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Meridian Mail Option 11 EC (EC11)

Site and Installation Planning Guide

Product release 13

Standard 1.0

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Meridian Mail Option 11 EC (EC11)

Site and Installation Planning Guide

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Chapter 1

Determining system size

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Overview

Introduction

This chapter outlines how to estimate the number of ports, nodes, and hours of storage your system will require, based on the estimated system usage. The methods for determining port and storage hours requirements are broken down by feature. You can ignore the procedures for those features that you do not plan to have on your system.

A term used in this chapter that you need to know is *multimedia applications*. This term refers to Meridian Mail services or features that include fax capability. For example, a voice menu that allows a caller to select a fax to receive is a multimedia application.

For hospitality systems, the estimates for system size requirements are different from those for other Meridian Mail systems. As a result, the method for determining the system size for hospitality systems is discussed separately in the section titled “Determining system size for hospitality systems” on page 1-52. If you are purchasing a hospitality system, go to that section now.

Basic-service, full-service, and multimedia ports

Introduction

The following port types and capabilities are available:

- basic-service voice
- full-service voice
- full-service multimedia

Note: Basic-service multimedia ports are not available.

Note: In some regions, Nortel Networks no longer sells full-service multimedia ports. Instead, two full-service ports are used to configure one multimedia port.

To determine how many ports are required for both multimedia and voice services, you will need to do the following (detailed instructions are provided later in this chapter):

- determine how many ports are required for multimedia services
- determine how many full- and basic-service ports are required for voice services
- calculate the total number of ports as follows:

$$(Multimedia \times 2) + full\text{- and basic-service} = total\ ports$$

Example

If five multimedia ports and six full-service voice ports are required, purchase

$$(5 \times 2) + 6 = 16\ full\text{-service ports}$$

Note: The total should be evenly divided by four since ports are provided on voice processor cards in multiples of four. If it cannot be divided evenly by four, add more basic-service ports until it can be.

- Reconfigure ten full-service ports as five multimedia ports.

The port type (voice versus multimedia) and capability (basic versus full) determine the features that can be processed by that port. You can have a mixture of port types and capabilities on your system depending on the requirements of your site. This flexibility allows your organization to purchase a lower-cost system (basic ports are less expensive than full-service).

Supported Meridian Mail features

The Meridian Mail features that are supported by basic-service and full-service ports are listed below. Note the following:

- Features requiring a multimedia port are listed in the “Basic-service ports” column with an asterisk beside them.
- Features supported by basic-service ports are also supported by full-service ports.

Basic-service ports		Full-service ports	
ACC	ICL Enable Option	VM	Voice Messaging
AS	Announcement Service	EM	Express Messaging
MS	Voice Menu Service	AN	AMIS Networking Agent
PM	Prompt Maintenance	DNU	Delivery to Non-User
RA	Remote Activation	RN	Remote Notification
TD	Time-of-Day Service	HM	Hospitality Messaging
TS	Thru-Dial Service	CO	Post-Checkout Mailbox
VS	Voice Softkey	VF	Voice Forms Service
TR	Transcription Service	NW	Meridian Networking
*FOC	Fax Outcalling		Plus all basic services

Note: Fax Outcalling (FOC) or Fax on Demand includes the following:

- same-call fax delivery (the caller receives faxes during the same call)
- fax callback (caller specifies a fax number for the fax delivery)
- fax information service (similar to voice announcements, except a fax is delivered instead of a voice message)
- fax item maintenance (allows the storage and updating of fax items used in Fax on Demand applications)

Note: Voice menus or announcements with fax items can run on full-service voice ports as long as the caller is required to enter a fax callback number. With this type of setup, only the fax delivery (fax callback) requires a multimedia port. This option reduces the number of multimedia ports required. Refer to “Number of multimedia ports required” on page 1-19 for more details.

If you are going to have a mixture of port types, capabilities, or both, you will need to determine how many of each port type and capability your system will require (that is, how many basic-service voice, full-service voice, and multimedia ports are required).

Calculating the number of ports required

Overview

To determine the number of basic-service ports, first consider which required services need basic-service ports (for example, ICL or IVR). Then refer to the section “Determining the number of voice ports required” on page 1-7 for instructions on estimating traffic requirements for those applications (features). Follow only those procedures that refer to applications or features that you plan to process through basic-service ports. Use those estimates to determine the number of basic-service voice ports required.

To determine the number of full-service voice ports, first consider which required services need full-service voice ports. Then refer to “Determining the number of voice ports required” on page 1-7 for instructions on estimating traffic requirements for those applications (features). Use those estimates to determine the number of full-service voice ports required.

When you have determined the number of basic-service and full-service voice ports required, add the totals to determine the total number of voice ports required.

To determine the number of multimedia ports required, refer to “Number of multimedia ports required” on page 1-19 for instructions on estimating traffic requirements for fax-related features. Follow only those procedures that refer to applications (features) that you plan to process through multimedia ports (such as voice menus that have fax items for same-call delivery). Use those estimates to determine the number of multimedia ports required. Then refer to “Total number of voice and multimedia ports required” on page 1-30 to determine the system size required.

ACD queue requirements

If you are going to have a mixture of port types or capabilities, or both, you must set up a separate ACD queue for each group of ports. After you determine the number of ports required of each type and capability, you must plan which ports should be linked to which queue.

Determining the number of voice ports required

Introduction

The number of ports on a system determines the maximum number of users who can use the system and its features at the same time. For example, an eight-port system allows up to eight users to use Meridian Mail at the same time. However, since it is unlikely that all users will try to access their mailboxes simultaneously, each port normally supports a large number of users.

Port requirements are determined using standard traffic engineering principles. These consider busy hour (BH) traffic and desired grade of service. The busy hour is the highest traffic hour for the system. Traffic capacity is stated in BH CCS (busy hour centa [hundred] call seconds), and is calculated by adding up the total call seconds (connect time) during the busy hour and dividing by 100.

$$\text{total call seconds CCS} = 100 \text{ seconds}$$

When calculating busy hour traffic, keep in mind that, for a typical business, the busy hour usually occurs between 10:00 a.m. and 11:00 a.m. or between 2:00 p.m. and 3:00 p.m. on weekdays. For individual businesses, the busy hour period may vary.

Furthermore, your busiest hour or peak period may not occur each day. Your peak period may occur only on certain days of the week or month, or only during certain months of the year (especially if your business is seasonal in nature). Consider these ideas when judging what hour in the week, month, or year is your busy hour. You must be aware of these factors to engineer a system that can truly handle your peak traffic requirements.

Determining the number of voice ports

The steps for determining the number of voice ports required for your organization are listed briefly and then explained in more detail in the procedures that follow. A worksheet, “Worksheet for calculating busy hour activity and the number of voice ports required” on page 1-9, helps you to perform the required calculations.

To determine the number of voice ports you require, follow these steps:

Step Action

- 1 Determine the busy hour voice messaging activity (connect time). For instructions, see “Calculating the busy hour voice messaging activity” on page 1-11.
 - 2 Determine the busy hour activity of all Meridian Mail applications used by your organization. For instructions, see “Calculating the total busy hour activity” on page 1-13.
 - 3 Determine the increase in activity that Networking will cause if that feature has been purchased.

For instructions, see “Calculating the networking activity” on page 1-15. For more information on planning for networking, see the *Networking Planning Guide* (NTP 555-7001-241).

If Networking has not been purchased, then skip this step.
For more information, see “Outcalling activity” on page 1-16.
If Outcalling has not been purchased, then skip this step.
 - 4 Estimate the increase in activity that Outcalling will cause if that feature has been purchased.
 - 5 Calculate the number of ports required. For instructions, see “Calculating the number of voice ports required” on page 1-17.
-

Worksheet for calculating busy hour activity and the number of voice ports required

Note: If you plan to use dedicated ports for particular applications, calculate these port requirements separately, and then insert this value in box 14 on page 1-10

Busy hour system activity and ports required		Basic-service voice activity (Call- seconds)	Full-service voice activity (Call- seconds)
1	Voice Messaging activity (see “Calculating the busy hour voice messaging activity” on page 1-11)	1	1 <input style="width: 100px; height: 40px;" type="text"/>
2	Activity of all applications (see “Calculating the total busy hour activity” on page 1-13)		
	Voice Menu activity	2a <input style="width: 100px; height: 25px;" type="text"/>	2b <input style="width: 100px; height: 25px;" type="text"/>
	Note: Voice menus with fax items for callback delivery must be on full-service voice ports. Refer to “Fax callback activity” on page 1-23. Other voice menus require only basic-service ports.		
	Announcements activity	2c <input style="width: 100px; height: 25px;" type="text"/>	
	Voice Forms activity		2d <input style="width: 100px; height: 25px;" type="text"/>
	ICL applications activity	2e <input style="width: 100px; height: 25px;" type="text"/>	2f <input style="width: 100px; height: 25px;" type="text"/>
	Auto Attendant activity (if used during the busy hour)	2g <input style="width: 100px; height: 25px;" type="text"/>	
3	Networking activity (if installed and not dedicated) (see “Calculating the networking activity” on page 1-15)		3 <input style="width: 100px; height: 40px;" type="text"/>
4	Outcalling activity (if installed and not dedicated) (see “Outcalling activity” on page 1-16)		4 <input style="width: 100px; height: 40px;" type="text"/>
5	Add each column	5a <input style="width: 100px; height: 25px;" type="text"/>	5b <input style="width: 100px; height: 25px;" type="text"/>

— continued —

Busy hour system activity and ports required

6 Number of voice ports required (see “Calculating the number of voice ports required” on page 1-17S)

a. Copy the basic-service total from box 5a on the previous page. **6**

--

b. Divide the figure in box 6 by 100 to determine the total basic-service busy hour activity in CCS. **7**

--

c. Look up the CCS (box 7) in “Capacity of system (in CCS)” on page 1-18 to determine the number of non-dedicated basic-service voice ports required. **8**

--

d. Copy the full-service total from box 5b on the previous page. **9**

--

e. Divide the figure in box 9 by 100 to determine the total full-service busy hour activity in CCS. **10**

--

f. Look up the CCS (box 10) in “Capacity of system (in CCS)” on page 1-18 to determine the number of non-dedicated full-service voice ports required. **11**

--

g. Number of ports dedicated to Meridian Networking (obtain assistance from a traffic engineer). **12**

--

h. Number of ports dedicated to Outcalling (obtain assistance from a traffic engineer). **13**

--

i. Number of voice ports dedicated to or required for other specialized services (see step 7 in “Calculating the number of voice ports required” on page 1-17). **14**

--

j. Total number of voice ports required (add lines 8 and 11 through 14). **15**

--

7 To determine the minimum number of nodes required, look up the value from box 15 in “Determining the number of nodes” on page 1-44. If you are planning to have multimedia ports, wait until the multimedia port requirements have been calculated before determining the number of nodes required.

— end —

Voice messaging activity

The busy hour voice messaging activity (connect time) is the anticipated activity of Meridian Mail during the busy hour.

To determine the busy hour voice messaging activity, use “Calculating the busy hour voice messaging activity” below, and then record the result in box 1 of “Worksheet for calculating busy hour activity and the number of voice ports required” on page 1-9. A sample calculation is provided after the steps.

Calculating the busy hour voice messaging activity

Follow these steps to calculate the busy hour voice messaging activity.

Step Action

-
- | | |
|---|--|
| 1 | Estimate the average connection time per registered user during the busy hour.

This includes both the time the user is logged on to Meridian Mail and the time callers use to leave messages for that user.

The normal range is 30 to 60 seconds per user. A reasonable assumption is 40 seconds per user. |
| 2 | Determine the number of Meridian Mail users. |
| 3 | Multiply the result of step 1 by the result of step 2. |
| 4 | Record the result in box 1 of “Worksheet for calculating busy hour activity and the number of voice ports required” on page 1-9. |
-

Busy hour messaging activity calculation example

This table provides an example calculation.

Average connection time (seconds)	x	Number of Meridian Mail users	=	Total seconds of voice messaging activity
40		1000		40 000
CCS = Total call seconds/ 100 = 400				

Activity of all applications

Applications that use voice ports include Voice Menus, Auto Attendants, Voice Forms, and Meridian ICL applications. It is important to analyze your specific applications, since many applications vary widely in the number of calls requiring processing and in the holding times of those calls.

Also, an application can use a shared port or a dedicated port. If you plan to use shared ports for applications, then add the applications' estimated activity to the requirements for Voice Messaging (see "Calculating the number of voice ports required" on page 1-17).

The "Configuring ACD queues on the Meridian 1" section in the "Voice Administration" chapter of the *System Administration Guide* discusses reasons for and against dedicating ports and how to configure dedicated ports.

To determine the total busy hour activity generated by Meridian Mail applications on shared ports, "see "Calculating the busy hour voice messaging activity" on page 1-11."

Calculating the total busy hour activity

Follow these steps to calculate the total busy hour activity on the system.

Note: Include the Auto Attendant application only if you plan to use it during peak hours.

Step Action

- 1 Estimate the average length of a call during the busy hour.

The average length is determined by the type of application. For an information-type menu, a reasonable assumption is 60 seconds per call. An automated attendant will have a much smaller average call length.
 - 2 Estimate the number of calls during the busy hour.
 - 3 Multiply the result of step 1 by the result of step 2.
 - 4 The result is the estimated busy hour activity for that particular application.
 - 5 Record the total.
 - 6 Repeat steps 1 through 4 for each application item (that is, voice menu, announcement, or voice form).
 - 7 Record the result in the appropriate step 2 box of "Worksheet for calculating busy hour activity and the number of voice ports required" on page 1-9.
 - 8 Repeat steps 1 through 6 for each application.
-

Busy hour applications activity calculation example

This table provides an example of a calculation.

Voice application	Average length of call (seconds)	Number of calls per hour	Total call seconds for applications
	x	=	
Voice Menu 1	60	40	2400
Voice Menu 2	90	10	900
Voice Menu 3	30	10	300
Subtotal (recorded in box 2a or 2b of Worksheet for calculating busy hour activity and the number of voice ports required)			3600
Announcement 1	40	5	200
Announcement 2	30	10	300
Subtotal (recorded in box 2c of Worksheet for calculating busy hour activity and the number of voice ports required)			500
Voice Form 1	200	10	2000
Voice Form 2	220	10	2200
Subtotal (recorded in box 2d of Worksheet for calculating busy hour activity and the number of voice ports required)			4200
Auto Attendant (if used during busy hour)	20	60	1200
(recorded in box 2g of Figure			
Total			9500
CCS = Total call seconds/100 = 95			

Networking activity

Networking ports can be shared with other applications or dedicated. If the ports are shared, add this networking traffic estimate to the traffic estimates for other applications.

To determine the networking activity for shared ports, use "Calculating the networking activity" below. A typical assumption is that networking traffic will increase overall voice messaging traffic by five percent. For more information on

planning for networking, see the *Networking Planning Guide* (NTP 555-7001-241).

Calculating the networking activity

Follow these steps to calculate the networking activity on the system.

Note: If you plan to dedicate ports to Networking (so that you can control the grade of service and caller access, although port usage will be less efficient), you will need to obtain assistance from a traffic engineer. The result is recorded in box 12 of “Worksheet for calculating busy hour activity and the number of voice ports required” on page 1-9.

Step	Action
------	--------

- | | |
|---|---|
| 1 | Multiply the result in box 1 of “Worksheet for calculating busy hour activity and the number of voice ports required” on page 1-9 by .05. |
| 2 | Record the result in box 3 of “Worksheet for calculating busy hour activity and the number of voice ports required” on page 1-9. |
-

Outcalling activity

Outcalling (which collectively refers to the Remote Notification and Delivery to Non-Users features) can be used in different ways by different organizations, so port requirements will vary from one organization to the next. You must consider how your organization will use Outcalling, especially during the busy hour. The following table summarizes your options.

IF	THEN
only a small number of users will be using Delivery to Non-Users, or Remote Notification, or both	the effect of these features on your overall system requirements will be small and can be ignored at this point.
the Delivery to Non-Users feature will be restricted to low-traffic periods (for example, after-hours)	the feature should have no impact on your system requirements.
a large number of users will be accessing Delivery to Non-Users, or Remote Notification, or both	estimate what the usage will be in CCS and record it in box 4 of "Worksheet for calculating busy hour activity and the number of voice ports required" on page 1-9.
ports are going to be dedicated to the Outcalling feature	you will need to obtain assistance from a traffic engineer to calculate the port requirements for outcalling. The result is recorded in box 13 of "Worksheet for calculating busy hour activity and the number of voice ports required" on page 1-9.

Calculating the number of voice ports required

Follow these steps to calculate the number of voice ports required for the system.

Step	Action
1	Copy the figure from box 5a on the first page of "Worksheet for calculating busy hour activity and the number of voice ports required" on page 1-9 into box 6 on the second page.
2	Divide box 6 by 100 to get the total busy hour system activity in CCS. Record the result in box 7.
3	Copy the figure from box 5b on the first page of the worksheet into box 9 on the worksheet's second page.
4	Divide box 9 by 100 to get the total busy hour system activity in CCS. Record the result in box 10.
5	For each of boxes 7 and 10, determine the number of ports required. See "Port capacity" below. In the column labeled "Capacity of system," find the range within which the calculated total busy hour CCS falls. The corresponding value in the column labeled "Number of ports" is the number of ports required to accommodate the estimated total system activity.
6	Record the values from "Port capacity" on page 1-18 in boxes 8 and 11 respectively.
7	If you are planning to have dedicated ports for specific services, calculate the port requirements for those specific services, and record it in box 14 of the worksheet.
8	Add boxes 8 and 11 through 14 together. Record the result in box 15.

Port capacity

Note: The capacity is based on 40-second sessions and two percent of busy hour calls being queued for more than one-sixth the average hold time.

Number of ports	Capacity of system (in CCS)
2	0 to 14
4	15 to 54
6	55 to 103
8	104 to 157
12	158 to 273
16	274 to 396
20	397 to 522
24	523 to 651
28	652 to 782
32	783 to 915
36	916 to 1049
40	1050 to 1183
44	1184 to 1318
48	1319 to 1455

In the sample calculations shown so far in this chapter, Voice Messaging and other voice applications would generate approximately 495 CCS in the busy hour. Referring to the above table, you can see that to accommodate that level of traffic, you would need a 20-port system. Remember to add allowances for busy hour traffic generated by Networking or Outcalling, if applicable.

Operational measurements reports, available to the system administrator, provide statistics on system traffic and activity. By monitoring these reports, the administrator can track system activity and forecast when an increase in the number of ports is necessary (for example, when the busy hour CCS exceeds your estimates).

Number of multimedia ports required

Introduction

If you are purchasing the Fax Outcalling/Fax on Demand feature (voice menu with fax items, fax callback delivery, fax announcements), your system will require multimedia ports. Each multimedia port is configured from two full-service port locations, whereas each voice port is configured from one port location. As a result, it is necessary to calculate the multimedia port requirements separately, and then convert this number to an equivalent number of full-service port locations by doubling the number of multimedia ports. This number can then be used to determine the overall system size required in terms of physical port locations.

Same-call delivery versus callback delivery

The number of multimedia ports your site will require depends on how you plan to offer fax services. The options are same-call delivery and callback delivery.

Same-call delivery

With same-call delivery, a caller who has accessed a voice menu with fax items can select and receive a fax during the same call (that is, using the same line). For this type of voice menu service, the voice menu must run on a multimedia port. Only a multimedia port can provide both the voice and multimedia services required for a voice menu with same-call fax delivery.

Similarly, fax announcements that use same-call delivery (the caller reaches the announcement service, hears a greeting, and receives the fax in the same call) must also use a multimedia port.

To calculate the traffic requirements for a voice menu with fax items and same-call delivery, see “Voice menus with fax items (same-call delivery)” on page 1-22. To calculate the traffic requirements for a fax announcement service with same-call delivery, see “Fax announcement (stand-alone fax service)” on page 1-25.

Callback delivery

With callback delivery, the caller who has accessed a voice menu with fax items must provide a fax number for the fax

delivery. After the caller completes the call, Meridian Mail then uses a multimedia port to deliver or send the selected fax items to the specified fax number. With this type of voice menu service, the voice menu can run on a full-service voice port.

Similarly, fax announcements that use callback delivery (caller reaches the announcement service, hears a greeting, and enters a fax callback number) only require a multimedia port for the fax delivery, not for the announcement.

To calculate the	refer to
traffic requirements for voice menus with callback delivery	"Determining the number of voice ports required" on page 1-7.
requirements for the fax delivery	"Fax callback activity" on page 1-23.
traffic requirements for a fax announcement service with callback delivery	"Fax announcement (stand-alone fax service)" on page 1-25.

If you plan to use only the callback method to deliver fax items, you can configure a more efficient system by dedicating multimedia ports to fax callback deliveries. For more details, see "Dedicated ports for fax callback deliveries" on page 1-27.

Keep in mind that the traffic requirements you need to estimate are those requirements you anticipate during the busy hour. If you set up your system so that callback deliveries are made outside of the busy hour, then the callback traffic will not impact your busy hour calculations. However, you must ensure that busy hours for voice and multimedia are accommodated by the number of ports.

Note: If a voice menu or announcement provides the option of same-call or callback delivery, then the number of each type of request (same-call delivery or callback delivery) and the resulting traffic requirements will have to be estimated separately.

Number of multimedia ports required

For example, if you anticipate ten voice menu calls where same-call delivery is requested in the busy hour, and 15 voice menu calls where callback delivery is requested, estimate the traffic requirements for ten same-call deliveries and 15 callback deliveries.

Worksheet for calculating multimedia busy hour activity and port requirements

The following worksheet helps you with your estimates and calculations for each step.

Multimedia busy hour activity and ports required		
		Activity (Call-seconds)
1	Voice menus with fax items (see "Estimating the call connect time for multimedia voice menus" on page 1-22)	1
2	Fax callback activity (see "Estimating the total busy hour connect time for fax callback deliveries" on page 1-24)	2
3	Fax announcement activity (same-call delivery) (see "Estimating the connect time for fax announcements with same-call fax delivery" on page 1-26)	3
4	Activity required to calculate the number of non-dedicated multimedia ports (see "Non-dedicated multimedia ports" on page 1-27)	4
	Add lines 1 through 3.	
5	Divide the total by 100 to determine the total activity in CCS.	5
6	Look up the CCS in "Port capacity" on page 1-18 to determine the number of non-dedicated multimedia ports required.	6
7	Number of dedicated multimedia ports required (see "Dedicated ports for fax callback deliveries" on page 1-27)	7
8	Add lines 6 and 7.	8

Voice menus with fax items (same-call delivery)

With the Fax on Demand feature, you can set up voice menus that offer faxes as some of the menu items. These can be referred to as multimedia voice menus. A caller who reaches a multimedia voice menu can select faxes to receive. If the caller is calling from a phone line that is also connected to a fax machine, the fax can be delivered during the same call (same-call delivery).

To estimate the call connect time (traffic) for multimedia voice menus during the busy hour, use procedure “Estimating the call connect time for multimedia voice menus” below.

Estimating the call connect time for multimedia voice menus

To estimate the call connect time for multimedia voice menus, follow these steps.

Step Action

-
- | | |
|---|---|
| 1 | Select a multimedia voice menu and estimate the average duration of calls during the busy hour. |
| | When estimating this duration, include the following: |
| | <ul style="list-style-type: none"> • time to listen to the menu greeting • time to listen to the voice menu and select as many faxes as required • time to receive “same-call” faxing instructions • time to transmit the faxes selected <ul style="list-style-type: none"> - about 12 seconds to establish protocol - 40 seconds per page in normal resolution; 80 seconds per page in fine resolution - about 10 seconds to complete the fax delivery (that is, end protocol/ disconnect) |
| 2 | Estimate the number of calls to this menu during the busy hour. This would depend on the specific function of the multimedia voice menu in your organization. |
| 3 | Multiply the result of step 1 by the result of step 2 to determine the estimated total activity generated from this multimedia voice menu during the busy hour. |

Step Action

- 4 Record the total.
 - 5 Repeat steps 1 through 4 for each multimedia voice menu.
 - 6 Add all the voice menu totals together and record the result in box 1 of "Worksheet for calculating multimedia busy hour activity and port requirements" on page 1-21.
-

Fax callback activity

A voice menu with fax items may require the caller to specify a fax number to receive the selected faxes. With this type of voice menu, Meridian Mail will use a multimedia port to call the specified fax number and deliver the selected faxes.

The voice menu and fax selection part of the process can use a full-service voice port or multimedia port. Only the actual fax delivery call requires a multimedia port.

To estimate the total busy hour connect time for the fax callback deliveries, follow the steps in procedure "Estimating the total busy hour connect time for fax callback deliveries" on page 1-24."

Estimating the total busy hour connect time for fax callback deliveries

Follow these steps to estimate the total busy hour connect time for fax callback deliveries.

Step Action

-
- | | |
|---|--|
| 1 | Estimate the average duration of fax callback delivery calls during the busy hour. When estimating this duration, include the following: <ul style="list-style-type: none">• 10 seconds to set up the call• 14 seconds to answer the call• 12 seconds to establish the protocol• 40 seconds per page in normal resolution; 80 seconds per page in fine resolution• 10 seconds to complete the fax delivery (that is, end protocol/ disconnect) |
| 2 | Estimate the number of fax callback deliveries during the busy hour. |
| 3 | Multiply the result of step 1 by the result of step 2 to determine the estimated total connect time used by fax callback deliveries in the busy hour. |
| 4 | Record the result in box 2 of "Worksheet for calculating multimedia busy hour activity and port requirements" on page 1-21. |
-

**Fax announcement
(stand-alone fax
service)**

A fax announcement service that requires the caller to enter a fax callback number requires a multimedia port only for the callback delivery. For these types of announcements, see “Determining the number of voice ports required” on page 1-7. To estimate the traffic generated by the actual fax delivery, see “Estimating the total busy hour connect time for fax callback deliveries” on page 1-24.

A fax announcement service that delivers the fax during the same call (no callback number is required) must use a multimedia port for the entire call. The procedure for estimating the connect time for these types of announcements is similar to the procedure for voice menus with fax items. See “Estimating the connect time for fax announcements with same-call fax delivery” on page 1-26.

Estimating the connect time for fax announcements with same-call fax delivery

Follow these steps to estimate the connect time for fax announcements with same-call fax delivery.

Step	Action
1	Select a fax announcement and estimate the average duration of calls to this fax announcement during the busy hour. When estimating this duration, include the following: <ul style="list-style-type: none"> time to listen to the announcement greeting time to receive same-call faxing instructions time to transmit the fax about 12 seconds to establish protocol <ul style="list-style-type: none"> 40 seconds per page in normal resolution; 80 seconds per page in fine resolution about 10 seconds to complete the fax delivery (that is, end protocol/ disconnect)
2	Estimate the number of calls to this fax announcement during the busy hour. This would depend on the specific function of this fax announcement in your organization.
3	Multiply the result of step 1 by the result of step 2 to determine the estimated total activity generated from this fax announcement during the busy hour.
4	Record the total on a piece of note paper.
5	Repeat steps 1 through 4 for each fax announcement.
6	Add all the fax announcement totals together and record the result in box 3 of "Worksheet for calculating multimedia busy hour activity and port requirements" on page 1-21.

Calculating the number of multimedia ports required

This section describes how to calculate the number of multimedia ports your system will require.

Non-dedicated multimedia ports

To calculate the number of non-dedicated multimedia ports required, follow these steps.

Step Action

-
- 1 Add the totals from “Estimating the call connect time for multimedia voice menus” on page 1-22, “Estimating the total busy hour connect time for fax callback deliveries” on page 1-24, and “Estimating the connect time for fax announcements with same-call fax delivery” on page 1-26. Record the result in box 4 of “Worksheet for calculating multimedia busy hour activity and port requirements” on page 1-21.
 - 2 Divide the result in box 4 by 100 to get the estimated busy hour multimedia activity in centa (hundred) call seconds (CCS). Record the result in box 5.
 - 3 Determine the number of non-dedicated multimedia ports required based on the estimated busy hour system activity.

See “Port capacity” on page 1-18. In the column labeled “Capacity of system,” find the range within which the calculated total CCS falls. The corresponding value in the column labeled “Number of ports” is the number of non-dedicated ports required to accommodate the estimated total system activity.
-

Dedicated ports for fax callback deliveries

Note: If you plan to use dedicated ports for fax callback delivery, calculate the non-dedicated port requirements for other Fax on Demand services separately (see “Non-dedicated multimedia ports” on page 1-27). Then add those port requirements to the number of dedicated fax callback ports to determine the total number of multimedia ports required.

Multimedia ports that are dedicated to callback delivery can support a much higher volume of traffic than non-dedicated multimedia ports. Specifically, 36 CCS can be supported by each dedicated port because the system can make continuous use of these ports.

Calculating the number of multimedia ports required (continued)

By contrast, 4 non-dedicated multimedia ports can support 48 CCS altogether, or 12 CCS per port on average. Therefore, if you are going to use the callback method of delivering fax items, you may want to consider dedicating multimedia ports to callback delivery.

The maximum wait time would have to be less than 3600 seconds (1 hour), or else the system could become overloaded.

Calculating the number of dedicated multimedia ports for fax callback deliveries

To calculate the number of dedicated multimedia ports required for fax callback deliveries, follow these steps.

Step Action

- 1 Use the following formula to determine how many dedicated ports you would require:

$$\text{Ports required} = (\text{Total fax callback delivery call seconds in busy hour}) / (\text{Maximum wait time for delivery in seconds})$$

- 2 Record the result in box 7 of "Worksheet for calculating multimedia busy hour activity and port requirements" on page 1-21.
-

Port capacity

Note: The capacity is based on 40-second sessions and 5 percent of busy-hour calls being queued for more than one-sixth of the average hold time.

Number of ports	Capacity of system (in CCS)
2	0 to 12
3	13 to 29
4	30 to 48
5	49 to 70
6	71 to 93
7	94 to 117
8	118 to 142
10	143 to 194
12	195 to 248
14	249 to 303
16	304 to 360
18	361 to 418
20	419 to 477
22	478 to 536
24	537 to 596

In this table, you can see that a traffic capacity (total activity) of 145 CCS would require 10 ports.

Total number of voice and multimedia ports required

Multimedia ports and voice ports

Note: If multimedia ports are not required (for example, you have not purchased Fax on Demand), then system size can be based solely on the number of voice ports. No conversion to physical ports is required since one voice port equals one physical port location.

Multimedia applications require more processing than voice applications. As a result, two physical port locations are required to configure one multimedia port, whereas only one physical port location is required to configure one voice port. Therefore, a system with multimedia ports is larger than a system with the same number of voice ports.

For example, if you require a system with 5 multimedia ports and 6 voice ports as per your calculations to this point, you would actually need a system with 16 physical port locations (10 ports to configure 5 multimedia ports, and 6 ports to configure 6 voice ports). As a result, to determine the actual system size you need in terms of the number of physical port locations, you need to convert the multimedia port requirements to an equivalent number of voice ports. Then, add this to the number of voice ports required to determine the overall system size required.

Worksheet for calculating the number of ports required (voice and multimedia)

To calculate the total number of ports required to support voice and multimedia services see “Calculating the total number of voice and multimedia ports” on page 1-32. Use the following table as your worksheet.

Ports required for voice and multimedia services			
1	Number of ports required for voice services (including dedicated ports) from box 15 of “Worksheet for calculating busy hour activity and the number of voice ports required” on page 1-9	1	
2	Number of ports required for multimedia (including dedicated ports) from box 8 of “Worksheet for calculating multimedia busy hour activity and port requirements” on page 1-21	2	
3	Equivalent number of physical ports required to support multimedia services (multiply line 2 by 2)	3	
4	Total number of physical ports required (add lines 1 and 3)	4	
5	If the result in box 4 cannot be divided evenly by 4, add more basic-service ports until the total can be divided evenly by 4	5	

Note: To determine the minimum number of nodes required, refer to “Determining the number of nodes” on page 1-44.

Calculating the total number of voice and multimedia ports

Follow these steps to calculate the total number of voice ports and multimedia ports.

Step	Action
1	Copy the figure from box 15 (total voice ports) of "Worksheet for calculating busy hour activity and the number of voice ports required" on page 1-9 into box 1 of "Worksheet for calculating the number of ports required (voice and multimedia)" on page 1-31.
2	Copy the figure from box 8 (total multimedia ports) of "Worksheet for calculating multimedia busy hour activity and port requirements" on page 1-21 into box 2 of "Worksheet for calculating the number of ports required (voice and multimedia)" on page 1-31.
3	Multiply box 2 by "2." Record the result in box 3.
4	Add boxes 1 and 3 together. Record the result in box 4.
5	If required, add more basic ports until the total number of ports can be divided evenly by four. (Ports are provided on voice processor cards in multiples of four.) Record the new total in box 5.
6	Look up the total in the section "Determining the number of nodes" on page 1-44 to determine the number of nodes your system will require.

-

Determining storage hours required

Introduction

The storage hours on a system, combined with the number of nodes, defines the system size. For example, a 2-node 54-hour system has a greater message storage capacity than a 2-node 26-hour system. Note that the storage hours referred to here do not include basic system storage hours (that is, for the basic software, and for voice prompts for one language).

Dependencies

The storage hours that your system requires depend on the requirements for

- message storage, which includes stored messages, personal verifications, and responses to voice forms
- voice services, which includes voice menus, announcements, voice forms definitions, and fax definitions
- personal verifications

These sources of storage requirements are discussed in:

- “Message storage requirements” on page 1-34
- “Voice services storage requirements” on page 1-37
- “Personal verifications storage requirements” on page 1-43

These sections are followed by “Determining system size based on traffic (nodes and ports) and storage hour requirements” on page 1-45, which explains how to calculate the total storage hours required and the overall system size that your site requires.

Message storage requirements

Introduction

Message storage includes received messages or unsent composed messages stored in your mailbox, greetings, and responses to voice forms.

Total message storage time required depends on the following:

- number of users
- average storage per user (for messages and personal verifications)
- voice forms response times

The method for determining the required amount of message storage time, based on the preceding items, is divided into three procedures which are outlined in the remainder of this section.

Storage time required for messages and personal verifications

The average storage per user is based on the average number of stored messages per user (received and composed but not sent) and the average length of each message, plus the length of the greetings. This varies depending on the organization and applications. The minimum storage time that should be allowed per user is one minute. Average message length is about 30 seconds. If each user is allocated 10 minutes of storage time, then approximately 20 messages (including greetings) can be stored per user.

Note: The storage requirements for personal verifications are calculated separately. See “Personal verifications storage time calculation example” on page 1-43.

When determining storage requirements for messages, consider the average storage time required per user, since this time reflects the storage time that will actually be used. The maximum allocated time is the limit on message storage, not the amount that you expect will be used, on average, by each user.

There are a number of factors to consider when estimating average message storage time, including

- user training to use the delete messages command
- maximum allocated time

- Read Message Retention period (automatic deletion of read messages)
- whether sent messages are kept or automatically deleted after sending
- messages received per user per day

Calculating the storage time required for messages and personal verifications

To calculate the storage time required for messages and personal verifications, follow these steps.

Step Action

1	Estimate the total number of users on the Meridian Mail system.
2	Estimate the average number of minutes of storage each user requires.
3	Multiply the result of step 1 by the result of step 2.
4	Multiply the result of step 3 by 1.2 (to add a 20 percent safety margin).
5	Divide by 60 to convert the storage time to hours.

Example

If there are 1000 Meridian Mail users and average storage per user is 5 minutes, the total storage time is 5000 minutes. With a 20 percent safety margin added on, total storage time is 6000 minutes or 100 hours as shown below.

Message storage time calculation example

Number of Meridian Mail users	x	Storage per user (minutes)	x	Storage time with 20 percent safety margin	=	Total storage time
1000		5		1.2		6000/60 = 100 h

Storage time required for responses to voice forms

Voice forms allow subscribers to call the system and provide verbal information to prerecorded prompts.

A typical voice form contains 10 prompts, and a response to each prompt is typically 10 seconds long. Thus, a total of 100 seconds of response storage time is required for each call to a typical voice form. If you know what the voice forms are going to be and have an idea of what response time you can expect, you can estimate more precisely the storage time required.

Calculating the storage time required for voice forms responses

To calculate the storage time required for voice forms responses, follow these steps.

Step Action

-
- 1 Determine the number of prompts in each voice form.
 - 2 Multiply the number of prompts by the expected response time (in seconds) for each prompt.
 - 3 Estimate the number of calls to each voice form before the responses are transcribed and deleted.
 - 4 For each form, multiply the number of calls by the expected total response time in seconds.
 - 5 Divide the storage time by 3600 to convert to hours.
-

Voice forms response time calculation example

The following table shows an example calculation.

Voice form number	Number of calls to voice form prior to deletion	x	Estimated total response time (seconds)	=	Required storage time (seconds)
1	50		100		5000
2	20		100		2000
3	50		100		5000
Total storage time in hours = 12 000 seconds/ 3600 = 3.3 h					

Calculating the total message storage requirements

To calculate the total message storage requirements, follow these steps.

Step Action

- | Step | Action |
|------|---|
| 1 | Add the storage times determined in "Calculating the storage time required for voice forms responses" on page 1-36. |
| 2 | If you have not already done so, convert the storage times to hours. |

Total message storage requirements calculation example

The following table shows a sample calculation.

Storage for users	100 hours
Storage for voice forms responses	3.3 hours
Total message storage time required	103.3 hours

Voice services storage requirements

Voice services includes voice menus and announcements, voice forms, and fax on demand.

The voice services storage time depends on the following factors:

- voice menus and announcements storage requirements
- voice forms definitions requirements
- fax definitions requirements

The method for determining the required amount of voice services storage time, based on the factors listed above, is divided into four procedures. These procedures are outlined in the remainder of this section.

Voice menus and announcements storage requirements

Estimate the storage time required for voice menus and announcements (if you have purchased that option). This depends on the type of applications you wish to have. Information-type menus require more storage time than call-handling applications (automated attendants, for example). The following procedures help you to determine the voice menus and announcements storage requirements.

Estimating the storage time required for voice menus and announcements

To estimate the storage time required for voice menus and announcements, follow these steps.

Step Action

-
- | | |
|---|---|
| 1 | Estimate the number of voice menus and announcements required. |
| 2 | Determine the wording of each voice menu and announcement. |
| 3 | Once the wording of each menu and announcement is determined, estimate the time (in minutes) each will take for playback. |
| 4 | Add the playback times for all the voice menus and announcements. |
| 5 | Divide the storage time by 60 to convert to hours. |
-

Voice menus and announcements storage time calculation example

This table shows an example calculation for voice menus and announcements storage times.

Voice menus and announcements	Estimated playback time (minutes)
Auto-attendant prompt	1
Auto-attendant choices	2
Announcement 1	1
Announcement 2	1
Thru-dial announcement	1
Voice menu 1 greeting	1
Voice menu 1 choices	2
Voice menu 1 announcement 1	1
Voice menu 1 announcement 2	1
Voice menu 1 announcement 3	1
Voice menu 2 greeting	1
Voice menu 2 choices	2
Voice menu 2 announcement 1	2
Voice menu 2 announcement 2	1
Total voice menus and announcements storage time =	18 minutes or 0.3 hours

Voice forms definitions storage requirements

Introduction

Voice forms definitions are similar to voice menus. Therefore, the procedure for calculating the voice form definitions storage requirements is similar to the procedure for calculating voice menu storage requirements.

Estimating the storage time required for voice forms definitions

To estimate the storage time required for voice forms definitions, follow these steps.

Step	Action
1	Estimate the number of voice forms required.
2	Determine the wording to be used for each form.
3	Estimate the playing time (in minutes) of each form.
4	Add the playback times for all forms. Include the voice form's initial greeting as well as any greeting, prompt, or other instructions played for each field.
5	Divide the storage time by 60 to convert to hours.

Voice forms definitions storage time calculation example

The following table shows an example calculation.

Voice form	Estimated playback time (minutes)
Voice form 1	2
Voice form 2	2
Voice form 3	2
Total voice forms definitions storage =	6 minutes or 0.1 hours

Fax storage requirements

The number of storage hours required for faxes depends on the number of fax pages and the resolution (quality) as follows:

- *normal resolution* 0.3 minutes per page or 200 pages per hour
- *fine resolution* 0.6 minutes per page or 100 pages per hour

Using these figures, estimate your fax storage requirements as outlined below.

Estimating the fax storage requirements

To estimate the fax storage requirements, follow these steps.

Step Action

- | Step | Action |
|------|--|
| 1 | Estimate the total number of fax pages you plan to have on the Meridian Mail system. |
| 2 | Multiply the result of step 1 by 0.3 to get the total number of minutes of storage required. |
| 3 | Estimate the total number of fax pages you plan to have on the Meridian Mail system. |
| 4 | Multiply the result of step 3 by 0.6 to get the total number of minutes of storage required. |
| 5 | Add the totals from steps 2 and 4 to get the total fax storage requirements in minutes. |
| 6 | Divide the storage time by 60 to convert to hours of storage. |

Fax storage time calculation example

The following table shows an example calculation.

Number of pages	Minutes per page =	Total storage time
20 normal	x 0.3	6 minutes
20 fine	x 0.6	12 minutes
Total storage in hours =		18/60 = 0.3 hours

Estimating the total hours of storage required for voice services

To estimate the total storage requirements, add the storage times determined in “Estimating the storage time required for voice menus and announcements” on page 1-38, “Estimating the storage time required for voice forms definitions” on page 1-40, and “Fax storage requirements” on page 1-41. The following table shows an example.

Storage for voice menus and announcements	0.3 hours
Storage for voice forms definitions	0.1 hours
Storage for fax items	0.3 hours
Total storage time required for voice services	0.7 hours

Personal verifications storage requirements

Requirements

Allow about 3.5 seconds per personal verification. Therefore, if you have 1000 subscribers, required storage time is $1000 \times 3.5 = 3500$ seconds or approximately 1.0 hour.

If your system does not have any user mailboxes (that is, your system is strictly a voice menu system), then no personal verifications are necessary and this storage requirement can be ignored.

Personal verifications storage time calculation example

The following table shows a sample calculation.

Number of users x	Estimated average personal verification length (seconds) =	Required storage time
1000	3.5	3500 seconds/3600 = 0.9 hour

Determining the number of nodes

Node configurations The following table shows the number of ports and the range of storage hours available with different numbers of nodes (with only one language installed).

Ports	Nodes	Total storage hours	Total storage hours with disk-to-disk backup
4-24	1	5	n/a
		11	n/a
		24	n/a
		36	n/a
		54	n/a
		100	n/a
		200	n/a
28-48	2	26	n/a
		54	46.2
		84	76.2
		114	106.2
		200	190.1
		400	384.8

Determining system size based on traffic (nodes and ports) and storage hour requirements

Introduction

At this point, you should have determined the following:

- the number of nodes required (based on the number of ports required)
- the number of hours required for voice services
- the number of storage hours required for messages (including greetings and voice forms responses)

These three criteria are discussed in earlier sections of this chapter.

Use “Message storage and Voice Services storage hours available per system size” on page 1-51 to select the system size your site requires based on the previously mentioned criteria. The table shows the full range of system sizes available, classified by the number of nodes and total storage hours. It also shows the maximum number of hours available for voice services for each system size.

Before continuing, you need to understand the following points:

- All systems have a disk volume VS1 (Volume Server 1). This volume is used primarily for the system software and for personal verifications. However, some of the storage space on VS1 that is available for personal verifications can also be used for voice services. This space is indicated in “Message storage and Voice Services storage hours available per system size” on page 1-51 under the “VS1” heading under “Maximum Hours available for Voice Services and messages.”
- Messages (“message storage”) are not stored on VS1. The disk volumes available for message storage depend on the system size, as follows:
 - 1-node system -VS2 disk volume
 - 2-node system -VS2, VS202 disk volumes

These volumes are also referred to as the user volumes.

- If the hours available on VS1 are enough to satisfy the expected voice services and personal verifications storage requirements, then voice services can be stored on VS1. If you can do this, then the storage hours available on the user volumes (see previous list item) can be used for message storage only.
- If both voice services and personal verifications cannot fit entirely on VS1, then the voice services must be stored on VS2 or VS202. These volumes are also used for message storage.

As a result, you will have to combine the voice services and message storage requirements to determine the total message storage hours required. This also means that every hour of voice services storage that is added decreases the storage hours available for messages by one hour. Voice services storage cannot be shared over separate disk volumes. It must be stored on a single volume.

- The shaded areas in “Message storage and Voice Services storage hours available per system size” on page 1-51 indicate disk volumes that are unavailable for that system size or that cannot be used for voice services for that system size. For example, disk volume VS202 is not available on 1-node systems.

Adjustments for prompts for additional languages

The storage space for Meridian Mail voice prompts for one language (for example, English) is part of the basic software package, so it is not counted in the storage hours figures in “Message storage and Voice Services storage hours available per system size” on page 1-51. However, if you are going to have additional languages installed, this will reduce the storage hours available on either VS1 or VS2, depending on where the language prompts are stored for your particular system size.

The amount of storage space used up by the additional language prompts and where they are stored depends on the system size and the number of additional languages as shown in “Additional language storage requirements for VS1 and VS2” on page 1-47. For example, on 1- and 2-node systems, additional language prompts reduce the storage hours available on VS2. The third and fourth languages impact storage hours available on VS1.

Additional language storage requirements for VS1 and VS2 The following table shows the additional storage requirements for VS1 and VS2.

Number of nodes	Number of languages			
	1	2	3	4
1– 2	0 hours	3 hours on VS2	6 hours on VS2	9 hours on VS2

When you refer to “Message storage and Voice Services storage hours available per system size” on page 1-51, you must adjust the storage hour figures on VS1 and VS2 accordingly. Keep in mind that if the VS2 storage hours are decreased, the message storage hours available are also decreased by the same amount.

Establishing whether disk-to-disk backup is required On multi-node systems, this allows the system configuration (not user messages) to be manually or automatically copied to another disk in the system to allow recovery from a disk failure. Note that disk-to-disk backup is not supported in single-node systems. See “Message storage and Voice Services storage hours available per system size” on page 1-51.

Selecting the required system size To select the required system size based on traffic and storage requirements, follow these steps.

Note: You must refer to “Message storage and Voice Services storage hours available per system size” on page 1-51.

Step	Action
1	Consider the number of nodes required based on the traffic calculations earlier in this chapter. Example: if your system requires two nodes to handle the traffic requirements, then that is the smallest system you can have regardless of storage requirements.
2	Refer to “Message storage and Voice Services storage hours available per system size” on page 1-51. Find the smallest system size with enough nodes to satisfy the traffic requirements and enough message storage hours to satisfy your message storage requirements.
3	Once you have selected your system size, review “Validating your system selection decision” on page 1-49 to confirm your decision.

Validating your system selection decision *Note:* Use “Message storage and Voice Services storage hours available per system size” on page 1-51 to determine the system size. Then use this table to validate your decision.

IF	THEN
both voice services and personal verifications can fit on VS1 on the system you selected	the message storage hours can be used entirely for messages and voice form responses.
voice services cannot fit on VS1 for the system you selected	voice services must be stored on VS2 or VS202. In this case, voice services must share space with message storage, so add the two numbers together to determine the combined storage requirements.
the number of nodes you selected has enough message storage hours available for the combined voice services and message storage requirements	that system is acceptable. Otherwise, you will need to select a system with more nodes. See if a system with one more node can be configured with sufficient storage hours.
the storage hours on the system you selected is close to your estimated storage requirements	you may prefer to choose the next larger system to allow for growth.

Examples

Example 1 lists the requirements for a system followed by the steps you follow to determine the system size required. Example 2 is a variation of Example 1.

Example 1:

Traffic requirement: 28 voice port equivalents (2 nodes)

- voice services storage: 0.7 hours
- personal verifications storage: 2.0 hours
- message storage: 103.3 hours
- additional languages: none
- disk-to-disk backup: no

The smallest system that can support the anticipated traffic is a 2-node system.

The smallest system with a minimum of two nodes that can provide enough message storage hours is the 2-node 114-hour system.

The voice services plus personal verifications storage requirement is 2.7 hours. The 2-node 114-hour system has 3.5 hours available for voice services plus personal verifications on VS1, so voice services can be stored there.

You must also decide if the 114 hours available on the system are enough to allow for growth since this system provides only 11.7 hours above the estimated requirements.

Example 2:

If the voice services requirement were larger (for example 4.0 hours), then voice services plus personal verifications would not both be able to fit on VS1. Voice services would have to share space with messages (on VS2 or VS202 for a 2-node system). However, the 114 message storage hours available on the selected system size are enough to accommodate message storage and voice services

$$(103.3 + 4.0 = 107.3).$$

Again, you may prefer to choose the next larger system to allow for growth (a 2-node 200-hour system).

Determining system size based on traffic (nodes and ports) and storage hour requirements

Message storage and Voice Services storage hours available per system size The following table shows message storage and voice services storage hours available per system.

Total storage hours			Maximum hours available for Voice Services and messages (per disk volume)			
Number of nodes	(without disk-to-disk backup)	(with disk-to-disk backup)				
			VS1	VS2	VS202 (without disk-to-disk backup)	VS202 (with disk-to-disk backup)
1	5	n/a	2.0	5		
	11	n/a	2.0	11		
	24	n/a	3.5	24		
	36	n/a	3.5	36		
	54	n/a	3.5	54		
	100	n/a	5.5	100		
	200	n/a	10	200		
1.2 Gbyte disk						
2.0 Gbyte disk						
2	26	n/a	2.0	11	15	n/a
	54	46.2	3.5	24	30	22.2
	84	76.2	3.5	24	60	52.2
	114	106.2	3.5	54	60	52.2
	200	190.1	5.5	100	100.0	90.1
	400	384.8	10	200	200.0	184.8
	1.2 Gbyte disk					
2.0 Gbyte disk						

Note 1: If a second language is installed, subtract three hours from VS2 for 1- or 2-node systems only.
 Note 2: If three languages are installed, subtract three hours from VS1 for 3-, 4-, or 5-node systems, or six hours from VS2 for 1- or 2-node systems.
 Note 3: If four languages are installed, subtract six hours from VS1 for 3-, 4-, or 5-node systems, or nine hours from VS2 for 1- or 2-node systems.

Determining system size for hospitality systems

System sizes

Hospitality systems are not used as heavily as other Meridian Mail systems. As a result, many of the estimates and guidelines presented earlier in this chapter for estimating system usage and system requirements are not realistic for hospitality systems. To determine the required system size for hospitality systems, refer to the following which provides estimates based on normal conditions for hotel environments.

Number of rooms (R)	Staff users (S)	Total CCS (T)	Hours req'd (H)	Minimum system					
				Nodes	Ports	Message storage hours			
						1 Lang	2 Lang	3 Lang	4 Lang
1 to 227	32	38.6	5.0	1	4	5	11	11	24
228 to 319	45	54.2	7.0	1	4	11	11	24	24
320 to 500	71	85.0	11.0	1	8	11	24	24	24
501 to 927	132	157.6	20.4	1	8	24	24	36	36
928 to 1225	175	208.3	27.0	1	12	36	36	36	36
1226 to 2330	332	396.1	51.3	2	16	54	84	84	84
2331 to 3073	439	522.4	67.6	2	20	84	84	84	84
3074 to 3832	547	651.4	84.3	2	24	114	114	114	114
3833 to 4603	657	782.5	101.3	3	28	120	120	120	120
4604 to 5382	768	914.9	118.4	3	32	120	120	120	120
5383 to 6169	881	1048.7	135.7	4	36	180	180	180	180
6170 to 6961	994	1183.4	153.1	4	40	180	180	180	180
6962 to 7758	1108	1318.9	170.7	4	44	180	180	180	180

For this table, make the following assumptions:

- There is one staff mailbox for every seven rooms ($S = R/7$).
- A staff mailbox uses 80 seconds of storage and 0.27 CCS in busy hour.

- A guest mailbox uses 50 seconds of storage and 0.1 CCS in busy hour in a full hotel.
- Allow a 30 percent safety margin in required storage hours.
- Other features (for example, auto-attendant, menus, forms, Outcalling, Networking) use at most another 20 percent of busy hour port time.
- Message Waiting Indication (MWI) is not on for the introductory greeting. If the system is to be set up such that the MWI is turned on for the introductory greeting, then increase traffic (that is, CCS) by another 20 percent. This may increase port requirements but will not affect storage requirements.
- Busy hour traffic is calculated as follows: $T = 1.2 \times (0.27S + 0.1R) = 0.17R$
- Hours of message storage required is calculated as follows: $H = 1.3 \times (80S + 50R) / 3600 = 0.022R$

Meridian Integrated Communication Link

Introduction

Multiple ICLs are supported on a single node where more than one serial port is available. This means that, for example, AdminPlus and Meridian IVR can run on the same node.

Maximum number of links supported

The number of links that can be created on a single node depends on the type of node and its position in the system as shown in the following table.

Number of nodes	Number of links
1	4
2	6

Note: Only one link can be used to run AdminPlus. Any one ICL can be configured for use by AdminPlus.

“Data ports that can be used for ICLs” on page 1-56 shows which data ports can be used for ICL links and the maximum bit rate (in Kbps) that can be used on those ports. “Bit rate limitations for data links lists both the minimum and maximum bit rates” below lists both the minimum and maximum bit rates.

Bit rate limitations for data links

This table lists the maximum and minimum bit rates.

For	Minimum bit rate (per port)	Maximum bit rate (per port)	Maximum combined bit rate (per node)
RSM/Utility card	2400 bps	9600 bps	19 200 bps
CPU card	2400 bps	38 400 bps	38 400 bps
ICL link	4800 bps	38 400 bps	not applicable

Note: The combined bit rate for all configured ICLs cannot exceed 38 400 bps.

Data port configuration for EC 11 systems

Introduction

The following table provides information on configuring data ports for EC 11 systems.

Data port configuration

Node	Circuit pack	Port	Console	Remote access	Network	AML	GAC	MAT	Printer	ICL / Admin Plus	PMSI to PMS	PMSI to SL-1
1	MMP40	1	X									
		2				X						
	Utility 1	1			X		X	X	X	X		
		2			X		X	X	X	X		
		3			X		X	X	X	X	X	
		4			X		X	X	X	X		X
2	MMP40	1					X	X	X	X		
	Utility 2	1			X		X	X	X			
		2			X		X	X	X			
			3		X		X	X	X			
		4			X		X	X	X			

Data ports that can be used for ICLs This table shows the data ports that can be used for ICLs (recommended setup for nodes 1 and 2).

System limits				Node 1						Node 2	
# of nodes	Data links	Max. voice ports	Cum. baud rate	68040 # 1	68040 # 2	UTL # 1	UTL # 2	UTL # 3	UTL # 4	68040 # 1	68040 # 2
1	0	24									
	1	24	9.6			9.6					
	2	24	19.2			9.6	9.6				
	3	24	19.2			9.6	4.8	4.8			
	4	24	19.2			4.8	4.8	4.8	4.8		
2	0	48									
	1	48	38.4							38.4	
	2	48	38.4							19.2	19.2
	3	48	48.0			9.6				19.2	19.2
	4	48	57.6			9.6	9.6			19.2	19.2
	5	48	57.6			9.6	4.8	4.8		19.2	19.2
	6	48	57.6			4.8	4.8	4.8	4.8	19.2	19.2

Chapter 2

Selecting a site

In this chapter

Site selection	2-2
Power requirements	2-3
Heat dissipation	2-4
Environmental specification	2-5
Security	2-6

Site selection

Introduction

The EC 11 is required to be co-located with the Meridian 1 Option 11 system. The following are site selection considerations:

- space and location
- power requirements
- environmental specification

Space and location

The EC 11 occupies exactly the same space as a single Option 11 cabinet. Identical considerations apply to the EC 11 as for an Option 11 expansion cabinet. Please refer to the *Option 11 General Information and Planning Guide* (NTP 553-3011-200) for further details. The EC 11 should be placed in close proximity to the Option 11 cabinets to allow for connections of NLI and AML cables. Note that all NLI cables used *must* be of the same length. The NLI cables connect to MGate cards on the Option 11 PBX. All MGate cards are required to be housed in the same Option 11 cabinet.

Power requirements

Power supply requirements are described on the following pages for Meridian Mail, administration terminal, printer, and remote access and networking modems.

Meridian Mail

Meridian Mail uses the NTDK35AA or NTDK35BA power supply unit. One power supply unit is used in 1- or 2-node systems.

EC 11 power supply requirements

The following table indicates the required power supply for each system size.

	NTDK35AA			NTDK35BA	
	@ 120 VAC	@ 220 VAC	@ 48 DVC	@ 220 VAC	@ 48 VDC
1-node system	2A	1A	5A	1A	5A
2-node system	4A	2A	10A	2A	10A

Printer power supply requirements

The following table shows the power supply requirements for the printers.

Printer type	Power input	Power usage
LA75	100 or 120 VAC @ 1.6A, 50/60 Hz	50 W
LA30N	100 or 120 VAC; -10%, +6%; 50/60 Hz	120 W to 240 W (maximum)

Modem power supply requirements

The following table shows power supply requirements for modems.

Modem type	Power input	Power usage
U.S. Robotics Sportster 14.4	120 V AC, 50/ 60 Hz	8 W nominal

Heat dissipation

The air conditioning in the equipment room must be capable of maintaining the operating temperature for the equipment while handling heat produced by the following sources:

- Meridian Mail
- switch
- peripheral devices
- equipment room personnel
- lighting
- external walls, windows, floors, and ceilings enclosing the room (if they permit heat to enter the equipment room)

Environmental specification

It is assumed that the EC 11 and Option 11 switch will reside in a typical office environment. The requirements for the EC 11 are similar to those for the Option 11. Please refer to the *Option 11 General Information and Planning Guide* (NTP 553-3011-200) for further details.

Security

Ensuring data security

Take special precautions to protect critical data such as business records or other information that is expensive or impossible to duplicate. Duplicate copies of data should be stored away from the equipment area. In most cases, a regular updating program is necessary to maintain the value of such duplicate data storage. It is particularly important to ensure that both keycodes and backup tapes are stored in a safe place.

Ensuring equipment security

If necessary, extend and improve existing practices of building security and fire protection to provide adequate protection for the equipment.

Equipment room accessories

Use a CO₂ fire extinguisher on electrical fires. Do not use water on electrical fires.

Install temperature and humidity monitoring devices containing both visual and audible alarm signals in the equipment and storage room so that personnel can act if the environmental conditions approach critical limits.

Chapter 3

Preparing for installation

In this chapter

Meridian 1 equipment requirements	3-2
Information to have on hand	3-5
Pre-installation inspections	3-6

Meridian 1 equipment requirements

Introduction

To connect Meridian Mail to Meridian 1 Option 11 equipment, the Meridian 1 requires the following:

- one ESDI port on the SDI/DCH card (NTAK02BB) with NTAK19FB cable for the Meridian (AML/CSL) link
- one or more network loops, as required, provided by the MGate cards (NTRB18AA) in the Option 11 cabinet. All MGate cards must reside in a single Option 11 cabinet. Each network loop/MGate card supports 16 voice channels.

Meridian 1 software requirements

Along with the above hardware requirements, the following Meridian SL-1 software packages are needed:

- Meridian 1 X11 Release 20 or later
- Make Set Busy (MSB - 17)
- Basic ACD features (BACD - 40)
- Automatic Call Distribution – package A (ACDA - 45)
- AML/CSL link (Option 77)
- Integrated Message System (IMS - 35)
- Message Waiting Center (MWC - 46)
- End-to-end signaling (EES - Option 10)

Network Message Service

Network Message Service (NMS) is an optional feature which allows a single Meridian Mail system to support multiple Meridian 1 sites. If you need NMS, the additional requirements *for each site* are as follows:

- Meridian 1 software release X11 Release 16.55 or later (Release 20 or later is required for EC 11)
- AML/ CSL Primary Rate ICL or AML/CSL Signalling Link (PRA/ ISL) (Option 145/6 or 145/7)
- Advanced AML features (NTWK - Option 148)
- Network Message Services (NMS - Option 175)
- Message Waiting Center (MWC-46, and ACD options 40, 45)

Note: Tandem nodes, which are nodes in the NMS network that pass information between the originating (remote site/s) and terminating nodes (main site), do not require the MWC (40, 45, 46) and NMS (175) options.

Hospitality Voice Services

Hospitality Voice Services (HVS) is a voice messaging system that is designed specifically for the hospitality industry (hotels, inns, resorts, and so on). Some of the software requirements for HVS are listed below. If you are purchasing a property management system, it must follow Property Management System Interface (PMSI) specifications 3.1 or later.

To support a property management system, the following basic packages are required on the Meridian 1:

- Controlled Class of Service (CCOS)
- Background Terminal Facility (BGD)
- Property Management System Interface (PMSI or PMS)
- Room Status (RMS)

For lamp status, the following is required:

- Message Center (MWC)

Optional packages for PMSI are the following:

- Message Registration (MR)
- Automatic Wake Up (AWU)

Note: PMSI is not compatible with the following packages: AUTOVON (DSN) Centralized Attendant Services (CAS), and Coordinated Dialing Plans (CDP).

For HVS, the additional requirements are as follows:

- Meridian 1 X11 Release 16 or later (Release 20 or later is required for EC 11)
- Recorded Announcement (RAN)
- Do-Not-Disturb, Individual (DNDI)
- End-to-End Signaling (EES)
- Intercept Treatment (INTR)
- Make Set Busy (MSB)

- Digit Display (DDSP)
- Integrated Message System (IMS)
- Basic Automatic Call Distribution
- ACD CDR Queue Record
- Auxiliary Processor Link (APL)
- Hospitality Voice Services (HVS)
- Digit Key Signaling (DKS)

Note: DKS may also be referred to as “Automatic End-to-End Signaling.”

Information to have on hand

The following items should be available at the time of installation:

- equipment room floor plan
- building cable plan
- installation plans
- Meridian Mail NTPs
 - *System Administration Guide* (NTP 555-7001-30x)
 - *Installation and Maintenance Guide* (NTP 555-7081-250)
 - *System Installation and Modification Guide* (NTP 555-7001-215)
 - *Maintenance Messages (SEERs)* (NTP 555-7001-510)
- Meridian 1 NTPs
 - *Meridian 1 Option 11 General Information and Planning Guide* (NTP 553-3011-200)
 - *Meridian 1 Option 11 General Installation Guide* (NTP 553-3011-210)

The work order should include the following:

- system and terminal cross-connect assignments
- a detailed listing of the equipment and services ordered

Pre-installation inspections

Pre-installation inspection checklist

The following table identifies the items that should be inspected and signed off before starting the installation.

For	Ensure that the following are completed:
Equipment room	<ul style="list-style-type: none"> • The equipment room complies with physical and environmental requirements. • Utility outlets are installed. • The equipment room is cleaned and prepared. • The cabinet location is marked on the equipment room floor.
Peripheral device locations	<ul style="list-style-type: none"> • The terminal, printer, modem, and A/B switchbox locations are ready. • AC outlets are provided. • Sufficient and appropriate terminal connecting blocks are provided.
General inspections	<ul style="list-style-type: none"> • Building cross-connect terminals are provided. • Conduits or floor-ducts to terminal locations (including service fittings) are installed. • ICL conduit for raceway is placed. • Sufficient terminal blocks are provided. • Sufficient cross-connect wires are provided.

Chapter 4

Web server setup

In this chapter

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System requirements	4-9
Setting up third-party applications	4-12
Installing the software	4-13
Configuring features	4-14
Configuring Integrated Communications Links	4-15
Configuring SNMP	4-18
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Overview

Introduction

There are several new features in Meridian Mail 13 that run on a PC.

The Personal Mailbox Administration (PMA) feature gives the mailbox owner the ability to view and, if necessary, modify mailbox settings using a web browser.

The Text Messaging and Notification feature provides the capability of sending a text message to an e-mail account, a PCS device, or a pager. It provides the ability to send and receive short alphanumeric messages of up to 160 characters.

The Simple Network Management Protocol (SNMP) has two system management features. The first system management feature is SNMP Notification that sends selected System Event and Error Reports (SEERs) as SNMP traps. The second system management feature is SNMP Reports. It provides information on the number of messages that are received, sent or failed. It also provide statistics for individual or combined sites.

This chapter provides information on the system, software, and PC requirements needed to set up the web server. This chapter also provides information on the system requirements for the web server.

Assumptions

This guide assumes that Meridian Mail is correctly installed and operational. For more information about configuring the Meridian Mail to support the Meridian Mail PC software, consult the *Meridian Mail PC Applications Guide*.

System requirements

Introduction

Depending on the application, Meridian Mail PC software requires a PC running Windows NT Server or Windows 95.

Refer to the following chart for information on each of the PC Applications.

PC Application	Windows 95	Windows NT
ICL	X	X
PMA		X
Text Messaging		X
SNMP	X	X

Hardware requirements

The minimum hardware requirements to run the Meridian Mail PC software are listed below. Hard disk space does not include the space required for third-party software:

- Pentium 90 or better
- minimum of 32 Mbytes memory
- hard disk space: 500 Mbytes on NTFS partition
- 800 x 600 pixel resolution monitor

Integrated Communication Link

- available COM port
- ethernet connection

PMA

- PMA installed on the Meridian Mail

Text Messaging requirements

- Text Notification feature installed on Meridian Mail
- One 16550 UART serial port and modem for dial-up notifications

SNMP support

- SNMP support installed on the Meridian Mail

Note: All of the PC Applications must be installed by a CD.

Software requirements

Meridian Mail PC Applications require the following third-party software:

- WinNT Server 4.0. Some applications can run on Windows 95 OSR 2 or later. For more information on platform requirements, see the Operating System section below.
- WinNT Server Service Pack 3
- WinNT Server 4.0 Option Pack
- Web Browser: IE 4.01 or Netscape 4 or later. (You must have Javascript, Java, cookies, and SSL enabled.)
- TCP/IP

Text Messaging requirements

- Microsoft Data ICL Components (MDAC) 2.1.1.3711.11 (GA) for x86
- IIS SMTP Service for e-mail notifications

SNMP support

- any network management system that is SNMP (version 1) compatible such as the M1 Meridian Administration Tool (MAT) or Hewlett-Packard's Openview
- SNMP service installed as a Windows NT Service to be started on boot up

Operating system

The following PC applications run on the Microsoft Windows NT 4.0 (or later) server with IIS 4:

- Personal Mailbox Administration (PMA)
- Text Messaging and Notification
- Simple Network Management Protocol (SMNP)

Note: While the above applications can only be run on a Windows NT server, they can be used by any computer connected to the network with an Internet browser.

The following Meridian Mail PC applications can run on the Microsoft Windows NT 4.0 or Windows 95 platform:

- Meridian Mail AutoAdmin
- Integrated Communication Link (ICL)
- SNMP Support for OMs
- SNMP Support for SEERS

Setting up third-party applications

Introduction

Before you can install the Meridian Mail PC application software, you need to install and configure your third-party applications.

The setup requirements for the PC server are itemized, followed by other software requirements:

1. Install Windows NT 4.0 SRV.
2. Install the Service Pack 3.
3. Install Internet Explorer 4.01 or later.
4. Install Option Pack 4 (including IIS 4).
5. Install Microsoft Data ICL Components (MDAC) 2.1.1.3711.11 (GA) for x86.

Refer to the appropriate Microsoft documentation for details. You can find the MDAC software on the Microsoft support website.

Security issues

To protect data, administrators should take the following precautions:

- All applications should be installed on an NTFS partition when installed on an NT server. FAT does not support security.
- You can set up a certificate server through IIS. This is recommended, particularly if you are administering web applications from a remote or unsecure site.
- You should set up directory security for your web-based applications. For more information, see Chapter 1, “Configuring Web-Based PC Applications.”

Installing the software

Introduction

The Nortel Networks PC System Operations software can install, uninstall, and upgrade the Meridian Mail PC applications. Installation can be done via a CD or a network. The following Meridian Mail PC applications can be installed:

- Integrated Communication Link (ICL)
- Meridian Mail AutoAdmin
- Personal Mailbox Administration (PMA)
- SNMP Support for Network OMs
- SNMP Support for SEERs
- Meridian Text Messaging

Installation methods

You can install the PC software from the Web or from a CD. The SysOps software installs and uninstalls the PC applications.

Note: If the CD does not automatically start, use the Windows Explorer to view the contents of the CD. Double-click the Setup.exe file to start the SysOps software.

Configuring features

Introduction

After you install the Meridian Mail PC software, you need to configure each application.

The following applications start immediately after installation:

- AutoAdmin Configuration Utility
- Integrated Communication Link (ICL)
- SNMP Configuration Utility (configures SNMP for SEERS and SNMP for OM)

The following applications are web-based and must be configured before use:

- PMA
- Text Messaging

Assumptions

The configuration instructions assume the Meridian Mail is correctly installed and configured to support the PC Application software. For more information on configuring Meridian Mail to support the PC Application software, consult the *Meridian Mail PC Applications Guide*.

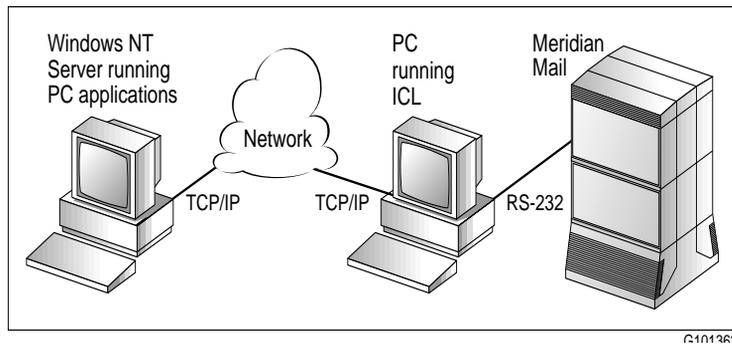
The configuration instructions also assume that the Windows NT Server and Internet Information Server are correctly installed and configured.

Specific changes in Windows NT and IIS needed to support the PC Applications are documented in the configuration instructions.

Configuring Integrated Communications Links

Introduction

The Integrated Communications Link (ICL) allows a PC to communicate with the Meridian Mail over an RS-232 cable. To use the Meridian Mail PC Applications software, at least one PC must have an ICL configured. The distance from the PC to the Meridian Mail system can not exceed 15.38 m (50 ft) as they are connected by a serial link.



All PC applications require an ICL to be set up except Meridian Mail Reporter and Alternate User Interface. ICLs are flexible: each ICL can support multiple PC applications, and PC applications can use one or more ICLs.

Configuring AutoAdmin

The AutoAdmin Configuration Utility sets up your PC so you can run the Meridian Mail AutoAdmin software. The Configuration Utility starts automatically after installing AutoAdmin through the SysOps Setup wizard.

Configuring web-based PC applications

The PMA and Text Messaging configurations can be done over a web browser.

Configuration requires several steps:

1. Create application administrators.
2. Configure directory security for web-based applications.
3. Configure IIS for web-based applications.

Note: For details on configuring your PC applications refer to the *Meridian Mail PC Applications Guide*.

Before you begin

You must configure Windows NT and install Internet Information Server (IIS) to manage your web-based applications.

Each mailbox must have the PMA feature enabled through the Administrator.

Create application administrators

The first step is to create one or more Windows NT administrator accounts for your web-based applications. A web-based application administrator may be different than the administrator for the NT server.

Refer to the *Meridian Mail PC Applications Guide* for more information on how to create application administrators.

Configure directory security for web-based applications

You need to configure directory security for your web-based applications to protect them against malicious or accidental tampering.

Refer to the *Meridian Mail PC Applications Guide* for more information on how to configure directory security for web-based applications.

Configure IIS for web-based applications

To configure IIS, follow these steps:

1. Create Virtual Directories.
2. Configure User Authentication.
3. Configure Default Document.

Create Virtual Directories

A virtual directory points to a real directory on the web server, but is easily accessed through a URL. For example, if there is a virtual directory called "PMA" on the web server "torweb," then a browser can reach the directory at `http://torweb/pma`.

You must create separate virtual directories for PMA and Text Messaging.

A virtual directory must be created for each Meridian Mail customer group.

Configure user authentication

If you are using Internet Explorer to configure your web-based applications, then your sessions are secure via Window NT's built-in security features.

Configure Default Document

Make sure that the file Default.asp is found in the Enable Default Document field.

Configuring SNMP

Introduction

The SNMP Configuration Utility configures the SNMP extension agents necessary to use SNMP to transmit SEERS and OM data. You need to configure SNMP support on the Meridian Mail.

There are four possible system configurations:

1. A PC containing both an SNMP agent and an SNMP manager is connected to a Meridian Mail switch using ICL over an RS-232 cable.
2. A PC containing an SNMP agent is connected to a Meridian Mail switch using ICL over an RS-232 cable. One or more SNMP managers communicate with the agent over the corporate network; that is, the Intranet.
3. A PC containing an SNMP agent is connected to a Meridian Mail switch using ICL over an RS-232 cable. One or more SNMP managers communicate with the agent through the corporate firewall over the public network; that is, the Internet.
4. A PC containing an SNMP agent is connected to a Meridian Mail switch using ICL over an RS-232 cable. One or more SNMP managers communicate with the agent through dial-up modems.

Network configuration

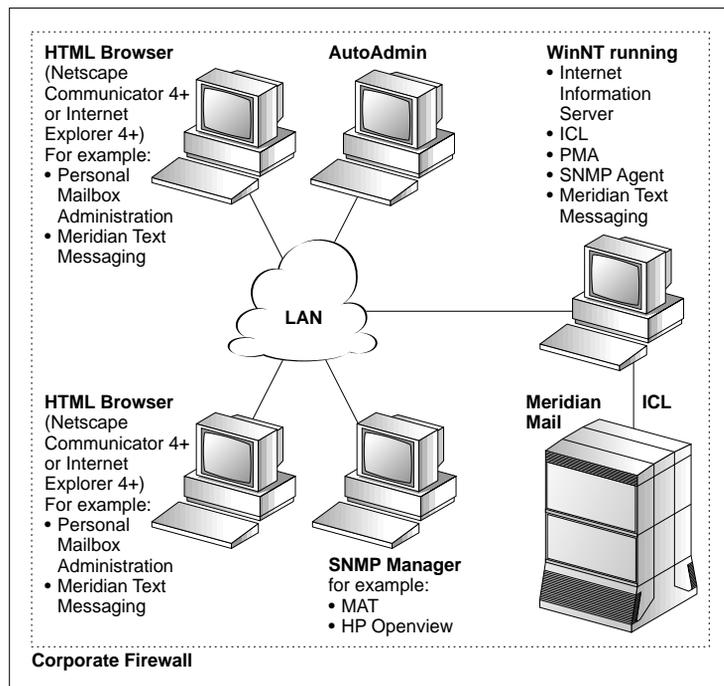
Introduction

The following section describe various network configurations.

Examples of networks

All of the following examples assume that they are being run behind a corporate firewall. For a more detailed breakdown of the PC application's minimum requirements refer to the *Meridian Mail PC Applications Guide*.

Basic configuration

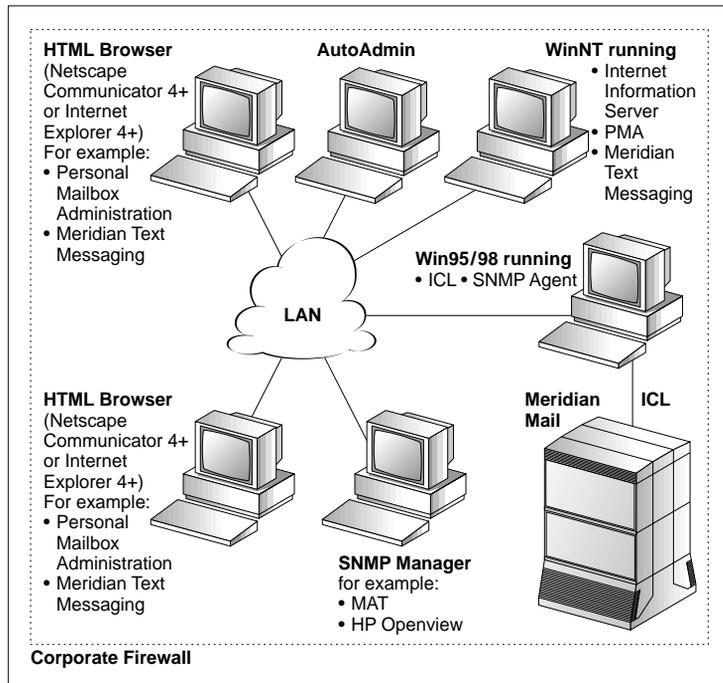


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- This configuration is desirable if you do not already have a web server running and you want to run all your Meridian Mail applications from one PC.

- Minimum requirement for WinNT running IIS and all PC applications: Pentium 90 CPU with 32 Mb RAM (64 Mbytes recommended), Windows NT 4.0 Server with Option Pack 4 and Service Pack 3 or 5 installed, 50 Mbytes of free disk space, CD-ROM drive, SVGA monitor, keyboard and mouse, one 16550 UART serial port for connection to Meridian Mail and an ethernet card and TCP/IP installed for connection to the LAN.
- One ICL port is required to be defined on Meridian Mail.

Basic configuration with separate web server

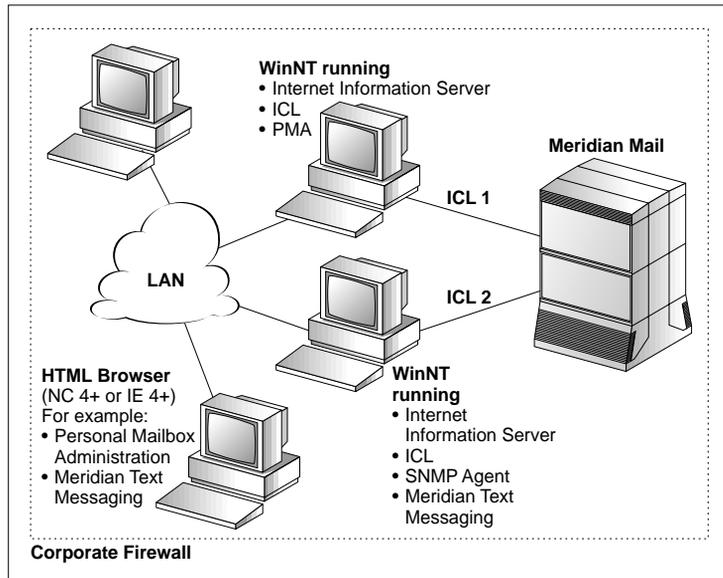


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- This configuration is desirable if you already have a web server running. You can then use a less expensive PC (with Windows 95/98) as a gateway to connect to your Meridian Mail system.
- Minimum requirement for Win95/98 running ICL & SNMP Agent: Pentium 90 CPU with 32 Mbytes RAM, Windows 95 with OSR2 installed or Windows 98, 15 Mbytes of free disk space, CD-ROM drive, SVGA monitor, keyboard and mouse, one 16550 UART serial port for connection to Meridian Mail and an ethernet card and TCP/IP installed for connection to the LAN.
- This configuration is desirable if you already have a web server running. You can then use a less expensive PC (with Windows 95/98) as a gateway to connect to your Meridian Mail system.

- Minimum requirement for Win95/98 running ICL & SNMP Agent: Pentium 90 CPU with 32 Mbytes RAM, Windows 95 with OSR2 installed or Windows 98, 15 Mbytes of free disk space, CD-ROM drive, SVGA monitor, keyboard and mouse, one 16550 UART serial port for connection to Meridian Mail and an Ethernet card and TCP/IP installed for connection to the LAN.

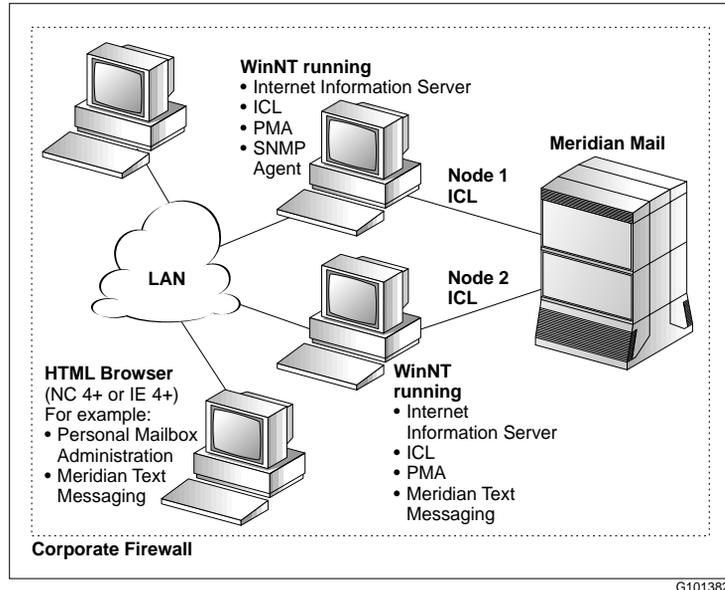
Multiple server configuration



G101383

- This configuration is desirable if you want to run a dedicated server for one of the PC applications (for example, PMA) and use the second PC for the other applications. This is sometimes desirable because you may want dedicated bandwidth for the solo PC application. The connected PCs can either be running Windows 95/98 or Windows NT.
- The minimum configuration of these PCs will be the same as for the Basic Configuration diagram.
- Two ICL ports are required to be defined on the same node of Meridian Mail. The Cumulative baud rate limitation on the node has to be observed.

Multiple server configuration with load sharing

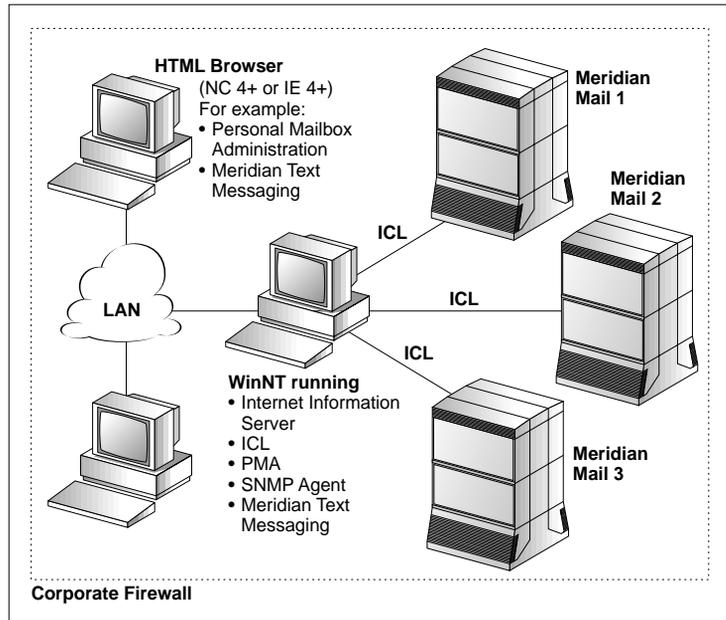


G101382

- This configuration is desirable if you have a multi-node system and you want to load share between 2 or more PCs. The connected PCs can either be running Windows 95/98 or Windows NT.
- The minimum configuration of these PCs will be the same as for the Basic Configuration diagram.
- Two ICL ports are required, one on each node of Meridian Mail.

Note: Both SNMP Agent and Text Messaging can only be run on *one* of the PCs.

Multiple Meridian Mail configuration with shared web server

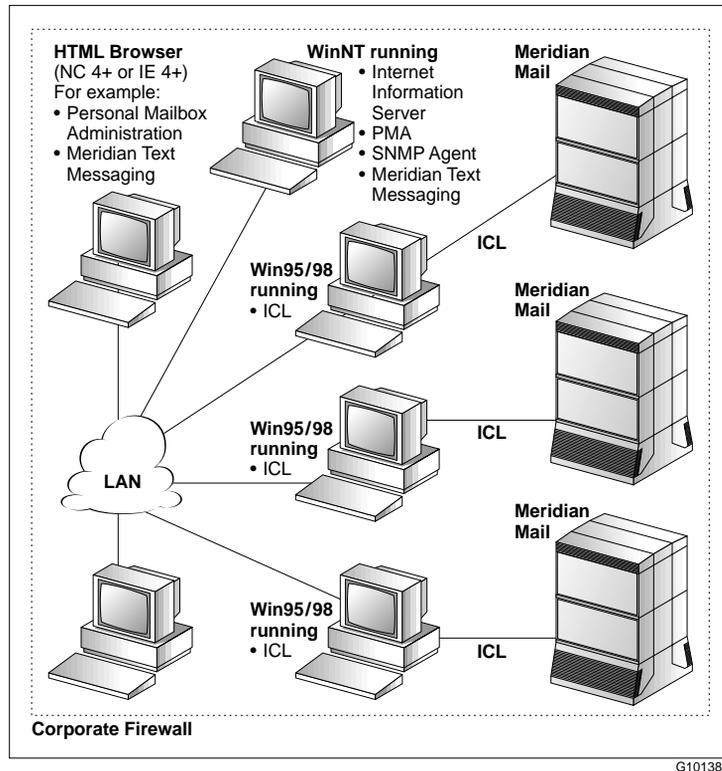


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- This configuration is desirable if you have a number of Meridian Mail systems that are sitting very close to each other and you want to share the same PC among them. The connected PC can either be running Windows 95/98 or Windows NT.
- The minimum configuration of these PCs will be the same as for the Basic Configuration diagram.
- One ICL ports is required to be defined on each of the Meridian Mail systems.

Note: All Meridian Mail systems have to running Meridian Mail 13 and have the applicable PC applications installed.

Multiple Meridian Mail configuration with multiple links



- This configuration is desired if you have a network of Meridian Mail systems and you want to share the same web server PC among them. Although the connected PCs can either be running Windows 95/98 or Windows NT, Windows 95/98 is recommended in this case since it provides a less expensive alternative.
- The minimum configuration of these PCs will be the same as for the Basic Configuration diagram.
- One ICL port is required to be defined on each of the Meridian Mail systems.

Note: All Meridian Mail systems have to running Meridian Mail 13 and have the applicable PC applications installed.

Chapter 5

Planning spares requirements

In this chapter

Mean time between failures

5-2

Mean time between failures

Introduction

The mean time between failures (MTBF) of the disk drives used in Meridian Mail is 16 years. Note that this is the *mean time*. It does not mean that every drive can be expected to operate without failure for the full duration of this time.

Example

A 16-port system has two 8-port voice processor cards. When planning spares, consider the sizes of the systems being serviced.

Spares planning— Mean time between failures

The following table lists the mean time between failures for the field-replaceable components of the Meridian Mail system.

Components serviced	Code	MTBF (years)
1 Gbyte disk (no power)	NT6P07AA	16.0
1 Gbyte disk (with power)	NT6P44AA	16.0
2 Gbyte disk (no power)	NT6P07BA	16.0
2 Gbyte disk (with power)	NT6P44BA	16.0
MMP40	NT6P97AA	15.0
Utility without modem	NT6P42AA	34.6
VP4	NT6P04AA	54.0
VP8	NT6P08AA	27.0
MGate	NTRB18AA	40.0
Power supply	NTDK35AA	68.0
CISPR-B 220 V power supply	NTDK35BA	68.0
2.5 Gbyte Tandberg tape drive external unit	NTAK30DA	2.9

Notes:

1. The mean time between failure of disk drives is based on electrical failures and, therefore, is not conclusive with regard to disk drive life expectancy. You should expect to replace the disk drive within five years.
2. System MTBF uses the Markhov model. A component failure does not necessarily cause a system failure.

**Spares planning—
Number of spares
required**

The following table lists the number of spares of each item a branch should stock.

Note: Some systems have multiples of the listed components.

Components serviced	Code	Number of units serviced by branch*				
		1	< 5	< 10	< 20	< 30
1 Gbyte disk (no power)	NT6P07AA	1	2	3	3	3
1 Gbyte disk (with power)	NT6P44AA	1	2	3	3	3
2 Gbyte disk (no power)	NT6P07BA	1	2	3	3	3
2 Gbyte disk (with power)	NT6P44BA	1	2	3	3	3
MMP40	NT6P97AA	1	2	2	3	3
Utility without modem	NT6P42AA	1	1	2	2	2
VP4	NT6P04AA	1	1	2	2	2
VP8	NT6P08AA	1	2	2	3	3
MGate	NTRB18AA	1	1	2	2	2
Power supply	NTDK35AA	1	1	2	2	2
CISPR-B 220 V power supply	NTDK35BA	1	1	2	2	2
2.5 Gbyte tape drive external unit	NTAK30DA	1	1	2	2	2
* Assumes that when a spare is committed, a replacement will be available within one week.						

Appendix A

Reference documents

In this appendix

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Document list	A-3

Overview

Introduction

The following documents contain information that may be of value during the site planning and preparation process. If local or national codes conflict with those listed below, follow the local or national code.

Document list

- *ANSI/IEEE Standard 484-1981*
- *ANSI/IEEE Standard 142-1982*
- *ANSI/IEEE Standard 81-1983*
- *Gaseous Hydrogen Systems 1984 - NFPA 50A*
- *National Electrical Code (NFPA 70-1984)*
- *Grounding Electrode System (NEC Articles: 250-23, 250-26, 250-54, 250-81, 250-83, 250-84, and 250-86)*
- *Grounding Electrode Conductor (NEC Articles: 250-23, 250-26, 250-51, 250-53, 250-91, 250-92, and 250-94)*
- *Grounding Conductor (that is, Neutral) (NEC Articles: 250-26, 250-50, 250-51, 250-53, and 250-61)*
- *Equipment Grounding Conductor (NEC Articles: 250-50, 250-51, 250-53, 250-57, 250-91, 250-32, 250-92, and 250-95)*
- *Main Bonding Jumper (NEC Articles: 250-23, 250-26, and 250-61)*
- *Grounding Evaluation Practices and Equipment*, ECOS Electronic Corporation, 205 West, Harrison Street, Oak Park, IL U.S.A. 60304
- *Protection of Electronic Computer/Data Processing Equipment - NFPA 75*
- *MIL - Handbook-419* (raised floor installation requirements)
- *IEC 68-2-14 Test Nb* (temperature cycling)
- *OSHA Occupational Safety and Health Administration Standards (29CFR 1910)*

- Recommended Practice on Static Electricity - NFPA 77
- Soares Grounding Electrical Distribution Systems for Safety
- Uniform Building Code 1982
- the most recent issues of local building codes

Appendix B

Component list

In this appendix

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Component List	B-3

Overview

Introduction

This appendix identifies Meridian Mail equipment components that can be ordered individually.

Component List

This table lists EC11 components.

Component	PEC code	Part no.	Order code
1.0 Gbyte disk drive module	NT6P07AA	A0391976	—
1.0 Gbyte disk drive module with auxiliary power	NT6P44AA	A0394781	—
2.0 Gbyte disk drive module	NT6P07BA	A0656257	—
2.0 Gbyte disk drive with auxiliary power	NT6P44BA	A0656258	—
MMP40 card	NT6P97AA	A0405603	—
Utility card (without modem)	NT6P42AA	A0394182	—
VP4 Card	NT6P04AA	A0391973	—
VP8 Card	NT6P08AA	A0392020	—
MGate card	NTRB18AA	A0645158	—
32K NVP Card*	NT4R01AC	A0364796	—
Tandberg tape unit (external) + cables + tapes	NTAK30DA	A0637905	—
Tandberg tape drive cleaning kit	—	A0633585	—
Power supply (120/ 240 V)	NTDK35AA	A0645023	—
Power supply (220 V, CISPR-B)	NTDK35BA	A0656876	—
Ground extension cable	QCAD310	A0336878	—
Alarm modem cable	NTDK59AA	A0649290	—
RS-232 4-port fanout cable	NT6P0110	A0393843	—
— continued —			

Component	PEC code	Part no.	Order code
Power and cable equipment			
Network loop interface cable (3.0 m/ 10 ft)	NTDK3302	A0646150	—
Network loop interface cable (6.1 m/ 20 ft)	NTDK3303	A0646150	—
Network loop interface cable (9.1 m/ 30 ft)	NTDK3304	A0648468	—
Network loop interface cable (3.0 m/ 10 ft) (CISPR-B)	NTDK3305	A0658012	—
INMAC 328 terminal adapter	—	A0351509	—
RS-232 terminal to printer cable	NT4R59AA	A0347499	—
RS-232 cable	NTND91AB	A0399144	—
RS-232 printer cable		A0376171	—
RS-232 printer cable (for NT220 terminal)	NTND82AA	A0398761	—
Communications equipment			
VT520 monochrome text terminal (14" flat surface)	—	A0637761	—
A/B data switchbox	NT3M50AD	A0345353	—
NT Personal Printer	NT3M56AC	A0345125	—
DEC LA30N printer kit	NTZR40BA	A0654974	—
Networking kit	NT9D67AA	AS7007	—
Racal ALM 3223 modem	—	A0658286	—
Hayes Optima 144 modem	—	A0658287	—
U.S. Robotics Sportster 14.4 (model 268) modem	—	A0638645	—
User guides			
Meridian Mail user guides (15)	NT5R25AA	A0403732	P0741311
Guest Administration Console/Guest Voice	—	—	P0741307
— end —			

Note: The Message Playback Speed Control feature does not work with the 16K NVP card.

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How the world shares ideas.

Reader Response Form

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Site and Installation Planning Guide
555-7081-200

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1. What is your level of experience with this product?

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