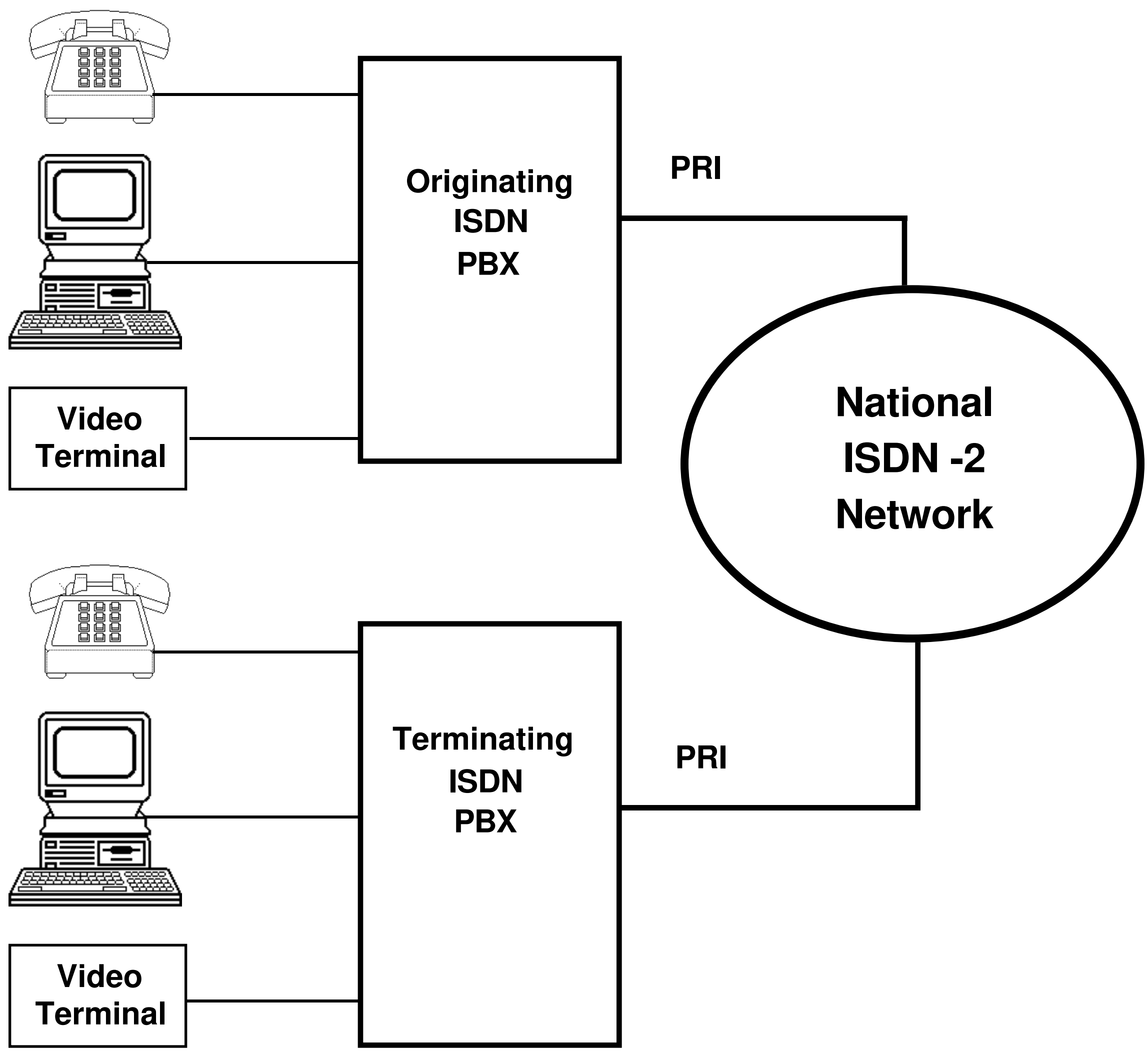
3.3.9 Caller identification to PBXs and other devices

An ISDN primary rate interface provides PBXs, mainframe computers, and other devices either the calling number or billing number identification of the calling party. These devices can than handle the call as instructed by their users. They can divert the call to another telephone or to a voice messaging system or use the number as the key in a database look up to present information about the calling customer to an ACD agent.

Configuration:



How It Works:

ISDN calls are established through messages sent between end-systems (terminals), network switches, and PBXs. These messages make up the protocols of ISDN, and are defined in standards. One information element is the Calling Number (or Redirecting Number when the call has been forwarded to the recipient.) This information is available to the terminal for use in its programming.

Obtain Equipment with These Capabilities

Private Branch Exchange (PBX)

- Support access interfaces for Voice, Data & Video users
- Support delivery of Calling & Redirecting Number information (Calling Number Identification Services).
- Support PRI, with alternate voice and data calling on each B channel.
- Support SWF-DS1 (Multirate ISDN) calling (2x64, 4x64, and 6x64) for WAN/LAN connections and videoconferencing
- B channel packet-data as required

Request These Capabilities From ISDN Service Provider

Network Interfaces to the PBX

- One 23B+D PRI.
- Directory Numbers (DNs) as required by application.
- B channels with:

  Voice

  Circuit data

  SWF-DS1 (Multirate ISDN)

  B channel packet-data as required

- Features for Voice, Circuit-data, & SWF-DS1
  - Calling Number Identification Services.

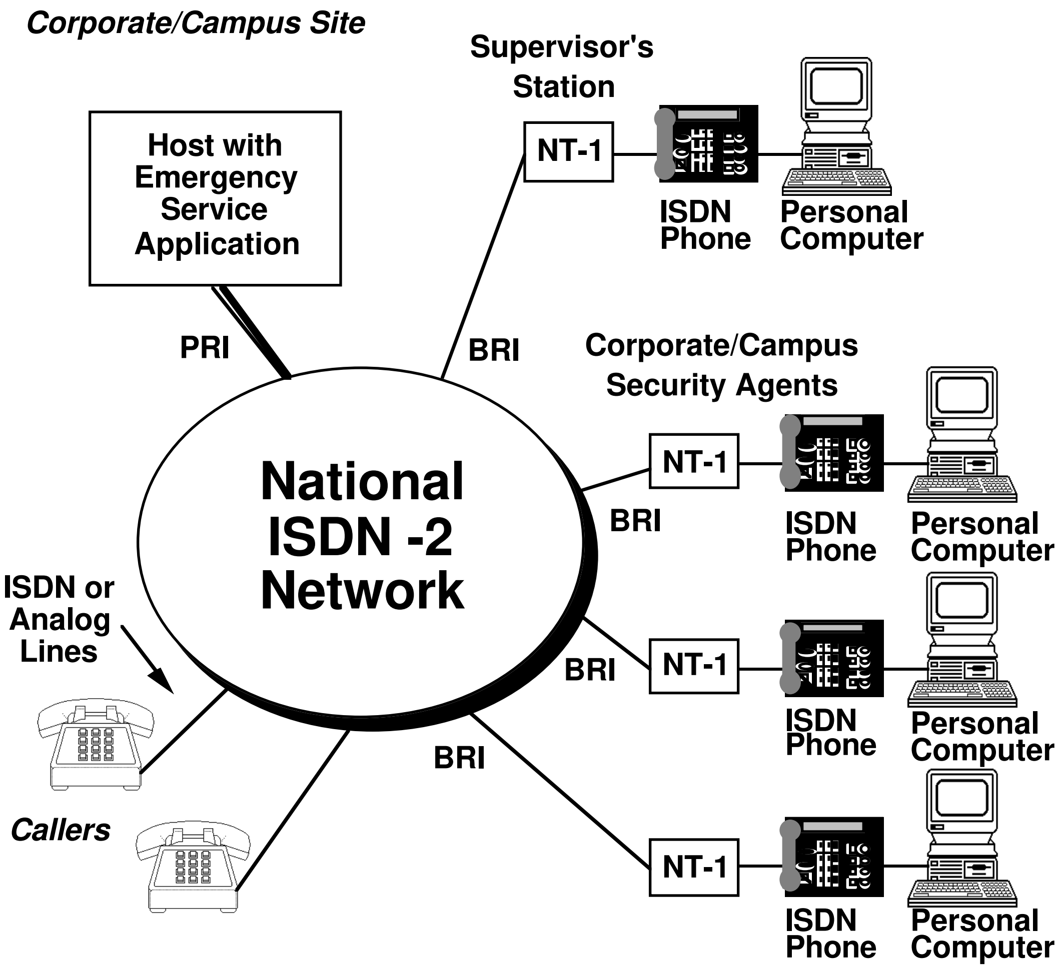
Technical Notes

- Calling Number Identification Services deliver either Calling Line Identification (CLID) or Automatic Number Identification (ANI) to the called user on Voice and circuit-data calls. CLID numbers are delivered with a Type of Number/Numbering Plan ID (TON/NPI) value of "National Number in ISDN Numbering Plan". ANI numbers are delivered with a TON/NPI value of "Unknown Number in Unknown Numbering Plan".
- ISDN Phones & Personal computers may also support applications for answering, rejecting, and forwarding incoming calls based on received Calling & Redirecting Number values. (If the Voice and circuit-data DNs both have Call Forwarding Don't Answer to a Message System, the Phone and PC can forward calls to that system by simply ignoring those calls based on the received CLID or ANI.)
- Redirecting Number Delivery applies as part of CLID for Voice and circuit-data calls, when the call was previously forwarded by a Voice or Data line. For example, if Data User A calls Data User B, and User B's line forwards the call to Data User C, User C's set will receive User A's CLID as the Calling Number and User B's CLID as the Redirecting Number. A Redirecting Reason (E.g. "B's Line was busy") is also delivered with each Redirecting Number.
- For detailed Signaling Flow Diagrams for this application, see Sections 5.2.3.3 (Voice Call Setup), 5.2.3.4 (Circuit-Data Call Setup) , 5.2.3.7 (Multirate Call Setup), and 5.2.3.8 (Voice, Circuit-Data and Multirate Call Clearing).

3.3.10 Emergency-services call management

Using calling number identification , ISDN can support emergency service systems. The calling number is used as the key for a data base look up that directs the call to the security officer closest to the caller's location. In addition, the security officer answering the call is provided with the location of the caller and other pertinent information. When coupled with the video solutions described elsewhere, a number of value added security services become apparent.

Configuration:



How It Works:

The Agent and Supervisor Stations call the Host, log in, and communicate their status using D Channel packet-data. The Host uses B channel packet-data to track the status of each Agent & Supervisor Station at all times. A customer requiring assistance dials the 800 number for Emergency Services. The network translates this 800 number into the INWATS Emergency Voice Directory Number and routes the call to the PRI serving the Host. The Host selects an available Agent for that call, and sets up an outgoing call to that Agent. The Agent is notified of Emergency Call via D Channel packet-data. The agent answers and the Host bridges the emergency call on an incoming B channel to the Agent The Host retrieves available information on the caller (based on Caller ID from the incoming PRI call) and downloads information to the Agent using D Channel packet-data.

Obtain Equipment with These Capabilities

Agent & Supervisor Stations

- Applications software for Sign-On to Host and Database Access, compatible with communications. software and Host system
- Supervisor Only: Application to Monitor Each Agent's Voice & Data Calls
- B channel capabilities:
  - Voice calling on a single B channel.
  - If using NI-2, one voice and packet-data Directory Number (DN) and Service Profile ID (SPID) will be needed.
  - If using NI-1, support for one voice DN and SPID will be needed.
  - Support for the voice features listed under "Network Interface to Stations".
- D channel capabilities:
  - Packet-data on the D channel.
  - If using NI-1, support for a separate DN (with fixed TEI) will be needed.
  - Packet Assembler & Disassembler (PAD) function, supporting X.3, X.28, X.29 .
  - Support for the packet-data features listed under "Network Interface to Stations".
- Physical interfaces:
  - Serial connection to Personal Computer (e.g., RS 232, RS-449, or V.35).
  - RJ-45 connector to NT-1, or integrated NT-1.

Host Computer

- Emergency service application for remote agent log-in, incoming call routing & information delivery to agents, agent monitoring by supervisors
- Support two DS1 facilities, total of 47 B Channels
- Set up, maintain, & clear up to 45 Voice calls, each using 1 B Channel
- Set up, maintain, & clear multiple X.25 packet-data calls
- Support X.25 SVCs on two Semi-Permanent B Channels
- Support at least six Two-Way Logical Channels on each B Channel
- Support at least three DN values for Voice calls, and at least three DN values for packet-data calls
- Support Calling & Redirecting Number Delivery features for Voice calls
- Support Fast Select & Fast Select Acceptance features for packet-data calls
- Support NT-1 and NT-2 functions for network interface

Request These Capabilities From ISDN Service Provider

Network Interface to Agent and Supervisor Stations

Network Services Required:

- One BRI. (1B+D)
- One B channel for voice calls (with voice DN and SPID for NI-1.)
- Packet-data on the D channel (with packet-data DN and fixed TEI for NI-1.)
- If using NI-2, one DN and SPID for Voice and D Channel Packet-Data.
- Voice Features:
  - Call Hold and Retrieve.
  - Call Pickup.
  - Automatic Callback.
  - Call Forwarding - Variable.
  - Call Forwarding - Interface Busy.
  - Call Forwarding - Don't Answer.
  - Optional Message Waiting Indicator.
  - Calling Number Identification Services.
  - Flexible Calling, with these Subfeatures : Call Transfer, Call Conference, Call Drop, Conference Size: 6, Consultation Hold
  - Calling Number Delivery
  - Redirecting Number Delivery
- Packet-Data Features:
  - Logical Channels: At Least 1 Two-Way LC.
  - Throughput Class : 9600 bps.
  - Maximum User Data Field: 128 Octets.
  - Packet Window Size: 2.

- Fast Select (Unrestricted) & Fast Select Acceptance.
- Closed User Group (CUG): Agent DN Should Belong to Same CUG as Hunt and Non-Hunt DNs of Host

Subscription or Ordering Information:

- This interface is configured for simultaneous voice calls and packet-data on the D channel (NIIG 6). Other NIIGs which have this functionality include 8, 20-23, 25, 27, and 28.
- Parameter Groups for Voice Features:
  - NIPG 2 - Advanced Call Forwarding for Voice.
  - NIPG 3 - Flexible Calling for Voice, With six way conference calling.
  - A la carte: Calling Number Information Services
- Parameter Groups for Packet-Data Features:
  - NIPG 7 - Basic D Channel Packet-Data. Plus Closed User Group and Fast Select, Fast Select Acceptance.

Network Interface To Host Computer

- One 47B+D PRI (24B + 23B + D) (Two DS1's)
  - 6 DNs; 3 DNs for Voice calls, 3 DNs for packet-data calls
  - Two Semi-Permanent B Channels for packet-data:
- Voice Features:
  - Calling Number Delivery
  - Redirecting Number Delivery
  - Call-by-Call Service Selection:
    1 INWATS DN & Simulated Facility Group (SFG)
    Assigned For Incoming Emergency Calls
    Maximum Number of Concurrent Calls: 20
    1 DN & SFG Assigned For Public Net. Outgoing
    Emergency Calls, Redirected to Agents
    Maximum Number of Concurrent Calls: 20
    1 INWATS DN & SFG Assigned For Incoming
    Supervisor Calls (Agent Monitor Function)
    Maximum Number of Concurrent Calls: 5
- Packet-Data Features
  - 2 B Channels, 3 DNs in Multiline Hunt Group (MLHG)
  - Each B Channel = 1 Hunt Group Member
  - 1 Hunt DN Shared by Both B Channels
  - Logical Channel Assignment (per B-Channel):
    At Least 16 Two-Way LCs
  - Default Throughput Class: 9600 bps
  - Maximum Packet Size: 128 Octets
  - Layer 3 Window Size: 2
  - Closed User Group (CUG): Hunt, Non-Hunt, &
    Agent DNs Should All Belong to Same CUG
  - Fast Select, Fast Select Acceptance

Technical Notes

- This Guide uses a Configuration that supports 20 Agent stations and 5 Supervisor Stations. It uses 20 PRI B Channels for incoming emergency Voice calls, 20 PRI B Channels for outgoing Agent voice calls, 5 PRI B Channels for incoming Supervisor Monitor calls, and 2 PRI B channels for packet-data access to the Agents & Supervisors.
- The Agent and Supervisor Stations call the packet - data Hunt DN of the Host, and log in and communicate their status to that Host using D-Channel packet-data. The Host uses D Channel packet-data to track the status of each Agent & Supervisor Station at all times.
- The Customer requiring assistance dials the 800 number for Emergency Services. The network translates this 800 number into the INWATS Emergency Voice DN & routes the call to the PRI serving the Host. The call comes into the Host on one B Channel via the Incoming Emergency Call SFG. (DN for SFG = Emergency Voice DN). The Host selects an available Agent for that call, and sets up an outgoing call to that Agent via the Outgoing Emergency Call SFG.
- Agent is notified of Emergency Call via D Channel packet-data, and sees Outgoing SFG DN as Caller ID on Voice call from Host. Agent answers and Host bridges emergency call on incoming B channel with Agent call on outgoing B Channel, connecting caller through to Agent. Host retrieves available information on caller (based on Caller ID from incoming PRI call) and downloads information to Agent using D Channel packet-data. Host maintains bridge between incoming and outgoing PRI calls until call is cleared by emergency caller.
- A Supervisor wishing to monitor Agent calls dials the 800 number for Agent Monitoring. The network translates this 800 number into the INWATS Agent Monitor DN and routes the call to the PRI serving the Host. The call comes into the Host on one B Channel via the Agent Monitor SFG. (DN for SFG = Agent Monitor DN) . Using D Channel packet-data, the Host accesses the Host's Agent Monitor Function, and tells Host which Agent he/she would like to monitor. Host

This information is subject to change without notice.
See Notice of Disclaimer on Title Page.

bridges Supervisor call on incoming B channel to existing bridged emergency call. (Host may bridge Supervisor in as "Listen and Talk" or as "Listen only".)

- Host may also download available information on caller (previously sent to Agent) to Supervisor using D Channel packet-data. Host may also notify Agent via D Channel packet-data that they are being monitored by Supervisor. Host keeps Supervisor bridged onto call until Supervisor disconnects, Supervisor uses D Channel packet-data to stop Monitoring , or call is cleared by caller.

- When logging in to the Host using D Channel packet-data, the Agent/Supervisor can use the Fast Select feature to "piggyback" up to 128 octets of Security information onto the call request as Call User Data. (The Host may require this information to do Security screening before allowing access to that Agent/Supervisor) If the Call User Data is less than 16 octets in length, the Fast Select feature may not be necessary.

- Closed User Group (CUG) is used here to provide the Attendants, Supervisors, and Host with data access security. Note that the Stations and the Host may use Calling Party Address and Call User Data from Fast Select in addition to CUG to enforce data access security.

- For details on subscription and ordering information using NIUF ISDN Interface Groups (NIIGs) and NIUF ISDN Parameter Groups (NIPG), see Section 5.1.11.

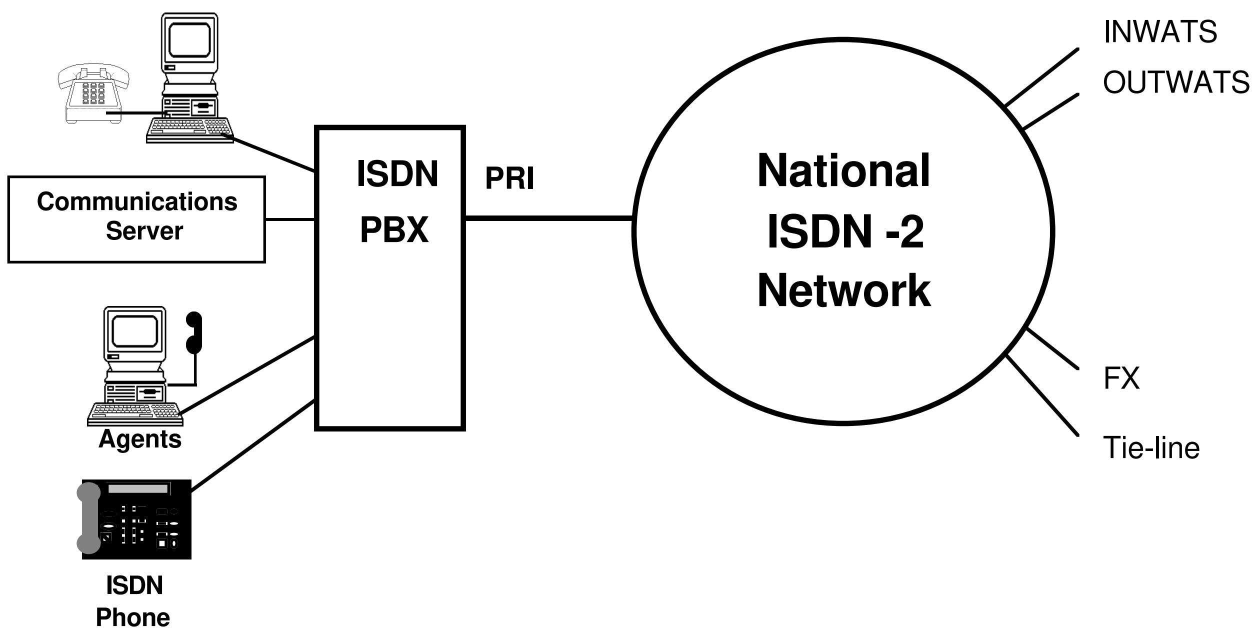
- For detailed BRI Signaling Flow Diagrams for this application, see Sections 5.2.1.4 (Voice Call Setup), 5.2.1.7 (Packet-Data Call Setup & Clearing) and 5.2.1.8 (Packet-Data Fast Select Setup & Clearing).

- For detailed PRI Signaling Flow Diagrams for this application, see Sections 5.2.3.3 (Voice Call Setup), 5.2.3.5 (Packet-Data Call Setup & Clearing), and 5.2.3.6 (Packet-Data Fast Select Setup & Clearing).

3.3.11 Call by call service selection

A company has a variety of communications requirements in and out of their PBX - public switched network access, data communications, inbound and outbound telemarketing. In a non-ISDN environment, specific access channels (trunks) must be pre-assigned and provisioned to support each desired special network service (e.g., OUTWATS, INWATS, FX , tie-line). Since dedicated facilities are usually provisioned for peak traffic, the company pays for the unused bandwidth. There may also be times when normal calling patterns change - for example, in response to a promotional announcement. By the time the network is alerted and modifications are made, conditions may have returned to normal. ISDN PRI call by call service selection enables a group of B channels to be designated to carry calls to different network services, even to different carriers on a call-by-call basis.

Configuration:



How It Works:

ISDN D channel messages pass between the PBX and the network. When placing a call, the initial call set-up message establishes dynamically the features (and service) to be provided. For incoming calls, call-by-call service selection gives a network manager the ability to route calls, on a call by call basis, based on attributes of the incoming call.

Obtain Equipment with These Capabilities

Private Branch Exchange (PBX)

- System management support for call by call service selection.
- PRI, with alternate voice and data calling on each B channel.
- SWF-DS1 (Multirate ISDN) - nx64 circuit-data calling for WAN/LAN connections and videoconferencing
- Support for network services, such as INWATS, OUTWATS, FX, or tie-line.

Request These Capabilities From ISDN Service Provider

Network Interfaces to the PBX

- One 23B+D PRI.
- Directory Numbers (DNs) as required by application.
- B channels with:

  Voice

  Circuit data

  SWF-DS1 (Multirate ISDN)

- Features for Voice, Circuit-data, and SWF-DS1
  - Call by call service selection, with access to the public network, FX, tie-line, INWATS, OUTWATS as required.

Technical Notes

- For detailed Signaling Flow Diagrams for this application, see Section 5.2.3.3 (Voice Call Setup), 5.2.3.4 (Circuit-Data Call Setup) and 5.2.3.8 (Voice & Circuit-Data Call Clearing).