

Meridian IVR

Product Guide

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Chapter 1: Meridian IVR product overview

What is an Interactive Voice Response (IVR) system?

Interactive Voice Response (IVR) is the generic term given to applications which allow a caller to interact directly with information stored in a computer's database through a touch-tone telephone.

The typical IVR application initiates a predefined sequence of verbal prompts, providing options and instructions to the caller. It allows the caller to respond to these verbal prompts and instructions via the telephone touch-tone keys, as if the keys were on the keyboard of a computer terminal. In this way, information inquiries and transactions can be carried out directly by the caller with no need for additional human intervention or terminal interface.

IVR benefits

The convenience and ease-of-use of IVR systems has led to their rapid acceptance by the general public. The organizations that offer these services have realized labor cost savings, new sources of revenue, and a measure of uniqueness from their competitors through deployment of new or improved customer services via advanced technology.

Northern Telecom (Nortel), a leading edge competitor in the IVR marketplace, continues to integrate new technologies such as fax and data device interfaces and call-screen synchronization CTI technology into the Meridian IVR product. Many companies and organizations expect this level of functionality in new technical products introduced to the marketplace.

Who uses IVR?

Interactive Voice Response can be used by organizations in a number of ways.

All companies and organizations

IVR can be used for the following:

- account inquiries
- customer service
- quotations

Financial organizations

Financial organizations can use IVR so that customers can retrieve up-to-date account information, pay bills, transfer funds, and receive stock quotations.

Health care industries

Health care industries can use IVR to allow customers to inquire about the status of policies, benefits, and claims.

Commercial airlines

Commercial airlines can use IVR so that customers can make inquiries about reservations, arrival and departure times, frequent flyer mileage, and vacation packages.

Educational institutions

Colleges and universities can use IVR for registration, including course selection and availability, and confirmation of admission to a class.

The people within these organizations who are responsible for purchasing an IVR system are usually

- Telecom managers
- Call Center managers
- MIS managers

Meridian IVR benefits

The benefits of the Meridian Interactive Voice Response system include

- improved customer service and satisfaction due to 24-hour access to information with less time spent waiting for a call to be serviced
- reduced business costs because of the decreased need for operators
- accuracy and consistency of information
- system reliability
- potential for increased revenues due to lower labor costs and Meridian IVR's ability to handle a large volume of calls
- customer privacy and confidentiality as the customers interact directly with a computer
- increased employee productivity because Meridian IVR eliminates the need for employees to spend time repeatedly providing routine information

Meridian IVR features

The features common to all Meridian IVR applications are

- administration
- integration with the telephone switch
- data connectivity
- fax processing
- voice processing
- telephony functions

Administration

Meridian IVR can run many different applications at the same time. Using a comprehensive set of administration tools, you can

- configure the Meridian IVR system
- assign applications to Meridian IVR voice channels
- start or stop applications

Integration

Functional integration permits integrated solutions for IVR processes. For example, ANI/DNIS information from the Meridian switch can be used to automatically retrieve information for playback to the caller, or to improve call detail logging.

Data connectivity

An account inquiry or transaction request must be completed via access to the appropriate information which usually resides in the database of a host computer. This requires a data host interface which can respond to the inquiry or request by providing the appropriate data. The data is then converted into voice responses for playback to the caller.

Fax processing

Meridian IVR fax capability allows the development of applications that use fax processing as part of an IVR application. These applications can

- send a fax in the same IVR call, or schedule a fax for delivery
- receive a fax during the same IVR call

Voice processing

Voice processing handles such functions as

- storing and playing messages and IVR prompts to callers
- monitoring call progress
- tone detection

Telephony functions

Basic Meridian IVR telephony functions can be described as the following:

Answering

The first function (for an individual or a machine) is to answer the telephone. This requires physical and functional interfaces to the telephone network.

Interacting

The second requirement is the ability to “talk” to the caller using a prerecorded vocabulary designed to provide the necessary voice prompts and responses.

Listening

Next is the ability to “listen” to the caller as the caller responds to the prompts through their touch-tone keypad.

Call flow structuring

Finally, the entire telephone call must take place within a logical predefined manner. The term for this conversation framework is “call flow.” Along with this is the “call script,” which provides the actual sequence of verbal prompts and responses.

The Meridian IVR system

Meridian IVR Release 2.0/I is the second release of Nortel’s Interactive Voice Response system. Release 2.0/I is based on the Meridian Mail (Release 8 and above) voice processing platform and an industry standard application processor (AP).

A unique feature specific to Nortel’s Meridian IVR system is its ability to interwork with Nortel’s Meridian Mail Voice Messaging and Call Centre applications.

Meridian IVR provides simultaneous support of multiple voice applications. This system can support a wide range of applications, communication interfaces, and multilingual language capability. It can also provide a scaleable, modular product family that addresses a range of configurations and options.

Integrated solutions

Customer demand for integrated solutions is increasing. Nortel’s research and development is focused on switch-integrated products and is sensitive to the needs of telecom and Call Center managers who require integrated solutions.

The IVR market can be separated into “stand-alone IVR” and “integrated IVR.” Stand-alone IVR systems are switch-attached (PBX or CO) but physically separate. Within the stand-alone IVR market, there are many inexpensive, low-end, PC-based solutions (typically using Dialogic cards).

Integrated IVR systems are part of a broader platform such as the switch itself, a voice mail system, Call Center systems, or the host computer. Functional integration permits integrated OA&M and interworking between applications. For example, ANI/DNIS information from the switch can be used to automatically retrieve information for playback to the caller or to improve call detail logging. Call ID can be used to track calls between IVR and live agent queues. Meridian IVR can utilize other capabilities of the platform such as fax or voice mail.

Call Center

Nortel, with its complete set of Meridian Applications, pushes the limits of integrated systems by defining new levels of integrated functionality within the Call Center.

Organizations that have tried stand-alone IVR systems and have identified more advanced needs are beginning to look for strategic platforms to support multiple application requirements. Flexible port sharing between IVR, fax processing, voice mail, automated attendant services, common maintenance, and administration result in cost-effective solutions. For premier account customers in particular, large port capacity and high reliability are important requirements.

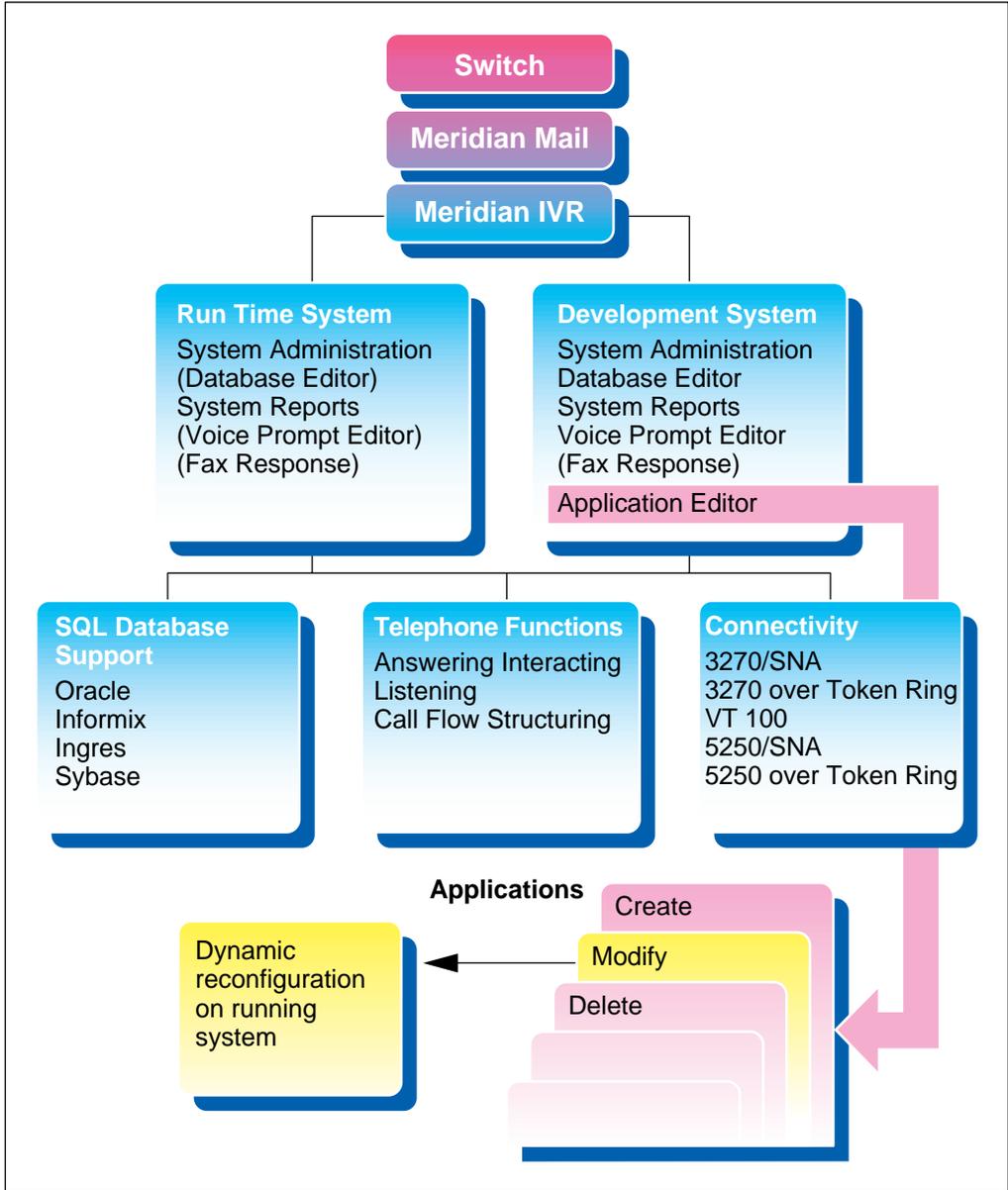
The Nortel focus is on an integrated IVR product as part of its Meridian IVR portfolio. With its strengths in comprehensive systems integration, Nortel is especially well positioned to address the integrated IVR market due to the added value of the multiple dimensions of integration.

Integrated IVR builds on the investment that Nortel has made in the Meridian Mail platform and dovetails with Nortel's Call Center products (Meridian MAX, Meridian CCR, and Meridian Link).

Meridian IVR components

Figure 1-1 provides an overview of the hardware and software components that make up a Meridian IVR system.

Figure 1-1
Meridian IVR overview



Meridian IVR Application Processor

The Application Processor (AP) is a self-contained unit providing basic IVR processing functions. The application processor, which runs on the SCO UNIX operating system, is a separate unit connected to Meridian Mail via an ACCESS link.

The application processor consists of hardware and software and is designed to work with Nortel's Meridian Mail voice processing system to provide IVR services.

All capabilities offered in Meridian IVR Release 1.2 will continue to be supported in Release 2.0/I with no regression in functionality or ease of use.

Hardware

The Meridian IVR AP uses Intel's new generation 64-bit Pentium™ microprocessors. The platform is designed to scale for any Intel 32-bit or 64-bit processor ranging from 60 MHz to 120 MHz. Meridian IVR 2.0/I supports a 75 MHz or 100 MHz processor. Other components include

- multiple communication ports
- onboard Super VGA Video Controller
- PS/2-style keyboard and mouse connectors
- SCSI hard drive
- floppy disk drive
- tape storage
- power supply
- 8-port serial card
- external modem

Optional items include host database connectivity cards, an Ethernet network interface card, a Token Ring network interface card, up to two 4-port fax cards, a second 8-port serial card, a second hard drive for the optional Fax response, a 14-inch or 17-inch monitor, and an integrated intelligent UPS.

Software

Meridian IVR software regulates general IVR functioning and also provides users with tools to create their own application call flows.

The Application Generator software is the key component of Meridian IVR that provides the various facilities necessary to develop and deploy voice applications.

Nortel's Meridian ACCESS Release 2 software is used to connect Meridian IVR to Meridian Mail.

Media server connectivity

This is Nortel's voice processing system. Meridian IVR uses the Meridian Mail platform as its media server. Meridian Mail Release 8 and above provides the voice processing component of Meridian IVR Release 2.0/I and handles such functions as

- storing and playing messages and IVR prompts to callers
- monitoring call progress
- tone detection
- switch integration

Figure 1-2
Meridian IVR equipment layout

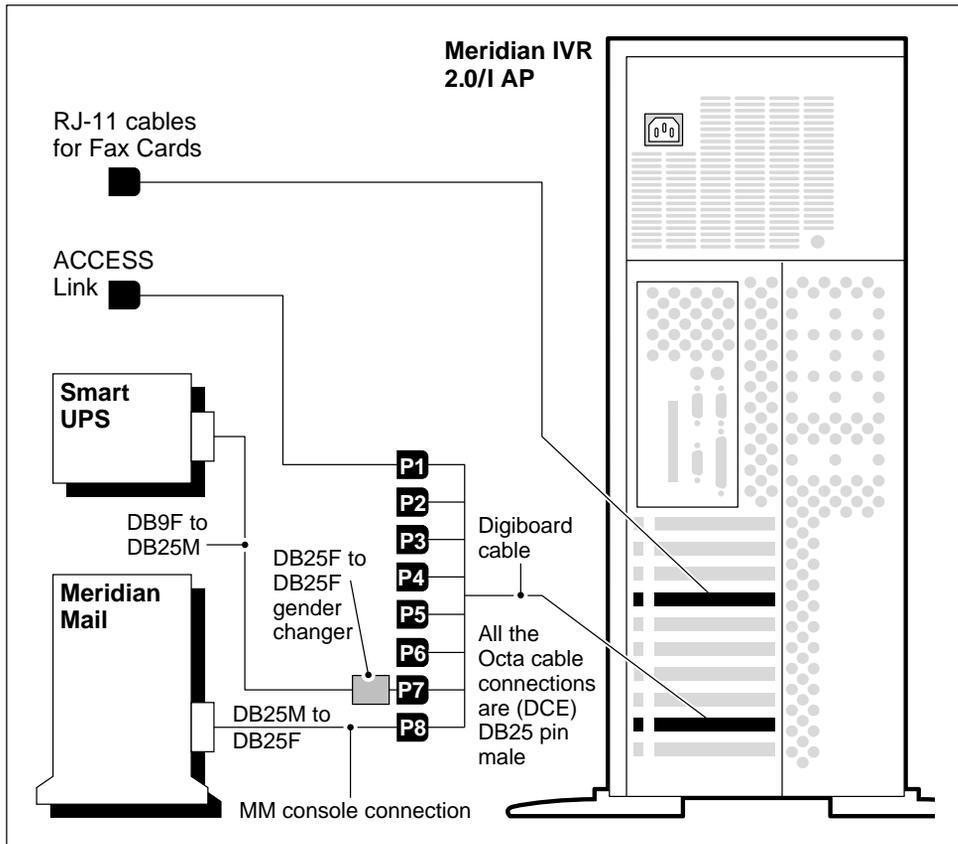
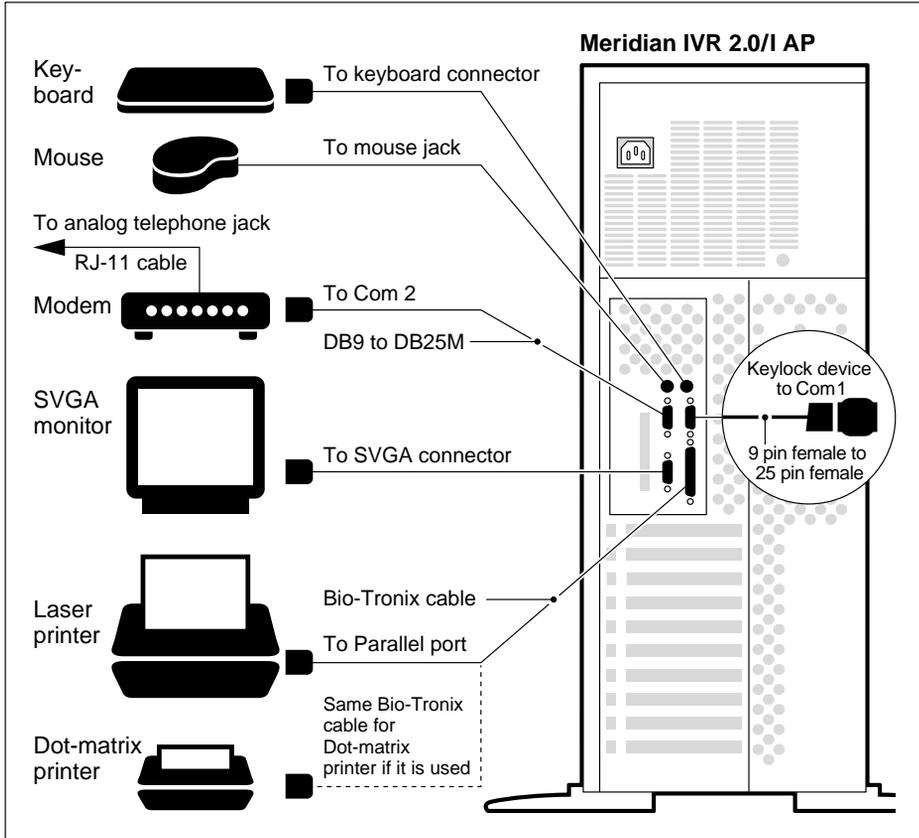


Figure 1-3
Meridian IVR peripherals



In Figure 1-2 and Figure 1-3, note the following components:

- the application processor, the platform from which application development is done using a graphical user interface
All Meridian IVR system administration functions are carried out from the application processor.
- the Meridian Mail media server
- the printer, used for printing call flows and reports
- the UPS, used for protection against power interruptions
- the external modem, used for remote support

Meridian IVR media server connectivity

Figure 1-2 illustrates the connectivity from the Meridian 1 switch to Meridian Mail, and to Meridian IVR when the caller dials into the system.

Meridian Mail provides the voice processing capability of the system via its voice channels.

Meridian IVR provides the application logic. For each voice channel on Meridian Mail, there may be a logical call on the Meridian IVR platform that will service calls arriving on that channel.

The maximum number of calls that a Meridian IVR application processor (AP) can service simultaneously is determined by the following:

- processor speed
- local SQL database size
- memory (RAM)
- complexity of the applications running on the system
- the capacity of the Meridian Mail system (that is, the number of physical ports)
- the capacity of the Meridian IVR system (that is, the number of logical channels)
- the number of Meridian Mail ports configured for Meridian IVR applications
- the number of fax ports configured on the IVR system

Meridian IVR platforms

Two distinct Meridian IVR Release 2.0/I platforms are supported:

- The Development system provides the capability to develop, modify, and run applications.
- The Run-Time system only allows a previously developed application to run on the Meridian IVR system.

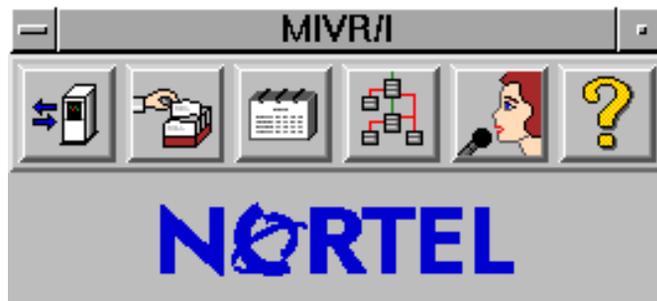
Development system

The Development system enables the user to develop and run applications.

By means of the application processor, Meridian IVR provides users with a special graphical user interface (GUI). Tasks that can be performed via the GUI include application development, system configuration, application management, and report generation. The application processor may also function with a remote console, allowing certain maintenance tasks to be performed through a dial-up modem.

The main menu appears whenever you log on to Meridian IVR (see Figure 1-4). Each icon in the menu represents a specific area of Meridian IVR administration or development tasks. For example, the first icon shown (the computer tower) allows general system administration activities to be carried out. Clicking the mouse on the other icons permits report generation, database creation, maintenance, and so on.

Figure 1-4
The Meridian IVR main menu



Meridian IVR's GUI-based application development environment offers a special advantage to the application developer.

When an application has been created, a printout of the "call flow" for that application can be easily generated by the developer. Meridian IVR formats the call flow diagram automatically and includes information about the content of each "cell," or step, of the call flow. The developer merely requests a call flow file for the desired application. Meridian IVR creates the entire file which the developer may then print out.

For the customer who wants to see a clear picture of the intended application call flow, or who needs to keep a detailed record of how the application works, Meridian IVR's ability to produce a comprehensive diagram of an application call flow is extremely useful.

Run-Time system

The Run-Time system is a full-featured version of Meridian IVR that does not include the Application Editor (XAE). The attendant Database Editor and Voice Prompt Editor (VPE) are optionally available on the Run-Time system. With this exception, all other functionality and features are identical for both systems.

The application processor used by the Run-Time system provides users with the same special graphical user interface (GUI) as the Development system. Tasks that can be performed via the GUI include system configuration, application management, report generation, and, optionally, database and voice prompt editing.

The Run-time system does not demand the use of a 17-inch SVGA monitor or a laser printer; a 14-inch SVGA monitor and a Dot Matrix printer may be substituted for economy. However, the 17-inch monitor and/or the laser printer can be used on the Run-Time system if so desired.

Meridian IVR applications

Meridian IVR utilizes application packages for specific horizontal and vertical industries. Applications are created by designing them and testing them on the Development version of Meridian IVR. Once they are tested, they can be installed on Meridian IVR and put to work. Organizations and businesses that purchase the Run-Time version of Meridian IVR must acquire applications from Value Added Developers (VADs) for use on their systems. Standard applications can be customized to suit any business need.

These application packages can be developed easily and quickly. Application creation and customization is driven both by the necessity of adapting to unique host screen layouts, and product or service terminology (reflected in voice prompts), and by the opportunity to be uniquely different from competitors. The challenge of cost-effective customization is met with high-level tools to streamline the sales cycle and a support infrastructure (including application specialists and Value Added Developers) that can apply these tools to deliver custom solutions.

Nortel offers off-the-shelf generic applications for selected industries which are easy to demonstrate, install, and customize, delivering total system solutions profitably. Standard applications provide a generic, packaged model for a specific vertical or horizontal application (for example, telebanking, order entry, flight arrivals/departures, and emergency outcalling) which can then be easily adapted to address individual customer requirements. Value Added Developers can also provide these packaged applications.

Business solutions via generic application platforms are created for

- Vertical markets
 - health care
 - banking
 - human resources
- Horizontal markets
 - new host interfaces

Meridian IVR tools

Meridian IVR starts automatically when you power on or reset your Meridian IVR system. Once you log in to the Meridian IVR system, the GUI window (on the desktop) appears (see Figure 1-4). By using the icons in this main menu, you can access the six basic tools for developing and managing applications:

- the System Administration tool for operating and administering the system
- the Database Editor tool for creating information databases (optional for Run-Time systems)
- the System Reports tool for generating reports
- the Application Editor tool for developing applications (Development system only)
- the Voice Prompt Editor for managing prompts (optional for Run-Time systems)
- online help
- If the Fax Response option is installed, the Fax Response main menu is presented for managing the Fax system.

The System Administration tool

The System Administration tool is a menu-driven tool for configuring and controlling your Meridian IVR system. Using this tool, you can

- configure the Meridian IVR system
- assign applications to Meridian IVR voice channels
- start or stop applications
- close the Meridian IVR main menu window

Meridian IVR has the power to run many different applications at the same time. Each application can be assigned to multiple Meridian IVR voice channels. Multiple applications can be run simultaneously, and applications can be started and stopped independently of each other. Consequently, you can update your applications as often as you like without ever losing a call on the other applications.

Refer to the *Meridian IVR System Administration Guide* (NTP 555-9001-300) for a detailed description of using the administration tool.

The Database Editor tool

Meridian IVR supports use of the Database Editor (optional on Run-Time systems) to store data such as names, addresses, and telephone numbers of customers who use an order entry application. You can use the Database Editor, which is menu-driven, to set up an information database for use with your applications.

Each information database consists of a series of records and can be connected to your applications or used separately. For example, an application can look up a specific record and then use this information within the application. Any changes made to this information can be written to the database.

Refer to the *Meridian IVR Application Development Guide* (NTP 555-9001-310) for a detailed description of using the Database Editor.

The System Reports tool

By using the System Reports tool, you can gather information about all of the activity in the system. You can easily find out how many calls have been received by day, hour of day, and channel. You can also monitor what is happening to any or all of the channels controlled by your applications module. Reports can be displayed or printed if you prefer.

Refer to the *Meridian IVR System Administration Guide* (NTP 555-9001-300), for a detailed description of the System Reports tool.

The Application Editor tool

The Application Editor tool is specific to the Development system. It is directly accessible from the Meridian IVR main menu. The Application Editor simplifies application development since you can see the design of your call flow as you draw it directly on a drawing board. When the application call flow is completed, it is an executable file ready to be loaded and run, or printed (documented).

All applications are constructed as a series of cells linked together to form the application. For each cell type, parameters can specify exactly how the cell will perform its functions. Each cell can be connected to other cells based on the results of the cell's operation. In this way, the program is represented in a pictorial form that is easy to understand.

This approach to basic application building requires minimal coding skills; the developer simply picks an action, optionally adjusts modifiers associated with the action, and then makes the logical connections between the actions to complete the application.

If developers require functions that are not available via the cells, they can write user functions in 'C' programming language to provide for any specialized functionality.

Refer to the *Meridian IVR Application Development Guide* (NTP 555-9001-310) for a detailed description of using the Application Editor.

The Voice Prompt Editor tool

This tool is optional on Run-Time systems. Meridian IVR makes it easy for you to record, distribute, and update the prompts that guide callers through your applications. You can access the Voice Prompt Editor to create prompts on Meridian Mail for use with applications that will run on Meridian IVR.

Procedures for using the Voice Prompt Editor are discussed in the *Meridian IVR System Administration Guide* (NTP 555-9001-300).

The Fax Response tool

Meridian IVR supports use of an optional Fax Response tool. The Fax Response option provides users with send and receive fax capability through the Meridian IVR session.

Meridian IVR Fax Response uses the graphic user interface (GUI) on the Meridian IVR palette for all fax functions. The Fax Response tool uses a separate set of icons (from the application processor) for all fax functions. These icons are accessed from the Fax Response main menu.

Fax Response capabilities include

- integration with interactive voice functions
- sending or receiving a multi-page fax to or from another fax device
- converting ASCII data to fax-ready format with a selection of fonts and character sizes
- converting Postscript data to fax-ready format with the “standard” 35 fonts found in most Postscript printers
- converting TIFF data to fax-ready format
- integration with host connectivity on Meridian IVR
- integration with system/SQL database on Meridian IVR
- overlaying data (for example, text, signature, logo, and so on) onto fax data
- fax view and edit capability

Chapter 2: Software

Meridian IVR software requirements

For developing and running applications, Meridian IVR requires the following software components:

- Meridian Mail Voice Processing software with ACCESS Enable option
- Meridian IVR System Voice Prompts
- Meridian IVR software

All systems include the following:

- Run-Time software
- SCO UNIX operating system

Development systems include the following:

- Application editor software
- SCO UNIX development option

Notes:

- 1 A minimum of Meridian Mail Release 8 software is necessary to run ACCESS and Meridian IVR.
- 2 Meridian IVR uses the Meridian ACCESS toolkit to interface to the Meridian Mail Voice Processing platform.

Meridian ACCESS (NTP 555-7001-31X) and *Meridian Mail* (NTP 555-7001-XXX) software are covered in standard NTP documents and are not repeated in this document.

The Application Editor

The Application Editor is one of the key software components of Meridian IVR. The Application Editor allows Meridian IVR users to customize their IVR applications for specific uses.

The Application Editor provides the various facilities necessary to develop and deploy voice and fax applications. This section describes the Application Editor, its major components, and its functionality. Those items which have been added specifically for Meridian IVR Release 2.0/I are highlighted.

The Application Editor is specifically designed to address several critical customer needs:

- development of voice processing applications through a graphical, user-friendly interface without impacting existing applications
- compliance with established network switching standards
- cost-effectiveness over a broad range of applications solutions
- modular architecture allowing the integration of future enhancements without impacting existing applications
- scalability and manageability

The Application Editor with its graphical user interface (GUI) is user-friendly, reducing the need for the application developer to write code in a traditional programming language. Applications are developed by selecting cells from the cell palette and joining them together.

For each cell type, parameters are available to specify exactly how the cell performs its functions. With this approach to application building, the developer picks an action, optionally adjusts modifiers associated with the action, and then makes the logical connections between the actions to complete the application.

If the developer requires functions that are not available through the cells, user functions can be written in the "C" programming language to provide the specialized functionality.

**CAUTION****Risk of system problems**

Development of "C" language code on a live system is not advisable as it is very powerful and can be potentially dangerous if poorly written.

Application concepts

An application consists of a collection of cells that are stored in a file. An application controls the activity on one or more telephone lines connected to the Meridian IVR and can perform activities such as the following:

- Answer a telephone call.
- Play recordings to a caller.
- Ask a caller to leave information by pressing Touch-Tone keys.
- Record and store messages from callers.
- Make outgoing telephone calls.
- Connect a caller with an operator.
- Perform math operations.
- Connect a caller with equipment outside the system, such as a paging terminal.
- Schedule message-delivery applications to be run at a later time.
- Send/Receive information from a 5250- or 3270-based IBM host application.
- Send/Receive information to a host application through VT100 emulation.
- Store, retrieve, and update data in a local or remote SQL database.
- Send/Receive faxes.
- Incorporate custom user functions.

Such applications can be created and modified on-line, and new versions of the application may be introduced on-line without closing down current calls.

The basic components needed to build an application are described in the following sections.

Cells and underlying structure

Cells are the building blocks of every application. Each cell performs a defined action and then determines which cell will be executed next. Various cell types are available to the application developer.

The cell type designates the functions that the cell will perform; for example, the “Play Prompt” cell type plays a series of voice prompts to the caller. For each cell type, the application developer defines the parameters to specify exactly how the cell will perform its functions (for example, the number of prompts to be played and the identification of each prompt).

The categories of cell types that make up the basic building blocks of applications are

- application execution
- application scheduling
- audiotext
- call management
- data manipulation
- fax response
- host communication
- local database
- messages
- multilingual
- outdialing
- SQL data base
- user function

In an application, control flow is determined at the cell level. The application begins with the designated first cell and branches from there. Each cell type has its own set of pathways to the next cell. Each time the cell is executed, it decides which pathway to take depending on the conditions.

Types and categories

There are 58 different types of cells that are grouped into 13 categories. Each category of cells has its own icon under which the specific cell types are listed.

Parameters

Each cell has parameters that permit the developer to fine-tune the way the system operates. There are default parameters that are used if the developer does not define a parameter.

Examples of some parameters for the MENU cell are as follows:

- the number of prompts that may be played
- the number of possible valid inputs
- the list of invalid input retries allowed
- the time-out interval when no input is received

Buffers

Each cell has buffers for storing information. Buffer values are on a per call basis. These can be used to store any information that will be used by the cell, or for storing the data collected by the cell operation such as calling and called telephone numbers, passwords, user inputs, mailbox IDs, and so on. Users can also create up to 50 customized buffers per application.

Tables

Each cell can also establish a set of tables. For instance, there is a table for Valid Inputs in a MENU Cell. This table defines the valid inputs and the next cell to which the caller is directed. There is also a Play Prompt Table for the cells that list the prompt numbers that are to be played.

Basic telephony functions

The following basic telephony functions are supported by Meridian IVR:

- initiate a telephone call
- answer a call
- add on call (conference)
- transfer (supervised)
- transfer (blind)
- reconnect to held call
- generate Dual Tone Multi-Frequency (DTMF) (0-9, A-D)
- disconnect a call

Call information

A number of data buffers are available to the application for storing information and passing it between cells. These buffers permit applications to make use of call information such as calling number and called number.

The buffers are maintained separately for each call. There is also a set of system buffers that are the same for every application. Additionally, the application developer can define user buffers that are particular to an application as required.

Coordinated Call Transfer to ACD

The Coordinated Call Transfer feature allows an IVR application to transfer a caller from an IVR session to an ACD agent queue. It monitors the call to determine the exact agent's set that answered the transferred call, and passes IVR session information to a host application so that the host application can send a screen of data to the agent.

This functionality requires coordination with the host application and, therefore, requires customization based upon each customer's particular host application. This requires a small amount of customization by the developer of the basic functions of the cells which are provided on the palette.

Coordinated Call Transfer functionality is provided through use of a predefined user function. In other words, the capability is preprogrammed in such a way that a small amount of customization is required by the application developer. This predefined user function is programmed with the majority of functionality required; however, it requires that the application developer add the data that is unique to the host application.

Call progress detection

Meridian IVR uses Meridian Mail's Digital Signal Processing (DSP) to detect the following call progress states:

No Answer

The call was not answered.

Answer

The call was answered (Miscellaneous).

Voice

The call was answered by Voice.

Short

The call was answered by Short Silence.

Long

The call was answered by Long Silence.

Pager

The call was answered by Pager.

SIT

The call was answered by SIT Tone.

Notes:

- 1 A *short* silence indicates that a ringback was detected and the call was answered, but no sound energy was detected within five seconds of the call being answered.
- 2 A *long* silence indicates that no ringback was detected, but the call was answered. No sound energy was detected within a fairly long time period (approximately 27 seconds).
- 3 There is currently no way to detect when a call is answered by an answering machine.

In addition, Meridian IVR uses signaling from the Meridian 1 to detect disconnect.

Fax response

Meridian IVR applications can be developed to send and receive faxes using the fax cells which are new for release 2.0/I.

These fax cells provide a Meridian IVR application developer with the following fax functions:

Fax Send

Either send a same call fax on the fax modem previously requested by Fax Request, or queue a Callback Fax for subsequent transmission.

Fax Receive

Receive a same call fax on the fax modem previously requested by Fax Request.

In addition, a Meridian IVR application developer will be able to

- define a fax document as one or more pages, each page consisting of overlaid and/or concatenated ASCII, Postscript, and TIFF data
- create fax documents using any UNIX editor (such as “vi”), or build a document at run-time using the data concatenation user function
- convert a generic document file into a pure fax file
- print a pure fax document on the system laser printer
- submit a pure fax document into the Callback queue for subsequent transmission
- preview fax documents before using them

Transaction messaging

It is often useful to record messages from callers during an IVR session. For example, it may be necessary to record a caller’s name and address in order to send requested material. These messages can be deposited into a mailbox and later retrieved for processing.

Meridian IVR provides cells to record, play, and delete voice messages during a single interactive session. The ability to address and send a Meridian Mail message is provided through these cells. (This requires Meridian Mail Release 8.29 or above or Release 9.58 or above.)

Administration

The system configuration facility is used to configure system parameters such as the number and types of voice channels and range of voice prompts.

Administrators can also perform top-level application management such as loading and unloading applications, starting and stopping applications, reassigning voice channels, and bringing new applications on-line.

Monitoring facilities are provided to indicate which voice channels are currently active and to show any outstanding alarms.

System prompts

System prompts required for Meridian IVR are provided in US English and Canadian French. This library of prompts consists of commonly used words and phrases. This allows the application developer to build and test the applications prior to recording the final prompts.

A Meridian Mail tape containing these system prompts is included with the Meridian IVR software. The system prompts must be installed on the customer's Meridian Mail system by using the Voice Prompt Transfer Tool on Meridian Mail.

Voice prompt loading and editing

The Voice Prompt Editor (VPE) is used to provide recording and editing of additional application voice prompts. New voice prompts can also be recorded to replace the old voice prompts.

Note: System prompts and application prompts should be rerecorded to maintain a common voice, although the wording of the system prompts should not change.

The Voice Prompt Editor is optional on a Run-Time system.

Local database

An information database is included as part of Meridian IVR. This database consists of a series of records that are accessed by a number (such as a phone number. Each record contains up to 10 fields of information).

Information databases have many uses such as determining which application to run based upon calling number and called number or which prompts to play based upon specific user input. These databases can be updated by either the System Administrator or by an application. The local Database Editor is optional on a Run-Time system.

SQL database

Meridian IVR Release 2.0/I provides support for local and remote relational databases. The SQL cells provided with Meridian IVR Release 2.0/I make it possible to interface into local or remotely located Informix, Oracle, Ingres, or Sybase databases.

The SQL database interface software is an optional package which is only included if purchased by the customer.

Notes:

- 1 Meridian IVR Release 2.0/I provides access to the local Informix, Oracle, Ingres, or Sybase databases but does not provide the actual database.
- 2 Informix, Oracle, Ingres, and Sybase options are mutually exclusive and may not be installed together on the same system.
- 3 Remote SQL databases are supported through Meridian IVR cells. Network software must be provided for each database.

Host connectivity

Meridian IVR Release 2.0/I supports host connectivity for IBM 3270/5250 and VT100 interfaces. By emulating an operator providing input and/or retrieving output from a 3270/5250 or VT100 session, Meridian IVR applications can easily access required information that is normally displayed on the terminal screen.

Host connectivity is provided in two ways:

- Host connectivity through cells provided with Meridian IVR
 - 3270/SNA (including 3274, 3278, 3279)
 - 5250/SNA
 - 3270 over Token Ring
 - VT100 emulation over serial ports
 - 5250 over Token Ring
- Host Connectivity through custom user functions, for example:
 - Token Ring and Ethernet
 - IBM 3270 over X.25
 - Standard RS-232 Serial Interface

3270 SNA connectivity

A category of cells supports IBM 3270 SNA host connectivity. By emulating an operator providing input to and/or retrieving output from a 3270 session, the Meridian IVR application can easily access required information that is normally displayed on the terminal screen.

The application developer provides screen templates that define the location of input and output fields on the terminal screen. This is accomplished either through row and column offset or through a unique field identifier that serves as a tag to identify the field.

The application developer also provides action templates that connect the screen templates into a logical transaction that must be traversed in order to accomplish the desired action. This emulates actions such as a terminal operator entering an account number on the first screen, completing the input by then pressing a function key, and, finally, obtaining a screen output that contains the desired account balance.

5250 SNA connectivity

Meridian IVR host communication cells provide the same level of interface for 5250 terminal emulation over SNA that is provided for 3270 emulation.

VT100 connectivity

Meridian IVR host communication cells provide the same level of interface for VT100 terminal emulation through an RS-232 serial interface that is provided for 3270 emulation.

Token Ring connectivity

Meridian IVR host communication cells provide the same level of interface for Token Ring connectivity for 3270 and 5250 terminal emulation.

Other connectivity

Meridian IVR supports Token Ring and Ethernet LAN connectivity (including TCP/IP), and, with a multiport serial I/O card, RS-232 communications.

Use of these data communication packages requires the application developer to write “C” language code as a user function.

Field definitions

Many host programs require field definitions. In these cases, the application developer must find out what these definitions are and build them into customized templates.

Example

A customer needs to enter an account number and a password in order to receive information about his or her account balance. The developer defines these in a template using the field definitions “Account Number” and “Password.” When the customer inputs their account number and password into the IVR system using Dual Tone Multi-Frequency (DTMF), the IVR application program stores each of them in buffers. The input from the buffers is then passed to the host, using the terms “Account Number” and “Password” (through the cells and the template).

Reports

The System Reports interface provides a range of operational and statistical reports. Within report windows, you can see and send to a printer reports that are provided in ASCII format for translation to any database. The following reports are provided with Meridian IVR:

Cell usage Provides statistics on cell access in each application.

Channel usage Provides statistics on channel usage.

Call Detail Provides a record of every call into the system.

Transaction log Provides a log of all internal system events.

Subscriber reports Provide information about incoming calls.

System configuration reports Provide a description of the current system configuration.

Fax reports are also provided with the Meridian IVR Fax Response option.

Chapter 3: Hardware components

Meridian IVR uses an Intel Altserver Altair motherboard mounted in a Magellan chassis. This platform is based on a scaleable, modular architecture which enables OEMs and custom solution providers to quickly access the latest enhancements in CPU/cache and memory technology. The modular design offers immense computing power, fast time to market, and quick configurability.

The Altserver accepts the full range of Intel's new generation 64-bit Pentium™ microprocessors. The Altserver architecture is a strobed, asynchronous memory bus designed to scale for any Pentium™ processor ranging from 60 MHz to 120 MHz. Meridian IVR 2.0/I supports 75 MHz and 100 MHz processors only.

Meridian IVR hardware components overview

The Meridian IVR 2.0/I system includes

- onboard Super VGA Video Controller with 1 Mbyte video DRAM and maximum resolutions of 1024x768 with 256 colors
- PS/2-style keyboard and mouse connectors
- 8-bus master slot (5 ISA/2 PCI/1 Hybrid) system baseboard
- onboard twin channel SCSI-2 controller
- Pentium 75 or 100 MHz CPU
- one parallel port and two 9-pin serial ports
- intelligent serial communications board (ISA), 8 ports per card
- host connectivity card (3270 SNA, 5250 SNA) (optional)
- 32 Mbyte system memory as base, upgradeable to a maximum of 112 Mbytes
- 2.5 Gbyte SCSI 1/2-inch cartridge tape drive
- 3.5-inch floppy drive
- 1.2 Gbyte fast SCSI-2 hard drive
- integrated intelligent UPS (optional)
- optional second hard drive for Fax Response option only
- 525-watt AC power supply
- keylock
- Ethernet PCI Network Interface Card (optional) provides connectivity to Thicknet, Thinnet (coax), and 10Base-T (twisted pair) network types
- Token Ring Network Interface Card (optional) provides connectivity to both Type 1 (shielded twisted pair) and Type 3 (unshielded twisted pair) network types. (The interface card is fully software configurable and supports both 4 and 16 Mbyte/second Token Ring transfer rates.)
- 4-port fax board (optional) provides four RJ-11 jacks per card, each of which supports one analog phone line.

Figure 3-1 shows the side view of the Meridian IVR application processor.

Figure 3-1
Application processor (AP) side view

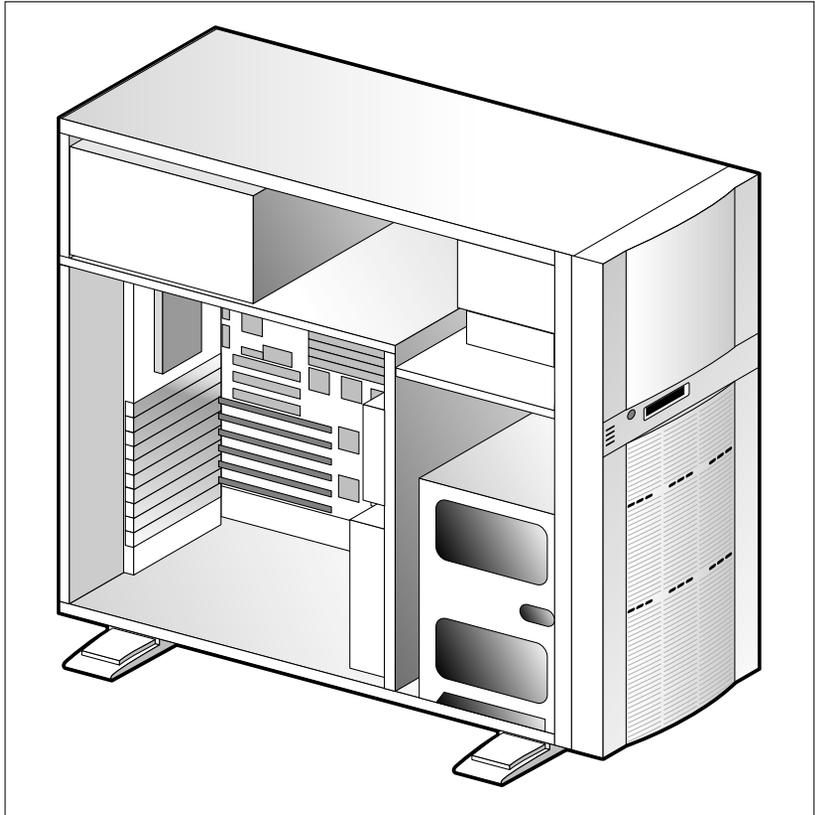
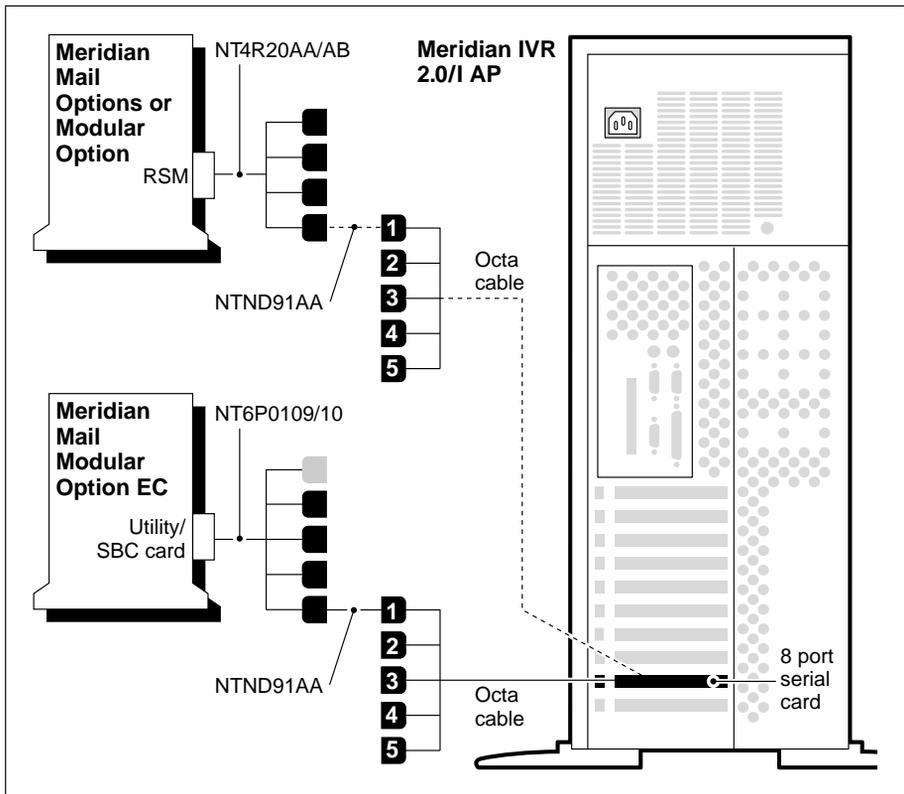


Figure 3-2 illustrates the Meridian IVR Release 2.0/I hardware components for a single application processor (up to 96 channels) configuration, when connected to a Meridian Mail system.

Figure 3-2
Meridian IVR Release 2.0/I configuration



Core hardware components

AC power supply

The application processor operates on an AC power supply.

Monitors

A 17-inch SVGA monitor is recommended for a Development system, and a 14-inch or 17-inch (optional) SVGA monitor is recommended for a Run-Time system.

Tape drive

The 2.5 Gbyte tape drive is used for software reinstallation, upgrades, and backup.

Serial communications card

This card provides eight serial RS-232 connections which can be used for a variety of purposes including host connectivity.

Remote support modem

The remote support modem is a 14 400 (v.32 bis) baud external modem.

Key lock security device

The software key lock is initialized by Nortel manufacturing with a custom serial number. The purpose of the software key lock is to ensure that the Meridian IVR software is installed on the system for which it was purchased.

UPS

An integrated intelligent uninterruptible power supply (UPS) is used to protect the system against interruptions in power. The UPS can sustain power for approximately 50 minutes for a fully loaded Meridian IVR system.

Additional hardware components

The following lists the additional hardware components which comprise the Meridian IVR Release 2.0/I system:

Fax modem

The Dialogic internal fax modem (VFX/40E) is used to support the Meridian IVR Fax Response. The internal Fax modem has the following features:

- ITU-T G3 compliant (T.4, T.30), ETSI NET/30 compliant
- 14 400 (v.17) (max), 9600, 7200, 4800, and 2400 bps
- Automatic Rate Adaptation (fallback)
- Bus compatibility: IEEE P996 ISA compatible (IBM PC XT/AT)
- Telephone Interface (Trunk Type): Loop start

Hard drive

A second 1.2 Gbyte SCSI hard drive is used for additional storage on systems with Meridian IVR Fax Response installed.

Ethernet card

The Ethernet adapter card is used to connect the Meridian IVR system to an Ethernet network wired with IEEE 802 10Base2 or 10Base5 coaxial cable, or 10Base-T twisted-pair cable.

Host connectivity cards

The Express High Performance Adapter (RS-232) card is used to support IBM mainframe connectivity.

The Madge Token-Ring card is used to support Token-Ring connectivity.

Printer

An HP LaserJet 4M plus with PostScript Option is recommended for Development systems. A DEC LA75S Dot matrix printer is recommended for Run-Time systems.

Audio Line Interface

The Audio Line Interface allows the transfer of voice prompts from a standard audio tape device to Meridian IVR. It is required when voice prompts recorded in a studio are loaded onto a Meridian IVR system via the Voice Prompt Editor at a later time.

Meridian Mail hardware system interface

This section provides an overview of the equipment that comprises the Meridian hardware system interface to the Meridian Mail voice processing platform.

Meridian 1 Switch

The interface to the telephone network is provided by the Meridian 1 switch. The Application Generator interacts with phone lines through the Meridian ACCESS Application Programming Interface (API). Notification of incoming calls, call hang-up, call transfer, and so on is passed to the Application Generator via the Meridian ACCESS API. A minimum of Meridian 1 X11 software Release 14.0 is required.

MSM and non-Nortel switches

Meridian IVR Release 2.0/I supports non-Meridian 1 switch connectivity (Simple Message Desk Interface [SMDI] system configurations) with any switch to which a Meridian Mail (GP or Message Service Module [MSM]) can be connected. This includes Nortel's DMS/SL-100 (BCS28 or later), and selected releases of switches from AT&T, Rolm, and NEC.

Meridian Mail module

The Meridian Mail module handles the call and voice processing activities such as Dual Tone Multi-Frequency (DTMF) collection, voice compression/decompression, and interface to the switching module. All Application Generator interaction with the Meridian Mail module is achieved through the Meridian ACCESS API Toolkit. A minimum of Meridian Mail Release 8 is required.

Global regulatory approvals

All new hardware is tested in order to comply with the regulatory standards for each country in which Meridian IVR is introduced.

Chapter 4: Meridian IVR documentation

Overview

Meridian IVR NTPs are packaged for two audience groups:

- developers who will use the Development NTP package
- operators or administrators who will use the Operational NTP package

Primary references

The Meridian IVR documentation suite is comprised of the following publications:

Development NTPs

These NTPs are for use by developers to develop and run Meridian IVR applications. The following skills are assumed:

- basic programming principles and telecommunications knowledge
- "C" programming in UNIX
- intermediate to advanced UNIX knowledge

This package is comprised of the following documents:

- *Meridian IVR Application Development Guide* (NTP 555-9001-310)
- *Meridian IVR 3270 Gateway Development Guide* (NTP 555-9001-312)
- *Meridian IVR SQL Server Guide* (NTP 555-9001-314)
- *Meridian IVR VT100 Gateway Development Guide* (NTP 555-9001-316)
- *Meridian IVR 5250 Gateway Development Guide* (NTP 555-9001-318)

Meridian IVR Application Development Guide (NTP 555-9001-310)

This document provides information and procedures for developing Meridian IVR applications. These include

- using the Application Editor
- using cells and the Database Editor
- creating applications

Meridian IVR 3270 Gateway Guide (NTP 555-9001-312)

This guide is intended for application developers whose voice applications require access to mainframe resources through the 3270 communications protocol.

This guide provides an overview of the 3270 communications protocol and the features of the Meridian IVR 3270 Gateway. It provides a description of how to install and configure the 3270 Gateway to enable the Meridian IVR application to access 3270 applications running on a mainframe.

The application developer is guided through defining 3270 transactions with template files and the creation of the call-flow interface.

Meridian IVR SQL Server Guide (NTP 555-9001-314)

This guide is intended for application developers whose voice applications require access to mainframe resources through an SQL server.

This guide provides an overview of the SQL server communications protocol needed, and a description of how to install and configure the SQL server to enable the Meridian IVR application to access SQL applications running on a mainframe.

The application developer is guided through defining SQL transactions with template files and the creation of the call-flow interface.

Meridian IVR VT100 Gateway Guide (NTP 555-9001-316)

This guide is intended for application developers whose voice applications require access to mainframe resources through the VT100 communications protocol.

This guide provides an overview of the VT100 communications protocol and the features of the Meridian IVR VT100 Gateway. It provides a description of how to install and configure the VT100 Gateway to enable the Meridian IVR application to access VT100 applications running on a mainframe.

The application developer is guided through defining VT100 transactions with template files and the creation of the call-flow interface.

Meridian IVR 5250 Gateway Guide (NTP 555-9001-318)

This guide is intended for application developers whose voice applications require access to mainframe resources through the 5250 communications protocol.

This guide provides an overview of the 5250 communications protocol and the features of the Meridian IVR 5250 Gateway. It provides a description of how to install and configure the 5250 Gateway to enable the Meridian IVR application to access 5250 applications running on a mainframe.

The application developer is guided through defining 5250 transactions with template files and the creation of the call-flow interface.

Operational NTPs

These NTPs are for use by customers who will run applications created by the Developer group. They are

- technicians who will install and maintain the systems
- system administrators who will run the systems

Operational technicians should be familiar with Meridian Mail and have a basic knowledge of UNIX. System administrators do not require UNIX experience.

This package is comprised of the following documents:

- *Meridian IVR Product Guide* (NTP 555-9001-010)
- *Meridian IVR Planning and Engineering Guide* (NTP 555-9001-200)
- *Meridian IVR Installation Guide* (NTP 555-9001-210)
- *Meridian IVR System Administration Guide* (NTP 555-9001-300)
- *Meridian IVR Getting Started Guide* (NTP 555-9001-302)
- *Meridian IVR Fax Application Guide* (NTP 555-9001-350)
- *Meridian IVR Maintenance and Diagnostics Guide* (NTP 555-9001-500)

Note: Operational NTPs are supplied for all Run-time systems. The Fax Application guide which is included with the operational NTPs also contains information on fax application development.

Meridian IVR Product Guide (NTP 555-9001-010)

This document provides a high-level overview of Meridian IVR 2.0/I. Basic information about the hardware, software, connectivity, and the system configuration is provided.

Meridian IVR Planning and Engineering Guide (NTP 555-9001-200)

This document provides task-based information and procedures for planning and engineering Meridian IVR systems. These include

- determining pre-configuration requirements
- determining service requirements
- packaging
- planning an expansion

Meridian IVR Installation Guide (NTP 555-9001-210)

This document provides task-based information for installing a Meridian IVR system. This includes

- installing the Meridian IVR 2.0/I system hardware and software
- upgrading a Meridian IVR system
- testing the installation
- verifying the installation
- configuring Meridian IVR for customer applications
- trouble locating and clearing (troubleshooting)
- routine maintenance (backups)

Meridian IVR System Administration Guide (NTP 555-9001-300)

This guide explains the procedures to be used for configuring and maintaining a system. These include

- using the backup tool
- using the Voice Prompt Editor
- allocating system resources
- managing prompts
- managing applications
- generating reports

Note: This document contains basic information on the character-based user interface (accessed remotely). It provides an overview and explains the differences between the graphical and character-based interfaces.

Meridian IVR Getting Started Guide (NTP 555-9001-302)

This document provides basic information for navigating through the Meridian IVR application development Graphical User Interface (GUI).

Meridian IVR Fax Application Guide (NTP 555-9001-350)

This is a detailed, task-oriented manual which provides information on the Meridian IVR 2.0/I Fax feature. This guide describes how to perform the following key activities:

- sending and scheduling faxes for delivery
- viewing/editing faxes
- customizing faxes with logos and/or signatures

Meridian IVR Maintenance and Diagnostics Guide (NTP 555-9001-500)

This guide is intended for personnel who are responsible for maintenance and diagnostics of the Meridian IVR system hardware and software. This guide provides information on the following topics:

- diagnostics strategies
- system support utilities
- fault isolation
- maintenance procedures
- error messages

Secondary references

Meridian Mail interface

Meridian Mail is the voice processing platform for Meridian IVR. Consult the applicable Nortel publications (NTP 555-70x1-xxx) for information concerning Meridian Mail.

Online documentation

Meridian IVR has a built-in help facility which provides general information and help for menu items and cells.

CDROM distribution

The Meridian IVR documentation is available on the Meridian 1 CDROM (a separately orderable item). All of the documentation discussed in this chapter (excluding third party documentation) is distributed on the Meridian 1 CD-ROM.

Third party documentation

Third party documentation for external peripherals or cards inside the AP is also provided. This documentation is for reference only. Maintenance and diagnostics procedures described in the *Meridian IVR Maintenance and Diagnostics Guide* (NTP 555-9001-500) should be followed for troubleshooting.

Meridian IVR

Product Guide

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Customer Documentation
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