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CallPilot

Planning and Engineering Guide

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NORTEL NETWORKS™

CallPilot

Planning and Engineering Guide

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Overview

In this guide

The *CallPilot Planning and Engineering Guide* provides descriptive information and instructions for selecting and planning your CallPilot system.

The process of planning and engineering involves determining the best size, platform, and location for your CallPilot system. This guide provides information about the various tools available to help you with this task.

As a framework for beginning your planning and engineering activities, some questions to consider are listed below.

Questions to consider

- What is the LAN connectivity for PCs?
- Which CallPilot server will you use?
- Where will you locate the servers and how will you connect them?

This guide helps you to find answers to these questions.

What's new in Release 2.0?

Introduction

This section describes the new features of CallPilot 2.0 that are described in this guide.

Web-based features

With CallPilot 2.0, you no longer need to install CallPilot Administration Client software. You can administer the CallPilot Server from any PC equipped with a web browser, such as Internet Explorer or Netscape, using CallPilot Manager.

CallPilot Reporter is also web-based for CallPilot 2.0.

Switches supported in CallPilot 2.0

This guide provides planning and engineering information for the following switches:

- Meridian 1
- Succession CSE 1000

Hardware platforms supported in CallPilot 2.0

CallPilot 2.0 supports the following platforms:

- 1002rp
  The 1002rp platform is new for CallPilot 2.0.
- 1001rp
- 702t
- 201i
- 200i

Skills you need

Introduction

You need certain skills and knowledge to use this guide effectively.

Nortel Networks product knowledge

Knowledge of, or experience with, the following Nortel Networks products is helpful:

- Meridian 1
- Meridian Mail
- Succession CSE 1000
- CallPilot 1.07

PC experience or knowledge

Knowledge of, or experience with, the following PC products is helpful:

- Microsoft Windows NT
- Microsoft Windows 95, 98, 2000, or XP

Other experience or knowledge

Other types of experience or knowledge that may be useful include

- network management
- client-server systems
- flowcharting

Other resources

The following documents and tools may be useful in engineering a CallPilot system:

- CallPilot 2.0 General Release Bulletin
- Meridian Client Compatibility Check utility
- Meridian Mail comparison
- Product Bulletins
- CallPilot Engineering Spreadsheet

To obtain the above resources, contact your Nortel Networks distributor. If you are a Nortel Networks distributor, you can obtain these documents from the CallPilot area of the Partner Information Center (PIC) web site at http://my.nortelnetworks.com.

Related information products

Introduction

The following CallPilot technical documents are available on the Documentation CD-ROM that you receive with your system. You can search the entire suite of documentation online, or you can print part or all of a guide.

Planning and engineering guides

Use these guides before you install CallPilot to help you plan your system, and to plan a migration of data from Meridian Mail to CallPilot.

Document titles
Planning and Engineering Guide
Meridian Mail to CallPilot Migration Utility Guide

Installation and configuration guides

These guides describe how to install hardware and software for the CallPilot server, client, and unified messaging. Instructions for configuring the switch are also provided.

Document titles
201i Installation and Configuration Guide
702t Installation and Configuration Guide
1001rp Installation and Configuration Guide
1002rp Installation and Configuration Guide

Document titles
Desktop Messaging Installation Guide

Administration guides

These guides provide specialized information to help you configure CallPilot, administer and maintain it, and use its features.

Document titles
Getting Started Quick Reference Card
Administrator's Guide
Reporter Guide
Application Builder Guide
Desktop Messaging Administration and Maintenance Guide

Networking guides

These guides describe how to plan, install, set up, and troubleshoot networking services.

Document titles
Networking Enhancements Guide
Network Planning Guide
AMIS Implementation and Administration Guide
Integrated AMIS Implementation and Administration Guide
NMS Implementation and Administration Guide

Document titles
Enterprise Implementation and Administration Guide
VPIM Implementation and Administration Guide

End user guides

These guides are intended for end users of CallPilot, such as phoneset users and Unified Messaging users, and are available on either CD or the Web.

Document titles
Multimedia Messaging User Guide
Speech Activated Messaging User Guide
Desktop Messaging Quick Reference Guide
Desktop Messaging User Guide

Using the online Help, guides, and tutorials

CallPilot contains three online sources for information:

- In CallPilot Manager, choose Help → Admin Assistant to find comprehensive help on administrative tasks.
- Online guides provide detailed conceptual information, as well as information on how to perform detailed tasks.
- Online tutorials provide a complete product overview, as well as specific information on how to use Application Builder.

You can access all information using either the Help menu or Help buttons.

Contacting technical support

Contact your distributor's technical support organization to get help with troubleshooting your system.

Contacting Nortel Networks

If you have comments or suggestions for improving CallPilot and its documentation, contact Nortel Networks at the following web site address:

http://www.nortelnetworks.com/callpilot_feedback

Components of a CallPilot system

Introduction

Before you can start planning, you must understand the key components that must be provisioned, and how these components interact with one another. This section provides a high-level overview of these concepts. For more details, refer to the *CallPilot Installation and Configuration* binder for your server.

System components

A CallPilot system consists of three key components: switch, server, and PC. Unified Messaging is an optional feature that can be installed on desktop PCs. For Web Messaging, a web server is another optional component (supplied by the customer), which allows desktop PCs to access messages using a web browser, such as Netscape or Internet Explorer.

Switch types

Switch types that are compatible with CallPilot include models of these switch families: Meridian 1 and Succession CSE 1000. Complete compatibility details are outlined later in this guide.

Server types and connection methods

The server can be an IPE (200i or 201i), a tower (702t), or a rackmount (1001rp or 1002rp) platform. The Meridian 1 and Succession CSE 1000 use the same connectivity method: Embedded LAN (ELAN) and IPE network loop through the MGate card.

Desktop PCs

You use a PC with a web browser to access CallPilot Manager to maintain and administer the CallPilot software, as well as to view reports.

A PC or wireless device with Desktop Messaging installed can download messages from the CallPilot server. A web server allows desktop users to access messages using a web browser.

What needs to be provisioned?

The following components must be provisioned:

- CallPilot server
- PC for CallPilot administration and Reporter
- switch resources related to CallPilot
- desktop client PCs, if the Desktop Messaging feature is required
- web server for Web messaging, Reporter, and CallPilot Manager

Note: The web server and CallPilot Manager functionalities reside on the CallPilot server, since both are automatically installed. A separate web server is not required for CallPilot Manager administrator or My CallPilot end-user web services. However, if CallPilot Reporter is desired for management reporting, then a separate web server is needed.

Component list

For component lists for each CallPilot server platform, refer to the *Ordering Procedures Bulletin*.

To obtain this document, contact your Nortel Networks distributor. If you are a Nortel Networks distributor, you can obtain this document from the CallPilot Partner Information Center (PIC) web site at http://my.nortelnetworks.com.

Chapter 2

System configurations

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Overview

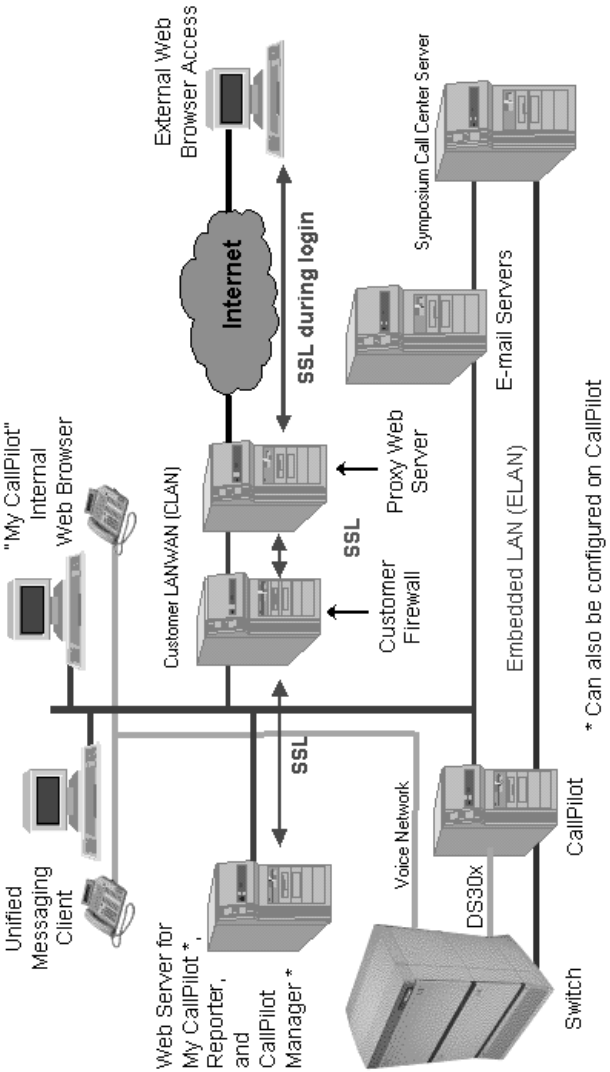
Introduction

This chapter provides an overview of the system configurations supported by CallPilot. It helps you to understand the system, and the hardware and software components that must be provisioned.

For more details on CallPilot network layout (for example, interaction between the switch and the server), refer to the *CallPilot Installation and Configuration Guide* for your server.

CallPilot architecture

The following diagram provides an overview of the CallPilot architecture:



The following list describes CallPilot's use of LAN connections and web servers within the CallPilot architecture:

- CallPilot connects to the M1 and Succession CSE 1000 via the Embedded LAN (ELAN), which is also used by other Nortel Networks applications for signaling.
- CallPilot connects to the M1 and Succession CSE 1000 via the Embedded LAN (ELAN) via DS30X TDM connection(s) for voice.
- CallPilot connects directly to the users' PCs via the Customer LAN (CLAN). CallPilot does not directly communicate with the e-mail servers.
- CallPilot utilizes an external IIS web server to provide management and end-user web services.

Supported server platforms

You can install CallPilot software on a tower (702t) or rackmount (1001rp or 1002rp) platform. The tower and rackmount platforms can connect to any of the supported switches.

You can also install the CallPilot software on a 200i or 201i server that resides in the Intelligent Peripheral Equipment (IPE) shelf on a Meridian 1 or the media gateway of the Succession CSE 1000.

Supported switches

Based on the server you choose, CallPilot supports the following switches:

- Meridian 1 (supported by all CallPilot servers)
- Succession CSE 1000 (supported by all CallPilot servers, except 200i)

For information about the hardware and software requirements, see page 33. For information about the connectivity requirements, see Section B: "Connectivity requirements," on page 41.

Web server for CallPilot administration

CallPilot Manager, Reporter and My CallPilot are web-based applications. All of them require a web server. In particular, a customer-supplied Microsoft Internet Information Server (IIS) web server is required for CallPilot Reporter. In the case where you are just running CallPilot Manager, My CallPilot, or both, CallPilot can be used as the web server.

Users connect to these web applications using a web browser, such as Internet Explorer 5.x or Netscape Navigator.

The web server hard drive requires free space in the range of 1.0 Gbyte or greater for CallPilot web services, and to host the database of operational measurements.

See “Web server for CallPilot” on page 35 for more information.

My CallPilot web server

If you are using the My CallPilot web server feature, you need a Microsoft Internet Information Server (IIS) web server. For information about the minimum configuration requirements, see page 39.

Desktop Messaging client

A PC running Windows 95, 98, 2000, NT, or XP can run the Desktop Messaging client that is available with CallPilot. The following Desktop Messaging clients are supported by CallPilot:

- Desktop Messaging for Microsoft Outlook
- Desktop Messaging for Lotus Notes
- Desktop Messaging for Internet Mail clients
- Desktop Messaging for Novell GroupWise
- My CallPilot Messaging for Web Browsers (Internet Explorer and Netscape Communicator)

For information about the minimum configuration requirements, see page 39.

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CallPilot server

Introduction

This section summarizes the hardware and software requirements for the CallPilot server.

Hardware

CallPilot is an application built on the CallPilot server hardware platform. The CallPilot platform for Release 2.0 consists of a tower chassis (702t), rackmount chassis (1001rp or 1002rp), or a server that fits into the IPE shelf of a Meridian 1 or Succession CSE 1000 switch (200i or 201i). You can connect the tower and rackmount platforms to any of the supported switches.

Software

The software configuration consists of the following items:

- the server operating system

  The CallPilot server uses the Windows NT Server 4.0 operating system with Service Pack 6a, and all applicable Microsoft security hot fixes.
- CallPilot software
- third-party software

Compatibility with other products and environments

Meridian Mail

CallPilot can coexist with Meridian Mail on the Meridian 1 switch. You can network CallPilot with Meridian Mail systems that use one or more of the following network protocols:

- AMIS-Analog Networking

- Enterprise Networking
- VPIM Networking using Meridian Mail Net Gateway

However, there are limitations. See page 77 for details.

Meridian 1 Multi-Tenant

CallPilot supports users on a multi-tenant Meridian 1 switch as if they were on a single-tenant system. CallPilot

- can only support a single customer of a Multi-Customer M1
- does not know to which Meridian 1 tenant a user belongs
- has no administration or billing features by tenant

Custom Controlled Routing

CallPilot 2.0 does not support Custom Controlled Routing (CCR).

Internet Telephony Gateway

AMIS-Analog and Enterprise Networking are supported with Internet Telephony Gateway (ITG) 1.1 (version 1.0.34 or later).

Network Message Service is supported by ITG 2.0. However, there are additional considerations for implementing Network Message Service over Voice over IP (VoIP) networks with CallPilot. Refer to product bulletins on the implementation ofVoIP and voice messaging.

Third-party Windows NT Server software and hardware

Only third-party applications that have been explicitly identified as CallPilot-supported by Nortel Networks can be installed on a CallPilot server.

Currently, the following third-party software is authorized to be installed on CallPilot:

- Computer Associates eTrust InoculateIT 4.53
- McAfee NetShield for Windows NT 4.5
- Symantec Norton AntiVirus version 2001 / v7

See Product Bulletin 2002-035 rev 1 for more details on implementing antivirus software on CallPilot.

Installation of non-recommended third-party Windows NT Server software or hardware can destabilize the system, degrade its mission of providing real-time call processing performance, and disrupt its Year 2000 (Y2K) conformance. For details, refer to Product Bulletin 99067, “CallPilot Unauthorized Hardware and Software.”

See also

For detailed information on the capacity of the servers, refer to Chapter 4, “Engineering the server.”

Symposium Call Center server

CallPilot 2.0 support of Symposium Call Center Server

CallPilot 2.0 provides integrated voice services to Symposium Call Center Server 4.2. CallPilot 2.0 brings the same capabilities as Meridian Mail to Symposium Call Center Server. Look for the product bulletin on specifics for implementing this integration.

CallPilot 2.0 can coexist with Symposium Call Center Server and Symposium Express on the same Meridian 1 switch and ELAN and CLAN. Signaling between CallPilot and Symposium Call Center Server travels over the ELAN and CLAN.

CallPilot supports the following voice processing element commands:

- Give IVR
- Give Controlled Broadcast Announcement
- Collect Digits
- Play Prompt
- Open…End Voice Session

CallPilot and Symposium Call Center Server voice services

For CallPilot 2.0 to work with Symposium Call Center Server 4.2 and its voice services, Symposium Call Center Server requires SU-7 or later. The CallPilot voice channels used to provide voice services to the Call Center must be dedicated to Symposium Call Center Server and can not be used for general messaging traffic. Additionally, the CallPilot voice channels for Symposium Call Center Server are further partitioned into two groups, one for “Give IVR” and the other for“Advanced Voice Processing” services.

Besides dedicated voice channels, no additional software options are required on CallPilot to integrate with Symposium Call Center Server.

Migration to CallPilot from Meridian Mail

Migration to CallPilot from Meridian Mail provides for full prompt migration by tape.

Full prompt migration also provides

- no prompt renumbering
- no required Symposium Call Center Server scripting changes
- support for deleting unused prompts
- extended prompt sizes
- enhanced editing control using third-party software, such as PeriStudio

As well, the Call Center can be split between Meridian Mail and CallPilot for voice services. ACCESS applications need to migrate all at once.

Note: For more information on migration, refer to the *Meridian Mail to CallPilot Migration Utility Guide* and Appendix A, "Migrating from Meridian Mail to CallPilot" in the *Nortel Networks Symposium Call Center Server Voice Processing Guide, Product Release 4.2*.

CallPilot AppBuilder

CallPilot AppBuilder replaces the Symposium Call Center ServerVoice Prompt Editor. AppBuilder offers WAV format import and enhanced "prompt production" using third-party editing software.

Switches and Voice over IP systems

Introduction

This section identifies the switches and Voice over IP (VoIP) systems that are supported by CallPilot 2.0.

Meridian 1 switch

The supported Meridian 1 platforms include

- Option 11C
- Option 11C Mini
- Option 81
- Options 51C through 81C

For North America, you need Release 23.55 or higher. For Europe, you need Release 24 or higher. For additional details on required software and packages, refer to Part 3 of the *CallPilot Installation and Configuration* binder.

For information about the connectivity requirements, see “Connectivity” on page 42.

Succession CSE 1000 (VoIP system)

The Succession CSE 1000 system includes

- fully installed and configured Succession CSE 1000 server
- Media Gateway
- Media Gateway Expansion (optional)
- connection to a TCP/IP network (the ELAN)

To support the CallPilot 201i server, the Succession CSE 1000 system requires software release X21 Release 1.0 or later.

To support the CallPilot 702t, 1001rp, or 1002rp servers, the Succession CSE 1000 system requires software release X21 Release 1.1 or later.

If X21 patches are required, this information is provided in the General Release Bulletin, available at http://my.nortelnetworks.com.

For information about the connectivity requirements, see “Succession CSE 1000” on page 53.

Web server for CallPilot

Introduction

CallPilot 2.0 has three web services that must be hosted on a Microsoft IIS web server running either on CallPilot or an external customer-supplied Windows NT or 2000 server. The three CallPilot web services are

- CallPilot Manager – system configuration and management
- Reporter – reporting
- My CallPilot – End user mailbox configuration, messaging and documentation

This section provides the hardware, software, networking, and engineering considerations for planning web servers.

CallPilot web service

Configurations

There are two principle web server configurations:

1. All three web services on External IIS Server – Recommended

   This configuration provides better security. The customer's IT department can manage and apply the latest IIS security approaches to the server. The IIS on CallPilot can be disabled altogether and, thus, remove a target for hacker attack.

   Note: While the IIS on CallPilot is preconfigured with the best security practices available, if it is not needed, disabling it on CallPilot completely shuts the door to attacks on IIS.

2. Hybrid

- My CallPilot on CallPilot server
- CallPilot Manager and Reporter on External IIS Server

Notes:

1. CallPilot Reporter cannot be installed on the CallPilot server. The "bursty" CPU loads from running reports are inconsistent with CallPilot server's mission as a real-time application environment.
2. When CallPilot Reporter is configured on an external IIS server, CallPilot Manager is also installed.
3. CallPilot Manager and My CallPilot can be installed on both CallPilot and the external IIS server, although this is not the recommended configuration.

CallPilot web service configuration

CallPilot comes pre-engineered to support My CallPilot or CallPilot Manager IIS web services, or both, and still provide high service levels to all other services running on CallPilot. End-user and administrator web browsers access the IIS server on CallPilot via the CallPilot IP address on the CLAN. There are no additional engineering considerations. However, as noted above, if there are no web services running directly on CallPilot, the IIS server can be disabled to increase security.

External web server configuration

The external web server, which hosts the CallPilot web services, networks to the CallPilot server via CallPilot's IP address on the CLAN.

Hardware

Since web messaging through My CallPilot and Reporter web services can generate high CPU loads, the minimum recommended hardware configuration for the external web server is

- 600 MHz PIII system
- 128 Mbytes of RAM

Software

The external web server requires the following software:

- Microsoft Windows NT 4 Server with Service Pack 6a and Option Pack 4, IIS 4 and applicable Microsoft security hot fixes

or

- Windows 2000 Server with IIS 5 and applicable Microsoft security hot fixes
- If SSL is to be used, you must purchase and install an additional IIS certificate from the vendor.

Free disk space

As a quick rule of thumb, there should be 1 Gbyte of free disk space on the server before installing the CallPilot web services. If the Reporter service is going to be used for a large CallPilot system or a network of CallPilot systems, Nortel Networks recommends that the free disk space be estimated using the following formula:

Free Disk Space = 300MB + (Total # of Channels * (Days in DB + 1) * 0.2 MB)

where

Total # of Channels is the total number of channels on all CallPilot systems whose data is in the Reporter database.

Days in DB is the number of days data will be stored in the Reporter database.

Engineering the server

The following factors drive the web server load from CallPilot services:

- the number of users of My CallPilot
- the number of users accessing messages from My CallPilot versus using desktop messaging clients such as Outlook
- the number of reports generated during busy hours

The server does not have to be dedicated to CallPilot web services, but it is recommended. The same server can host other web pages or also provide standard network services, such as printing and file sharing. However, running other applications and services on the server may cause slow response levels for CallPilot services that significantly lower user productivity and satisfaction with the services.

Monitoring performance

As with any web server, the performance should be monitored following an installation or major change, such as adding more users, to check for possible system overload. If response time is slow during the busy hour, you can monitor the level of activity on the web server to see if it is overloaded. Windows NT Performance Monitor can provide this information. The two main indicators to monitor are CPU usage and available memory. If the CPU usage (shown as Processor Time) is constantly above 90 percent for a number of minutes during the busy hour or memory availability (shown as Available Bytes) is ever below 4 Mbytes, or both, then user response time is likely degraded.

Web browsers supported

CallPilot web services can be accessed from a Windows PC with Netscape 6.2 or higher, or an Internet Explorer 5.0 or higher web browser.

Application builder

The administrative service, Application Builder, that is used to build voice menus and auto attendant application services, still requires a client to be installed on the administrator's PC. However, the client can be downloaded, on demand, onto the PC from CallPilot Manager web service.

CallPilot desktop messaging

PC requirements

CallPilot is compatible with Windows 95, 98, 2000 Professional, XP, and NT SP6a.

Clients

The following section lists the desktop messaging clients that CallPilot supports, and the software requirements for each client:

Desktop messaging for Microsoft Outlook

The Microsoft Outlook client requires

- Microsoft Outlook 98
- Microsoft Outlook 2000
- Microsoft Outlook 2002

Desktop messaging for Lotus Notes

The Lotus Notes client requires Lotus Notes version 5.0.

Desktop messaging for Internet Mail clients

The Internet Mail client requires

- Microsoft Outlook 2000
- Microsoft Outlook 98 and 2000 (in Internet Mail mode)
- Microsoft Outlook 2002 (Microsoft Office XP client) if you are using it as an IMAP client
- Microsoft Outlook Express
- Netscape Mail (part of Netscape Communicator, version 6.2 or higher)
- Qualcomm Eudora Pro CommCenter (version 5.x)

Desktop Messaging for Novell GroupWise

The Novell GroupWise client requires

- Groupwise 6.x
- Windows Messaging 4.0

  Note: Networking TCP/IP must use the Microsoft protocol stack in the Novell Netware network. The disk space required for the software is 20 Mbytes.

Desktop messaging for Web Browsers

The Web Browser client requires

- Microsoft Internet Explorer, version 5.x or 6.x on Windows 95B, Windows 98 SE, Windows XP, or Windows NT Workstation SP6a
- Netscape Navigator, version 6.2x on Windows 95B, Windows 98 SE, Windows XP, or Windows NT Workstation SP6a

Disk storage for messages

CallPilot uses a proprietary sub-band voice encoding at 18 kbps. To calculate the storage used for voice in the CallPilot message store of desktop messaging, use the following conversion factor:

141 kbytes = 1 minute of voice (SBC or VBK)

Note: Messages are kept in the message store on the PC only if they are played via the PC.

If a voice message is converted and saved to disk as WAV, then use:

945 kbytes = 1 minute of voice (WAV)

See also

For more information on the desktop messaging software available with CallPilot, refer to the *Desktop Messaging Quick Reference Guide* and the *Desktop Messaging User Guide*.

Section B: Connectivity requirements

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Connectivity

Overview

CallPilot uses both LAN and voice switch connectivity.

It connects to the customer's IP network through the CLAN, and to the Nortel Networks voice system through the ELAN and a proprietary TDM (DS30x) connection(s). For more information, refer to "CallPilot architecture" on page 23.

Customer LAN connections

Introduction

CLAN connectivity is required for

- Unified Messaging
- VPIM networking
- SNMP Network Managers
- CallPilot web services: CallPilot Manager, Reporter, My CallPilot

Hardware requirements

You must provide your own LAN hub and associated cables for the connection of your LAN/WAN (not switch, implying the M1) to the CallPilot server.

Supported LAN topologies

The following CallPilot platforms either support one or both of the Ethernet CLAN topologies, as identified in the following table:

CallPilot platforms	Ethernet: 10 Mbps	Ethernet: 100 Mbps
200i	✔	
201i	✔	✔
702t	✔	✔
1001rp	✔	✔
1002rp	✔	✔

Supported network protocols

CallPilot supports only the Windows TCP/IP protocol stack (Windows TCP/IP networking) on client PCs. CallPilot does not support Novell's IPX/SPX or TCP/IP protocol stack on client PCs. However, CallPilot can coexist on networks running both IPX/ SPX and other protocols as long as Windows TCP/IP is used for CallPilot client-server communication.

CLAN traffic considerations

You must ensure that the CLAN has the appropriate bandwidth capacity to handle the traffic between the client PCs and the CallPilot server. When calculating bandwidth capacity calculations, consider the following facts:

Traffic type	Bandwidth
Desktop traffic from CallPilot to a desktop client or the web server	One minute of voice consumes 200 kbytes. One page of fax averages 55 kbytes.
My CallPilot web server traffic from the web server to the browser on the client PC	One minute of voice in WAV format consumes 60 kbytes. One minute of voice in VBK format takes 130 kbytes. One page of fax averages 40 kbytes.
VPIM Networking traffic	One minute of voice consumes 330 kbytes.

Data transfer rates

The following table identifies, per user, the average data transfer rates in Kbps:

Traffic type	Voice messaging	Fax messaging	Both
Desktop Messaging	0.09	0.06	0.15

Traffic type	Voice messaging	Fax messaging	Both
My CallPilot web server using WAV	0.12	0.10	0.22
My CallPilot web server using VBK	0.15	0.10	0.26

Notes:

1. Voice messaging rates assume that 60 percent of the voice messages are transferred across the customer data network, and the remaining 40 percent are retrieved by phone.
2. Fax messaging rates assume that 80 percent of the fax messages are transferred across the network, and that fax messaging users retrieve their fax messages with either a Desktop or My CallPilot web server client. The other 20 percent are retrieved via fax machine.
3. The transfer rates for My CallPilot web server files include the message transfer from CallPilot to the web server, and subsequent transfer from the web server to the web browser.
4. My CallPilot web server with VBK (CallPilot's proprietary encoding) requires that the Nortel Networks voice player be installed on the client PC.
5. The embedded player in My CallPilot plays messages in VBK format.

ELAN connections

About ELAN



Risk of severe performance degradation

It is essential that the customer's network not be connected to the ELAN to avoid severe performance degradation. This means that only Nortel Networks products should be connected to the ELAN hub.

An embedded LAN (ELAN) runs between CallPilot, Symposium, OTM, and the Meridian 1/Succession CSE 1000 system (see "CallPilot architecture" on page 23 for a diagram). This private 10BaseT LAN is implemented using MAU to 10BaseT transceiver(s) (for connection to the call processor), category 5 cables and a dedicated hub that can either be supplied by Nortel Networks or a third party. If CallPilot is being added to an existing system and an ELAN is already implemented, then only a category 5 cable is required to connect CallPilot to the ELAN hub.

CallPilot performs real-time call control signaling to the Meridian 1 or CSE 1000 system over the ELAN using the proprietary AML protocol (also used by Meridian Mail).

If the Meridian 1 and CallPilot power are protected via a UPS because the customer expects telephone and messaging service to continue through power disruptions, the ELAN LAN hub must also be on UPS power. If power is disrupted to the ELAN LAN hub, CallPilot service stops because the AML signaling link to the Meridian 1 is disrupted.

The ELAN is used for low delay, mission-critical signaling between the real-time services provided by CallPilot/Symposium and the Meridian 1 or Succession CSE 1000 systems using the proprietary AML protocol (also used by Meridian Mail). This is why it is essential to keep all other customer data traffic off the ELAN.

Elan connectivity requirements

The CallPilot server connects to the Meridian 1 switch through a proprietary DS30X TDM connection for voice and the ELAN for signaling.

With Option 81 systems, a separate embedded LAN (ELAN) connection is needed for each Call Processor.

The following hardware must be in place on the Meridian 1 to support the CallPilot server. All prices for referenced parts can be found in the current Meridian Product Catalog.

The Meridian 1 Option 51C-81C, 81 must be equipped with the appropriate Ethernet IOP/CMDU card or IODU/C cards to support connecting to the ELAN.

The following table provides a list of the Ethernet IOP/CMDU card or IODU/C cards to support connecting to the ELAN.

Note: The number in parentheses beside the card identifier indicates the number of cards required.

Meridian 1 switch	IOP card	Combo card	IODU/C card
Option 51C	NT6D63BA (1)	NT5D20BA (1)	NT5D61AA/BA (1)
Option 61C	NT6D63BA (2)	NT5D20BA (2)	NT5D61AA/BA (1)
Option 81C	----------	NT5D20BA (2)	NT5D61AA/BA (2)
Option 81	NT6D63BA (2)	NT5D20BA (2)	NT5D61AA/BA (2)

If the switch is on or upgraded to X11 Release 23.55 and, in the process, is also upgraded to IODU/C cards, then these cards also provide the Ethernet connectivity to the embedded LAN (ELAN).

The IODU/C card provides drive unit functions, as well as the input/output processing functions. The IODU/C card provides for the Ethernet connectivity to the embedded LAN, comparable to the capability provided by the IOP/CMDU cards list above.

Switch connectivity to the LAN hub referenced below is accomplished utilizing the following cables:

Option 11C – NTDK27AA (A0630723) (cable connects to CORE backplane position P1)

Option 51C/61C/81/81C – NT7D90CA (A0406481) (cable connects to CORE backplane slot 16 Position F)

A DB-15 to 10BaseT transceiver is required to convert for the DB-15 end of the Ethernet cable to 10Base-T. The RJ-45 end of the transceiver then can be cabled to the ELAN hub. Each site must get one or two DB-15 to 10Base-T transceivers depending on the number of COREs. DB-15 to 10Base-T transceiver (DB-15 to RJ-45) is available from any computer supply store, or order from Nortel Networks:

CPC	PEC	Description
A0795886	NTRH9069	Transceiver (MAU to 10Base-T)

Meridian 1

Introduction

The CallPilot server connects to the Meridian 1 switch using an ELAN. The ELAN uses the TCP/IP protocol at a speed of 10 Mbps.

CallPilot is supported on Meridian 1 Options 11C (11C Mini on 201i only), 51C, 61C, 81C, and 81.

Option 11C

The copper-connected Option 11C is not supported with CallPilot. If you are using a copper-connected Option 11C, you must upgrade to a Fiber Cabinet Option 11C to support the ELAN connection.

For a list of supported Meridian 1 switches, see “Supported switches” on page 24.

Tower and rackmount connectivity requirements

The tower (702t) and rackmount (1001rp or 1002rp) platforms connect to the IPE network loops through the MGate card. Each MGate card resides in the Meridian 1 IPE shelf and is connected to an MPB16-4 card in the CallPilot server using a 10 m (32.5 ft.) twisted pair cable.

The MGate card can support a maximum of 32 channels. A fully configured 96-channel tower or rackmount system requires three MGate cards.

The MPB16-4 board provides from 16 to 48 MPU resources, and DS0 channel connectivity to the Meridian 1 switch:

- The MPB16-4 board contains two embedded DSPs (2 x 8 MPUs =16 embedded MPUs).
- Up to four MPC-8 cards can be inserted in an MPB16-4 board (4 x 8 MPUs for each card = 32 additional MPUs).

- Each MPB16-4 board contains a maximum of 48 MPUs (16 embedded MPUs plus 32 additional MPUs from inserted MPC-8 cards).
- DS0 channel support equals the number of MPUs (again, a maximum of 48 DS0 channels).

For more details on CallPilot to Meridian 1 connectivity, refer to Part 3 of the *CallPilot Installation and Configuration* binder.

Required X11 software features

The following X11 Base software options are required for CallPilot:

46 - MWC (Message Waiting Center)

164 - LAPW (Limited Access to Overlays)

242 - MULI (Multi-User Login)

243 - Alarm Filtering

254 - (Phantom TN)

296 - MAT (Meridian Administration Tool)

The following X11 Options not included in base software are required for CallPilot:

41 - ACDB (ACD Package B)

77 - CSL (Command Status Link)

153 - X25AP (Application Module Link - AML)

214 - EAR (Enhanced ACD Routing)

215 - ECT (Enhanced Call Treatment)

218 - IVR (Hold in Queue for IVR)

247 - Call ID (for AML Applications)

324 - NGen (MAS Connectivity)

364 - NMCE (CallPilot)

M1 memory and real-time engineering

The M1 real-time impact of CallPilot is essentially the same as Meridian Mail for the equivalent call traffic.

Additional memory for the M1 may be required with the upgrade to X11 R23.55 or later. Refer to Product Bulletin 98097 for details.

CallPilot usage of M1 software resources

Ensure that sufficient software resources are provisioned on the Meridian 1 (that is, TN levels, ACD agents, CDNs, voice ports, and so on) to support CallPilot 1.0. CallPilot does not share Meridian 1 PBX resources with other applications.

Two CDNs: A primary CDN is required for most traffic. A secondary CDN is required for fax call answering.

One phantom TN/DN or dummy ACD Queue is required for each service that has an entry in the Service DN table (equivalent to the VSDN table of Meridian Mail). CallPilot's phantom TN/DN usage is the same as that for Meridian Mail.

Two ACD DNs: CallPilot uses one ACD Queue to manage its hardware channels, and another is required for the default DN.

ACD Agents: CallPilot uses one ACD Agent for each channel.

One phantom DN and one DID line per fax user with a virtual fax machine DN (optional).

DID lines for other services being accessed from outside the PBX.

M1 IPE resource requirements

For IPE server: 2 slots in Option 11C, 11C mini cabinet, or the IPE shelf

For Tower/Rackmount server: 1 IPE slot for each MGate card (32 voice channels/each MGate)

A non-blocking configuration recommended for the IPE shelf may require the provisioning of additional network loops to the IPE shelf. The IPE shelf vintage must be NT8D37BA / EC or later.

IPE (200i and 201i) platform connectivity requirements

The 200i and 201i servers occupy two slots in the Meridian 1 IPE shelf, and interface with the network loops through the IPE backplane. From the Meridian 1 switch perspective, the 200i and 201i servers appear logically equivalent to an XDLC. These servers contain one embedded DSP and can accept optional DSPs through inserted MPC-8 cards.

200i server

A 200i server supports up to 24 DS0 channels (8 embedded plus 16 through 2 optional MPC-8 cards).

The 200i server occupies two slots in the Meridian 1 IPE shelf but does not connect to the backplane for the second slot. Therefore, the 200i server is presented to the switch as one MGate card.

201i server

A 201i server supports up to 40 DS0 channels (8 embedded plus 32 through 4 optional MPC-8 cards).

The 201i server occupies two slots in the Meridian 1 IPE shelf and connects to the backplane for both slots to gain access to the DS30X associated with the second slot. Therefore, the 201i server is presented to the switch as two MGate cards.

Succession CSE 1000

Introduction

The CallPilot server connects to the Succession CSE 1000 system through its Media Gateway using an ELAN. Voice is routed through the Media Gateway and signaling is routed through the ELAN.

IPE (201i) connectivity requirements

The 201i server is installed directly into two of the Media Gateway or Media Gateway Expansion slots. Refer to the *CallPilot Installation and Configuration* binder for the 201i server for details.

Tower (702t) and rackmount (1001rp and 1002rp) connectivity requirements

The tower (702t) and rackmount (1001rp and 1002rp) platforms connect through Media Gateway with the MGate card. Each MGate card takes one slot in the Media Gateway or Media Gateway Expansion slots and is connected to an MPB16-4 board in the CallPilot server using a 10 m (32.5 ft.) twisted pair cable. Refer to the *CallPilot Installation and Configuration* binder, *Part 3: Succession CSE 1000 and CallPilot Server Configuration*, for details.

The MGate card can support a maximum of 32 channels. The maximum CallPilot tower/rackmount channel capacity on Succession CSE 1000 is 48 channels, which requires 2 MGate cards.

CallPilot uses the same media processing hardware with Succession CSE 1000 as with the Meridian 1. It uses up to 2 MPB16-4 boards, each with 48 MPU of DSP resource and 48 DS0 channel connectivity to the switch.

The MPB16-4 board is installed in the PCI bus of the tower or rackmount server. When multiple MPB16-4 boards are installed, an SCbus cable connects the boards.

Required Succession CSE 1000 software features

These software features are included in the Succession CSE 1000 Release 2.0 Basic Software Services Level - NTM400xx (dependent on regions and feature set level):

46 - MWC (Message Waiting Center)

164 - LAPW (Limited Access to Overlays)

242 - MULI (Multi-User Login)

243 - Alarm Filtering

254 - (Phantom TN)

296 - MAT (Meridian Administration Tool) – The MAT tool is not supported in CSE (only OTM 2.0), but this feature is enabled in the following:

41 - ACDB (ACD Package B)

77 - CSL (Command Status Link)

153 - X25AP (Application Module Link - AML)

214 - EAR (Enhanced ACD Routing)

215 - ECT (Enhanced Call Treatment)

218 - IVR (Hold in Queue for IVR)

247 - Call ID (for AML Applications)

324 - NGen (MAS Connectivity)

364 - NMCE (CallPilot)

Other Succession CSE 1000 requirements

Real-Time Engineering

CallPilot does have an impact on real time. The engineering tool performs the real-time engineering when a Succession CSE 1000 and CallPilot are provisioned together.

CallPilot usage of Succession CSE 1000 software resources

Ensure that sufficient software resources are provisioned on the Succession CSE 1000 (that is, ACD agents, CDNs, voice ports, and so on) to support CallPilot. CallPilot does not share Succession CSE 1000 resources with other applications. The following software resources are provisioned on the Succession CSE 1000 to support CallPilot:

- A primary CDN is required for most traffic, and a secondary CDN is required for fax call answering.
- One phantom TN/DN is required for each service that has an entry in CallPilot's Service DN table.
- One ACD Queue is used by CallPilot to manage its hardware channels, while a second ACD Queue is required for the default DN.
- An ACD Agent is required for each channel.
- One phantom DN and one DID line per fax user is required for a virtual fax machine DN (optional).
- DID lines are required for other services being accessed from outside the Succession CSE 1000.

Chapter 3

Determining system size

In this chapter

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Overview

Introduction

This chapter is intended to provide an overview of your enterprise capacity issues that you need to consider before you install CallPilot. Nortel Networks provides engineering tools that automatically calculate what type of system you need based on data you provide. This data comprises the number of users, application usage, and busy hour activity.

System sizing

Engineering tools

The following engineering tools are available from Nortel Networks:

- Meridian Configurator (North and South America)
- NetPrice (Europe, the Middle East, Africa, and Asia)
- CallPilot Engineering Spreadsheet in Microsoft Excel. This spreadsheet is available from the CallPilot area of the Partner Information Center (PIC) web site at http://my.nortelnetworks.com.

System requirements

Engineering tools are used to determine the size and capacities of the following:

- channel requirements
- DSP MPU requirements
- CPU real-time requirements
- the CallPilot platform having sufficient channel, DSP, and CPU real- time capacity to meet these requirements
- switch channel connectivity hardware
- DSP hardware

Channel requirements

The quantity of voice, fax, and speech recognition channels required to meet the customer needs are determined by estimating the busy hour traffic using a parameter-driven traffic model, and by looking up the corresponding channel capacity using a P05 Erlang C traffic table.

The parameters available for modeling traffic are described later in this chapter.

DSP MPU requirements

DSP capacity is calculated in terms of Multimedia Processing Units (MPU). The required DSP processing power is determined by the tool by using the following ratios:

- 1 MPU per voice channel
- 2 MPUs per fax channel
- 4 MPUs per speech recognition channel

Storage requirements

Storage capacity is calculated in terms of hours of voice. The tool estimates voice message storage requirements by multiplying the number of mailboxes by the minutes of voice per mailbox parameter. Storage for fax is estimated by multiplying the estimated pages of fax stored by a mix of the regular and fine storage densities:

212 pages of fax (normal) = 1 hour voice

106 pages of fax (fine) = 1 hour voice

CPU real-time requirements

With the introduction of CPU-intensive services such as E-Mail by Phone, which use host-based text-to-speech algorithms, it is necessary to now calculate the CPU load of a given set of applications. The engineering tool calculates the CPU load by estimating the total traffic in CCS for applications, messaging, and E-Mail by Phone services, multiplying by load factors per service type, and summing.

CallPilot platform

CallPilot is offered in three different platforms – IPE, Tower, and Rackmount. The tool checks the selected platform's capacity for channels, DSP MPU, and CPU Real-time against the calculated requirements and flags instances where the platform's capacity is exceeded.

Switch channel connectivity hardware

The tool provisions the necessary quantity of channel connectivity hardware to meet the channel requirements.

DSP hardware

The tool provisions the necessary quantity of DSP hardware to meet the DSP MPU requirements.

Customer requirements

Principal input

The principal input into these engineering tools are customer requirements. These requirements are the major driver of the capacity needed by the system. The following parameters must be completed as part of customer requirements:

Parameter	Initial value	Min.	Max	Comments
System Type (IPE, Tower, Rackmount)	None	NA	NA	The selection of any option enables all of the CallPilot inputs.
Voice Users	Blank	0	8000 for IPE systems and 20 000 for 702t Tower and 1001rp Rackmount systems; 40 000 for 1002rp Rackmount system.[a]	Enter the number of voice mailboxes.
Email by Phone Users	Blank	0	Less than or equal to Voice Mailboxes	Enter the number of mailboxes with Email by Phone using text to speech.

Parameter	Initial value	Min.	Max	Comments
Speech Activated Messaging	Blank	0	Less than or equal to Voice Mailboxes	Enter the number of mailboxes with Speech Activated Messaging.
Fax Users	Blank	0	Less than or equal to Voice Mailboxes	Enter the number of mailboxes with Fax Messaging.
Users with Single (Voice/ Fax) DN	Blank	0	Less than or equal to Fax Users	Enter the number of fax mailboxes with a Single DN used for both voice and fax access.
Desktop Messaging	Blank	0	5000 for IPE systems and 20 000 for Tower/ Rack systems	Enter the number of mailboxes with desktop messaging.
Users on NMS Satellite M1s	Blank	0	Less than or equal to Voice Mailboxes	Enter the number of mailboxes that will be used by users on one or more NMS satellite locations (remote M1 switches) via the NMS feature. **Note:** The maximum number of NMS satellite locations is 59. **Note:** This field is disabled when system connectivity is chosen for non-M1 switches.

Parameter	Initial value	Min.	Max	Comments
Switch: (M1, Succession CSE 1000)	None	NA	NA	Select a switch to determine the setup requirements for system connectivity. If the IPE System Type is selected, then the only choice available is Nortel M1 or Succession CSE 1000. Lastly, if CallPilot is ordered in conjunction with an M1 switch, then the only switch available is the M1. If CallPilot is ordered in conjunction with a Succession CSE 1000 switch, then the only switch available is the Succession CSE 1000.
Power (AC / DC)	AC	NA	NA	The AC and DC power options are available for the Rackmount system. The Tower comes only with AC, but by selecting DC, causes the configuration tool to provision a DC Power Inverter. Not applicable for IPE systems.
Number of Voice Menu Applications	2	0	2500	Enter the number of voice applications created by Application Builder.

Parameter	Initial value	Min.	Max	Comments
Number of Fax On Demand Applications	0	0	2500	Enter the number of Fax On Demand applications created by Application Builder.
Number of Symposium Channels	0	0	Max voice channel capacity for selected platform	Enter the number of voice channels that are dedicated to be used by Symposium Call Center Server.

a.Voice user maximums are limits to software license RTU only. That is, this is the maximum number of mailboxes that can be configured on a system. The actual limit to the number of voice users a CallPilot system can support with an adequate service levels is affected by many factors and can only be determined by using an engineering tool.

Channel requirements

Overview of channel types

There are three types of channel media – voice, fax, and speech recognition:

- Voice channels support voice services, such as Voice Mail.
- Fax channels can support both voice and fax services, such as Fax on Demand.
- Speech recognition channels support voice, fax, and speech-activated messaging services.

Sizing the number and type of channels

The following steps are used by the engineering tools:

1. Estimate the busy hour CCS for each channel type.
2. Look up the channel requirements in the Erlang C P05 traffic table. See "CCS values and channel requirements table" on page 111.

There are several approaches for estimating traffic.

Use default assumptions in the system sizing tools

The system sizing tools contain default assumptions for typical business usage levels for voice, fax, and speech-activated messaging. The various traffic modeling parameters and their default values are covered later in this section. Use the default traffic modeling parameter values to get the following overall channel sizing for different user population sizes.

Note: Percentages of feature usage stated in 2 and 3 on pages 67 and 68, depend on the nature of the customer business and may not be exact. Also, light or infrequent users of these features can be disregarded from a system engineering standpoint.

1. Channel requirements with no multimedia features:

Users	Voice	Fax	Speech rec.
100	4	0	0
200	6	0	0
500	12	0	0
1000	20	0	0
2000	36	0	0
5000	72	0	0

2. Channel requirements for users with multimedia feature usage:
   - 10% Mobile User (Speech Activated Messaging + Email By Phone)
   - 20% Fax Messaging
   - 50% Desktop Messaging

Users	Voice	Fax	Mobile user
100	4	2	2
200	6	4	2
500	12	6	4
1000	18	8	4
2000	32	14	6
5000	*	*	*

* not supported because it requires >96 MPU

3. Channel requirements for users with multimedia feature usage:

- 25% Mobile User (Speech Activated Messaging + Email by Phone)
- 50% Fax Messaging
- 100% Desktop Messaging

Users	Voice	Fax	Mobile user
100	4	4	2
200	6	6	4
500	10	10	4
1000	18	16	6
2000	*	*	*
5000	*	*	*

* not supported because it requires >96 MPU

Use estimates or measures of calls/faxes per day

If existing traffic reports are not available, but average calls or faxes per day are known or estimated, then you can determine the number of faxes/calls during the peak busy hour using

Peak Hour Traffic = 13% of daily traffic

Overview of voice traffic services

Principal services

The following are the principal services that generate traffic on voice channels:

- Voice Call Answering Service
- Voice Logon (Mail) Service
- Email by Phone on Voice channels
- Application Builder Services
  - Voice Menus
  - Auto Attendants
- Fax On Demand Requests
- Outcalling (Remote Notification and Delivery to Telephone)
- Networking (Enterprise and AMIS)

Provision the same number of voice channels on CallPilot as on voice mail system being replaced

Many times, CallPilot is being brought in to replace an existing voice mail system. If the port capacity on the existing voice mail system provided satisfactory service levels, then simply provision the same number of voice channels on CallPilot without engineering the solution. This is done by entering the number of voice channels in the Voice Channels Override parameter of the Configurator/NetPrice tool.

In the case of two or more voice mail systems being consolidated into a single CallPilot system, it is not necessary to provision as many voice channels on CallPilot as are on each of the voice mail systems being replaced. This is because of increased traffic efficiency of large systems. Consequently, when consolidating systems onto a single server, it is recommended to use the tool to size channel requirements based on the number of users hosted by CallPilot.

Modeling busy hour (BH) voice traffic

The following parameters are used in calculating the estimate of traffic for each of the services in “Principal services” on page 69. These parameters are deemed “advanced parameters” by the tools and are generally left unchanged by the sales engineer. However, they are provided in the tool to enable the sales engineer to adapt the traffic model to the needs and behaviors of the customer.

Field name	Initial value	Min.	Max	Comments
Voice Call Answering Session Calls	.4	.1	5	Enter the number of call answering calls in the busy hour per mailbox.
Voice Call Answering Session AHT	40 sec.	10	200	Enter the average hold time (AHT) in seconds for the busy hour.
Voice Logon Session AHT	70 sec.	10	300	Enter the average hold time (AHT) in seconds for the busy hour.
Total Busy Hour Message Access	.35	0.1	1.0	This is the number of expected single message retrievals from all potential modes (DTMF, SAM, and Desktop) per mailbox during the busy hour (BH).

Field name	Initial value	Min.	Max	Comments
EBP Session AHT	240 sec.	10	600	Enter the E-mail by Phone session average hold time (AHT) in seconds for the busy hour.
Pct DTMF Voice Mail Accesses using EBP	10%	00	100	This is the percentage of DTMF logons that make use of EBP.
Voice Menus Calls	5	1	200	Enter the number of calls per voice menu application in the busy hour.
Voice Menus AHT	60 sec.	5	200	Enter the average hold time (AHT) in seconds for the busy hour.
Voice Menus: %Xfrd	33	0	100	Enter the percentage of voice menu calls that will be transferred.
Auto Attendant Calls	40	5	1000	Enter the number of auto attendant calls in the busy hour.
Auto Attendant AHT	30 sec.	5	90	Enter the average hold time (AHT) in seconds for the busy hour.
Fax On Demand Request Calls	2	1	200	Enter the number of request calls (on voice channels) per Fax On Demand application in the busy hour.
Fax On Demand Requests AHT	60 sec.	5	200	Enter the average hold time (AHT) for fax requests in seconds.
Outcalling (RN and DTT)% of Calls	5%	0	100	Enter the percentage of Voice Call Answering calls (%Calls) that will result as Outcalling calls.

Field name	Initial value	Min.	Max	Comments
Outcalling (RN and DTT) AHT	60 sec.	10	180	Enter the average hold time (AHT) in seconds.
Analog Networking Percentage	3%	0	100%	Enter the percentage of messaging traffic that will be analog (Enterprise or AMIS) Networking. The more VPIM is used, the lower this percentage should be. If VPIM is the only protocol used, then this parameter is set to zero.

Overview of fax traffic services

Principal services

The following principal services generate traffic on fax channels:

- Fax on Demand applications with same call fax access
- Fax on Demand fax callback delivery
- Fax auto attendant (Fax express messaging)
- Fax call answering
- Delivery to fax services
- Fax broadcasting (Multicast to fax service)

Estimating fax channels

It is not advised to simply count the number of existing fax machines and replace them with fax channels on a one-for-one basis. This is especially true when replacing a small number of machines that have high inbound traffic with fax channels. Instead, it is recommended to estimate 1) the average number of fax messages per fax user, and 2) the average number of pages per fax message, and input these into the “advanced parameters” of the engineering tool.

Modeling busy hour (BH) fax traffic

The following parameters are used in calculating the estimate of traffic for each of the above services. These parameters are deemed “advanced parameters” by the tools and are generally left unchanged by the sales engineer. However, they are provided in the tool to enable the sales engineer to adapt the traffic model to the needs and behaviors of the customer.

Field name	Initial value	Min.	Max	Comments
Fax Messaging Calls	.1	0.05	1000	Enter the number of Fax Messaging calls within the busy hour per mailbox.
Fax Messaging Pages	3	1	100	Enter the average number of pages for fax messaging within the busy hour.
Fax Printing Displaced By Desktop	90%	10	100	Percentage of Fax printing that is displaced by the user reading the message via the desktop instead of printing the message.
Fax On Demand-Call Back Calls	2	1	200	Enter the number of calls that will be made by the Call Back feature, per fax on demand application, during the busy hour.
Fax On Demand-Call Back Pages	4	0	99	Enter the number of pages that will be sent via the Call Back feature.
Fax Broadcast Recipients	Blank	0	5000	Enter the number of Fax Broadcast recipients. Only set this parameter to a non-zero value if broadcasts are to occur during busy hours.
Fax Broadcast Max Wait time	4	.2	20	Enter the maximum wait time to deliver the fax broadcast to all recipients in hours.
Fax Broadcast Pages	3	1	100	Enter the average number of pages per fax broadcast message.

Overview of Speech Recognition traffic services

Principal services

The following principal services generate traffic on speech recognition channels. These services are typically used by mobile users from wireless phones to pick up voice messages and e-mail with hands-free, eyes-free access:

- Speech Activated Messaging (SAM) Service
- Email-by-Phone on Speech Recognition channels

Modeling busy hour (BH) Speech Recognition traffic

The following parameters are used in calculating the estimate of traffic for each of the above services. These parameters are deemed "advanced parameters" by the tools and are generally left unchanged by the sales engineer. However, they are provided in the tool to enable the sales engineer to adapt the traffic model to the needs and behaviors of the customer.

Field name	Initial value	Min.	Max	Comments
Speech Activated Messaging Session AHT	75 sec.	10	300	Enter the average hold time (AHT) for Speech Activated Messaging sessions.

Field name	Initial value	Min.	Max	Comments
Telset Accesses Via SAM	70%	10	100	Busy hour users of SAM are either desktop/SAM users away from their desks, or SAM users without desktop messaging rights. SAM Users prefer SAM to DTMF, yet some SAM users may use DTMF logons in environments where speaking commands is inappropriate, such as open cubicles. The value of this parameter reflects the likelihood that a user with SAM rights, who must access messages using a phoneset will use SAM over DTMF.
Pct SAM Accesses with EBP	20%	00	100	Enter the percentage of time users will access Email by Phone via a SAM session.

Storage hour estimation

Storage calculation assumptions

The following assumptions are used by the engineering tools when calculating storage:

- One page of normal fax = 1/212 hour
- One page fine resolution fax = 1/106
- Voice storage overhead factor = 20% of voice stored
- Average voice message length = 1 minute

The following parameters are used in calculating the storage hours:

Field name	Initial value	Min.	Max
Minutes of voice messages per mailbox	6	1	100
Pages of fax per mailbox	5	1	100

Chapter 4

Engineering the server

In this chapter

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CallPilot server capacities at a glance

The following table provides server capacities at a glance. For other capacities and features, refer to the appropriate server in this chapter.

Item	200i	201i	702t	1001rp	1002rp
Channels	24	40	96	96	96
DSP MPU	24	40	96	96	96
Storage hours[a]	200	350	1000	1000	2400
Max. Mailboxes[b]	8000	10 000	20 000	20 000	50 000
Max. voice-only users[c]	1400	2500	7000	7000	7000
Max. logged in unified messaging users[d e f]	1200	2200	5800	5800	12 000
RAID (Level 1 hardware mirroring only)	Not supported	Not supported	Supported (optional)	Standard	Standard
Disks	Not hot-swap; not redundant	Not hot-swap; not redundant	Not hot-swap; redundant (optional)	Hot-swap; redundant	Hot-swap; redundant
Power supply fans	N/A	N/A	Not hot-swap; not redundant	Hot-swap; redundant	Hot-swap; redundant

a. This does not include storage reserved for voice prompts.
b. This is the maximum number of mailboxes that can be created on a system. It does not mean that this number of users can practically use the system.

c. This is the maximum number of voice-only users, with “typical” voice mail usage, that can be supported with a P05 grade of service with all voice channels. User capacity is lower if fax or mobile user features are configured. The Configurator or NetPrice engineering tool should be used in all cases for an “engineered” solution.

d. This limit is not enforced.

e. This is the maximum amount of unified messaging clients that can be logged on at one time. This is not the “keycode” limit. The keycode limit for desktop messaging is the same limit as the maximum for mailboxes.

f. Maximum remote users on a platform is the maximum mailboxes for the platform minus the number of mailboxes implemented.

CallPilot product capacities

Overview

The following table of product capacities is provided as a reference. Footnotes at the bottom of the table indicate special conditions that may be required by an item.

Item	Limit
Number of Application Builder services	2500
Levels of imported applications in an Application Builder service	20
Number of faxes stored in an Application Builder service	3000
Number of voice prompts in an Application Builder	3000
Voice messages per mailbox	1000
Minutes per mailbox	360
SDNs (previously called Voice Service DNs)[a]	1500
Minutes of voice per message	120
Pages of fax per message	500
Number of voice prompt languages	6
Number of speech recognition languages[b]	3
Number of shared distribution lists (SDLs)	500
Entries per shared distribution list	999
Number of personal distribution lists (PDLs) per mailbox	99
Entries per personal distribution list	200

Item	Limit
Selections per fax on each fax on demand session	99
Pages per fax selection	99
User Greeting length (each) in minutes	10
Seconds for a Personal Verification, Site Spoken Name	30
System Greeting length in minutes	10
Maximum Announcement Length, minutes	10
Classes of service	unlimited
Number of temporary remote user references	1000
Private Network Sites	500
Open VPIM Short-Cut Network Sites	500
Number of CDP steering codes per network location	500
Number of NMS satellite location	59
Tenants	1
Customers	1
Restriction Permissions Lists[c]	200
DNs per mailbox	8
Number of concurrent administration sessions	16
Max. Simultaneous E-Mail Phone Sessions	20
Max. E-Mail by Phone Languages	10

a. No actual limit enforced. Each entry will also require a phantom DN to be defined on the switch.
b. Voice prompt and speech recognition languages must be identical.
c. Each list contains up to 30 restriction and 30 permission codes.

200i server features

Introduction

You should be familiar with the capacities of the 200i server to ensure your selection meets the requirements of your site. The 200i is no longer a currently shipped product, but is in “sustained” status.

Switch connectivity

The 200i server supports connectivity to a Meridian 1 or Succession CSE 1000 system. The server occupies two slots in both systems.

From the switch perspective, the 200i server appears logically equivalent to one XDLC.

DSP configurations

The server contains one embedded DSP providing support for eight MPUs. Twenty-four MPUs are supported by inserting two MPC-8 cards into the server’s faceplate. Each MPC-8 card provides eight MPUs.

Disk and volume capacities

There is one system volume (VS1) on each CallPilot server, and it is always found on the system disk. VS1 contains system prompts, user personal verifications, network message queues, and user mailboxes.

The 200i server supports a single IDE hard drive with 200 hours of storage.

Data port provisioning

Only one COM port is available on the 200i server (identified as COM1), which you can use for remote support.

Connection to the COM port is provided by a 9-pin RS-232 connector on the external I/O breakout panel.

The 200i server does not have a parallel port. In contrast to the other CallPilot servers, the software feature key is installed on the motherboard.

201i server features

Introduction

You should be familiar with the capacities of the 201i server to ensure your selection meets the requirements of your site.

Switch connectivity

The 201i server supports connectivity to a Meridian 1 or Succession CSE 1000 system. Both servers occupy two slots.

From the switch perspective, the 201i server appears as two MGate cards.

DSP configurations

The server contains one embedded DSP providing support for eight MPUs. Forty MPUs are supported by inserting four MPC-8 cards into the server's faceplate. (Each MPC-8 card provides eight MPUs.)

Disk and volume capacities

There is one system volume (VS1) on each CallPilot server, and it is always found on the system disk. VS1 contains system prompts, user personal verifications, network message queues, and user mailboxes.

The 201i server supports a single IDE hard drive with 350 hours of storage.

Data port provisioning

Only one COM port is available on the 201i server (identified as COM1), which you can use for remote support.

Connection to the COM port is provided by a 9-pin RS-232 connector on the multi I/O cable.

The 201i server does not have a parallel port. In contrast to the other CallPilot servers, the software feature key is installed on the motherboard.

702t server features

Introduction

You should be familiar with the capacity of the 702t server to ensure it meets the requirements of your site.

MPC-8 cards and MPB16-4 boards

The 702t server supports the MPB16-4 board, which has 2 onboard DSPs. There are 4 additional slots on the board into which you can insert a total of 4 MPC-8 cards for a total of 48 channels per MPB16-4 board. You can insert a maximum of 2 MPB16-4 boards into the server.

A single MPB16-4 board provides two DS30X connections, each of which is connected to an MGate card in the switch. Each MGate card provides 32 channels. Therefore, for 96 channels, you require 3 MGate cards.

Number of disks

The 702t comes standard with 3 disks with a total of 1000 hours of storage capacity. If the RAID option is installed, the number of disks doubles to 6 disks, while the storage remains at 1000 hours.

Note: You must order the RAID option when the system is new. It cannot be added once the 702t system is installed.

Volume capacities

There is one system volume (VS1) on each CallPilot server, and it is always found on the system disk. User volumes VS102 and VS103 are placed on separate hard drives that are configured on the server. The following table shows the recommended number of storage hours per volume:

Volume	Storage hours
VS1	200
VS102	400
VS103	400

Data port provisioning

On the 702t server, the parallel port is dedicated to the dongle, a keycode security device.

There are two serial ports, one of which is used to support an external modem for remote access (particularly for remote technical support). The other port is retained as a spare.

LAN connectivity

The 702t server provides 10- or 100Base-T Ethernet network connectivity. The function of each network interface is described below:

- An Ethernet controller on the 702t motherboard provides connectivity to the ELAN.

  For information about the ELAN's purpose and requirements, see "About the ELAN (Meridian 1 and Succession CSE 1000 only)" in Part 1 of *CallPilot Installation and Configuration.*

  Note: There is no ELAN when the 702t is connected to an MSL-100.
- An optional network interface card (NIC) is installed in the server.

This optional NIC is required only for Meridian 1 or Succession CSE 1000 systems that require a CLAN connection (in addition to the ELAN connection). The CLAN provides data connectivity between desktop and web messaging clients, and the CallPilot server.

Network requirements

Appropriate networking equipment must be available for both the CLAN and ELAN.

The CLAN and ELAN must be properly configured for correct CallPilot operation. To ensure correct configuration, Nortel Networks recommends that you consult a network specialist.

ATTENTION

For important considerations about using the ELAN in your network, see "About the ELAN (Meridian 1 and Succession CSE 1000 only)" in Part 1 of the *CallPilot Installation and Configuration* binder.

Remote access connectivity

The RS-232 COM 1 connector on the rear of the CallPilot server provides the connection to an external high-speed modem. The modem allows administrators and technical support personnel to administer the CallPilot server from a remote location.

Microsoft Windows NT Remote Access Service is used to establish the remote access connection to the server. Then the Symantec pcAnywhere remote control software is used to remotely control the server over the RAS connection.

1001rp server features

Introduction

You should be familiar with the capacities of the 1001rp server to ensure it meets the requirements of your site. The 1001rp is no longer a currently shipping product for application with M1 and Succession CSE 1000 systems, but is in “sustained” status.

MPC-8 cards and MPB-16 carrier boards

The 1001rp server supports the single MPB-16 carrier board, which has 2 onboard MPC-8 sections. There are 4 additional slots on the board into which you can insert a total of four MPC-8 cards for a total of 48 channels per carrier board. You can insert a maximum of 2 carrier boards into the server.

A single carrier board provides two DS30x connections, each of which is connected to an MGate card in the switch. Each MGate card provides 32 channels. Therefore, for 96 channels, you require three MGate cards.

Number of disks

The 1001rp comes standard with six disks in a RAID configuration, three primary and three redundant, with a total of 1000 hours of storage capacity. The disks are hot-swappable.

Volume capacities

There is one system volume (VS1) on each CallPilot server, and it is always found on the system disk. You can find user volumes VS102 and VS103 on separate hard drives that are configured on the server. The following table shows the recommended number of storage hours per volume:

Volume	Storage hours
VS1	200
VS102	400
VS103	400

Data port provisioning

On the 1001rp server, the parallel port is dedicated to the dongle, a keycode security device.

There are two serial ports, one of which is used to support an external modem (particularly for remote technical support). The other port is retained as a spare.

LAN connectivity

The CallPilot server provides 10- or 100Base-T Ethernet connectivity through network interface cards (NIC) installed in the server. The function of each network card is described below:

- One network card provides connectivity to the ELAN.

  For information about the ELAN's purpose and requirements, see "About the ELAN (Meridian 1 and Succession CSE 1000 only)" in Part 1 of the *CallPilot Installation and Configuration* binder.

  Note: There is no ELAN when the 1001rp is connected to an MSL-100.

- A second network card is optional.

This optional NIC is required only for Meridian 1 or Succession CSE 1000 systems that require a CLAN connection (in addition to the ELAN connection). The CLAN provides data connectivity between desktop and web messaging clients, administrative PCs, and the CallPilot server.

Network requirements

Appropriate networking equipment must be available for both the CLAN and ELAN.

The CLAN and ELAN must be properly configured for correct CallPilot operation. To ensure correct configuration, Nortel Networks recommends that you consult a network specialist.

ATTENTION

For important considerations about using the ELAN in your network, see "About the ELAN (Meridian 1 and Succession CSE 1000 only)" in Part 1 of the *CallPilot Installation and Configuration* binder.

Remote access connectivity

The RS-232 COM 1 connector on the rear of the CallPilot server provides the connection to an external high-speed modem. The modem allows administrators and technical support personnel to administer the CallPilot server from a remote location.

Microsoft Windows NT Remote Access Service is used to establish the remote access connection to the server. Then the Symantec pcAnywhere remote-control software is used to remotely control the server over the RAS connection.

1002rp server features

Introduction

You should be familiar with the capacities of the 1002rp server to ensure it meets the requirements of your site.

MPC-8 cards and MPB-16 carrier boards

The 1002rp server supports the single MPB-16 carrier board, which has 2 onboard MPC-8 sections. There are 4 additional slots on the board into which you can insert a total of 4 MPC-8 cards for a total of 48 channels per carrier board. You can insert a maximum of 2 carrier boards into the server.

A single carrier board provides 2 DS30x connections, each of which is connected to an MGate card in the switch. Each MGate card provides 32 channels. Therefore, for 96 channels, you require 3 MGate cards.

Number of disks

The 1002rp comes standard with six disks in a RAID configuration, three primary and three redundant, with a total of 2400 hours of storage capacity. The disks are hot-swappable.

Volume capacities

There is one system volume (VS1) on each CallPilot server, and it is always found on the system disk. You can find user volumes VS102 and VS103 on separate hard drives that are configured on the server.

The following table shows the recommended number of storage hours per volume:

Volume	Storage hours
VS1	500
VS102	950
VS103	950

Data port provisioning

On the 1002rp server, the parallel port is dedicated to the dongle, a keycode security device.

There are two serial ports, one of which is used to support an external modem (particularly for remote technical support). The other port is retained as a spare.

LAN connectivity

The 1002rp has two on-board Ethernet connections for network cards directly on the single board computer (SBC) card. The function of each network card is described below:

- One network card provides connectivity to the ELAN.

  For information about the ELAN's purpose and requirements, see "About the ELAN (Meridian 1 and Succession CSE 1000 only)" in Part 1 of the *CallPilot Installation and Configuration* binder.

- A second network card is optional.

  This optional NIC is required only for Meridian 1 or Succession CSE 1000 systems that require a CLAN connection (in addition to the ELAN connection). The CLAN provides data connectivity between desktop and web messaging clients, and the CallPilot server.

Network requirements

Appropriate networking equipment must be available for both the CLAN and ELAN.

The CLAN and ELAN must be properly configured for correct CallPilot operation. To ensure correct configuration, Nortel Networks recommends that you consult a network specialist.

ATTENTION

For important considerations about using the ELAN in your network, see "About the ELAN (Meridian 1 and Succession CSE 1000 only)" in Part 1 of the *CallPilot Installation and Configuration* binder.

Remote access connectivity

The RS-232 COM 1 connector on the rear of the CallPilot server provides the connection to an external high-speed modem. The modem allows administrators and technical support personnel to administer the CallPilot server from a remote location.

Microsoft Windows NT Remote Access Service is used to establish the remote access connection to the server. Then the Symantec pcAnywhere remote-control software is used to remotely control the server over the RAS connection.

Chapter 5

Selecting a site

In this chapter

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Space requirements for the CallPilot server

Introduction

Take into account that the physical space occupied by the CallPilot server is part of your planning activities. This section provides guidelines for determining that adequate space is provided for the servers.

Space requirements for the server

Front and rear access room is required to service components. Situate the server in an area with enough space for the front and rear cabinet doors to open and close, and allow extra access room for service or removal of components.

Switch room space planning

When you plan for the incremental space and mounting needed for the CallPilot server and peripherals, you must consider the space required in the switch room.

ELAN

Ensure there is sufficient space for the Ethernet hub and cables.

IPE (200i or 201i) server

The 200i and 201i IPE servers occupy two slots in the IPE shelf, and weigh approximately 2.1 kg (4.5 lbs). You must also ensure there is sufficient space for the following:

- mounting and space
- I/O breakout panel (200i server)
- multi-I/O cable (201i server)

- modem
- tape drive
- monitor, keyboard, mouse (although these cannot be permanently connected)

Tower (702t) server

The 702t server is freestanding. The dimensions, clearance, and weight are listed in the following table:

Height	49 cm (19.3 in.)
Width	21 cm (8.3 in.) (chassis), 26 cm (10 in.) with feet
Depth (distance from front to back)	45 cm (17.75 in.)
Clearance front	21.59 cm (8.5 in.)
Clearance rear	12.70 cm (5 in.)
Clearance side	7.62 cm (3 in.). Additional side clearance is required for service.
Weight of fully loaded system with 6 SCSI drives, 6 populated boards, and 1 CD-ROM drive, floppy drive, and tape drive	22.05 kg (48.50 lbs)

The cable from the tower server to the Meridian 1 IPE shelf is 10 m (33 ft) in length.

You must ensure that there is sufficient space for the following items:

- modem
- monitor
- keyboard
- mouse

Rackmount (1001rp or 1002rp) server

The 1001rp or 1002rp server goes into a customer-supplied 48.3 cm (19 in.) shelf. The dimensions are

Height	32 cm (12.5 in.)
Width	48.3 cm (19 in.)
Depth (distance from front to back)	
■ without front bezel	49.5 cm (19.5 in.)
■ with front bezel	53.3 cm (21 in.)
Weight of fully loaded system with 6 SCSI drives, 1 CD-ROM drive, 1 floppy drive, and 1 tape drive	45.5 kg (100 lbs)

The cable from the rackmount server to the Meridian 1 IPE shelf is 10 m (33 ft) in length.

You must ensure there is sufficient space for the following items:

- modem
- monitor
- keyboard (with integrated mouse track-ball)

Administrative PC

Any suitable PC that can access the CallPilot CLAN or ELAN network can serve as an administrative PC. Administration is performed through the CallPilot Manager web-based interface.

CallPilot power supply requirements

Introduction

You must consider the power supply requirements for the CallPilot server as part of your planning activities. This section defines the requirements.

UPS recommendations

Nortel Networks recommends that the CallPilot server be powered by a UPS or equivalent power supply.

The UPS provides two important services that are key for maintaining high availability, mission critical messaging:

1. It conditions the power by filtering power brown-outs and transients, which can shorten the server's life and damage hardware.
2. It greatly reduces the risk of unplanned power outages that can cause severe corruption of the operating system components of a server.

If the switch is also protected by a UPS, it is further recommended that the ELAN hub be powered by UPS to prevent service outages due to power loss.

General requirements

Locate the CallPilot server in an area that is

- not subject to static electricity
- not subject to vibration
- away from a sprinkler system, water, steam, or other liquid-carrying pipes
- physically safe for personnel and equipment
- not subject to electomagnetic interference (EMI)

  Sources of EMI include

- broadcast stations
- radar
- mobile communications
- high-voltage power lines
- power tools
- office machines, such as photocopiers

CallPilot server power requirements

The three types of servers require different power inputs and usage. The following table summarizes the power requirements:

Device	Power input	Power usage
200i and 201i	provided by the M1 IPE	40 W
702t	120 V AC 240 V AC	300 W
1001rp AC	120 V AC 240 V AC	400 W
1001rp DC	48 V, 20-ampere DC See the note below.	400 W or 500 W depending on which power supply is populated
1002rp AC	120 V AC 240 V AC	400 W
1002rp DC	48 V, 20-ampere DC See the note below.	500 W
ELAN hub	110 V	1.8 W

Device	Power input	Power usage
external tape drive	110 V	7.2 W
MGate card	provided by the M1 IPE or Succession CSE 1000 system	5 W
modem	110V via a power adapter that provides 9-15VAC @10 W	10 W
monitor	110 VAC	90 W

Note: If you are using the Nortel Networks MFA150 rectifier (which comes with 30-ampere breakers, two 20-ampere breakers in the Spare Circuit Breaker Kit, 20 ampere [P0729846]), it must be configured to supply the two 20-ampere DC circuits for the rackmount server.

Environmental specifications for the CallPilot servers

Introduction

Consider the environmental requirements of the CallPilot servers when planning an adequate location for the servers.

Note: Switch environment specifications should be considered first before the server environment specifications.

Specifications for the 200i and 201i servers

The proper temperature and humidity are important for the longevity of the server. The following table summarizes the key specifications:

Parameter	Condition	Specification
Temperature	Recommended temperature	15°C (59°F) to 30°C (86°F)
	Absolute temperature	10°C (50°F) to 45°C (113°F)
	Long-term storage temperature	-20°C (-4°F) to 60°C (140°F)
	Short-term storage temperature	-40°C (-40°F) to 70°C (158°F) (less than 72 hours)
	Change rate temperature	less than 1°C (33.8°F) per 3 minutes

Parameter	Condition	Specification
Humidity	Recommended relative humidity	20% to 55% RH (non-condensing)
	Absolute relative humidity	20% to 80% RH (non-condensing)
	Long-term storage relative humidity	5% to 95% RH (at -40°C [-40°F] to 70°C [158°F] respectively) (non-condensing)

Specifications for the 702t server

The proper temperature and humidity are important for the longevity of the server. The following table summarizes the key specifications:

Note: The "Non-operating" term refers to the specification during shipping, storage, or both.

Parameter and condition	Specification
Operating temperature	+10°C to +35°C with the maximum rate of change not to exceed 10°C per hour
Non-operating temperature	-40°C to +70°C
Non-Operating Humidity	95%, non-condensing at 30°C
Acoustic noise	< 45 dBA at typical office ambient temperature (18° – 22°C)
Operating shock	No errors with a half sine wave shock of 2Gs (with 11 millisecond duration)
Package shock	System operational after a 76.2-cm (30-in.) free fall. Cosmetic damage may be present.
ESD	200 KV per Intel Environmental test specification (CD-ROM only to 15 KV)

Specifications for the 1001rp and 1002rp servers

The proper temperature, humidity, and altitude are important for the longevity of the server. The following table summarizes the key specifications:

Note: The "Non-operating" label under the Condition column refers to the specification during shipping, storage, or both.

Parameter	Condition	Specification
Temperature	Operating	5°C (41°F) to 35°C (95°F)
	Non-operating	-40°C (-40°F) to 70°C (158°F)
Humidity	Operating	5% to 95% at 40°C (104°F) (non-condensing)
	Non-operating	0% to 95% at 40°C (104°F) (non-condensing)
Shock	Operating	1.25 Gs, 10 ms (10.0 Gs, 11 ms in appropriate chassis)
	Non-operating	30.0 Gs, 10 ms (40.0 Gs, 11 ms in appropriate chassis)
Vibration	Operating	0.25 Gs at 5 Hz to 100 Hz (1.5 Gs over 5 Hz to 100 Hz in appropriate chassis)
	Non-operating	5 Gs at 5 Hz to 100 Hz
Altitude	Operating	4572 m (15 000 ft)
	Non-operating	15 240 m (50 000 ft)

Appendix A

Traffic capacity tables

In this appendix

Types of traffic capacity tables 110

CCS values and channel requirements table 111

Types of traffic capacity tables

Types of tables to use

The following table identifies the type of table to use for your CallPilot system and switch type. The actual tables begin on page 111.

	Busy hour CCS (BHCCS) traffic capacity table type			
Switch and media type	**Erlang C P.05 BHCCS (40-second AHT)**	**Erlang C P.05 BHCCS (adjust for one MWI channel)**	**Erlang B P.02 BHCCS**	**Erlang B P.02 BHCCS (adjust for one MWI channel)**
Meridian 1 and Succession CSE 1000 Voice, Fax, and ASR	✔			

CCS values and channel requirements table

Introduction

This section provides traffic capacity tables to use when calculating channel requirements.

Before using this table

To determine which column of the following table to use when calculating channel requirements, refer to “Types of tables to use” on page 110.

	CCS values			
Number of channels	**Erlang C P.05 GOS**	**Erlang C P.05 (adjusted for one MWI channel)**	**Erlang B P.02 GOS**	**Erlang B P.02 (adjusted for one MWI channel)**
1	2	< 2	1	< 1
2	14	2	8	1
3	32	14	22	8
4	54	32	40	22
5	77	54	60	40
6	103	77	83	60
7	129	103	106	83
8	156	129	131	106
9	184	156	157	131

	CCS values			
Number of channels	**Erlang C P.05 GOS**	**Erlang C P.05 (adjusted for one MWI channel)**	**Erlang B P.02 GOS**	**Erlang B P.02 (adjusted for one MWI channel)**
10	213	184	183	157
11	242	213	210	183
12	271	242	238	210
13	301	271	267	238
14	331	301	295	267
15	362	331	325	295
16	392	362	356	325
17	424	392	386	356
18	455	424	416	386
19	486	455	447	416
20	518	486	477	447
21	550	518	508	477
22	582	550	539	508
23	614	582	570	539
24	646	614	602	570
25	678	646	633	602
26	711	678	665	633

	CCS values			
Number of channels	**Erlang C P.05 GOS**	**Erlang C P.05 (adjusted for one MWI channel)**	**Erlang B P.02 GOS**	**Erlang B P.02 (adjusted for one MWI channel)**
27	744	711	697	665
28	776	744	729	697
29	809	776	761	729
30	842	809	793	761
31	875	842	825	793
32	908	875	857	825
33	941	908	890	857
34	974	941	922	890
35	1008	974	955	922
36	1041	1008	987	955
37	1074	1041	1020	987
38	1108	1074	1053	1020
39	1141	1108	1086	1053
40	1175	1141	1119	1086
41	1209	1175	1152	1119
42	1242	1209	1185	1152
43	1276	1242	1218	1185

	CCS values			
Number of channels	**Erlang C P.05 GOS**	**Erlang C P.05 (adjusted for one MWI channel)**	**Erlang B P.02 GOS**	**Erlang B P.02 (adjusted for one MWI channel)**
44	1310	1276	1252	1218
45	1344	1310	1285	1252
46	1378	1344	1318	1285
47	1412	1378	1352	1318
48	1445	1412	1385	1352
49	1479	1445	1418	1385
50	1513	1479	1452	1418
51	1548	1513	1486	1452
52	1582	1548	1519	1486
53	1616	1582	1553	1519
54	1650	1616	1587	1553
55	1684	1650	1620	1587
56	1718	1684	1654	1620
57	1753	1718	1688	1654
58	1787	1753	1722	1688
59	1821	1787	1756	1722
60	1856	1821	1790	1756

	CCS values			
Number of channels	**Erlang C P.05 GOS**	**Erlang C P.05 (adjusted for one MWI channel)**	**Erlang B P.02 GOS**	**Erlang B P.02 (adjusted for one MWI channel)**
61	1890	1856	1824	1790
62	1924	1890	1858	1824
63	1959	1924	1892	1858
64	1993	1959	1926	1892
65	2028	1993	1960	1926
66	2062	2028	1994	1960
67	2097	2062	2028	1994
68	2131	2097	2063	2028
69	2166	2131	2097	2063
70	2200	2166	2131	2097
71	2235	2200	2165	2131
72	2269	2235	2200	2165
73	2304	2269	2234	2200
74	2339	2304	2268	2234
75	2373	2339	2303	2268
76	2408	2373	2337	2303
77	2443	2408	2372	2337

	CCS values			
Number of channels	**Erlang C P.05 GOS**	**Erlang C P.05 (adjusted for one MWI channel)**	**Erlang B P.02 GOS**	**Erlang B P.02 (adjusted for one MWI channel)**
78	2477	2443	2406	2372
79	2512	2477	2441	2406
80	2547	2512	2475	2441
81	2582	2547	2510	2475
82	2616	2582	2544	2510
83	2651	2616	2579	2544
84	2686	2651	2613	2579
85	2721	2686	2648	2613
86	2756	2721	2682	2648
87	2791	2756	2717	2682
88	2825	2791	2752	2717
89	2860	2825	2786	2752
90	2895	2860	2821	2786
91	2930	2895	2856	2821
92	2965	2930	2891	2856
93	3000	2965	2925	2891
94	3035	3000	2960	2925

	CCS values			
Number of channels	**Erlang C P.05 GOS**	**Erlang C P.05 (adjusted for one MWI channel)**	**Erlang B P.02 GOS**	**Erlang B P.02 (adjusted for one MWI channel)**
95	3070	3035	2995	2960
96	3105	3070	3030	2995

Appendix B

Planning spares requirements

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Planning spares for the CallPilot servers

Introduction

This section lists the parts and assemblies that can be ordered for replacement and spares. It also shows the estimated Annual Failure Rate (AFR) in percentage.

Note: When ordering a replacement software feature key, you must also include the ordering code for an Upgrade (NTZE4002 A0809123).

Annual failure rate

The AFR is the percentage of the parts that are expected to fail in a year. The following formula converts AFR to a Mean Time Between Failure (MTBF):

MTBF (years) = 1 / AFR%

Example

If the AFR% is 2%, then the MTBF = 1 /.02 = 50 years.

200i server spares

Component	CPC	PEC	AFR%
Base system	A0641449	NTRH14AA	2
Hard drive power cable	P0684414	P0684414	–
4 Gbyte IDE hard drive	A0731186	NTRH9049	2
128 Mbyte DIMM	A0738130	A0738130	2
Hard drive data cable	A0661097	NTRH16BA	–
Option 11 SCSI cable	A0767359	NTRH1407	–
Meridian 1 faceplate SCSI cable	A0769733	NTRH1408	–
Meridian 1 bulkhead SCSI cable	A0769774	NTRH1409	–
4.3 m (14 ft) shielded Ethernet cable	A0769310	A0769310	–
200i breakout panel assembly	**A0688377**	**NTRH09AA**	**–**
1.8 m (6 ft) breakout panel interconnect cable	A0726955	NTRH0910	–
4.6 m (15 ft) breakout panel interconnect cable	A0765601	NTRH0911	
CLAN Token Ring connection kit	**A0739898**	**NTUB51AA**	**1**
Token Ring adapter PCMCIA	A0683742	NTRH9040	1
Token Ring cabling	A0742083	NTRH1406	–
CLAN Ethernet connection kit	**A0739900**	**NTUB52AA**	**1**

Component	CPC	PEC	AFR%
Ethernet adapter PCMCIA	A0683741	NTRH9039	1
Internal Ethernet cabling	A0730304	NTRH1405	–

Component	CPC	PEC	AFR%
External SCSI 4-Gbyte tape drive kit	**A0739901**	**NTUB53AA**	**1**
External SCSI tape drive (4 Gbytes)	A0683740	NTRH9038	1
SCSI cable	A0372864	NTAK1305	–
Data cartridge	A0780247	A0780247	3
SCSI adapter	A0769312	A0769312	–
Cleaning cartridge	A0627875	A0627875	3
Recovery kit	**A0739902**	**NTUB54AA**	**1**
CD-ROM kit	A0744832	NTUB59AA	1
MAS flash recovery PC card	A0744464	NTRH9055	1
Monitor peripheral kit	**A0739905**	**NTUB56AA**	**0.2**
14" monitor	A0663896	NTRH9011	0.2
Keyboard	A0663898	NTRH9013	0.2
Mouse	A0663899	NTRH9014	0.2

201i server spares

Component	CPC	PEC	AFR%
201i server base hardware	–	–	–
201i server	A0774802	NTRH30AA	2
CallPilot 1.07 keycode package	A0805067	NTUB14AC	–
Ultra ATA/100 20 Gbyte hard drive	A0885779	A0885779	–
MPC-8	A0639034	NTRH01AA	2
MPB 16-4	A0772417	NTRH20BA	
Hardware accessories	–	–	–
10BaseT hub	A0829151	NTRH9075	0.5
10BaseT transceiver MAU	A0795886	NTRH9069	0.5
Option 11 SCSI cable	A0767359	NTRH1407	–
Meridian 1 faceplate SCSI cable	A0769733	NTRH1408	–
Multi I/O cable - dual Ethernet	A0789694	NTRH0912	NA
Meridian 1 unfiltered ring/tip cable	A0812878	NTRH3501	–
Meridian 1 bulkhead SCSI cable	A0827498	NTRH1410	–
14 ft shielded Ethernet cable	A0769310	A0769310	–
PS 2 cable instruction	P0941397	P0941397	
PS 2 extension cable	A0855616	A0855616	

Component	CPC	PEC	AFR%
Option 11 Mini EMC Kit	**A0837489**	**NTRH3503**	
Gender changer for Option 11C mini / CSE 1000	A0882476	A0882476	
Base server software	**A0811164**	**NTUB20AD**	**–**
Windows NT 4.0 OS Recovery CD-ROM	A0744465	NTRH8027	–
CallPilot Master Driver CD-ROM Bootable	A0811040	NTRH8101	–
CallPilot 1.07 Server Software CD-ROM	A0805235	NTUB40AC	–
CallPilot 1.07 Admin Client CD-ROM	A0795747	NTUB41AC	–
CallPilot 1.07 Desktop Messaging CD-ROM	A0805370	NTUB42AC	–
CallPilot 1.07 PEP Software CD-ROM	A0805372	NTUB43AC	–
CallPilot 1.07 Language Prompts CD-ROM	A0811170	NTUB44BC	–
CallPilot 1.07 Web Messaging CD-ROM	A0805374	NTUB45AC	–
External SCSI 4 Gbyte tape drive kit	**A0739901**	**NTUB53AA**	**1**
External SCSI tape drive	A0683740	NTRH9038	–
External SCSI tape drive cable	A0820829	NTRH3502	–
Data cartridge	A0780247	A0780247	–

Component	CPC	PEC	AFR%
SCSI adapter	A0769312	A0769312	3
Cleaning cartridge	A0677506	A0677506	3

Component	CPC	PEC	AFR%
CD-ROM Kit	**A0744832**	**NTUB59AA**	**1**
Hardware assembly—portable CD-ROM drive	A0683739	NTRH9037	1
External SCSI drive cable	A0820829	NTRH3502	–
Monitor peripheral kit	**A0739905**	**NTUB56AA**	**0.2**
14" monitor	A0663896	NTRH9011	0.2
Keyboard	A0663898	NTRH9013	0.2
Mouse	A0663899	NTRH9014	0.2
Modem kit	**A0744831**	**NTUB16AA**	**1**
56K modem	A0841982	NTRH9078	1
Modem cable with filters	A0841984	A0841984	–
Ethernet cables	**–**	**–**	**–**
.6 m (2 ft) Ethernet cable	A0648374	A0648374	–
1.25 m (4 ft) Ethernet cable	A0648372	A0648372	–
2.1 m (7 ft) Ethernet cable	A0648375	A0648375	–
3 m (10 ft) Ethernet cable	A0648377	A0648377	–
4.6 m (15 ft) Ethernet cable	A0648378	A0648378	–
7.7 m (25 ft) Ethernet cable	A0648379	A0648379	–

702t server spares

Component	CPC	PEC	AFR%
702t base hardware package	**–**	**–**	**–**
300 W power supply	A0741561	A0741561	1.5
Tower Series DC Power Converter	A0673987	NTRH9032	
Fan module assembly	A0741576	A0741576	0.5
Floppy drive	A0662019	NTRH9004	0.5
Floppy cable	A0741572	A0741572	–
Sony IDE CD-ROM drive	A0680752	NTRH9035	0.5
IDE cable to CD-ROM	A0806019	A0806019	–
Pentium II 400 MHz CPU (2)	A0761148	A0761148	0.6
128 Mbyte DIMM (2)	A0744456	A0744456	2
9 Gbyte SCSI disk (3)	A0741778	NTRH9054	2
9-drop SCbus cable	A0788131	A0788131	–
2-drop SCbus cable	A0742080	NTRH2011	
Software feature key adapter	A0731666	A0731666	0.2
CallPilot 1.07 keycode package	A0805067	NTUB14AC	–
7.7 m (25 ft) Ethernet cable	A0648379	A0648379	–
Base server software	**A0811166**	**NTUB22AD**	**–**
Emergency Repair Disk (blank)	A0682962	NT3R9501	–

Component	CPC	PEC	AFR%
Windows NT 4.0 Install Disk	A0747562	NTRH8033	–
Windows NT 4.0 OS Recovery CD-ROM	A0744465	NTRH8027	–
CallPilot Master Driver CD-ROM Bootable	A0811040	NTRH8101	–
CallPilot 1.07 Server Software CD-ROM	A0805235	NTUB40AC	–
CallPilot 1.07 Admin Client CD-ROM	A0795747	NTUB41AC	–
CallPilot 1.07 Desktop Messaging CD-ROM	A0805370	NTUB42AC	–
CallPilot 1.07 PEP Software CD-ROM	A0805372	NTUB43AC	–
CallPilot 1.07 Language Prompts CD-ROM	A0811170	NTUB44BC	–
CallPilot 1.07 Web Messaging CD-ROM	A0805374	NTUB45AC	–

Component	CPC	PEC	AFR%
700 series RAID kit	**A0739908**	**NTUB58AA**	**1**
Mylex Acc352 RAID card	A0833400	NTRH9076	2
9 Gbyte SCSI disk (3)	A0741778	NTRH9054	2
Wide SCSI cable	A0788129	A0788129	–
Wide SCSI terminator	A0766997	A0766997	–
Modem kit	**A0744831**	**NTUB16AA**	**1**
56K modem	A0841982	NTRH9078	1
Modem cable with filters	A0841984	A0841984	–
Monitor peripheral kit	**A0739905**	**NTUB56AA**	**0.2**
14" monitor	A0663896	NTRH9011	0.2
Keyboard	A0663898	NTRH9013	0.2
Mouse	A0663899	NTRH9014	0.2
General parts	**–**	**–**	**–**
Meridian Mail to CallPilot Migration Tape (S/W)	A0805432	NTUB24AB	–
MPC-8	A0639034	NTRH01AA	2
MPB16-4 DSP carrier card (512TS)	A0765614	NTRH20AB	2
MPB16-4 DSP carrier card (1024TS) (MSL-100 only)	A0772417	NTRH20BA	2
10/100BaseT Ethernet adapter	A0680753	NTRH9036	0.2
Token Ring adapter PCI	A0663895	NTRH9010	0.2

Component	CPC	PEC	AFR%
10BaseT hub	A0829151	NTRH9075	0.5
10BaseT transceiver MAU	A0795886	NTRH9069	0.5
700 Series DC power converter	A0673987	NTRH9032	0.2
Ethernet cables	**–**	**–**	**–**
.6 m (2 ft) Ethernet cable	A0648374	A0648374	–
1.25 m (4 ft) Ethernet cable	A0648372	A0648372	–
2.1 m (7 ft) Ethernet cable	A0648375	A0648375	–
3 m (10 ft) Ethernet cable	A0648377	A0648377	–
4.6 m (15 ft) Ethernet cable	A0648378	A0648378	–
7.7 m (25 ft) Ethernet cable	A0648379	A0648379	–
Internal tape drive kit	**A0739904**	**NTUB55AA**	**1**
SLR50 tape drive	A0841770	NTRH9077	1
Cleaning cartridge	A0677506	A0677506	3
Data cartridge	A0841919	A0841919	3
M/M Wide-Nar SCSI adapter	A0729069	A0729069	–
F/F Wide-Nar SCSI adapter	A0684822	A0684822	–
Twisted wide SCSI cable	A0818585	A0818585	–
Wide SCSI terminator	A0766997	A0766997	–

1001rp server spares

Component	CPC	PEC	AFR%
AC and DC platform spares	–	–	–
Hot-swappable fan	A0681326	A0681326	0.5
Alarm status module	A0681164	A0681164	0.2
Rack rails	A0797941	A0797941	–
Floppy drive	A0662019	NTRH9004	0.5
256 Mbyte SDRAM	A0813446	A0813446	2
9 Gbyte disk—hot swappable (6)	A0741777	NTRH9053	2
Sony IDE CD-ROM drive	A0680752	NTRH9035	0.5
Video card adapter	A0683743	NTRH9041	0.2
10/100BaseT Ethernet adapter	A0680753	NTRH9036	0.2
SCSI RAID controller	A0663892	NTRH9007	2
9-drop SCbus cable	A0788131	A0788131	–
2-drop SCbus cable	A0742080	NTRH2011	
Software feature key adapter	A0731666	A0731666	0.2
7.7 m (25 ft) Ethernet cable	A0648379	A0648379	–
CallPilot 1.07 keycode package	A0805067	NTUB14AC	
AC rackmount platform spares	–	–	–
500 W AC power supply (2)	A0805434	A0805434	1.5

Component	CPC	PEC	AFR%
DC rackmount platform spares	**–**	**–**	**–**
300 W DC power supply	A0723663	A0723663	1.5
DC power cord	A0725949	A0725949	–
PDU	A0676108	A0676108	–
Dual Pentium III SBC	**A0793321**	**NTRH9068**	**2**
Floppy cable	A0685305	A0685305	–
Cable harness for first and second serial ports	A0826698	A0826698	–
IDE cable to CD-ROM	A0806019	A0806019	–
Base server software	**A0811166**	**NTUB22AD**	**–**
Emergency Repair Disk (blank)	A0682962	NT3R9501	–
Windows NT 4.0 Install Disk	A0747562	NTRH8033	–
Windows NT 4.0 OS Recovery CD-ROM	A0744465	NTRH8027	–
CallPilot Master Driver CD-ROM Bootable	A0811040	NTRH8101	–
CallPilot 1.07 Server Software CD-ROM	A0805235	NTUB40AC	–
CallPilot 1.07 Admin Client CD-ROM	A0795747	NTUB41AC	–
CallPilot 1.07 Desktop Messaging CD-ROM	A0805370	NTUB42AC	–

Component	CPC	PEC	AFR%
CallPilot 1.07 PEP Software CD-ROM	A0805372	NTUB43AC	–
CallPilot 1.07 Language Prompts CD-ROM	A0811170	NTUB44BC	–
CallPilot 1.07 Web Messaging CD-ROM	A0805374	NTUB45AC	–
Internal tape drive kit	**A0739904**	**NTUB55AA**	**1**
SLR50 tape drive	A0841770	NTRH9077	1
Cleaning cartridge	A0677506	A0677506	3
Data cartridge	A0841919	A0841919	3
M/M Wide-Nar SCSI adapter	A0729069	A0729069	–
F/F Wide-Nar SCSI adapter	A0684822	A0684822	–
Twisted wide SCSI cable	A0818585	A0818585	–
Wide SCSI terminator	A0766997	A0766997	–
Modem kit	**A0744831**	**NTUB16AA**	**1**
56K modem	A0841982	NTRH9078	1
Modem cable with filters	A0841984	A0841984	–
General parts	**–**	**–**	**–**
14" monitor	A0663896	NTRH9011	0.2
Keyboard	A0663898	NTRH9013	0.2
Mouse	A0663899	NTRH9014	0.2
MPC-8	A0639034	NTRH01AA	2

Component	CPC	PEC	AFR%
MPB16-4 DSP carrier card (512TS)	A0765614	NTRH20AB	2
MPB16-4 DSP carrier card (1024TS) (MSL-100 only)	A0772417	NTRH20BA	2
Token Ring adapter PCI	A0663895	NTRH9010	0.2
10BaseT transceiver MAU	A0795886	NTRH9069	0.5
10BaseT hub	A0829151	NTRH9075	0.5
Meridian Mail to CallPilot Migration Tape (S/W)	A0805432	NTUB24AB	–
Ethernet cables	**–**	**–**	**–**
.6 m (2 ft) Ethernet cable	A0648374	A0648374	–
1.25 m (4 ft) Ethernet cable	A0648372	A0648372	–
2.1 m (7 ft) Ethernet cable	A0648375	A0648375	–
3 m (10 ft) Ethernet cable	A0648377	A0648377	–
4.6 m (15 ft) Ethernet cable	A0648378	A0648378	–
7.7 m (25 ft) Ethernet cable	A0648379	A0648379	–

1002rp server spares

Note: The spares used in the 1002rp server are not for the CALA market.

Component	CPC	PEC	AFR%
AC and DC platform spares	**–**	**–**	**–**
Hot-swappable fan	A0681326	A0681326	0.5
Alarm status module	A0681164	A0681164	0.2
Rack rails	A0797941	A0797941	–
Floppy drive	A0662019	NTRH9004	0.5
512 Mbytes SDRAM	A0877358	A0877358	2
Quantum Hot Swap Hard Drive (18 Gbytes/10K rpm)	NTRH9085	A0844619	2
Sony IDE CD-ROM drive	A0680752	NTRH9035	0.5
Video card adapter	A0683743	NTRH9041	0.2
10/100BaseT Ethernet adapter	A0680753	NTRH9036	0.2
AMI 1600 Elite w/32 Mbyte RAID card	A0871700	NTRH9093	2
9-drop SCbus cable	A0788131	A0788131	–
12 PCI / 7 ISA / 1 CPU backplane	A0733475	A0733475	
Dual SCSI hot-swap backplane	A0879250	A0879250	
SCSI backplane LVD/SE terminator (two RAID channels)	A0879254	A0879254	

Component	CPC	PEC	AFR%
Trenton SLE dual 866 MHz SBC	A0871698	NTRH9091	
PIII 866 MHz CPU	A0879913	A0879913	
Processor fan	A0879263	A0879263	
Serial DB-9 and parallel cable bracket	A0879260	A0879260	
Single serial DB-9	A0879261	A0879261	
2-drop SCSI cable for hot-swap drive bay (round shield plastic protection)	A0869102	A0869102	
3-drop SCSI cable for tape drive (round shield plastic protection)	A0869103	A0869103	
Software feature key adapter	A0731666	A0731666	0.2
7.7 m (25 ft) Ethernet cable	A0648379	A0648379	–
CallPilot 1.07 keycode package	A0805067	NTUB14AC	
AC rackmount platform spares	**–**	**–**	**–**
500 W AC power supply (2)	A0805434	A0805434	1.5

Component	CPC	PEC	AFR%
DC rackmount platform spares	**–**	**–**	**–**
500 W DC power supply	A0823837	A0823837	1.5
DC power cord	A0725949	A0725949	–
DC Power Entry Module	A0733623	A0733623	
PDU	A0676108	A0676108	–
Dual Pentium III SBC	**A0793321**	**NTRH9068**	**2**
Floppy drive cable (round shield plastic protection)	A0869104	A0869104	
Cable harness for first and second serial ports	A0826698	A0826698	–
IDE cable to CD-ROM (round shield plastic protection)	A0869105	A0869105	
Base server software	**A0811166**	**NTUB22AD**	**–**
Emergency Repair Disk (blank)	A0682962	NT3R9501	–
Windows NT 4.0 Install Disk	A0747562	NTRH8033	–
Windows NT 4.0 OS Recovery CD-ROM	A0744465	NTRH8027	–
CallPilot Master Driver CD-ROM Bootable	A0811040	NTRH8101	–
CallPilot 1.07 Server Software CD-ROM	A0805235	NTUB40AC	–
CallPilot 1.07 Admin Client CD-ROM	A0795747	NTUB41AC	–

Component	CPC	PEC	AFR%
CallPilot 1.07 Desktop Messaging CD-ROM	A0805370	NTUB42AC	–
CallPilot 1.07 PEP Software CD-ROM	A0805372	NTUB43AC	–
CallPilot 1.07 Language Prompts CD-ROM	A0811170	NTUB44BC	–
CallPilot 1.07 Web Messaging CD-ROM	A0805374	NTUB45AC	–
Internal tape drive kit	**A0739904**	**NTUB55AA**	**1**
SLR50 tape drive	A0841770	NTRH9077	1
Cleaning cartridge	A0677506	A0677506	3
Data cartridge	A0841919	A0841919	3
M/M Wide-Nar SCSI adapter	A0729069	A0729069	–
F/F Wide-Nar SCSI adapter	A0684822	A0684822	–
Twisted wide SCSI cable	A0818585	A0818585	–
LVD/SE SCSI terminator (tape drive)	A0766897	A0766897	–
Modem kit	**A0744831**	**NTUB16AA**	**1**
56K modem	A0841982	NTRH9078	1
Modem cable with filters	A0841984	A0841984	–
Modem for SMDI link in T1 Application	A0620530	A0620530	

Component	CPC	PEC	AFR%
General parts	**–**	**–**	**–**
14" monitor	A0663896	NTRH9011	0.2
Keyboard	A0663898	NTRH9013	0.2
Mouse	A0663899	NTRH9014	0.2
MPC-8	A0639034	NTRH01AA	2
MPB16-4 DSP carrier card (512TS)	A0765614	NTRH20AB	2
MPB16-4 DSP carrier card (1024TS) (MSL-100 only)	A0772417	NTRH20BA	2
Token Ring adapter PCI	A0663895	NTRH9010	0.2
10BaseT transceiver MAU	A0795886	NTRH9069	0.5
10BaseT hub	A0829151	NTRH9075	0.5
Meridian Mail to CallPilot Migration Tape (S/W)	A0805432	NTUB24AB	–
Ethernet cables	**–**	**–**	**–**
.6 m (2 ft) Ethernet cable	A0648374	A0648374	–
1.25 m (4 ft) Ethernet cable	A0648372	A0648372	–
2.1 m (7 ft) Ethernet cable	A0648375	A0648375	–
3 m (10 ft) Ethernet cable	A0648377	A0648377	–
4.6 m (15 ft) Ethernet cable	A0648378	A0648378	–
7.7 m (25 ft) Ethernet cable	A0648379	A0648379	–

Switch connectivity spares (tower and rackmount platforms)

Component	CPC	PEC	AFR%
CallPilot to Meridian 1 Integration	**A0787957**	**NTZE29AA**	**1**
MGate card	A0767356	NTRB18CA	1
Dual DS30X connect cable	A0767358	NTRH2013	–
Single DS30XV interconnect cable	A0767357	NTRH2012	–

Component	CPC	PEC	AFR%
CallPilot to Nortel Networks SL-100 Integration	**A0787961**	**NTZE29EA**	**1**
Dialogic DT1/480SC DualSpan T1	A0788895	NTRH9065	1
T1 cable	A0788107	A0788107	–
Modem for SMDI link in T1 application	A0620530	A0620530	0.2
Modem cabling	A0601464	A0601464	–
VTG adapter cable	A0788198	A0788198	–
9-drop SCbus cable (used for DSE connectivity kit)	A0788131	A0788131	–
CT to CT bus cable (used for NTZE29GA kit)	A0790468	NTRH0915	–

IPE distributor support kits

Introduction

This section identifies the hardware that distributors use to install, support, and recover CallPilot IPE systems.

Description	CPC	PEC	AFR%
Recovery kit (200i server only)	**A0739902**	**NTUB54AA**	**1**
CD-ROM kit	A0744832	NTUB59AA	1
MAS flash recovery PC card	A0744464	NTRH9055	1
Monitor peripheral kit	**A0739905**	**NTUB56AA**	**0.2**
14" monitor	A0663896	NTRH9011	0.2
Keyboard	A0663898	NTRH9013	0.2
Mouse	A0663899	NTRH9014	0.2

Notes:

- The 201i server contains a read-only disk operating system (ROM-DOS) that enables you to perform a system recovery and build. For more details, refer to *Part 5: 201i Server Maintenance and Diagnostics* in the *CallPilot 201i Installation and Configuration* binder.
- The monitor kit (monitor, mouse, and keyboard) is needed only for initial installation of the IPE platform. To conform with EMI regulations, remove it after installation.

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Planning and Engineering Guide

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