Caller ID

Caller ID (**caller identification**, **CID**), also called **calling line identification** (**CLID**), **calling number delivery** (**CND**), **calling number identification** (**CNID**) or **calling line identification presentation** (**CLIP**), is a telephone service, available in analog and digital phone systems and most voice over Internet Protocol (VoIP) applications, that transmits a caller's number to the called party's telephone equipment during the ringing signal, or when the call is being set up but before the call is answered. Where available, caller ID can also provide a name associated with the calling telephone number. This service is called CNAM. The information made available to the called party may be displayed on a telephone's display, on a separately attached device, or personal computer.

Caller ID information typically consists of the caller's telephone number while CNAM consists of the caller's name. A modem can pass CLID information to a computer for purposes of call logging or blocking, but this can be problematic as modems in different countries have different systems, causing hardware or software incompatibilities. However, many modems are designed and programmed to handle multiple signalling methods, and can be configured to use the local standard.

Caller ID may be used by the recipient to avoid answering unwanted incoming calls by the concept of informed consent; however, it also poses problems for personal privacy. However, the possibility of caller ID spoofing may render received information unreliable.

1 Calling-line identification

In some countries, the terms ***caller display***, ***calling line identification presentation (CLIP)***, *call capture*, or just ***calling line identity*** are used; *call display* is the predominant marketing name used in Canada (although some customers use the phrase caller ID). The idea of CNID as a service for POTS subscribers originated from automatic number identification (ANI) as a part of toll free number service in the United States.

However, CNID and ANI are not the same thing. ANI was originally a term given to a system that identified a caller placing a long distance call, in a non-electronic central office switch. Previous to this implementation, after dialling the long distance number, the caller would be intercepted by the operator to request their number before the call proceeded. Caller ID is made up of two separate pieces of information: the calling number and the billing (or subscriber) name where available. When a call is made from a given name, this name can be passed on through a number of different methods. For example, the caller's name may be datafilled in the originating switch, in which case it is sent along with the number. More commonly, a database is accessed by the receiving switch, in order to match the number to a name. If the name does not exist, then the city, State, Province, or other designation may be sent. Some of these databases may be shared among several companies, each paying every time a name is "extracted". It is for this reason that mobile phone callers appear as WIRELESS CALLER, or the location where the phone number is registered (these vary based on which company owns the block of numbers, *not* the provider to which a number may have been ported). Additionally, nothing ensures that the number sent by a switch is the actual number where the call originated; the telephone switch initiating the call may send any digit string desired as caller ID. As such, the telephone switch, and therefore the operating entity, must also be trusted to provide secure authentication.

The displayed caller ID also depends on the equipment originating the call.

If the call originates on a POTS line (a standard loop start line), then caller ID is provided by the service provider's local switch. Since the network does not connect the caller to the callee until the phone is answered, generally the caller ID signal cannot be altered by the caller. Most service providers however, allow the caller to block caller ID presentation through the vertical service code **67*.

A call placed behind a private branch exchange (PBX) has more options. In the typical telephony environment, a PBX connects to the local service provider through Primary Rate Interface (PRI) trunks. Generally, although not absolutely, the service provider simply passes whatever calling line ID appears on those PRI access trunks transparently across the Public Switched Telephone Network (PSTN). This opens up the opportunity for the PBX administrator to program whatever number they choose in their external phone number fields.

Some IP phone services (ITSPs, or Internet Telephony Service Providers) support PSTN gateway installations throughout the world. These gateways egress calls to the local calling area, thus avoiding long distance toll charges. ITSPs also allow a local user to have a number located in a "foreign" exchange; the New York caller could have a Los Angeles number, for example. When that user places

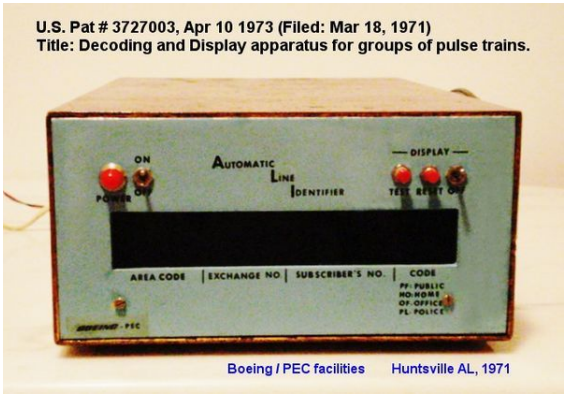
a call, the calling line ID would be that of a Los Angeles number, although they are actually located in New York. This allows a call return without having to incur long distance calling charges.

With cellphones, the biggest issue appears to be in the passing of calling line ID information through the network. Cellphone companies must support interconnecting trunks to a significant number of Wireline and PSTN access carriers. In order to save money, it appears that many cellphone carriers do not purchase the North American feature Group D or PRI trunks or SS7 trunks (Signalling System 7) required to pass calling line ID information across the network.

2 History

In 1968, Theodore George "Ted" Paraskevakos, while working in Athens, Greece as a communications engineer for SITA,[1] began developing a system to automatically identify a telephone caller to a call recipient. After several attempts and experiments, he developed the method in which the caller's number is transmitted to the called receiver's device. This method was the basis for modern-day Caller ID technology.

From 1969 through 1975, Paraskevakos was issued 20 separate patents related to automatic telephone line identification,[2] and since they significantly predated all other similar patents, they appear as prior art in later United States Patents issued to Kazuo Hashimoto[3] and Carolyn A. Doughty.[4]



The first caller identification receiver

In 1971, Paraskevakos, working with Boeing in Huntsville, Alabama, constructed and reduced to practice a transmitter and receiver, representing the world's first prototypes of caller-identification devices. They were installed at Peoples' Telephone Company in Leesburg, Alabama and were demonstrated to several telephone companies with great success. These original and historic working models are still in the possession of Paraskevakos.

In the patents related to these devices, Paraskevakos also proposed to send alphanumeric information to the receiving apparatus, such as the caller's name, and also to make feasible banking by telephone. He also proposed to identify the calling telephone by special code (e.g., "PF" for public phone, "HO" for home phone, "OF" for office phone, "PL" for police).

In May 1976, Kazuo Hashimoto, a prolific Japanese inventor with over 1000 patents worldwide,[5] first built a prototype of a caller ID display device that could receive caller ID information. His work on caller ID devices and early prototypes was received in the Smithsonian Institution, National Museum of American History in 2000.[6] U.S. patent 4,242,539, filed originally on May 8, 1976, and a resulting patent re-examined at the patent office by AT&T, was successfully licensed to most of the major telecommunications and computer companies in the world.[7]

Initially, the operating telephone companies wanted to have the caller ID function performed by the central office as a voice announcement and charged on a per-call basis. John Harris, an employee of Northern Telecom's telephone set manufacturing division in London, Ontario promoted the idea of having caller ID as a telephone set display. The telephone was coded ECCS for Enhanced Custom Calling Services. A video of his prototype was used to leverage the feature from the central office to the telephone set.

In 1977, a Brazilian inventor, Valdir Bravo Salinas, filed a patent application for a caller ID device at the Brazilian Patent and Trademarks Office (INPI). The patent was issued in 1982 as patent PI7704466 and is the first patent ever issued for a caller ID equipment in Brazil. Later in 1980 two other Brazilian inventors, João da Cunha Doya and Nélio José Nicolai, filed different patent applications for caller ID devices. Mr. Doya's application was filed on May, 2nd, 1980 and issued as patent PI8003077. Mr. Nicolai's application was filed on July, 2nd,1980 and rejected for being a mere copy of Mr. Salinas' invention, thus lacking novelty. In 1981 another application for a caller ID equipment was filed at the INPI. The inventors were Mr. José Daniel Martin Catoira and Mr. Afonso Feijó da Costa Ribeiro Neto. This application was granted and the patent was issued as patent PI8106464.

The first market trial for Caller ID and other "Custom Local Area Signaling Services" was conducted by BellSouth as one of the "TouchStar" services on July 7, 1984 in Orlando, Florida. The Lines of Business (marketing) department in BellSouth Services named the service "Caller ID". The other Regional Bell Operating Companies later adopted the name and eventually became the generally accepted name in the US. Planning for the trial was initiated by a team in Bell Laboratories, AT&T Co., and Western Electric before the Bell System divestiture, with the participation of Southern Bell. The purpose of these trials was to assess the revenue potential of services that

depend on deployment of the common channel signaling network needed to transmit the calling number between originating and terminating central offices. Trial results were analyzed by Bellcore members of the original team.

In 1987, Bell Atlantic (now Verizon Communications) conducted another market trial in Hudson County, New Jersey, which was followed by limited deployment.[8] BellSouth was the first company to deploy caller ID in December 1988 in Memphis, Tennessee, with a full deployment to its nine-state region over the next four years. Bell Atlantic was the second local telephone company to deploy Caller ID in New Jersey's Hudson County. US West Communications (now Qwest/CenturyLink) was the third local telephone company to offer caller ID service in 1989.

3 Type II Caller ID

In 1995, Bellcore released another type of modulation, similar to Bell 202, in which it became possible to transmit caller ID information and even provide call-disposition options while the user was already on the telephone. This service became known in some markets as **call waiting ID**, or (when it was combined with call-disposition options), **Call Waiting Deluxe**; it is technically referred to as **Analog Display Services Interface**. "Call Waiting Deluxe" is the Bellcore (now Telcordia Technologies) term for Type II caller ID with Disposition Options.

This CLASS-based POTS-telephone calling feature works by combining the services of call waiting with caller ID but also introduces an "options" feature that, in conjunction with certain screen-based telephones, or other capable equipment, gives a telephone user the option to

- **Switch**: Place the current call on hold to take the second call (not a new feature)
- **Hang-up**: Disconnect the current call and take the second call (not a new feature)
- **Please Hold**: Send the caller either a custom or telephone-company-generated voice message asking the caller to hold
- **Forward to Voice Mail**: Send the incoming caller to the recipient's voice mail service.
- **Join**: Add the incoming caller to the existing conversation.

4 Operation

In the United States, caller ID information is sent to the called party by the telephone switch as an analogue data stream (similar to data passed between two modems), using Bell 202 modulation between the first and second rings, while the telephone unit is still on hook. If the telephone call is answered too quickly after the first ring, caller ID information will not be transmitted to the recipient. There are two types of caller ID, number only and name+number. Number-only caller ID is called **Single Data Message Format** (SDMF), which provides the caller's telephone number, the date and time of the call. Name+number caller ID is called **Multiple Data Message Format** (MDMF), which in addition to the information provided by SDMF format, can also provide the directory listed name for the particular number. Caller ID readers which are compatible with MDMF can also read the simpler SDMF format, but an SDMF caller ID reader will not recognize an MDMF data stream, and will act as if there is no caller ID information present, e.g. as if the line is not equipped for caller ID.

Instead of sending the caller ID in between the first and second ring, some systems use a "line reversal" to announce the caller ID, or caller ID signals are simply sent without any announcement. Instead of Bell 202, the European alternative V.23 is sometimes used, (without the 75-baud reverse channel) or the data is sent using DTMF signalling.

In general, CID as transmitted from the origin of the call is only the calling party's full phone number (including area code, and including international access code and country code if it's an international call). The calling party name is added by the consumer's terminating central office if the consumer has subscribed to that service. Calling name delivery is not automatic. A SS7 (or Signalling System 7) TCAP query may be launched by the called party's central office, in order to retrieve the information for Calling Name delivery to the caller ID equipment at the consumer's location, if the caller's name has not already been associated with the calling party's line at the originating central office. Canadian systems using CCS7 automatically (but not in all cases) send the calling name with the call set-up and routing information at the time of the call.

To look up the name associated with a phone number, the carrier in some instances has to access that information from a third-party database, and some database providers charge a small fee for each access to such databases. To avoid such charges, some carriers will report the name as "unavailable", or will report the name as "*(city), (state)*" based on the phone number, particularly for wireless callers. For 800 numbers, they may report a string such as TOLLFREE NUMBER if the name is not available in a database.

5 Uses

5.1 Telemarketing

Telemarketing organisations often spoof caller ID. In some instances, this is done to provide a "central number" for consumers to call back, such as an 800 number, rather than having consumers call back the outbound call centre where the call actually originated. However, some telemarketers block or fraudulently spoof caller ID to prevent being traced. It is against United States federal law for telemarketers to block or to send false caller ID.[9] Individuals can bring civil suits and the Federal Communications Commission (FCC) can fine companies or individuals that are illegally spoofing or blocking their caller ID.

Some telemarketers have used caller ID itself for marketing, such as by using a toll-free number and registering the text string "FREE MONEY" or "FREE PLANE TICKETS" as the name to be displayed on the caller ID.

5.2 ISPs

Some Internet service providers (ISPs) providing dial-up access require the customer to use CNID to prevent abuse of the account by unauthorised callers. Some systems with dial-up access can be programmed only to accept calls with specific caller ID strings.

5.3 Mobile providers

Most mobile phone providers used the caller ID to automatically connect to voice mail when a call to the voice mail number was made from the associated mobile phone number, bypassing the need to enter a password. While this was convenient for many users, because of spoofing, this practice has been replaced by more secure authentication by many carriers.

6 Regional differences

Converter that converts from DTMF to FSK format

Different countries often use different standards for transmitting caller ID information. As a result, phones purchased in one country may not be compatible with the local caller ID standard when the phone is used in a different country.[10] For example, the US uses Bellcore FSK, whereas Taiwan uses ETSI FSK, so a phone purchased in the US will not understand Taiwan's caller ID standard. There are even cases where individual state/provinces will use different protocols within a country. There do exist, however, caller ID converters that will translate from one standard to another. Below is a list of countries and the caller ID standard used:

6.1 UK

Telephone equipment usually displays CLID information with no difficulty. Modems are notoriously problematic; very few modems support the British Telecom standard in hardware; drivers for those that do often have errors that prevent CLID information from being recognised.[12] Other UK telephone companies use slight variations on the Bellcore standard, and CLID support is "hit and miss".[13]

7 Legal issues

7.1 United States

In the United States, telemarketers are required to transmit caller ID.[14] This requirement went into effect on January 29, 2004.[15] Courts have ruled that caller ID is admissible.[16] Providers are required by FCC rules to offer "per-call" blocking of caller ID to their customers. Legislation in the United States in 2007 would make it illegal to "spoof" caller ID for fraudulent purposes. See caller ID spoofing.

8 Getting around caller ID

8.1 Blocking

Blocking is the common term for preventing the display of a calling number.

Telecommunications regulators vary in their requirements for the use and effectiveness of assorted technologies to prevent numbers from being displayed. Generally, unlisted numbers are always blocked. Non-published and regular listed numbers are not usually blocked. But there is varying treatment for the determination of call display blocking because of many factors. If desired, customers should inquire carefully to make sure their number will not be displayed. The telephone service provider may also have vertical service codes which can be dialed to

The caller ID information is masked when a SkypeOut call is placed.

configure blocking as active for all calls or on a call-by-call basis.

In some locations in the United States, regulations allow (or require) blocking to be automatic and transparent to the caller.

Where blocking is applied on a call-by-call basis (that is, at the time a call is made), subscribers can block their caller ID by dialing a special code (a vertical service code, or VSC) before making a call. In North America and some other regions, the code is *67, while in the United Kingdom and Ireland, it is 141. This special code does not block the information from companies using call capture technology. This means that equipment with caller ID will simply display the word "PRIVATE" or "WITHHELD". When CNID is blocked at the caller's request, the number is actually transmitted through the entire telephone network, with the "presentation withheld" flag set; the destination CO is expected to honor this flag, but sometimes does not—especially when the destination phone number is served by an ISDN PRI.

Alternatively, in cases where caller ID is being blocked automatically, it can only be released on a call-by-call basis by dialing a special code (*82 in North America; 1470 in the UK). See "Enabling", below.

Similarly, some countries offer **anonymous caller rejection**, which rejects all calls when the subscriber's name, number (or both) is blocked. Some telephone companies protect their clients from receiving blocked information by routing anonymous calls to a service (such as AT&T Privacy Manager), where the caller is required to announce himself or herself. The service then asks the called party if they want to accept or reject the call. Other telephone companies play a recording to the caller advising them of the called party's rejection configuration, and often offer advice (such as prefixing their dialing with *82) on how to get their call to the intended called party. Blocking the number is referred to as *calling line identification restriction* (CLIR). Emergency services will most likely be able to show the restricted number using a service called *calling line identification restriction override* (CLIRO), or by using general ANI services.

These features create a cat-and-mouse game type of situation, whereby subscribers must purchase additional services in order to cancel out other services.

8.2 Spoofing

Caller ID spoofing is the practice of causing the telephone network to display a number on the recipient's Caller ID display that is not that of the actual originating station. Many telephone services, such as ISDN PRI based PBX installations, and voice over IP services, permit the caller to configure customized caller ID information. In corporate settings this permits the announcement of switchboard number or customer service numbers.

8.3 Disabling

Prefixing the following numbers will disable Caller ID on a call-by-call basis:

- **Albania:** #31# (cell phones)
- **Argentina:** *31# (landlines) or #31# (most cell phone companies)
- **Australia:** 1831 (landline and mobile phones)
- **Denmark:** #31#
- **France:** #31# (cell phones) or 3651 (landlines)
- **Iceland:** *31*
- **Germany:** On most landlines and mobiles, *31#, however some mobile providers use #31#.
- **Greece:** *31* (landlines), #31# (cell phones).
- **Hong Kong:** 133
- **India:** *31# after network unlocked
- **Pakistan:** *32# PTCL
- **Israel:** *43 (landlines) or #31# (most cell phone companies)
- **Italy:** *67# (landlines) or #31# (most cell phone companies)
- **Japan:** 184
- **New Zealand:** 0197 (Telecom/Spark) or *67 (Vodafone)
- **North America:** *67, 1167 (rotary phone), #31# (AT&T Wireless)

- **the Netherlands:** #31#
- **Romania:** #31#
- **South Korea:** *23 or *23# (most cell phone companies)
- **South Africa** *31* (Telkom)
- **Sweden** #31#
- **Switzerland:**#31# or *31 xxx yyyy zzz abc (dial the number for there your CID should be only for this call dis.)
- **United Kingdom and Ireland:** 141

Other countries and networks vary, however on GSM mobile networks, callers may dial #31#[17] before the number they wish to call to disable it.

8.4 Enabling

Depending on the operator and country, there are a number of prefix codes that can unblock Caller ID.

- **Australia:** 1832 (landline and mobile phones)
- **Czech Republic:** *31* (landline)
- **Denmark:** *31*
- **Germany:** *31# (Some mobile providers)
- **India:** *31#
- **Ireland:** 142 (Landlines)
- **Japan:** 186
- **Hong Kong:** uses 1357.
- **New Zealand:** 0196 (Telecom/Spark)
- **North America:** *82 (*UB, **U**n**B**lock), 1182 (rotary phone).
- **Switzerland:** #31#
- **United Kingdom:** 1470.

On GSM mobile networks, callers may dial *31#[17] before the number they wish to call to enable caller ID.

9 Notes

- Calling ID (vs. *Caller* ID) is the identification of whom you are calling, or connecting to, as opposed to caller ID identifying who calls you. Some Centrex telephone systems offer this feature. Similarly, when one Skype user calls another Skype user, the caller can see the other party's details and even an image or photograph they have chosen to represent their identity.
- The inverse feature, giving the number originally dialed, is known as direct inward dialing, direct dialing inward, or Dialed Number Identification Service. This tells the PBX where to route an incoming call, when there are more internal lines with external phone numbers than there are actual incoming lines in a large company or other organisation.
- Not all types of caller identification use 202-type modulation, nor do all systems send the information between the first and second ring, e.g., British Telecom sends the signal before the first ring, after a polarity reversal in the line. (Because of this most caller ID software is not compatible with BT even if the modem is) As a result, not all caller ID devices are compatible from country to country or in the same country, even though the basic phone system is the same. Some providers use FSK, others use the DTMF protocol.
- This is not to be confused with Microsoft Caller-ID, a patented e-mail authentication technology. For the history of this now-dead proposal, see MARID.
- Caller ID as now implemented is not as originally represented to the public as a Call Blocking feature. Regardless of blocking status, your Caller ID is always transmitted with each call; the actual blocking occurs at the destination central office, where it may be incorrectly ignored, or which may be improperly delivered by ISDN PRI to the end customer.

10 See also

- Smartwatch

11 References

[1] formerly known as Société Internationale de Télécommunications Aéronautiques

[2] Patent #3,727,003/4-10-1973 and Patent # 3,812,296/5-21-1974

[3] Patent # 4,242,539/12-30-1980

[4] Patent # 4,551,581/11-5-1985 and Patent # 4,582,956/4-15-1986; (both assigned to AT&T Bell Laboratories)

[5] PhoneTel Patent Services :: History : Hashimoto

[6] PhoneTel Collection, 1954-1994

[7] Fight heats up over patents on Caller ID. (Kazuo Hashimoto) - Communications News - HighBeam Research

[8] "Caller ID - Consumer's Friend or Foe? - NYTimes.com". *nytimes.com*. 4 April 1992. Retrieved 3 February 2015.

[9] 47 CFR 64.1601

[10] "Caller ID FAQ". *ainslie.org.uk*. Retrieved 3 February 2015.

[11] Telecom New Zealand TNA 102

[12] talkingcallerid.com

[13] "Caller ID FAQ". *ainslie.org.uk*. Retrieved 3 February 2015.

[14] 18 FCC Rcd 14014 (FCC, July 3, 2003) at para. 173 *et seq*.

[15] 47 C.F.R. § 64.1601(e).

[16] State v. Schuette, 273 Kan. 59, 44 P.3d 459 (Kansas 2002)

[17] GSM Features

12 External links

- Report and Order from the FCC on Implementing the Telephone Consumer Protection Act of 1991, including rules and discussion of caller ID issues.
- "Caller ID Information" at Privacy Corps
- Technical details of Caller ID
- Additional MDMF details
- Caller ID how it works

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