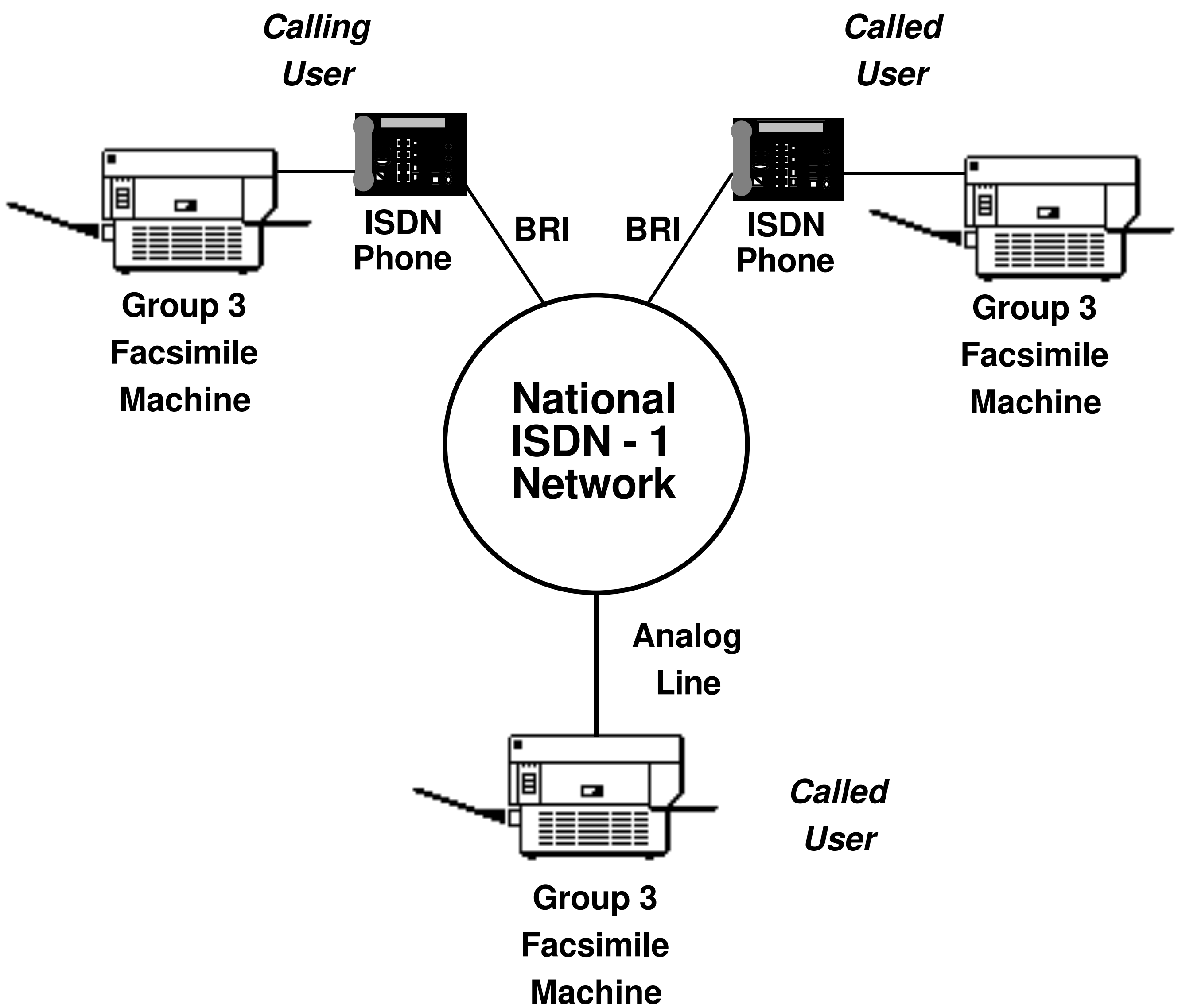
3.1.23 Group 3 facsimile

ISDN can connect existing Group 3 (analog) facsimile through ISDN telephones that can integrate the facsimile transmission with other services such as voice and data communications. The Group 3 facsimile machine connected to the ISDN line can easily communicate with other Group 3 facsimile machines connected to analog phone lines.

Configuration:



How It Works:

The ISDN phones provide a standard analog phone jack to the fax machines. The fax machines operate normally from a user perspective, but the ISDN phones provide all necessary call control functions by monitoring the analog jack and performing the necessary call setup and clearing.

Obtain Equipment with These Capabilities

ISDN Phone

- B channel capabilities:
  - Simultaneous voice calling on two B channels.
  - If using NI-1, support for two Directory Numbers (DNs) and Service Profile IDs (SPIDs) will be needed.
- Physical interfaces:
  - Analog phone jack for fax machine.
  - RJ-45 connector to NT-1, or integrated NT-1.

Group 3 Fax Machine

- Send and receive Group 3 facsimile messages.
- Analog phone jack for connection to ISDN phone.

Request These Capabilities From ISDN Service Provider

Network Interface to ISDN Phone

Network Services Required:

- One BRI. (2B)
- Two B channels for voice calls, with voice DNs and SPIDs.
- Voice Features:
  - None required.

Subscription or Ordering Information:

- This interface is configured for two simultaneous voice calls (NIIG 10). Other NIIGs which have this functionality include 12, 17, 20, 22, and 27.
- Parameter Groups for Voice Features:
  - None required.

Technical Notes

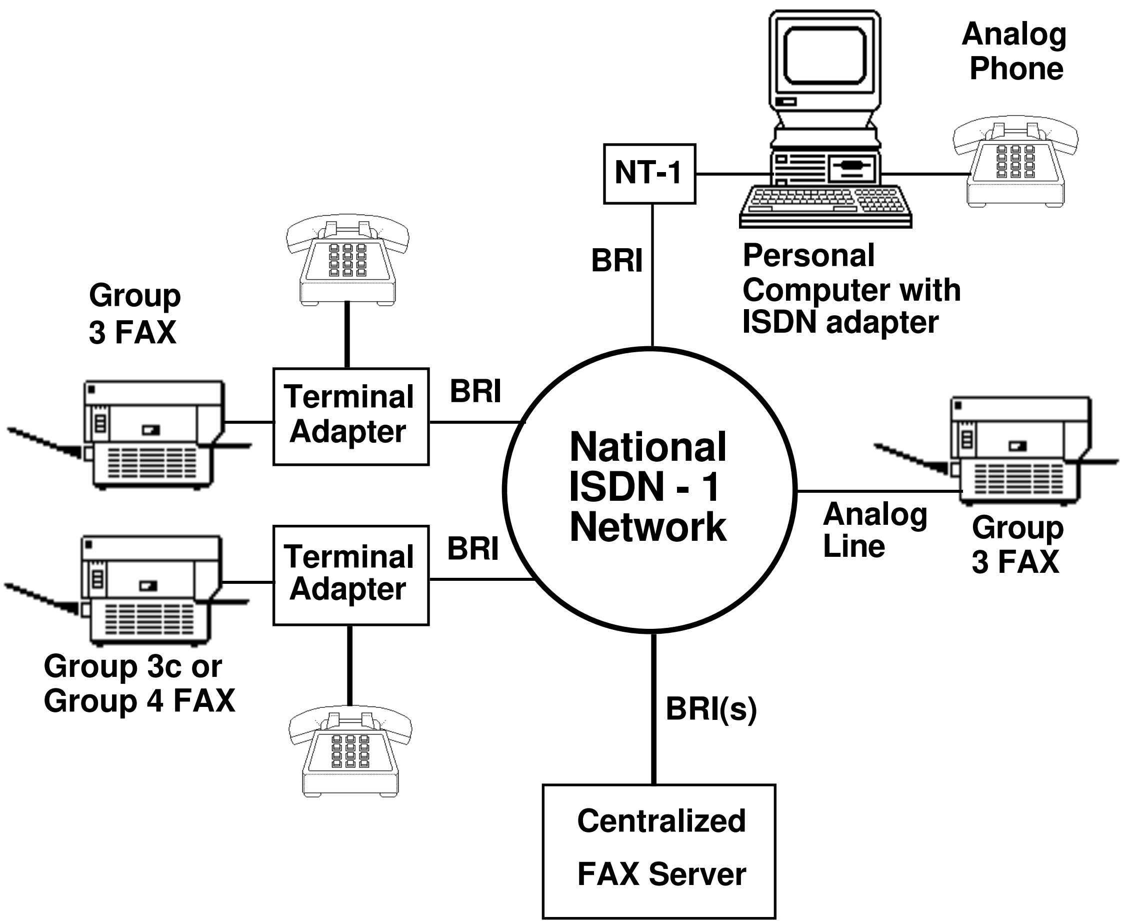
- While this description shows the fax machines connected to an ISDN phone, other configurations are possible. Terminal adapters and Personal Computer based ISDN adapters may also be used if they support voice DNs and SPIDs and provide an analog phone jack.
- Typical LLC and HLC values which may be used for this application are:
  - Low Layer: Layer 1: CCITT G.711 μ-Law
  - High Layer: Facsimile Group 2/3 (CCITT F.182)

  A discussion of LLC and HLC values may be found in Section 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 5.2.1.4 (Voice Call Setup) and 5.2.1.6 (Voice & Circuit-Data Call Clearing).

3.1.24 Receiving faxes as electronic documents

ISDN can support the receipt of facsimile images by personal computers at speeds up to 64 kbps. Group 3, Group 3c, or Group 4 images are sent to a centralized fax server, which can then forward them to the personal computers at high speed. This provides the convenience of receiving the facsimile at the desk top and storing the facsimile image on a personal computer for later retrieval. Similarly, ISDN can be used to send an electronic document from a personal computer to a remote facsimile machine via a fax server at speeds up to 64 kbps. This eliminates the need to print the document and take it to a facsimile machine for transmission. Assuming the fax server provides sufficient capacity, it will never be busy, allowing the Personal Computer user to send the fax and move on to other tasks.

Configuration: (1, 2, 3, 4)



How It Works:

Group 3 fax calls are placed to the server using voice calls as normal. The Group 3 fax machines may also be connected using analog telephone lines. Group 3c and Group 4 fax machines may also be used to send faxes to the server, but they require digital connectivity and must be served using Switched 56 service or ISDN circuit-data. The fax server stores the incoming faxes in mailboxes for the users or forwards them, depending on the configuration.

Obtain Equipment with These Capabilities

Terminal Adapter for G3 Fax Machine

- B channel capabilities:
  - Simultaneous voice calling on two B channels.
  - If using NI-1, support for two Directory Numbers (DNs) and Service Profile IDs (SPIDs) will be needed.
- Physical interfaces:
  - Two analog phone jacks.
  - RJ-45 connector to NT-1, or integrated NT-1.

Terminal Adapter for G3c or G4 Fax Machine

- B channel capabilities:
  - Simultaneous voice and circuit-data calling.
  - 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 G3c or G4 Fax Machine (e.g., RS-232, RS-449, or V.35).
  - RJ-45 connector to NT-1, or integrated NT-1.

Personal Computer with ISDN Adapter

- Application software for processing and transporting fax files compatible with communication software and far end.
- B channel capabilities:
  - Simultaneous voice and circuit-data calling.
  - For NI-1, support for two Directory Numbers (DNs) and Service Profile IDs (SPIDs) will be needed.
  - Support rate adaptation for rates lower than 64 kbps. For example, asynchronous communications may be rate adapted using V.120.
- Physical interfaces:
  - Analog phone jack.
  - RJ-45 connector to NT-1, or integrated NT-1.

Fax Server

- Fax software support for Group 3, 3c, and 4.
- Accounting and access control application.
- Systems for managing the input, storage and forwarding of images in electronic form.
- Multiple BRIs to meet network traffic requirements, for each BRI:

  B channel capabilities:
  - Simultaneous voice and circuit-data calling.
  - Simultaneous voice calling on two B channels.
  - 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 than 64 kbps. For example, asynchronous communications may be rate adapted using V.120.
  - Support for Multiline Hunt Group as listed under "Network Interface to Fax Server".
- Physical interfaces:
  - RJ-45 connector to NT-1, or integrated NT-1.

Request These Capabilities From ISDN Service Provider

Network Interface to G3 TA

Network Services Required:

- One BRI. (2B)
- Two B channels for voice calls, with voice DNs and SPIDs.
- Voice Features:
  - None required.

Subscription or Ordering Information:

- This interface is configured for two simultaneous voice calls (NIIG 10). Other NIIGs which have this functionality include 12, 17, 20, 22, and 27.
- Parameter Groups for Voice Features:
  - None required.

Network Interface to G3c or G4 TA

Network Services Required:

- One BRI. (2B)
- One B channel for voice calls, with voice DN and SPID.
- One B channel for circuit-data calls, with circuit-data DN and SPID.
- Voice Features:
  - None required.
- Circuit-Data Features:
  - None required.

Subscription or Ordering Information:

- This interface is configured for simultaneous voice calls and circuit-data calls (NIIG 11). Other NIIGs which have this functionality include 12, 15, 17, 21, 22, 25, and 27.
- Parameter Groups for Voice Features:
  - None required.
- Parameter Groups for Circuit-Data Features:
  - None required.

Network Interface to Personal Computer with ISDN Adapter

Network Services Required:

- One BRI. (2B)
- One B channel for voice calls, with voice DN and SPID.
- One B channel for alternate voice and circuit-data calls. For NI-1, this requires both a voice DN and SPID and a circuit-data DN and SPID.
- Voice Features:
  - None required.
- Circuit-Data Features:
  - None required.

Subscription or Ordering Information:

- This interface is configured for simultaneous voice calls and alternate voice and circuit-data calls (NIIG 12). Other NIIGs which have this functionality include 17, 22, and 27.
- Parameter Groups for Voice Features:
  - None required.
- Parameter Groups for Circuit-Data Features:
  - None required.

Network Interface to Fax Server

Network Services Required:

- One or more BRI. (2B)

For each BRI:

- Two B channels for alternate voice and circuit-data, with alternate voice and circuit-data DNs and SPIDs.
- Voice Features:
  - Multiline Hunt Group.
- Circuit-Data Features:
  - Multiline Hunt Group.

Subscription or Ordering Information:

- This interface is configured for two simultaneous alternate voice and circuit-data calls (NIIG 17). The only other NIIG with this functionality is 27.
- Parameter Groups for Voice Features:
  - None required.
  - A la Carte: Multiline Hunt Group.
- Parameter Groups for Circuit-Data Features:
  - None required.
  - A la Carte: Multiline Hunt Group.

Technical Notes

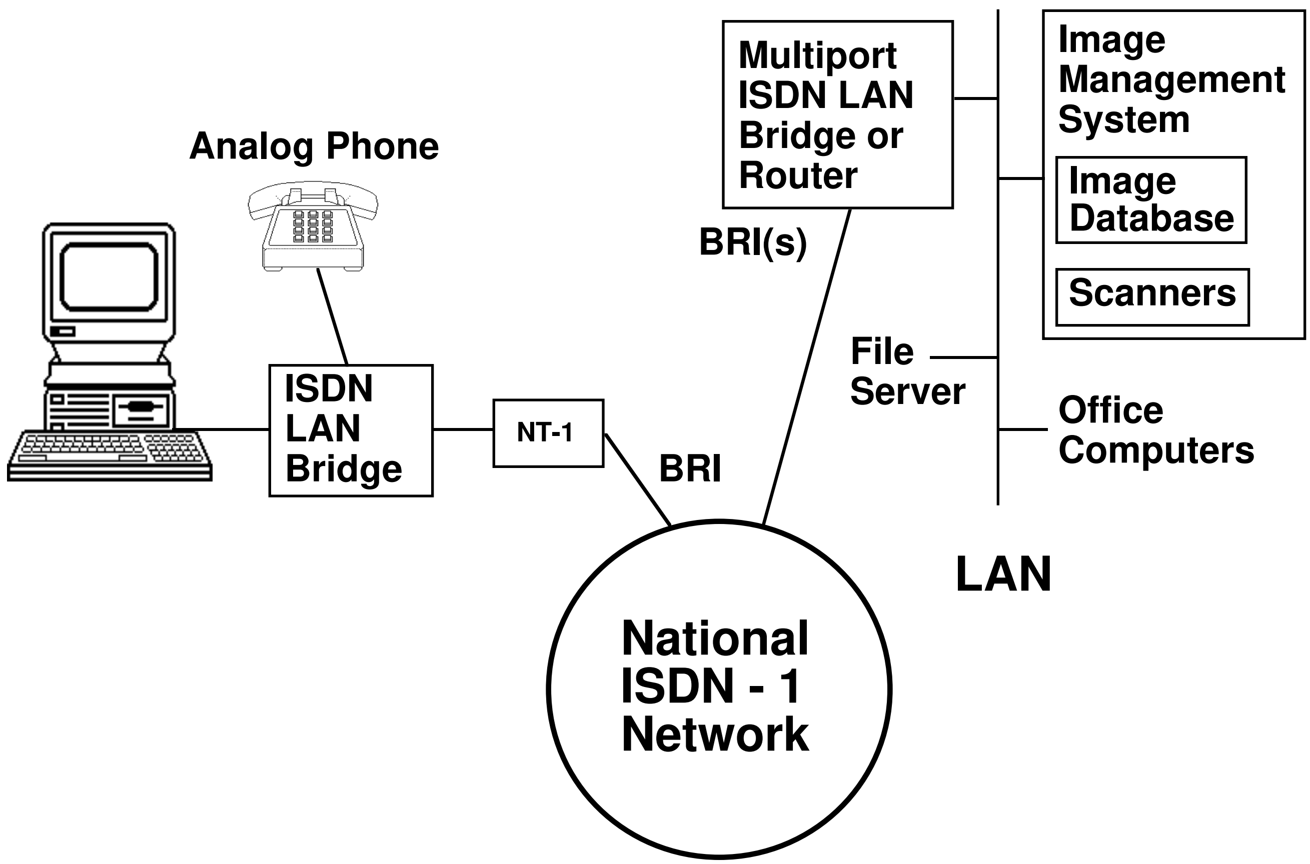
- The G3 portion of this guide will also work if the calling FAX is served by an analog (non-ISDN) interface. The G3c or G4 portion of this guide will also work if the calling FAX is served by a digital Switched 56 (non-ISDN) interface.
- For G3 FAX calls, the TAs, Server, and Computer use the 3.1 kHz Audio bearer. For G3c and G4 FAX calls, they use the 56k and 64k bearers. For more information on bearer capabilities, see Section 5.1.1.
- Each FAX TA, as well as the PC interface, uses one DN for Telephone calls (Voice), & one DN for G3 , G3c or G4 FAX (Voice or CMD).
- Typical LLC and HLC values which may be used for this application are:
  - For G3 FAX:
    Low Layer: Layer 1: CCITT G.711 μ-Law
    High Layer: Facsimile Group 2/3 (CCITT F.182)
  - For G3c FAX:
    Low Layer:
    Layer 2: ISO / IEC 7776 DTE-DTE
    Layer 3: ISO / IEC 8208 (X.25 PLP)
    High Layer: Facsimile Group 2/3 (CCITT F.182)
  - For G4 FAX:
    Low Layer:
    Layer 2: ISO / IEC 7776 DTE-DTE
    Layer 3: ISO / IEC 8208 (X.25 PLP)
    High Layer: Facsimile Group 4 (CCITT F.184)

  A discussion of LLC and HLC values may be found in Section 5.1.5.
- The Lower Layer Compatibility Information Element (LLC-IE) can also be used to communicate rate-adaptation details end-to-end. For details on V.120 rate adaptation, 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 5.2.1.4 (Voice Call Setup), 5.2.1.5 (Circuit-Data Call Setup) and 5.2.1.6 (Voice & Circuit-Data Call Clearing).

3.1.25 High speed access to electronic document image systems

ISDN can provide remote access to electronic document image systems at speeds up to 128 kbps. Electronic document image systems provide a fast, convenient way to access very large files of documents from widely distributed locations. The high performance of ISDN connections provides the remote user with nearly the same speeds enjoyed by a user directly connected to the electronic document image system.

Configuration: (1, 3, 4, 5)



How It Works:

This application uses an ISDN LAN bridge at the remote site to provide fast access to a LAN-based imaging system. Because the bridge provides a 128 kbps connection to the LAN, images may be transferred very quickly to the remote site. The ISDN LAN bridge is programmed to automatically dial the central-site LAN using circuit-data when the remote user runs a LAN application. When the traffic on the first B channel circuit-data call exceeds a pre-programmed threshold the ISDN LAN bridge will place a second circuit-data call and inverse multiplex it with the first. Similarly, when the traffic on the inverse-multiplexed data path falls below a pre-programmed threshold the bridge will clear the second call. Finally, when there is no traffic, the bridge will clear the first call. After initially configuring the bridge the remote user does not need to manage the LAN connection, as it is all done automatically. The user has the perception of being directly connected to the LAN.

Obtain Equipment with These Capabilities

Personal Computer

- Application software compatible with communication software and far end LAN devices.
- LAN interface (e.g., Ethernet, Token Ring) compatible with ISDN LAN bridge and far end.

ISDN LAN Bridge

- LAN bridge functions compatible with far end and local LAN (e.g., Ethernet or Token Ring).
- B channel capabilities:
  - Simultaneous voice and circuit-data calling.
  - Simultaneous circuit-data calling on two B channels.
  - For NI-1, support for two Directory Numbers (DNs) and Service Profile IDs (SPIDs) will be needed.
  - Combine two 64 kbps signals to/from the BRI into 128 kbps signal in a way that is compatible with far end.
- Physical interfaces:
  - Analog phone jack.
  - Local LAN (e.g., Ethernet or Token Ring).
  - RJ-45 connector to NT-1, or integrated NT-1.

Image Management System

- Imaging application software compatible with Multiport ISDN LAN Bridge or Router and far end equipment.
- Accounting application.
- Systems for managing the input, storage and retrieval of images in electronic form.
- Interface compatible with local LAN (e.g., Ethernet or Token Ring).

Multiport ISDN LAN Bridge or Router

- LAN bridge or router functions compatible with far end and local LAN (e.g., Ethernet or Token Ring).
- Access control using Calling Number Identification Service, or MAC address.
- Multiple BRIs to meet network traffic requirements.

B channel capabilities for each BRI:

- Simultaneous circuit-data calling on two B channels.
- For NI-1, support for two Directory Numbers (DNs) and Service Profile IDs (SPIDs) will be needed.
- Combine two 64 kbps signals to/from the BRI into 128 kbps signal in a way that is compatible with far end.
- Support for the Calling Number Identification Service and Multiline Hunt Group as listed under "Network Interface to Multiport ISDN LAN Bridge or Router ".

- Physical interfaces:
  - Local LAN (e.g., Ethernet or Token Ring).
  - RJ-45 connector to NT-1, or integrated NT-1.

Request These Capabilities From ISDN Service Provider

Network Interface to ISDN LAN Bridge

Network Services Required:

- One BRI. (2B)
- One B channel for circuit-data calls, with circuit-data DN and SPID.
- One B channel for alternate voice and circuit-data calls. For NI-1, this requires both a voice DN and SPID and a circuit-data DN and SPID.
- Voice Features:
  - None required.
- Circuit-Data Features:
  - None required.

Subscription or Ordering Information:

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

Network Interface to Multiport ISDN LAN Bridge or Router

Network Services Required:

- One or more BRI. (2B)

For each BRI:

- Two B channels for circuit-data calls, with circuit-data DNs and SPIDs.
- Circuit-Data Features:
  - Calling Number Identification Services
  - Multiline Hunt Group.

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:
  - A la Carte:
    Calling Number Identification Services.
    Multiline Hunt Group.

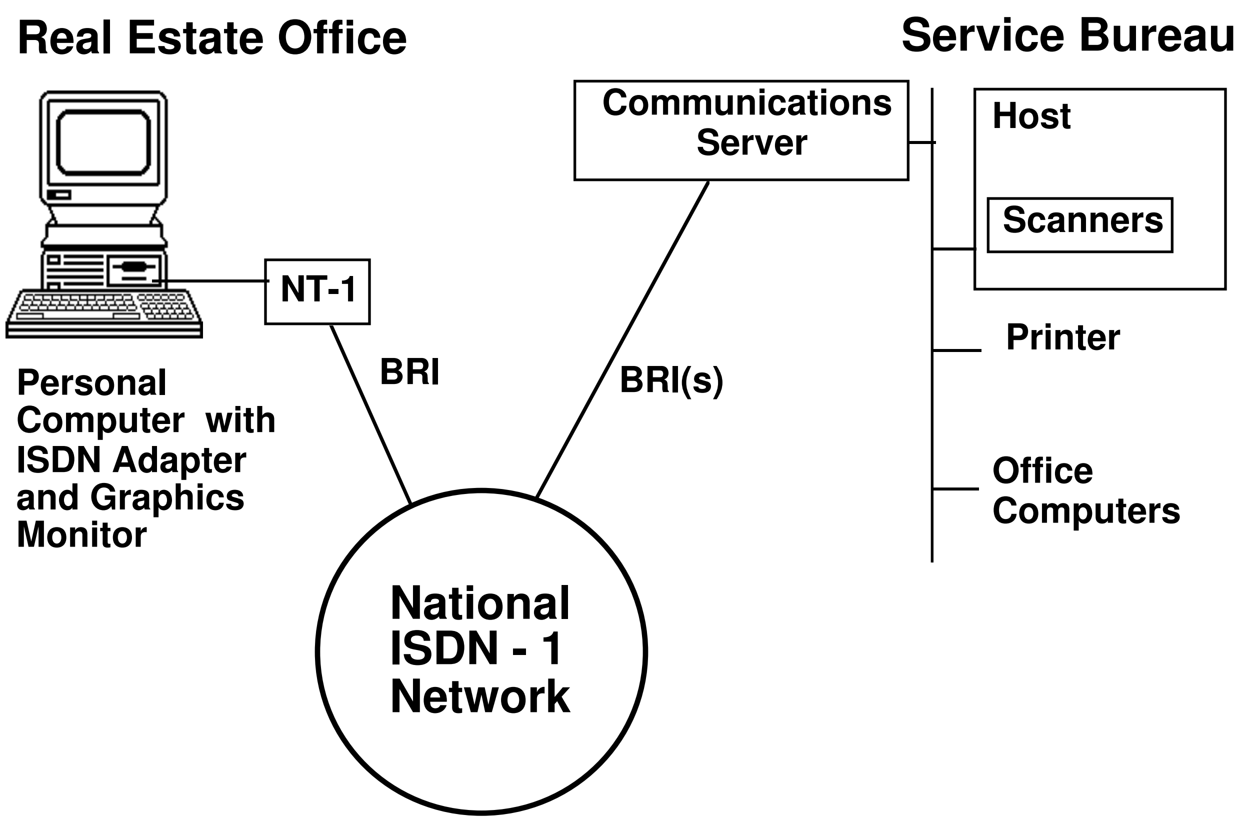
Technical Notes

- The terminal configuration shown here uses a Personal Computer/Workstation with a standalone ISDN LAN Bridge. Some LAN adapter cards may have integrated ISDN LAN bridges.
- Many Multiport LAN Bridges and Routers can utilize a PRI or multiple BRI lines for network access.
- Some ISDN LAN Bridges and Routers support data compression, so effective data throughput may be higher. See Section 4 for products.
- The Lower Layer Compatibility Information Element (LLC-IE) can communicate rate-adaptation details end-to-end. For details on V.120 rate adaptation, 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 5.2.1.4 (Voice Call Setup), 5.2.1.5 (Circuit-Data Call Setup) and 5.2.1.6 (Voice & Circuit-Data Call Clearing).

3.1.26 Multimedia real estate listings

Real estate agents and their clients rely on up to date listings to learn about available properties. With today's listings, photos are often grainy, and in black and white. Pictures are unavailable electronically. ISDN can support a multimedia listing service, with pictures on-line and in color. Client meetings are more productive, the presentation of properties is improved, and service is better for all involved.

Configuration: (1, 3, 4, 5)



How It Works:

Real estate agents place two 64 kbps circuit-data calls to connect with the communications server at 128 kbps. The communications server (or router) internetworks the personal computer and host. The agent's personal computer has a high resolution monitor, it runs the real estate application client software to search and retrieve listings from the host. The service bureau host stores and retrieves text and digitized photos in a multimedia database. It responds to queries with the appropriate listing files. Photos of properties can be scanned at the service bureau, or agents can be equipped with scanners (not shown) to post new listings remotely. Calling Number Identification Services support screening the calling number for access control. The calling number can also be used for accounting.

Obtain Equipment with These Capabilities

Personal Computer with ISDN Adapter

- Real estate application software compatible with communication software and service bureau.
- Support for desired graphics capabilities. At least 512 x 512 x 8 RGB color is recommended. Performance may be improved by the use of accelerator boards optimized for image compression and manipulation.
- 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.
  - Combine two 64 kbps signals to/from the BRI into 128 kbps signal in a way that is compatible with far end. (BONDING, H.221).
  - Support rate adaptation for rates lower than 64 kbps. For example, asynchronous communications may be rate adapted using V.120.
  - Support for Calling Number Identification Services as listed under "Network Interface to Personal Computer".
- Physical interfaces:
  - Connection to Graphics Monitor (e.g., RS-170 or equivalent).
  - RJ-45 connector to NT-1, or integrated NT-1.

Graphics Monitor

- NTSC/RH3 or RGB graphics capability.
- At least 512 x 512 x 8 RGB color.
- Connection to Personal Computer (e.g., RS-170 or equivalent).

Service Bureau Host

- Real estate application software compatible with communication software and far end Personal Computers.
- Accounting application.
- Systems for managing the input, storage and retrieval of 35mm pictures and text in electronic form.
- Interface compatible with Communications Server (e.g. V.35 , Ethernet).

Communications Server

- Compatible communications software.
- Access control using Calling Number Identification Services.
- Multiple BRIs to meet network traffic requirements, for each BRI:

  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.
  - Combine two 64 kbps signals to/from the BRI into 128 kbps signal in a way that is compatible with far end. (BONDING, H.221).
  - Support rate adaptation for rates lower than 64 kbps. For example, asynchronous communications may be rate adapted using V.120.
- Physical interfaces:
  - Interface compatible with Communications Server (e.g. V.35 , Ethernet).
  - RJ-45 connector to NT-1, or integrated NT-1.

Request These Capabilities From ISDN Service Provider

Network Interface to Personal Computer with ISDN Adapter

Network Services Required:

- One BRI. (2B)
- Two B channels for circuit-data calls, with circuit-data DNs and SPIDs.
- Circuit-Data Features:
  - Calling Number Identification Services

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:
  - A la carte: Calling Number Identification Services.

Network Interfaces to Communications Server

Network Services Required:

- One or more BRI. (2B)

For each BRI:

- 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.

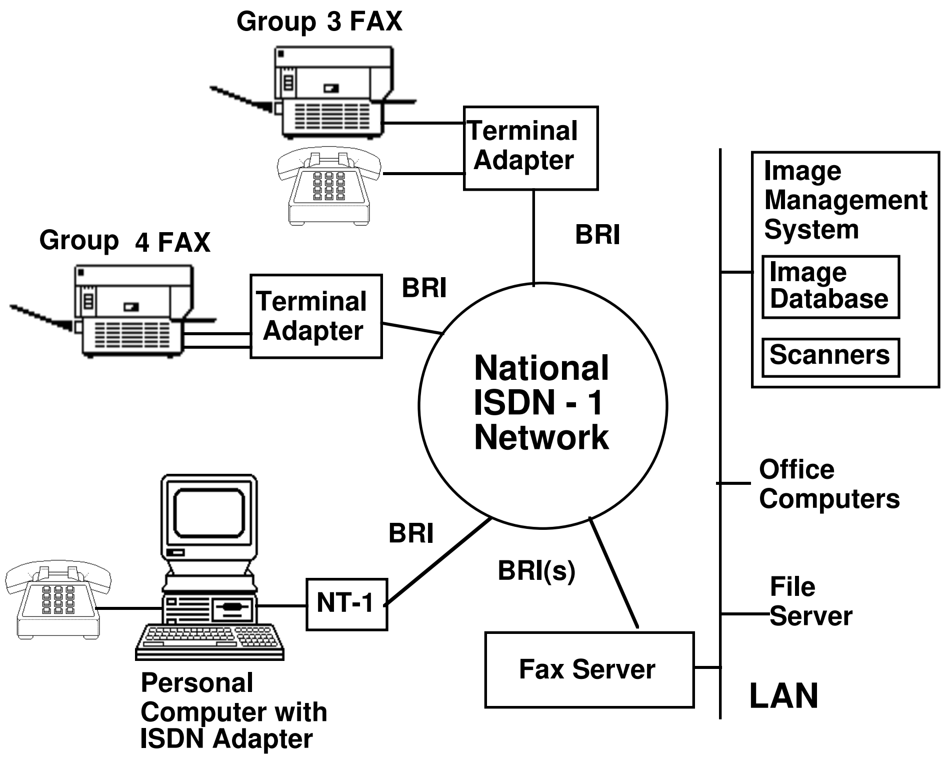
Technical Notes

- 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.
- Optionally, a Multiline Hunt Group (MLHG) may be used at the Communications Server to allow all users to dial the same DN. More information on MLHG may be found in Section 5.1.7.
- The Lower Layer Compatibility Information Element (LLC-IE) can communicate rate-adaptation details end-to-end. For details on V.120 rate adaptation, 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).

3.1.27 Medical document imaging

Many industries are heavily dependent on processes which involve paper copies of documents, often faxed between locations. For many reasons it is desirable to migrate these processes toward fully electronic solutions. Getting the data into document imaging systems has proven to be a very challenging problem. In those applications where documents are produced by many organizations which are not located close to each other existing fax machines may be used to scan documents into a remote document management system. As an example, a company providing health insurance could set up a document imaging system which could receive faxed claims from physicians offices. The system could automatically route incoming claims to specific agents, reducing handling costs and also strengthening relationships with the physicians' offices by providing a single point of contact. ISDN is shown in the example below because Group 4 fax requires digital service, but also because it provides an inexpensive second channel for voice calls. Group 3 fax machines may also be used over ordinary phone lines to send documents to the insurance company, but that scenario is not illustrated here.

Configuration: (1, 2, 3, 4)



How It Works:

People processing claims in small medical offices prepare the claim forms as they have traditionally. They then fax them to a central number at the insurance company. This number corresponds to a host processor with image recognition software which optionally routes the claims to a department or specific employee based on calling number, or possibly by recognition of a bar code which was placed on the claim.

Obtain Equipment with These Capabilities

Terminal Adapter for G3 Fax Machine

- B channel capabilities:
  - Simultaneous voice calling on two B channels.
  - If using NI-1, support for two Directory Numbers (DNs) and Service Profile IDs (SPIDs) will be needed.
- Physical interfaces:
  - Two analog phone jacks.
  - RJ-45 connector to NT-1, or integrated NT-1.

Terminal Adapter for G4 Fax Machine

- B channel capabilities:
  - Simultaneous voice and circuit-data calling.
  - If using NI-1, support for two Directory Numbers (DNs) and Service Profile IDs (SPIDs) will be needed.
  - Support rate adaptation for rates lower than 64 kbps. For example, asynchronous communications may be rate adapted using V.120.
- Physical interfaces:
  - Analog phone jack for Group 3 interworking.
  - Serial connection to G4 Fax Machine (e.g., RS-232, RS-449, or V.35).
  - RJ-45 connector to NT-1, or integrated NT-1.

Personal Computer with ISDN Adapter

- Application software for processing and transporting fax files compatible with communication software and far end.
- B channel capabilities:
  - Simultaneous voice and circuit-data calling.
  - If using NI-1, support for two Directory Numbers (DNs) and Service Profile IDs (SPIDs) will be needed.
  - Support rate adaptation for rates lower than 64 kbps. For example, asynchronous communications may be rate adapted using V.120.
- Physical interfaces:
  - Analog phone jack.
  - RJ-45 connector to NT-1, or integrated NT-1.

Image Management System

- Imaging application software compatible with Communications Server and far end fax equipment.
- Accounting application.
- Systems for managing the input, storage and retrieval of images in electronic form.
- Interface compatible with Communications Server (e.g. V.35 , Ethernet).

Fax Server

- Fax handling application for the transfer of G3 and G4. Must use image format compatible with Image Management System.
- Multiple BRIs to meet network traffic requirements.
- B channel capabilities: for each BRI:
  - Simultaneous voice calling on two B channels. (for G3 calls)
  - Simultaneous circuit-data calling on two B channels. (for G4 calls)
  - Simultaneous voice and circuit-data calling.
  - If using NI-1, support for two Directory Numbers (DNs) and Service Profile IDs (SPIDs) will be needed.
  - Support rate adaptation for rates lower than 64 kbps. For example, asynchronous communications may be rate adapted using V.120.
  - Support for Multiline Hunt Group as listed under "Network Interface to Fax Server".
- Physical interfaces:
  - Interface compatible with Image Management System (e.g. V.35 , Ethernet).
  - RJ-45 connector to NT-1, or integrated NT-1.

Request These Capabilities From ISDN Service Provider

Network Interface to G3 TA

Network Services Required:

- One BRI. (2B)
- Two B channels for voice calls, with voice DNs and SPIDs.
- Voice Features:
  - None required.

Subscription or Ordering Information:

- This interface is configured for two simultaneous voice calls (NIIG 10). Other NIIGs which have this functionality include 12, 17, 20, 22, and 27.
- Parameter Groups for Voice Features:
  - None required.

Network Interface to G4 TA

Network Services Required:

- One BRI. (2B)
- One B channel for voice calls, with voice DN and SPID.
- One B channel for circuit-data calls, with circuit-data DN and SPID.
- Voice Features:
  - None required.
- Circuit-Data Features:
  - None required.

Subscription or Ordering Information:

- This interface is configured for simultaneous voice calls and circuit-data calls (NIIG 11). Other NIIGs which have this functionality include 12, 15, 17, 21, 22, 25, and 27.
- Parameter Groups for Voice Features:
  - None required.
- Parameter Groups for Circuit-Data Features:
  - None required.

Network Interface to Personal Computer with ISDN Adapter

Network Services Required:

- One BRI. (2B)
- One B channel for voice calls, with voice DN and SPID.
- One B channel for alternate voice and circuit-data calls. For NI-1, this requires both a voice DN and SPID and a circuit-data DN and SPID.
- Voice Features:
  - None required.
- Circuit-Data Features:
  - None required.

Subscription or Ordering Information:

- This interface is configured for simultaneous voice calls and alternate voice and circuit-data calls (NIIG 12). Other NIIGs which have this functionality include 17, 22, and 27.
- Parameter Groups for Voice Features:
  - None required.
- Parameter Groups for Circuit-Data Features:
  - None required.

Network Interface to Fax Server

Network Services Required:

- One or more BRI. (2B)

For each BRI:

- Two B channels for alternate voice and circuit-data, with alternate voice and circuit-data DNs and SPIDs.
- Voice Features:
  - Multiline Hunt Group.
- Circuit-Data Features:
  - Multiline Hunt Group.

Subscription or Ordering Information:

- This interface is configured for two simultaneous alternate voice and circuit-data calls (NIIG 17). The only other NIIG with this functionality is 27.
- Parameter Groups for Voice Features:
  - A la Carte: Multiline Hunt Group.
- Parameter Groups for Circuit-Data Features:
  - A la Carte: Multiline Hunt Group.

Technical Notes

- The G3 portion of this guide will also work if the calling FAX is served by an analog (non-ISDN) interface. The G4 portion of this guide will also work if the calling FAX is served by a digital Switched 56 (non-ISDN) interface.
- For G3 FAX calls, the TAs, Server, and Computer use the 3.1 kHz Audio bearer. For G4 FAX calls, they use the 56k and 64k bearers. For more information on Bearer Capabilities, see Section 5.1.1.
- Each FAX TA, as well as the PC interface, uses one DN for Telephone calls (Voice), & one DN for G3 or G4 FAX (Voice or CMD).
- Typical LLC and HLC values which may be used for this application are:
  - For G3 FAX:
    Low Layer: Layer 1: CCITT G.711 μ-Law
    High Layer: Facsimile Group 2/3 (CCITT F.182)
  - For G4 FAX:
    Low Layer:
      Layer 2: ISO / IEC 7776 DTE-DTE
      Layer 3: ISO / IEC 8208 (X.25 PLP)
    High Layer: Facsimile Group 4 (CCITT F.184)

  A discussion of LLC and HLC values may be found in Section 5.1.5.
- The Lower Layer Compatibility Information Element (LLC-IE) can also be used to communicate rate-adaptation details end-to-end. For details on V.120 rate adaptation, 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 5.2.1.4 (Voice Call Setup), 5.2.1.5 (Circuit-Data Call Setup) and 5.2.1.6 (Voice & Circuit-Data Call Clearing).