Planning & Engineering Guide

CallPilot
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NORTEL

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Contents

Chapter 1

How to get Help

This section explains how to get help for Nortel products and services.

Getting Help from the Nortel Web site

The best way to get technical support for Nortel products is from the Nortel Technical Support Web site:

http://www.nortel.com/support

This site provides quick access to software, documentation, bulletins, and tools to address issues with Nortel products. More specifically, the site enables you to:

- download software, documentation, and product bulletins
- search the Technical Support Web site and the Nortel Knowledge Base for answers to technical issues
- sign up for automatic notification of new software and documentation for Nortel equipment
- open and manage technical support cases

Getting Help over the phone from a Nortel Solutions Center

If you don't find the information you require on the Nortel Technical Support Web site, and have a Nortel support contract, you can also get help over the phone from a Nortel Solutions Center.

In North America, call 1-800-4NORTEL (1-800-466-7835).

Outside North America, go to the following Web site to obtain the phone number for your region:

http://www.nortel.com/callus

Getting Help from a specialist by using an Express Routing Code

To access some Nortel Technical Solutions Centers, you can use an Express Routing Code (ERC) to quickly route your call to a specialist in your Nortel product or service. To locate the ERC for your product or service, go to:

http://www.nortel.com/erc

Getting Help through a Nortel distributor or reseller

If you purchased a service contract for your Nortel product from a distributor or authorized reseller, contact the technical support staff for that distributor or reseller.

Chapter 2

Getting started

In this chapter

Scope and purpose

The *CallPilot Planning and Engineering Guide* provides information and instructions for selecting the best CallPilot system for the specific needs of your organization.

The purpose of planning and engineering is to determine the best size, platform, and location for your CallPilot system. This guide provides information designed to help you plan and engineer your CallPilot system.

Issues to consider

At the beginning of the process of planning and engineering a CallPilot system, you must consider the following issues:

- the CallPilot platform that you intend to use
- the CallPilot server location
- the CallPilot server connection to the switch
- the connectivity of the PCs in your network

Reference documents

CallPilot Customer Documentation Map

- **Fundamentals**
  - CallPilot Fundamentals Guide (555-7101-010)
- **Planning and Engineering**
  - Planning and Engineering Guide (555-7101-101)
  - Network Planning Guide (555-7101-102)
  - Data Networking for Voice over IP Guide (553-3001-160)
- **Installation and Configuration**
  - Upgrade and Platform Migration Guide (555-7101-207)
  - Installation and Configuration Task List Guide (555-7101-210)
  - **Server Installation Guides**
    - 201i Server Hardware Installation Guide (555-7101-220)
    - 703t Server Hardware Installation Guide (555-7101-226)
    - 1002rp Server Hardware Installation Guide (555-7101-205)
    - 1005r Server Hardware Installation Guide (555-7101-228)
  - **Configuration and Testing Guides**
    - Meridian 1 and CallPilot Server Configuration Guide (555-7101-222)
    - T1/SMDI and CallPilot Server Configuration Guide (555-7101-224)
    - Succession 1000 System and CallPilot Server Configuration Guide (555-7101-510)
  - **Unified Messaging Software Installation**
    - Desktop Messaging and MyCallPilot Installation Guide (555-7101-505)
- **Administration**
  - Administrator's Guide (555-7101-301)
  - Software Administration and Maintenance Guide (555-7101-202)
  - Desktop Messaging and MyCallPilot Administration Guide (555-7101-503)
  - Meridian Mail to CallPilot Migration Guide (555-7101-801)
  - Application Builder Guide (555-7101-325)
  - Reporter Guide (555-7101-310)
- **Maintenance**
  - Troubleshooting Guide (555-7101-501)
  - **Server Maintenance and Diagnostics**
    - 201i Server Maintenance and Diagnostics Guide (555-7101-119)
    - 703t Server Maintenance and Diagnostics Guide (555-7101-227)
    - 1002rp Server Maintenance and Diagnostics Guide (555-7101-206)
    - 1005r Server Maintenance and Diagnostics Guide (555-7101-512)
    - Symposium, M1/Succession 1000, and Voice Processing Guide (297-2183-909)
- **End User Information**

End User Cards	End User Guides
Unified Messaging Quick Reference Card	Multimedia Messaging User Guide
Unified Messaging Wallet Card	Speech Activated Messaging User Guide
A-Style Command Comparison Card	Desktop Messaging User Guide for Microsoft Outlook
S-Style Command Comparison Card	Desktop Messaging User Guide for Lotus Notes
Menu Interface Quick Reference Card	Desktop Messaging User Guide for Novell Groupwise
Alternate Command Interface Quick Reference Card	Desktop Messaging User Guide for Internet Clients
	MyCallPilot User Guide

Components of a CallPilot system

A CallPilot system comprises three key components:

- the CallPilot server
- the switch resources related to CallPilot
- the desktop client PCs (if the Unified Messaging feature is installed)

The CallPilot system can also include optional features:

- Unified Messaging—installed on the PCs in the CallPilot network
- customer-provided web server—necessary for the installation of CallPilot web services (particularly CallPilot Reporter)

The functionality of the web server and CallPilot Manager resides on the CallPilot server, since both components are automatically installed. The CallPilot Manager administrator component and My CallPilot end-user web services can require a separate web server.

If CallPilot Reporter is used for management reporting purposes, you must install it on a separate web server.

Servers and switches

The CallPilot 4.0 server is available on the following platforms: 201i, 703t, and 1002rp.

The following switches are compatible with CallPilot 4.0:

- Meridian 1*
- Communications Server 1000 (formerly known as Succession 1000)
- T1/SMDI connectivity switches

More information on the compatibility of CallPilot with various types of switches is provided later in this guide.

Desktop PCs and wireless devices

System administrators can use the web browser on a PC to access CallPilot Manager to

- maintain and administer the CallPilot software
- view CallPilot Reporter reports

If the desktop messaging client is installed, users can download messages from the server using a PC or a wireless device.

System configuration and ordering

The *Models & Ordering Procedures* document that applies to CallPilot 4.0 lists features and ordering information for each CallPilot server platform. To obtain the *Models & Ordering Procedures* document, contact your Nortel* channel partner.

Nortel channel partners can obtain this document from the CallPilot area established on the Partner Information Center (PIC) at http://www.nortel.com/pic.

Chapter 3

Grounding and power requirements

In this chapter

Overview

This chapter outlines the guidelines for providing power and grounding to switch and CallPilot equipment, and describes the auxiliary power requirements. However, if the information in this chapter conflicts with the local or national code, then follow the code.

Before the CallPilot server installation, a qualified electrician must implement the single-point ground reference, as required, between the power outlets of the CallPilot server and the power outlets of the switch.

DANGER OF ELECTRIC SHOCK

If you fail to ground the switch and the CallPilot equipment correctly, the installation can be

- unsafe for personnel
- unprotected from lightning or power transients
- subject to service interruptions, degraded performance, and loss of information.

Power and grounding guidelines

General

The power and ground for the switch and the CallPilot equipment must originate from the same supply service (equipment room service panel or transformer), where the ground conductor and the neutral conductor are connected and referenced to the main building ground. All power feeds must contain a separate safety conductor (green wire).

Note: Do not use the main building ground directly as the ground reference for the system.

To ensure a complete power and grounding installation:

- In rackmount server installations, ensure that the CallPilot server chassis and equipment racks are isolated from other foreign sources of ground. Acceptable isolation methods include: isolation pads, grommets, chassis side rail strips, non-conducting washers, and so on.
- In rackmount server installations where other equipment is also installed in the same 19 inch rack, ensure that all equipment derives ground from the same service panel as CallPilot and the switch, whether or not the equipment is AC or DC powered.
- In rackmount DC-powered server installations, ensure that the PDU (Power Distribution Unit for DC applications) is installed on the same rack as the CallPilot server. This is required because the main ground wire for the PDU is not insulated from the metal enclosure.

Power

The service panel, which must be located in the equipment room, must not service lighting, air conditioning, heating, generators, or motors. Nortel strongly recommends that supply conductors be dedicated and uninterrupted from a building primary source to the dedicated equipment room service panel.

Power is supplied to the service panel by a power transformer. The transformer typically provides secondary voltages of 208/120 V three-phase four-wire “wye” service, 240/120 V single-phase four-wire “delta” service, or 240/120 V single-phase three-wire service. Collectively, these secondary voltages are referred to as “nominal 208/240 V AC”.

A dedicated power transformer for the switch, CallPilot server, and associated auxiliary and telephone operating company interface equipment is preferred. However, a shared transformer or distribution is acceptable.

Do not use ground fault circuit interrupt (GFCI) devices on the switch and CallPilot power feeds.

Single-point ground

The switch and the CallPilot system require a single-point ground (SPG) topology for all switch equipment and all CallPilot associated auxiliary equipment respectively.

The switch and the CallPilot system have several types of grounds and several types of signal returns that are generally referred to as “grounds”:

- In AC systems, a logic return (LR or LRTN) and a green wire frame ground, called the AC equipment ground (ACEG), are typically part of the input power cord.
- In DC systems, a logic return (LR or LRTN) and a battery return (RTN), as well as an AC equipment ground (ACEG) green wire, are on the input to the rectifiers.
- All systems must have an external hardwired frame ground connection (also called the personal hazard safety ground). The frame ground is connected internally to the ACEG green wire. As the frame ground is hardwired, it ensures that the equipment has a ground connection even if the system is “unplugged.”
- External Communications wiring that meets the requirements as stipulated in NEC Article 800-30 FPN 4 requires the use of lightning protection. The cable sheaths, and protection grounds must be installed as indicated in NEC Article 800 - 33, and Article 800 - 40 (b).

For an SPG topology, each of the preceding grounds, from each of the columns, must terminate at a single connection point before attaching to the actual ground reference at the service panel or transformer. Physically, the SPG is usually a copper bar or plate (referred to as a "bus"). In its simplest form, the SPG (the single connection point) can be an isolated ground bus or an ACEG bus in the service panel or transformer.

Refer to the documentation associated with the PBX switch configured with CallPilot for further information on grounding requirements.

Document title	NTP number
Meridian 1 Installation Planning	553-3001-120
Meridian 1 Power Engineering	553-3001-152
Meridian 1 System Installation Procedures	553-3001-210
Planning and Installation Guide for Option 11C Mini	553-3021-209
Planning and Installation Guide for Option 11C	553-3021-210
Planning and Engineering Guidelines - Succession 1000	553-3023-102
Planning the Engineering Guidelines - CS 2100	TBD

Also refer to the ANSI-J-STD-607-A-2002 standard *Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications*.

Follow these requirements when implementing the SPG:

- All ground conductors must be identified according to local codes and terminated permanently.
- Terminations must be accessible for inspection and maintenance during the life of the installation.
- All grounding conductors must be
  - continuous, with no splices or junctions
  - tagged "Do not remove or disconnect"
  - insulated against contact with foreign grounds

- Grounding conductors must be no load, non-current carrying cables, under normal operating conditions.
- The ground interface in a steel-framed building must have a single connecting reference located at the service panel, to the building steel on the same floor as the switch and the CallPilot system (or within one floor from the switch and the CallPilot system).

  Note: Nortel does not recommend the use of building steel as an integral part of the switch and CallPilot ground system. The building steel is a reference point only.

The DC resistance of the system ground conductor, which runs from the switch to the main building ground, must be as close to zero as possible. The maximum total resistance on all runs within the building must not exceed 0.5 ohms.

Auxiliary power

Terminal devices

Terminal devices located in the equipment room require local power. Power for these devices must be wired and fused independently from all other receptacles, labeled at the service panel (to prevent unauthorized power interruption), and referenced to the same interface point on the building system ground as the service panel ground.

Auxiliary power in the equipment room can be supplied by isolated or non-isolated service receptacles, which must match the grounding for the system. In other words, if the switch and the CallPilot server have an isolated ground topology, the receptacles must also be isolated.

Auxiliary equipment

If auxiliary equipment using an RS-232 interface is too remote to be powered from the service panel, a modem or fiber link is required for ground isolation. Failure to provide this isolation defeats the SPG required by the system.

Existing power and grounding

Existing powering and grounding on some sites can make it difficult to ensure that the local power grounding is referenced to the same potential as the system ground. In addition, local power grounding can form part of a common grounding network that is subject to noise from external sources. Under these conditions, where locally powered terminals and equipment connect directly to the system through DC coupled links sharing a common ground, incidental ground loops can form and inject noise onto the system.

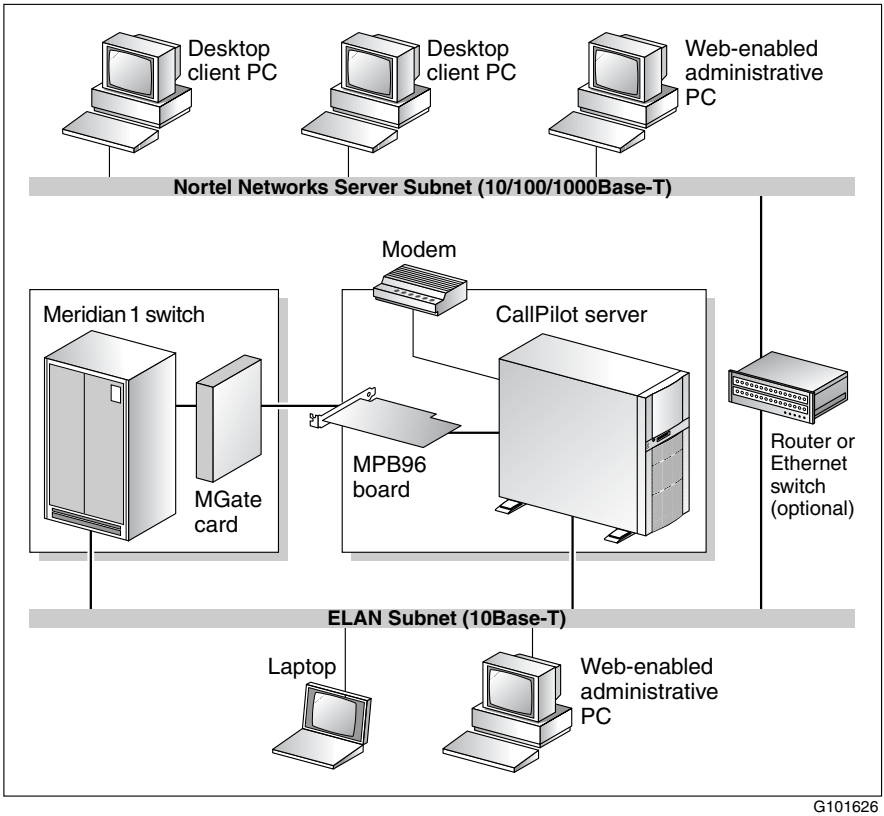
Chapter 4

System configurations

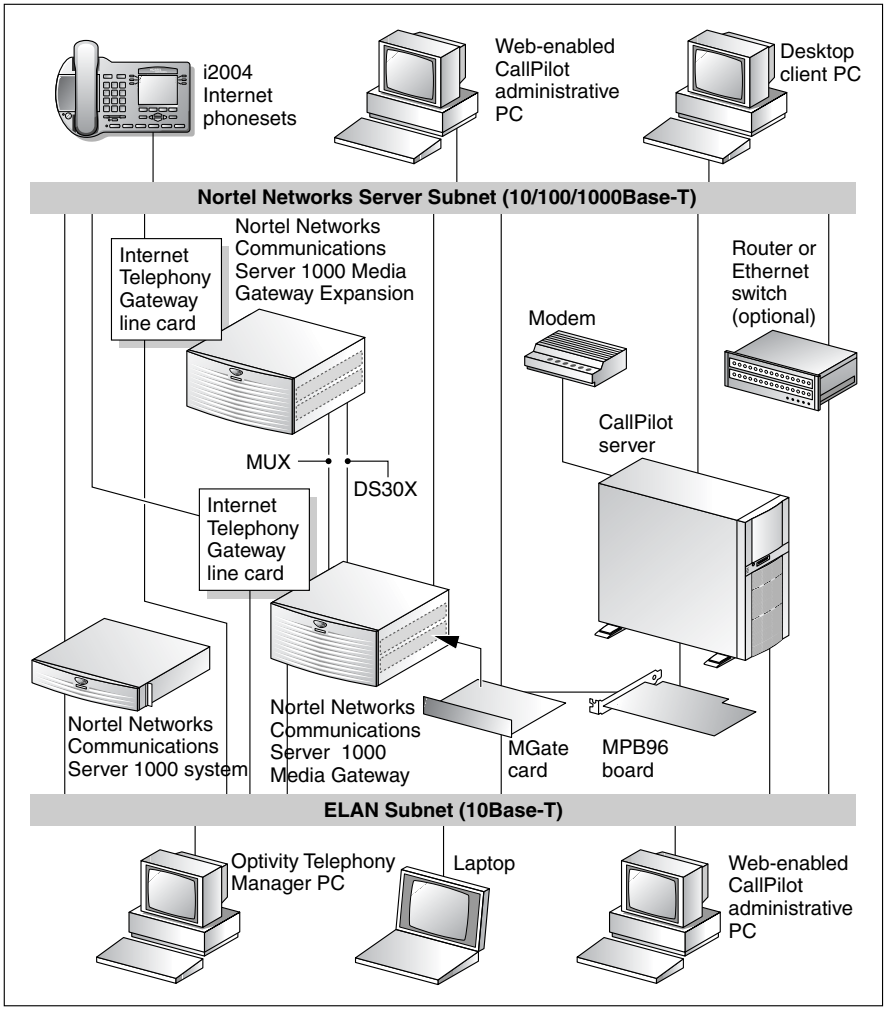
In this chapter

CallPilot architecture

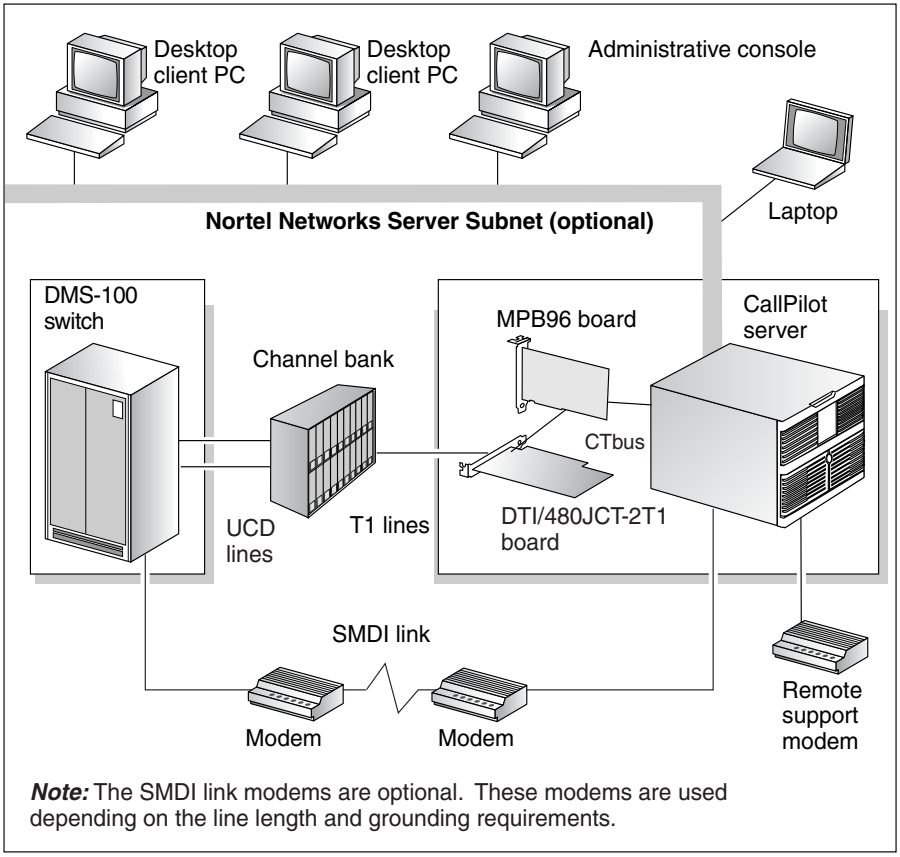
The following figure shows an example of network in which a CallPilot server is connected to a Meridian 1 switch.



The following figure shows an example of network in which a CallPilot server is connected to a Communications Server 1000.



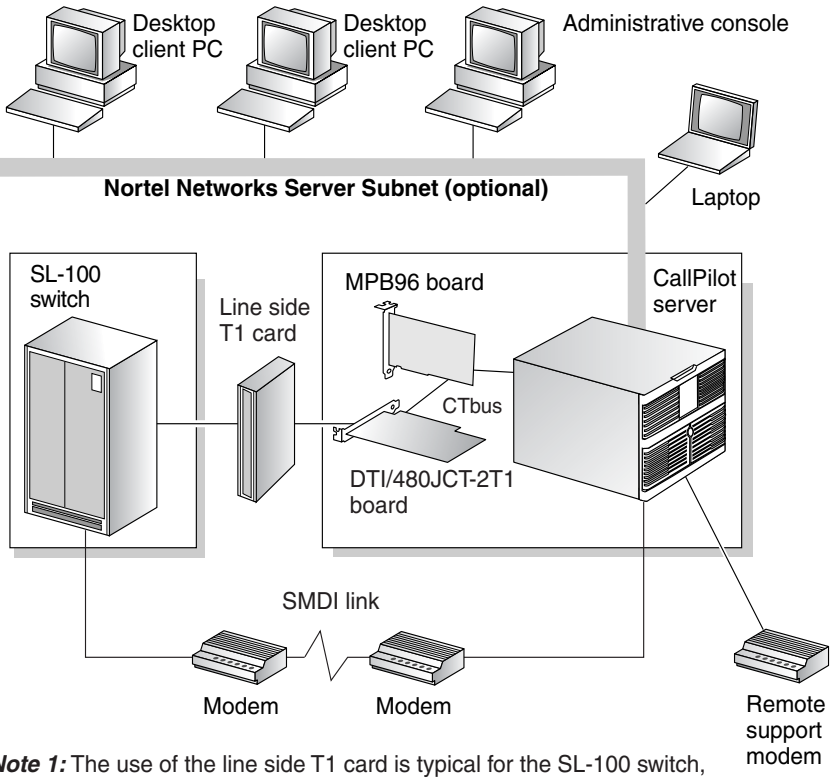
The following figure shows an example of network in which a CallPilot system is connected to a DMS-100* switch.



Note: The SMDI link modems are optional. These modems are used depending on the line length and grounding requirements.

g250052

The following figure shows an example of network in which a CallPilot server is connected to an SL-100* switch.



Note 1: The use of the line side T1 card is typical for the SL-100 switch, but in certain circumstances a channel bank can be used instead.

Note 2: The SMDI link modems are optional. The modems are used depending on the line length and grounding requirements.

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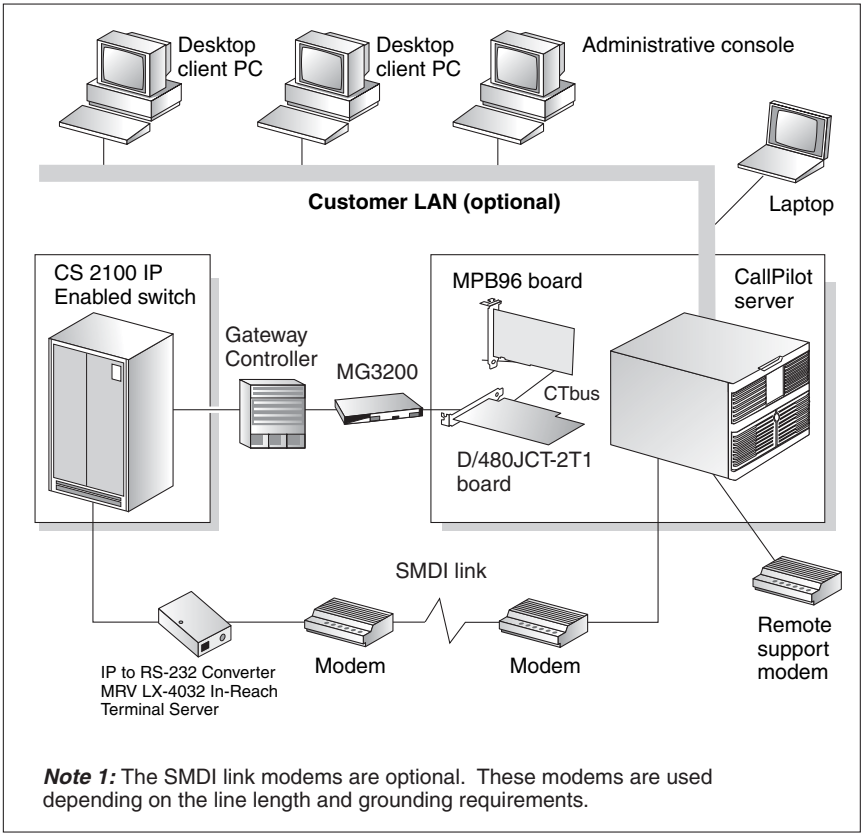
The following figure shows an example of network in which a CallPilot server is connected to an CS 2100 IP Enabled switch.



Note 1: The SMDI link modems are optional. These modems are used depending on the line length and grounding requirements.

The following table summarizes the CallPilot use of connections to web servers.

Switch	Connection	Service
Meridian 1 and Communications Server 1000	ELAN Subnet	Data (signaling)
	ELAN Subnet and DS30X TDM link	Voice
T1/SMDI connectivity ■ DMS-100 ■ SL-100 ■ CS 2100 IP Enabled	SMDI link	Data
	T1 channels	Voice

Note: The CallPilot server is connected directly to the users' PCs by way of a Nortel server subnet.

Supported switches

The following table summarizes the compatibility of switching equipment with the CallPilot 4.0 server platforms:

Switch	CallPilot server platform		
	201i	703t	1002rp
Meridian 1	✔	✔	✔
Communications Server 1000	✔	✔	✔

T1/SMDI connectivity ■ DMS-100 ■ SL-100 ■ CS 2100 IP Enabled	✔

Web server for CallPilot administration

CallPilot Manager, CallPilot Reporter, and My CallPilot are web-based applications that require a web server. If you use CallPilot Manager or My CallPilot, or both, then the CallPilot server can be used as the web server.

CallPilot can use an optional, external Internet Information Server (IIS) to provide management and end-user web services. You must have an external web server to be able to install and use CallPilot Reporter.

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

The web server hard drive must have approximately 1.0 Gbyte or more of free space available for CallPilot web services and for the database of operational measurements.

Desktop messaging clients

The desktop messaging client that is available with CallPilot can be installed on PCs running Windows 2000 Professional or Windows XP Professional. For more information on the desktop messaging clients, refer to “Compatibility” on page 72.

Section A: Hardware and software configurations

In this section

CallPilot server

Hardware

The CallPilot application is installed on the CallPilot server hardware platform.

Platform	Type
201i	IPE (the 201i server is installed in the IPE shelf of the switch)
703t	tower
1002rp	rackmount

Software

The CallPilot software configuration comprises the following items:

- server operating system—Windows 2003

  Note: The exact name of the operating system is Windows Server 2003, Standard Edition with the Telephony Service Appliance Kit (SAK)
- 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 connect CallPilot with Meridian Mail systems on networks that use one or both of the following networking protocols:

- Audio Messaging Interchange Specification-Analog (AMIS-A)
- Enterprise

For more information on the coexistence of CallPilot and Meridian Mail on the same switch, refer to the *Meridian Mail to CallPilot Migration Guide* (555-7101-801).

Multi-tenant Meridian 1 switch

CallPilot supports users on a multi-tenant Meridian 1 switch as if the users were on a single-tenant system. However, CallPilot does not

- support more than a single customer of a multi-customer Meridian 1 switch
- know to which Meridian 1 tenant a user belongs
- provide administration or billing features by tenant

Internet Telephony Gateway

The Internet Telephony Gateway (ITG) supports the following networking protocols:

ITG version	Networking protocol
1.1 (1.0.34 or later)	AMIS-A Enterprise
2.0	NMS (see Note)

Note: Additional considerations apply to the NMS implementation on Voice over IP (VoIP) networks with CallPilot. Refer to the product bulletins on the implementation of VoIP and voice messaging.

Antivirus software

The antivirus software application currently authorized for installation on the CallPilot server is Symantec Norton AntiVirus 9.0 (corporate edition).

Refer to the *CallPilot Support for Antivirus Applications* bulletin for updated information on the antivirus applications tested and approved for installation on CallPilot.

For details on installing antivirus software on the CallPilot server, refer to the most recent version of the CallPilot *Distributor Technical Reference (DTR) Bulletin.*

Third-party software

The installation of non-authorized third-party software or hardware can destabilize the system and degrade its capacity of providing real-time call processing. For more information on third-party software, refer to the *Distributor Technical Reference* document.

Symposium* Call Center Server

In general, CallPilot has the same capabilities as Meridian Mail. As a result, CallPilot can provide integrated voice services to Symposium Call Center Server. Refer to the Symposium Call Center Server bulletin for detailed information on implementing the voice service integration.

CallPilot can coexist on the same Meridian 1 switch, ELAN Subnet, and CLAN Subnet with the following Symposium products:

Product	Version
Symposium Call Center Server	4.2 and 5.0—for call center interworking 5.0—the CallPilot web services (CallPilot Manager, CallPilot Reporter, and My CallPilot) may co-reside on the Symposium Call Center Server web server
Symposium Express Call Center	4.2

Signaling between CallPilot and Symposium Call Center Server travels over the ELAN Subnet and CLAN Subnet.

CallPilot supports the following voice processing script commands:

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

Voice services

The CallPilot voice channels that provide voice services must be dedicated to Symposium Call Center Server and cannot serve for general messaging traffic. The CallPilot voice channels for Symposium Call Center Server are further partitioned into two groups for the following services:

- Give IVR
- Advanced Voice Processing

CallPilot does not require additional software options to ensure the integration with Symposium Call Center Server.

CallPilot Application Builder

Use the Application Builder program to create CallPilot applications that callers can access as dialable services. With Application Builder, you can perform the following tasks:

- specify the call functions that you want to include in applications, such as menus and announcements
- design the call flow (the path that calls follow) in an application
- import system prompts, voice items, and customized prompts
- record system prompts, voice items, and customized prompts
- archive and restore applications

In Application Builder, a series of blocks connected by lines represent an application. The graphical display allows you to follow the call flow.

Application Builder requires the installation of a client on the administrator's PC. You can download the client, on demand, from the CallPilot Manager web service to the PC.

For more information, refer to the *CallPilot Application Builder Guide* (555-7101-325).

Supported switches

Meridian 1

CallPilot supports the following Meridian 1 platforms:

- Option 11C
- Option 11C Mini
- Option 51C
- Option 61C
- Option 81C

CallPilot requires X11 Release 25.40 or later on the Meridian 1 switch.

Communications Server 1000

The Communications Server 1000 VoIP system includes the following features:

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

CallPilot requires X21 Release 3.0 or later on the Communications Server 1000 system.

For information about X21 patches (if any), refer to the *CallPilot Distributor Technical Reference (DTR) Bulletin.* You can find this document on the Nortel Partner Information Center (PIC) at http://www.nortel.com/pic

T1/SMDI switches

CallPilot 4.0 supports the DMS-100, SL-100, and CS 2100 IP Enabled T1/SMDI switches:

Two hardware components must be installed and configured on the CallPilot server to ensure the connection to the T1/SMDI switches:

- the simplified message desk interface (SMDI) link
- the T1 links

The SL-100 and DMS-100 switches support the SMDI link using either an input-output controller (IOC) shelf with an NT1X89 card or an NTFX30 input-output module (IOM). The CS 2100 IP Enabled switch supports the SMDI link using a Terminal Server

The T1 connection is integrated with the SL-100 switch by way of line side T1 interface cards installed in the intelligent peripheral equipment (IPE) module of the switch. You must have a sufficient number of line side T1 cards for the number of channels purchased. Refer to the *Line Side T-1 Interface (LT1) for IPE Services Guide* (555-4001-022) for instructions on installing the line side T1 cards.

The line side T1 cards must be configured for ground start. CallPilot does not support loop start. The DMS-100 switch does not use line side T1 cards for the T1 connection. However, the DMS-100 switch requires an external channel bank to support Centrex service. The CS 2100 IP Enabled switch uses a Gateway controller and a MG 3200 line side T1 card for the T1 connection.

Note: The SL-100 switch can also use an external channel bank for call lines.

The T1 links from the switch are terminated on Intel Dialogic boards (D/480JCT-2T1) installed in the CallPilot server.

For programming purposes, the SL-100 switch requires MSL-10 software or higher, the DMS-100 switch requires NA08 software or higher, and the CCS 2100 IP Enabled switch requires SE09 software for higher.

For information on connectivity requirements, see “T1/SMDI connectivity” on page 67.

Web server for CallPilot

Introduction

You can install three CallPilot applications on the web server.

Application	Function
CallPilot Manager	System configuration and management
CallPilot Reporter	Report generation
My CallPilot	End-user mailbox configuration, messaging, and documentation

The Microsoft Internet Information Server (IIS) established on the CallPilot server is preconfigured according to the best security practices available.

You can have multiple external web servers for a single CallPilot server.

You can use one external web server for up to 20 CallPilot servers.

Configurations of CallPilot web services

CallPilot Manager, CallPilot Reporter, and My CallPilot can all reside on an external IIS server. In this situation, you have the option to disable the IIS server on the CallPilot server to reduce security risks.

In a hybrid configuration, My CallPilot can reside on the CallPilot server, while CallPilot Manager and CallPilot Reporter reside on the IIS server

CallPilot is supplied pre-engineered to support My CallPilot or CallPilot Manager IIS web services, or both, and still be capable of providing high performance levels to all other services running on CallPilot. CallPilot end users and administrators can access the IIS server on the CLAN Subnet using web browsers.

External web server configuration

Hardware

The My CallPilot and CallPilot Reporter web services can generate high CPU loads. The minimum hardware configuration for the external web server must include

- a 600 MHz PIII processor
- 128 Mbytes of RAM
- 1 Gbyte of free disk space

Software

The external web server requires one of the following software configurations:

- Windows 2000 server with IIS 5.0
- Windows 2003 server with IIS 6.0

Note: For Windows 2000, the Advanced Server and DataCenter Server versions are not supported. For Windows 2003, the Standard Server version is supported. Future support for both Enterprise and DataCenter versions is planned.

If the Secure Socket Layer (SSL) technology is to be used, you must purchase and install an additional SSL certificate for use with the IIS. Nortel recommends the following SSL certificate vendors:

- Entrust (http://www.entrust.com/certificate_services)
- Verisign (http://www.verisign.com)

Free disk space

Generally, the web server must have approximately 1 Gbyte of free disk space available for the installation of CallPilot web services. If CallPilot Reporter is used for a large CallPilot system or a network of CallPilot systems, Nortel recommends that you estimate the necessary free disk space using the following formula:

```
Free disk space = 300 Mbytes + [total number of
channels * (days in DB + 1) * 0.2 Mbytes]
```

where

- `total number of channels =` the total number of channels on all CallPilot systems whose data is in the CallPilot Reporter database
- `days in DB` = the number of days that data are stored in the CallPilot Reporter database

Other web server considerations

The following factors determine the web server load generated by CallPilot services:

- the number of active My CallPilot users
- the number of users simultaneously accessing messages using My CallPilot versus the number of users using desktop messaging clients such as Microsoft Outlook
- the number of reports generated during the busy hour

The web server does not have to be dedicated to CallPilot web services. The same server can host web pages or provide standard network services, such as printing and file sharing. However, running other applications and services on the server can slow down CallPilot services and significantly reduce user productivity and satisfaction with the services. Therefore, Nortel recommends dedicating the web server to CallPilot services.

Monitoring performance

You must monitor the web server performance after an installation or a major change, such as the addition of users, to detect a possible system overload. If the response time is slow during the busy hour, then use the Windows Performance Monitor to determine if the server is overloaded.

The main indicators to monitor are the CPU usage, the available memory, and the physical disk space. The user response time can be degraded if one or all of the following conditions are encountered:

- the CPU usage (shown as Processor Time) is constantly above 90 percent for a significant number of minutes during the busy hour
- the available memory (shown as Available Bytes) is below 4 Mbytes
- the disk space (shown as Physical Disk Space) is insufficient

CallPilot desktop messaging

Voice messages

CallPilot uses a proprietary sub-band voice encoding at 18 kbit/s for messaging. To calculate the disk space used for voice in the CallPilot message store of desktop messaging, use the following conversion factors:

Message duration	Format	Storage space
1 minute	SBC or VBK	141 kbytes
1 minute	WAV	945 kbytes

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

Fax pages

To calculate the disk space used for fax in the CallPilot store of desktop messaging, use the following conversion factor:

Message size	Format	Storage space
1 page	TIFF	40 kbytes

Desktop messaging clients

For more information on the desktop messaging software available with CallPilot, refer to the following documents:

- *Desktop Messaging and My CallPilot Administration Guide* (555-7101-503)
- the user guide for each desktop messaging client

Section B: Connectivity requirements

In this section

CLAN Subnet connections

Introduction

The CallPilot server connects to the customer's network through the CLAN Subnet. The CLAN Subnet connectivity is required for

- Unified Messaging
- Voice Profile for Internet Mail (VPIM) networking protocol
- Simple Network Management Protocol (SNMP)
- web services: CallPilot Manager, CallPilot Reporter, and My CallPilot

Hardware requirements

The customer must provide the hub and cables required for the connection of the CallPilot server to the CLAN Subnet or WAN.

Data transmission rates

The following data transmission rates are supported by the CallPilot servers:

Note: Depending on your network, data transmission rates may fluctuate.

CallPilot platform	Ethernet data transmission rate		
	10 Mbit/s	**100 Mbit/s**	**1 Gbit/s**
201i	✔	✔	
703t	✔	✔	✔
1002rp	✔	✔	
Note: CallPilot does not support token ring CLAN Subnets (4 Mbit/s or 16 Mbit/s).			

Network protocols

Supported	Not supported
Windows TCP/IP stack on client PCs	Novell IPX/SPX stack on client PCs
Note: CallPilot can coexist on networks using IPX/SPX and other non-supported protocols if Windows TCP/IP is used for the CallPilot client-server communication.	

CLAN Subnet traffic considerations

You must ensure that the CLAN Subnet has the appropriate bandwidth capacity to support the traffic between the client PCs and the CallPilot server. Calculate bandwidth capacity on the basis of the following information.

Traffic type	Volume	Bandwidth
Desktop traffic from CallPilot to a desktop client or the web server	1 minute of voice 1 page of fax (average)	200 kbytes 55 kbytes
My CallPilot web server traffic from the web server to the browser on the client PC	1 minute of voice (WAV) 1 minute of voice (VBK) 1 page of fax (average)	945 kbytes 141 kbytes 40 kbytes
VPIM networking traffic	1 minute of voice	330 kbytes

Data transfer rates

The following table identifies the average data transfer rates for each CallPilot user.

Traffic type	Voice messaging	Fax messaging	Both
Desktop Messaging	0.09 kbit/s	0.06 kbit/s	0.15 kbit/s
My CallPilot web server traffic (WAV)	0.12 kbit/s	0.10 kbit/s	0.22 kbit/s
My CallPilot web server traffic (VBK)	0.15 kbit/s	0.10 kbit/s	0.25 kbit/s

The following considerations apply to the information provided in the previous table.

- The average voice messaging rates are based on the assumption that 60 percent of the voice messages are transferred across the customer data network and the remaining 40 percent are retrieved by phone.
- The average fax messaging rates are based on the assumption that 80 percent of the fax messages are retrieved across the network by fax messaging users with either a desktop messaging or a My CallPilot web server client, while the remaining 20 percent of the fax messages are retrieved by fax machines.
- The transfer rates for My CallPilot web server files include the message transfer from CallPilot to the web server and the subsequent transfer from the web server to the web browser.

My CallPilot web server with VBK (CallPilot proprietary encoding format) requires that the Nortel voice player be installed on the client PC.

ELAN Subnet connections

Introduction

The embedded LAN (ELAN) Subnet is implemented only if the CallPilot server is connected to a Meridian 1 switch or a Communications Server 1000 system.

You can also implement the ELAN Subnet with Layer 2 and Layer 3 switching. However, the specific design of the ELAN Subnet is complex; for detailed information, refer to the document *Data Networking for Voice over IP* (553-3001-160).

ELAN Subnet description

The CallPilot server connects to the switch or system by way of an ELAN Subnet and one or more proprietary time division multiplexing (TDM) connections (DS30X).

The CallPilot ELAN Subnet is a segregated network that carries IP traffic only between the following equipment:

- the CallPilot server
- the Meridian 1 switch, Communications Server 1000 system
- a limited number of connected administration PCs

The ELAN Subnet is used for real-time, low-delay, and mission-critical signaling between CallPilot and the switch using the proprietary Application Module Link (AML) protocol. The AML protocol is also used by Meridian Mail. All customer data traffic must be kept off the ELAN Subnet.

CAUTION

Risk of severe performance degradation

Only Nortel equipment must be connected to the ELAN switch (layer 2) or hub. To prevent severe performance degradation, the customer's network must not be connected to the ELAN Subnet.

The direct connection of the ELAN Subnet to external networks (such as the CLAN Subnet), as well as the improper router, bridge, or switch device selection or configuration, can degrade the call processing abilities of the ELAN Subnet-based switches and CallPilot server. A direct connection can also increase the risk of hacker traffic into the network.

Nortel does not recommend the implementation of router and switching technologies that are applied to the ELAN Subnet. If you require such connections, contact your Nortel technical support representative.

ELAN Subnet power requirements

Customers expect telephone and messaging services to continue through power disruptions. The CallPilot server and the switch must be protected from power failures by uninterruptible power supply (UPS) devices. The ELAN switch (layer 2) or hub must also be connected to a UPS.

If power to the ELAN switch (layer 2) or hub is disrupted, CallPilot service stops because the AML signaling link to the switch is interrupted.

System administration and the ELAN Subnet

You can connect administration PCs to the ELAN Subnet to administer CallPilot and the switch.

CallPilot administration PCs are typically located on the CLAN Subnet, if a CLAN Subnet is available.

CAUTION

Risk of reduced system performance

Because the ELAN Subnet carries critical real-time traffic between the CallPilot server and switch, do not perform high-traffic OA&M activities on the ELAN Subnet while CallPilot call processing is in progress. The traffic-intensive tasks include, for example, remote control, large file transfers, backup and restore operations, and printing.

Desktop client PCs and the ELAN Subnet

The ELAN Subnet is dedicated to the connectivity between CallPilot and the switch, and their associated applications only.

The ELAN Subnet does not support high volumes of IP traffic originating within the local ELAN Subnet or from external interconnected networks. As a result, the ELAN Subnet does not support desktop client PCs.

ELAN Subnet hardware requirements

The ELAN Subnet runs between CallPilot, Symposium, Optivity Telephony Manager (OTM), and the switch; see the diagram in "CallPilot architecture" on page 26. The 10Base-T ELAN Subnet is implemented using the following equipment:

- a Medium Attachment Unit (MAU) to one or more 10Base-T transceivers for the connection to the call processor
- category 5 cables
- a dedicated hub from either Nortel or a third party

Hardware requirements for Option 11C

CallPilot does not support the copper-connected Option 11C switch. If you are using a copper-connected Option 11C switch, then you must upgrade it to a Fiber Cabinet Option 11C switch to support the ELAN Subnet connection.

Hardware requirements for Options 51C, 61C, and 81C

Options 51C, 61C, and 81C must be equipped with the appropriate Ethernet IODU/C card to support the connection to the ELAN Subnet.

Switch	IODU/C cards
Option 51C	NT5D61AA/AB (1)
Option 61C	NT5D61AA/AB (1)
Option 81C	NT5D61AA/AB (2)

A Meridian 1 switch that runs X11 Release 25.40 can be upgraded with IODU/C cards. The IODU/C cards provide

- Ethernet connectivity to the ELAN Subnet (comparable to the capability provided by the IOP/CMDU cards)
- drive unit functions

- input/output processing functions

Cabling between the Meridian 1 switch and the ELAN switch (layer 2) or hub

The following table presents the cables required to connect the Meridian 1 switch to the ELAN switch (layer 2) or hub.

Switch	Cable PEC	Cable CPC	Connection
Option 11C	NTDK27AA	A0630723	backplane—position P1
Option 51C Option 61C Option 81C	NT7D90CA	A0406481	CORE backplane—slot 16, position F

A DB-15 to 10Base-T transceiver is necessary to convert the DB-15 end of the Ethernet cable to a 10Base-T end. The RJ-45 connector of the transceiver can then be connected to the ELAN switch (layer 2) or hub.

Each site must have one or two DB-15 to 10Base-T transceivers, depending on the number of CORE backplanes. You can purchase the DB-15 to 10Base-T transceiver (DB-15 to RJ-45) in any computer supply store, or you can order it from Nortel.

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

ELAN Subnet connectivity requirements on the switch

The CallPilot server connects to the switch by way of a proprietary TDM DS30X connection for voice services, and through the ELAN Subnet for data (signaling) services.

Separate ELAN Subnet connections are required as follows:

- Meridian 1 Option 81 switch: one connection for each call processor

- Communications Server 1000 system: one connection for the call server and one connection for the Media Gateway or Media Gateway Expansion card

Meridian 1 connectivity

Introduction

The CallPilot server connects to the Meridian 1 switch by way of an ELAN Subnet, using the TCP/IP protocol at a rate of 10 Mbit/s.

CallPilot requires X11 release 25.40 or later on the Meridian 1 switch.

IPE (201i) platform connectivity

Each 201i CallPilot server occupies two card slots in the Meridian 1 intelligent peripheral equipment (IPE) shelf and interfaces with the network loops through the IPE backplane. Both slots have access to the DS30X connection associated with the second slot.

The 201i CallPilot server contains one embedded digital signal processor (DSP) and can accept optional DSPs through inserted multimedia processing cards (MPC-8). Each MPC-8 is equipped with a DSP; each DSP provides 8 media processing units (MPU) and DS0 channels or ports (the number of DS0 channels or ports is equal to the number of MPUs).

A 201i server can support up to 40 ports:

- the first card slot has XDLC capacity and can support up to 32 ports. The first 32 ports are configured on the first card slot.
- the remaining 8 ports are configured on the second card slot.

The 201i server is supplied with 24 MPUs and DS0 channels.

Tower and rackmount connectivity

MPB16 board

MPB16 is only for legacy 1002rp systems.

MPB96 is provided for new 1002rp shipments and required for all MSL-100/DMS integrations (replacing the MPB16-4 and MPC-8 boards).

MPB96 board

The MPB96 board is installed in the 703t and 1002rp servers and provides 96 MPUs and DS0 channels to the switch through embedded DSPs.

MGate card

Three MGate cards installed in the switch connect the 703t and 1002rp platforms to the network loops.

Each MGate card provides a maximum of 32 channels. A fully configured 96-channel Tower system requires three MGate cards in the switch, while a fully configured 192-channel Rackmount system requires six MGate cards in the switch.

ATTENTION

In order to ensure proper clock synchronization, all MGate cards sharing the same MPB16-4 or MPB96 board must be connected to the same IPE or Media Gateway backplane.

ATTENTION

The CallPilot 4.0 rackmount 1002rp server does not support a combined MPB96 and MPB16-4 DSP (MPU) hardware configuration

The MGate card occupies one slot in the switch IPE shelf and connects to the MPB16-4 or MPB96 board installed in the CallPilot server with a 20-m (60-ft.) twisted pair cable.

ATTENTION

If more than three MGate cards are installed in the same superloop, callers can experience network blocking. For more information, refer to the *Communication Server 1000M and Meridian 1 Planning and Engineering* guide (553-3021-120). Meridian 1 and CS1000 traffic reports (Overlay 2) identify occurrences of network blocking.

For information on establishing the connection between the CallPilot server and the Meridian 1 switch, refer to the *Meridian 1 and CallPilot Server Configuration* document.

Meridian 1 IPE resource requirements

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

Meridian 1 software requirements

CallPilot requires X11 release 25.40 or later on the Meridian 1 switch.

CallPilot requires Release 3.0 or later on the CS1000.

If the CallPilot server provides Symposium voice services, refer to NTP 297-2183-931 Contact Center Communications Server 1000/Meridian 1 and Voice Processing Guide for the supported Meridian 1 or CS1000 software releases

The X11 base software must include the following feature packages:

Number	Name	Mnemonic
41	Automatic Call Distribution (ACD), Package B	ACDB
46	Message Waiting Center	MWC
214	Enhanced ACD Routing	EAR
215	Enhanced Call Trace	ECT
218	Hold in Queue for IVR*	IVR
247	Call identification	CALL ID
254	Phantom TN	PHTN
324	Next Generation Connectivity (see Note)	NGEN
364	Meridian Communication Exchange/CallPilot	NMCE
Note: Package 324 (NGEN) has the following dependencies:		
77	Command Status Link	CSL
153	Application Module Link	X25AP
164	Limited Access to Overlays	LAPW
242	MultiUser Login	MULI
243	Alarm Filtering	ALRM_FILTER
296	Meridian Administration Tools	MAT

Certain X11 Performance Enhancement Packages (PEP) must also be installed to support CallPilot. For more information on the applicable PEPs, refer to the *CallPilot Distributor Technical Reference (DTR) Bulletin*.

Meridian 1 memory and real-time engineering

The real-time impact of CallPilot on Meridian 1 is essentially the same as the impact of Meridian Mail for the equivalent call traffic.

A Meridian 1 switch upgraded to X11 release 25.40 or later can require additional memory. Refer to *Product Bulletin 98097* for details.

CallPilot usage of Meridian 1 software resources

Ensure that sufficient software resources are provisioned on the Meridian 1 switch to support CallPilot. The software resources are, for example, terminal number (TN) levels, automatic call distribution (ACD) agents, control directory numbers (CDN) and voice ports. CallPilot does not share Meridian 1 resources with other applications.

The following considerations apply to the provisioning of software resources on the Meridian 1 switch to support CallPilot:

- 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, which is equivalent to the voice service directory number (VSDN) table on Meridian Mail. CallPilot uses the phantom TN/DN in the same way as Meridian Mail.
- CallPilot uses one ACD queue to manage its hardware channels. A second ACD DN is required for the default DN.
- CallPilot uses one ACD agent for each channel.
- Each fax user with a virtual fax machine DN requires one phantom DN and one optional direct inward dial (DID) line.
- Each service accessed from outside the Meridian 1 switch requires one DID line.

ACD DN overflow

The Meridian 1 switch does not permit the ACD DN to overflow to a CDN. Therefore, the ACD DN overflow is not possible with CallPilot, which uses a CDN model for call management and control. If ACD DN overflow is required, then use either Symposium Express or Symposium Call Center Server integrated with CallPilot as a viable alternative that provides enhanced call routing capabilities.

Communications Server 1000 connectivity

Introduction

The CallPilot server connects to the Communications Server 1000 system on the ELAN Subnet through the Media Gateway or Media Gateway Expansion card. Voice services are routed through the Media Gateway card and data (signaling) services are routed through the ELAN Subnet.

IPE (201i) platform connectivity

The 201i server occupies two slots in the Media Gateway or Media Gateway Expansion. Refer to the *201i Server Hardware Installation* document for details on the 201i server installation.

The 201i CallPilot server contains one embedded digital signal processor (DSP) and can accept optional DSPs through inserted multimedia processing cards (MPC-8). Each MPC-8 is equipped with a DSP; each DSP provides 8 media processing units (MPU) and DS0 channels (the number of DS0 channels is equal to the number of MPUs).

A 201i server can support up to 40 DS0 channels:

- 8 channels in the embedded DSP
- 32 additional channels in 4 optional MPC-8 cards

The 201i server is supplied with 24 MPUs and DS0 channels.

Tower and rackmount server connectivity

For detailed information on tower and rackmount server connectivity, refer to the *Communications Server 1000 and CallPilot Server Configuration* document.

MPB16 board

MPB16 is only for legacy 1002rp systems and has been replaced by the MPB96 board.

MPB96 board

The MPB96 board is installed in the 703t and 1002rp servers and provides a maximum of 96 MPUs and 96 DS0 channels to the Communications Server 1000 system through embedded DSPs. The MPB96 board does not contain MPC-8 cards.

MGate card

MGate cards installed in the Communications Server 1000 system connect the 703t and 1002rp platforms to network loops. The 1002rp platform requires up to two MGate cards in the switch. The 703t platform requires up to three MGate cards (a fully configured 96-channel 703t system requires three MGate cards in the switch). A fully configured 192-channel Rackmount system requires six MGate cards in the switch.

The MPB16-4 or MPB96 board in the CallPilot server is connected to the MGate cards on the Communications Server 1000 system.

Each MGate card occupies one slot in the Media Gateway or Media Gateway Expansion of the Communications Server 1000 system and connects to the board in the CallPilot server with a 20-m (60-ft.) twisted pair cable.

Communications Server 1000 software

The X21 software Release 3.0 or later on the Communications Server 1000 system must include the following feature packages:

Number	Name	Mnemonic
41	Automatic Call Distribution (ACD), Package B	ACDB
46	Message Waiting Center	MWC
214	Enhanced ACD Routing	EAR
215	Enhanced Call Trace	ECT
218	Hold in Queue for IVR	IVR
247	Call identification	CALL ID
254	Phantom TN	PHTN
324	Next Generation Connectivity (see Note)	NGEN
364	Meridian Communication Exchange/CallPilot	NMCE
Note: Package 324 (NGEN) has the following dependencies:		
77	Command Status Link	CSL
153	Application Module Link	X25AP
164	Limited Access to Overlays	LAPW
242	MultiUser Login	MULI
243	Alarm Filtering	ALRM_FILTER
296	Meridian Administration Tools	MAT

Certain X21 PEPs must also be installed to support CallPilot. For more information on the X21 PEPs, refer to the most recent version of the *CallPilot Distributor Technical Reference (DTR) Bulletin*.

Real-time engineering

CallPilot has a real-time impact on Communications Server 1000. The engineering tool performs the real-time engineering when a Communications Server 1000 system and a CallPilot server are provisioned together.

CallPilot usage of Communications Server 1000 software resources

Ensure that sufficient software resources are provisioned on the Communications Server 1000 system to support CallPilot. The software resources are, for example, ACD agents, CDNs, and voice ports. CallPilot does not share Communications Server 1000 resources with other applications.

The following considerations apply to the provisioning of software resources on the Communications Server 1000 system to support CallPilot:

- A primary CDN is required for most traffic. A secondary CDN is required for fax call answering.
- Each service that has an entry in the CallPilot Service DN table requires one phantom TN/DN.
- CallPilot uses one ACD queue to manage hardware channels. The default DN requires a second ACD queue.
- CallPilot uses an ACD agent for each channel.
- Each fax user with a virtual fax machine DN requires one phantom DN and one optional DID line for each fax user.
- Each service accessed from outside the Communications Server 1000 system requires one DID line.

T1/SMDI connectivity

Introduction

The 1002rp server is the only CallPilot platform that can be connected to T1/SMDI switches.

The SL-100 and DMS-100 switches exchange information with the CallPilot server using

- a simplified message desk interface (SMDI) link
- T1 links

MPB96 board

The MPB96 board provides 96 MPUs.

Intel Dialogic D/480JCT-2T1 board

One or more D/480JCT-2T1 boards reside in the CallPilot server. Each D/480JCT-2T1 board supports up to two T1 links and a maximum of 48 channels per board.

The D/480JCT-2T1 board receives the media stream and call control signals from the switch and passes them to the MPB96 carrier boards for processing. A CTBus cable connects the D/480JCT-2T1 board to the MPB96 board. The CTBus cable must have 1024 timeslots to support the D/480JCT-2T1 boards.

SL-100 and DMS-100 connectivity

SMDI link

The SMDI link is a data link between the serial port COM2 on the CallPilot server and the multimedia processing card (MPC) port on the switch. The SMDI link transports incoming call information and message waiting indicator (MWI) control messages. If the CallPilot server is physically close enough to the switch, then the SMDI link can be a direct cable connection between the server and the switch.

The criteria for direct cable connection depend on whether the switch has an input-output controller (IOC) shelf or an input-output module (IOM):

- With an IOC shelf in the switch, the CallPilot server must be within 15.25 m (50 ft.) of the switch.
- With an IOM in the switch, the CallPilot server must be within 230 m (750 ft.) of the switch.

Use a modem connection for distances that are greater than those specified in the preceding list. The General DataComm 060A010-001 (North American AC version) modem and the Telenetics V3600 33.6K SMDI modem (NTRH9098) are approved for ensuring the connection between the CallPilot server and the switch.

Line side T1 cards

The line side T1 cards in the SL-100 switch send the voice and data signals to the CallPilot server.

Note: The SL-100 switch can also use an external channel bank for the call lines.

Channel bank for DMS-100

The DMS-100 switch does not use line side T1 cards, and requires an external channel bank for the call lines. The channel bank multiplexes up to 48 universal call distribution (UCD) lines configured on the DMS-100 switch onto two T1 links that are attached to the D/480JCT-2T1 boards in the CallPilot server.

Software requirements

CallPilot requires the following software on the SL-100 and DMS-100 switches:

- SL-100 switch—MSL10 software or later
- DMS-100 switch—NA08 software or later

Programming considerations

The following considerations apply to the programming of the SL-100 and DMS-100 switches:

- A UCD group is defined for each required media type on the switch. Each UCD group has unique directory numbers (DN) and supporting UCD agents.
- Line DNs are created for each directly dialable service. The DNs must be set up so that they can be forwarded to the UCD groups defined for each media type.
- The switch subscriber forwards the calls to the primary voice messaging DN if the condition Busy or No Answer is encountered.
- The MWI feature must be configured for each subscriber set.

The forwarding DN can be configured as either the originally called DN (the first forwarding DN in a call forward chain is the default option) or the redirecting DN (the last forwarding DN in a call forward chain) if the LASTFWDN option is assigned to the SMDI link.

Section C: System requirements

In this section

Compatibility

Products and environments

The following table summarizes the compatibility of CallPilot with various products and environments.

Product	CallPilot compatibility
Meridian Mail	Meridian Mail and CallPilot can coexist on the same Meridian 1 switch. Networking to Meridian Mail is available with the following protocols: ■ Audio Messaging Interchange Specification—Analog (AMIS-A) ■ Enterprise networking ■ VPIM with Meridian Mail Net Gateway **Note:** Some compatibility limitations apply.
Meridian Mail Reporter	You cannot use Meridian Mail Reporter to generate reports from a CallPilot server. Meridian Mail supports only Meridian Mail Reporter and CallPilot supports only CallPilot Reporter.

Product	CallPilot compatibility
Symposium Call Center Server 4.2 and 5.0; Symposium Express Call Center 4.2	CallPilot can coexist with Symposium Call Center Server or Symposium Express Call Center on the same ELAN Subnet and Meridian 1 switch. CallPilot supports the following Symposium Call Center Server voice-processing script commands: ■ Give IVR ■ Give Controlled Broadcast ■ Collect Digits ■ Play Prompt ■ Open...End Voice Session—this command requires Symposium Call Center Server 4.2 and at least SU07.
Internet Telephony Gateway (ITG)	CallPilot AMIS-A and Enterprise networking protocols are supported with ITG release 1.1 (version 1.0.34 or later). ITG 1.1 does not support Network Message Service (NMS), which requires ITG 2.0.
Microsoft Office 2000, 2002, and 2003 (Microsoft Office XP)	CallPilot desktop messaging clients are compatible.

Application Builder clients—operating systems

CallPilot 4.0 supports the following operating systems for Application Builder clients.

- Windows 2000 Professional with ISO-8859-1 (Latin-1) character set versions (see Note)
- Windows XP Professional

  Note: The ISO-8859-1 (Latin-1) character sets cover most West-European languages including, but not limited to, the following: English, French, Spanish, Catalan, Basque, Portuguese, Italian, Albanian, Rhaeto-Romanic, Dutch, German, Danish, Swedish, Norwegian, Finnish, Faeroese, Icelandic, Irish, Scottish, Afrikaans, and Swahili.
- Windows 98SE
- Windows NT (Service Pack 6A)

Desktop Messaging clients—operating systems

CallPilot 4.0 supports the following operating systems for desktop messaging clients.

- Non-English versions of Windows with localized client
- Windows 2000 Professional
- Windows XP Professional

If desktop messaging or My CallPilot or both are used, refer to the *Desktop Messaging and My CallPilot Installation Guide* for more information.

Customer e-mail clients

CallPilot Desktop Messaging supports the following e-mail clients:

Product	Supported versions
Microsoft Outlook Express	6.0 (released with Internet Explorer 6.0)

Product	Supported versions
Microsoft Outlook	Versions released in 2000, 2002, and 2003, including Internet Mail Mode versions
Netscape	6.2x and 7.x
Lotus Notes	6.0 and 6.5
Novell GroupWise	6.5

My CallPilot web messaging

My CallPilot web messaging supports the following operating systems and Internet browsers:

Product	Supported versions
Server side	
Operating system and Internet Information Server (IIS)	IIS 5.0 on Windows 2000 Server SP1 and above (Only the Standard version is supported.) IIS 6.0 on Windows 2003 (Only the Standard version is supported.)
Note: For Windows 2000, the Advanced Server and DataCenter Server versions are not supported.	
Client side	
Operating system	Redhat Linux Windows 2000 Professional Windows XP Professional Mac OS 9.0 and 9.1 Mac OS X (limited support only)
Internet browser	Internet Explorer 6.0 Netscape 6.2 and 7.x Mozilla 1.7.x Firefox 1.0

If CallPilot Desktop Messaging and web messaging are installed on the same client PC, CallPilot web messaging is compatible with all versions of the player.

Java script and cookies must be enabled in the web browser.

Support for localized web browsers is available in English, French, Dutch, German, and traditional Chinese.

Operating system and Internet browser support with My CallPilot, CallPilot Manager, and CallPilot Reporter

My CallPilot, CallPilot Manager, and CallPilot Reporter support the following operating systems and Internet browsers:

Product	Supported versions
Server side	
Operating system and IIS	Windows Server 2000 with service pack 1 or later and IIS 5.0 Windows 2003 Standard Edition and IIS 6.0
Client side	
Operating system	Windows 98 SE Windows 2000 Professional Windows XP Professional
Internet browser	Internet Explorer 5.x and 6.x Netscape Communicator 6.2x and 7.x

If you use CallPilot Reporter and your Internet browser does not have a built-in Java virtual machine, then you must install the Sun Java run-time environment version 1.3.1_11. This software is available on your CallPilot Applications CD-ROM.

Java script and cookies must be enabled in the web browser.

Support for localized web browsers is available in English, French, Dutch, German, and traditional Chinese.

Software feature key adapter

You must install the CallPilot software feature key adapter (dongle) correctly so that you can access CallPilot Manager.

Migration from Meridian Mail

The Meridian Mail migration utility supports the migration from Meridian Mail systems to CallPilot systems.

For information on the Meridian Mail platforms and releases that can be migrated to CallPilot and on the migration process, refer to the *Meridian Mail to CallPilot Migration Utility Guide* (555-7101-801).

The migration from Meridian Mail to CallPilot provides support for full voice prompt migration. You can migrate the following Meridian Mail voice services to CallPilot:

- menus
- announcements
- fax items
- voice items
- Symposium voice prompts

Each voice service (for example, a menu) migrated from Meridian Mail is represented as an Application Builder application on CallPilot. This application contains voice or fax items, or both, that were associated with the migrated voice service on Meridian Mail.

The logic of the voice services is not migrated to CallPilot. Only a default application is created in Application Builder. You must complete the application manually so that you can put it into service in CallPilot.

Chapter 5

Determining system size

In this chapter

Overview

Introduction

This chapter provides an overview of the enterprise capacity issues that you must consider before installing a CallPilot system. Nortel provides engineering tools that determine automatically the type of CallPilot system that you need on the basis of the information that you provide:

- the number of users
- the application usage
- the busy hour activity

System sizing

Sales engineering tools

Nortel Enterprise Configurator

After completing the gathering of solution planning requirements, you can obtain a customer quotation by way of the Nortel Enterprise Configurator (NNEC) tool. The NNEC is the global enterprise configurator and quotation tool for Nortel voice and Voice over IP (VoIP) portfolios.

Use the NNEC tool to determine the following system requirements:

- Channel media type and resources driven by the number and type of seats and feature usage required.
- Server platform determined by the total number of channels, resiliency requirements, and storage requirements.
- The integration type and amount of interworking connectivity required depending on the selected solution host.

The NNEC replaces Meridian Configurator in North and South America.

The NNEC provides the following quotation methods:

- Engineered Offer Quote (North and South America)
- Functional Offer Quote (Europe, the Middle East, Africa, and Asia)

CallPilot Capacity Engineering Spreadsheet

The CallPilot Capacity Engineering Spreadsheet in Microsoft Excel format is available for pre-quotation planning. This spreadsheet is available in the CallPilot area established on the Partner Information Center (PIC) web site at http://www.nortel.com/pic. Click **Products > Products by category > Alphabetically > CallPilot 4.0 > P.13 CallPilot Sales Engineering.**

System requirements

Use the engineering tools to determine the requirements for the following system factors:

- channels
- digital signal processors (DSP) media processing units (MPU)
- storage
- CPU real-time resources

The engineering tools also help you determine

- the CallPilot platform having sufficient channel, DSP, and CPU real-time capacity to meet the requirements of your specific situation
- the hardware for the switch channel connectivity
- the DSP hardware

Channel requirements

Determine the number of voice, fax, and speech-recognition channels required to meet your needs as follows:

1. Estimate the busy-hour traffic using a parameter-driven traffic model.
2. Look up the corresponding channel capacity in the P05 Erlang C traffic table.

The parameters available for modeling traffic are described later in this chapter. Also refer to Appendix A, “Traffic capacity tables”, on page 133.

DSP MPU requirements

The DSP capacity is calculated in MPUs. The engineering tool determines the required DSP processing power on the basis of the following ratios:

- 1 MPU for each voice channel
- 2 MPUs for each fax channel
- 4 MPUs for each speech-recognition channel

Storage requirements

The storage capacity is calculated in hours of voice messages. The engineering tool multiplies the number of mailboxes by the minutes of voice messages for each mailbox to estimate the voice message storage requirements.

The storage capacity for fax services is determined by multiplying the estimated number of stored fax pages by a mix of the normal and fine densities:

- 212 pages of normal density fax = 1 hour of voice messages
- 106 pages of fine density fax = 1 hour of voice messages

CPU real-time requirements

With the introduction of CPU-intensive services (such as E-Mail by Phone, which uses host-based text-to-speech algorithms), it is necessary to calculate the CPU load of a given set of applications. The engineering tool calculates the CPU load by

1. estimating the total traffic in centum call seconds (CCS) for applications, messaging, and E-mail by Phone services
2. multiplying each service type by load factors
3. adding up the results of the estimations and calculations

CallPilot platform capacity

The engineering tool performs the following tasks for the selected CallPilot platform:

- checks the platform capacity for channels, DSP MPUs, and CPU real-time load against the calculated requirements
- flags instances in which the platform capacity is exceeded

Switch channel connectivity hardware

The engineering tool provisions the switch channel connectivity hardware that is necessary to meet the channel requirements.

DSP hardware

The engineering tool provisions the DSP hardware that is necessary to meet the DSP MPU requirements.

Customer requirements

Principal input

Customer requirements are the principal input into the engineering tools and the major driver of the system capacity. The following parameters must be determined as part of the customer requirements:

Parameter	Initial value	Minimum	Maximum	Comments
System Type (IPE, tower, rackmount)	None	Not applicable	Not applicable	The selection of any option enables all the CallPilot inputs.
Voice Users	Blank	0	8 000 (201i) 20 000 (703t) 50 000 (1002rp) See "Voice Users maximums" on page 91.	Enter the number of voice mailboxes.
Email by Phone Users	Blank	0	The number of voice mailboxes	Enter the number of mailboxes with E-mail by Phone using text to speech.
Speech Activated Messaging	Blank	0	The number of voice mailboxes	Enter the number of mailboxes with speech activated messaging (SAM).
Fax Users	Blank	0	The number of voice mailboxes	Enter the number of mailboxes with Fax Messaging.

Parameter	Initial value	Minimum	Maximum	Comments
Users with Single (Voice/ Fax) DN	Blank	0	The number of fax users	Enter the number of fax mailboxes with a Single DN used for both voice and fax access.
Desktop Messaging	Blank	0	5000 (201i) 20 000 (703t, 1002rp)	Enter the number of mailboxes with desktop messaging.
Switch (Meridian 1, Communications Server 1000, SL-100, DMS-100, CS 2100 IP Enabled)	None	Not applicable	Not applicable	Select a type of switch to determine the setup requirements for connectivity (see notes).
NMS (yes or no)	N/A	N/A	N/A	Drives the CallPilot NMS feature enablement and potential Meridian 1 software.
Mobile Users	Blank	0	The number of voice mailboxes	Enter the number of mailboxes with SAM and E-mail by phone seats.

Parameter	Initial value	Minimum	Maximum	Comments
Users on NMS Satellite M1s	Blank	0	The number of voice mailboxes	Enter the number of mailboxes that are to be used by users in one or more NMS satellite locations (remote Meridian 1 switches) through the NMS feature. ■ The maximum number of NMS satellite locations is 59. ■ This field is disabled when system connectivity is selected for non-Meridian 1 switches.
Power (AC/DC)	AC	Not applicable	Not applicable	The AC and DC power options are available for the 703t and 1002rp. The tower systems are available only with the AC power option; selecting DC causes the configuration tool to provision a DC power inverter.

Parameter	Initial value	Minimum	Maximum	Comments
Number of Voice Menu Applications	2	0	500 (201i) 2500 (703t, 1002rp)	Enter the number of voice applications created by Application Builder.
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	Maximum number of voice channel capacity for the selected platform (minus one which is reserved for recording and maintaining prompts).	Enter the number of voice channels that are dedicated to the Symposium Call Center Server.

Note 1: If the IPE option is selected as the System Type parameter, then only Meridian 1 or Communications Server 1000 can be selected as the Switch parameter.

Note 2: If CallPilot is ordered in conjunction with a Meridian 1 switch, then only the Meridian 1 parameter can be selected.

Note 3: If CallPilot is ordered in conjunction with a Communications Server 1000 system, then only the Communications Server 1000 parameter can be selected.

Voice Users maximums

The Voice Users maximums are the limits to software right-to-use (RTU) licences only. That is, the number associated with the Voice Users parameter value (such as 8 000, 20 000, and 50 000) represents the maximum number of mailboxes that can be configured on a platform. The actual limit to the number of voice users that a CallPilot system can support at an adequate service level is affected by many factors and can be determined only with an engineering tool.

Channel requirements

Channel types

CallPilot provides three types of media channels:

Channel type	Support
voice	voice services (Voice Mail)
fax	voice and fax services (Fax On Demand)
speech recognition	voice, fax, and speech activated messaging services

Busy hour

The busy hour (BH) can be different for each channel type.

- Voice channels are typically busiest in mid-morning and mid-afternoon, although the BH can vary according to the business schedule of the customer.
- Speech recognition (SR) channels can be busiest during the time when users drive to work and back home.
- Faxes can arrive most frequently at yet a different time of day.

Consider the BH traffic separately for each channel type.

Usage assumptions

Basic user

The following assumptions apply to the BH voice port usage for a basic user:

- 0.4 call answering sessions of 40 seconds each
- 0.35 DTMF login sessions of 70 seconds each
- 10 percent of messages require a 60-second BH telephone call
- analog networking increases traffic by 5 percent

Mobile user

The following assumptions apply to the SAM and SR usage for mobile users:

- The frequency of SAM usage during the SR BH is 70 percent of the telephone set usage during the voice BH.
- An SR session lasts 70 seconds.

Fax user

A fax user receives 0.2 faxes (three pages each) during the fax BH.

Desktop user

The desktop users view received faxes on their PCs and therefore reduce the usage of fax ports needed for printing faxes.

Sizing the number and type of channels

Perform the following tasks to size the number and type of channels:

1. Estimate the busy hour traffic in CCS for each channel type.
2. Look up the channel requirements in the Erlang C P.05 traffic table. See “CCS values and channel requirements table” on page 135.

You can determine the traffic levels using one of the following factors:

- default assumptions in the system sizing tools
- estimations and measures of daily calls and faxes

Default assumptions in the system sizing tools

The system sizing tools contain default assumptions for typical business usage levels for voice, fax, and SAM services. The traffic modeling parameters and their default values are covered later in this section. Use the default values of traffic modeling parameters to obtain the overall channel sizing for various user populations.

1. Typical channel requirements for users without fax and SR usage.

Users	Voice	Fax	SR	Total channels	Total MPUs
100	5	0	0	5	5
200	7	0	0	7	7
500	11	0	0	11	11
1000	18	0	0	18	18
2000	31	0	0	31	31
3000	44	0	0	44	44
5000	69	0	0	69	69
7000	94	0	0	94	94
9000	120	0	0	120	120
11000	144	0	0	144	144
13000	168	0	0	168	168
15000	192	0	0	192	192

2. Typical channel requirements assuming that 2% of the users are mobile users, 2% of the users are fax users, and 100% of the users are desktop users. This assumes that 35% of telset mailbox logins are displaced by desktop users who play messages on their PC.

Users	Voice	Fax	SR	Total channels	Total MPUs
100	5	1	1	7	11
200	6	1	1	8	12
500	10	1	2	13	20
1000	15	1	2	18	25
2000	26	1	2	29	36
3000	36	2	3	41	52
5000	56	2	3	61	72
7000	76	2	4	82	96
9000	95	2	4	101	115
11000	116	2	5	123	140
13000	136	2	5	143	160
15000	156	2	6	164	184
17000	172	3	6	181	202

3. Typical channel requirements assuming that 10% of the users are mobile users, 20% of the users are fax users, and 50% of the users are desktop users. This assumes that 35% of telset mailbox logins by desktop users are displaced by desktop users who play messages on their PC.

Users	Voice	Fax	SR	Total channels	Total MPUs
100	5	1	2	8	15

Users	Voice	Fax	SR	Total channels	Total MPUs
200	6	1	2	9	16
500	10	2	3	15	26
1000	16	2	3	21	32
2000	28	3	5	36	54
3000	39	3	6	48	69
5000	61	4	8	73	101
7000	83	5	10	98	133
9000	104	6	12	122	164
11000	128	6	14	148	196
13000	148	7	16	171	226
14500	164	8	17	189	248

4. Typical channel requirements assuming that 25% of the users are mobile users, 50% of the users are fax users, and 100% of the users are desktop users. This assumes that 35% of telset mailbox logins are displaced by desktop users who play messages on their PC.

Users	Voice	Fax	SR	Total channels	Total MPUs
100	4	2	2	8	16
200	6	2	3	11	22
500	9	2	4	15	29
1000	15	3	5	23	41
2000	25	4	8	37	65

Users	Voice	Fax	SR	Total channels	Total MPUs
3000	34	5	11	50	88
5000	53	7	15	75	127
7000	72	9	20	101	170
9000	90	10	24	124	206
11000	180	12	29	149	248
13000	128	14	33	175	288

Daily calls and faxes

If existing traffic reports are not available, but average numbers of daily calls or faxes are known or estimated, then you can determine the number of calls and faxes during the peak busy hour using this formula:

Peak hour traffic = 13% of daily traffic

Voice traffic services

Principal services

The following principal services 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)

Provisioning voice channels on CallPilot

Customers often purchase CallPilot 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. Enter the number of voice channels in the Voice Channels Override parameter of the Meridian Configurator or NetPrice tool.

If a single CallPilot system replaces two or more existing voice mail systems, then it is not necessary to provision as many voice channels on the CallPilot system as the number of voice channels on all the voice mail systems that are replaced. Larger systems have increased traffic efficiency. When a single CallPilot server replaces two or more existing voice mail systems, Nortel recommends using the engineering tool to size the channel requirements on the basis of the number of CallPilot users.

Modeling busy hour voice traffic

The following table presents the parameters used to estimate the traffic in hours for each principal voice traffic service. The engineering tools consider these parameters to be advanced parameters. The sales engineer generally leaves the advanced parameters unchanged. However, the engineering tools use the advanced parameters to enable the sales engineer to adapt the traffic model to the needs and behavior of the customer.

Field name	Initial value	Minimum	Maximum	Comments
Voice Call Answering Session Calls	0.4	0.1	5	Enter the number of call answering calls in the busy hour (BH) for each mailbox.
Voice Call Answering Session AHT	40	10	200	Enter the average hold time (AHT) in seconds for the BH.
Voice Logon Session AHT	70	10	300	Enter the AHT in seconds for the BH.
Total Busy Hour Message Access	0.35	0.1	1.0	Enter the number of expected single message retrievals from all potential modes (DTMF, SAM, and Desktop) for each mailbox during the BH.
EBP Session AHT	240	10	600	Enter the E-mail by Phone (EBP) session AHT in seconds for the BH.
Pct DTMF Voice Mail Accesses using EBP	10%	00	100%	Enter the percentage of dual-tone multifrequency (DTMF) logins that make use of EBP.

Field name	Initial value	Minimum	Maximum	Comments
Voice Menus Calls	5	1	200	Enter the number of calls for each voice menu application in the BH.
Voice Menus AHT	60	5	200	Enter the AHT in seconds for the BH.
Voice Menus: %Xfrd	33%	0	100%	Enter the percentage of voice menu calls that are to be transferred.
Auto Attendant Calls	40	5	1000	Enter the number of auto attendant calls in the BH.
Auto Attendant AHT	30	5	90	Enter the AHT in seconds for the BH.
Fax On Demand Request Calls	2	1	200	Enter the number of request calls (on voice channels) for each Fax On Demand application in the BH.
Fax On Demand Requests AHT	60	5	200	Enter the AHT in seconds for fax requests.
Outcalling (RN and DTT)% of Calls	5%	0	100%	Enter the percentage of Voice Call Answering calls (% of Calls) that can result in Outcalling calls.
Outcalling (RN and DTT) AHT	60	10	180	Enter the AHT in seconds.

Field name	Initial value	Minimum	Maximum	Comments
Analog Networking Percentage	3%	0	100%	Enter the percentage of analog messaging traffic (Enterprise or AMIS networking). The more VPIM networking is used, the lower this percentage must be. If VPIM networking is the only protocol used, then set this parameter to zero.

Fax traffic services

Principal services

These are the principal services that generate traffic on fax channels:

- Fax On Demand applications with same call fax access
- Fax On Demand callback delivery
- Fax auto attendant (fax express messaging)
- Fax call answering
- Delivery to fax services
- Fax broadcasting (multicast to fax service)
- Fax printing to fax machines

Estimating fax channels

In some situations, the CallPilot fax channels replace a small number of fax machines that have high inbound traffic. Nortel does not recommend that you replace the fax machines with fax channels on a one-for-one basis. Instead, Nortel recommends that you estimate the average number of

- fax messages per fax user
- pages per fax message

Enter the estimated average numbers into the Advanced parameters box of the engineering tool.

Modeling busy hour fax traffic

The following table presents the parameters used to estimate the traffic for each principal fax service. The engineering tools consider these parameters to be advanced parameters. The sales engineer generally leaves the advanced parameters unchanged. However, the engineering tools use the advanced parameters to enable the sales engineer to adapt the traffic model to the needs and behavior of the customer.

Field name	Initial value	Minimum	Maximum	Comments
Fax Messaging Calls	0.1	0.05	1000	Enter the number of Fax Messaging calls during the BH per mailbox.
Fax Messaging Pages	3	1	100	Enter the average number of pages per fax message during the BH.
Fax Printing Displaced By Desktop	90%	10	100%	Enter the percentage of fax printing that is displaced by users reading fax messages on the desktop (and possibly printing them to a network printer) instead of printing the fax messages to a fax machine.
Fax On Demand—Call Back Calls	2	1	200	Enter the number of calls that can be made by the Call Back feature per fax on demand application during the BH.
Fax On Demand—Call Back Pages	4	0	99	Enter the number of pages that can be sent by way of the Call Back feature.

Field name	Initial value	Minimum	Maximum	Comments
Fax Broadcast Recipients	Blank	0	5000	Enter the number of fax broadcast recipients. Set this parameter to a non-zero value only if the broadcasts occur during BHs.
Fax Broadcast Max Wait time	4	0.2	20	Enter the maximum waiting time (in hours) for delivering the fax broadcast to all recipients.
Fax Broadcast Pages	3	1	100	Enter the average number of pages per fax broadcast message.

Speech recognition traffic services

Principal services

These are the principal services that generate traffic on speech recognition channels:

- speech activated messaging (SAM)
- E-mail by Phone on speech recognition channels

Mobile users typically use these services from wireless phones to listen to voice and e-mail messages without using their hands and looking at a telephone display.

Modeling busy hour speech recognition traffic

The busy hour for speech recognition services can be different from the overall system busy hour.

The following table presents the parameters used to estimate the traffic for each principal speech recognition traffic service. The engineering tools consider these parameters to be advanced parameters. The sales engineer generally leaves the advanced parameters unchanged. However, the engineering tools use the advanced parameters to enable the sales engineer to adapt the traffic model to the needs and behavior of the customer.

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

Field name	Initial value	Min.	Max	Comments
Telset Accesses Via SAM	70	10	100	Enter the number of BH users of SAM. These users are desktop or SAM users away from their desks, or SAM users without desktop messaging rights. The SAM users prefer SAM to DTMF, yet some SAM users can use DTMF logins in environments where it is inappropriate to speak commands; for example, in open cubicles. The value of this parameter reflects the likelihood that a user with SAM rights who must access messages using a phone set chooses SAM over DTMF.
Pct SAM Accesses with EBP	20%	00	100%	Enter the percentage of time that users access E-mail by Phone (EBP) by way of a SAM session.

Storage estimation

Storage calculation assumptions

The engineering tools make the following assumptions when estimating the storage space:

- one page of normal fax = 1/212 hour
- one page of fine resolution fax = 1/106 hour
- voice storage overhead factor = 20 percent of voice stored
- average length of a voice message = 1 minute

The following parameters are used to calculate the storage hours:

Field name	Initial value	Minimum	Maximum
Minutes of voice messages per mailbox	6	1	360
Pages of fax per mailbox	5	1	635

Chapter 6

Engineering the server

In this chapter

CallPilot server capacities at a glance

The following table summarizes the CallPilot server capacities. For other capacities and features, refer to the appropriate server section in this chapter.

Item	201i	703t	1002rp
Channels	40	96	192
DSP MPUs	40	96	288
Storage hours[a]	350	1 200	2 400
Maximum Directory Size[b]	10 000	50 000	50 000
Maximum number of mailboxes[c]	10 000	20 000	50 000
Maximum number of voice-only users[d]	2 500	7 000	50 000
Maximum number of logged-in unified messaging users[e f g]	2 200	12 200	12 200
RAID (level 1 hardware mirroring only)	Not supported	Standard (Double channel)	Standard (Double channel)
Disks			
Hot swappable	No	No	Yes
Redundant	N/A	Yes	Yes
System fans	N/A		
Hot swappable		No	Yes
Redundant		Yes	Yes

a. The number of storage hours does not include the storage reserved for voice prompts.

b. The maximum number of permanent Remote Users that can be created on a server is determined by the formula: Max Permanent Remote Users = Maximum Directory Size - Local Users (mailboxes) - Temporary Remote Users. (See Network Planning Guide for more background information.)

c. The maximum number of mailboxes that can be created on a system. However, this is not necessarily the number of users who can use the system.

d. The maximum number of voice-only users with typical voice mail usage that can be supported with a P.05 grade of service with all voice channels. User capacity is lower if fax or mobile user features are configured. Use the Meridian Configurator or NetPrice tool in all cases to obtain an engineered solution.

e. The limit is not enforced.

f. The maximum number of unified messaging clients that can be logged in at one time. This is not the keycode limit. The keycode limit for desktop messaging is the same as the maximum limit for mailboxes.

g. The value is based on platform memory limits. Each logged-in desktop or web user requires 20 bytes.

CallPilot product capacities

Overview

The product capacities provided in the following table are reference values. The footnotes at the end of the table indicate special conditions that apply to specific items.

Item	Limit
Number of Application Builder services	2500[a]
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 service	3000
Voice messages for each mailbox	1000
Minutes for each mailbox	600
Service directory numbers (SDN)—previously known as Voice Service directory numbers (DN)	2500
Minutes of voice per message	120
Pages of fax for each message	100
Number of voice prompt languages	6
Number of speech recognition languages[b]	3
Number of shared distribution lists (SDL)	No limit
Entries for each SDL	999

Item	Limit
Number of personal distribution lists (PDL) per mailbox	99
Entries for each PDL	200
Selections for each fax on each fax on demand session	99
Pages for each 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 in minutes	10
Classes of service	unlimited
Number of temporary remote user references	10 000
Private network sites	500
Open VPIM Short-Cut Network Sites	500
Number of CDP steering codes for each network location	500
Number of NMS satellite locations	59
Tenants	1
Customers	1
Restriction Permission Lists (RPL)[c]	200
DNs for each mailbox	8

Item	Limit
Number of concurrent administration sessions	16
Maximum simultaneous E-Mail by Phone sessions	20
Maximum number of E-Mail by Phone languages	10

a.This Limit is for tower and rackmount systems only. In those configurations, disk drive D supports 500 services. Each of the disk drives E and F supports 1000 services. The IPE platform supports up to 500 services.

b. The number of voice prompts and speech recognition languages must be identical.

c. Each list contains up to 30 restriction and 30 permission codes.

201i server features

Feature	Characteristics
DSP configuration	One embedded DSP—eight MPUs. Four MPC-8 cards inserted into the server faceplate increase the server capacity to 40 MPUs.
Hard disk	One IDE hard disk
Volume	VS1 (system volume)—350 hours of storage
Data port	One serial port—COM1
Routing and remote access service (RRAS) connectivity	The 9-pin RS-232 COM1 connector on the multi-I/O cable provides the connection to an external modem.
Parallel port	Not available
Software feature key	Installed on the motherboard
ELAN Subnet connectivity	10Base-T built-in Ethernet controller on the motherboard
CLAN Subnet connectivity	10/100Base-T Ethernet controller on the motherboard

703t server features

Feature	Characteristics
DSP configuration	Twelve DSPs on the MPB96 board—96 MPUs
Hard disks	■ two hard disks in a RAID configuration (RAID 1 - mirroring) ■ total storage capacity: 1200 hours ■ the hard disks are not hot swappable
Volumes	VS1 (system volume)—400 hours VS102 (user volume)—400 hours VS103 (user volume)—400 hours
Data port	Two serial ports, but only one is installed—COM1. The serial port connects the server to an external modem for remote access (particularly for remote technical support).
RRAS connectivity	The RS-232 COM1 connector on the rear of the CallPilot server provides the connection to an external modem.
Parallel port	Available
Software feature key	Installed in the parallel port
ELAN Subnet connectivity	10/100Base-T Ethernet controller on the motherboard
CLAN Subnet connectivity	10/100/1000Base-T Ethernet controller on the motherboard

1002rp (ELAN) server features

Feature	Characteristics
DSP configuration	36 DSPs on each MPB96 board—288 MPUs
Hard disks	■ six hard disks in a RAID configuration (RAID 1 - mirroring) ■ total storage capacity: 2400 hours ■ the hard disks are hot swappable
Volumes	VS1 (system volume)—500 hours VS102 (user volume)—950 hours VS103 (user volume)—950 hours
Data port	Two serial ports—one serial port that supports an external modem (particularly for remote technical support) and a spare port.
RRAS connectivity	The RS-232 COM1 connector on the rear of the CallPilot server provides the connection to an external modem.
Parallel port	Available
Software feature key	Installed in the parallel port
ELAN Subnet connectivity	10/100Base-T Ethernet network card
CLAN Subnet connectivity	10/100Base-T Ethernet optional network card

1002rp (T1/SMDI) server features

Feature	Characteristics
DSP configuration	36 DSPs on each MPB96 board—288 MPUs
Interface to the switch	Up to 4 Intel Dialogic D/480JCT-2T1 boards that carry the media stream and call control signals to and from the switch.
Hard disks	■ six hard disks in a RAID configuration (RAID 1 - mirroring) ■ total storage capacity: 2400 hours ■ the hard disks are hot swappable
Volumes	VS1 (system volume)—500 hours VS102 (user volume)—950 hours VS103 (user volume)—950 hours
Data port	Two serial ports ■ a serial port (COM1) that supports an external modem (particularly for remote technical support) ■ a serial port (COM2) that provides the SMDI connection to the switch
RRAS connectivity	The RS-232 COM1 connector on the rear of the CallPilot server provides the connection to an external modem.
Parallel port	Available
Software feature key	Installed in the parallel port
CLAN Subnet connectivity	10/100Base-T Ethernet optional network card

Remote access service connectivity

The external modem allows administrators and technical support personnel to administer the CallPilot server from a remote location.

- Use the Microsoft Windows 2003 Routing and Remote Access Service (RRAS) to establish the remote connection to the CallPilot server.
- Use the Symantec pcAnywhere software to control the CallPilot server (703t and 1002rp) over the RRAS connection.

or

- Use the Windows Remote Desktop Connection software to control the CallPilot server over the RRAS connection.

Chapter 7

Selecting a site

In this chapter

Space requirements for the CallPilot server

You must consider the physical space occupied by the CallPilot server as part of your planning activities. This section provides guidelines for determining the adequate space that you must provide for the server.

General requirements

Install the CallPilot server in an area that is

- free of static electricity
- exempt from vibrations
- away from a sprinkler system, as well as from water, steam, and any liquid-carrying pipes
- safe for personnel and equipment
- protected against electromagnetic interference (EMI) from the following sources:
  - broadcast stations
  - radar
  - mobile communications
  - high-voltage power lines
  - power tools
  - office equipment such as photocopiers

Space requirements

Install the server in an area that provides enough space for

- the front and rear cabinet doors to open and close
- the servicing or removal of components

Switch room space planning

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

Ethernet hub and cables

Ensure that sufficient space is available for the Ethernet hub and cables.

ATTENTION!

Always use shielded Ethernet cables to connect the CallPilot servers to the switch and the hub.

Peripheral devices

You must ensure that sufficient space is available for the following peripheral devices:

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

The monitor, keyboard, and mouse do not have to be permanently connected to the 201i server.

201i server

The 201i server occupies two slots in the intelligent peripheral equipment (IPE) shelf of the switch and weighs approximately 2.1 kg (4.5 lb). You must ensure that sufficient space is available for the following equipment:

- the multi-I/O cable
- the tape drive
- the CD-ROM drive

703t server

The 703t server is freestanding. The following table lists the characteristics of the 703t server:

Characteristic	Value
Height	420 mm (16.75 in.)—chassis only 440 mm (17.5 in.)—with chassis feet
Width	215 mm (8.6 in.)—chassis only 320 mm (12.7 in.)—with chassis feet
Depth (distance from front to back)	650 mm (26 in.)
Clearance	■ front: 250 mm (10 in.) ■ rear: 125 mm (5 in.) ■ side: 75 mm (3 in.)—additional side clearance is required for service ■ top: 75 mm (3 in.)

Characteristic	Value
Weight of fully loaded system equipped with ■ two SCSI drives ■ six populated boards ■ CD-ROM drive ■ floppy drive ■ tape drive	Approximately 22 kg (48.50 lb)

1002rp server

The 1002rp server is installed in a customer-supplied shelf. The following table lists the server characteristics:

Characteristic	Value
Height	320 mm (12.5 in.)
Width	483 mm (19 in.)
Depth (distance from front to back)	■ without front bezel: 495 mm (19.5 in.) ■ with front bezel: 533 mm (21 in.)
Weight of fully loaded system equipped with ■ six SCSI drives ■ CD-ROM drive ■ floppy drive ■ tape drive	45.5 kg (100 lb)

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 power supply requirements.

Single-point grounding

WARNING

Risk of personal injury and risk of hardware failure

The power outlets that are used by the CallPilot server and its peripheral devices must be connected to the single-point ground (SPG) reference used by the switch connected to the CallPilot server.

If this requirement is not met, power transients can cause personal injury or hardware failure, or both.

Nortel strongly recommends that a qualified electrician establish the proper SPG before the installation of the CallPilot server.

For more information on the SPG reference, refer to Chapter 3, “Grounding and power requirements.”

UPS recommendation

Nortel recommends using an uninterruptible power supply (UPS) or an equivalent device to power the CallPilot server. The UPS provides two important services that are essential to the maintaining of high-availability and mission-critical messaging:

- The UPS conditions the power by filtering power brown-outs and transients, which can shorten the server life and damage the server hardware.
- The UPS reduces the risk of unplanned power outages, which can corrupt severely the operating system components of a server.

If a UPS protects the switch, then Nortel recommends using a UPS to power the hub to prevent service loss due to power outages.

Power requirements

The CallPilot servers require different types of power input and different levels of power usage. The following table summarizes the CallPilot power requirements:

Device	Power input	Power usage
201i	Provided by the Meridian 1 IPE shelf	40 W
703t	Auto-ranges from 90 V ac to 120 V ac and from 200 V ac to 240 V ac at 50 Hz or 60 Hz (see Note)	450 W
1002rp AC	120 V AC 240 V AC	400 W
1002rp DC	48 V, 20 A DC (see Note)	500 W
Hub	110 V	1.8 W

Device	Power input	Power usage
External tape drive	110 V	7.2 W
MGate card	Provided by the Meridian 1 IPE shelf or Communication Server system	5 W
Modem	110 V with a power adapter that provides 9 V ac to 15 V ac at 10 W	10 W
Monitor	110 V ac	90 W

Note: The NTRH9032 dc to ac power converter is no longer available. Nortel recommends that you supply a third-party dc to ac power converter that provides at least 1000 W of capacity for the 703t and 1002rp servers and its peripherals. Ensure that the power converter is properly installed, according to the manufacturer's instructions.

If you use the Nortel MFA150 rectifier (which is supplied with 30 A breakers and two 20 A breakers in the Spare Circuit Breaker Kit, 20 A [P0729846]), then you must configure the rectifier to supply the two 20-A dc circuits for the rackmount server.

Environmental specifications

General

Always consider the environmental specifications when planning an adequate location for the CallPilot servers.

Before considering the server environmental specifications, you must take into account the switch environmental specifications.

The proper operating temperature and humidity are important for the longevity of the servers. The tables provided in this section summarize the key environmental specifications of the CallPilot servers.

The “non-operating” term used in the tables refers to the environmental conditions that have to be maintained during shipping and storage.

201i server

Environmental condition	Specification
Recommended temperature	15°C to 30°C (59°F to 86°F)
Absolute temperature	10°C to 45°C (50°F to 113°F)
Long-term storage temperature	–20°C to 60°C (–4°F to 140°F)
Short-term storage temperature	–40°C to 70°C (–40°F to 158°F) for less than 72 hours
Change rate temperature	less than 1°C (1.8°F) per 3 minutes
Recommended relative humidity (RH)	20% to 55% RH (non-condensing)
Absolute RH	20% to 80% RH (non-condensing)
Long-term storage RH	5% to 95% RH at –40°C to 70°C (–40°F to 158°F) respectively (non-condensing)

703t server

Environmental condition	Specification
Operating temperature	10°C to 35°C (50°F to 95°F) The maximum rate of change must not exceed 10°C (18°F) for each hour.
Non-operating (storage) temperature	–40°C to 70°C (–40°F to 158°F)
Non-operating humidity	95%, non-condensing, at 30°C (86°F)
Altitude	1 829 m (6 000 ft)
Electrostatic discharge	15 kV or more
Acoustic noise	50 dBA in a typical office ambient temperature (18°C to 25°C) [64.4°F to 77°F]
Operating shock	No errors with a half-sine wave shock of 2 G (with 1 millisecond duration)
Handling drop	Operational after a free fall from 450 mm through 600 mm (18 in. to 24 in.), depending on weight

1002rp server

Parameter	Condition	Specification
Temperature	Operating	5°C to 35°C (41°F to 95°F)
	Non-operating	–40°C to 70°C (–40°F to 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 G, 10 ms (10.0 G, 11 ms in the appropriate chassis)
	Non-operating	30.0 G, 10 ms (40.0 G, 11 ms in the appropriate chassis)
Vibration	Operating	0.25 G at 5 Hz to 100 Hz (1.5 G over 5 Hz to 100 Hz in the appropriate chassis)
	Non-operating	5 G at 5 Hz to 100 Hz
Altitude	Operating	4 572 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

Introduction

When calculating the number of channels required on your CallPilot system, take into consideration the differences between sizing Meridian 1 switches and sizing non-Meridian 1 switches.

Types of tables to use

The following table identifies the traffic capacity table to use for your CallPilot system and switch type. The actual traffic capacity tables begin on page 135.

Busy hour CCS (BHCCS) traffic capacity table type

Switch and media type	Erlang C P.05 BHCCS (40-second AHT)	Erlang B P.02 BHCCS
Meridian 1 and Communications Server 1000—Voice, Fax, and ASR	✔	
SL-100	✔	
DMS-100	✔	
CS 2100 IP Enabled	✔	

Note: The Erlang B table is only needed if there is no call queuing, such as when a Multi-Line Hunt Group is used to distribute the calls.

CCS values and channel requirements table

Introduction

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

Before using the table

To determine which column of the following table to use when calculating channel requirements, refer to “Types of tables to use” on page 134.

	CCS values			CCS values	
Number of channels	**Erlang C P.05 GOS**	**Erlang B P.02 GOS**	**Number of channels**	**Erlang C P.05 GOS**	**Erlang B P.02 GOS**
1	2	1	97	3155	3062
2	14	8	98	3190	3097
3	33	22	99	3225	3132
4	54	40	100	3260	3167
5	78	60	101	3295	3202
6	104	82	102	3330	3237
7	130	106	103	3366	3272
8	158	131	104	3401	3307
9	186	157	105	3436	3342

	CCS values			CCS values	
Number of channels	**Erlang C P.05 GOS**	**Erlang B P.02 GOS**	**Number of channels**	**Erlang C P.05 GOS**	**Erlang B P.02 GOS**
10	215	183	106	3471	3377
11	244	210	107	3506	3412
12	274	238	108	3541	3446
13	304	267	109	3577	3481
14	334	295	110	3612	3516
15	365	325	111	3647	3551
16	396	354	112	3682	3587
17	427	384	113	3717	3622
18	459	414	114	3753	3657
19	491	444	115	3788	3692
20	523	475	116	3823	3727
21	555	505	117	3858	3762
22	587	536	118	3893	3797
23	619	567	119	3929	3832
24	652	599	120	3964	3867
25	684	630	121	3999	3902
26	717	661	122	4034	3937

Number of channels	CCS values		Number of channels	CCS values	
	Erlang C P.05 GOS	Erlang B P.02 GOS		Erlang C P.05 GOS	Erlang B P.02 GOS
27	750	694	123	4070	3973
28	783	725	124	4105	4008
29	816	757	125	4140	4043
30	849	790	126	4175	4078
31	882	822	127	4211	4113
32	915	854	128	4246	4148
33	948	887	129	4281	4184
34	982	919	130	4317	4219
35	1015	952	131	4352	4254
36	1049	985	132	4387	4289
37	1082	1017	133	4423	4325
38	1116	1050	134	4458	4360
39	1150	1083	135	4493	4395
40	1183	1116	136	4529	4430
41	1217	1149	137	4564	4466
42	1251	1182	138	4599	4501
43	1285	1215	139	4635	4536

	CCS values			CCS values	
Number of channels	**Erlang C P.05 GOS**	**Erlang B P.02 GOS**	**Number of channels**	**Erlang C P.05 GOS**	**Erlang B P.02 GOS**
44	1319	1249	140	4670	4571
45	1353	1282	141	4706	4607
46	1387	1315	142	4741	4642
47	1421	1349	143	4776	4677
48	1455	1382	144	4812	4713
49	1489	1416	145	4847	4748
50	1523	1449	146	4883	4783
51	1558	1483	147	4918	4819
52	1592	1517	148	4953	4854
53	1626	1550	149	4989	4890
54	1660	1584	150	5024	4925
55	1695	1618	151	5060	4960
56	1729	1652	152	5095	4996
57	1764	1685	153	5130	5031
58	1798	1719	154	5166	5067
59	1832	1753	155	5201	5102
60	1867	1787	156	5237	5137

	CCS values			CCS values	
Number of channels	**Erlang C P.05 GOS**	**Erlang B P.02 GOS**	**Number of channels**	**Erlang C P.05 GOS**	**Erlang B P.02 GOS**
61	1901	1821	157	5272	5173
62	1936	1855	158	5301	5208
63	1970	1889	159	5343	5244
64	2005	1923	160	5379	5279
65	2040	1957	161	5414	5316
66	2074	1992	162	5449	5350
67	2109	2026	163	5485	5386
68	2143	2060	164	5520	5421
69	2178	2094	165	5556	5456
70	2213	2129	166	5591	5492
71	2248	2163	167	5626	5527
72	2282	2197	168	5662	5563
73	2317	2232	169	5698	5598
74	2352	2266	170	5733	5634
75	2387	2300	171	5769	5669
76	2421	2335	172	5804	5705
77	2456	2369	173	5840	5741

	CCS values			CCS values	
Number of channels	**Erlang C P.05 GOS**	**Erlang B P.02 GOS**	**Number of channels**	**Erlang C P.05 GOS**	**Erlang B P.02 GOS**
78	2491	2404	174	5875	5776
79	2526	2438	175	5911	5812
80	2561	2473	176	5946	5847
81	2596	2507	177	5981	5883
82	2630	2542	178	6017	5918
83	2665	2576	179	6053	5954
84	2700	2611	180	6088	5989
85	2735	2646	181	6124	6025
86	2770	2680	182	6159	6061
87	2805	2715	183	6195	6096
88	2840	2750	184	6230	6062
89	2875	2784	185	6266	6067
90	2910	2819	186	6302	6203
91	2945	2854	187	6337	6238
92	2980	2889	188	6373	6274
93	3015	2923	189	6408	6310
94	3050	2958	190	6444	6345

	CCS values			CCS values	
Number of channels	**Erlang C P.05 GOS**	**Erlang B P.02 GOS**	**Number of channels**	**Erlang C P.05 GOS**	**Erlang B P.02 GOS**
95	3085	2992	191	6479	6381
96	3120	3028	192	6515	6417

Appendix B

Regulatory information

In this appendix

Grounding

Make sure that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, connect together. This precaution is for the users' protection, and is particularly important in rural areas.

CAUTION

Risk of equipment damage

The CallPilot system frame ground of each system cabinet or chassis must be tied to a reliable building ground reference.

WARNING

Risk of electrocution

Do not attempt to make electrical ground connections yourself. Contact your local electrical inspection authority or electrician to make electrical ground connections.

For more information on the preceding issues, refer to Chapter 3, "Grounding and power requirements."

General compliance and safety information for specific countries

If insufficient planning or technical information is available for your country of operation, contact your regional telecommunications distributor or authority for assistance.

Information for European countries

Safety specifications

The CallPilot system meets the following European safety specifications:

- EN 60825 and EN 60950.

Information for North America

CallPilot server models 703t and 1002rp comply with the following standards:

- UL 60950-1 Information Technology Equipment Safety Part 1- General Requirements (U.S.A.)
- CSA-C22.2 No. 60950-1-03 Safety Telecom Information Technology Equipment Safety, Part 1- General Requirements (Canada)

Note: Because the 201i server is housed in the CS 1000 Media Gateway, its safety compliance falls under the standards the CS 1000 supports.

Information for Japan

Japan Denan statement

The following applies to server models 703t and 1002rp:

⚠ Warning

Please be aware of the following while installing the equipment:

- Please use the connecting cables, power cord, and AC adaptors shipped with the equipment or specified by Nortel to be used with the equipment. If you use any other equipment, it may cause failures, malfunctioning or fire.
- Power cords shipped with this equipment must not be used with any other equipment. If the above guidelines are not followed, it may lead to death or severe injury.

⚠ 警告

本製品を安全にご使用頂くため、以下のことにご注意ください。

● 接続ケーブル、電源コード、ACアダプタなどの部品は、必ず製品に同梱されております添付品または指定品をご使用ください。添付品・指定品以外の部品をご使用になると故障や動作不良、火災の原因となることがあります。

● 同梱されております付属の電源コードを他の機器には使用しないでください。

上記注意事項を守らないと、死亡や大怪我など人身事故の原因となることがあります。

Electromagnetic compatibility

The following table summarizes the electromagnetic compatibility (EMC) specifications for Class A devices.

Jurisdiction	Standard	Title
United States	FCC CFR 47 Part 15	FCC Rules for Radio Frequency Devices (see Note 1)
Canada	ICES-003	Interference-Causing Equipment Standard: Digital Apparatus
Europe	EN 55022/ CISPR 22	Information technology equipment—Radio disturbance characteristics—Limits and methods of measurement (see Note 2)
	EN 55024	Information technology equipment—Immunity characteristics—Limits and methods of measurement
	EN 61000-3-2	Limits for harmonic current emissions (equipment input current <= 16 A per phase)
	EN 61000-3-3	Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current <= 16 A
Australia	CISPR 22/ AS/NZS 3548	Limits and methods of measurement of radio disturbance characteristics of information technology equipment (see Note 2)
Korea	KN22	Information technology equipment — Radio disturbance characteristics — Limits and methods of measurement

Jurisdiction	Standard	Title
Korea (continued)	KN24	Information technology equipment — Immunity characteristics — Limits and methods of measurement
Taiwan	CNS 13438	Limits and methods of measurement of radio disturbance characteristics of information technology equipment

Note 1: FCC CFR 47 Part 15.21 statement:
"Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense."

Note 2: EN 55022/CISPR 22 statement:
"WARNING
This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures."

Radio and TV interference

ATTENTION The user should not make changes or modifications not expressly approved by Nortel. Any such changes could void the user's authority to operate the equipment.

Information for the United States

The CallPilot system complies with Part 15 of the FCC rules in the United States. Operation is subject to the following two conditions:

- The system must not cause harmful interference.
- The system must accept any interference received, including interference that can cause undesirable operation.

If the CallPilot system causes interference to radio or television reception, which can be determined by placing a telephone call while monitoring, the user is encouraged to try to correct the interference by the following measures:

- Reorient the receiving TV or radio antenna where this can be done safely.
- Move the TV or radio in relation to the telephone equipment.

If necessary, ask a qualified radio or television technician or supplier for additional information. Also, you can refer to the document “How to Identify and Resolve Radio-TV Interference”, prepared by the Federal Communications Commission. This document is available from:

U.S. Government Printing Office
Washington DC 20402

Information for Canada

The CallPilot system does not exceed Class A limits for radio noise emissions from digital apparatus, as set out in the radio interference regulations of Industry Canada.

This equipment complies with the CE Marking requirements.

Information for Japan

The following applies to server models 703t, 201i, and 1002rp:

この装置は、情報処理装置等電波障害自主規制協議会 (VCCI) の規定に基づくクラス A 装置です。この装 置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を取るように要求されることがあります。

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may occur, in which case, the user may be required to take corrective action.

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Planning & Engineering Guide

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