lines from one or more central offices and to all of the telephones at the location served by the PBX.

**PIC (Presubscribed Interexchange Carrier):** PIC codes are 7-digit prefixes which identify US long distance carriers to the local exchange carriers (LEC). This allows the customers to use a different long-distance carriers for separate calls. The PIC code is configured as a prefix to the dialed number. Most PICs are of the format 1010xxx.

**Plain Old Telephone Service:** See POTS

**Point of Demarcation:** The physical point where the phone company ends its responsibility with the wiring of the phone line.

**Point Of Presence:** See POP

**POP:** (Point Of Presence): A long distance carrier's office in your local community. A POP is the place where your long distance carrier, or IXC, terminates your long distance lines just before those lines are connected to your local phone company's lines or to your own direct hookup. Each IXC can have multiple POPs within one LATA. All long distance phone connections go through the POPs

**POTS** (Plain Old Telephone Service): The basic telephone service – standard single line telephones, telephone lines, and access to the public switched network. There are no added features, such as call waiting or call forwarding, with POTS.

**Presubscribed Interexchange Carrier :** See PIC

**PRI** (Primary Rate Interface): A larger aggregate than a BRI, a PRI will consist of 24 channels (T1) or 31 channel's (E1). In either case one channel is reserved for call signaling. For T1s, the D–channel is the 24th channel while the E1s use the 16th channel for signaling.

**Private Branch exchange:** See PBX

**Q series:** Series recommendations from the ITU for switching and signaling

**Q.921:** See LAPD

**Q.931:** ITU that Describes the Layer 3 signaling procedure protocol stack to setup ISDN connections. Primarily used for basic and primary rate interfaces

**RBOC** (Regional Bell Operating Company): The regional telephone companies that were created by the AT & T divestiture.

**Reference Point:** Several reference points defined to characterize the different interfaces for ISDN defined in ITU recommendation I.411 ( T,S and R reference points will be defined ( physical and electrical characteristics ).

**Round–Robin Hunting:** Also referred to as "walking rotary" hunt. In this type of hunting the switch keeps track of the last trunk picked, then picks the next free one.

**SAPI** (Service Access Point Identifier): An address used at layer 2 to manage different data types for the same individual device connecting to the ISDN network. The SAPI and TEI together form the layer 2 address. SAPI values are shown below:

```
0 : Q931 (signaling information)
1 : Telemetry
16 : X.25 on D-channel
63 : Data Link Management
```

**Service Access Point Identifier:** See SAPI

**Service Order Number:** See SON

**Service Profile Identifier:** See SPID

**SON** (Service Order Number): The SON is the number issued by the local exchange carrier to confirm the order for the ISDN service. It provides a matching number for cross referencing the order to the phone company.

**SPID** (Service Profile Identifier): The ISDN switch needs to have a unique identification number for each ISDN set to which it sends calls and signals. SPIDs are particular to North American BRI implementations.

SPIDs allow multiple ISDN devices, such as voice and data, to share the local loop while supporting the multiple services simultaneously. SPIDs identify the services that are ordered from the carrier. For information about SPID problems, refer to Troubleshooting ISDN BRI SPIDs

**S/T-interface** A four-wire ISDN circuit. The S/T interface is the part of an ISDN line that connects to the terminal equipment. In North America, if your router has an S/T interface it requires an external NT-1 to connect to the telco network. In the rest of the world, a NT-1 is not required in the customer premises. Reference: ISDN Functions and Reference Points drawing at the end of this document.

**Subscriber Verification Number:** See SVN

**SVN (Subscriber Verification Number):** The SVN is the number issued by the long distance carrier to confirm the order for long distance service.

**Switched 56:** Digital service at 56 Kbps provided by local telephone companies and long distance carriers. Similar to ISDN, Switched 56 traffic can travel over the same physical infrastructure that supports ISDN. Switched 56, however, is an older technology with decreasing significance.

**Switch-type:** Q.931 comes in many local versions So it will specify the correct version of the protocol implemented by specific organizations .

- US

5ess : North America ( AT & T ) dms100 : North America ( Northern ) NI : National ISDN ( NI-1 and NI-2 are available )

For more information about these switches, refer to Capabilities of Typical ISDN Switches

- Europe

NET3 : Euro-isdn ( standard of ETSI based on the Germany DSS1 specification ) 1tr6 : German specification VN3 : France specification ( very closed to NET3 specification )

**T1:** ISDN service, provided mainly in North America, consisting of 23 B-channels and 1 D-channel. There are different implementations of T1s such as PRI, CAS etc. The T1 rates: 24 DS0s = 1.536Mbps + 8000bps overhead = 1.544Mbps. Reference: ISDN Functions and Reference Points drawing at the end of this document.

**TEI (Terminal Endpoint Identifier):** An address used at layer 2 to manage individual devices connecting to the ISDN network. The TEI is typically dynamically negotiated with the ISDN switch. The range is from 0 till 127 :

- TEI value : 0 : for Point-to-point service ( as it is for PRI ). 1 till 63 : fixed assigned 64 till 126 : dynamically assigned by Switch 127 : Broadcast to send frame to all attached device on the BUS ( for example : used by Link management ( SAPI : 63 ) ).

**Terminal Endpoint Identifier :** See TEI

**TE-1 (Terminal Equipment (type) 1):** This equipment uses an interface that complies with the ISDN user-network interface recommendations. This device can connect to and work with ISDN. Reference: ISDN Functions and Reference Points drawing at the end of this document.

**TE-2 (Terminal Equipment (type) 2):** This equipment uses an interface that complies with interface recommendations other than the ISDN interface recommendation. This device requires a terminal adapter to connect and work with ISDN. Reference: ISDN Functions and Reference Points drawing at the end of this

document.

**TA** (Terminal Adapter): Adapter which allows a TE-2 terminal to be served by an ISDN user-network interface. Reference: ISDN Functions and Reference Points drawing at the end of this document.

**Twisted Pair:** Two insulated wires, usually copper, twisted together and often bound into a common sheath to form multi-pair cables. In ISDN, the cables are the basic path between a subscriber's terminal or telephone and the PBX or the central office.

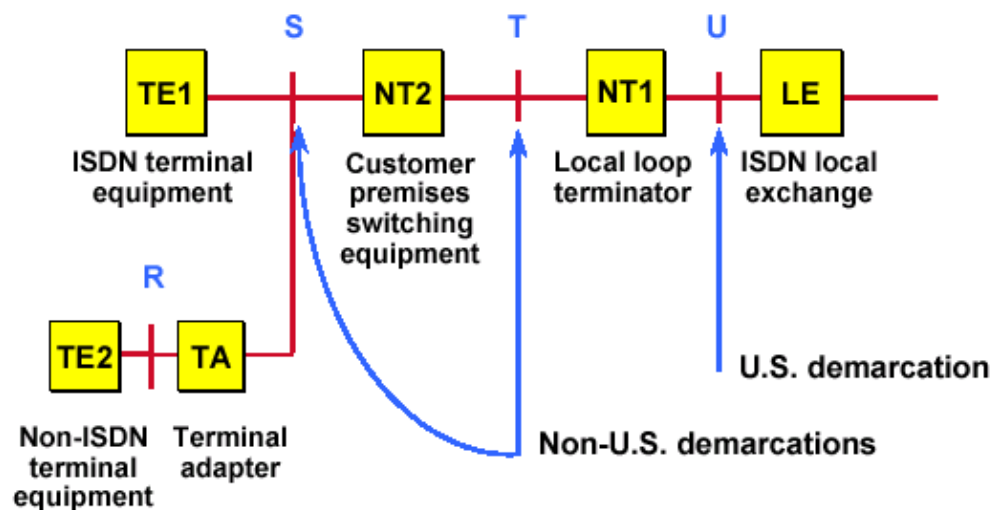
**U-interface:** A two-wire ISDN circuit – essentially today's standard one pair telephone company local loop made of twisted-wire. The U interface is the most common ISDN interface (in North America) and extends from the central office. Reference: ISDN Functions and Reference Points drawing at the end of this document.

**V series:** ITU recommendation for Data communication over the telephone network.

**V.110:** ITU recommendation for Multiplexing, rate adaptation and support of existing interfaces ( same as I.463 ).

**V.120:** ITU recommendation for Multiplexing, rate adaptation and support of existing interfaces for restricted 64 kbit/s transfer capability. Also called bit rate adaptation ( same as I.465).

## ISDN Functions and Reference Points



## Related Information

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