Lucent Technologies
Bell Labs Innovations

LINCS Server

Release 1.0

Communication Development

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AUTOMATIC RE-ATTEMPTS TO THE SAME NUMBER: Some parameters required for compliance with Telecom's Telepermit requirements are dependent on the equipment (PC) associated with this device. The associated equipment shall be set to operate within the following limits for compliance with Telecom specifications:

• There shall be no more than 10 call attempts to the same number within any 30 minute period for any single manual call initiation, and,

• The equipment shall go on-hook for a period of not less than 30 seconds between the end of one attempts and the beginning of the next attempt.

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USER INSTRUCTIONS (AUTOMATIC CALL SETUP): This equipment shall not be set up to make automatic calls to the Telecom "111" emergency service.

CALL ANSWERING (AUTOMATIC ANSWERING EQUIPMENT): Some parameters required for compliance with Telecom's Telepermit requirements are dependent on the equipment (PC) associated with this device. In order to operate within the limits for compliance with Telecom specifications, the associated equipment shall be set to ensure that calls are answered between 3 and 30 seconds of receipt of ringing.

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Toll fraud is the unauthorized use of your telecommunications system by an unauthorized party, for example, persons other than your company's employees, agents, subcontractors, or persons working on your company's behalf. Note that there may be a risk of toll fraud associated with your telecommunications system and, if toll fraud occurs, it can result in substantial additional charges for your telecommunications services.

Your Responsibility for Your System's Security

Lucent Technologies Fraud Intervention and Corporate Security

If you suspect that you are being victimized by toll fraud and you need technical support or assistance, call the Lucent Technologies National Customer Care Center Toll Fraud Intervention Hotline at 1 800 643-2353.

Aside from whether immediate support is required, all toll fraud incidents involving Lucent products or services should be reported to Lucent Corporate Security at 1 800 821-8235. In addition to recording the incident, Lucent Corporate Security is available for consultation on security issues, investigation support, referral to law enforcement agencies, and educational programs.

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Contents

About This Book

Overview

This book is a reference manual for creating the necessary platform environment and applications to implement various communication interfaces between callers, administrators, and the LINCS server.

Intended Audiences

The primary audience for this document are system administrators. This includes:

- On-site technicians who perform system administration at the customer site
- End customers who choose to administer their own systems

Secondary audiences include the field support personnel.

We assume that the primary users of this book have completed the LINCS server hardware installation and maintenance training course (see Using the CD-ROM Documentation on page xxvi).

How to Use This Book

This document is designed to step you through the system administration process. Each chapter contains procedures for a specific product area that requires administration.

This book is organized into the following sections:

- Chapter 1, Digital Telephony Interfaces

  This chapter describes the use of digital telephony as a communication arrangement, as well as the provisioning required to implement this interface. This includes the suggested administrative values to set on the system.

- Chapter 2, Call Classification Analysis

  This chapter describes the potential use and benefits of Call Classification Analysis (CCA) within analog and digital communication arrangements, as well as the provisioning required to implement this interface. This includes the suggested administrative values to set on the system.

- Chapter 3, Data Network Communications

  This chapter describes the potential uses of data network communications, discusses physical and logical protocol differences, and details what you must do on the system to implement this type of communication.

• [Appendix A, Transmission Level Adjustment](#)

This appendix describes how to ensure that all speech heard by a caller is at a level that is appropriate for listening without causing oscillations or distortions in the network.

The book also includes a glossary and a cross-references index.

Conventions Used in This Book

Understanding the typography and other conventions used is this book is necessary to interpret the information.

Note: Any screens shown in this book are examples only. The screens you see on your system may be similar, but not exactly the same in all cases.

Terminology
• The word "type" means to press the key or sequence of keys specified. For example, an instruction to type the letter "y" is shown as

Type **y** to continue.

• The word "enter" means to type a value and then press the **ENTER** key on the keyboard. For example, an instruction to type the letter "y" and press **ENTER** is shown as

Enter **y** to continue.

- The word "select" means to move the cursor to the desired menu item and then press **ENTER**. For example, an instruction to move the cursor to the start test option on the Network Loop-Around Test screen and then press **ENTER** is shown as

  Select **Start Test**.

- The system displays menus, screens, and windows. Menus (Figure 1) present options from which you can choose to view another menu, or a screen or window. Screens and windows both show (Figure 2 on page xviii and Figure 3 on page xix) and request (Figure 4 on page xix and Figure 5 on page xx) system information.

Figure 1.   Example of LINCS Menu

```
        Voice System Administration

 Application Package Administration
 Backup/Restore
 Configuration Management
 Feature Packages
 Reports
 Script Builder Applications
 Switch Interfaces
 System Monitor
 Unix Management
 Exit
```
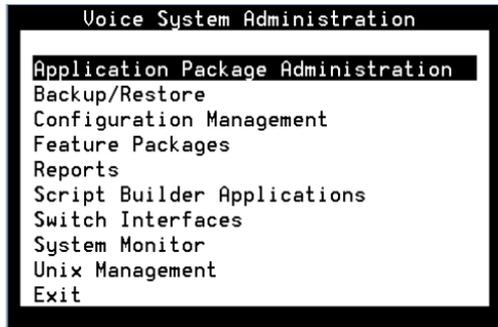
Figure 2. Example of LINCS Screen Showing Information

```
UnixWare Installation            Primary Hard Disk Partitioning

In order to install LINCS, you should reserve a UNIX system
partition (a portion of your hard disk's space) containing 100%
of the space on your primary hard disk. After you press 'ENTER'
you will be shown a screen that will allow you to create new
partitions, delete existing partitions or change the active
partition of your primary hard disk (the partition that your
computer will boot from).

WARNING: All files in any partition(s) you delete will be
destroyed. If you wish to attempt to preserve any files from an
existing UNIX system, do not delete its partitions(s).

The UNIX system partition that you intend to use on the primary
hard disk must be at lease 4200 MBs and labeled "ACTIVE."

Press 'ENTER' to continue
```

Figure 3.   Example of LINCS Window Showing Information

```
 3                    Shut Down the Machine

Users currently logged on:

renee       pts000      Sep  2 09:22
laura       pts001      Sep  2 09:27
root        pts002      Sep  2 09:52



```

Figure 4.   Screen Requesting Information

```
UNIX System Installation                    Set Slice Sizes

Please select whether you would like the recommended slice
sizes or would like to customize the slice sizes.

Your choices are:
1. Recommended Slice Sizes
2. Customize Slice Sizes

Press '1' or '2' followed by 'ENTER': 1
```

Figure 5. Example of LINCS Window Requesting Information
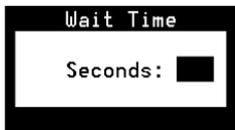
Keyboard and Telephone Keypad Representations

- Keys that you press on your terminal or PC are represented as small, capitalized **BOLD** text. For example, an instruction to press the enter key is shown as

  Press **ENTER**.

- Two or three keys that you press at the same time on your terminal or PC (that is, you hold down the first key while pressing the second and/or third key) are represented as a series of small, capitalized **BOLD** text separated by the **+** sign. For example, an instruction to press and hold "Alt" while typing the letter "d" is shown as

  Press **ALT+D**

- Function keys on your terminal, PC, or system screens, also known as soft keys, are represented as small, capitalized **BOLD** text followed by the function or value of that key enclosed in parentheses. For example, an instruction to press function key 2 is shown as

  Press **F2** (Choices).

• Keys that you press on your telephone keypad are represented as **bold** text. For example, an instruction to press the first key on your telephone keypad is shown as

Press **1** to record a message.

Screen Displays

• System messages, field names, and prompts that appear on the screen are shown in `type-writer text`, as shown in the following examples:

~ Enter the number of ports to be dedicated to outbound traffic in the `Maximum Simultaneous Ports` field.

~ Enter **y** in the `Message Transfer?` field.

~ The system displays the following message:

`Installation in progress.`

• The sequence of menu options that you must select to display a specific screen or submenu appears in a series of boxes.

Example:

Start at the Voice System Administration menu and select:

```
> Reports
```

```
    > Message Log Report
```

In this example, you would access the Voice System Administration menu and select the Reports menu. From the Reports menu, you would then select the Message Log Report window.

Some Screen Simulations   Text in a simulated screen display appears in type-writer text.

Example:

```
          QuickStart - Data Recovery Rescue
Copyright(c) 1997-1999 by Enhanced Software Technologies, Inc.
     Serial# 8200-999                      Version: 1.3.13


    Backup     Verify     Recover    Duplicate    Configure     Exit
    System     System     System     Diskette     QuickStart    and Reboot


```

Items That May or May Not Appear

Grayed-out type represents optional items that may or may not appear in a given display.

Example:

Once the backup is complete, the system displays a message similar to the following:

```
The Differential UNIX backup is now complete.  Please remove
the tape and label it as "Differential UNIX Backup, created
August 30, 1999."
```

Other Typography

Command Text

- Literal values, commands and text you type in or enter, appear in **bold type**, as in the following examples:

  Example 1: Enter **change-switch-time-zone** at the Enter command: prompt.

  Example 2: Type **high** or **low** in the Speed: field.

- Command variables are shown in **_bold proportional italic_** type when they are part of what you must type in, and in italics when they are not part of the command line, for example:

  Enter **ch ma _machine_name_**, where _machine_name_ is the name of the call delivery machine you just created.

- Command options are shown inside square brackets, for example:

  Enter **connect *switchname* [-c] [-b | -w]**

Cross References and Hypertext   [Blue, underlined](#) type indicates a cross reference or hypertext link that will take you to another location in the document when you click on it.

Safety and Security Alert Labels

This book uses the following symbols to call your attention to potential problems that could cause personal injury, damage to equipment, loss of data, service interruptions, or breaches of toll fraud security:

⚠ CAUTION:
Indicates the presence of a hazard that if not avoided *can* or *will* cause minor personal injury or property damage, including loss of data.

⚠ WARNING:
Indicates the presence of a hazard that if not avoided *can* cause death or severe personal injury.

⚠ DANGER:
Indicates the presence of a hazard that if not avoided *will* cause death or severe personal injury.

⚠️ **SECURITY ALERT:**
**Indicates the presence of a toll fraud security hazard. Toll fraud is the
unauthorized use of a telecommunications system by an unauthorized
party.**

Related Resources

Additional training material and documentation is available for you to learn
more about the LINCS Server product.

Training   For more information on LINCS Server training, call the BCS Education and
Training Center at one of the following numbers:

- Organizations within Lucent Technologies (904) 636-3261

- Lucent Technologies customers and all others (800) 256-8988

Documentation   Appendix A, "Documentation Guide," in *LINCS Server System Description*,
585-313-209, provides an overview of all the books in the LINCS library that
are mentioned in this book.

**Additional
Suggested
Documentation**   It is suggested that you also obtain and use the following book for information
on security and toll fraud issues:

- *GBCS Products Security Handbook*, 555-025-600

Obtaining Printed Versions of the Documentation

See [Printing the Documentation on page xxviii](#) for information on how to print this document.

You can also order the printed documents by calling 1-888-582-3688 or visiting the Customer Information Center (CIC) website at:

http://www.lucent.com/cgi-bin/CIC_store.cgi

Using the CD-ROM Documentation

Lucent Technologies ships the documentation in electronic form. Using the Adobe® Acrobat® Reader application, you can read these documents on a Windows PC, on a Sun Solaris workstation, or on an HP-UX workstation. Acrobat Reader displays high-quality, print-like graphics on both UNIX and Windows platforms. It provides scrolling, zoom, and extensive search capabilities, along with online help. A copy of Acrobat Reader is included with the documents.

Setting the Default Magnification

You can set your default magnification by selecting **File | Preferences | General**. We recommend the **Fit Page** option.

Adjusting the Window Size

On HP and Sun workstations, you can control the size of the reader window by using the **-geometry** argument. For example, the command string **acroread -geometry 900x900 mainmenu.pdf** opens the main menu with a window size of 900 pixels square.

Hiding and Displaying Bookmarks

By default, the document appears with bookmarks displayed on the left side of the screen. The bookmarks serve as a hypertext table of contents for the chapter you are viewing. You can control the appearance of bookmarks by selecting **View | Page Only** or **View | Bookmarks and Page.**

Using the Button Bar

The button bar can take you to the book's Index, table of contents, main menu, and glossary. It also lets you update your documents. Click the corresponding button to jump to the section you want to read.

Using Hypertext Links

Hypertext-linked text appears in blue, italics, and underlined. These links are shortcuts to other sections or books.

Navigating with Double Arrow Keys

The double right and double left arrows (◄◄ and ►►) at the top of the Acrobat Reader window are the go-back and go-forward functions. The go-back button takes you to the last page you visited prior to the current page. Typically, you use ◄◄ to jump back to the main text from a cross reference or illustration.

Searching for Topics

Acrobat has a sophisticated search capability. From the main menu, select **Tools | Search.** Then choose the **Master Index.**

Displaying Figures

If lines in figures appear broken or absent, increase the magnification. You might also want to print a paper copy of the figure for better resolution.

Printing the Documentation

Note: For information on ordering printed copies of the documents, see

If you would like to read the documentation in paper form rather than on a computer monitor, you can print all or portions of the online screens.

Printing an Entire Document

To print an entire document, do the following:

1 From the documentation main menu screen, select one of the print-optimized documents. Print-optimized documents print two-screens to a side, both sides of the sheet on 8.5x11-in or A4 paper.

2 Select **File | Print**.

3 Enter the page range you want to print, or select **All**. Note that the print page range is different from the page numbers on the documents (they print two to a page).

4 The document prints.

5 Close the file. Do not leave this file open while viewing the electronic documents.

Printing Part of a Document

To print a single page or a short section, you can print directly from the online version of the document:

1. Select **File | Print**.

2. Enter the page range you want to print, or select **Current**.

   The document prints, one screen per side, two sides per sheet.

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A comment card is included at the back of this book. While we have tried to make this document fit your needs, we are interested in your suggestions for improving it and urge you to complete and return a comment card to us. If the comment card has been removed from this book, send you comments to the address below. Be sure to include the name and document number of this book.

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> Denver, Colorado 80234-2703 US

You may also fax your comments to the attention of the Lucent Technologies LINCS writing team at (303) 538-1741. Please mention the title of this book, *LINCS Server Release 1.0 Communication Development*, 585-313-213.

1 Digital Telephony Interfaces

Overview

This chapter describes the T1, E1, and Primary Rate Interface (PRI) digital telephony interfaces available with the LINCS server. It also describes optional software and the requirements that must be met to implement these interfaces.

This chapter also provides examples of typical digital connections, and discusses application development issues you must address when using the various digital telephony interfaces and their parameters.

Introduction to Digital Communications

A digital T1 (E&M) or E1 (CAS) circuit (trunk) allows the system to connect to digital network facilities such as a central office switch. Digital connections can be through PRI, T1 (E&M), or E1 (CAS). (Generally only E1 or T1 service is offered in a given area.)

Advantages of Digital Service

E1 CAS requires only one cable to provide 30 channels of service. T1 E&M requires only one cable to provide 24 channels of service.

Digital connections also significantly reduce the number of circuit cards required to support LINCS server-to-switch interface. E1 reduces the required hardware to only one CWB2 circuit card and part of a speech and signal processor (SSP) circuit card. T1 requires one CWB2 circuit card per 24 channels of digital service. Two CWB2 circuit cards provide 48 voice channels.

Advantages of PRI

PRI acts as a powerful interface between intelligent equipment such as PBXs and computers. Furthermore, PRI is widely used for access to features provided over the larger network such as automatic number identification (ANI).

See for a detailed discussion of features that accompany the use of PRI.

Note: PRI can be carried on either T1. It provides 23 bearer (B) channels when carried over T1 lines. Calls are controlled from endpoint to endpoint by messages transferred over data (D) channels.

Network Communications

A T1 digital circuit carries information at 1.544 Mbps, and consists of 24 DS-0 channels. Each DS-0 channel operates at 64 Kbps, and is the equivalent of one incoming data line. The CWB2 (E1/T1) circuit card has a mechanical switch that can be set for the card to be used for either E1 or T1 services. The E1 interface is very similar to the T1 except that an E1 digital circuit carries information at a rate of 2.048 Mbps and consists of 30 B channels and 2 signaling and framing channels. Each B channel is the equivalent of one incoming voice line.

T1 connections also provide dialed number identification service (DNIS) information to further automate incoming calls for customers with multiple 800 or 900 numbers. Table 2 on page 4 shows the maximum number of digital lines that are supported for the LINCS server.

T1 and Integrated Services Digital Network (ISDN) PRI support trunk interfaces. A T1-PRI interface contains either 23 B+D channels or 24 B channels that are associated with the D channel on another 23 B+D card. The D channel does not provide normal telephony service, but is used to control the calls on the B channels. It provides information such as DNIS and ANI. Each B channel provides a 64-Kbps voice path.

Interconnection with PBX

T1 (E&M), E1 (CAS), and PRI connections to a switch are supported, but these connections to do not generally support switch-hook flash.

The system supports call bridging through a digital connection. Call bridges can also be used to simulate a transfer, but this consumes channel resources. Table 1 on page 5 lists the digital line capabilities that call bridge supports.

Digital Telephony Interface Specifications

Table 1 details the general digital telephony interface specifications for all T1/E1 protocols.

Table 1.   Digital Telephony Interface General Specifications

Attribute	Specification for E1/T1 Circuit Card
Physical connector	BNC co-ax or 8-pin modular
FCC registration	AS5USA-27438-XD-E
Safety approval	UL 1459 type approval for US markets
	CSA 22.2 type approval for Canadian markets
	EN 60950 type approval for European markets
	AS3260 and TS-001 for Australian markets
T1 Signal regeneration	CSU required over 200 meters (655 feet)
T1 Loopback capability	CSU required for remote capability
	1 of 4

Table 1. Digital Telephony Interface General Specifications

Attribute	Specification for E1/T1 Circuit Card
Transmission Level Point (TLP) at DS-1 interface	0 ELP, 0 DLP
TLP at time-division multiplexed (TDM) interface	0 ELP, 0 DLP
Call progress tone frequency	Precise tone frequencies can be tuned to accommodate local standards
Call progress tone levels	-10 dBm total (nominal) This value is tunable through digital switch interface packages.
Call progress tone timing	• Ringing –on/off: 2 sec on, 4 sec off • Busy – on/off: 0.5 sec on, 0.5 sec off Values are tunable through digital switch interface packages
DS-1 timing source	Slave to DS-1 source (loop timed)
DS-1 timing (free running)	Stratum 4
	2 of 4

Table 1.   Digital Telephony Interface General Specifications

Attribute	Specification for E1/T1 Circuit Card
Suggested channel service unit (CSU) types for use at T1 rate	• Paradyne (PEC 21581-ESF) • Verilink 551VST List 2, or equivalent
Supported configurations	Tie trunk (robbed-bit E&M), E1 (CAS), ISDN-PRI (T1)
Dual tone multifrequency (DTMF) output timing	70 msec on, 70 msec off This value is tunable through digital switch interface packages.
DTMF output levels	-8 dBm per frequency (nominal) This value is tunable through digital switch interface packages.
	3 of 4

Table 1. **Digital Telephony Interface General Specifications**

Attribute	Specification for E1/T1 Circuit Card
DTMF receivers	LATA Switching Systems Generic Requirements (LSSGR) compatible. Note: If DTMF muting is on for a call, the DTMF receiver's minimum on time for detection is increased and may not meet LSSGR requirements. DTMF muting does not impact LSSGR compatibility of DTMF receivers during call setup, that is S digits. This value is tunable through digital switch interface packages.
Number of receivers: T1	24 (1 per DS-0 channel)
Number of receivers: E1	30 (1 per B-channel)
	4 of 4

Digital Connectivity

The server supports up to fourteen T1 circuit cards. An SSP or an LSPS circuit card is required if you are using T1 circuit cards in coding and playback situations.

Each SSP circuit card supports up to 120 channels of simultaneous speech playback using adaptive differential pulse code modulation (ADPCM) 32-Kbps coded speech.

Each LSPS circuit card supports up to 64 channels of simultaneous speech playback using adaptive differential pulse code modulation (ADPCM) 32-Kbps OKI coded speech.

See "Replacing and Installing Circuit Cards" in the *LINCS Server Maintenance*, 585-313-126, for information on installing digital and SSP circuit cards.

details the digital telephony specification for the T1.5 Robbed-bit E&M protocol. Use in conjunction with .

Channel Service Unit Connectivity (T1 Only)

The T1 interface circuit card is connected to a CSU or directly to the DS-1 terminal block to establish T1 connections to a CO.

A CSU performs certain line-conditioning and equalization functions and responds to loopback commands from the CO. A CSU regenerates digital signals, monitors them for problems, and provides a way to test the digital circuit. A CSU is not always needed. However, a CSU is *required* if any of the following situations applies to the system setup:

- The server is more than 200 meters (655 feet) from the signal source. The signal source may be a DSX or the last T1 repeater. Here, the CSU regenerates the received signal and properly attenuates the transmitted signal to prevent crosstalk.

- The LINCS server is terminating the T1 trunk from outside the building. Here, the CSU provides the primary lightning and surge protection as required by FCC Rules Part 68.

- The T1 loop is not dry (that is, the loop is powered by either 110 VAC, +24 VDC or -48 VDC sources).

- You want to use the remote loopback and/or extended super frame (ESF) maintenance features. Here, the CSU recognizes the in-band bit patterns that signal it to loopback the incoming signal or to perform other maintenance functions.

On some types of CSUs, the connector on the T1 cable can plug into the CYD2 rear I/O transition card and the cable terminates at a 15-pin D subminiature connector to the CSU (Figure 6). On other types, you must cut off the CSU connector and slide latch and strip and connect the wires (Figure 7).

Figure 6.   Example of T1 Interface Connection to a CSU (From a CYD2 Rear I/O Transition Card)

8-pin to 15-pin-subminiature

15-pin to 8-pin cable

CSU

CYD2
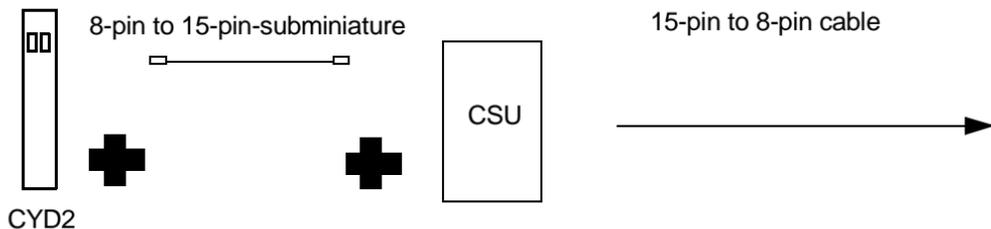
Figure 7.   Example of AYC21 Connection to a CSU with Wire Wrapping Posts

8-pin modular

1 From Network
RX 2
4
TX 5
To Network
GND

Wire Wrapping Post

Output Pair TX
Input Pair RX
GND

CSU

CSU and RJ48C
15-pin to 8-pin cable
To DS1 Terminal Block or 4ESS

CYD2
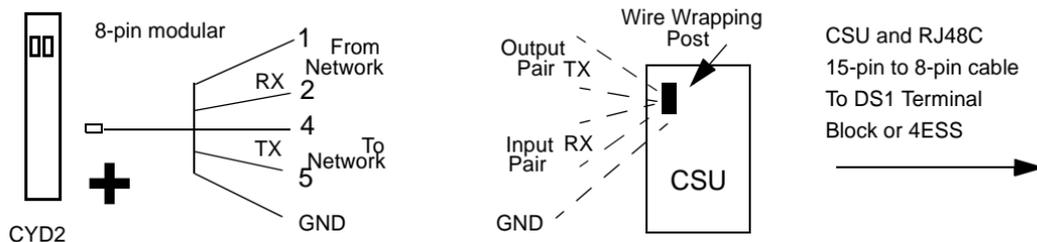
E1-CAS (Channel Associated Signaling) Interface

The E1/T1 circuit cards can operate with Channel Associated Signaling (CAS). This interface (at the E1 rate: 2.048 Mbits/sec) uses signaling bits associated with each channel to determine the state of the channel. Thirty voice channels are supported on each link.

Several country specific signaling protocols have been developed using E1-CAS. Contact your local Lucent Technologies technical representative for more information about locally supported protocols.

Note: The LINCS server supports the R2-MFC for Mexico package (**r2mex**, delivered as part of the LINCS Base Server Software CD-ROM). Other packages may be available on a custom basis. Contact your local Lucent Technologies technical representative for more information.

Table 2.   Digital Telephony Interface Specifications for E1-CAS Configurations

Attribute	Specification
DS1 Rate	2.048 Mbits/sec (ITU G.703)
DS1 framing/line coding	HDB3 (ITU G.704, G.705)
Cyclic Redundancy Check (CRC)	(ITU G.706) May be set to YES or NO; must match the CRC setting of the network entity connected to the AYC21
Physical Connector Options	120 Ohm twisted pair on RJ-48C modular jack or 75 Ohm BNC jacks
PCM Companding Rule	A-Law or Mu-Law. (ITU G.711)
Line Signaling	ITU System R2, Q.421 compliant; variations by specific protocol are supported
Address Signaling Options (Register Signaling) Incoming and Outgoing	DTMF (Touch Tone) ITU system MFC, Q.440, Q.441; variations for specific protocols are supported by table entries; Dial pulse (slower than DTMF or MFC)
Outgoing Destination Number	15 digits max
	1 of 2

Table 2. Digital Telephony Interface Specifications for E1-CAS Configurations

Attribute	Specification
Outgoing ANI Number	15 digits max (if supported by protocol)
Incoming Address: (DNIS)	15 digits max
Incoming ANI Number	15 digits max (if supported by protocol)
Audible Alerting Tones on Incoming Calls	Ring, busy, reorder; variations by country supported
Call Progress Tone Recognition on Outbound Calls	Not supported
Call Transfer Capability	Not supported
	2 of 2

E1 Switch Integration and Administration

Switch Integration for E1-CAS is done using the Digital Interfaces screen. This screen is described in Chapter 5, "Switch Interface Administration," of *LINCS Server Administration*, 585-313-507. You must select one of the E1-CAS protocols that correspond to optional packages loaded on the LINCS server.

Placing a card in the INSERV state allows it to be used for the purpose for which it is allocated in the application. After performing switch integration on the E1 circuit card for the CAS protocol, you may need to *manually* place an E1 circuit card into service if:

- After first installing the card or changing switch integration parameters, the voice system did not automatically place the card in the INSERV state.

- The card was placed in the MANOOS state.

- A diagnostic procedure failed (that is, placed that card in the MANOOS or BROKEN state).

To change the state of the E1 circuit cards to INSERV, use the steps described in Chapter 3, "Voice System Administration," of *LINCS Server Administration*, 585-313-507.

E1 Connections

Because telephone network connections vary from country to country, no specific recommendation can be made concerning connection to the network entity. Consult your local Lucent Technologies technical representative to determine the proper physical connectivity.

T1 E&M Interface

The T1 circuit cards accept an ISDN PRI or DS-1 two-way digital trunk and convert it to two-way analog audio channels. Because of the bandwidth and transmission differences of each trunk, ISDN PRI and DS-1 offer different numbers of converted channels. A standard 1.544-Mbps DS-1 format trunk converts to 24 DS-0 channels. These 64-Kbps channels can provide 24 two-way audio channels.

Table 3. Digital Telephony Interface Specifications for T1 E&M Type Configurations

Attribute	Specification
DS-1 framing	D4 type only
DS-1 line coding	Zero code suppression (ZCS)
Protocol	Robbed-bit (4-wire) E&M
Alerting in/out	Wink/wink
Wink generation	230 msec default (selectable: 20–2500 msec)
Wink detection range	10–350 msec
	1 of 3

Table 3. Digital Telephony Interface Specifications for T1 E&M Type Configurations

Attribute	Specification
Addressing (outgoing)	• DTMF (touch tone) • MF (multifrequency) • Dial pulse (slower than DTMF or MF)
Number of digits	15-digit maximum
Addressing (incoming)	• DTMF (touch tone) • MF (multifrequency) • Dial pulse (slower than DTMF or MF)
Number of digits (DNIS)	Will wait for up to 16 digits (selectable); can also be provisioned not to wait for digits
Initial digit timer	Will wait up to 4 seconds for first digit; can also be provisioned not to wait for digits
Interdigital timer	Will wait up to 2 seconds between digits
Audible ring starts	As soon as the selected number of digits is received or when one of the above timers expire, whichever occurs first

2 of 3

Table 3.   Digital Telephony Interface Specifications for T1 E&M Type
Configurations

Attribute	Specification
DNIS capacity	0–16 digits
ANI capacity	Not supported
Transfer capability	Not supported
	3 of 3

T1 Switch Integration and Administration

Switch integration for T1 is done using the Digital Interfaces screen. This
screen is described in Chapter 5, "Switch Interface Administration," of *LINCS
Server Administration*, 585-313-507. You must select T1 A/B robbed-bit E&M
Protocol from the Digital Interfaces screen. (See
and for
information on performing switch integration for those types of protocols.)

Placing a card in the INSERV state allows it to be used for the purpose for which it is allocated in the application. After performing switch integration on the T1 circuit card for the E&M protocol, you may need to *manually* place a T1 circuit card into service if:

- After first installing the card or changing switch integration parameters, the voice system did not automatically place the card in the INSERV state.

- The card was placed in the MANOOS state.

- A diagnostic procedure failed (that is, placed that card in the MANOOS or BROKEN state).

To change the state of the T1 circuit cards to INSERV, use the steps described in Chapter 3, "Voice System Administration," of *LINCS Server Administration*, 585-313-507.

T1 Connections

See above for information on T1 connections through CSUs.

Digital Application Development Issues

The E1/T1 circuit card recognizes call progress tones. The E1/T1 circuit card *does not*, however, support flash transfer over T1 (E&M), E1 (CAS), or PRI. See Primary Rate Interface on page 21 for more information.

Simulated transfers using digital cards can be performed over call bridges. In line-side digital environment, the switch-hook-flash transfer releases the call from the server once the transfer is made. A call bridge, however, ties up an incoming port and an outgoing port until the call has concluded. Thus, with two ports being tied up simultaneously, more digital ports may be necessary.

Script Language
The **tic** instruction is used for basic control of incoming and outgoing calls on T1 and E1 lines. For additional information about using the transaction state machine (TSM) script language on T1 lines, see the **tic** instruction in Chapter 3, "TAS Script Instructions," and Appendix B, "Summary of Script Instructions," of *LINCS Server Application Development with Advanced Methods*, 585-313-214.

Response Application Programming Interface
The **irCall()**, **irAnswer()**, **irDial()**, and **irDisconnect()** functions provide the basic call control capabilities for T1 interfaces with the Response Application Programming Interface (IRAPI). See Chapter 5, "IRAPI," of *LINCS Server Application Development with Advanced Methods*, 585-313-214, for more information about these functions when developing IRAPI applications.

With General Purpose PRI, call control is performed by the General Purpose PRI application, rather than the TSM **tic** instruction or IRAPI call control functions, such as **irCall()** or **irDisconnect()**.

Primary Rate Interface

ISDN-PRI is desirable for customers that need faster call-setup times, special signaling, or access to the information elements that are available with PRI. Such information elements as ANI, DNIS, redirecting number, and service type are available for incoming PRI calls. Outbound calls can provide information elements like outbound ANI, service type, and bearer capability.

The LINCS server supports the ISDN-PRI between itself and the digital telephone network or entity through the use of a special digital protocol, with the same physical connectivity as standard T1 digital communication. The system supports this digital ISDN communication with ISDN-PRI Layer 1 protocol rather than the T1 A/B Robbed-bit E&M Protocol used with standard T1 communications. The ISDN-PRI Layer 1 protocol uses either D4 or ESF framing. Standard T1 circuit card connectivity, as described in the previous pages, is used to implement the physical connection between the system and the remote network entity when using ISDN-PRI.

PRI connectivity offers the ability to administer key protocol parameters through software interfaces. This parameter administration must be performed before the physical connectivity is established. Two key parameters are dependent on the framing protocol used. If D4 framing is used, line coding must be "ZCS" and D-channel inversion must be *inverted*. If ESF framing is used, line coding must be "B8ZS" and D-channel inversion must be *non-inverted*. The ISDN-PRI service provider determines the method of framing used. ESF/B8ZS is preferred.

The server does not support switch-hook-flash transfers using PRI configurations. Simulated T1 transfers can be performed only over call bridges. In digital line-side environments, the switch-hook-flash transfer releases the call from the server once the transfer is made. A call bridge, however, ties up an incoming port and an outgoing port until the call has concluded. Thus, with two ports being tied up simultaneously, more ports may be necessary.

Table 4 details the digital telephony interface specifications for ISDN-PRI type configurations. Use Table 4 in conjunction with Table 1 on page 5.

Table 4. Digital Telephony Interface Specifications for ISDN-PRI Type Configurations on T1 Circuit Cards

Attribute	Specification
DS-1 framing	D4 or ESF (selectable) for T1 rate
DS-1 line coding	• ZCS (with T1 D4 framing only)
	• B8ZS (with T1 ESF framing only)
	1 of 2

Table 4. Digital Telephony Interface Specifications for ISDN-PRI Type Configurations on T1 Circuit Cards

Attribute	Specification
B-channel capacities	Up to 311 B+D when 13T1 cards are used
	See the *LINCS Server System Description*, 585-313-209, for a list of platform limitations.
	Note: These configurations are switch dependent as not all switches support all configurations.)
D-channel capacities	Multiple D-channels are supported up to the maximum number of T1 cards. (13 D channels for 13 T1 cards)
Interface ID	• 1 (for a card with a D-channel, not selectable)
	• 2–13 (for a card without a D-channel)
DNIS capacity	0–15 digits
ANI capacity	0–15 digits
D-channel backup	Not supported
Transfer capability	Not supported
	2 of 2

Using PRI in a DEFINITY Call Center

ISDN-PRI provides a Universal Call ID (UCID) capability for every call in a DEFINITY call center customer environment. UCID provides a unique identifier (8-byte binary or 20-character ASCII) to allow for uniform data-tracking for all call-related data in a call center, regardless of the system. Also, available is the User-to-User Information element (UUI), which allows for the customer to specify additional information to be passed in external function arguments. For more information about these features, see *LINCS Server Application Development with Advanced Methods*, 585-313-214.

PRI Provisioning

Supported B-channel capacities in PRI configurations are switch dependent (see). Not all switches support all configurations. For example, the 5ESS switch only supports the 23 B+D configuration, but the 4ESS switch can support up to 311 B+D. See the *LINCS Server System Description*, 585-313-209, for information on supported PRI configurations.

Special parameter provisioning of PRI is required on the switch, but is not part of the normal order process for AT&T PRI network services. Thus, give special attention to the determination and provisioning of these parameters when ordering and implementing this feature.

In addition, the LINCS server uses some Layer 2 and Layer 3 parameters that must be correct and matching in both machines. Table 5 and show how to set these parameters on the switch. See *LINCS Server New System Installation*, 585-313-127, for additional provisioning information.

You should provision incoming calls to the server so that the channel number is exclusive and not preferred. Also, if the switch is configured to deliver ANI on a subscription basis, it is not possible for the system to request a different type of ANI on a call-by-call basis.

Table 5.   PRI Layer 2 Parameters

Parameter	**Value**
Retry Count N200	3
Timer T200	1 sec
Timer T203	30 sec
High-level data link control or HDLC (D4/ZCS)	Inverted
HDLC (ESF/B8ZS)	Noninverted

Table 6.   PRI Layer 3 Parameters

Parameter	Value
Timer T302[*]	15 sec
Timer T303*	4 sec
Timer T304*	30 sec
Timer T305*	4 sec
Timer T308*	4 sec
Timer T309*	30 sec
Timer T310*	10 sec
Timer T313*	4 sec
Timer T316*	120 sec
Timer T3M1*	120 sec
Interface ID (with D-channel)	1
Interface ID (without D-channel)	2 - 13
Bearer capability	64 Kbps voice

* All timers are adjustable as described in the **/vs/man/cat4/pri.rc.4** file

PRI Switch Integration and Administration

Switch integration for the PRI feature is done using the Digital Interfaces screen. This screen is described in Chapter 5, "Switch Interface Administration," of *LINCS Server Administration*, 585-313-507. You must select ISDN-PRI Layer 1 Protocol from the Digital Interfaces screen.

To assign PRI functionality to a T1 circuit card, refer to Chapter 5, "Switch Interface Administration," of *LINCS Server Administration*, 585-313-507.

Understanding B-Channel and D-Channel

LINCS Server Administration, 585-313-507The D-channel cannot be used to run applications. It carries messages between the switch and the system. These messages are used to control the state of calls on all the other PRI channels.

All the other PRI channels are referred to as B (bearer) channels. The B-channels provide two-way audio channels to run applications. Therefore, on a PRI that has been configured to have only one T1 circuit card, the first 23 channels (B-channels) on that card can be used to run applications. The 24th channel (D-channel) is reserved for call control. If your PRI is configured with more than one T1 card, the additional T1 cards (the ones configured without a D-channel) will have 24 B-channels on which to run applications, unless the system has more than one T1 card configured to have a D-channel. The system can run applications on a total of 311 B-channels (that is, 13 T1 cards).

Note: To provide acceptable performance, only 144 B-channels can be used for incoming calls; the rest of the channels must be used for outgoing bridged calls.

Determining the D-Channel

If you do not know which channels have the D-channels, perform the following procedure. Refer to Chapter 3, "Voice System Administration," of *LINCS Server Administration*, 585-313-507, for more information.

1 Begin at the Administration menu, and select the following sequence:

```
> Voice System Administration

    >Configuration Management

        >Equipment
```
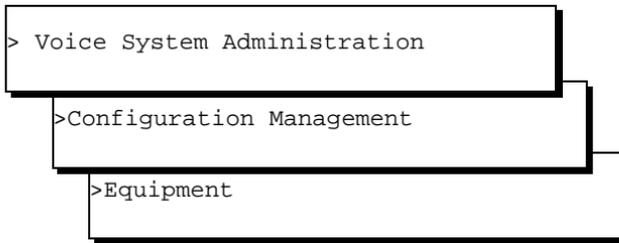
The system displays the Voice Equipment screen showing a list of all channels in the system.

2 Use the ▲ and ▼ cursor keys to scroll through the list of channels.

The D-channels are the only channels that are labeled "*PRID*" in the **TYPE** column. B-channels are labeled *PRIB*.

Once you know which channels have the D-channel, you are ready to bring the PRI into service to allow it to begin taking calls. Change the state of all PRI channels to *INSERV* using the steps described in Chapter 3, "Voice System Administration," of *LINCS Server Administration*, 585-313-507.

Display the Options field to see with which D-channel group the card is associated (PRI1, PRI2, etc.) and whether it has a D-channel (DCHAN).

PRI Application Development Issues

The following are PRI application development issues for script language and the IRAPI.

Script Language Several capabilities are available to implement the PRI feature in TSM script language applications.

• The **tic** instruction is used for basic control of incoming and outgoing calls on the PRI. The **tic('C')** and **tic('O')** instructions provide additional return code information over the T1 interface implementations.

The following additional script registers apply to PRI:

~ IE.ANI – Calling party number

~ IE.DNIS – Called party number

~ IE.REDIRECTING – Originally dialed number

~ IE.SERVICE – Incoming service type

- The **setattr** instruction can be used to request the Calling Party Number (CPN) from the network before starting the script.

- The **setstring** instruction can be used to send a CPN on an outbound call.

- The **setparam** instruction can be used to specify an outbound service type or bearer capability on an outbound call.

For additional information about integrating the PRI feature using TSM script language, see Chapter 3, "TAS Script Instructions," of *LINCS Server Application Development with Advanced Methods*, 585-313-214.

Response API The **irCall()**, **irAnswer()**, **irDial()**, and **irDisconnect()** functions provide the basic call control capabilities for T1 interfaces. The **irFlash()** and **irStartSpeechED()** function is not supported for PRI interfaces. The **irSetIE()** and **irGetIE()** can be used to set and get information elements available only with PRI. See Chapter 5, "IRAPI," of *LINCS Server Application Development with Advanced Methods*, 585-313-214, for more information about these functions when developing IRAPI applications.

2 Call Classification Analysis

Overview

This chapter describes the use of call classification analysis (CCA) and the benefits it provides in digital communications. It also details requirements for implementing this feature and suggested values for telephony parameters when using this feature.

What is CCA?

CCA allows application developers to classify the disposition of originated and transferred calls. There are two types of CCA:

- Intelligent — This type of call classification supports call transfers and call bridges. It uses the signaling and tone-detection capabilities of the network interface card that is being used. Intelligent CCA is intended only for use on outbound calls that terminate on the switch or PBX to which the LINCS server is connected.

- Full — This type of call classification provides enhanced capabilities to intelligent call classification. These capabilities include better answer detection, busy and audible ring tone detection, modem tone detection, etc. Full CCA is offered as an optional feature package. It should be used when outbound calls will terminate beyond the local switch or PBX.

Note: Full CCA is used only in the United States and Canada.

CCA Provisioning

Full CCA requires at least one speech and signal processor (SSP) circuit card to be installed and operational prior to loading the Full CCA software. The SSP circuit card must be dedicated to call classification (see CCA Administration on page 33) and connected to the TDM bus. See "Replacing and Installing Circuit Cards" in the *LINCS Server Maintenance*, 585-313-126, for information on installing the SSP circuit card.

Intelligent CCA on T1 or Primary Rate Interface (PRI) digital lines provides answer and disconnect supervision only.

If you require detection of call progress tones with T1 (E&M) or PRI, you must install Full CCA.

Note: Full CCA is not recommended for use with E1 (CAS) or for use with protocols typically used outside the United States and Canada.

CCA Administration

You must assign CCA functionality to the SSP circuit card for the CCA feature to operate properly. See Chapter 3, "Voice System Administration," of *LINCS Server Administration,* 585-313-507, for the procedure to change the state of the SSP circuit card.

CCA Application Development Issues

This section covers general development issues with CCA and specific issues dealing with the use of CCA and script language and Intuity Response Application Programming Interface (IRAPI) development issues with CCA.

General Issues

An error is generated if a script attempts to use Full CCA and the maximum number of CCA instances are running. The maximum number of CCA instances allowed on the SSP circuit card is 24. No further attempts to use Full CCA are made after the error is logged. See the system message TSM003 in Chapter 4, "Alarm and Log Messages," in LINCS Server *System Reference*, 585-313-210, for more information.

Script Language

The following instructions invoke Full CAA through script language:

• **setcca**

• **tic**

This section gives a brief discussion of these two instructions. For detailed information, see Chapter 3, "TAS Script Instructions," and Appendix B, "Summary of TAS Script Instructions," of *LINCS Server Application Development with Advanced Methods*, 585-313-214.

setcca The **setcca** script instruction allows the application developer to set CCA parameters at the script level. These parameters specify the following:

- Whether to use intelligent or Full CCA

- The number of rings to wait for an answer

- Whether to use answer detection or speech-energy detection

tic The **tic** instruction specifies additional call dispositions for Full CCA if Full CCA is turned on via the **setcca** instruction.

IRAPI

The **irSetParam(3irAPI)** function can be used to set the IRP_OUTCALL_CCALEVEL to IRD_FULL_CCA. This parameter enables Full CCA on a channel for subsequent **irCall(3irAPI)** and **irDial(3irAPI)** function calls.

CCA Example

The following example is an excerpt from a script showing how an application developer might use the **setcca** and **tic** instructions in a Full CCA application.

```
setcca(im.1,im.10,im.-1)
nextcall:
dbase( .... )   /* get number to dial from DIP */

tic('O', r.3)   /* call number in register 3 */

jmp(r.0 == im.'N', noAns)   /* no answer after 10 rings */
jmp(r.0 == im.'B', busy)
jmp(r.0 == im.'F', retry)
jmp(r.0 == im.'A', answer)
jmp(r.0 == im.'s', SIT)
jmp(r.0 == im.-4, noResource)

noAns:
tic('h')   /* put line on-hook to stop ringing */

busy:
dbase ( .... )   /* report result to controlling DIP */
goto (nextcall)

SIT:
jmp(r.1 == im.'R', retry)
jmp(r.1 == im.'r', retry)
```

```
jmp(r.1 == im.'K', retry)
jmp(r.1 == im.'k', retry)
dbase ( .... )    /* report result to controlling DIP */

answer:
talk("Hello, you may be the winner of a free trip to Hawaii")
dbase ( .... )    /* report result to controlling DIP */
goto (nextcall)
```

3 Data Network Communications

Overview

The following data network communication interfaces are available for use in conjunction with the LINCS server software:

- TCP/IP
- SQL*NET

This chapter provides information on each of these packages, including the configuration and administration procedures.

TCP/IP Communications

Transmission Control Protocol/Internet Protocol (TCP/IP) is a process-to-process protocol. The IP component dispatches information around the network, and the TCP component assures that information's accuracy. TCP/IP within the LINCS server system provides high-speed data transmission over an Ethernet.

There are three areas that you must address when using TCP/IP protocol with the LINCS server.

- Current network topology — See .

- Application structure — See .

- Software installation — See "Installing the Optional Feature Software," in *LINCS Server Maintenance*, 585-313-126.

See *Network Administration* for additional information on TPC/IP protocol. See the *SQL*NET TCP/IP User's Guide* for additional information on using SQL*NET TCP/IP.

Network Architecture

UnixWare includes an implementation of the TCP/IP protocol. The package has been internetworked successfully by Lucent Technologies and others with a wide variety of TCP/IP networks. Given this standard and compliant implementation, there is no reason that a LINCS server running this software cannot be connected successfully to a standard, compliant TCP/IP network.

shows the layering of TCP/IP over Ethernet in the context of the first four layers of the OSI Reference Model. This figure illustrates that the styles of networking differ at the physical and link layer only. The network layer and above are the same, regardless of the physical and link layer.
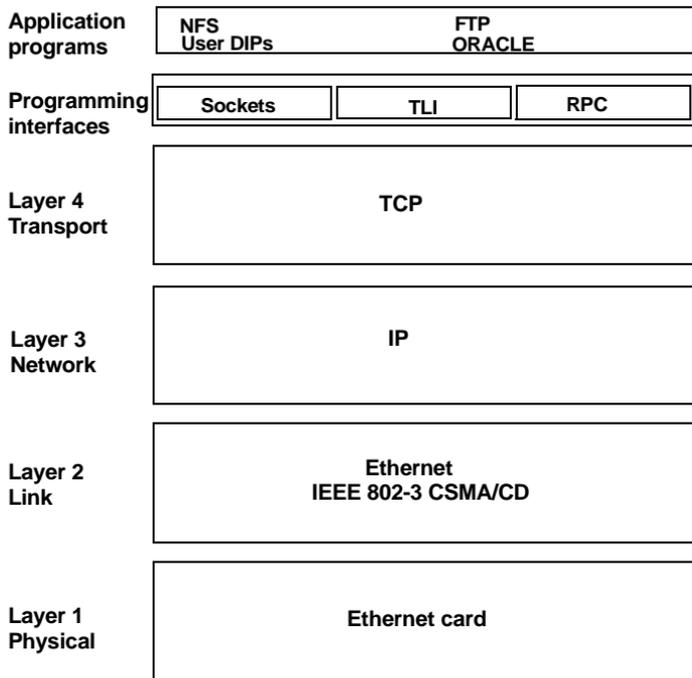
Some standard networking utilities are available with UnixWare. These utilities are used to network the LINCS server with other machines without developing a custom application interface. These utilities include:

- **rcp** — Allows a user to copy files to and from a remote machine.

- **rlogin** — Allows a user to log in to a remote machine from a local machine.

- **ftp** — Transfers files to and from a remote network.

- **telnet** — Enables terminal and terminal-oriented processes to communicate on a TCP/IP network.

See UnixWare network administration book for additional information about standard networking utilities.

Sockets, TLI, and RPC are alternative and equivalent application programming interfaces to the network. Sockets was introduced as part of the UNIX systems 4.2BSD. Almost every implementation of TCP/IP for UNIX includes a sockets interface. TLI was released with AT&T UNIX R3. It offers a streams-based interface to the transport layer. As a streams interface, it offers a measure of portability from one protocol suite to another. RPC is a remote procedure call interface. This implementation of TCP/IP offers a Sockets, a TLI, and an RPC interface.

Figure 8.   Network Layering

Application programs	NFS FTP User DIPs ORACLE
Programming interfaces	Sockets | TLI | RPC
Layer 4 Transport	TCP
Layer 3 Network	IP
Layer 2 Link	Ethernet IEEE 802-3 CSMA/CD
Layer 1 Physical	Ethernet card

Application Development Issues

Typically, an LINCS server is added to a network that is already in place. Adding a LINCS server to your network allows you to use information from the network in a custom application. You must first determine if the information you want is available through the standard UnixWare utilities (for example, **rcp**, **rlogin**, **ftp**) or whether a custom process is necessary. See the UnixWare network administration book for additional information about the standard network utilities.

If it is necessary to write a custom program, you may also write a data interface process (DIP) to access the program. See *LINCS Server Application Development with Advanced Methods,* 585-313-214. When writing the DIP, you must use the Sockets, TLI, or RPC application programming interface (see *NFS/RPC/NIS Administration*).

It is also possible to use sockets, TLI, or RPC with an Response Application Programming Interface (IRAPI) application. Care must be used to determine who the process should block. See Chapter 5, "IRAPI," of *LINCS Server Application Development with Advanced Methods*, 585-313-214, for information.

Provisioning TCP/IP

The following sections detail the network addressing and hardware and software requirements for the TCP/IP protocol.

Network Addressing

TCP/IP allows each machine on the network to be "addressed" so that it can be distinguished from other machines. Every host on the network must have a unique network address. The addresses consist of four decimal integers each separated by a dot (.). Three different classes of addresses are possible with the TCP/IP protocol. The default network uses a class A address. However, if you want to assume responsibility for maintaining the network database files, other network architectures are possible.

See TCP/IP administration in the UnixWare Documentation Set, for additional information on setting up the network.

Hardware Requirements

Using the TCP/IP protocol on the LINCS server requires an Ethernet interface. The LINCS server supports two LAN connections:

- Interface that is integrated into the SBC

- LAN PMC (PCI Mezzanine Card). This card plugs onto a mezzanine card position on the IOB (the card attached to the SBC and together with the SBC makes up the CPU Complex)

Both LAN connections support either 10BaseT or 100BaseT.

See Chapter 2, "Installing and Replacing Circuit Cards," in *LINCS Server Maintenance*, 585-313-126, for information on installing the hardware needed to support TCP/IP.

Software Requirements UnixWare 2.1 must be installed on the LINCS server to use TCP/IP protocol. The drivers (Ethernet) are included on the Base LINCS UnixWare CD-ROM and should be configured properly.

SQL*NET Communications

SQL*NET is the ORACLE communications component that allows the LINCS server to share information stored in different remote ORACLE databases. With SQL*NET, you can run an ORACLE tool or another application on the LINCS server and be able to find, manipulate, and store data in an ORACLE database located on another machine.

For additional information on ORACLE SQL*NET communications, see ORACLE SQL*NET TCP/IP documentation on the *ORACLE Product Documentation Library Release 1.0.16* CD-ROM, 585-310-920.

A **Transmission Level Adjustment**

Transmission Level Plan

A Transmission Level Plan (TLP) for a piece of telecommunications equipment is a set of specifications dictating the incoming/outgoing speech volume levels that pass through the equipment and the hardware and software tools for implementing those specifications. The specifications take into account the level plans of the various telephone network interfaces to which the equipment will connect. The goal of the plan is to ensure that all speech heard by a caller be at a level that is appropriate for listening without causing oscillations or distortions in the network.

Network-Interface Hardware
The LINCS server connects to digital telephone network facilities (T1/E1).

The LINCS server default TLP is partially based on the facs that the system's T1/E1 interface circuit cards have a gain of 0 dB built into the hardware interface.

Typical Network TLP Characteristics

The T1/E1 network facilities have typical TLP characteristics associated with them. The system default TLP is partially based on the following typical network TLP characteristics:

- The system default TLP assumes a nominal 0-dB gain in each digital trunk connected to any T1/E1 card in the system.

Incoming and Outgoing Speech Volume Nonbridging Modes

When a voice signal enters a Intuity CONVERSANT system in a nonbridged connection, it is usually going to be coded and stored in the speech filesystem of the machine. Before it is coded, its incoming volume can be adjusted by the IVOL parameter.

By default, all coding modes are subjected to an automatic gain control (AGC) after the IVOL is applied. The AGC is used to maintain a proper recording level. AGC attenuates signals that would otherwise be too loud and amplifies signals that would otherwise be too quiet. For this reason, small adjustments of IVOL have little impact when AGC is active. It may, however, be necessary to increase IVOL if the input is so low the AGC takes it to be silence. (Such input the AGC treats as background noise and, for the listener's comfort, does not pass it. Consequently, input that is too low may be cut off and short phrases may be completely missing.)

When a voice signal stored in the speech file system is played back from a LINCS server to a caller, its outgoing volume can be adjusted by the OVOL parameter.

The Digital Interfaces screen allows the user to adjust both the incoming and outgoing speech volume for digital (T1/E1) network interfaces. The digital IVOL and OVOL parameters apply to T1/E1 circuit cards on a per-card basis.

IVOL and OVOL should be thought of as volume multipliers (that is, +/- gain) of the incoming/outgoing signal. A value of 1000 for IVOL or OVOL is equivalent to multiplying the incoming or outgoing signal volume by 1, that is, *unity gain*. Each multiplication of the current IVOL or OVOL setting by a factor of 0.707 results in a signal volume gain of -3 dB from the current volume (s volume of 3 dB lower); each multiplication of the current IVOL or OVOL setting by a factor of 1.414 results in a signal volume gain +3 dB from the current volume (s volume of 3 dB higher).

Note: IVOL and OVOL affect only signals being coded or played back by the LINCS server. They do not affect end-to-end conversations in call bridge mode, DTMF or CPT tone detection, or speech recognition.

The following list shows the IVOL and OVOL settings required to implement the default TLP along with the actual gain in decibels (shown in parenthesis) that each setting represents.

- Digital
  - ~ IVOL — 1414(+3)
  - ~ OVAL — 707(-3)
- Text-to-Speech (TTS)
  - ~ OVOL — 1000 (The TTS OVOL is an option only when the TTS package is installed)

Voice Coding and Play
As described above, most switches build in some loss in a typical station-set-to-station-set connection. With the system in a nonbridging mode, station-set-to-station-set connection actually involves a signal being affected by IVOL while it is coded and stored on the disk, then affected by OVOL when it is played back. To be in accordance with the TLP, the level the caller hears during playback should be somewhat lower than the level that was spoken when the signal was coded. See for considerations used to determine proper input and output volume.

Voice Coding

shows an example of how the IVOL parameters control the level at which a voice signal is coded and stored in the system speech filesystem. The levels in illustrate the interaction between a switch and the CONVERSANT system.

Note: The actual default IVOL is +12 dB rather than the +6 shown in . The +12 dB level reduces the chance of low input volume levels being recorded as silence. Automatic gain control (AGC) makes it unlikely that the higher input volume will cause clipping or other distortion. See .

The top part of Figure 9 shows a T1/E1 interface connected to the system. As you follow the signal from left to right, if the initial spoken level is 0 and all typical network TLP characteristics listed above are true, the coded level that is stored in the speech filesystem will always be zero (0), regardless of which type of network interface is connected to the LINCS server.

**Figure 9.   Effect of IVOL Parameters on Voice Coding**
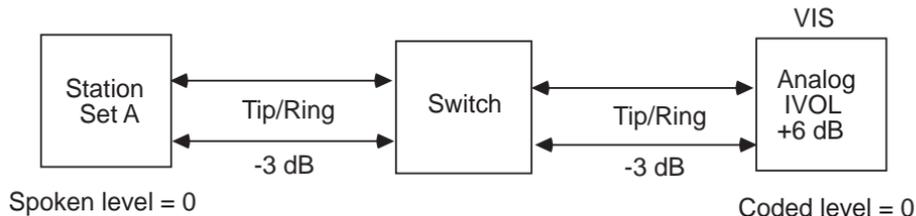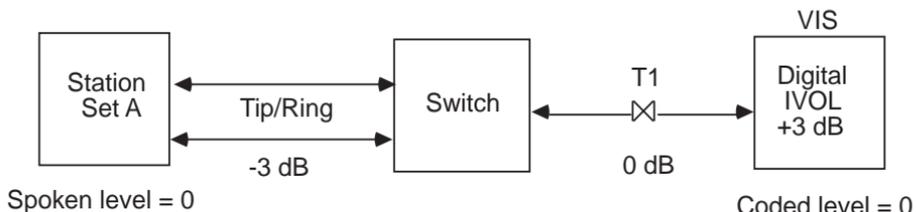
Voice Play

Figure 10 on page 52 shows how the default OVOL parameters control the level at which a previously coded voice signal stored in the speech filesystem is played back.

The top part of Figure 10 on page 52 shows a T1 interface connected to the system. As you follow the signal from right to left, if the signal was coded in the manner depicted in Figure 9 on page 50, the initial playback level is 0. If all typical network TLP characteristics listed above are true, the level heard at the station set is always -6, regardless of which type of network interface is connected to the system. Since the initial spoken level shown in Figure 9 on page 50 was 0, the heard level of -6 is in accordance with the LINCS server TLP.

Figure 10.   Effect of OVOL Parameters on Voice Play
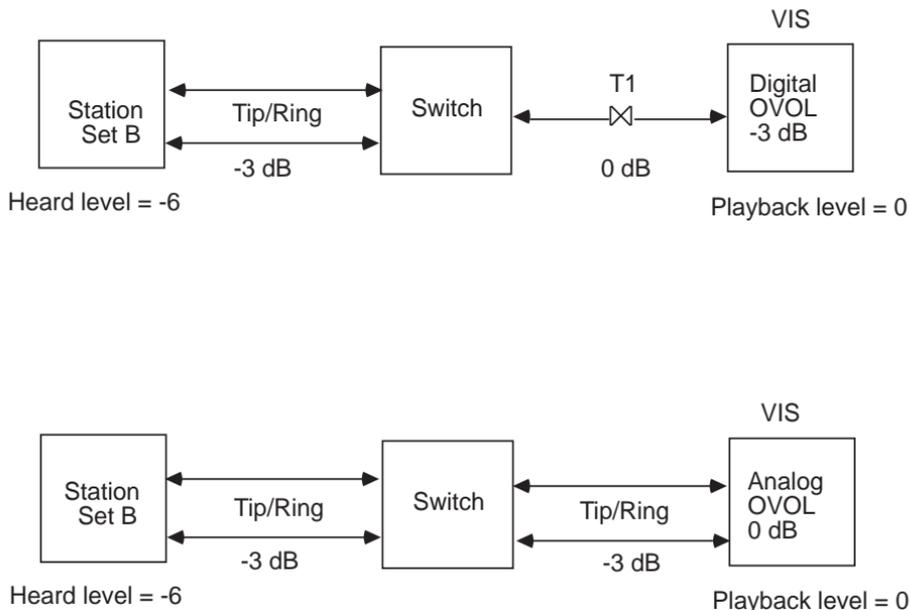
Reasons for Deviating from the Default IVOL and OVOL Settings

For most applications, the default TLP provides callers with appropriate speech volume levels for prompts that were coded as shown in Figure 9 on page 50.

In many cases, however, speech prompts are coded in a studio at higher volumes than they would have been coded from a system network interface. In these situations, it may be desirable to decrease the applicable OVOL parameter to decrease the volume the caller actually hears. Note that if the system is used to code speech that will be played back with the prerecorded speech, you should increase IVOL by the same amount that you decrease OVOL to ensure that speech is coded at the same level.

Also, some network lines and/or trunks do not abide by the typical network characteristics listed above. For example, some T1 trunks actually have insertion loss in the network. This loss can be compensated for by increasing the corresponding IVOL and OVOL parameters by an amount equal to the additional insertion loss. For example, if the digital trunks connected to a system had insertion loss of -3 dB instead of 0 associated with them as the default LINCS server TLP assumes, the default digital IVOL and OVOL parameters could be changed to 2000 and 1000, respectively. This would have the effect of adding a gain of +3 dB to the incoming signal before coding, and adding a gain of +3 dB to the outgoing signal before playback. Making these changes results in meeting the TLP goal of -6 dB gain from end to end.

If the IVOL is set too low, phrases may be cut short or may be missing. In such cases the input may be so low the AGC takes it to be silence. (Such input the AGC treats as background noise and, for the listener's comfort, does not pass it. Consequently, input that is too low may be cut short and some phrases may be completely missing.) Try turning up the IVOL to remedy the problem.

If IVOL is set too high, the recorded phrases may be recorded louder than pre-recorded speech or speech heard while connected to a bridge to another person. The AGC generally prevents this from being a problem, but if recorded speech appears to be to loud, try using a lower IVOL setting.

Finally, subjectivity plays a large role in the effectiveness of a TLP. What sounds appropriate to one person may sound inappropriate to another. The default IVOL and OVOL parameters have been carefully selected to provide appropriate volume levels in the majority of applications. It is strongly recommended that you do not change them based on subjective evaluation. However, the flexibility is provided to tune them to whatever suits the needs of the application at hand.

Transmission Level Plan and Call Bridging
When two incoming calls are bridged together by the system, the callers on either end (station set A and station set B) can talk with each other through the system. In such a situation, the previously discussed IVOL and OVOL parameters do not apply. Instead, software on the LINCS server (specifically the TSM process) has built in rules for directing the LINCS server Network Interface cards to insert up to +6 dB gain in either direction of a call bridge connection.

Recall that the LINCS server TLP dictates that there be a gain of -6 dB from station-set-to-station-set. Assuming the typical network TLP characteristics for the network facilities (as discussed in), shows the amount of gain (in dB) that is automatically inserted in each direction for each of the four possible call bridging scenarios.

shows digital-to-digital (T1-to-T1) call bridging.

Figure 11. Digital-to-Digital Call Bridging
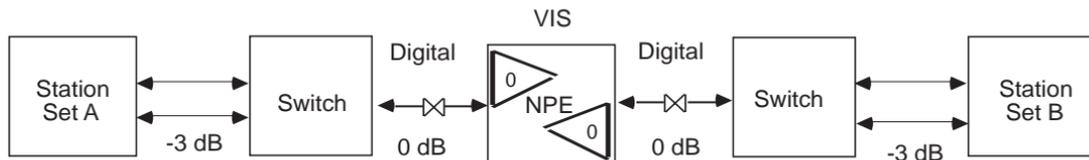
Possible Exceptions to the CONVERSANT System TLP

When a LINCS server is used as a network adjunct within the network, some changes to the default TLP settings are recommended to ensure optimal speech volume and clarity. Similar conditions may apply to commercial customers providing voice-response services that are primarily accessed via the long distance network.

Note: Customers should check with their switch and/or network services provider before deviating from the CONVERSANT system TLP.

In addition to the 6-dB end-to-end loss described above, the FCC requires that the local exchange carrier (LEC) insert a 6-dB loss as signals leave the long distance network. AT&T TrueVoice® feature adds up to a gain of 4 dB as low volume level signals leave the network. This partially compensates for the loss of the 6 dB that the LEC is required to insert.

Within the AT&T network, network recordings and announcements (and operator speech) should be presented at a volume level of -21 dBm0 at the AT&T Point of Presence. If recordings and announcements are recorded at a volume level that is too high, the calling party is likely to hear distortion. This distortion is due to the clipping that occurs when high volume levels exceed the capability of the network to represent the signal. Clipping can occur at -13 dBm0. Excessive volume levels on prerecorded speech is one of the most frequent causes of hearing distortion.

Within the AT&T network, all trunks and bridges should insert zero gain so that the volume level remains as -21 dBm0 throughout the AT&T network.

When the system is being used as a network adjunct and digital trunks are used, it is recommended that IVOL and OVOL settings be set to the non-default value of 1000 (for zero gain and that prerecorded speech be recorded at -21 dBm0. By using zero gain, the CONVERSANT system being used as the network adjunct may avoid introducing another digital signal transformation that contributes to the distortion heard by users of the network.

When the quality of speech is more important than minimizing space usage (as for most prerecorded announcements and prompts), encode the speech using 64 Kbps PCM rather than 32 Kbps ADPCM.

When the highest quality speech is required, ISDN PRI may provide slightly better sound quality than T1 E&M robbed-bit signaling (see Chapter 2, "Digital Telephony Interfaces), where the least significant bits rather than voice data are used for signaling. However, the difference in sound quality is not the only advantage to using ISDN PRI.

Calculating Volume Settings

This section offers a method for calculating the volume settings just described. The same method applies for calculation of IVOL and for OVOL. The method applies to speech and signal processor (SSP) circuit cards.

Calculation of volume settings for the LINCS server is very similar to calculation of relative voltage levels. So that volume settings take the form of integers, however, the equation is calculated relative to the (arbitrary) constant of 1000 rather than to a second voltage:

$$dB = 20\log\frac{Vol}{1000}$$

To calculate a setting where the volume level to be set is known and is expressed in decibels, the required setting becomes relative to the inverted log (or antilog) of 10:

$$\text{Vol} = 1000 \times 10^{(dB \div 20)}$$

Using this formula, the formula for the setting required to get an OVOL level of -3dB would look like:

$$\text{OVOL} = 1000 \times 10^{(-3 \div 20)}$$

which becomes: $\text{OVOL} = 1000 \times 10^{-0.15}$ or: $\text{OVOL} = (1000 \times 0.707) = 707$.

The setting would be 707.

sets out the results of this calculation in 3-dB increments from -21 dB to 21 dB.

Table 7.   Loss and Gain Settings

dB Loss	Setting	dB Gain	Setting
0 dB	1000	0 dB	1000
-3 dB	707	3 dB	1412
-6 dB	501	6 dB	1995
-9 dB	354	9 dB	2818
-12 dB	251	12 dB	3981
-15 dB	177	15 dB	5623
-18 dB	125	18 dB	7943
-21 dB	89	21 dB	11220

Numerics

23B+D

23 bearer (communication) and 1 data (signaling) channel on a T1 PRI circuit card.

30B+D

30 bearer (communication) and 1 data (signaling) channel (plus framing channel 0) on an E1 PRI circuit card.

47B+D

47 bearer (communication) and 1 data (signaling) channel on two T1 PRI circuit cards.

4ESS®

A large Lucent central office switch used to route calls through the telephone network.

5ESS®

A Lucent electronic switching machine used to route calls through the telephone network or private branch exchange.

A

AC

alternating current

ACD

automatic call distributor

AD

application dispatch

AD-API

application dispatch application programming interface

adaptive differential pulse code modulation

A means of encoding analog voice signals into digital signals by adaptively predicting future encoded voice signals. This adaptive modulation method reduces the number of bits required to encode voice. See also pulse code modulation.

adjunct products

Products (for example, the Adjunct/Switch Application Interface) that the system administers via cut-through access to the inherent management capabilities of the product itself; this is in opposition to the ability of the system to administer the switch directly.

ADPCM

adaptive differential pulse code modulation

ADU

asynchronous data unit

advanced speech recognition

A speech recognition ability that allows the system to understand WholeWord and FlexWord™ inputs from callers.

affiliate

A business organization that Lucent controls or with which Lucent is in partnership.

AGL

application generation language

ALERT

System alerter process

alerter

A system process that responds to patterns of events logged by the "logdaemon" process.

American Standard Code for Information Interchange

A standard code for data representation that represents alphanumeric characters as binary numbers. The code includes 128 upper- and lowercase letters, numerals, and special characters. Each alphanumeric and special character has an ASCII code (binary) equivalent that is 1 byte long.

analog

An analog signal, such as voice or music, that varies in a continuous manner. An analog signal may be contrasted with a digital signal, which represents only discrete states.

ANI

automatic number identification

announcement

A message the system plays to the caller to provide information. The caller is not asked to give a response. Compare to prompt.

API

Application programming interface

application

The automated transaction (interactions) among the caller, the voice response system, and any databases or host computers required for your business.

application administration

The component of the system that provides access to the applications currently available on your system and helps you to manage and administer them.

application verification

A process in which the system verifies that all the components needed by an application are complete.

ASCII

American Standard Code for Information Interchange

ASI

analog switch integration

ASR

advanced speech recognition

asynchronous communication

A method of data transmission in which bits or characters are sent at irregular intervals and spaced by start and stop bits rather than by time. Compare to synchronous communication.

asynchronous data unit

An electronic communications device that allows computer systems to communicate over asynchronous lines more than 50 feet (15 m) in length.

automatic call distributor

That part of a telephone system that recognizes and answers incoming calls and completes these calls based on a set of instructions contained in a database. The ACD can send the call to an operator or group of operators as soon as the operator has completed a previous call or after the system has played a message to the caller.

automatic number identification

A method of identifying the calling party by automatically receiving a string of digits that identifies the calling station of a particular customer.

B **back up**

The preservation of the information in a file in a different location, so that the data is not lost in the event of hardware or system failure.

backing up an application

Using a utility that makes an archive copy of a completed application or an interim copy of an application in progress. The back-up copy can be restored to the system if the on-line version is damaged, or if you make revisions and want to go back to the previous version.

barge-in

A capability provided by WholeWord and FlexWord speech recognition and Dial Pulse Recognition (DPR) that allows callers to speak or enter their responses during the prompt and have those responses recognized (similar to the Speak with Interrupt capability). See also echo cancellation.

batch file

A file containing one or more lines, each of which is a command executable by the UNIX shell.

BB

bulletin board

blind transfer protocol

A protocol in which a call is completed as soon as the extension is dialed, without having to wait to see if the telephone is busy or if the caller answered.

bps

bits per second

BRDG

call bridging process

bridging

The process of connecting one telephone network connection to another over the system TDM bus. Bridging decreases the processing load on the system since an active bridge does not require speech processing, database access, host activity, etc., for the transaction.

bundle

In the context of the Enhanced File Transfer package, this term is used to denote a single file, a group of files (package), or a combination of both.

byte

A unit of storage in the computer. On many systems, a byte is 8 bits (binary digits), which is the equivalent of one character of text.

C call classification analysis

A process that enables application designers to use information available within the system to classify the disposition of originated and transferred calls. CCA is an optional feature package.

call data event

A parameter that specifies a list of variables that are appended to a call data record at the end of each call.

call data handler process

A software process that accumulates generic call statistics and application events.

called party number

The number dialed by the person making a telephone call. Telephone switching equipment can use this number to selectively route an incoming call to a particular department or agent.

caller

The party who calls for a service, gets connected to the system, and interacts with it. As the system can also make outbound calls for service, the caller can also be the person who responds to those outbound calls.

call flow

See transaction.

call progress tones

Standard telephony sounds that indicate the status of the call. These sounds include busy, fast busy, ringback, reorder, etc.

card cage

An area within a hardware platform that contains and secures all of the standard and optional circuit cards used in the system.

cartridge tape drive

A high-capacity data storage/retrieval device that can be used to transfer large amounts of information onto high-density magnetic cartridge tape based on a predetermined format. This tape can be removed from the system and stored as a backup, or used on another system.

CAS

channel associated signalling

caution

An admonishment or advisory statement used in the system documentation to alert the user to the possibility of a service interruption or a loss of data.

CCA

call classification analysis

CDH

call data handler process

CELP

code excited linear prediction

central office

An office or location in which large telecommunication devices such as telephone switches and network access facilities are maintained. These locations follow strict installation and operation requirements.

central processing unit

See processor.

CGEN

Voice system general message class

channel

See port.

channel associated signaling

A type of signaling that can be used on E1 circuit cards. It occurs on channel 16.

circuit card upgrade

A new circuit card that replaces an existing card in the platform. Usually the replacement is an updated version of the original circuit card to replace technology made obsolete by industry trends or a new system release.

cluster controller

A bisynchronous interface that provides a means of handling remote communication processing.

CO

central office

code excited linear prediction

A means of encoding analog voice signals into digital signals that provides excellent quality with use of minimum disk space.

command

An instruction or request the user issues to the system software to make the system perform a particular function. An entire command consists of the command name and options.

configuration

The arrangement of the software and hardware of a computer system or network. The system configuration includes either a standard or custom processor, peripheral equipment (for example, printers and modems), and software applications. Configuration also refers to the way the switch network is set up; that is, the types of products that are in the network and how those products communicate.

configuration management

The component of the system that allows you to manage the current configuration of voice channels, host sessions, and database connections, assign scripts to run on specific voice channels or host sessions, assign functionality to SSP and E1/T1 circuit cards, and perform various maintenance functions.

connect and disconnect (C and D) tones

DTMF tones that inform the system when the attendant has been connected (C) and when the caller has been disconnected (D).

connected digits

A sequence of digits that the system can process as a group, rather than requiring the caller to enter the digits one at a time.

controller circuit card

A circuit card used on a computer system that controls its basic functionality and makes the system operational. These circuit cards are used to control magnetic peripherals, video monitors, and basic system communications.

copying an application

A utility in which information from a source application is directed into the destination application.

coresidency

The ability of two products or services to operate and interact with each other on a single hardware platform.

CPE

customer provided equipment or customer premise equipment

CPN

called party number

CPT

call progress tones

CPU

central processing unit

CPU Complex

The processor for the LINCS server consisting of a single-board computing circuit card and an I/O companion board (SBC/IOB). The CPU complex is also used in other compactPCI platforms.

crash

An interactive utility for examining the operating system core and for determining if system parameters are being exceeded.

CSU

channel service unit

custom speech

Unique words or phrases to be used in system voice prompts that Lucent Technologies custom records on a per-customer basis.

custom vocabulary

A specialized package of unique words or phrases created on a per-customer basis and used by WholeWord or FlexWord speech recognition.

CVS

converse vector step

D **danger**

An admonishment or advisory statement used in system documentation to alert the user to the possibility of personal injury or death.

data interface process

A software process that communicates with Script Builder applications.

database

A structured set of files, records, or tables.

database field

A field used to extract values from a local database and form the structure upon which a database is built.

database record

The information in a database for a person, product, event, etc. The database record is made up of individual fields for each information item.

database table

A structure, made up of columns and rows, that holds information in a database. Database tables provide a means of storing information that changes too often to "hard-code," or store permanently, in the transaction outline.

dB

decibel

DB

database

DBC

database checking process

DBMS

database management system

DC

direct current

DCE

data communications equipment

DCP

digital communications protocol

debug

The process of locating and correcting errors in computer programs; also referred to as troubleshooting.

default

The way a computer performs a task in the absence of other instructions.

default owner

The owner of a channel when no process takes ownership of that channel. The default owner holds all idle, in-service channels. In terms of the IRAPI, this is typically the Application Dispatch process.

diagnose

The process of performing diagnostics on a bus or on Tip/Ring, E1/T1, or SSP circuit cards.

dial ahead

The ability to collect and process touch-tone inputs in sequence, even when they are received before the prompts.

dial pulse recognition

A method of recognizing caller pulse inputs from a rotary telephone.

dialed number identification service

A service that allows incoming calls to contain information about the telephone number for which it is destined.

dial through

A capability provided by touch-tone and dial pulse recognition that allows callers to enter their responses during the prompt and have those responses recognized (similar to the Speak with Interrupt capability). See also barge-in and echo cancellation.

DIO

>   disk input and output process

DIP

>   data interface process

directory

>   A type of file used to group and organize other files or directories.

DMA

>   direct memory address

DNIS

>   dialed number identification service

DPR

>   dial pulse recognition

DSP

>   digital signal processor

DTE

data terminal equipment

DTMF

dual tone multi-frequency

DTR

data terminal ready

dual tone multi-frequency

A touch-tone sound that is an audio signal including two different frequencies. *DTMF feedback* is the process of the "switch" providing this information to the system. *DTMF muting* is the process of ignoring these tones (which might be simulated by human speech) when they are not needed for the application.

dump space

An area of the disk that is fixed in size and should equal the amount of RAM on the system. The operating system "dumps" an image of core memory when the system crashes. The dump can be fetched after rebooting to help in analyzing the cause of the crash.

E

E&M

Ear and Mouth

E1 / T1

Digital telephony interfaces, commonly called *trunks*. E1 is an international standard at 2.048 Mbps. T1 is a North American standard at 1.544 Mbps.

Ear and Mouth

A common T1 trunking protocol for connection between two "switches."

EBCDIC

Extended Binary Coded Decimal Interexchange Code

echo cancellation

The process of making the channel quiet enough so that the system can hear and recognize WholeWord, FlexWord, and dial pulse inputs during the prompt. See also barge-in.

editor system

A system that allows speech phrases to be displayed and edited by a user.

EIA

Electronic Industries Association

EISA

Extended Industry Standard Architecture

EMI

electromagnetic interference

Enhanced Basic Speech

Pre-recorded speech available from Lucent Technologies in several languages. Sometimes called standard speech.

error message

A message on the screen indicating that something is wrong with a possible suggestion of how to correct it.

ESD

electrostatic discharge

ESS

electronic switching system

EST

Enhanced Software Technologies, Inc.

ET

error tracker

Ethernet

A name for a local area network that follows IEEE standard 802.3. Supported implementations are 10BaseT and/or 100BaseT.

event

The notification given to an application when some condition occurs that is generally not encountered in normal operation.

EXTA

external alarms feature message class

external actions

Specific predefined system tasks that Script Builder can call or *invoke* to interact with other products or services. When an external action is invoked, the systems displays a form that provides choices in each field for the application developer to select.

Examples are Call_Bridge, Make_Call, SP_Allocate, SR_Prompt, etc. In Voice@Work, external actions are treated as external functions.

external functions

Specific predefined (or customer-created) system tasks that Voice@Work or Script Builder can call or *invoke* to interact with other products or services. The function allows the application developer to enter the argument(s) for the function to act on. Examples are concat, getarg, length, substring, etc. See also external actions.

F FCC

Federal Communications Commission

FDD

floppy disk drive

feature

A function or capability of a product or an application within the system.

feature package

An optional package that may contain both hardware and software resources to provide additional functionality to a standard system.

feature_tst script package

A standard system software program that allows a user to perform self-tests of critical hardware and software functionality.

FEP

front end processor

field

See [database field](#).

FIFO

first-in-first-out processing order

file

A collection of data treated as a basic unit of storage.

file transfer

An option that allows you to transfer files interactively or directly to and from UNIX using the file transfer system (FTS).

filename

Alphabetic characters used to identify a particular file.

FlexWord speech recognition

A type of speech recognition based on subword technology that recognizes phonemes or parts of words in a specific language. See also subword technology.

foos

facility out-of-service state

FTS

file transfer process message class

function key

A key, labeled F1 through F8, on your keyboard to which the system software gives special properties for manipulating the user interface.

G **GEN**

PRISM logger and alerter general message class

grammar

The inputs that a recognizer can match (identify) from a caller.

GUI

graphical user interface

H **hard disk drive**

A high-capacity data storage/retrieval device that is located inside a computer platform. A hard disk drive stores data on nonremovable high-density magnetic media based on a predetermined format for retrieval by the system at a later date.

hardware

The physical components of a computer system. The central processing unit, disks, tape, and floppy drives, etc., are all hardware.

hardware upgrade

Replacement of one or more fundamental platform hardware components (for example, the CPU or hard disk drive), while the existing platform and other existing optional circuit cards remain.

HDD

hard disk drive

hwoos

hardware out-of-service state

Hz

Hertz

IBM

International Business Machines

iCk or ICK

The system integrity checking process.

ID

identification

IDE

integrated disk electronics

idle channel

A channel that either has no owner or is owned by its default owner and is onhook.

IE

information element

IEEE

Institute of Electrical and Electronic Engineers

IND$FILE

The standard SNA file transfer utility that runs as an application under CICS, TSO, and CMS. IND$FILE is independent of link-level protocols such as BISYNC and SDLC.

independent software vendor

A company that has an agreement with Lucent Technologies to develop software to work with the system to provide additional features required by customers.

indexed table

A table that, unlike a nonindexed table, can be searched via a field name that has been indexed.

industry standard architecture

A PC bus standard that allows processors and other circuit cards to communicate with each other.

INIT

voice system initialization message class

initialize

To start up the system for the first time.

inserv

in-service state

Integrated Services Digital Network

A network that provides end-to-end digital connectivity to support a wide range of voice and data services.

intelligent CCA

Monitoring the line after dialing is complete to determine whether a busy, reorder (fast busy), or other failure has been encountered. It also recognizes when the extension is answered or if the extension is not answered after a specified number of rings. The monitoring capabilities are dependent on the network interface circuit card and protocol used.

interface

The access point of a system. With respect to the system, the interface is designed to provide you with easy access to the software capabilities.

interrupt

The termination of voice and/or telephony functions when some condition occurs.

Intuity Response Application Programming Interface

A library of commands that provide a standard development interface for voice-telephony applications.

IOB

I/O companion card to the SBC. This is part of the CPU Complex.

IPC

interprocess communication

IPC

intelligent ports card (IPC-900)

IRAPI

Intuity Response Application Programming Interface

IRQ

interrupt request

ISA

industry standard architecture

ISDN

Integrated Services Digital Network

ISV

[independent software vendor](#)

ITAC

International Technical Assistance Center

K **Kbps**

kilobytes per second

Kbyte

kilobyte

keyboard mapping

In emulation mode, this feature enables the keyboard to send 3270 keyboard codes to the host according to a configuration table set up during installation.

keyword spotting

A capability provided by WholeWord speech recognition that allows the system to recognize a single word in the middle of an entire phrase spoken by a caller in response to a prompt.

L

LAN

local area network

LDB

local database

LED

light-emitting diode

library states

The state information about channel activities maintained by the IRAPI.

LIFO

last-in-first-out processing order

LINCS

Lucent Integrated Network Call Server

line side E1

A digital method of interfacing a system to a PBX or "switch" using E1-related hardware and software.

line side T1

A digital method of interfacing a system to a PBX or "switch" using T1-related hardware and software.

listfile

An ASCII catalog that lists the contents of one or more talkfiles. Each application script is typically associated with a separate listfile. The listfile maps speech phrase strings used by application scripts into speech phrase numbers.

local area network

A data communications network in a limited geographical area. The LAN provides communications between computers and peripherals.

local database

A database residing on the system.

LOG

System logger process message class

logical unit

A type of SNA Network Addressable Unit.

logdaemon

A UNIX system information and error logging process.

logger

See logdaemon.

logging on/off

Entering or exiting the system software.

LSE1

line side E1

LSPS II

Lucent speech processing solutions II circuit card (6UB5)

LST1

line side T1

LU

logical unit

Lucent speech processing solutions II circuit card (6UB5)

A high-performance speech processing circuit card capable of simultaneous support for various speech technologies. In addition to the basic speech-processing features, The LSPS II circuit card provides enhanced Text-to-Speech capabilities and subword recognition for large vocabularies.

M   **magnetic peripherals**

Data storage devices that use magnetic media to store information. Such devices include hard disk drives, floppy disk drives, and cartridge tape drives.

main screen

The system screen from which you are able to enter either the System Administration or Voice System Administration menu.

maintenance process

A software process that runs temporary diagnostics and maintains the state of circuit cards and channels.

manoos

manually out-of-service state

masked event

An event that an application can ignore (that is, the application can request not to be informed of the event).

master

A circuit card that provides clock information to the TDM bus.

Mbps

megabits per second

MByte

[megabyte](#)

megabyte

A unit of memory equal to 1,048,576 bytes (1024 x 1024). It is often rounded to one million.

menu

Options presented to a user on a computer screen or with voice prompts.

MF

multifrequency

MHz

megahertz

ms

millisecond

msec

millisecond

MS-DOS

A personal computer disk operating system developed by the Microsoft Corporation.

MTC

maintenance process

multifrequency

Dual tone digit signalling (similar to DTMF), used for trunk addressing between network switches or by network operators.

multichannel application

A single process/application that controls several channels. Each channel of the application is managed explicitly. Typically this means state information for each channel is maintained and the state of the application on each channel is tracked.

N **NCP**

Network Control Program

NEBS

Network Equipment Building Standards

NEMA

National Electrical Manufacturers Association

netoos

network out-of-service state

non-facility associated signalling

NFS

network file sharing

NM-API

Network Management - Application Programming Interface

NMVT

network management vector transport

nonex

nonexistent state

nonindexed table

A table that can be searched only in a sequential manner and not via a field name.

nonmasked event

An event that must be sent to the application. Generally, an event is nonmaskable if the application would likely encounter state transition errors by trying to it.

null value

An entry containing no value. A field containing a null value is normally displayed as blank and is different from a field containing a value of zero.

O   OEM

original equipment manufacturer

on-line help

Messages or information that appear on the user's screen when a function key (usually F1) is pressed.

option

An argument used in a command line to modify program output by modifying the execution of a command. When you do not specify any options, the command executes according to its default options.

ORACLE

A company that produces relational database management software. It is also used as a generic term that identifies a database residing on a local or remote system that is created and maintained using an ORACLE RDBMS product.

P

PBX

private branch exchange

PC

personal computer

PCB

printed circuit board

PCI

peripheral component interconnect

PCI Mezzanine Card

A PCI module, such as a LAN or RAID controller, that connects to the CPU Complex IOB companion card.

PCM

pulse code modulation

PEC

price element code

peripheral (device)

Equipment such as printers or terminals that is in addition to the basic processor.

peripheral component interconnect

A newer, higher speed PC bus that is gradually displacing ISA for many components.

permanent process

A process that starts and initializes itself before it is needed by a caller.

phoneme

A single basic sound of a particular spoken language. For example, the English language contains 40 phonemes that represent all basic sounds used with the language. The English word "one" can be represented with three phonemes, "w" - "uh" - "n." Phonemes vary between languages because of guttural and nasal inflections and syllable constructs.

phrase filtering (screening)

The rejection of unrecognized speech. The WholeWord and FlexWord speech recognition packages can be programmed to reprompt the caller if the system does not recognize a spoken response.

phrase tag

A string of up to 50 characters that identifies the contents of a speech phrase used by an application script.

platform migration

See platform upgrade.

platform upgrade

The process of replacing the existing platform with a new platform.

pluggable

A term usually used with speech technologies, in particular standard speech, to indicate that a basic algorithmic technique has been implemented to accept one or more sets of parameters that tailors the algorithm to perform in one or more languages.

PMC

PCI Mezzanine Card

poll

A message sent from a central controller to an individual station on a multipoint network inviting that station to send if it has any traffic.

polling

A network arrangement whereby a central computer asks each remote location whether it wants to send information. This arrangement enables each user or remote data terminal to transmit and receive information on shared facilities.

port

A connection or link between two devices that allows information to travel to a desired location. See telephone network connection.

PRI

Primary Rate Interface

Primary Rate Interface

An ISDN term for connections over E1 or T1 facilities that are usually treated as trunks.

private branch exchange

A private switching system, either manual or automatic, usually serving an organization, such as a business or government agency, and usually located on the customer's premises.

processor

In system documentation, the computer on which UnixWare and system software runs. In general, the part of the computer system that processes the data. Also known as the central processing unit.

prompt

A message played to a caller that gives the caller a choice of selections in a menu and asks for a response. Compare to announcement.

pseudo driver

A driver that does not control any hardware.

PSTN

public switch telephone network

pulse code modulation

A digital modulation method of encoding voice signals into digital signals. See also adaptive differential pulse code modulation.

R

RAID

redundant array of independent disks

RAID Array

An assembly of disk drives configured to provide some level of RAID functionality

RAM

random access memory

RDMBS

ORACLE relational database management system

RECOG

speech recognition feature message class

recognition type

The type of input the recognizer can understand. Available types include touch-tone, dial pulse, and Advanced Speech Recognition (ASR), which includes WholeWord and FlexWord speech recognition.

recognizer

The part of the system that compares caller input to a grammar in order to correctly match (identify) the caller input.

record

See database record.

recovery

The process of using copies of the system software to reconstruct files that have been lost or damaged. See also restore.

remote database

Information stored on a system other than your current system that can be accessed by your current system.

REN

ringer equivalence number

reports administration

The component of a system that provides access to system reports, including call classification, call data detail, call data summary, message log, and traffic reports.

restore

The process of recovering lost or damaged files by retrieving them from available back-up tapes or from another disk device. See also "recovery."

restore application

A utility that replaces a damaged application or restores an older version of an application.

reuse

The concept of using a component from a source system in a target system after a software upgrade or platform migration.

RFS

remote file sharing

RM

resource manager

roll back

To cancel changes to a database since the point at which changes were last committed.

rollback segment

A portion of the database that records actions that should be undone under certain circumstances. Rollback segments are used to provide transaction rollback, read consistency, and recovery.

RTS

request to send

S SCA

single connector architecture

SBC

A single-board computing circuit card used in LINCS servers. It is part of the CPU complex.

screen pop

A method of delivering a screen of information to a telephone operator at the same time a telephone call is delivered. This is accomplished by a complex chain of tasks that include identifying the calling party number, using that information to access a local or remote ORACLE database, and pulling a "form" full of information from the database using an ORACLE database utility package.

script

The set of instructions for the system to follow during a transaction.

Script Builder

An optional software package that provides a menu-oriented interface designed to assist in the development of custom voice response applications on the system (see also Voice@Work).

SCSI

small computer system interface

SDN

software defined network

shared database table

A database table that is used in more than one application.

shared speech

Speech that is a part of more than one application.

shared speech pools

A parameter that allows the user of a voice application to share speech components with other applications.

SID

station identification

single-threaded application

An application that runs on a single voice channel.

slave

A circuit card that depends on the TDM bus for clock information.

SLIP

serial line interface protocol

small computer system interface

A disk drive control technology in which a single SCSI adapter circuit card plugged into a PC slot is capable of controlling as many as seven different hard disks, optical disks, tape drives, etc.

SNA

systems network architecture

SNMP

simple network management protocol

software

The set or sets of programs that instruct the computer hardware to perform a task or series of tasks — for example, UnixWare software and the system software.

software upgrade

The installation of a new version of software in which the existing platform and circuit cards are retained.

source system

The system from which you are upgrading (that is, your system as it exists *before* you upgrade).

speech and signal processor circuit card (CWB1)

A high-performance signal processing circuit card capable of simultaneous support for various speech technologies.

speech energy

The amount of energy in an audio signal. Literally translated, it is the output level of the sound in every phonetic utterance.

speech envelope

The linear representation of voltage on a line. It reflects the sound wave amplitude at different intervals of time. This envelope can be plotted on a graph to represent the oscillation of an audio signal between the positive and negative extremes.

speech file

A file containing an encoded speech phrase.

speech filesystem

A collection of several talkfiles. The filesystem is organized into 16-Kbyte blocks for efficient management and retrieval of talkfiles.

speech modeling

The process of creating WholeWord speech recognition algorithms by collecting thousands of different speech samples of a single word and comparing them all to obtain a statistical average of the word. This average is then used by a WholeWord speech recognition program to recognize a single spoken word.

speech space

An area that contains all digitized speech used for playback in the applications loaded on the system.

speech phrase

A continuous speech segment encoded into a digital string.

speech recognition

The ability of the system to understand input from callers.

SPIP

signal processor interface process

SPPLIB

speech processing library

SQL

structured query language

SR

speech recognition

SSP

[speech and signal processor circuit card (CWB1)](#)

standard speech

The speech package available in several languages containing simple words and phrases produced by Lucent Technologies for use with the system. This package includes digits, numbers, days of the week, and months, each spoken with initial, medial, and falling inflection. The speech is in digitized files stored on the hard disk to be used in voice prompts and messages to the caller. This feature is also called Enhanced Basic Speech.

standard vocabulary

A standard package of simple word speech models provided by Lucent Technologies and used for WholeWord speech recognition. These phrases include the digits "zero" through "nine," "yes," "no," and "oh," or the equivalent words in a specific local language.

string

A contiguous sequence of characters treated as a unit. Strings are normally bounded by white spaces, tabs, or a character designated as a separator. A string value is a specified group of characters symbolized by a variable.

structured query language

A standard data programming language used with data storage and data query applications.

subword technology

A method of speech recognition used in FlexWord recognition that recognizes phonemes or parts of words. Compare to WhoieWord speech recognition.

switch

A software and hardware device that controls and directs voice and data traffic. A customer-based switch is known as a private branch exchange.

switch hook

The device at the top of most telephones that is depressed when the handset is resting in the cradle (in other words, is *on hook*). The device is raised when the handset is picked up (in other words, when the telephone is *off hook*).

switch hook flash

A signaling technique in which the signal is originated by momentarily depressing the "switch hook."

switch interface administration

The component of the system that enables you to define the interaction between the system and switches by allowing you to establish and modify switch interface parameters and protocol options for both analog and digital interfaces.

switch network

Two or more interconnected telephone switching systems.

synchronous communication

A method of data transmission in which bits or characters are sent at regular time intervals, rather than being spaced by start and stop bits. Compare to asynchronous communication.

SYS

UNIX system calls message class

sysgen

system generation

system administrator

The person assigned the responsibility of monitoring all system software processing, performing daily system operations and preventive maintenance, and troubleshooting errors as required.

system architecture

The manner in which the system software is structured.

system message

An event or alarm generated by either the system or end-user process.

system monitor

A component of the system that tests to verify that each incoming telephone line and its associated Tip/Ring or T1 circuit card is functional. Through the "System Monitor" component, you are able to see displays of the Voice Channel and Host Session Monitors.

T **T1**

A digital transmission link with a capacity of 1.544 Mbps.

table

See [database table](#).

talkfile

An ASCII file that contains the speech phrase tags and phrase tag numbers for all the phrases of a specific application. The speech phrases are organized and stored in groups. Each talkfile can contain up to 65,535 phrases, and the speech filesystem can contain multiple talkfiles.

talkoff

The process of a caller interrupting a prompt, so the prompt message stops playing.

TAM

[telecom alarm module](#)

target system

The system to which you are upgrading (that is, your system as you expect it to exist *after* you upgrade).

TAS

[transaction assembler script](#)

TCP/IP

transmission control protocol/internet protocol

TDM

time division multiplexing

telecom alarm module

An intelligent alarm module that provides critical, major, and minor alarm indicators.

telephone network connection

The point at which a telephone network connection terminates on a system. Supported telephone connections are Tip/Ring, T1, and E1.

Text-to-Speech

An optional feature that allows an application to play US English speech directly from ASCII text by converting that text to synthesized speech. The text can be used for prompts or for text retrieved from a database or host, and can be spoken in an application with prerecorded speech.

ThickNet

A 10-mm (10BASE5) coaxial cable used to provide interLAN communications.

ThinNet

A 5-mm (10BASE2) coaxial cable used to provide interLAN communications.

time-division multiplex

A method of serving a number of simultaneous channels over a common transmission path by assigning the transmission path sequentially to the channels, with each assignment being for a discrete time interval.

Tip/Ring

Analog telecommunications using four-wire media.

token ring

A ring type of local area network that allows any station in the network to communicate with any other station.

trace

A command that can be used to monitor the execution of a script.

traffic

The flow of information or messages through a communications network for voice, data, or audio services.

transaction

The interactions (exchanges) between the caller and the voice response system. A transaction can involve one or more telephone network connections and voice responses from the system. It can also involve one or more of the system optional features, such as speech recognition, 3270 host interface, FAX Actions, etc.

transaction assembler script

The computer program code that controls the application operating on the voice response system. The code can be produced from Voice@Work, Script Builder, or by writing directly in TAS code.

transaction state machine process

A multi-channel IRAPI application that runs applications controlled by TAS script code.

transient process

A process that is created dynamically only when needed.

troubleshooting

The process of locating and correcting errors in computer programs. This process is also referred to as debugging.

TSO

time share operation

TSM

[transaction state machine process](#)

TTS

[Text-to-Speech](#)

TWIP

T1 interface process

U

UK

United Kingdom

US

United States of America

UNIX Operating System

A multiuser, multitasking computer operating system originally developed by Lucent Technologies.

UNIX shell

The command language that provides a user interface to the UNIX operating system.

upgrade scenario

The particular combination of current hardware, software, application and target hardware, software, applications, etc.

usability

A measurement of how easy an application is for callers to use. The measurement is made by making observations and by asking questions. An application should have high usability to be successful.

USOC

universal service ordering code

UVL

unified voice library

V   **VDC**

video display controller

vi editor

A screen editor used to create and change electronic files.

virtual channel

A channel that is not associated with an interface to the telephone network (Tip/Ring, T1, LSE1/LST1, or PRI). Virtual channels are intended to run "data-only" applications which do not interact with callers but may interact with DIPs. Voice or network functions (for example, coding or playing speech, call answer, origination, or transfer) will not work on a virtual channel. Virtual channel applications can be initiated only by a "virtual seizure" request to TSM from a DIP.

vocabulary

A collection of words that the system is able to recognize using either WholeWord or FlexWord speech recognition.

vocabulary activation

The set of active vocabularies that define the words and wordlists known to the FlexWord recognizer.

vocabulary loading

The process of copying the vocabulary from the system where it was developed and adding it to the target system.

Voice@Work

An optional software package that provides a graphical interface to assist in development of voice response applications on the system (see also Script Builder).

voice channel

A channel that is associated with an interface to the telephone network (T1, E1, or PRI). Any system application can run on a voice channel. Voice channel applications can be initiated by being assigned to particular voice channels or dialed numbers to handle incoming calls or by a "soft seizure" request to TSM from a DIP or the **soft_szr** command.

voice processing co-marketer

A company licensed to purchase voice processing equipment to market and sell based on their own marketing strategies.

voice response output process

A software process that transfers digitized speech between system hardware (for example, Tip/Ring and SSP circuit cards) and data storage devices (for example, hard disk, etc.)

voice response unit

A computer connected to a telephone network that can play messages to callers, recognize caller inputs, access and update a databases, and transfer and monitor calls.

voice system administration

The means by which you are able to administer both voice-related aspects of the system.

VPC

voice processing co-marketer

VROP

voice response output process

VRU

voice response unit

W **warning**

An admonishment or advisory statement used in system documentation to alert the user to the possibility of equipment damage.

watchdog timer

An timer that activates a [TAM](#) alarm when CPU activity is not received within the 30-second threshold.

WholeWord speech recognition

An optional feature package based on whole-word technology that can recognize the numbers one through zero, "yes", and "no" (the key words). This feature is reliable, regardless of the individual speaker. This feature can identify the key words when spoken in phrases with other words. A string of key words, called *connected digits*, can be recognized. During the prompt announcement, the caller can speak or use touch tones (or dial pulses, if available). See also [whole-word technology](#).

whole-word technology

The ability to recognize an entire word, rather than just the phoneme or a part of a word. Compare to "subword technology."

wink signal

An interruption of current to a busy lamp indicating that there is a line on hold.

word

A unique utterance understood by the recognizer.

wordlist

A set of words available for FlexWord recognition by an application during a Prompt & Collect action step.

word spotting

The ability to search through extraneous speech during a recognition.

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S

T