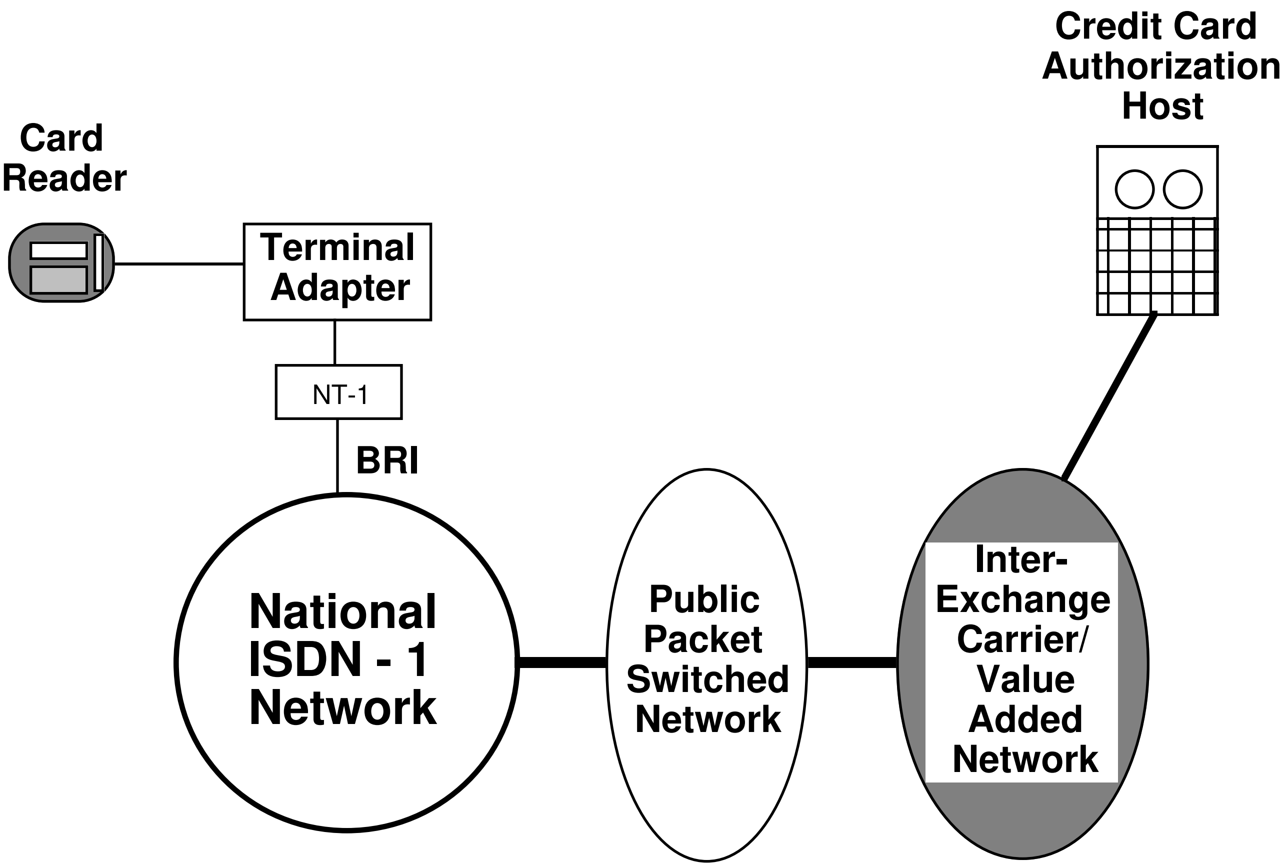
3.1.28 Credit card authorization at the point of sale

A busy merchant can use ISDN to get a credit card authorization in significantly less time. The merchant does not lose customers beacause of long waits in line.

Configuration:



How It Works:

When credit card verification is needed, the Terminal Adapter reads the transaction data from the card reader and sets up a 9600 bps D Channel packet-data call to the Credit Card Authorization (CCA) Host. After the CCA Host answers, the TA and Host exchange data packets containing transaction information. When the transaction is completed, the call is cleared.

Obtain Equipment with These Capabilities

ISDN Terminal Adapter

- D channel capabilities:
  - Packet-data on the D channel.
  - If using NI-1, support for a packet-data DN (with fixed TEI) will be needed.
  - Packet Assembler & Disassembler (PAD) function, supporting X.3, X.28, X.29 and possibly T3POS, depending on service provider.
  - Support for the packet-data features listed under "Network Interface to ISDN Terminal Adapter".
- Physical interfaces:
  - Serial connection to Personal Computer (e.g., RS-449).
  - RJ-45 connector to NT-1, or integrated NT-1.

Request These Capabilities From ISDN Service Provider

Network Interface to ISDN Terminal Adapter

Network Services Required:

- One BRI. (0B+D)
- Packet-data on the D channel, with packet-data DN and fixed TEI.
- Packet-Data Features:
  - Logical Channels: At Least 1 Two-Way LC.
  - Default Throughput Class : 9600 bps.
  - Maximum User Data Field: 128 Octets.
  - Packet Window Size: 2.
  - Closed User Group (CUG) Security.

Subscription or Ordering Information:

- This interface is configured for packet-data on the D channel (NIIG 1). Other NIIGs which have this functionality include 6-9, and 20-29.
- Parameter Groups for Packet-Data Features:
  - None required.
  - NIPG 7 - Basic D Channel Packet-Data.
  - A la Carte: Closed User Group (CUG) Security.

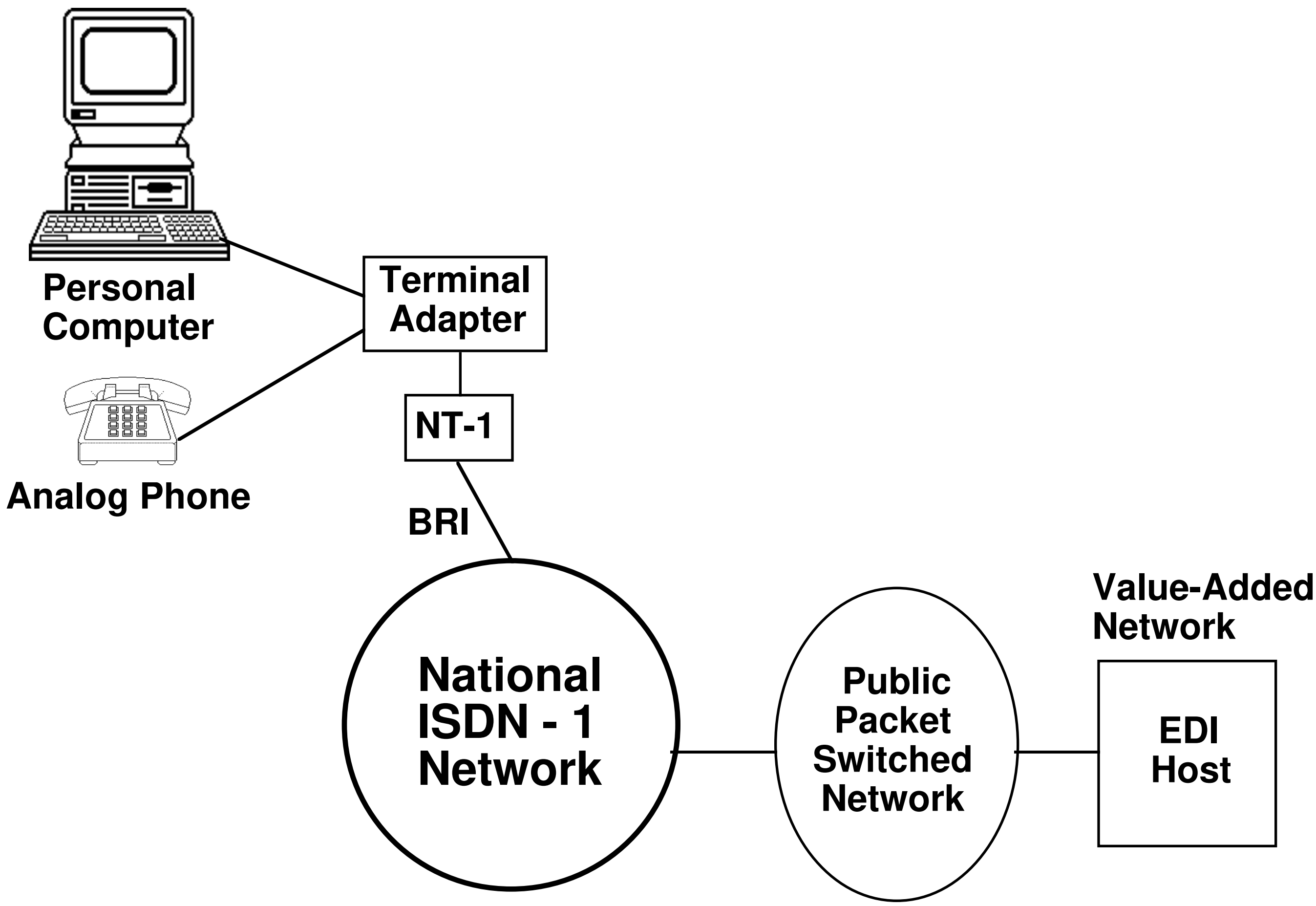
Technical Notes

- The T3POS TA uses a Two-Way Logical Channel because the CCA Host can also place packet-data calls to the Card Reader (e.g., at the end of the business day to download a record of all credit card transactions received that day.)
- Simultaneous Voice and Data: Note that, though not shown in this application, Voice calls can be placed and answered using the B channel while credit-card transactions are performed on the D Channel. (A Voice DN and SPID are needed for the phone).
- In cases where the data exchange between the TA and the Host involves 128 octets or less in each direction, Fast Select can be used instead of a complete X.25 call. If Fast Select is used the TA interface must also be subscribed to the Fast Select and Fast Select Acceptance features.
- In many cases the packet-data configuration of the TA and the CCA Host (and the intermediate X.25 network) will not be the same. As a result, the likelihood of packet-data call completion will be higher if the TA and its packet-data DN also support Throughput Class Negotiation & Flow Control Parameter Negotiation.
- Closed User Group (CUG) is used here to provide the Card Reader and the CCA Host with access security. If the Card Reader needs to access multiple CCA Hosts, the Card Reader's DN will have to belong to multiple CUGs (e.g., one CUG for each Host), and will have to support CUG Selection so that the TA can select the Host's individual CUG on a per-call basis. Note also that the Host may use screening of the Card Reader's X.25 Calling Party Address (in addition to CUG screening) to enforce access security.
- The interface between the card reader and the TA can support either X.28 or T3POS protocol. T3POS ("Transaction Processing Protocol for Point-of-Sale") is a credit-card verification protocol that optimizes transactions over X.25 networks (including ISDN) and is based on VISA protocols and ISO Basic Mode Control Procedures. Details on T3POS can be found in Bellcore document SR-NWT-002026, *X.25 Packet Network PAD Support of T3POS.*
- For details on subscription and ordering information using NIUF ISDN Interface Groups (NIIGs) and NIUF ISDN Parameter Groups (NIPGs), see Section 5.1.11.
- For detailed Signaling Flow Diagrams for this application, see Sections 5.2.1.7 (packet-data Call Setup & Clearing) and 5.2.1.8 (packet-data Fast Select Setup & Clearing).

3.1.29 Electronic Data Interchange (EDI)

ISDN provides an affordable way to exchange electronic documents such as purchase orders and invoices with trading partners. A rich set of standard formats for business documents has been defined to facilitate electronic commerce. ISDN provides an excellent transport service for EDI for small businesses because of its wide availability and relatively low cost.

Configuration: (1, 2, **3**, 4)



How It Works:

Using a 9600 bps D channel packet-data call, the PC establishes a connection to the host computer run by an EDI Value Added Network. Such networks are often used as intermediaries for electronic trading to avoid the need for expensive direct links between an organization and all of its trading partners. Once the connection is established, the PC uploads the electronic documents that it has collected as a batch, usually over the course of a day.

Obtain Equipment with These Capabilities

Personal Computer

- Application software compatible with communications software and far end.
- Serial connection to Terminal Adapter (e.g., RS-232, RS-449, V.35).

ISDN Terminal Adapter

- B channel capabilities:
  - Voice calling on a single B channel.
  - If using NI-1, support for one Directory Number (DN) and Service Profile ID (SPID) will be needed.
- 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, and X.29.
  - Support for the packet-data features listed under "Network Interface to ISDN Terminal Adapter".
- Physical interfaces:
  - Analog phone jack.
  - Serial connection to Personal Computer (e.g., RS-232, RS-449, or V.35).
  - RJ-45 connector to NT-1, or integrated NT-1.

Request These Capabilities From ISDN Service Provider

Network Interface to ISDN Terminal Adapter

Network Services Required:

- One BRI. (1B+D)
- One B channel for voice calls, with voice DN and SPID.
- Packet-data on the D channel, with packet-data DN and fixed TEI.
- Voice Features:
  - None required.
- Packet-Data Features:
  - Closed User Group (CUG) Security.

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:
  - None required.
- Parameter Groups for Packet-Data Features:
  - NIPG 7 - Basic D Channel Packet-Data.
  - A la carte: Closed User Group (CUG) Security.

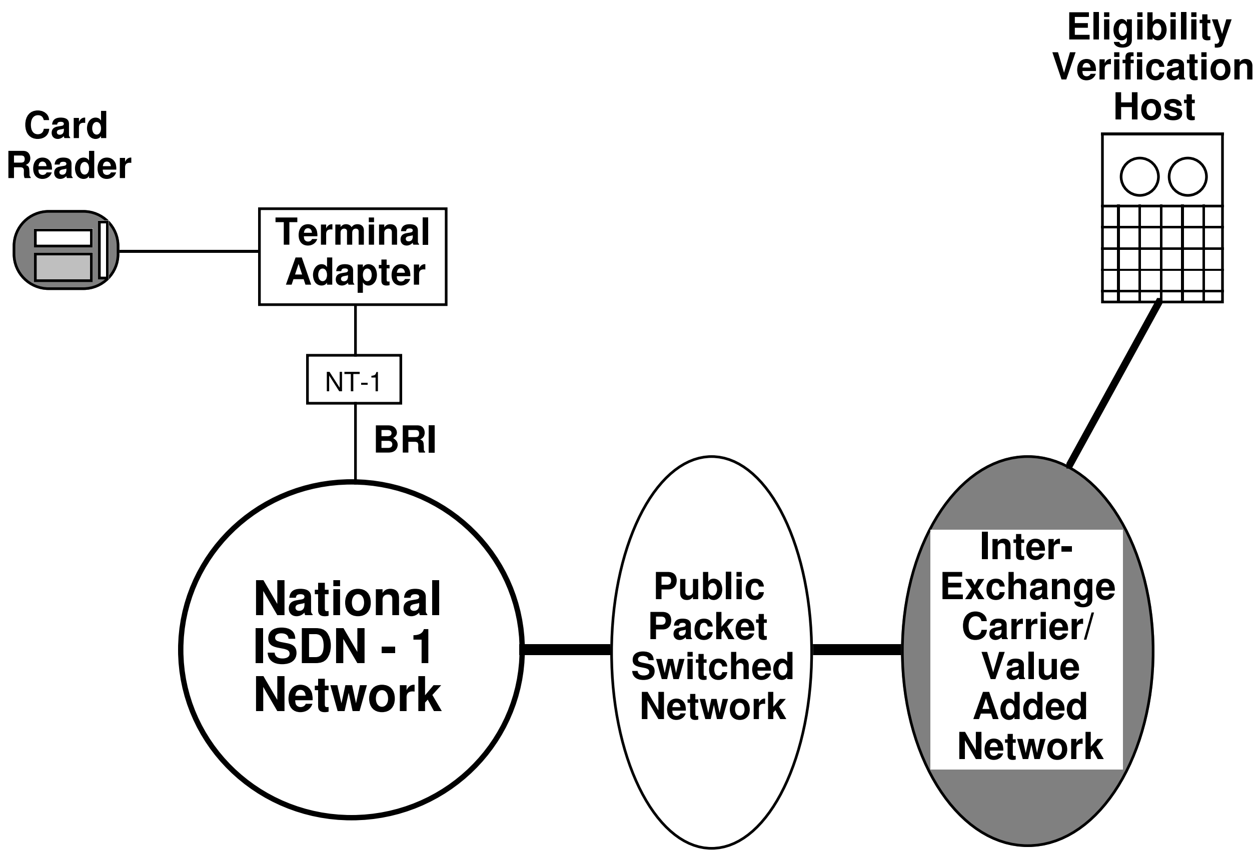
Technical Notes

- Closed User Group (CUG) is used here to provide the Personal Computer and the Host with access security. If the Personal Computer needs to access multiple Hosts, the Personal Computer's DN will have to belong to multiple CUGs (e.g., one CUG for each Host), and will have to support CUG Selection so that the TA can select the Host's individual CUG on a per-call basis. Note also that the Host may use screening of the Personal Computer's X.25 Calling Party Address (in addition to CUG screening) to enforce access security.
- For details on subscription and ordering information using NIUF ISDN Interface Groups (NIIGs) and NIUF ISDN Parameter Groups (NIPGs), see Section 5.1.11.
- For detailed Signaling Flow Diagrams for this application, see Sections 5.2.1.4 (Voice Call Setup), 5.2.1.6 (Voice & circuit-data Call Clearing), 5.2.1.7 (packet-data Call Setup & Clearing) and 5.2.1.8 (packet-data Fast Select Setup & Clearing).

3.1.30 Insurance verification at the point of service

Health care providers may use recent advances in point of service telecommunications to check a patient's insurance eligibility for specific procedures before actually providing those services. This check, which operates similarly to a credit card check, will allow physicians to better manage the financial side of their businesses. Because they know who will pay how much when they treat patients, they may send bills to the appropriate insurers or directly to the patient if necessary. This accelerated process removes the delay typically experienced by waiting for claims to come back unresolved, and then billing the remainder to an alternate insurer or to the patient.

Configuration:



How It Works:

The patient carries a medical insurance card which may be read electronically like a credit card. Health care providers may then scan the card and enter a code for the necessary procedure into the point-of-service device. This device then uses the ISDN link to access transaction services through the public packet switched network. A pre-arranged third-party service provider will receive the verification request and check it against a database. A response will then be returned to the health care provider stating the limit of the patient's insurance coverage for that procedure.

Obtain Equipment with These Capabilities

ISDN Terminal Adapter

- D channel capabilities:
  - Packet-data on the D channel.
  - If using NI-1, support for a packet-data DN (with fixed TEI) will be needed.
  - Packet Assembler & Disassembler (PAD) function, supporting X.3, X.28, X.29 and possibly T3POS, depending on the service provider.
  - Support for the packet-data features listed under "Network Interface to ISDN Terminal Adapter".
- Physical interfaces:
  - Serial connection to Personal Computer (e.g., RS-449).
  - RJ-45 connector to NT-1, or integrated NT-1.

Request These Capabilities From ISDN Service Provider

Network Interface to ISDN Terminal Adapter

Network Services Required:

- One BRI. (0B+D)
- Packet-data on the D channel, with packet-data DN and fixed TEI.
- Packet-Data Features:
  - Logical Channels: At Least 1 Two-Way LC.
  - Default Throughput Class : 9600 bps.
  - Maximum User Data Field: 128 Octets.
  - Packet Window Size: 2.
  - Closed User Group (CUG) Security.

Subscription or Ordering Information:

- This interface is configured for packet-data on the D channel (NIIG 1). Other NIIGs which have this functionality include 6-9, and 20-29.
- Parameter Groups for Packet-Data Features:
  - NIPG 7 - Basic D Channel Packet-Data.
  - A la Carte: Closed User Group (CUG) Security.

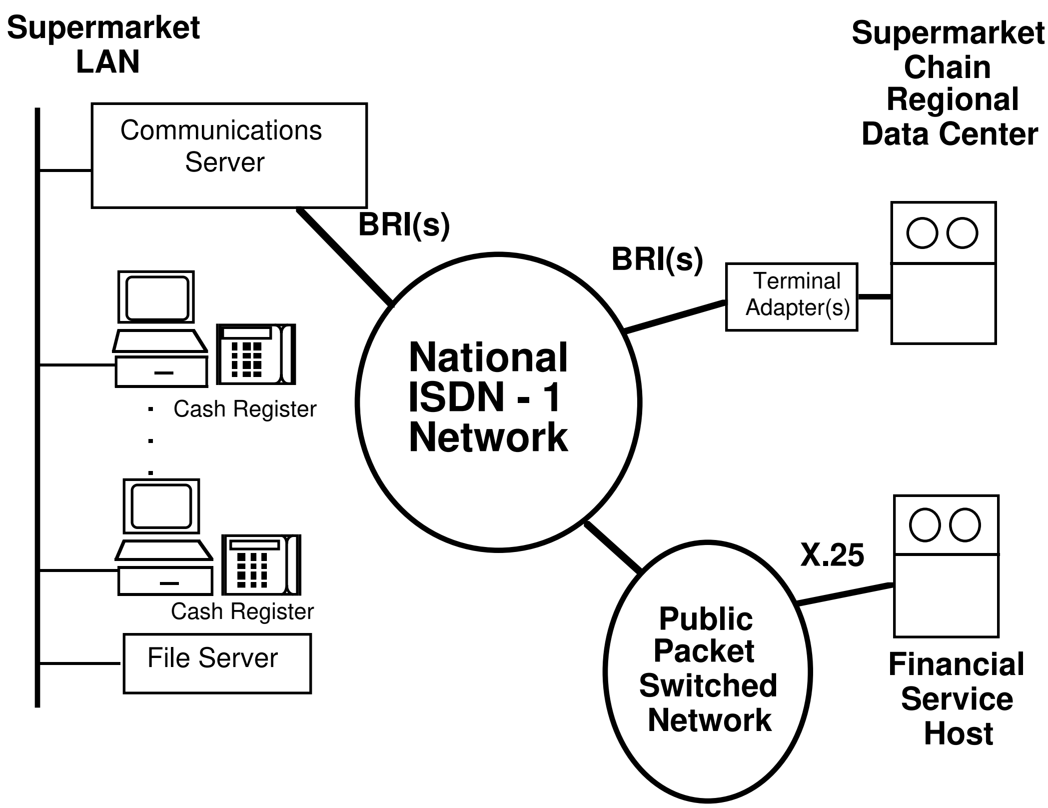
Technical Notes

- The T3POS TA uses a Two-Way Logical Channel because the Eligibility Host can also place packet-data calls to the Card Reader (e.g., at the end of the business day to download a record of all credit card transactions received that day.)
- Simultaneous Voice and Data: Note that, though not shown in this application, Voice calls can be placed and answered using the B channel while credit-card transactions are performed on the D Channel. (A Voice DN and SPID are needed for the phone).
- In cases where the data exchange between the TA and the Host involves 128 octets or less in each direction, Fast Select can be used instead of a complete X.25 call. If Fast Select is used the TA interface must also be subscribed to the Fast Select and Fast Select Acceptance features.
- In many cases the packet-data configuration of the TA and the Host (and the intermediate X.25 network) will not be the same. As a result, the likelihood of packet data call completion will be higher if the TA and its packet-data DN also support Throughput Class Negotiation & Flow Control Parameter Negotiation.
- Closed User Group (CUG) is used here to provide the Card Reader and the Host with access security. If the Card Reader needs to access multiple Hosts, the Card Reader's DN will have to belong to multiple CUGs (e.g., one CUG for each Host), and will have to support CUG Selection so that the TA can select the Host's individual CUG on a per-call basis. Note also that the Host may use screening of the Card Reader's X.25 Calling Party Address (in addition to CUG screening) to enforce access security.
- The interface between the card reader and the TA can support either X.28 or T3POS protocol. T3POS ("Transaction Processing Protocol for Point-of-Sale") is a credit-card verification protocol that optimizes transactions over X.25 networks (including ISDN) and is based on VISA protocols and ISO Basic Mode Control Procedures. Details on T3POS can be found in Bellcore document SR-NWT-002026, *X.25 Packet Network PAD Support of T3POS.*
- For details on subscription and ordering information using NIUF ISDN Interface Groups (NIIGs) and NIUF ISDN Parameter Groups (NIPGs), see Section 5.1.11.
- For detailed Signaling Flow Diagrams for this application, see Sections 5.2.1.7 (packet-data Call Setup & Clearing) and 5.2.1.8 (packet-data Fast Select Setup & Clearing).

3.1.31 Supermarket checkout

Supermarkets are highly dependent on automation for reduction of their operating costs. Typically they have dial-up communications lines to a regional headquarters location for their data needs, which include inventory management, employee time reporting, and energy management. In addition, they may have additional lines for communicating with external service providers for credit/debit card authorization, check verification, alarm system monitoring, automated teller machines, or pharmacy insurance claim processing. Each application may be using different protocols and specialized communications equipment. ISDN provides an economical alternative by providing a common access line for multiple applications operating within a supermarket.

Configuration:



How It Works:

The cash registers in this example are personal computers with scanners, cash drawers, and magnetic card readers. These registers are connected to a LAN which gives them access to a file server and a communications server in the back office. The file server keeps a database of the master inventory and pricing files for the store, while the communications server controls transactions with the chain's regional office and the financial service provider. The regional data center periodically connects to the communications server using a circuit-data call and uploads information. Transactions involving credit cards, debit cards, and checks are sent to the financial service provider over the D channel packet connection to an X.25-based Public Packet Switched Network.

Obtain Equipment with These Capabilities

Communications Server

- Application software compatible with communication software and with far end.
- Software providing security and accounting information on the BRI lines.
- Multiple BRIs to meet network traffic requirements.

  B channel capabilities for each BRI:

  - Simultaneous circuit-data calling on two B channels.
  - If using NI-1, support for two Directory Numbers (DNs) and Service Profile IDs (SPIDs) will be needed.
  - Support rate adaptation for rates lower then 64 kbps. For example, asynchronous communications may be rate adapted using V.120.
  - Support for the circuit-data features listed under "Network Interface to Communications Server".

  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 and possibly T3POS, depending on service provider.
  - Support for the packet-data features listed under "Network Interface to Communications Server".
- Physical interfaces:
  - Local LAN (e.g., Ethernet or Token Ring).
  - RJ-45 connector to NT-1, or integrated NT-1.

ISDN Terminal Adapter(s) at Regional Data Center

- B channel capabilities:
  - Simultaneous circuit-data calling on two B channels.
  - If using NI-1, support for two Directory Numbers (DNs) and Service Profile IDs (SPIDs) will be needed.
  - Support rate adaptation for rates lower then 64 kbps. For example, asynchronous communications may be rate adapted using V.120.
- Physical interfaces:
  - Analog phone jack.
  - Serial connection to Host Computer (e.g., RS-232, RS-449, or V.35).
  - RJ-45 connector to NT-1, or integrated NT-1.

Host Computer at Regional Data Center

- Application software compatible with communication software and with far end. This software should be capable of downloading data from the inventory database on the store file server in batch mode, and optionally compose ad-hoc database queries.
- Software providing security and accounting information on the BRI lines.
- Serial connection to ISDN Terminal Adapter (e.g., RS - 232, RS-449, or V.35).

Host Computer at Financial Service Provider

- Application software compatible with communication software and with far end. This software should be capable of processing financial transactions such as credit/debit card authorization, check verification, or ATM transactions. This host may actually route individual transactions to other hosts for processing. It is shown here directly connected to an X.25-based Public Packet Switched Network.

Request These Capabilities From ISDN Service Provider

Network Interface to Communications Server

Network Services Required:

- One or more BRI. (2B+D)

For each BRI:

- Two B channels for circuit-data calls, with circuit-data DNs and SPIDs.
- Packet-data on the D channel, with packet-data DN and fixed TEI.
- Circuit-Data Features:
  - Calling Number Identification Services.
- 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.
  - Closed User Group (CUG) Security.

- Optional Fast Select (Unrestricted) & Fast Select Acceptance. See Technical Note.
- Optional Throughput Class Negotiation. See Technical Note.
- Optional Flow Control Parameter Negotiation. See Technical Note.

Subscription or Ordering Information:

- This interface is configured for two simultaneous circuit-data calls and packet-data on the D channel (NIIG 24). Other NIIGs which have this functionality include 25, and 27.
- Parameter Groups for Circuit-Data Features:
  - None required.
  - A la carte: Calling Number Identification Services.
- Parameter Groups for Packet-Data Features:
  - NIPG 7 - Basic D Channel Packet-Data. Add optionally throughput class and flow control negotiation.
  - A la carte: Closed User Group (CUG) Security

Network Interface to ISDN Terminal Adapter

Network Services Required:

- One BRI. (2B)
- Two B channels for circuit-data calls, with circuit-data DNs and SPIDs.
- Circuit-Data Features:
  - None required.

Subscription or Ordering Information:

- This interface is configured for two simultaneous circuit-data calls (NIIG 14). Other NIIGs which have this functionality include 15, 17, 24, 25, and 27.
- Parameter Groups for Circuit-Data Features:
  - None required.

Technical Notes

- Security and accounting functions for circuit-data calls may be provided in software using Calling Number Identification Services on both the communications server and the regional data center host. The software should screen the Calling Number of incoming calls against a set of valid DNs and also authenticate callers with passwords.
- Although this eaxample shows the supermarket communicating with the regional data center using circuit-data calls, packet-data may also be used.
- Closed User Group (CUG) is used here to provide the communications server and the financial services provider host with access security for packet-data calls. If the communications server needs to access multiple hosts, the communications server's DN will have to belong to multiple CUGs (e.g., one CUG for each host), and will have to support CUG Selection so that the communications server can select the host's individual CUG on a per-call basis. Note also that the host may use screening of the communications server's X.25 Calling Party Address (in addition to CUG screening) to enforce access security.
- The T3POS function in the communications server uses a Two-Way Logical Channel because the financial service provider host can also place packet-data calls to the communications server (e.g., at the end of the business day to download a record of all credit card transactions received that day.)
- In cases where the data exchange between the communications server and the host involves 128 octets or less in each direction, Fast Select can be used instead of a complete X.25 call. If Fast Select is used the communications server interface must also be subscribed to the Fast Select and Fast Select Acceptance features.
- In many cases the packet-data configuration of the communications server and the host (and the intermediate X.25 network) will not be the same. As a result, the likelihood of packet-data call completion will be higher if the communications server and its packet-data DN also support Throughput Class Negotiation & Flow Control Parameter Negotiation.
- The interface between the communications server and the host can support either X.28 or T3POS protocol. T3POS ("Transaction Processing Protocol for Point-of-Sale") is a transaction-oriented protocol that optimizes transactions over X.25 networks (including ISDN) and is based on VISA protocols and ISO Basic Mode Control Procedures. Details on T3POS can be found in Bellcore document SR-NWT-002026, *X.25 Packet Network PAD Support of T3POS.*

- An existing communications server (dial-up router, or terminal server) can be adapted to support ISDN access. Change out modems or CSU/DSUs for Terminal Adapters. See Section 4 for products.

- The Lower Layer Compatibility (LLC) Information Element can communicate rate-adaption details end to-end. For details on V.120 rate adaption, and the use of the LLC Information Element for circuit-data calls, see Sections 5.1.4 and 5.1.5.

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

- For detailed Signaling Flow Diagrams for this application, see Sections 5.2.1.5 (Circuit-Data Call Setup), and 5.2.1.6 (Voice & Circuit-Data Call Clearing), 5.2.1.7 (packet-data Call Setup & Clearing) and 5.2.1.8 (packet-data Fast Select Setup & Clearing). For additional information on MLHG, see 5.1.7.