BITNET Postmaster's Guide for VAX/VMS Systems

Written for CREN by
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April 1992

This book describes mail routing and transport, and the responsibilities of the Postmaster, for a computer system on BITNET. This book also provides instructions, specific to the BITNET environment, on installing, configuring, and managing NJE and mailer software and data tables for Digital VAX computer systems running VMS, Jnet, and PMDF, to supplement the documentation provided with commercial software products.

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Operating System and Version:	VAX/VMS Version V5.0 or later
Software Versions:	Jnet Version 3.5 PMDF Version 4.0 or later

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Preface

This Preface explains the objectives, intended audience, and structure of this book, describes the software environment for which this book is relevant, and explains the topographical conventions used.

Objectives

This book is designed to help get the routing and transport of BITNET mail up and running on a Digital VAX system running VMS as quickly and as easily as possible, while complying with BITNET standards for mailers. It does not deal with the mail user interface, except for aspects specific to BITNET.

The general approach is to provide BITNET-specific instructions for all the tasks required at a new BITNET site in the order that they are encountered. For continuing BITNET sites, where Network Job Entry (NJE) software is already installed but with no mailer, the reader can easily review the NJE configuration and continue with mailer configuration and installation.

Intended audience

This book is addressed to the person or persons responsible for installation and ongoing management of the electronic mail application on a BITNET computer system. This person is called the *Postmaster* throughout this book. (This book also discusses an electronic mailbox and user name for the Postmaster, called *POSTMASTER*, in upper case letters, throughout this book.)

For large systems, Postmaster responsibilities can be shared by a systems programmer, a network manager, a user services consultant, and those with other job titles. For a small system, a single individual may have all of these responsibilities as well as other, unrelated roles. For VAX/VMS systems, the Postmaster is usually the system manager. The Postmaster is assumed to be familiar with VMS management procedures and the use of VMSmail.

Many of the tasks described here require access to privileged system functions and technical competence to manage the system and attached networks. Other tasks, such as responding to routine requests for information from network users and monitoring the system for trouble, can be delegated to staff with ordinary privileges and less technical expertise. You are urged to delegate Postmaster duties, as appropriate to your system environment, so that important tasks are performed in a timely manner without overloading staff. Both local and remote BITNET users depend on the Postmaster to complete the required tasks to provide reliable mail service.

No prior experience with BITNET is assumed. For BITNET links over other networks and mail gateways to other networks, such as SNA, DECnet, and TCP/IP networks, the reader is assumed to be familiar with the concepts and software required to install and manage those networks.

Structure of this book

This book includes seven chapters and three appendices.

- Chapter 1, Mailers on BITNET, introduces required networking concepts and explains the requirements for and benefits of running a mailer on a BITNET node.
- Chapter 2, Overview of Setting Up a BITNET Node, provides an overview of the installation and registration steps covered in this book.
- Chapter 3, Planning System and User Names, suggests guidelines for choosing names for computer systems and user accounts on BITNET.
- Chapter 4, Installing and Configuring Networking Software, reminds you to install DECnet-VAX and TCP/IP software if your system will participate in DECnet or TCP/IP networks, and highlights aspects of DECnet and TCP/IP configurations that affect NJE and/or mailer software.
- Chapter 5, Installing and Configuring NJE Software, supplements Jnet documentation with BITNET-specific instructions for installing and configuring Jnet software and registering systems with the BITNET Network Information Center.
- Chapter 6, Installing and Registering a BITNET Mailer, explains how to install and configure PMDF in the BITNET context and how to register a mailer and a domain name for a BITNET node.
- Chapter 7, On-going Management of BITNET Nodes, lists BITNET Postmaster responsibilities and provides suggestions for the on-going management of BITNET nodes.
- Appendix A, Adding an Internet Connection to a BITNET Node, suggests steps to take when adding an Internet connection to a system that previously was connected to BITNET only.
- Appendix B, Operating BITNET Mail Gateways, explains how to configure a system to act as a BITNET-Internet or BITNET-DECnet mail gateway.
- Appendix C, Migration from Gmail, provides supplementary information for sites where GMAIL is used to send mail to Internet addresses.

Software environment and associated documents

This book assumes that you will use specific software products to implement BITNET and its mail application, that you have or will install the latest version of each program, and that you intend to upgrade your software as new versions become available. For this book to be helpful, you must install at least the *minimum version* of each recommended software product.

When making references to vendor software product documentation, the references are to a specific version, called the *assumed version*, unless another version is specifically referenced by version number. You should have the complete documentation for the installed version of the recommended product at hand when working through this book, since not all information in vendor documentation is duplicated here.

For Digital VAX systems running VMS, the minimum and assumed versions of relevant software products are listed in Table 1.

Table 1 Minimum and assumed software versions for Digital VAX systems running VMS

Vendor and product name	Minimum version	Assumed version
Digital VMS Operating System	V5.0	V5.5
Digital DECnet-VAX	V5.0	V5.5
Joiner Jnet standard features	V3.5	V3.5
Joiner Jnet link driver options	V1.1	V1.1
Innosoft PMDF	V3.2	V4.0

Unless stated otherwise, the minimum and later versions of software products discussed here function in substantially the same way.

The commercial mailer software recommended here is PMDF, from Innosoft International, Inc. (*Innosoft*). You will need the following Innosoft publications to install and configure PMDF:

- *PMDF Installation Guide & Release Notes*, Version 4.0
- *PMDF System Manager's Guide*, Version 4.0

Additional important information on PMDF, including software corrections, is released regularly on the PMDF network forum: Info-PMDF. Instructions for subscribing to Info-PMDF are given in Section 6.7.2 of this book.

If you are missing any PMDF documentation, or need additional copies, contact Innosoft:

> 250 West First Street, Suite 240
> Claremont, California 91711 U.S.A.
> Telephone: +1 (714) 624-7907, facsimile: +1 (714) 621-5319
> BITNET: III@YMIR
> Internet: Service@Innosoft.Com

Preface

Most BITNET member sites make NJE connections among VAX systems over DECnet networks, and between VAX systems and other types of BITNET nodes over *binary synchronous communications (BSC)* lines or TCP/IP networks. You will need to refer to the following publications of Joiner Software, Inc. (*Joiner*), to install and configure Joiner's Jnet NJE software and the required options:

- *Jnet Installation Guide*, Version 3.4
- *Jnet Manager's Guide*, Version 3.5
- *Jnet User's Guide*, Version 3.5
- *Jnet BSC/370 Manager's Guide*, Version 1.0
- *Jnet TCP NJE Manager's Guide*, Version 1.0

Additional important information on Jnet and its options is found in cover letters, software product descriptions, and release notes. Release notes are shipped in machine-readable format on the distribution media, and can be printed using the instructions in the cover letters. The cover letters and software product descriptions are shipped with the product documentation.

If you are missing any of the required Jnet documentation, or need additional copies, contact Joiner:

450 Science Drive
Post Office Box 5630
Madison, Wisconsin 53705-0630 U.S.A.
Telephone: +1 (608) 238-4454, facsimile: +1 (608) 238-8986
BITNET: CSC@JOINER
Internet: CSC@Joiner.Com

This book assumes you have access to the VMS Extended Documentation Set, published by Digital Equipment Corporation (*Digital*) on paper and Compact Disk-Read-Only Memory (CD-ROM). To obtain Digital documentation, telephone Digital at 1-(800)-DIGITAL in the U.S.A., or contact the Digital subsidiary or distributor in your country.

For recommendations on which VMS publications are most relevant to the installation and management of NJE and mailer software, refer to the Preface of the *Jnet Manager's Guide*.

See also the publication lists in the recommended software vendor documentation listed here for additional references on prerequisite products, protocols, historical background, and other topics.

Conventions

The following conventions are used in this book.

New term	This typeface in the text represents the introduction of a new term.
User input	In examples, boldface type indicates text that the user enters.

UPPERCASE	Uppercase letters in a command or UPDATE job represent text that you have to enter as shown.
lowercase italics	Lowercase italic letters in a command or UPDATE job indicate variable information that you supply.

The Return key is not shown in syntax statements or in examples; however, you must press the Return key after entering a command or responding to a prompt.

This book distinguishes between the *installation* and *configuration* of Jnet and PMDF software. Installation is a standardized process requiring little input from the installer, and moves the software from the distribution media to its place in the file system. Configuration is a more complex task requiring careful, individualized planning for each site, and results in the creation of data tables that enable the software to do useful work.

Distinctions are also made between installation and post-installation, and between configuration (or autoconfiguration) and post-configuration. Installation and autoconfiguration are accomplished by running command procedures that prompt for input; post-installation and post-configuration consist of manual tasks that are not easily automated, such as editing a system startup command procedure.

1 Mailers on BITNET

You may have been asked to install and operate a ‘‘mailer’’ on your computer system. This chapter describes the transmission of mail on BITNET without the use of a mailer (*direct transmission*, Section 1.1), defines *mailer* and related concepts (Section 1.2), lists CREN requirements for electronic mail (Section 1.3), and attempts to provide a rationale for running a mailer (Section 1.4).

1.1 Direct Transmission of Electronic Mail by Network Job Entry

On a computer system (or *node*) on BITNET, the mail application is supported by a specialized software system, called a mailer, which transfers mail among local users and applications and mailers on remote nodes. Mail is transferred between mailers using files in *Batch Simple Mail Transfer Protocol (BSMTP)* format and BITNET’s built-in *Network Job Entry (NJE)* file transfer facilities.

Before mailers were developed, a copy of every BITNET mail message was sent directly from the sender to each recipient as a separate NJE file. This approach has many disadvantages. Some of the most important ones are:

- Only users and applications with directly reachable NJE addresses can receive mail. This precludes sending mail to addresses on other networks connected to BITNET by mail gateways.
- Sending separate copies of a message to every addressee is wasteful of network bandwidth, central processor cycles, and disk space. This problem is compounded by the fact that there is no standardized group communication application on BITNET except those based on mail.
- The NJE envelope, or *tag*, does not include the information needed for adequate error handling.
- When no mailer is present to insulate users from mail transports, end users must explicitly address mail to different networks, for example, BITNET and the Internet. Mailers allow mail to be sent on different networks, simultaneously and transparently, from a single *user agent*.
- Using NJE software directly for electronic mail increases the difficulty of adapting to new mail transport and user interface technologies. This causes problems when switching from other transports to NJE and again when switching from NJE to other transports.

To avoid the serious disadvantages of direct NJE transmission of mail, the CREN Board of Trustees and its Technical Advisory Committee have mandated the use of mailer software for BITNET nodes that send or receive mail through INTERBIT mail gateways. There are three reasons to switch to mailer-based BITNET mail:

1 Almost every BITNET user uses the INTERBIT mail gateways at least one time, so the CREN Terms and Conditions of Membership and Affiliation requires you to install a mailer.

2 There are many technical advantages and no significant disadvantages.

3 CREN has worked hard to make installing a mailer easy.

The sponsorship of the development and distribution of this book is one way CREN is supporting the installation of BITNET mailers.

1.2 BITNET Mail Concepts

To *register* a BITNET node means to describe it in a standard format in the data file BITEARN NODES[1], maintained by the BITNET Network Information Center (*BITNIC*) and the European Academic and Research Network (*EARN*) Central Office. Various methods are used to generate NJE routing tables based on BITEARN NODES that are ultimately installed on every BITNET system, enabling each system to originate or forward NJE data to any node on BITNET and its cooperating networks.

A *mailer*, as used in this document, is software that transmits BITNET mail in BSMTP format to NJE users (human users, applications, and devices). Normally, mail is transmitted between nodes by NJE file transfer between mailers on those nodes. Mailers have NJE addresses (eight-character usernames and eight-character node names), and can also exchange mail with NJE users by direct NJE transmission, if necessary.

On BITNET, a *mail gateway*, as used in this document, is software that sends or accepts BITNET mail in BSMTP format on behalf of addressees with *fully-qualified domain-style names (FQDNs)*. Some confusion can result from the fact that mailers and mail gateways are usually implemented as different aspects of the configuration of the same software, for example, PMDF on VAX/VMS systems.

A fully-qualified domain-style name is a name of the form *mailbox_name@subdomain.subdomain.domain*. My own Internet address, *Arnold@Eisner.DECUS.Org*, is an example. For a formal definition of a FQDN, refer to Section 6 of *RFC 822: Standard for the format of ARPA Internet Text Messages*, shipped with PMDF in the documentation subdirectory.

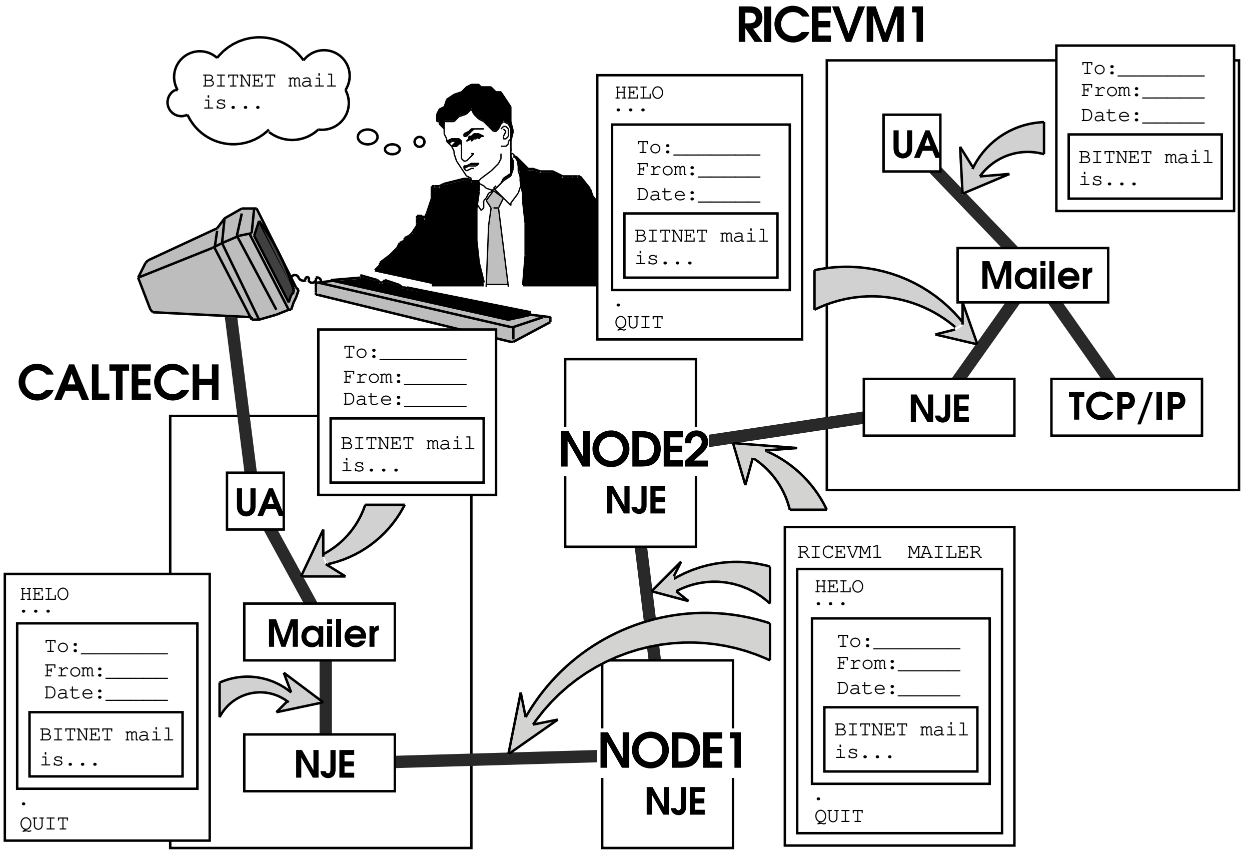
The concepts of mailers and mail gateways are illustrated in Figure 1–1. The figure shows the content of a mail message, ‘‘BITNET mail is...’’, created by a user at node CALTECH, with mail headers prepended by the VMSmail user agent (UA), wrapped in a BSMTP envelope by the PMDF mailer (Mailer), and transmitted over the NJE network by Jnet (NJE). Intermediate nodes NODE1 and NODE2 transmit the NJE file to its final destination, node RICEVM1. At RICEVM1, the NJE tag is removed by RSCS, the BSMTP envelope is interpreted and discarded by the VM

---

[1] Mailers were first developed under IBM’s VM operating system, and BITNET data files are still maintained under VM. This book refers to BITEARN NODES and other such files using VM file naming conventions. VM file identifications have space between the file name and the file type, while VAX/VMS file specifications have a period (.) in that position. For example, when a copy of BITEARN NODES is stored on a VAX system, it is called BITEARN.NODES.

Mailer, and the Rice Mail user agent delivers the content and mail headers to the addressee, using the address from the BSMTP envelope.

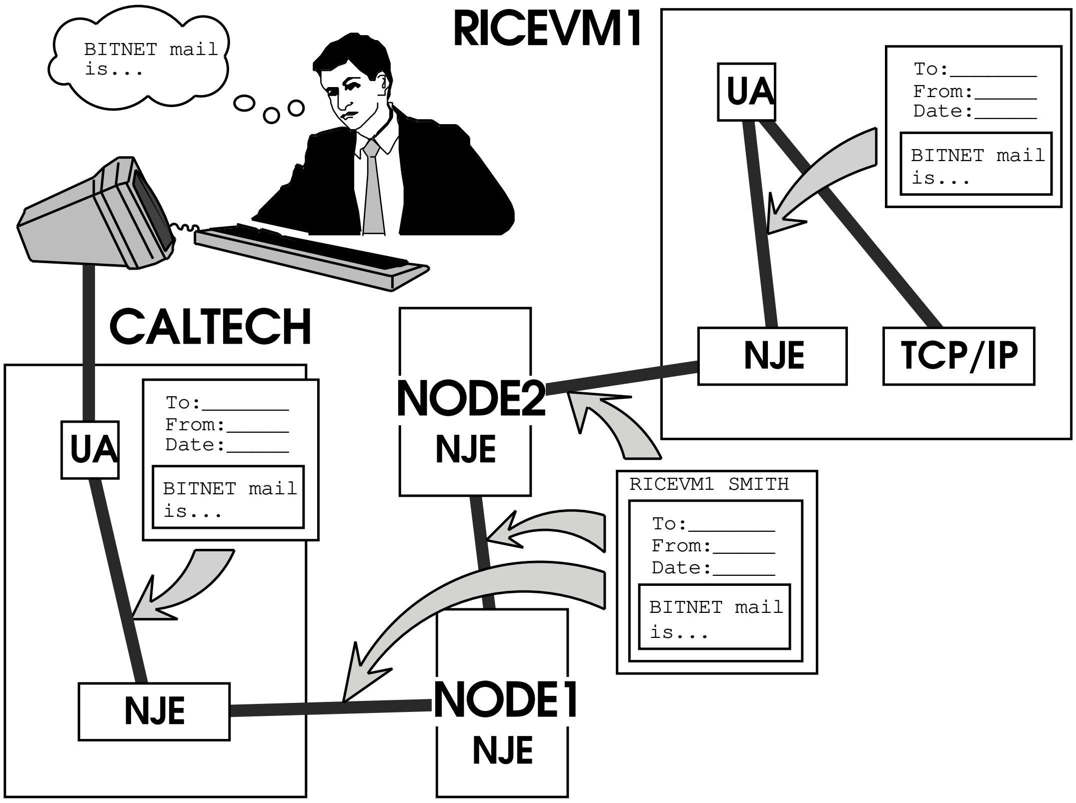
Figure 1–1 Architecture of the BITNET mail application.


RICEVM1
BITNET mail is...
HELO
...
To:
From:
Date:
BITNET mail is...
.
QUIT
To:
From:
Date:
BITNET mail is...
UA
Mailer
NJE
TCP/IP
CALTECH
To:
From:
Date:
BITNET mail is...
NODE2
NJE
UA
Mailer
HELO
...
To:
From:
Date:
BITNET mail is...
.
QUIT
NJE
NODE1
NJE
RICEVM1 MAILER
HELO
...
To:
From:
Date:
BITNET mail is...
.
QUIT

RICEVM1 serves as a mail gateway between BITNET and the Internet (an *INTERBIT* gateway). Therefore, RICEVM1’s mailer could follow instructions in the BSMTP envelope to send copies of the message to Internet addressees instead of or in addition to delivering it to local users. This is shown in Figure 1–1 by the connection between the mailer and TCP/IP software within RICEVM1.

Contrast Figure 1–1 with Figure 1–2, which illustrates BITNET mail directly over NJE. Without the use of mailers, CALTECH users would have to send a separate copy of the message to every addressee at RICEVM1, and there would be no option to send mail to Internet users using the Internet connection at RICEVM1.

Figure 1–2 Sending BITNET mail by direct use of NJE software.


BITNET mail is...
RICEVM1
UA
To:_______
From:_____
Date:_____
BITNET mail is...
NJE
TCP/IP
CALTECH
UA
To:_______
From:_____
Date:_____
BITNET mail is...
NODE2
NJE
RICEVM1 SMITH
To:_______
From:_____
Date:_____
BITNET mail is...
NJE
NODE1
NJE

To *register a BITNET mailer* means to describe it in a standard format in BITEARN NODES. While mailers and mail gateways installed around BITNET and its cooperating networks could theoretically generate the routing tables they use, called *mailer tables*, from BITEARN NODES directly, in practice most sites generate mailer tables from a much smaller file, XMAILER NAMES. XMAILER NAMES is automatically derived from BITEARN NODES each month and made available for *automatic file distribution* (*AFD*). (AFD is described in Section 6.3.1.) Mailer tables enable mailers and mail gateways running on BITNET nodes to route mail files (in BSMTP format) to other mailers for delivery to addressees on specific NJE nodes.

To *register a mail gateway* means to describe it in a standard format in the data file DOMAIN NAMES, maintained by BITNIC for BITNET, EARN, and their cooperating networks. DOMAIN NAMES is much smaller than BITEARN NODES or even XMAILER NAMES. Like XMAILER NAMES, it is updated each month and available for AFD. Data in DOMAIN NAMES is also incorporated in mailer tables, to enable mailers and mail gateways running on BITNET nodes to send mail files (again in BSMTP format) to mail gateways for delivery to addressees at specific domain-style addresses. Some of these addressees are on the same NJE node as the mail gateway, and mail is delivered to the addressee locally. Others are on systems on non-NJE networks, and the non-NJE network (for example, the Internet) is used to deliver the mail to its ultimate destination.

This book explains how to register PMDF to simultaneously serve as a mailer to handle mail for a BITNET node by its NJE name and a mail gateway to handle mail for a BITNET node by any of its domain names. For VAXclusters, these instructions explain how to sent up PMDF to handle all the nodes of the cluster, both collectively and individually. Appendix B explains how to set up and register PMDF as a mail gateway between BITNET and an external network like the Internet.

1.3 BITNET Technical Requirements

Every CREN member and affiliate is required to implement CREN technical standards, and to make every effort to implement CREN technical recommendations. These requirements are part of the CREN Terms and Conditions of Membership and Affiliation, published as the file CREN TERMS, available from LISTSERV@BITNIC[2].

It is one of the objectives of this book to help you meet these BITNET technical requirements:

1. Every BITNET node must accept mail for the local addresses POSTMASTER and POSTMAST, in any combination of upper and lower case letters. All such mail must be promptly delivered to a trained person who can solve network problems and answer inquires.
2. Every BITNET node that exchanges mail with an INTERBIT mail gateway must have mailer software compliant with the BSMTP specification, as defined in the files BSMTP LISTING[3] and BSMTP ADDENDUM, available from LISTSERV@BITNIC. Currently, PMDF and *MX* are the only BSMTP-compliant mailers for the VAX/VMS environment known to me. (Additional information about MX, a public domain mailer by Matt Madison, of Rensselaer Polytechnic Institute, is in the file MX INFO, available from LISTSERV@BITNIC.)

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[2] To obtain a copy of a file from LISTSERV, send the LISTSERV command *GET filename filetype* to the NJE address of the server as an interactive command or in the body of an electronic mail message, where *filename* is the VM filename of the file, and *filetype* is the VM filetype of the file. For example, to get the file CREN TERMS from the LISTSERV server on node BITNIC by sending an interactive message, enter *$ SEND LISTSERV@BITNIC GET CREN TERMS*. Most public BITNET files are available from the LISTSERV server on node BITNIC, operated by the BITNET Network Information Center.

You must send LISTSERV commands from nodes registered in BITEARN NODES, or the server will not be able to send files to you. To obtain a file before your node is registered, ask for the assistance of the TECHREP or Postmaster of a registered node adjacent to yours.

[3] This file is provided as a print-type file with FORTRAN carriage control of forms skipping, underscoring, and bolding. For VMS to properly recognize these controls, RMS attribute must be correctly set. These settings can be changed with Joe Meadows' FILE utility, available as a VMS_SHAR file from any NETSERV server.

Request the FILE utility by sending the command *GET MODATT COM* to a NETSERV server, such as NETSERV@BITNIC. Receive the command procedure MODATT.COM into an empty directory and run it to unpack the files. Follow the instructions provided to install the FILE utility, then enter *$ FILE filespec /ATTRIBUTES=(FORTRANCC,NOIMPLIEDCC)* to to set the correct RMS attributes on *filespec* for typing or printing.

3 Official INTERBIT mail gateways must reject mail from the Internet that is addressed to BITNET systems without registered BSMTP mailers, and reject mail from systems without a registered mailer if the mail is addressed to Internet addresses.

4 Official INTERBIT mail gateways must rewrite addresses correctly:

   a. FQDNs must not be modified when going through the mail gateway in either direction.

   b. NJE addresses of the form *username@nodename* must be converted to domain-style addresses of the form *username%nodename.BITNET@gateway_fqdn* (the ‘‘%-hack’’ convention) on the way from BITNET to the Internet, where *gateway_fqdn* is the fully-qualified domain name of the INTERBIT mail gateway itself.

   c. Domain-style addresses of the form *username%nodename.BITNET@gateway_fqdn* must be converted to NJE addresses of the form *username@nodename* on the way from the Internet to BITNET.

   d. Addresses with ‘‘!’’ in username must be rejected, because the precedence of ‘‘!’’ and ‘‘%’’ in *abc!mno%xyz.BITNET@gateway_fqdn* is undefined.

INTERBIT mail gateways accept NJE files tagged for the NJE address SMTPUSER@INTERBIT and interpret the BSMTP commands in the files to forward mail to Internet addresses. The requirements for INTERBIT mail gateways are documented in the file GATEWAY STANDARD, available from LISTSERV@BITNIC. Official INTERBIT sites are listed in the file BITNET GATES, available from LISTSERV@BITNIC. Unofficial mail gateways, which include almost every BITNET system with an Internet connection, should strive to comply with requirements 3 and 4.

Strictly speaking, if users at a node do not require the use of INTERBIT gateways, CREN does not require that node to run a mailer. However, it is practically impossible for active BITNET users to avoid using INTERBIT services. To avoid using INTERBIT services:

- Local users must never send mail to Internet addresses over their BITNET connection (for example, with the GMAIL command procedure, by Ed Miller, of Stanford Linear Accelerator Center).
- Remote users must never attempt to address your local users through an INTERBIT gateway.
- Users must never reply to old messages that traversed any Internet/BITNET mail gateway.

Installing a mailer and not registering it is just as bad as not installing a mailer at all. The INTERBIT gateways will not know you have a mailer, so they will bounce your users’ mail. The performance and usability benefits of installing a mailer will not be realized, for the same reason: remote nodes will not know they they can take advantage of the mailer protocols.

In conclusion, there is really no practical alternative to correctly installing and registering a mailer to meet your organization's obligations under the CREN Terms and Conditions of Membership and Affiliation.

1.4 Benefits of Installing a Mailer

Fortunately, there are several substantial, immediate benefits of running a mailer that offset the extra expense and system management effort.

1.4.1 Mailers Ease Addressing

User names longer than the NJE maximum eight characters are correctly handled by mailers, since addresses are not confined to the eight-byte fields in the NJE tag. Domain-style host names can also be longer, and thus more meaningful, than eight-character NJE node names.

Mailers allow the user of a single address format, such as the *IN%* format used by PMDF, for BITNET NJE-style addresses, BITNET domain-style addresses, and Internet domain-style addresses. Every correspondent can be addressed using the most natural form of address, and the reply function can be used with all messages. Local users need never be concerned with what network a correspondent uses.

Many BITNET-only nodes (that is, nodes with no direct Internet connection) now send all mail with a domain-style return address, and this practice is becoming more widespread. If your node does not have a mailer, you must use the VMSmail SEND or FORWARD/EDIT commands to send to a different address than the return address, since the VMSmail REPLY command won't work. The resulting mail must go over Internet to an INTERBIT mail gateway for retransmission to the final addressee, delaying the mail and wasting network and system resources.

As an alternative to responding to BITNET domain-style addresses as if they are Internet addresses, each user can keep a personal table of BITNET and Internet equivalent addresses (or you can make one available to all users of your system), and manually look up each domain-style address to determine if the system is on BITNET only and its NJE address. Mailers perform this function automatically.

Installing a mailer allows Internet and other global network users to address your users by a domain-style name instead of the more awkward ''%-hack'', for example, *Postmaster@host.domain.Edu* instead of *Postmaster%host.BITNET@CUNYVM.CUNY.Edu*.

Even if you could train all your users when to begin addresses with *Jnet%* and *SMTP%*, and even if you could get rid of all the old mail on the network with INTERBIT return addresses, it makes much more sense to install a mailer. Certainly your users will prefer to use the common mail addressing scheme that a mailer permits.

1.4.2 Mailers Isolate Users From Network Changes

If you drop your BITNET connection completely, you need a mailer even more. A mailer will allow local users to continue to use the BITNET addresses stored on your system without change, in mailing lists and in the return addresses of old mail. When a mailer is installed, switching from a BITNET-only connection to BITNET and Internet connections or a an Internet-only connection is transparent to the mail application.

1.4.3 Mailers Provide New Functions

PMDF adds many important new functions to your mail network. It supports forwarding to lists, a feature removed from VMSmail at VMS Version 5.0. Other additional functions include store-and-forward reliability for VMSmail-to-VMSmail links, mail directory service, a simple file server, and optionally, facsimile capabilities for any mail user.

Mailers send all the copies of a message routed to one system or gateway in a single NJE file. This conserves network resources, and thereby improves the delivery speed of mail for all users.

2 Overview of Setting Up a BITNET Node

You should be able to work straight through this book, whether you are a new BITNET site starting from scratch or a continuing site reviewing your configuration and adding a mailer, whether you are already on the Internet or not, and whether your have previously installed TCP/IP software or are doing it at this time. (If you add an Internet connection later, see Appendix A.)

Depending on your situation, you will be skipping certain sections. So that your work goes as quickly and easily as possible, skip ahead when asked to do so.

There are many ways to accomplish some effects. I have favored methods that give the highest level of network service, are easiest to modify or extend as your network evolves, and, if all else is equal, that are somewhat standardized by tradition. I've consulted a panel of BITNET experts in coming to these recommendations, but where there is no clear consensus, I've made the final decision based on my own experience.

2.1 Assumptions

This book makes the following assumptions:

- You will connect or have connected one or more systems to BITNET. If you do not have or plan a BITNET connection, do not use this book.
- You will use as few names (mail addresses) for your system as possible, to simplify the use of network mail for your users and their correspondents.
- You will use Jnet and PMDF software.
- If you have a VAXcluster system, you will configure all the nodes of the VAXcluster for BITNET (and if applicable, Internet) mail by running PMDF on every node, even though not all of the nodes run BITNET (or TCP/IP) software.
- You will install at least the minimum versions of the software in Table 1. This book explains major dependencies on the installed versions of Jnet, PMDF, and VMS.
- You will establish a domain name for your systems, which will be used for addressing mail by all your users and any correspondents on BITNET and Internet.
- VMSmail will be the mail user agent for BITNET mail. This book will not attempt to describe the use of ALL-IN-1, MM, Pony Express, or other user agents.

The following variations are accommodated in this book:

- Your system may already be on BITNET, or you may be adding your BITNET connection at this time.
- Your system may be a single, standalone VAX system, a homogeneous VAXcluster system, or a heterogeneous VAXcluster system. (This book explains these terms.)
- If you have a VAXcluster system, you can either configure all your VAXcluster nodes as BITNET nodes, or only a subset of them (a *subcluster* configuration).
- Your system may already be on a DECnet network, or you can set up a DECnet connection at the same time as your BITNET connection, or you can have no DECnet connection and no plans to add one.
- Your system may already be on Internet, or you can set up an Internet connection at the same time as your BITNET connection, or you can reserve the option of connecting to the Internet at some future time.

Other combinations of software can be configured to meet CREN requirements, but such configurations are outside the scope of this book.

2.2 Steps to set up a BITNET node

With these assumptions in mind, the planning and implementation of your network connections are divided into four steps here:

1 Plan system and user names

Planning is required for the names of systems, users, and other network entities because the names are very hard to change once they become established. System and user names are the primary elements of your configuration that are visible to remote network users.

This step is described in Chapter 3.

2 Plan and install DECnet and/or TCP/IP software

If you intend to install DECnet or TCP/IP software, installation of your mailer will be considerably simplified if you install the DECnet-VAX and/or TCP/IP software first.

If DECnet and/or TCP/IP software was previously installed on your system, you'll need to review how it is configured in order to install your mailer.

The actual installation and configuration of DECnet-VAX and TCP/IP software is outside the scope of this book.

This step is described in Chapter 4.

3 Bring up BITNET

In this step you plan your BITNET connections and services, install and configure Jnet software, bring up your BITNET links with adjacent nodes, and register your nodes with BITNIC.

If Jnet software was previously installed on your system, you'll need to review how it is configured in order to install your mailer. You may also be able to use some of the suggestions in Chapter 5 to streamline your Jnet configuration and/or improve the level of network service your users enjoy.

If your BITNET node is new, you may have to wait for several weeks for your node to become known to other systems on BITNET. You may be able to continue with the configuration of your mailer if you have an account on another BITNET node, if your system is already on the Internet, or if the Postmaster of another BITNET site is willing to help you obtain certain files.

Install Jnet after TCP/IP and/or DECnet-VAX software, because Jnet is a network application that can be layered over TCP/IP or DECnet software.

This step is described in Chapter 5.

4 Install and register a mailer and register a domain name

In this step you will install and configure PMDF using the information about your network connections you collected in the previous steps. You will also register your system's domain name through BITNIC (if it is not already registered) and update the BITNET node registration database to show your system's mailer and domain name.

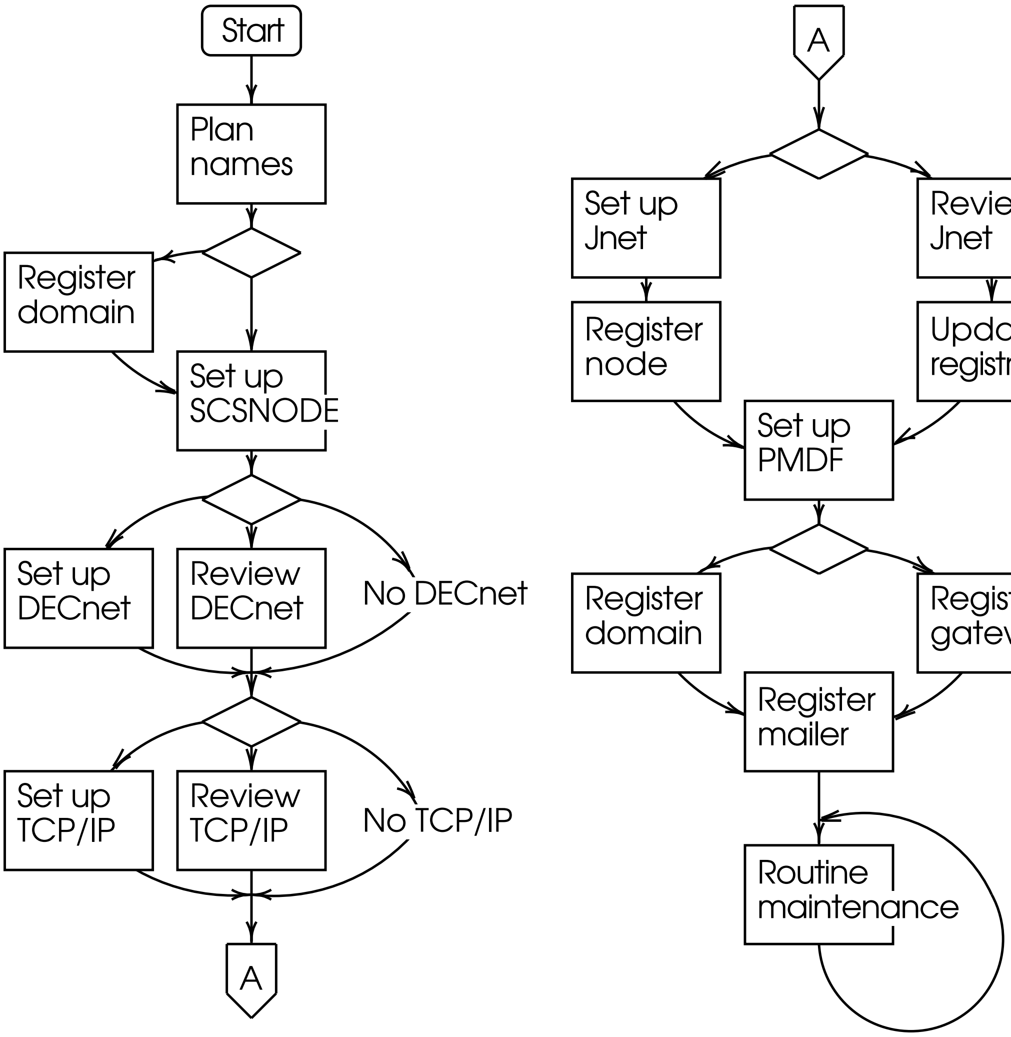
Install PMDF after NJE, TCP/IP, and/or DECnet-VAX software, because mail is a network application that is layered over over NJE, TCP/IP, or DECnet transports.

This step is described in Chapter 6.

Figure 2–1 shows the steps described in this book in graphical form.

Chapter 7 provides information on on-going management of your BITNET node.

Figure 2–1 Steps to set up an operational BITNET node.


Start
Plan names
Register domain
Set up SCSNODE
Set up DECnet
Review DECnet
No DECnet
Set up TCP/IP
Review TCP/IP
No TCP/IP
A
A
Set up Jnet
Review Jnet
Register node
Update registration
Set up PMDF
Register domain
Register gateway
Register mailer
Routine maintenance

3 Planning System and User Names

This chapter provides suggestions for naming, or reviewing the names of, your computer systems and users in the BITNET environment. If the computer systems are on other networks as well, their names on those other networks must also be considered.

This chapter does not deal with network topology. Network topology must be planned for each network in which your systems participate. For suggestions on BITNET topology, see Section 5.1.

3.1 Starting assumptions for name planning

This chapter assumes that your organization has joined BITNET by:

- Completing a CREN Application for Membership or Affiliate Status
- Receiving approval from membership or affiliation from the CREN Board of Trustees
- Paying its CREN dues invoice
- Appointing institutional representatives: Member or Affiliate Representative, Technical Representative (*TECHREP*), and Information Representative (*INFOREP*)

The remainder of this chapter is directed primarily to the TECHREP, whom I call ‘‘you’’ in this chapter. The TECHREP is responsible for coordinating the BITNET names and topology for the organization.

Before continuing, make sure you have received your TECHREP information packet from BITNIC. BITNIC mails this packet in hardcopy form upon receipt of the forms appointing you as TECHREP for your organization.

3.2 General considerations for network names

Once a name comes into use for a system, user, or other network entity, the name spreads rapidly through the interconnected networks of computers and people in the form of directory entries, return addresses, routes, and other network information. It is hard to change this information, in both computers and people, even using such devices as forwarding addresses and electronic ‘‘change of address’’ notices. Therefore, planning the use of network names saves time and effort because it reduces the future need to change names.

Name planning should be done for all systems under your administrative control at the same time, so as to have a coherent name system that will serve you for the foreseeable future.

Authority for names should be clearly vested in an organization-wide authority appointed by the organization's chief executive officer, such as the chair of a campus or corporate network group. Names of systems sometimes have organizational connotations, and the name authority for your organization should have the clout, sensitivity, and expertise to deal with both political and technical issues.

The names you approve should meet as many of these guidelines as possible:

- Name should serve only for identification, and not imply addressing or routing. The organization operating the system is often a useful source for a name. Within an organization, it is often useful to give systems easy-to-remember names from a series that is not otherwise meaningful to the organization, such as planet or wildflower names.
- Each system can have many types of names, each conforming to different rules. Try to make as many of these the same as possible to minimize the number of names with which network users and managers must cope.
- Names should be short for ease of typing and remembering.
- Names should be globally descriptive. Since you will be participating in interconnected networks that span five continents, avoid names like ''VAX1'' and ''PHYSICS'' that give no clue to the owner or location of a system.
- Avoid names that could be embarrassing to the organization or individuals. Names intended to be ''cute'' may seem silly or be offensive to those that speak other languages or have different cultural backgrounds.
- Names should not make reference to the system's manufacturer or operating system. Network names often outlive the hardware and software platforms for which they were first established, and become inappropriate when they are re-used for a new system.
- The name of the organization itself, ''Harvard'', for example, should only be given to centrally managed systems, such as the primary timesharing system for an academic computer center.
- Hierarchical name spaces, such as the domain names used for Internet hosts, should be wide and shallow, not deep. A naming system based on campus and host would easier to set up and require less changes over time than one based on campus, college, department, system-type, and host.

3.3 Names for BITNET hosts

BITNET hosts, or nodes, have at least two names: NJE and domain. (The domain name was formerly optional. This book assumes you will establish and register a domain name and exchange mail with the Internet community. If this assumption is not true, do not use this book.)

In addition, VAX systems running VMS may also have Jnet cluster names, SCSNODE names, DECnet Phase IV names, Distributed Name Service names, VAX P.S.I. addresses, VAXcluster DECnet aliases, UUCP names, and synonyms or aliases for some of these. Insofar as possible, names for a system should all be the same, and VAXcluster names should be related to the names of systems that make up the cluster in an obvious way.

3.4 Suggested procedure for planning system names

When planning your system and user names, seek help from your organization's network naming authority, or if your organization has little experience in this area, from BITNIC and other applicable network information centers.

3.4.1 Summary of name planning procedure

If you are experienced at planning network names in global networks, use the following checklist to make sure you have considered all the relevant issues in naming your systems. If you have not previously reviewed your system names using the criteria in this chapter, follow the step-by-step instructions beginning with Section 3.4.2, and use the following checklist after you have completed all the instructions in this chapter.

☐ Plan SCSNODE and DECnet-VAX names

☐ For VAXclusters, plan a VAXcluster alias name

☐ Plan domain names

☐ If necessary, register your domain

☐ Plan NJE names

☐ Plan reserved and general user names

3.4.2 Plan SCSNODE and DECnet-VAX names

Of all the names a VAX system can have, perhaps the most difficult to change is the name used by Systems Communications Services, a component of VMS. An SCSNODE name is *required*, even for stand-alone VAX systems, if the system uses:

- VAXcluster Software,
- DSNlink service software,
- License Management Facility V1.1 or later, or
- VMS V5.5 or later.

The DECnet-VAX name of your system must match the SCSNODE name, and other names are often based on the DECnet-VAX name.

Display the SCSNODE name with the System Generation Utility (SYSGEN):

```
$ sysgen :== $sysgen
$ sysgen show scsnode
Parameter Name            Current    Default     Min.     Max.     Unit  Dynamic
--------------            -------    -------    -------  -------   ----  -------
SCSNODE                 "BAYACB  "    "    "    "    "    "ZZZZ" Ascii
```

If no SCSNODE name is defined, or if one is defined that does not meet the criteria in Section 3.2, take this opportunity to plan a better name. Because DECnet names must match SCSNODE names, and because DECnet names are known throughout the DECnet network and must not conflict with other DECnet names, coordinate any changes in SCSNODE names with the network name authority of your organization and the name space coordinator for your DECnet network.

SCSNODE names must be six or less alphanumeric characters, one of which must be alphabetic.

If your system is part of a VAXcluster system, review the additional information in Section 3.4.3 before changing the SCSNODE name.

Make a note of the SCSNODE names you plan to use. You will use the same names for DECnet-VAX software. You will set or modify these names, if necessary, when you work through Chapter 4.

If your system runs DECnet-VAX Extensions and Digital's Distributed Name Service (DEC DNS), and you have elected to store the DECnet nodes database in DEC DNS, you can establish a DNS name for your system as well as a six-character DECnet node name. DEC DNS names are not currently used by mailer software, however. If you establish a DEC DNS name for your system or VAXcluster, consider the criteria in Section 3.2, and if possible, use a systematic mapping between six-character DECnet node names and DEC DNS node names.

If your system does not participate in a VAXcluster and you do no anticipate that it will in the future, skip ahead to Section 3.4.4. Otherwise, continue with Section 3.4.3.

3.4.3 Plan a VAXcluster alias name

If your system currently participates in a VAXcluster, or you plan that it will in the near future, you can give it an additional DECnet name, called a *VAXcluster alias*. This is to your advantage if two or more systems provide a similar computing environment to a group of users, an arrangement called a *homogeneous VAXcluster*. (Recent versions of the VMS documentation set use the terms *common-environment* and *multiple-environment* instead of homogeneous and heterogeneous.)

Every characteristic of the computing environment need not be identical to use a VAXcluster alias. For purposes of electronic mail, a VAXcluster is homogeneous if the systems share a common System User Authorization File (*SYSUAF*), VMSmail profile, and batch queues. In addition, you must set up mailer software for a homogeneous VAXcluster, as described in Chapter 6.

Likewise, all of the systems in a VAXcluster need not serve the same users for a VAXcluster alias to be useful. If not all the systems in a cluster are identical, you can use an alias for a proper subset of the VAXcluster, sometimes called a *subcluster*. Consider establishing a VAXcluster alias for each group of two or more nodes that shares a SYSUAF and VMSmail profile. However, the configuration of multiple homogeneous subclusters on a single VAXcluster is beyond the scope of this book. Use the VAXcluster instructions in this book to configure a VAXcluster alias for only one homogeneous cluster or subcluster.

If you intend to use a VAXcluster alias, consider deriving the names of the systems in the VAXcluster from the alias by adding a modifying letter or digit. For example, the U.S. Chapter DECUS Symposium timesharing VAXcluster nodes could be named DECUSA, DECUSB, and so on, and the VAXcluster aliases could be DECUS.

Make a note of the VAXcluster alias name you plan to use. You will set or modify the VAXcluster alias name, if necessary, when you work through Chapter 4.

3.4.4 Plan domain names

Domain names are used to identify computer systems (called *hosts*) on the Internet for many applications, including mail, file transfer, and remote login. Domain names have proven to be so useful that they are now widely used for mail among non-Internet systems. This book assumes that you will follow CREN recommendations to establish a domain name for your system and to use that domain name to identify your system when sending mail to Internet addresses and other domain-style addresses.

The primary reference for the use of domain names on BITNET is the file DOMAIN GUIDE[1], available from LISTSERV@BITNIC[2]. If you do not have a copy of DOMAIN GUIDE, obtain a copy at this time. If necessary, ask someone at BITNIC or at another BITNET node to print a paper copy and mail it to you.

Only one second-level domain may be registered for each organization. All systems in an organization must have the same top- and second-level domains (for example, Berkeley.Edu). The *Defense Data Network* (*DDN*) *Network Information Center* (*NIC*), which oversees the registration of domain names world-wide, recommends that second-level domain names be limited to twelve characters.

Having a single domain can be a significant issue for large organizations having many computers, since it forces the chief executive officer of the organization, who may care little for these matters, to delegate the naming of networked systems to a single authority. No matter how difficult it may be for your organization, however, this issue must be resolved internal to your organization before proceeding with the planning process!

Using the criteria in Section 3.2, choose:

- a top-level domain and a second-level subdomain for your entire organization,

- third-level subdomains for each VAXcluster alias and third-level host names each host without a VAXcluster alias, and
- fourth-level host names for each clustered system that has a VAXcluster alias.

The third-level subdomain for each VAXcluster or stand-alone system can be the same as the VAXcluster alias or DECnet node name for that system. A fourth-level subdomain can be the DECnet node name of a clustered system or a modifier to VAXcluster alias to construct the DECnet node name. For example, the DECUS Symposium VAXcluster mentioned as an example in Section 3.4.3 could use the domain-style name Sympos.DECUS.Org for the entire VAXcluster, and A.Sympos.DECUS.Org, B.Sympos.DECUS.Org, and so on as the domain-style names for individual nodes DECUSA, DECUSB, etc.

If a VAXcluster or stand-alone system is a the main computing facility for an organization, it could use only the second- and top-level names as its domain-style name. For example, the main computing facility for Indiana University of Pennsylvania is a VAXcluster. The cluster bears the institution's top- and second-level domains as its domain-style name: IUP.Edu.

Your organization's lower-level domain names must be coordinated by your own organization's network name authority. If you are not that authority, contact the authority to request that the names you have choosen be assigned to your system.

Make a note of the domain-style name you plan to use for this system, and if applicable, the domain-style name you plan to use for the VAXcluster alias. You will register the second-level domain when you work through either Section 3.4.5 or Section 6.6.3, depending on the circumstances, and you will set or modify the domain name for your system and, if applicable, its VAXcluster alias, when you work through Chapter 4.

3.4.5 Register a domain name with the DDN NIC

Your organization's second-level domain name (or more simply, your *domain*) must be registered with the DDN NIC. One of three situations applies to your case:

1. If your domain is already registered with the DDN NIC, no further action is necessary. Skip ahead to Section 3.4.6.
2. If you do not anticipate connecting your organization to the Internet, at least for the foreseeable future, the BITNIC will register your domain with the DDN NIC on your behalf. Detailed instructions are provided in DOMAIN GUIDE. Register your domain through BITNIC with the DDN NIC when directed to do so in Section 6.6.3. For now, skip ahead to Section 3.4.6.
3. If you are establishing an Internet connection, or intend to do so in the near future, you must register your domain directly with the DDN NIC at this time. References to instructions are provided in this section.

To register your domain, you will need access to an electronic mail account that can communicate with the Internet (either on an Internet host or on a BITNET node running mailer software that conforms to CREN technical requirements for the use of INTERBIT mail gateways). A guest account on the system to which you will be making your BITNET link, as suggested in the TECHREP information packet, is ideal. It is also possible to register a domain with only paper correspondence, but the process is slower and more awkward.

Send an empty electronic mail message to Service@NIC.DDN.Mil with the subject line ‘‘NETINFO DOMAIN-TEMPLATE.TXT’’. The DDN NIC document server will send the domain application template to you by electronic mail. For example:

```
MAIL> SEND NL:/NOEDIT
To:     IN%"SERVICE@NIC.DDN.MIL"
Subj:   NETINFO DOMAIN-TEMPLATE.TXT

MAIL>
```

You will also find a copy of DOMAIN-TEMPLATE.TXT in DOMAIN GUIDE.

Review the template file. For additional background material, review DOMAIN GUIDE and the RFCs that it references. If you still have questions, telephone the DDN NIC at the toll-free number listed in the template.

To operate a domain, you must also arrange for *name service*. A name server is an Internet host that converts FQDNs to Internet Protocol (IP) numeric addresses that can be used by TCP/IP software. You must arrange for both authoritative (primary) and backup (secondary) name servers for your own domain. Usually an organization operates a primary name server on one of its own hosts and recruits one or more organizations to run secondary name servers in geographically and logically remote parts of the Internet. Additional information on name service can be found in the RFCs referenced in DOMAIN GUIDE.

Collect all the information requested by the template, edit the on-line copy of the template, and send it by electronic mail to Hostmaster@NIC.DDN.Mil. You should receive return mail acknowledging the registration of your domain (or rarely, notifying you of a conflict with a pre-existing registration) within about ten business days.

After you have received acknowledgment of your registration, you can use the Internet WHOIS application to check that the registration is in the DDN NIC’s on-line database. For example, if you are the Postmaster for the domain ASU.Edu, to check your domain registration data from an Internet host running VMS and TGV MultiNet, enter:

```
$ whois asu.edu
Arizona State University (ASU-DOM)
   Tempe, AZ

   Domain Name: ASU.EDU

   Administrative Contact:
      Cantrall, Arthur  (AC85)  icsadc%asuic.bitnet@CUNYVM.CUNY.EDU
 . . .
```

3.4.6 Plan NJE names

While the NJE name of a system need not have any relation to its other names, it will be easier for users and their correspondents to remember mail addresses if the DECnet-VAX and NJE names and the host portion of the domain name of a system are all the same. Likewise, if a system is part of a VAXcluster, the DECnet alias name and the Jnet cluster name should be the same.

NJE user and system names must be eight or less alphanumeric or IBM *national characters*, and the first character must be alphabetic. However, avoid the use of the IBM national characters (*$*, *@*, and *#*), as they are not permitted in other kinds of network names, and cause problems with some user interfaces.

For other suggestions on planning NJE names, refer to Section 6.1, NJE Node Naming, in the *Jnet Manager's Guide*.

Make a note of the NJE name you plan to use for this system, and if applicable, the NJE name you plan to use for the Jnet cluster, on the worksheet in Chapter 6 of the *Jnet Manager's Guide*. You will set or modify the NJE name for your system and, if applicable, its Jnet cluster name alias, when you work through Section 5.4, and you will register the NJE names with BITNET when you work through Section 5.7.

3.4.7 Plan reserved and general user names

There are user names that are conventionally used for specific purposes on BITNET nodes and Internet hosts. If you are setting up a new system, or if these names are not yet in use for any purpose, you should take steps to prevent them from being assigned to general users or otherwise used in ways that conflict with their conventional purposes. If these user names have been assigned for conflicting use, you should make every effort to reclaim them for their conventional purposes. Using these names for their conventional purposes only will make it easier for other network users and managers to deal with your system in the global network environment.

3.4.7.1 POSTMASTER and POSTMAST

The Internet has long required that the reserved mailbox ''Postmaster'' be supported on every host, and that mail to Postmaster be forwarded to the person with management responsibility for the mail application on that host or for the entire system (RFC 822, Sections 6.3 and 3.4.7; RFC 1123, Section 5.2.7). In 1991, CREN adopted a standard that all BITNET nodes must similarly support a Postmaster address, and its eight-character truncation, ''Postmast'', in any combination of upper and lower case letters. For the full text of this standard, see the file POSTMAST STANDARD, available from LISTSERV@BITNIC.

In order to serve its intended purpose, the Postmaster user on VAX/VMS BITNET nodes, called POSTMASTER (in upper case) in this book, must:

- Be able to receive VMSmail.

The login directory for POSTMASTER must exist on a mounted and accessible device. If disk quotas are enabled, POSTMASTER must have ample disk quota. The SYSUAF flag DISMAIL must not be set for the POSTMASTER entry.

- Not forward its mail to another system.

  Mail for POSTMASTER may be forwarded to another user on the local system so that mail to POSTMASTER receives prompt attention, but forwarding to a remote system could subject Postmaster mail to delivery failures due to failure of the underlying network.

  If POSTMASTER's mail is forwarded to another local user, it should be forwarded consistently at both the VMSmail and PMDF levels. The user to which POSTMASTER's mail is forwarded must be able to receive VMSmail. (See the preceding item.)

- Never send automatic replies to received mail.

  Many automatic programs on the global networks, including mailers and other servers, send error reports to the Postmaster mailbox. To prevent mail loops, they depend on the Postmaster to not send automatic replies. POSTMASTER, or, if POSTMASTER's mail is forwarded to another local user, the user receiving POSTMASTER's mail, must not be an automatic server or employ any automatic response or filtering programs, including ''vacation'' programs and DELIVER scripts that return or delete mail.

During the installation of Jnet, you will be asked if a POSTMASTER user should be created. The PMDF autoconfiguration procedure asks the mail address of the Postmaster. Recommendations for these options are given in Section 5.3 and Section 6.3. For now, plan to reserve the POSTMASTER user for this special purpose, and determine, if applicable, where POSTMASTER's mail is to be forwarded.

3.4.7.2 MAILER and SMTPUSER

When a mailer is configured on your system, BITNET mail files sent to the mailer address are handled by PMDF. (See Section 1.2 for an explanation of the mailer concept.) MAILER is the recommended user name for mailers, because the name clearly indicates the purpose of the address and because of long historical precedent.

You will forward mail for MAILER to PMDF's BSMTP interpreter at the PMDF level when you install and configure PMDF. There is no need to create a user name of MAILER in the SYSUAF, but you should verify that no MAILER entry exists now, and modify your account creation procedures to prevent the name MAILER from ever being used for any other purpose.

To quickly discover any mail incorrectly sent to MAILER, forward MAILER's VMSmail to POSTMASTER. If for some reason PMDF should become disabled (for example, by upgrading Jnet and forgetting to reinstall PMDF's replacement for the Jnet command procedure LMD.COM), BSMTP mail from other mailers will be sent to your POSTMASTER account where the problem will immediately become apparent. From an account with the VMS *SYSNAM* privilege, enter:

```
MAIL> FORWARD /USER=MAILER POSTMASTER
```

Some sites use SMTPUSER for the mailer address. Take the simple precaution to reserve the SMTPUSER name at your site and forward any mail to it to the Postmaster also.

```
MAIL> FORWARD /USER=SMTPUSER POSTMASTER
```

3.4.7.3 LISTSERV and NETSERV

LISTSERV and NETSERV are BITNET server programs widely installed on IBM VM systems on BITNET. Versions are not currently available for VAX/VMS systems.

NETSERV provides file server functions for various data and program files including BITEARN NODES. NETSERV generates and distributes the new routing tables each month for those nodes that have requested that service from BITNIC. It also provides directory services for general users.

You should not assign the user names LISTSERV and NETSERV to ordinary users, and you should not run server software under these user names unless the software is compatible with the IBM VM versions and interoperates with the VM versions as true peers. (Such software is not likely to be available for years, if ever.) Choose other names for servers that are not completely compatible peers of IBM VM LISTSERV and NETSERV.

Verify that no LISTSERV or NETSERV entry exists in your SYSUAF now, and modify your account creation procedures to prevent the names LISTSERV and NETSERV from being used for any purpose in the future.

3.4.7.4 JOB

JOB is the conventional user name for the batch input stream on IBM mainframes running MVS and VAX/VMS systems running Jnet. When installing Jnet, you can elect to set up a batch server, and JOB is the recommended and default name.

Verify that no JOB entry exists in your SYSUAF now, and modify your account creation procedures to prevent the name JOB from being used for any purpose, other than the Jnet batch server, in the future.

3.4.7.5 SYSTEM, ROOT, and MAINT

SYSTEM is the system manager user name on VAX/VMS systems, which Digital recommends reserving for software installations and system backup operations. IBM and Joiner recommend that SYSTEM be used in a similar way on IBM Application System/400 systems, as the User ID for the system operator, QSYSOPR.

On IBM mainframes running VM or MVS, however, SYSTEM is reserved for addressing the system default printer and punch devices; mail sent to these addresses may be discarded. Nodal message records (NMRs, or simply ‘‘messages’’) to SYSTEM are treated as commands to the NJE software on the system (RSCS or JES). In the same way, Jnet treats to messages to SYSTEM as network commands to Jnet, and not as messages to the system operator.

Because of these inconsistencies, take these precautions:

- Do not send messages, files, or mail to SYSTEM on any BITNET node unless you know the operating system running on the node and the effect of your action.
- Do not send messages, files, or mail from the SYSTEM account on your system to other BITNET nodes.

Remote BITNET users may attempt to reach a knowledgeable user of your system to report a problem or ask a question by writing to the conventional system manager account for various operating systems: SYSTEM (for VAX/VMS), ROOT (for UNIX), or MAINT (for VM). Forward mail for these user names to the Postmaster for prompt and knowledgeable handling. From an account with the VMS *SYSNAM* privilege, enter:

```
MAIL> FORWARD /USER=SYSTEM POSTMASTER
MAIL> FORWARD /USER=ROOT POSTMASTER
MAIL> FORWARD /USER=MAINT POSTMASTER
```

Verify that no ROOT or MAINT entry exists in your SYSUAF now, and modify your account creation procedures to prevent the names ROOT and MAINT from being used for any purpose in the future.

3.4.7.6 PMDF and PMDF_USER

During the installation of PMDF, you are asked if a PMDF or PMDF_USER entry should be created in the SYSUAF. PMDF is a nonprivileged user that will own many PMDF files and under which certain PMDF jobs run. PMDF_USER is a privileged user required for the operation of the PMDF-FAX option. Do not confuse these users with the mailer user name, MAILER. You should not have these entries in the SYSUAF unless you have installed the related products. Electronic mail should never be sent to these accounts.

Verify that no PMDF or PMDF_USER entry exists in your SYSUAF unless created by the PMDF or PMDF-FAX product installation procedures, and modify your account creation procedures to prevent the names beginning with ‘‘PMDF’’ from being used for non-PMDF purposes in the future.

3.4.7.7 General user names

BITNET places limitations on user names. Although VAX/VMS supports user names of up to twelve characters, and while PMDF and other mailers can handle longer user names, only eight characters are supported for BITNET messages and file transfers.

To minimize confusion among users of your system and their network correspondents, and to meet the requirements of the most restrictive user agent software used on BITNET, follow these recommendations in assigning user names to general users of your system:

- Limit user names to eight characters.

  If you are working with an existing system that already has users with longer user names, make sure no user name has the same first eight characters as any other user name. Reassign user names, if necessary, to meet this constraint.

- Construct user names of only letters and decimal digits, with the first character a letter. For example, do not include IBM national characters ($, @, and #), spaces, underscores, or hyphens.
- Do not create a user name with same first eight characters as the name of an BITNET link (adjacent system) or NJE server running in your system.

  In the case of a conflict, the user must usually yield to a link, since the link takes its name from the adjacent system, and ordinarily you will have no control over the name assigned to other systems in the network.
- If you run ALL-IN-1 Integrated Office System, assign each ALL-IN-1 user his or her own VMS account, and assign each user an ALL-IN-1 user name identical to his or her VMS user name.

  Blanks, used frequently in ALL-IN-1 user names, cannot be used in BITNET addresses with certain important BITNET software, including Jnet and LISTSERV.

3.5 Campus network example

Bay College has a central timesharing VAXcluster of two timesharing systems and ten workstations for academic computing, an IBM mainframe for administrative computing, two UNIX servers and a dozen UNIX workstations for computer science. The IBM system and the VAXcluster timesharing systems are on BITNET, the VAX systems are on a local DECnet network, and all systems are on Internet.

The College President has designated the Vice President for Information and Communications Systems as the authority for campus network names, who has delegated the development of a naming scheme and day-to-day assignment of names to the chair of the network council, a committee hosted by the academic computer center to coordinate campus networks. The council chair developed, and the council approved, the scheme for system names in Table 3–1.

Table 3–1 Campus-wide network name space example: Bay College

System	BITNET	DECnet	Internet
IBM mainframe	BAYADM		Adm.Bay.Edu
VAXcluster	BAYACA	BAYACA	Aca.Bay.Edu
VAX servers	BAYACB	BAYACB	B.Aca.Bay.Edu
	BAYACC	BAYACC	C.Aca.Bay.Edu
VAXstations		ELVIS	Elvis.Aca.Bay.Edu
		BOPPER	Bopper.Aca.Bay.Edu
		EVERLY	Everly.Aca.Bay.Edu
		...	...
UNIX servers			Popcorn.CS.Bay.Edu
			Pretzel.CS.Bay.Edu
UNIX workstations			Cracker.CS.Bay.Edu
			Cookie.CS.Bay.Edu
			...

Bay College allows system administrators to choose their own scheme for assigning user names, except:

- names must consist of only uppercase letters and digits, and the first character must be a letter,
- no names on the same system may have the same first eight characters, and
- ordinary user names may not be MAILER, JOB, ROOT, SYSTEM, or MAINT, or begin with POSTMAST.

The POSTMASTER user name and its eight-character abbreviation POSTMAST is used on every system by an electronic mail coordinator, who, on the larger systems, checks mail many times a day. MAILER is reserved for the BITNET mail application, and ROOT, SYSTEM, and MAINT are (or are forwarded to) the mailbox of the system programmer for each system. JOB is the NJE name of the batch subsystem on the VMS systems and the IBM mainframe.

4 Installing and Configuring Networking Software

This chapter provides an overview of the installation of DECnet-VAX and TCP/IP software. You should install DECnet and TCP/IP software before installing Jnet and PMDF. Both Jnet and PMDF can use DECnet and TCP/IP network services, and the configuration of Jnet and PMDF is easier if the underlying networking software is already in place.

4.1 VMSINSTAL and autoanswer files

VAX/VMS software from Digital, Joiner, and Innosoft, and VAX/VMS TCP/IP software from many vendors, is installed with the Digital-supplied installation procedure *VMSINSTAL*, in the directory SYS$UPDATE. When installing software, consider adopting the convention of documenting your installation by using the *autoanswer* option of VMSINSTAL and leaving the generated autoanswer file in the directory SYS$UPDATE.

The autoanswer file contains all the questions asked during the installation and your answers, and the creation date of the file shows when the installation took place. Autoanswer files are also useful in reinstalling a specific version of a software product, should that ever become necessary. While a product's installation dialogue can be changed from one version to the next, having the dialogue from the installation of the previous version of the software can be helpful when upgrading. The installations shown in this book assume you are following this convention.

4.2 Changing SCSNODE names

If necessary, change the SCSNODE name to the new value you planned in Section 3.4.2. To change the SCSNODE name and the corresponding numeric SCSSYSTEMID, edit the file SYS$SYSTEM:MODPARAMS.DAT, then run SYS$UPDATE:AUTOGEN.COM, as explained in Section 6.1 of the *Guide to Setting Up a VMS System*. It will be necessary to reboot your system to make the change effective.

On a system in active use, changing the SCSNODE name is likely to cause problems in the operation of many software products. Try to make the change before the beginning of a business day, advertise widely that there will be a system change, and plan to spend the day reconfiguring software in response to problem reports. Here is a partial list of uses of SCSNODE:

- SCSNODE and SCSSYSTEMID must be set in the file SYS$SYSROOT:[SYSEXE]MODPARAMS.DAT. There is a separate MODPARAMS file for each system in a VAXcluster.
- SCSNODE is used by the License Management Facility to control which systems may load software licenses. Check the /INCLUDE and /EXCLUDE qualifiers in the license database for the changed SCSNODE. A license for VAX-VMS should always be affected.

- The SYSMAN STARTUP database uses SCSNODE to enable or disable the running of startup command procedures.
- Jnet uses SCSNODE as part of the name of the root directory tree (or trees, if you use a split Jnet device). If Jnet is already installed, change these names manually, or reinstall Jnet with VMSINSTAL, to use the new SCSNODE name.
- The DECnet-VAX *executor name* (node name) of your system must match the SCSNODE name. If DECnet-VAX is already configured, change the DECnet-VAX executor name manually, or reconfigure DECnet-VAX with SYS$MANAGER:NETCONFIG.COM, to reset the executor name to match the SCSNODE name.
- If you are running VAXcluster Software, the SCSNODE name is used to qualify the device names in your system configuration. For example, if the SCSNODE name is BIOLAB, disk devices will have the names of the form BIOLAB$Ddcu. Many software products create startup and other command procedures at installation time that contain these device names. Use the SEARCH command to search for the old SCSNODE name in command procedures in the directories in the search list SYS$STARTUP, and edit the procedures to change the device names.
- DECnet node names, which should match SCSNODE names, are used in the startup procedures for DECwindows (see SYS$MANAGER:DECW$PRIVATE_APPS_SETUP.COM) and DSNlink (see SYS$STARTUP:DSN$STARTUP.COM). Edit these files to change the names.
- Batch queue names are often qualified by node names, and are often initialized to run or autostart on specific nodes with the /ON or /AUTOSTART_ON qualifiers. Examine all queues, create any necessary new queues, make any changes required to existing queues, and delete queues with obsolete names.

When you have rebooted your system and run for a weekday without any reports of problems caused by changing the SCSNODE name, you can turn your attention to the configuration of DECnet-VAX software.

4.3 Configuring DECnet-VAX

DECnet-VAX is a VMS *system integrated product*, that is, it is shipped and installed with the VMS operating system. No installation is required. You must, however, have a DECnet-VAX license to use the product.

To enable the use of DECnet-VAX software, register the license by entering the information on the Product Authorization Key (PAK) into the license database, as explained in the *VMS License management Utility Manual*.

For the most straight-forward DECnet-VAX configurations, you can configure your system automatically, as described in Section 3.3.2.2 of the *Guide to DECnet-VAX Networking*. If you will have a VAXcluster alias name for this system, manually define it using the commands in Step 9 of that section. Use the node name and VAXcluster alias name you selected in Section 3.4.2 and Section 3.4.3 of this book.

If you will install and configure DECnet-VAX software on this system, do it before installing and configuring Jnet, described in Chapter 5. The installation and configuration of DECnet-VAX software is outside the scope of this book.

4.4 Configuring DECnet-VAX Extensions

DECnet-VAX Extensions is optional software that can be installed with DECnet-VAX V5.4 or later to provide certain *Open Systems Interconnect (OSI)* functions in the context of a DECnet network. As of this writing, the only reason to install DECnet-VAX Extensions to support BITNET or Internet networking is to support BITNET links over OSI sessions with Digital's OSI Application Kernel (OSAK) product. The configuration of BITNET or TCP/IP applications over OSI networks is outside the scope of this book.

If you require DECnet-VAX Extensions for your configuration, you can install it now or at any time in the future to support emerging OSI applications.

4.5 Configuring VMSmail

If this system is a member of a homogeneous VAXcluster, you should set three flags to control the delivery of VMSmail. Include the command

```
$ DEFINE/SYSTEM/EXEC MAIL$SYSTEM_FLAGS 7
```

in the command procedure SYS$MANAGER:SYLOGICALS.COM. Defining this logical name bypasses DECnet for mail delivery within the VAXcluster, announces the arrival of mail on all VAXcluster nodes, and includes a time stamp in new mail announcements.

If this system is not part of a homogeneous VAXcluster because it does not share a SYSUAF or VMSmail profile with any other system, or because the systems in the VAXcluster are not all running PMDF, you must set MAIL$SYSTEM_FLAGS to an even number (4 or 6 is recommended) or leave the logical name undefined.

For further information on the settings of these flags, see Section 9 in the *VMS Mail Utility Manual*.

4.6 TCP/IP installation and configuration

You may require TCP/IP software on your system to participate in the Internet or a TCP/IP network internal to your organization. For BITNET, your TCP/IP software may have two purposes:

- You may want to make you BITNET link over an Internet connection, using the *BITNET II* or *TCP NJE* protocol to save on the cost of a dedicated leased line for BITNET purposes. This configuration requires that you use TCP/IP software supported by Jnet TCP/NJE.

- You may want to send electronic mail to Internet addressees directly over an Internet connection, using the Internet standard *Simple Mail Transfer Protocol (SMTP)* protocol. This configuration requires that you use TCP/IP software supported by PMDF.

By using software that is compatible with both Jnet TCP NJE and PMDF, you can use your TCP/IP software for both of these purposes simultaneously, a common and flexible arrangement.

Jnet TCP NJE V1.1, the version current when this book was published, supports these TCP/IP software products:

- Carnegie Mellon University CMU-TEK IP/TCP
- Digital VMS/ULTRIX Connection (also known as UCX, and renamed TCP/IP Services for VMS beginning with V2.0)
- Network Research FUSION for VAX/VMS
- TGV MultiNet
- The Wollongong Group WIN/TCP for VMS

Consult Joiner for the most current information on TCP/IP products compatible with Jnet TCP NJE, including applicable versions, support recommendations and limitations, and vendor contact addresses.

PMDF V4.0, the version current when this book was published, supports these TCP/IP software products:

- Carnegie Mellon University CMU-TEK IP/TCP
- Digital VMS/ULTRIX Connection
- Network Research FUSION For VAX/VMS
- Novell Excelan TCP/IP
- Process Software TCPware
- Tektronix TCP/IP
- TGV MultiNet
- The Wollongong Group WIN/TCP for VMS

Consult Innosoft for the most current information on TCP/IP products compatible with PMDF, including applicable versions, support recommendations and limitations, and vendor contact addresses.

Since most TCP/IP networks are eventually connected to the Internet, you should install your TCP/IP software in a way that allows you to take advantage of an Internet connection in the future, even if you don’t plan to connect to the Internet immediately. To prepare for eventual connection to the Internet, you should:

- Apply for a network number and register a domain name with the DDN NIC.
- Install TCP/IP software that conforms to all the applicable Internet standards, as documented in RFCs.

- Use your assigned network number and registered domain name in the configuration of your hosts.
- Use fully-qualified domain names (for example, Stat.Wisc.Edu) instead of short-form names (for example, Stat), and train your users to do the same.

If your organization has more than one department that maintains its own computers (for example, a computer science department, an engineering school, administrative data processing, and an academic computer center) but no strong tradition of central network management, check with each such department to determine whether that department has already registered a domain name for your organization or been assigned a network number by the DDN NIC. See Section 3.4.4 for additional information on this step.

Whether you have already installed TCP/IP software but must change the domain-style name you are using, or are installing TCP/IP software for the first time, set the host name of your system to the new value you planned in Section 3.4.4 and registered with the DDN NIC in Section 3.4.5. Follow the instructions for your TCP/IP software to set the host name of your system. If another name has been widely used on the Internet for your system, you may want to configure your software to advertise that name as a synonym, or *host alias*, but be certain that your software is using your registered, fully-qualified domain name as its official host name.

Because the Internet rules require you to have a Postmaster mailbox, your TCP/IP software may require you to specify what VMS user is to receive mail addressed to the SMTP Postmaster mailbox. To facilitate the delegation of Postmaster duties, specify that such mail is to be sent as VMSmail to VMS user name POSTMASTER.

If your system is a member of a homogeneous VAXcluster and your TCP/IP software permits it, configure the domain-style name of the VAXcluster as the official host name of your system, and configure a specific domain-style name as a host alias name for your system.

If your system will be on both BITNET and the Internet, consider operating an INTERBIT mail gateway. Information on running an INTERBIT mail gateway is provided in Section B.3.

If you will install and configure TCP/IP software on this system, do it before installing and configuring Jnet, described in Chapter 5. The installation and configuration of TCP/IP software is outside the scope of this book.

5 Installing and Configuring NJE Software

This chapter provides suggestions for the BITNET transport layer of your network, which uses *Network Job Entry (NJE)* protocols. This book provides supplementary information on running Jnet in the BITNET environment, and is not intended to replace Jnet documentation. If you are unfamiliar with Jnet, read Chapter 1, Introduction to Network Job Entry (NJE), in the *Jnet Manager's Guide*. For additional background, see the references in the Preface of that book.

5.1 Plan BITNET topology

In this section you will plan the topology of computer system participating in BITNET, called *nodes*, and the logical connections among them, called *links*.

5.1.1 Selecting systems to participate in BITNET

The first decision in planning the BITNET topology for your organization is to determine which systems will be BITNET nodes. Systems that run NJE software and are listed in the BITNET routing tables are BITNET nodes.

There is no separate charge to CREN members for adding nodes to BITNET, and BITNET communications within an organization are often over existing DECnet or TCP/IP networks, so the main cost of adding additional systems to BITNET may be Jnet software licenses. In determining whether to put a specific system on BITNET, an organization must balance the costs with the expected benefits.

The benefits of BITNET, or any other network, are network services received by users. Electronic mail is perhaps the most valuable service BITNET offers, but when mailers are used, mail can be carried over DECnet, TCP/IP, and NJE networks transparently to users, so adding direct BITNET connectivity does not normally increase electronic mail services to a system running PMDF and already on a DECnet network or the Internet. The added value of BITNET comes from non-mail services.

In addition to electronic mail, BITNET services include:

- Sender-initiated, password-free file transfer
- Interactive commands and messages
- Remote printing
- Remote batch job execution

- Applications built on the generic services above, such as group communication and automatic file distribution with LISTSERV

Additional information about these services is available from CREN and Joiner, and some of these services are used in this book for the on-going management of Jnet and PMDF.

Avoid putting single-user systems on BITNET. Users of workstations and personal computers can get direct access to BITNET services by using terminal emulation to log into a timesharing system or server with the DECnet SET HOST command, LAT Connect command, or TCP/IP TELNET application. By not putting single-user systems on BITNET, you will conserve BITNET's limited address space, save resources on every BITNET node by reducing the size of the BITNET routing tables, and free resources on the single-user system that would be consumed by running NJE software.

There are several common exceptions to this guideline:

- VAXstations used as network management consoles can benefit from running NJE software so as to more closely monitor BITNET traffic and link status.
- VAXstations used as BITNET wide-area routers must run NJE software. This arrangement is used in the Texas Higher Education Network, THEnet.
- VAXstations that are members of homogeneous VAXclusters can be configured to run Jnet with little management overhead, at little or no license cost (because of Joiner's ClusterWide license pricing), and without increasing the size of the BITNET routing tables. (Running Jnet on VAXcluster members without registering the NJE names of those systems in the BITNET tables is beyond the scope of this book, however.)

In general, put only timesharing systems and servers on BITNET, and train users in BITNET applications to get a rapid return on investment in Jnet licenses.

Another approach may appear, at first, to be more cost-effective: grant users needing BITNET services accounts on a single timesharing system on BITNET, and require that they log into *guest accounts* on the BITNET node from their home system to access BITNET services. When the number of BITNET users grows to a critical mass on another timesharing system, those users can can be asked to raise the money for additional Jnet licenses. The disadvantage of this approach is that users may never see the benefits of non-mail BITNET services, and so the potential of BITNET in the organization may never be realized. This is the reason that public and university libraries are not funded by user fees.

Even if significant BITNET use builds, users of guest accounts on the initial BITNET node must notify all their correspondents, including server applications such as LISTSERV, that they have moved to a new address. As explained in Section 3.2, this is a long, manual process.

If, for any reason, not all members of an otherwise homogeneous VAXcluster participate in BITNET, users must take care when they log in to use a BITNET node if they intend to access non-mail BITNET services. This configuration is not recommended, because the usual motivation for setting up a homogeneous VAXcluster is to provide high availability while relieving users from concern about which member they are using.

This book assumes that you will run Jnet on all the nodes of a homogeneous VAXcluster. If this is not the case, install Jnet as for a standalone VAX system, install PMDF as for a VAXcluster, and train your users to only attempt to use non-mail BITNET services from the system(s) on BITNET.

5.1.2 Principal Nodes

To connect your VAX or VAXcluster system to the BITNET, you have arranged to make a BITNET connection with another organization and have agreed on a transport protocol with technical representatives of that organization.

If the system which you are connecting or have connected to BITNET has a connection to another BITNET member or affiliate, or is on the BITNET route between two of your organization's systems with such connections, the system is a *Principal Node* and must meet the requirements for Principal Nodes in the CREN Terms and Conditions of Membership and Affiliation. The first system on BITNET at a member or affiliate is always a Principal Node. See the file CREN TERMS[1], available from LISTSERV@BITNIC[2], for more information.

Designate either a large, production system or a dedicated routing system as Principal Node for your organization. Your Principal Node must meet the requirements for availability, and your links to other CREN members and affiliates must meet the requirements for BITNET bandwidth, that are listed in CREN TERMS.

Ideally, your Principal Node should be available for forwarding BITNET traffic all the time, and have around-the-clock supervision by operators who can diagnose and repair any problems with BITNET connections. If you can't meet this recommendation, and if the TECHREP or other CREN representative of the adjacent CREN member or affiliate is trusted and experienced, consider giving that individual a privileged guest account, enabled for dial-in access, on your Principal Node. That individual can be an additional resource in resolving any BITNET forwarding problems that appear when your organization is not open for business.

5.1.3 Planning external connections

If you have not yet determined where you will connect your organization to BITNET, the considerations in this section may help.

Arrange to connect your Principal Node as close to the center of BITNET as possible. With the regionalization of BITNET over a TCP/IP backbone, the regional BITNET II *core* of hub sites are the ‘‘center’’ of BITNET. Each of these hub sites, two per region, are connected to every other hub by BITNET links over high-speed (1.5 Mbits/second or faster) lines operated by NSFnet and regional affiliated mid-level TCP/IP networks. A summary of the BITNET II project may be found in the file BITNET-2 INFO, available from LISTSERV@BITNIC. That file references additional on-line files that provide further information on protocols, core topology, and other topics. Personalized advice on where to connect to BITNET can be obtained by telephone BITNIC and asking to speak to a member of the technical staff.

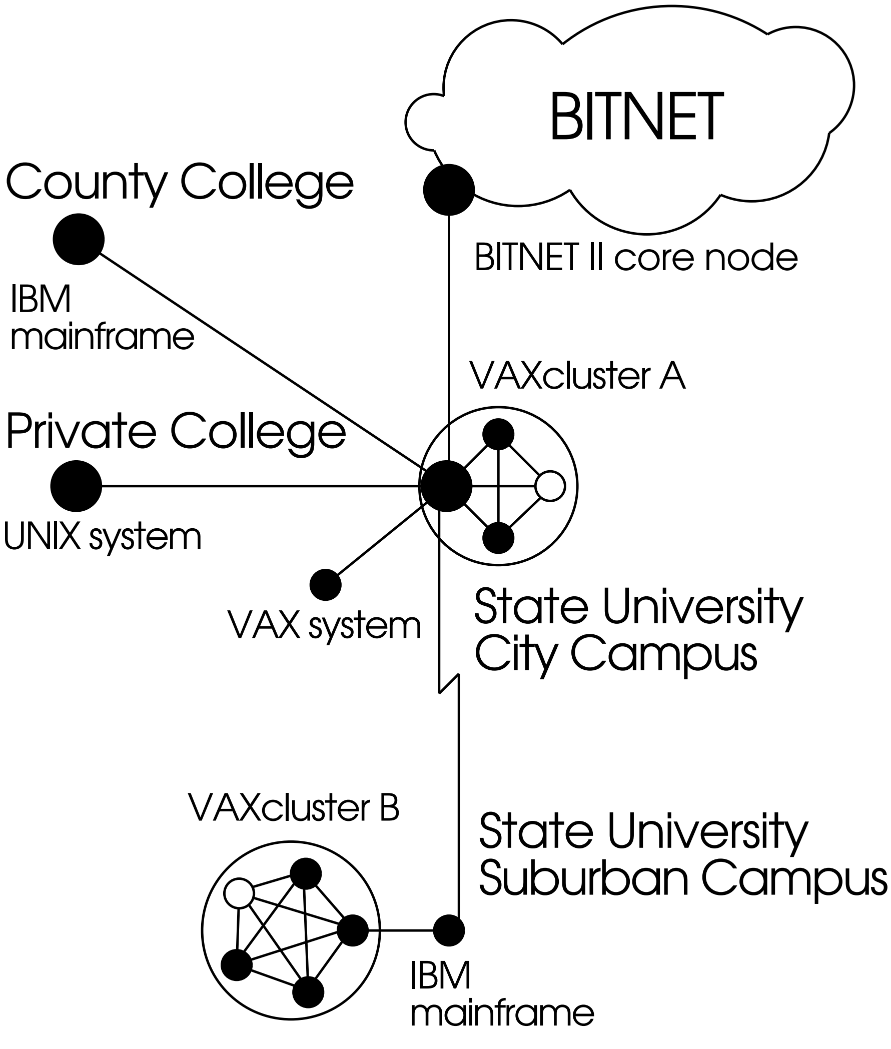
Minimizing the number of forwarding nodes between your Principal Node and the nearest BITNET II core site has two advantages. First, transit time for NJE traffic is proportional to the number of links in the path to the destination, and minimizing the number of links to the core minimizes the average number of links traffic from your node must traverse, and so improves the speed of delivery of files to and from your node. Second, each link is a potential point of failure, and minimizing the number of links between your systems and the core means improved BITNET reliability for your users and their correspondents.

If possible, put all links to other BITNET members and affiliates on the Principal Node. Otherwise, any other node you use for external connections, and any nodes in your organization that carry traffic between them, must also meet all the requirements for Principal Nodes.

Figure 5–1 illustrates these planning considerations for external links. State University has three external links, to a BITNET II core node and two local colleges. All three external links are to the State University’s Principal Node, so the resources of other campus systems are not consumed in routing traffic between the colleges and the rest of BITNET. It would benefit the colleges to connect directly to the BITNET II core node themselves, but in this hypothetical example, they cannot make direct connections to the BITNET II core because of the cost of wide-area links.

When planning NJE links over underlying networks, including TCP/IP, DECnet, SNA, and OSI networks, consider the structure of the underlying network when deciding on NJE topology. In general, make connections to other nodes that are *logically* close, where logical distance is measured by the number of routers and the speed and cost of bandwidth between routers. For example, when looking for a ‘‘nearby’’ BITNET II core node on the Internet, follow the topology of your fastest Internet links until you reach the BITNET II core.

Figure 5–1 BITNET topology example. Large filled circles represent Principal Nodes. Open circles represent pseudonodes bearing Jnet cluster names.


BITNET
County College
IBM
mainframe
BITNET II core node
VAXcluster A
Private College
UNIX system
VAX system
State University
City Campus
VAXcluster B
State University
Suburban Campus
IBM
mainframe

5.1.4 Planning intraorganization links

The principle of minimizing the number of forwarding links, or *hops*, between nodes also applies when planning NJE topology within your organization. In general, it is best to use a star topology, with your Principal node as the hub. There are two main exceptions to this rule of thumb: you should establish a second hub on the other side of a slow or unreliable link, and each Jnet cluster system should be configured as a single node externally and a full mesh internally. See Section 5.1.5 for suggestions on the NJE topology within VAXclusters.

Figure 5–1 also illustrates the planning considerations for internal links. State University has two VAXclusters, a stand-alone VAX system, and an IBM mainframe. For optimal performance, each should be connected to the Principle Node directly, but that would be too costly because the mainframe and one VAXcluster are at a second campus, connected to the main campus by a slow link. The IBM mainframe serves as a secondary hub for the suburban campus, and any future BITNET systems on that campus should be connected to that mainframe.

As with external connections, consider the structure of any underlying network when planning NJE topology within your organization. At State University, if the two VAXclusters were connected by a DECnet network, VAXcluster B would have probably been a better choice as the hub node for the Suburban Campus. But since there is no DECnet connection between the campuses, the IBM mainframe was choosen as the hub because it has greater synchronous port capacity.

5.1.5 VAXcluster connections

In a VAXcluster system, you should license and run Jnet software on all timesharing nodes, establish links over DECnet between every pair of nodes (a *full mesh* topology), and register all NJE nodes and a Jnet cluster name in BITEARN nodes. You will register the Jnet cluster name in BITEARN NODES as a node that is connected to every other node in the Jnet cluster. The *pseudonode* bearing the Jnet cluster name is shown as an open circle in Figure 5–1.

If there are more than four NJE nodes in a Jnet cluster, consider registering only nodes with external connections and the Jnet cluster name in BITEARN NODES, and defining a subset of a full mesh of links within the Jnet cluster. A star topology of internal links centered on a node with all external connections is another common configuration. These advanced configurations are outside the scope of this book, however.

5.1.6 Link protocols

Jnet supports links to other systems using many link protocols, and the protocols used on different links are independent. Select a protocol for each link based on compatibility with NJE software on the node at the other end of the link (the *peer node*) and requirements for underlying networks, specialized hardware, communications lines, and Jnet licenses.

Running NJE over DECnet or TCP/IP networks and local area network (*LAN*) hardware provide the highest available performance, and should be used whenever possible. Over wide area links, communications line costs become an overriding factor, and sharing existing connections by running NJE over existing TCP/IP, DECnet, or less commonly SNA or OSI networks is recommended. For new, BITNET-only connections, links over BSC lines often have the lowest initial cost for equipment and software.

In general, use links over DECnet (*DNA NJE* links) within Jnet clusters and in all other cases where an underlying DECnet network is available. Choose links over TCP/IP (*TCP NJE* links) when making connections between VAX/VMS and UNIX or IBM VM systems over a campus-wide network or when connecting to the rest of BITNET if an Internet connection is available.

If your organization is currently connected to BITNET by a dedicated BSC line and to the Internet by a separate connection, an attractive option is to switch your external connection from the BSC link to a TCP NJE link over the Internet and terminate the lease on the dedicated BSC line to save money. This change should be undertaken with caution, particularly if funding for your Internet connection comes from another entity. Technical problems can also crop up in the first few months of using a new connection that makes a BSC backup route desirable.

When planning links, work with the Postmaster or other technical staff for the peer node to agree on the NJE names your systems will use, the link protocols, and any link protocol parameters. Examples:

- If multistreaming is available on both systems, you should use it to improve total throughput and throughput of small files, but you must agree on how many streams will be used.
- There are several BSC link protocols, and there must be agreement on which one will be used.
- If you will use TCP NJE, you must exchange IP addresses or domain names and TCP port numbers with the manager of the peer system.

Work through the appropriate chapters of the *Jnet Manager's Guide* to determine which parameters must be set for each link, and which must be coordinated with the peer system.

5.2 Install BITNET transports

You should have already installed DECnet and/or TCP/IP software, as directed by Chapter 4 and the documentation for the relevant software.

If you are installing a BSC link, you must arrange for the installation of a communications line, modems, and a synchronous port on a VAX system before you can install and configure Jnet BSC/370 link driver software.

BSC NJE software is designed to be used with V.29 analog modems and dedicated communications lines, either privately owned or leased from a telephone company. Order a ‘‘full-duplex, Bell type 3002’’ circuit if you are leasing a telephone company line. Specify that you will be sending data at 9600 baud over the line. Unconditioned lines are usually sufficient within metropolitan areas, but D1 conditioning may be required for wide area links. Full-duplex circuits have four wires, two for sending and two for receiving.

V.29 modems are relatively expensive and use mature technology. A second alternative is a Dataphone Digital Service (DDS) connection. Instead of modems, DDS lines use less expensive devices called data service units and channel service units, most often combined into devices called DSU/CSUs . Whenever ordering leased lines, determine both initial and monthly costs of both analog and DDS services and equipment before making a decision, because either type can be more cost-effective, depending on the specific situation.

For links within a local calling area, a third alternative is V.32 or V.32*bis* dial-up modems. Such modems use two-wire dial-up circuits and the switched telephone network. Dedicating a switched business telephone line to a BITNET link may be much less expensive than a leased line, and V.32 modems are sold in volume to personal computer users, so they are much less expensive than V.29 modems.

While Jnet BSC/370 has no software support for dialing these modems, many modem models can be configured to automatically dial a stored number when Jnet signals the modem that it is ready to communicate. Modem configuration is usually accomplished by attaching a terminal to the modem port and sending configuration commands to the modem as asynchronous data.

When purchasing any type of modem for BITNET use, be certain that a full complement of diagnostic features, including indicators and testing functions, are provided. Testing and diagnostic features are very useful in the BITNET environment, but they are often omitted from modems designed to be sold into price-sensitive markets, such as to personal computer users.

There are many different synchronous interfaces available for the members of the VAX family of computers. Consult the *Jnet System Support Addendum* for a current list of supported interfaces, and the Digital *VAX Systems/DECsystems Systems and Options Catalog* for which interfaces are supported on your VAX systems. If required for the interface and VMS version you will use, obtain and install Digital's Wide Area Network Device Drivers software. Then refer to the *Jnet BSC/370 Manager's Guide* for information on configuring synchronous interfaces for use by Jnet BSC/370.

5.3 Install Jnet and link drivers

Jnet installation is a straight-forward process of unpacking files from the distribution save sets into the Jnet directory tree. Your primary decision is where to put the Jnet files.

To allow easy movement of Jnet files from one disk to another as your configuration changes, consider defining the logical names MY_JNET_PERM_DEVICE and MY_JNET_TMP_DEVICE in SYS$MANAGER:SYLOGICALS.COM, as in this example:

```
...
$ ! Put Jnet permanent files on DUA0: and transitory
$ ! files on DUA4:.
$ DEFINE/SYSTEM/EXEC/TRANS=(TERMINAL,CONCEALED) -
        MY_JNET_PERM_DEVICE $1$DUA0:
$ DEFINE/SYSTEM/EXEC/TRANS=(TERMINAL,CONCEALED) -
        MY_JNET_TMP_DEVICE $1$DUA4:
...
```

Then create a Jnet startup procedure, called MY_JNET_STARTUP.COM, that uses the new logical names, as in this example:

```
$ DEFINE/SYS/EXEC JAN_DEVICE -
        MY_JNET_PERM_DEVICE:[JNET_PERM.]
$ DEFINE/SYS/EXEC JAN_TMPDEVICE
        MY_JNET_TMP_DEVICE:[JNET_TMP.]
$ @JAN_DEVICE:[JANCOMMON.SYS]JANSTART 'P1
```

In the example above, a different top-level directory is used for the permanent and temporary files, allowing you to set up this flexible file arrangement even if all Jnet files will be on the same disk device initially. This directory arrangement is recommended for all new Jnet installations.

Note: In these logical and file names, *MY_* (or another string of your preference) should be used to avoid conflicts with logical names used by the Jnet software itself, now or in the future.

If you keep the Jnet startup procedure in the directory SYS$COMMON:[SYS$STARTUP], you can use the SYSMAN utility to start Jnet at each system reboot. To direct SYSMAN to execute the Jnet startup procedure in batch mode in the main layered product phase of the VMS startup procedure, enter:

```
$ SYSMAN :== $SYSMAN
$ SYSMAN ADD FILE MY_JNET_STARTUP.COM /PHASE=LPMAIN -
_$ /MODE=BATCH /PARAMETER=P1:COLD
```

If, at some later time, you need to move one of the Jnet directory trees to a different disk device, merely shut down Jnet cold (as explained in Section 16.1.1.4 of the *Jnet Manager's Guide*, edit the logical name definitions in SYS$MANAGER:SYLOGICALS.COM, manually redefine the two device logical names, move the directory trees with the VMS BACKUP utility, and restart Jnet.

Before beginning the installation, determine whether there is a POSTMASTER entry in the SYSUAF. You must tell the Jnet installation procedure whether the user entry already exists so the procedure can create it if necessary.

The POSTMASTER entry created by the Jnet installation has system privileges. Handling files for other or nonexistent users is a privileged function, so if you already have a POSTMASTER entry in the SYSUAF for another purpose, but it does not have system privileges, you will have to reconcile your use of the POSTMASTER entry with Jnet's. If you want the Jnet installation procedure to make a new POSTMASTER entry, delete the existing entry, any POSTMASTER entry in the system rights list database, and the login directory and any other files belonging to the old POSTMASTER user.

When you have prepared the device logical names and determined whether you have a POSTMASTER entry in the SYSUAF, install Jnet with VMSINSTAL according the directions in the *Jnet Installation Guide*.
If you will be configuring a Jnet cluster, perform the installation on any fast or lightly loaded VAX system that will be a member of the cluster. Normally, you should choose your Principal Node, or the system that will have the external links to systems outside the Jnet cluster.

Unless you are running a VMS version before V5.0, answer that you do *not* want to install the install the whole kit. Then install all the kit parts *except* VMS ‘‘V4 compatibility’’. (There are certain situations, explained in the *Jnet Installation Guide*, in which you will skip installing other kit parts.)

If you will be configuring a Jnet cluster, reinstall Jnet on every other system that will be a node in the cluster. On the second and subsequent nodes, do not install the whole kit again, but install *only* the ‘‘node-specific root’’.

When you have installed Jnet’s standard features, install any optional link drivers licensed and required for system. You can install these on any system that will be part of a Jnet cluster.

When you have installed all the required Jnet components, continue with the configuration of Jnet, as described in Section 5.4.

5.4 Configure Jnet

Jnet configuration is the process of creating or modifying Jnet startup files to automatically set up the proper NJE servers and links for your organization each time Jnet is started. Chapters 5-14 of the *Jnet Manager’s Guide* provide instructions for configuring Jnet that will not be repeated here. The following sections provide additional recommendations for Jnet configuration in the BITNET environment.

5.4.1 Run Jnet autoconfiguration procedure

There are two steps to running the Jnet autoconfiguration command procedure, JAN_LIB:JANCONFIG.COM:

1. Work through the *Jnet Manager’s Guide*, choosing the options you will need and recording your choices on the worksheet provided in Section 6.2 of that book.
2. Run the procedure and enter the information you have collected as you are prompted for it.

If more than one VAX system will run Jnet, first record your configuration choices for all nodes, then run the procedure to enter your choices on each node.

This section provides configuration recommendations for VAX systems running Jnet on BITNET, in the order that the relevant questions are asked by JANCONFIG. The material in the *Jnet Manager’s Guide* also applies to BITNET nodes, and is not repeated here. See the *Jnet Manager’s Guide* for additional important information.

Specific recommendations follow:

- Number of NJE network nodes:

Specify that there are 4000 nodes in your NJE network. This answer will cause JANCONFIG to request space for 4050 nodes in the Jnet section, allowing about 14% free space. The ample free space will accommodate future variation in the number of NJE names defined in BITEARN NODES without the necessity of checking free space each month. The resulting Jnet section will require 463 global pages.

- NJE names:

  If your system participates in a VAXcluster system, JANCONFIG will ask you if you want to define a Jnet cluster name. In any event, it will prompt you for the NJE name of your system. Enter the names you previously planned in Section 3.4.6.

- Time zone:

  Use numeric offsets from Universal Time (UT, once called Greenwich Mean Time, or GMT) instead of customary United States timezone abbreviations, even though they are permitted by RFCs 822 and 1123. Your systems will participate in a global network where there is no standard for timezone abbreviations, and where even common timezone abbreviations are ambiguous.

  Numeric timezone designations can be subtracted directly from the adjacent local time displayed in mail headers to get UT for easy correlation of message times. They are understood globally, and avoid the appearance of ‘‘Internet provincialism’’, the view that the United States is the center of the global networks and the rest of the world is somehow less important. Be sensitive and use numeric timezone abbreviations!

  Many references to do not clearly state whether positive offsets from UT are east or west of the prime meridian. Positive offsets are east, so, for example, most of western Europe observes +0100 when Summer Time is not in effect. Negative offsets are west of UT, so the United States Eastern Time Zone observes -0500 when on Eastern Standard Time and -0400 when on Eastern Daylight Time.

  Enter the offset used by your system clock. If you change your system clock to observe Daylight Savings Time or Summer Time twice a year, you will edit the Jnet startup file JAN_SYS:JANLINKS.JCP to show the changed offset at the same time, as explained in Section 7.5.

- Local servers:

  Your organization should establish a security policy on whether to configure batch server on BITNET, as VMS batch jobs submitted through Jnet’s JOB server must contain VMS passwords, and the confidentiality of BITNET files is not assured. Never sending batch jobs over BITNET to run in privileged accounts unless you

  - trust the confidentiality of the file on forwarding nodes and know that your job will not be queued on those nodes for more than a few moments, or
  - can access the system interactively to change the password immediately after the job runs.

Configure batch and printer servers only on Jnet cluster nodes with external links, because batch and printer servers are normally used only by remote BITNET users, and not by local VMS users. The servers can queue jobs to batch queues and printers running on any VAXcluster node, even nodes not running Jnet, if the nodes share a batch/print subsystem. (All the nodes of a VAXcluster normally share a batch/print subsystem, and this arrangement is required beginning with VMS V5.5.) If you expect *local* users to send files to your BITNET batch and print servers, configure the servers homogeneously on all the nodes of a Jnet cluster so that users can send jobs to servers at the Jnet cluster name from any Jnet cluster node.

5.4.2 Manual configuration tasks

Chapters 7-14 of the *Jnet Manager's Guide* deal with configuration tasks on a component-by-component basis. That organization is most useful when modifying a component in your Jnet configuration, but can be awkward for new Jnet site, because it requires a number of editing sessions on each of several command procedures.

As an alternative, new sites should consider working through Section 7.2 of the *Jnet Manager's Guide*, making all the changes require in each file (for example, JAN_SYS:LOGIN.COM) before going onto the next file. You can use Table 7-1 of the *Jnet Manager's Guide* as a check list of possible customizations and cross-reference to instructions for each change.

Specific recommendations for postconfiguration follow. These recommendations supplement, but do not replace, the instructions in the *Jnet Manager's Guide*.

5.4.2.1 Edit JAN_COMMON:[SYS]LOGIN.COM

Change the word ‘‘network’’ to ‘‘BITNET’’ in the message.

5.4.2.2 Test SYS$MANAGER:SYLOGIN.COM

After editing the Jnet login command procedure (*Jnet Manager's Guide*, Section 7.3.1) and this file (Section 7.3.2), test the files carefully from a non-privileged account. All users execute these command procedures at login time, and incorrect protections, editing errors, and so on can prevent logins by non-privileged users. Remember to test batch jobs, too.

5.4.2.3 Use SYSMAN STARTUP instead of SYS$MANAGER:SYSTARTUP_V5.COM

If you followed the recommendation in Section 5.3 to create a site-specific Jnet startup file in SYS$COMMON:[SYS$STARTUP] and enter the file in the SYSMAN STARTUP database, you do not have to edit SYS$MANAGER:SYSTARTUP_V5.COM (*Jnet Manager's Guide*, Section 7.3.3).

5.4.2.4 Edit JAN_SYS:JANLINKS.JCP and JAN_SYS:JANSTART.JCP

Normally, these files are created by the Jnet automatic configuration command procedure, JANCONFIG.COM. For most configurations, there will be one CREATE command and several DEFINE/LINK commands in JANLINKS.JCP, and a START command in JANSTART.JCP for every DEFINE/LINK command in JANLINKS.JCP. You can manually edit these files to change links without running JANCONFIG, however, and manual editing is required to use certain features that are not supported by JANCONFIG.

The *line* name for a TCP NJE link determines which TCP/IP product Jnet will attempt to use to make the TCP NJE connection. If you change from one TCP/IP software product to another, edit JANLINKS.JCP to change the line name, or execute JANCONFIG.COM to create a new set of startup files. The line name is normally the only Jnet setup parameter that must be changed when switching TCP/IP software products. See Table 5–1 for the line name keyword associated with each TCP/IP software product supported by Jnet TCP NJE V1.1.

Table 5–1 TCP/IP Products supported by Jnet TCP NJE

Line name	TCP/IP Vendor and Product
CMU	Carnegie Mellon University CMU-TEK IP/TCP
UCX	Digital VMS/ULTRIX Connection
FUSION	Network Research FUSION TCP/IP
MNETV20	TGV MultiNet V2.0
MULTINET	TGV MultiNet V2.1 and later
WIN	TWG WIN/TCP for VMS

Busy BITNET links should use file queuing by size, explained in the *Jnet Manager's Guide*, Section 3.5. Set up file queuing by size when you define links by editing JANLINKS.JCP. BITNET links can benefit from using six size categories, the maximum number, distributed so approximately equal numbers of files are transmitted in each category.

Initially, establish at least three categories. Categories for files up to 100 records, 100 to 1000 records, and larger than 1000 records are suggested. Later, you can tune category boundaries using the size data Jnet collects in log files.

If you implement *multistreaming* , which is also recommended for busy links, you must also implement file queuing by size and use one of the size category boundaries as the size threshold for ''large files''.

5.4.2.5 Defer the creation of JAN_SYS:JANROUTES.JCP

Defer the creation of the route file (*Jnet Manager's Guide*, Section 7.4.3). The creation of the route file is discussed in Section 5.6.

5.4.2.6 Consolidate JAN_SYS:JANLOAD.COM

JANLOAD.COM is also created by JANCONFIG, and its contents depend on the types of links in your configuration. It is normally used for set up synchronous interfaces for use by BSC links.

If your configuration results in a JANLOAD procedure containing only the definition of the SYSGEN symbol, you can replace it by a new, empty JANLOAD procedure. If more than one system in a Jnet cluster uses the same JANLOAD procedure, you can reduce the number of startup files by moving one copy to JAN_COMMON:[SYS] and deleting the remaining copies. Do not delete all the copies of the empty JANLOAD procedure, or JAN_COMMON:[SYS]JANSTART.COM, the main site-independent Jnet startup file, will produce an error message when it attempts to run JANLOAD.COM.

5.4.2.7 Edit JAN_COMMON:[SYS]JANSITECOMMON.COM

For all BITNET nodes, edit JANSITECOMMON.COM to assign the value 34 to JAN_SYSTEM_FLAGS. This has two effects. Setting bit 5 (adding 32 to the value) causes Jnet to limit responses to network commands to 50 lines of output, in compliance with an EARN traffic requirement. If this bit is not set, Jnet can send thousands of high priority nodal message records in response to the command *QUERY SYSTEM ROUTES*, blocking file traffic on the affected links (*Jnet Manager's Guide* Section 7.5.9). Setting bit 1 (adding 2 to the value) causes Jnet to broadcast file arrival messages to all members of a VAXcluster (*Jnet Manager's Guide* Section 8.2.4). This setting does no harm on standalone systems (single-node VAXclusters).

Beginning with VMS V5.5, the batch/print subsystem does not require queues to be initialized each time the system is rebooted. For systems running Jnet on VMS V5.5 or later and defining NJE symbionts, including JNET_JOBLOG (for batch servers), initialize queues manually only once, using commands like those provided as comments in JANSITECOMMON.COM. Leave the commands you used to initialize the queues as comments in JANSITECOMMON to document your queue setup. To avoid errors caused by running NJE symbionts when Jnet is not started, do *not* define queues for NJE symbionts as autostart queues with the /AUTOSTART_ON qualifier.

Remove the comment character (!) from the SUBMIT command to submit the JANTIDY job to a batch queue each time Jnet is started.

The remaining recommendations in this section apply only to Jnet clusters. If you are not setting up a Jnet cluster, skip ahead to Section 5.4.2.8.

Jnet versions before V3.5 did not support messages to the Jnet cluster name, causing endless confusion about NJE node names, especially regarding the use of remote servers such as LISTSERV. It was so difficult for Jnet cluster users to maintain LISTSERV subscriptions that it is a frequent recommendation to never use interactive commands to communicate with LISTSERV, but instead send all commands by mail.

Beginning with Jnet V3.5, this precaution is no longer necessary, because Jnet clusters can be set up to use the Jnet cluster name for all inbound and outbound messages, files, and electronic mail. For more information, see the *Jnet Release Information, Version 3.5*, Sections 1.10 and 1.11. If you are configuring a Jnet cluster, it is *strongly* recommended that you take advantage of cluster-wide messaging.

If you have a Jnet cluster but are not yet running Jnet V3.5 or later, it is *strongly* recommended that you upgrade to the latest version of Jnet to take advantage of cluster-wide messaging. Implement it by following the instructions in the *Jnet Manager's Guide*, Section 8.2.2 (for new nodes) or the *Jnet Release Information, Version 3.5*, Section 2.16.1 (for upgrading nodes). The master node for should be the node with all (or at least most) of the external connections.

If you are forming a Jnet cluster by adding a systems to a stand-alone Jnet node (for example, changing from the single node ACME to two nodes, ACME1 and ACME2, with Jnet cluster name ACME), no mail address or server subscriptions will be affected by the change. If you form a Jnet cluster from nodes previously operating on the BITNET with separate names (for example, forming the Jnet cluster ACME out of nodes ACME1 and ACME2), some care is required to change server subscriptions.

To change a LISTSERV subscription from a specific node name to a Jnet cluster name, the user must sign off the list using the specific node name and resubscribe to the list using the Jnet cluster name. See the *Jnet Release Information, Version 3.5*, Section 1.11, for an example.

It is possible for the TECHREP or node ADMIN contact to change LISTSERV subscriptions on behalf of other users, and it may be possible to use LISTSERV jobs to obtain lists of subscribers to all lists on a specific node and change them to the Jnet cluster name in bulk, but these techniques are beyond the scope of this book. See the online documentation available from LISTSERV for additional information on List Owner commands and LISTSERV jobs.

Jnet's use of the specific node name or the Jnet cluster name as the origin of files, mail, and messages is controlled by logical names. Before V3.5, Jnet used a separate logical name for every image that called the Jnet shareable image. Beginning with V3.5, these logical names are no longer required. Follow the instructions in the *Jnet Release Information, Version 3.5*, Section 2.17, or the *Jnet Manager's Guide*, Section 8.2.3, to configure Jnet to use the Jnet cluster name for all files, messages, and mail.

5.4.2.8 Skip instructions for LMD.COM

Jnet versions after V3.3 use the logical name JAN_SPOOL for the directory to contain transient files, while earlier versions used JAN_SYS. Section 7.6.2 of the *Jnet Manager's Guide* asks you to define a search list for JAN_SYS in JAN_SYS:LMD.COM so that PMDF or other alternative mail handlers can find inbound mail files. This step is not necessary when using PMDF V4.0 or later versions, because the replacement files LMD.COM and LMD.V35, supplied with PMDF V4.0, already incorporate this change. You will replace Jnet's version of LMD.COM with one of these files as you work through Section 6.3.7.

5.4.2.9 Edit and enable JAN_COMMON:[SYS]JANTIDY.COM

The use of JANTIDY.COM, Jnet's nightly cleanup and monitoring procedure, is recommended for all BITNET nodes. Edit JANTIDY to define the symbols *JANSYSTEM, JANMANAGER*, and *BATCHQUEUE*. Setting *JANMANAGER* to POSTMASTER is recommended, to funnel all BITNET management mail through a single account for ease of forwarding to the responsible individual.

You may wish to develop a specialized version of JANTIDY (with a different name) to run frequently, as often as six times an hour, on busy BITNET nodes. Such a job can check that all links are up, queues are not too long, and so on, and send mail to POSTMASTER or a REQUEST to the system operator if it discovers any problems. This is a common practice on IBM mainframes on BITNET, where such a program is called a *line monitor*.

5.4.2.10 Edit link parameter files

Create link parameter files in JAN_SYS: to specify characteristics of specific links. Recommendations for BITNET nodes follow:

- If you will use batch or print servers over wide areas (rather than just between NJE hosts at your institution), configure each server to send messages as a user rather than a link, so that command replies from the server won't appear to be from an unknown BITNET node. Specify *MSG=USER* in the parameter file for the link. If servers are installed homogeneously across a Jnet cluster, you can store a single copy of the parameter file in the common directory JAN_COMMON:[SYS]. See Section 9.4 of the *Jnet Manager's Guide* for additional information.
- Use DECnet object numbers rather than object names for DNA NJE links. Such a configuration eliminates login failure notices from DNA NJE daemons attempting to connect before Jnet has been started on their peer systems, and can improve security by allowing the removal of the DECnet TASK object. See Section 11.2.1 of the *Jnet Manager's Guide* for additional information.
- Always enable *multistreaming* on busy BITNET links when both peers permit it. For the best utilization of available bandwidth, especially on TCP NJE links, configure seven streams. For the most responsive transmission of electronic mail files, specify transmission algorithm F with a file size threshold larger than most electronic mail files. Use an initial setting of 1000 lines unless you have determined the size distribution of files transmitted on the link. See Section 11.5.1 of the *Jnet Manager's Guide* for additional information on multistreaming on DNA NJE links, or the corresponding sections of the documentation for BSC NJE, OSI NJE, SNA NJE, and TCP NJE links.

5.4.2.11 Edit SYS$COMMON:[SYSMGR]LAT$SYSTARTUP.COM

If you have a VAXcluster configuration in which not all VAXcluster members are Jnet cluster nodes, and users use *Local Area Transport* (*LAT*) to connect to the VAXcluster for timesharing services, consider establishing a LAT service called ‘‘BITNET’’, available only on BITNET nodes, to which BITNET users may connect.

Setting up such a service, and training BITNET users to connect to it when they want BITNET services, will reduce the number of times BITNET users log into a VAXcluster member and try to use BITNET services, only to find that they must log out and connect to another cluster member. This situation often arises when a VAXcluster includes both timesharing systems on BITNET and workstations that do not run Jnet, as suggested in Section 5.1.1.

5.5 Bring up BITNET link

If you have agreed on link protocols, parameters, and names with the Postmaster (or NJE network manager) of your peer node, your link should come up to the Connect state as soon as both sides are started. For your first attempt to bring up the link, it is useful to make telephone contact with the Postmaster of the other node and start both ends of the link while you monitor the state of the link with the JCP command *MONITOR/CONTINUOUS*.

If both sides go to the Active state but do not connect, you and the other Postmaster can immediately review the configuration, test the underlying network layers, trace the BSC line, or initiate other troubleshooting procedures. If either side does not reach the Active state, you should review the configuration of that side of the link, and if necessary, call Joiner or the vendor of the peer’s NJE software for support. See Chapter 18 of the *Jnet Manager’s Guide* for more information on troubleshooting BITNET links.

If the link goes to the Connect state, test the link by sending interactive messages. If that works, request the other Postmaster to send you a copy of the routing tables for the peer node. You will use them in Section 5.6.

5.6 Install BITNET tables

NJE routing requires every node to have a table of all the nodes in the network. For your node to fully participate in BITNET, you must obtain a list of all the nodes in the network, and your node must be added to the routing tables of every other node. This section provides suggestions for setting up *initial* routing tables for your node or Jnet cluster. After you have registered your nodes with the BITNIC, you will automatically receive updated tables monthly. Section 5.7 gives instructions on registering your nodes so that they can be included in the routing tables generated for nodes throughout the network. Section 5.8 discusses how tables on other nodes are updated.

To create an initial routing table for your first or only node, you must edit a list of BITNET nodes into a file of Jnet Control Program DEFINE/ROUTE commands and store it as JAN_SYS:JANROUTES.JCP. If your peer node is a VAX running Jnet, this is a simple matter. Use your favorite editor to make the name of your peer node the route for every node in the network. Each line of JANROUTES.JCP must be of the form:

```
DEFINE linkname /ROUTE=peername ! optional comment
```

Normally, adjacent nodes (links) are defined in a different file than non-adjacent nodes (routes), so you must add to your routing tables routes for all the nodes that are adjacent to your peer node but not adjacent to your own node. These nodes may be listed as comments in the routing table you get from your peer. If not, send the NJE command *QUERY SYSTEM LINKS* to your peer if it is a VAX or IBM VM system, or telephone the Postmaster of the peer node, to get a list of adjacent nodes.

For additional information on setting up initial routing tables, see Section 7.4.3 of the *Jnet Manager's Guide*. Install your initial tables manually, as described in that section, and watch for messages caused by duplicate entries, typing mistakes, and other errors.

If you are configuring a Jnet cluster, install the initial tables for the node with your first (or only) external connection and store it in the directory JAN_SPECIFIC:[SYS]. Create a second table, routing every node outside of your cluster through the first node, and store it in the directory JAN_COMMON:[SYS]. This single routing table can serve every node in your Jnet cluster except nodes with external connections. (If you configure a full-mesh topology among the nodes of a Jnet cluster and request routing tables for each node, you will find that the tables for nodes without external links are *identical*.)

5.7 Register BITNET nodes

You are ready to register a BITNET node if the following prerequesites have been met:

- All the assumptions in Section 3.1 are fulfilled.
- Connection to adjacent site is operational.
- Initial routing tables are installed.

5.7.1 About the UPDATE procedure

All the data about the BITNET network and all NJE cooperating networks are maintained in BITEARN NODES. Each data value is associated with or assigned to a specific *tag* (not to be confused with the tag of an NJE file). Each tag begins with a colon (:) and ends with a period (.). The information after the period is the value associated with the tag.

To register a BITNET node, the TECHREP sends a file of update commands and tags to the *update server* at BITNIC to add or change information in BITEARN NODES.

You should have copies of ‘‘BITNET Node Information Update Procedures’’ and ‘‘Required Info’’. Printed copies were sent as part of the TECHREP packet. They are also available as the files UPDATE PROCEDUR and REQUIRED INFO, from LISTSERV@BITNIC. (Don’t use the older, now-obsolete REQUIRED INFO1.) These documents describe the procedures required to prepare and submit an on-line request to add, delete, or modify node and certain member information, and the minimum information required in a node entry to register a new node.

This book does not attempt to discuss the usage of all defined tags. The defining document for BITEARN NODES tags is NEWTAGS DESCRIPT[3], available from LISTSERV@BITNET. NEWTAGS DESCRIPT is a comprehensive document that is normally more useful to developers of BITNET servers than to TECHREPs, who just need to update BITEARN NODES, for which UPDATE PROCEDUR and REQUIRED INFO are better references.

The steps for a new member or affiliate are:

1. Receive notification that a BITNIC staff member has created the member entry
2. Send initial update job to CONNECT@BITNIC with steps to:
    - add Postmaster people tag to member entry
    - register Principal Node
3. Send update jobs to UPDATE@BITNIC to create remaining nodes

These steps are explained in the following sections.

5.7.2 Where to send UPDATE jobs

When registering the Principal Node for a new members and affiliates, the Principal Node is not yet in the routing tables at intermediate nodes, so acknowledgments, error messages, and other mail automatically sent by the update processor cannot be sent to the TECHREP’s address. Update jobs to create the Principal Node at a new member or affiliate must therefore be sent to a special address, CONNECT@BITNIC. A BITNIC staff member checks these jobs manually and offers any needed assistance to the staff of the new site, submits the update on behalf of the new site, and reports the results back, by telephone if necessary.

After the TECHREP’s node (usually the Principal Node) of a new member or affiliate is registered in BITEARN nodes, the TECHREP can send UPDATE jobs directly to UPDATE’s BITNET address: UPDATE@BITNIC. The update server can also communicate directly with the TECHREP.

If a group of UPDATE job steps are interdependent, they should be sent in a single job. Then, if any step fails, no step will be applied to BITEARN NODES. Independent job steps can be sent as separate UPDATE jobs or combined into multi-step jobs. In the following sections, UPDATE job steps are shown. If the TECHREP’s node is connected to the network but not yet registered, send the UPDATE job to CONNECT@BITNIC. If the TECHREP’s node is both connected and registered in BITEARN NODES, send the job to UPDATE@BITNIC for automatic processing.

You should make every effort to submit UPDATE jobs, particularly the job to add your initial node, by the cutoff date for the first possible monthly update cycle. Currently the cutoff date is the fifteenth day of each month, including holidays and weekends, for the following month's tables. You will be able to manage your BITNET nodes much more effectively after the TECHREP's node is registered in BITEARN NODES and the TECHREP can receive files and electronic mail over the network.

5.7.3 Adding a Postmaster people tag

Each BITNET member organization has a single member entry in BITEARN NODES, which contains information about the member as a whole, or common to all the member's nodes. The TECHREP may modify member entries. Example 5–1 shows how the node entry MN_DECUS might look if DECUS became a BITNET affiliate.

Example 5–1 Member entry from BITEARN NODES

```
:node.MN_DECUS
* Member-specific address/location information
:MEMBER.Digital Equipment Computer Users Society, U.S. Chapter
:A_MEMBER.SHR1-4/D32; 333 South Street; Shrewsbury MA 01545-4195
:TYPE.MEMBER
:MEMDATE.19920101
:COUNTRY.US
* Contact people for this member
:DIR.P_SARNOLD
:INFOREP.P_SARNOLD
:TECHREP.P_SARNOLD
:ADMIN.P_SARNOLD
:P_SARNOLD.Stephen L. Arnold;ARNOLD@DECUS;+1 608 238.7835
```

You will need to specify a Postmaster for every node you register. The easiest way to do this is to add a *people tag* for the Postmaster to your member entry where it can be referenced in every node entry. If this has not been done, include the following step in an UPDATE job:

```
MODIFY MEMBER membername
:P_POSTMAST.POSTMASTER;POSTMAST@principalnodename;+n nnn nnn.nnnn
```

where:

membername	is the name assigned to your member tag by BITNIC staff or as subsequently renamed one of your authorized member representatives. (It is *not* the same as the name of your organization or any of your nodes.)
principalnodename	is the NJE name of your Principal Node (or its Jnet cluster name, if your Principal Node is a member of a Jnet cluster).
+n nnn nnn.nnnn	is the telephone country code, city or area code, and number of the person who currently holds the postmaster role. The country code for the United States, Canada, and the Carribean is 1. Follow the punctuation example for this tag exactly; no hyphens may be used.

To add a postmaster tag to the DECUS entry in Example 5–1, the TECHREP would submit this update job:

```
MODIFY MEMBER MN_DECUS
:P_POSTMAST.Postmaster;POSTMAST@DECUS;+1 608 238.7835
```

As your organization adds additional systems to BITNET, you may want different Postmasters for different kinds of systems, for example, one for IBM systems and one for VAX/VMS systems. You can then define additional people tags. See UPDATE PROCEDUR for more information on people tags.

Note: Even if you do not create a people tag for the POSTMASTER mailbox and even if you do not register the POSTMASTER mailbox as an privileged ADMIN user at the member or node level, there must still be a POSTMASTER (and POSTMAST) mailbox on every BITNET node, as explained in Section 3.4.7.1.

5.7.4 Registering a node

There must be a node entry in BITEARN NODES for each NJE name to be in the routing tables. You create node entries in BITEARN NODES by sending ADD NODE job steps to UPDATE.

This section describes information required to create a node entry for a VAX system running VMS and Jnet. A node entry contains data about a specific node on the network. Only the TECHREP or ADMIN at the member level may add new nodes for a member.

If more than one person is to have authority to create nodes and make other changes to your member entry, create people tags for each authorized user and reference each people tag in the *:ADMIN* tag. This is a better security practice than having a privileged account that is shared by more than one person. So entries like:

```
:P_SARNOLD.Stephen L. Arnold;ARNOLD@DECUS;+1 608 238.7835
:P_MGRACEFF.Mark Graceffa;GRACEFFA@DECUS;+1 508 467.4526
:P_KMEANY;Kevin Meany;MEANY@DECUS;+1 508 467.4346
:ADMIN.P_SARNOLD P_MGRACEFF P_KMEANY
```

are better than

```
:P_TECHREP.DECUS BITNET managers;TECHREP@DECUS;+1 608 238.7835
:ADMIN.P_TECHREP
```

where Arnold, Graceffa, and Meany have access to the TECHREP account.

While POSTMAST should be registered as the contact for problems with mailer software on your system as described in Section 6.5, do not routinely use the POSTMASTER account for managing your BITNET system, because certain software, including LISTSERV, ignores commands in mail from POSTMASTER or POSTMAST to avoid mail loops. Instead, use specific, personal accounts listed in the *:ADMIN* tag for management tasks. Nevertheless, it is permitted and recommended to register POSTMASTER (or POSTMAST) as the contact point for questions and recipients of routing table updates.

A sample update job step to create an entry for a stand-alone VAX/VMS system is shown in Example 5–2. The UPDATE job steps to create node entries for a two-node VAXcluster with a Jnet cluster name are shown in Example 5–3. Features of the job steps are explained in the following list.

Example 5–2 UPDATE job to create a node entry in BITEARN NODES for a standalone VAX system

```
ADD NODE ARNOLD❶ TO MEMBER MN_ARNOLD
:NODEDESC.Arnold Consulting
:FFORMAT.VD ND PU PR DD❷
:MSGS.YES❸
* Topology configuration (connected to WISCMAC3 by Ethernet LAN)
:LINKS1.WISCMAC3(V1,10M)❹
:CONNECT.READY❺
* System hardware/software configuration
:MACHINE.Digital VAXstation 3100❻
:SYSTEM.VMS
:NETSOFT.Jnet
* Routing table generation/destination information
:ROUTTAB.JNET (NETSERV,POSTMAST@ARNOLD)❼
```

❶ UPDATE uses the node name specified on the *ADD NODE* command to set the *:NODE* tag. Do not specify the *:NODE* tag in UPDATE jobs.

❷ Users at this node, and all nodes running recent versions of Jnet, can receive files in VMSDUMP (*VD*), NETDATA (*ND*), PUNCH (*PU*), PRINT (*PR*), and DISK DUMP (*DD*) formats, in order of preference.

❸ For Jnet V3.5 and later versions, specify *:MSGS.YES*, or omit the *:MSGS* tags from both node and Jnet cluster entries, accepting the default of *:MSGS.YES*. (For Jnet V3.4 and earlier versions, it was necessary to specify *:MSGS.NO* for VAXcluster entries. All versions of Jnet support message to VAXcluster members and standalone VAX systems, so always specify *:MSGS.YES* in their entries.)

❹ The *:LINKSn* tags (*:LINKS1* through *:LINKS99*) specifies other BITNET nodes to which your node has a direct connection. If a link is not a 9600 baud leased line, code the link type and speed immediately after the name in parenthesis. For more information on link definition parameters refer to the *:LINKS* tag in NEWTAGS DESCRIPT.

If a link is a virtual link between the Jnet cluster name and one of the cluster members, code the link type as *(P,999M)* (a dedicated, *very* fast link).

If a node has many links, you may want to organize these by type. For example, you can put all links external to your organization on *:LINKS1*, all intracluster links on *:LINKS2*, all TCP NJE links to

Example 5–3 UPDATE job to create node entries in BITEARN NODES for a two-node VAXcluster system

```
ADD NODE DECUSA❶ TO MEMBER MN_DECUS
:NODEDESC.DECUS U.S. Chapter Spring Symposium
:FFORMAT.VD ND PU PR DD❷
* Topology configuration (connected to Georgia Tech by T1 link)
:LINKS1.GITVMA(V1,1.5M)❹
:CONNECT.19920501❺
* System hardware/software configuration
:MACHINE.Digital VAX 9000-420❻
:SYSTEM.VMS
:NETSOFT.Jnet
* Routing table generation/destination information
:ROUTTAB.JNET (NETSERV,ARNOLD@DECUS)❼

ADD NODE DECUSB❶ TO MEMBER MN_DECUS
:NODEDESC.DECUS U.S. Chapter Spring Symposium
:FFORMAT.VD ND PU PR DD❷
* Topology configuration (connected to DECUSA by Ethernet)
:LINKS1.DECUSA(V0,10M)❹
:CONNECT.19920501❺
* System hardware/software configuration
:MACHINE.Digital VAX 6000-660❻
:SYSTEM.VMS
:NETSOFT.Jnet
* Routing table generation/destination information
:ROUTTAB.NONE❼

ADD NODE DECUS❶ TO MEMBER MN_DECUS
:NODEDESC.DECUS U.S. Chapter Spring Symposium
:FFORMAT.VD ND PU PR DD❷
* Topology configuration (VAXcluster of DECUSA and DECUSB)
:LINKS1.DECUSA(P,999M) DECUSB(P,999M)❹
:CONNECT.19920501❺
* System hardware/software configuration
:MACHINE.Digital VAXcluster❻
:SYSTEM.VMS
:NETSOFT.Jnet
* Routing table generation/destination information
:ROUTTAB.JNET (NETSERV,ARNOLD@DECUS)❼

MODIFY NODE DECUSA
:LINKS1.GITVMA(V1,1.5M) DECUSB(V0,10M)❹
:LINKS2.DECUS(P,999M)❹
MODIFY NODE DECUSB
:LINKS2.DECUS(P,999M)❹
```

UNIX on your campus to *:LINKS3*, and a temporary link by itself on *:LINKS4*.

❺ Specify the date, in *yyyymmdd* format, in the *:CONNECT* tag to show a future connection date, or specify *READY* to indicate a node is operational on the date the UPDATE job is submitted.

❻ For the *:MACHINE* tag, specify either *Digital* and the system marketing model, as shown in the examples, or *Digital VAXcluster*, for Jnet cluster names.

❼ The *:ROUTTAB* tag specifies the type of routing tables to be generated for this node, their source, and the BITNET address to which they should be sent. Specify *JNET* tables, that NETSERV is to generate the tables, and give the Postmaster's NJE address (not the name of a people tag) as the destination. Do not put a space after the comma.

For VAXcluster nodes, specify *:ROUTTAB.NONE* for all entries except the Principal Node and the Jnet cluster name. You will only receive two routing tables each month.

5.8 Wait for routing tables

When you register your nodes with BITNIC, as described in Section 5.7, information about your nodes will be distributed throughout the network in the next update cycle. An outline of the update cycle schedule is given in Section 5.8.1. Suggestions for monitoring the installation of tables with routes to your node, and for encouraging other Postmasters to install the new tables, are provided in Section 5.8.2. Instructions for the installation of your own initial monthly table updates are in Section 5.8.3.

5.8.1 The monthly update cycle

After submitting UPDATE jobs to add your first node, and optionally additional nodes, to BITEARN NODES, wait for routing tables including your nodes to be distributed throughout the network. Tables are normally sent the first full weekend of each month, and important hub nodes generally install them within a few days, so if you register your nodes just before the update cutoff (currently the fifteenth of each month), tables with routes for your nodes will be shipped in as few as three weeks. If you just miss an update cutoff, however, it will take up to eight weeks for tables including your nodes to be shipped. Plan ahead!

Since your first node will *not* be in the tables when they are shipped unless you have made special arrangements, the initial attempt to send you routing tables will probably fail. As a service to new nodes, however, an EARN participant, Hans-Ulrich Giese, U001212@HEARN or U001213@HNYKUN11.URC.KUN.NL, resends routing tables for new nodes about two weeks after the initial tables are shipped. By this time, intermediate nodes have had a chance to install their tables, and successful delivery is much more likely.

Until tables with routes for your nodes are generally available, you can improve initial network service by arranging for TECHREPs or Postmasters to manually define a route for your Principal Node at intermediate nodes between your node BITNIC, and between your node and your regional NETSERV. Contact the responsible people after your node is connected but before it is widely defined in NETSERV-generated tables. A telephone call to BITNIC can help determine if this would be practical and useful in your case. By the second update cycle after you register your nodes, your tables should arrive uneventfully each month.

5.8.2 Monitoring table updates

You are dependent on Postmasters throughout the network to manually install their routing tables when they arrive. Many Postmasters can be depended upon to perform this important task promptly, but unfortunately, a few Postmasters do not take this responsibility seriously. This causes network connectivity problems for new nodes.

If there are still nodes between your node and your users' correspondents that have not installed tables defining a route for your node a month after such tables are generally available, you should feel justified in contacting the Postmaster of the node, by electronic mail or telephone, to insist that the new tables be installed, as required by the CREN Terms and Conditions of Membership and Affiliation.

After you node has been published in the tables, trouble receiving mail and files is probably caused by out-of-date routing tables on other nodes. Remember how it feels, because years from now, Postmasters of new nodes will be depending on *you* to update your tables in a timely way, as demanded by the CREN terms.

You can find out which nodes do not have you in their tables by sending a short file to or through them. The node adjacent to the last node to send you a *file progress message* is the cause of the trouble, if the system runs VM and RSCS or VMS and Jnet. (IBM systems running MVS and JES do not send messages when they forward files on behalf of a remote user.)

If a node runs VM or Jnet and has your node in its tables, you can also send the NJE command *QUERY VERSyymm* to the node. If the node has a route for the pseudonode VERSyymm, it is using the *mm*th set of tables issued in the year 19*yy*. Unless there are special table updates (usually made to correct a problem), version *yymm* tables are those issued at the beginning of the *mm*th month.

5.8.3 Installing initial tables

When you receive your own routing tables, they will come as file transfers to POSTMASTER (if you have followed the suggestions in Section 5.7) and be named *nodename*.NETINIT. Receive each routing table as the file JAN_SPECIFIC:[SYS]JANROUTES.JCP on the appropriate node, except tables for Jnet cluster names. Such tables should be received into JAN_COMMON:[SYS]JANROUTES.JCP on any node of the Jnet cluster, to be shared by all Jnet cluster nodes that do not have external links.

If you followed the suggestions in Section 5.4.2.9, the new tables will be automatically installed by the next nightly JANTIDY run. When your receive the JANTIDY report the following morning, you can purge the old tables. For more information on installing subsequent monthy table updates, see Section 7.4.1.

Consider using RMS version numbers to identify the versions of JANROUTES.JCP and other files that are updated monthly. These files have internal four-digit version numbers, consisting of the last two digits of the year and two digits for update in the current year, for example, 9202 for second set of tables in 1992. Unless there are special table updates (usually made to correct a problem), version *yymm* tables are those issued at the beginning of the *mm*th month. The file name, type, and version of your node's second set of tables routing tables in 1992 would thus be JANROUTES.JCP;9202.

6 Installing and Registering a BITNET Mailer

This chapter provides suggestions for the mailer layer of your network. This book provides supplementary information on running PMDF in the BITNET environment, and is not intended to replace PMDF documentation.

6.1 External view of a mailer

To other BITNET nodes, a mailer is an application with an NJE address that can send and receive BSMTP mail. To correctly set up a mailer, you must choose an NJE address for the mailer and insure that:

- PMDF uses the selected address as the NJE envelope (tag) return address
- Mail to the selected address is routed to PMDF's BSMTP processor
- The selected address is registered as the mailer for your node in BITEARN NODES[1], and in turn, in XMAILER NAMES
- The selected address is registered as the mail gateway for your domain in DOMAIN NAMES

This book recommends that you select MAILER@*nodename* as the NJE address for your mailer, where *nodename* is the NJE name of your Jnet cluster, or if your system is not in a Jnet cluster, the NJE name of your VAX system. Using other addresses and setting up a remote mailer for your systems is beyond the scope of this book.

The remainder of this chapter shows how to install and configure PMDF on a VAX or VAXcluster system to consistently meet these four requirements.

6.2 Install PMDF

PMDF installation is a straight-forward process of unpacking files from the distribution save sets into the PMDF directory tree. Your primary decisions are the User Identification Codes (UICs) of any required PMDF accounts, the name of the batch queue(s) PMDF will use, and where to put the PMDF files.

6.2.1 Determine UICs for PMDF SYSUAF entries

Before beginning the installation, determine whether you need PMDF server and user entries in the SYSUAF, their names, the UICs to be used for each entry, and whether the entries already exist in the UAF. This book recommends that you set up a server entry called PMDF in all cases, and a user account called PMDF_USER if you will be installing the PMDF-FAX optional product. See Sections 1.2.1 and 1.2.2 in the *PMDF Installation Guide & Release Notes* for further information.

6.2.2 Select a location for the PMDF files

To allow easy movement of PMDF files from one disk to another as your configuration changes, consider defining the logical name MY_PMDF_DEVICE in SYS$MANAGER:SYLOGICALS.COM, as in this example:

```
...
$ ! Put PMDF files on DUA0:.
$ DEFINE/SYSTEM/EXEC/TRANS=(TERMINAL,CONCEALED) -
        MY_PMDF_DEVICE $1$DUA0:
...
```

If, at some later time, you need to move the PMDF directory tree to a different disk device, merely shut down PMDF (as explained in Section 1.4.1 of the *PMDF Installation Guide & Release Notes*, edit the logical name definition in SYS$MANAGER:SYLOGICALS.COM, manually redefine the device logical name, move the directory trees with the VMS BACKUP utility, and restart the PMDF queues.

6.2.3 Set up PMDF queues

Section 1.2.3 of the *PMDF Installation Guide & Release Notes* provides instructions for selecting a batch queue in which to run PMDF jobs. Do not use the queue name *MAIL$BATCH*, as recommended by Innosoft. The name contains a dollar sign ($), and so is reserved for use by Digital. (The PMDF startup procedure will still use *MAIL$BATCH* as a logical name for your queue.)

This book suggests that you create queues for exclusive by PMDF. Establish batch execution queues called *PMDF_nodename*, where *nodename* is the SCSNODE name (and DECnet node name) of each system that will run PMDF. If you are installing PMDF on a VAXcluster, also establish a generic batch queue called *PMDF_aliasname*, where *aliasname* is the DECnet alias name of your VAXcluster.

To initialize PMDF batch queues, create the command procedure SYS$COMMON:[SYS$STARTUP]PMDF_INIT_QUEUES.COM. For VMS V5.0-V5.4, execute the procedure using the SYSMAN STARTUP facility (recommended) or SYS$STARTUP:SYSTARTUP_V5.COM. For VMS V5.5 and later versions, run PMDF_INIT_QUEUES.COM only once, then save it to document how you initialized your PMDF queues. The batch/print subsystem introduced with VMS V5.5 does not require queues to be initialized after each system boot.

Example 6–1 shows a sample PMDF queue initialization procedure for a VAXcluster with two members running PMDF. Do *not* start the node-specific queues from this procedure, and do *not* use the *autostart* feature, introduced in VMS V5.5, for PMDF queues.

Example 6–1 Command procedure to initialize PMDF batch queues on a two-member VAXcluster

```
$ ! PMDF_INIT_QUEUES.COM:  initialize PMDF queues
$
$ ! Run this procedure from SYSMAN STARTUP for VMS versions before V5.5.
$ ! For VMS V5.5 and later versions, run this procedure manually and
$ ! only once.
$
$ ! Node-specific queues, to execute jobs that may run on any node as
$ ! well as those that require special facilities of this node.
$ ! Start these queues in SYS$STARTUP:PMDF_START_QUEUES.COM.
$ initialize /queue PMDF_ARNOL1 /batch /on=ARNOL1:: /base=4 /job=2
$ initialize /queue PMDF_ARNOL2 /batch /on=ARNOL2:: /base=4 /job=2
$
$ ! Cluster-wide generic queue, to receive jobs that may run on any node.
$ initialize /queue PMDF_ARNOLD /batch /start -
    /generic=(PMDF_ARNOL1,PMDF_ARNOL2)
```

Example 6–2 Command procedure to start PMDF batch execution queues on a two-member VAXcluster

```
$ ! PMDF_START_QUEUES.COM:  start PMDF execution queues
$
$ ! Run this procedure from SYSMAN STARTUP after all PMDF is started,
$ ! PMDF queues are initialized, and all networks started.
$
$ if 'f$edit(f$getsyi("SCSNODE"),"TRIM") .eqs. "ARNOL1" then -
    start /queue PMDF_ARNOL1
$ if 'f$edit(f$getsyi("SCSNODE"),"TRIM") .eqs. "ARNOL2" then -
    start /queue PMDF_ARNOL2
$ ! An alternative method, if all members have PMDF queues:
$ ! start /queue PMDF_'f$edit(f$getsyi("SCSNODE"),"TRIM")
```

Start PMDF batch queues in a command procedure SYS$COMMON:[SYS$STARTUP]PMDF_START_QUEUES.COM. Execute the procedure using the SYSMAN STARTUP facility (recommended) or SYS$STARTUP:SYSTARTUP_V5.COM.

Example 6–2 shows a sample PMDF queue startup procedure for a VAXcluster with two members running PMDF. Note that the node-specific queues are started as the node on which they run comes up.

6.2.4 Run VMSINSTAL

When you have prepared the device logical name, determined whether you have any PMDF entries in the SYSUAF, and set up the PMDF batch queues, install PMDF with VMSINSTAL according the directions in Section 1.5 of the *PMDF Installation Guide & Release Notes*, as supplemented by the suggestions in this section.

If you will be installing PMDF on a VAXcluster, perform the installation on any fast or lightly loaded VAX system in the cluster that is licensed to run PMDF. This section assumes that this installation is the first installation of PMDF on your VAX or VAXcluster system. The *PMDF Installation Guide & Release Notes* explains the differences between a new installation and an upgrade installation. Consider saving an autoanswer file in SYS$UPDATE as documentation of the installation choices you make, as suggested in Section 4.1.

The PMDF installation procedure asks a number of questions. The procedure's prompts and Section 1.5 of the *PMDF Installation Guide & Release Notes* provide directions for answering the questions. Recommended answers for selected questions follow:

- If you followed the suggestion to create a logical name for the PMDF device in Section 6.2.2, enter MY_PMDF_DEVICE:[PMDF] for the device and directory for PMDF files.
- If you have no PMDF server entry in the SYSUAF, allow VMSINSTAL to create one named PMDF. Accept the default name and UIC offered by the installation procedure.

Security caution: If you requested an autoanswer file, the password of the PMDF account will be written in the file. Edit the file after the installation is complete to delete the password, and purge the original version of the autoanswer file.

- Specify the same numeric offset from Universal Time as you did for the Jnet configuration procedure (Section 5.4).
- The source files are useful only for applying patches, a process which requires a Pascal compiler. Normally you should request that the source files not be installed.

When VMSINSTAL completes, if you added the PMDF command to the DCL tables and you are installing on a VAXcluster system, reinstall the DCL tables on all the nodes of the VAXcluster using SYSMAN. Then continue with the PMDF post-installation steps 1 and 2 in Section 1.6 of the *PMDF Installation Guide & Release Notes*.

6.2.5 Configure PMDF for automatic startup

This section supplements the instructions for Post-installation step 1 in Section 1.6 of the *PMDF Installation Guide & Release Notes*.

PMDF components and other software must be started in a specific order to prevent mishandling of mail. You can use either the SYSMAN STARTUP facility (recommended) or SYSTARTUP_V5.COM to start PMDF and other networking and mail software. Software components must be started in this order:

1. Initialize PMDF queues (VMS V5.0-V5.4 only): PMDF_INIT_QUEUES.COM
2. Install PMDF images and define PMDF logical names: PMDF_STARTUP command procedure
3. Start DECnet-VAX: STARTNET.COM
4. Start other network software, for example: UCX$STARTUP.COM or MULTINET_STARTUP.COM
5. Start DECwindows

6. Start Jnet: JNET_STARTUP.COM
7. Start PMDF queues (only needed on nodes with PMDF queues): PMDF_START_QUEUES.COM
8. Submit periodic PMDF jobs: PMDF_SUBMIT_JOBS.COM

Innosoft recommends that PMDF_STARTUP.COM be run before any networks are started. Because DECnet-VAX must be started before DECwindows, STARTNET.COM must be run from SYSTARTUP_V5.COM. If you will run PMDF over DECnet (either MAIL-11 or SMTP over DECnet), you must run PMDF_STARTUP before STARTNET, and thus, from STARTUP_V5 as well. Only if you will not be running PMDF over DECnet can you run PMDF_STARTUP with SYSMAN.

Initialization of PMDF batch queues is *only* required on VMS versions before V5.5. If you follow the recommendation to not use MAIL$BATCH and to initialize queues from a command procedure, you can run the procedure before or after PMDF_STARTUP, but you must run it before any networks that PMDF uses are started and before users are allowed onto the system.

If you are not using PMDF over DECnet, the SYSMAN utility is recommended for starting PMDF at each system reboot. To direct SYSMAN to execute the PMDF startup procedures in the correct order during the VMS startup procedure, enter, for all versions of VMS:

```
$ SYSMAN :== $SYSMAN
$ SYSMAN STARTUP ADD FILE PMDF_STARTUP.COM /PHASE=LPBEGIN
$ SYSMAN STARTUP ADD FILE PMDF_SUBMIT_JOBS.COM /PHASE=END
$ SYSMAN STARTUP ADD FILE PMDF_START_QUEUES.COM /PHASE=END
```

and enter, for VMS V5.0 through V5.4:

```
$ SYSMAN STARTUP ADD FILE PMDF_INIT_QUEUES.COM /PHASE=LPBEGIN
```

6.2.6 Make PMDF online books available to Bookreader

Step 2 of Section 1.6 of the *PMDF Installation Guide & Release Notes* suggests that you run PMDF_ROOT:[EXE]PMDF_DEFINE_BOOK.COM each time you start up your system to add the PMDF online library to the list of libraries searched by the DECwindows Bookreader. Because this procedure must be run after DECwindows is started, it cannot be run from SYS$MANAGER:SYSTARTUP_V5.COM. Use one of these methods to make the PMDF online books available to Bookreader:

- Copy the command procedure PMDF_DEFINE_BOOK.COM to the directory SYS$COMMON:[SYS$STARTUP], and use the SYSMAN STARTUP facility to run it in phase LPMAIN.
- Edit SYS$MANAGER:SYLOGICALS.COM to define DECW$BOOK in the system logical name table. Do not define it in the DECwindows logical name table, because the DECwindows startup procedures run after SYLOGICALS, and would overwrite your definition.

DECW$BOOK is a search list that has one value for each online library. The following lines show one way to define DECW$BOOK in SYLOGICALS.COM to make the online libraries for VMS, PMDF, and TGV MultiNet available to Bookreader:

```
...
$
$! Online documentation for Bookreader
$ DEFINE/SYSTEM/EXEC DECW$BOOK OLD_DEVICE:[DECW$BOOK],-
        PMDF_ROOT:[DOC],-
        MULTINET_ROOT:[MULTINET.DOCUMENTATION]
...
```

The version of Bookreader shipped with DECwindows Motif (DECwindows Version 3) supports the expansion of libraries in outline form by double-clicking on the library name in the library window. Unless the bookshelf for a library has a *TITLE* line, the library is listed only as ‘‘Library *n*’’, where *n* is an integer.

To cause Bookreader to display an informative name for the PMDF online library, enter:

```
$ SET DEFAULT PMDF_ROOT:[DOC]
$ COPY SYS$INPUT+PMDF.DECW$BOOKSHELF
_To: LIBRARY.DECW$BOOKSHELF;/CONCATENATE
TITLE\pmdf.decw$bookshelf\Innosoft PMDF for VMS
Ctrl/Z
```

This change also reduces by one the number of bookshelves a user must traverse to open the PMDF online books. Stop and restart Bookreader to make the change effective.

To make the online version of this book available as part of the PMDF online library, copy the online book file VMS_MAILER.DECW$BOOK to the directory PMDF_ROOT:[DOC] and set its protection to W:RE. To add the title of this book to the PMDF bookshelf file, enter:

```
$ APPEND SYS$INPUT PMDF_ROOT:[DOC]LIBRARY.DECW$BOOKSHELF
BOOK\vms_mailer\BITNET Postmaster's Guide for VAX/VMS Systems
Ctrl/Z
```

When you have finished this post-installation step, complete steps 5-8 in Section 1.6 of the *PMDF Installation Guide & Release Notes*, if applicable to your system. *Skip* steps 3-4; you will cover this material in detail as you work through Section 6.3 of this book and Chapter 3 of the *PMDF Installation Guide & Release Notes*.

6.3 Configure PMDF

This section provides instructions for:

1. Obtaining initial mailer tables (Section 6.3.1)
2. Running the PMDF autoconfiguration procedure (Section 6.3.2)
3. Manual steps to complete PMDF configuration (Section 6.3.3-Section 6.3.7)

The section concludes with a list of PMDF instructions to *avoid*, either because they are handled by autoconfiguration or because they are not recommended for BITNET nodes (Section 6.3.8).

6.3.1 Obtain mailer files

To generate PMDF tables, you must obtain up-to-date copies of the files DOMAIN NAMES and XMAILER NAMES initially and when the files are updated each month. (The use of current mailer tables is a CREN requirement.) Initial tables are shipped with PMDF, but unless your PMDF distribution includes the *current* tables, you should obtain the current tables immediately.

When your BITNET link is operational, you can obtain the current versions of these files by entering:

```
$ SEND LISTSERV@BITNIC GET DOMAIN NAMES
$ SEND LISTSERV@PUCC GET XMAILER NAMES
```

You can also send the *GET* commands to the servers in the text portion of electronic mail messages.

You can also obtain XMAILER NAMES from LISTSERV@BITNIC, but because the mailer for IBM VM systems, VM Mailer V2, is maintained at Princeton University, and because PUCC is a BITNET II core node, LISTSERV@PUCC is a better source for XMAILER NAMES.

If your node is not in the routing tables of all of the nodes between your node and PUCC, and between your node and BITNIC, ask the Postmaster of the node adjacent to yours to obtain current versions of these files and forward them to you.

To have new versions of the mailer files sent to you each time they are updated, subscribe to LISTSERV's *automatic file distribution* (*AFD*) service. Log into the account to which you would like the servers to send the files, for example, POSTMASTER. Then enter:

```
$ SEND LISTSERV@BITNIC AFD ADD DOMAIN NAMES
$ SEND LISTSERV@PUCC ADF ADD XMAILER NAMES
```

You can also send the *AFD ADD* commands to the servers in the text portion of electronic mail messages.

When the files arrive either initially or after a monthly update, use the Jnet RECEIVE utility to receive them into the directory PMDF_ROOT:[TABLE].

Consider using RMS version numbers to identify the versions of XMAILER NAMES, DOMAIN NAMES, and other files that are updated monthly. These files have internal four-digit version numbers, consisting of the last two digits of the year and two digits for the update number in the current year, for example, 9202 for the second update in 1992. Unless there is an extra update, for example, to correct an error, the last two digits normally correspond to the month. The file name, type, and version of your copy of the February 1992 DOMAIN NAMES file would thus be DOMAIN.NAMES;9202.

The use of XMAILER NAMES and DOMAIN NAMES is described in Section 6.3.2.

6.3.2 Run PMDF autoconfiguration

Section 3.2 and Chapter 4 of the *PMDF Installation Guide & Release Notes* describe and illustrate the autoconfiguration of PMDF. This section provides additional suggestions for PMDF autoconfiguration of BITNET nodes.

1. If DECnet-VAX is available on your system, *SET HOST/LOG* to the system to be autoconfigured. The log provides a valuable record of the autoconfiguration session. If you are autoconfiguring a VAXcluster, set host to the fastest available system, as autoconfiguration is computationally intensive!
2. Log into a fully privileged account to autoconfigure PMDF. A personal account is preferred to the SYSTEM account for this purpose. Digital recommends that SYSTEM be used only for software installation and standalone backups, and the use of SYSTEM renders useless the configuration file comments identifying the user who ran the procedure.
3. Set your default device and directory to PMDF_ROOT:[TABLE].
4. The autoconfiguration procedure checks the values of certain DCL symbols to set configuration options. Setting these symbols is recommended over editing the autoconfiguration procedure, because changes to the autoconfiguration procedure will be lost when you upgrade PMDF. You can either make a permanent note on what symbols you set, or if you set many symbols, write a command procedure to set the symbols and then run the autoconfiguration procedure.

   Setting the following symbols is recommended:

   - For all BITNET nodes, set *SKIP_XMAILER* to *"/nodename1/nodename2/.../"*, where the *nodename*s are a list of all the NJE names for your system or VAXcluster that appear in XMAILER NAMES. This option avoids configuring these names twice, once as a BITNET node and once as the local node. For example, if your system is a standalone node with NJE name KNOX, then enter:

     ```
     $ SKIP_XMAILER == "/KNOX/"
     ```

   - For all BITNET nodes, set *DO_CRDB* to *1*. This option causes your configuration to use an indexed file to store the large amount of configuration information required for BITNET. Enter:

     ```
     $ DO_CRDB == 1
     ```

   - For VAXclusters, set *BITNET_QUEUE* to *PMDF_scsnode*, where *PMDF_scsnode* is the name of a PMDF batch queue that runs only on the VAXcluster member with the external BITNET links. This option causes all batch jobs that send mail on BITNET to run on the node with the external links, which avoids the NJE transfer of mail files between VAXcluster members. For example, if the external link to the DECUS Symposium VAXcluster is on node DECUSA, then enter:

```
$ BITNET_QUEUE == "PMDF_DECUSA"
```

5 To run the autoconfiguration procedure, enter:

```
$ @PMDF_ROOT:[EXE]CONFIGURE
```

6 If your system is on a TCP/IP network, you are asked your system's host name in Part One of the autoconfiguration dialogue. You should usually take the default. If your system is a homogeneous VAXcluster, you will edit PMDF_ROOT:[TABLE]PMDF.CNF in Section 6.3.3 to add the TCP/IP host names of the other cluster members and the TCP/IP host alias for the VAXcluster system to your PMDF configuration, so that you can receive mail addressed to the TCP/IP host name of any cluster member.

7 You are asked your system's NJE node name in Part Two of the autoconfiguration dialogue. If your system is a homogeneous VAXcluster, enter the Jnet cluster name. This name will be the return address for all mail sent to BITNET destinations. You will edit PMDF_ROOT:[TABLE]PMDF.CNF in Section 6.3.3 to add the NJE node names of all cluster members running Jnet to your configuration, both with and without the .BITNET pseudodomain, so that you can receive mail addressed to the NJE node name of any cluster member.

8 You are asked if your system is a BITNET gateway in Part Two. Answer *YES*. Your system is a BITNET gateway for mail to its own domain-style name, even if it doesn't receive mail for routing to other systems.

9 Next you are asked for the domains for which your system serves as a gateway. At a minimum, enter your system's domain-style name, even if your system doesn't receive mail for routing to any other systems. For example, if you are configuring PMDF for BITNET node ARNOLD with domain name Arnold.Com, enter *Arnold.Com* in response to this question.

10 Next you are asked for the name of the mailbox the gateway uses. Accept the default, *MAILER*. The purpose of the mailbox is much more obvious from the name if you use MAILER than if you use SMTPUSER, and MAILER is the default name of the sending user for outbound BSMTP mail.

11 You are asked for the official local host name in Part Four of the autoconfiguration dialogue. If your system is a homogeneous VAXcluster, enter the domain-style name of the VAXcluster, not that of the cluster member. This name will be the return address for all mail except that sent to BITNET destinations.

12 You are also asked for the account to which mail for Postmaster is to be sent. Enter *POSTMASTER@* and the official host name of this homogeneous VAXcluster or system. You can later forward POSTMASTER's mail to another account, if necessary.

13 In Part Five of the autoconfiguration dialogue, you are asked to confirm or re-specify the file specifications of the files the procedure will use. The defaults are recommended, except for the files PMDF_ROOT:[TABLE]GATEWAY.RULES and PMDF_ROOT:[TABLE]BGATEWAY.RULES. Take the defaults for these files if there are VAX systems running PMDF, that are on the same DECnet or TCP/IP network and not on BITNET and not in the same VAXcluster as yours, and that will route mail to BITNET through your system. Otherwise enter *NL:* for these two files.

When the autoconfiguration procedure finishes, review Chapter 5 in the *PMDF System Manager's Guide*. Much of the chapter explains how to manually set up the configuration you have just created automatically. Certain manual steps are still required, and are explained in the following sections. Section 6.3.8 provides more information on which steps you should *not* do.

6.3.3 Edit PMDF configuration file

The autoconfiguration procedure writes the PMDF configuration file, PMDF_ROOT:[TABLE]PMDF.CNF, that recognizes mail for the TCP/IP host name or BITNET node name as local mail. On a homogeneous VAXcluster system, each cluster member and the VAXcluster itself can be known by

BITNET (NJE) node name,
domain (TCP/IP host) name,
short-form aliases for the names above,
DECnet node name, and
domain literal name (IP address).

The usual intention is to recognize mail to any of these names as local mail. Use an editor to add all the missing names to your own new PMDF configuration file. Insure that the TCP/IP host name, BITNET node name (with and without *.BITNET*), and DECnet node name of every system in your VAXcluster maps to the domain name of the VAXcluster itself.

Example 6–3 shows the PMDF configuration file for a two-node VAXcluster system on both BITNET and the Internet. The file has been manually edited to include the full list of names recognized as local.

Certain characteristics of PMDF's operation are controlled for each delivery *channel* by *channel keywords* in the PMDF configuration file. Beginning with V4.0, PMDF supports the configuration of a *default channel*. The default channel exists only to allow modification of the default channel keywords. (The default channel is not documented until PMDF V4.1.)

BITNET nodes should normally have a default channel with two keywords: *LOGGING* and *SENDHEAD*. (*SENDHEAD* is called *POSTHEADONLY* beginning with PMDF V4.1.)

Tracing individual mail files, for troubleshooting or to confirm delivery, is an important duty of the Postmaster. Tracing BITNET mail between mailers requires that mail files be logged at the mailer layer. Unfortunately, the autoconfiguration procedure shipped with PMDF

Example 6–3 PMDF configuration file for a BITNET node

```
! PMDF.CNF - PMDF configuration file for the two-member
! VAXcluster system Arnold.Com.
!
! Rewrite rules for the local host/cluster
! Domain names
Arnold.Com                              $U@Arnold.Com
Arnold1.Arnold.Com                      $U@Arnold.Com
Arnold2.Arnold.Com                      $U@Arnold.Com
! BITNET names
ARNOLD.BITNET                           $U@Arnold.Com
ARNOL1.BITNET                           $U@Arnold.Com
ARNOL2.BITNET                           $U@Arnold.Com
! DECnet and short form names
Arnold                                  $U@Arnold.Com
ARNOL1                                  $U@Arnold.Com
Arnold1                                 $U@Arnold.Com
ARNOL2                                  $U@Arnold.Com
Arnold2                                 $U@Arnold.Com
! TCP/IP domain literals
[192.135.80.1]                          $U@Arnold.Com
[192.135.80.2]                          $U@Arnold.Com
[192.135.80.3]                          $U@Arnold.Com
! All other domain literals
[]                                      $U%[$L]@MTCP-DAEMON
!
! BITNET rewrites included from external files
!
<PMDF_ROOT:[TABLE]GATES.RULES
<PMDF_ROOT:[TABLE]TCPIP.RULES
!
! Rewrite for BITNET gateways
!
BITNET-GATEWAY                          $U@BITNET-GATEWAY

! Defaults channel
! (sets default channel keywords for all channels)
!
defaults sendhead logging
! For PMDF V4.0.
! At PMDF V4.1, change 'sendhead' above to 'postheadonly'.

l nox_env_to
Arnold.Com

bit_local 733 single nosmtp
Jnet-DAEMON

! BITNET channel definitions included from external files
!
<PMDF_ROOT:[TABLE]GATES.CHANS

! BITNET gateway channel
!
bit_gateway nox_env_to period 4
BITNET-GATEWAY

mtcp_local single_sys smtp nox_env_to mx
MTCP-DAEMON
```

generates configurations with logging disabled. The *LOGGING* channel keyword on the DEFAULT enables logging for all channels.

When PMDF encounters a permanent delivery error, it trys to return the message, along with a notification of the error, to the sender. Optionally and by default, PMDF sends a *copy* of this nondelivery notice to the Postmaster. PMDF also sends the notice to the Postmaster if it encounters a permanent delivery error while trying to send the nondelivery notice to the sender of the original message.

If the nondelivery notice contains the text of the original message (the default), the privacy of the original message can be compromised by careless handling by the Postmaster. The *SENDHEAD* (or *POSTHEADONLY*) keyword helps the Postmaster to maintain the privacy of user mail.

The PMDF configuration file in Example 6–3 shows the addition of a default channel at the proper place, just before the local channel.

Do not specify the *HEADEROMIT* or the *HEADERBOTTOM* keywords on the default channel. The former makes it very difficult to diagnose mail routing problems. The latter forces the Postmaster to scroll through the user's message to read the mail headers at the bottom.

Users may object to scrolling through many mail headers at the top of each message. Users who thoroughly understand the disadvantages of discarding mail headers at local delivery can use PMDF's integrated DELIVER facility to discard some or all headers from their own mail or otherwise process it upon arrival. The details of setting up such a channel are outside the scope of this book, however. See Section 2.3 of the *PMDF System Manager's Guide* for information on DELIVER.

6.3.4 Run LONG_NAMES

If there are mailboxes on your system (including SYSUAF entries and forwarding addresses in the VMSmail profile) with names longer than eight characters, review Section 5.9.4 of the *PMDF System Manager's Guide* and take the most appropriate action for your system. (POSTMASTER is such a mailbox name, but it is handled by the PMDF autoconfiguration procedure.)

In most cases where there are mailbox names (other than POSTMASTER) longer than eight characters, it is useful and harmless to run the procedure PMDF_ROOT:[EXE]LONG_NAMES.COM. This procedure creates aliases for names longer than eight characters, and warns you about any mailboxes with the same first eight characters.

After you run LONG_NAMES, append the new aliases, in the file PMDF_ROOT:[TABLE]ALIASES.TMP, to the end of PMDF_ALIAS_FILE (normally PMDF_ROOT:[TABLE]ALIASES.). Deal with conflicting mailbox names, listed in the file PMDF_ROOT:[TABLE]CONFLICTS.TMP, by changing the user's login name (recommended) or by manually adding an alias for the mailbox to the PMDF_ALIAS_FILE.

6.3.5 Edit PMDF aliases file

Edit the PMDF_ALIAS_FILE (normally PMDF_ROOT:[TABLE]ALIASES.) to forward mail for additional system-manager-like mailboxes to the Postmaster, to add the aliases generated by LONG_NAMES, and to add any locally useful aliases and mailing lists. See Section 3.3 of the *PMDF System Manager's Guide* for background information and instructions.

Example 6–4 shows an alias file for a small VAX system on BITNET. It forwards all system management names to POSTMASTER, then forwards POSTMASTER to the personal user name of the current Postmaster, allowing Postmaster duties to be easily reassigned. The example also shows nickname aliases (for local and remote mailboxes) and a mailing list, allowing mail to be locally fanned out to a number of mailboxes.

Example 6–4 PMDF alias file for a BITNET node

```
! ALIASES. - PMDF aliases file for Arnold.Com.
!
! Address(es) for the local Postmaster
!
field:                                  system
maint:                                  postmaster
pmdf:                                   postmaster
pmdf_user:                              postmaster
postmaster:                             arnold
postmast:                               postmaster
root:                                   postmaster
smtpuser:                               postmaster
system:                                 postmaster
!
! BITNET gateway alias
!
mailer:                                 mailer@bitnet-gateway
!
! Locally useful aliases
!
info-pmdf:                              info-pmdf@ymir.claremont.edu
service:                                arnold, maxwell
steve:                                  arnold
!
! Aliases for long names generated by PMDF_ROOT:[EXE]LONG_NAMES.COM
!
DSN$SERV: DSN$SERVER
FARMINGT: FARMINGTON
MAIL$SER: MAIL$SERVER
MIRRO$SE: MIRRO$SERVER
NML$SERV: NML$SERVER
SYSTEST_: SYSTEST_CLIG
VPM$SERV: VPM$SERVER
```

There can be no duplicates in ALIASES. The autoconfiguration procedure creates an alias for POSTMAST, as does LONG_NAMES. When you add ALIASES.TMP to ALIASES., delete the alias for POSTMAST created by LONG_NAMES.

6.3.6 Compile configuration

Because of the size of the mailer tables required for BITNET nodes, *always compile* your PMDF configuration to improve performance. Compiled configurations are described in the *PMDF System Manager's Guide*, Section 3.5.

6.3.6.1 Compile maximum configuration

When you compile the PMDF configuration for the *first* time, and after any major change in the size of your mailer tables (for example, upon joining BITNET), you must compute the sizes of internal PMDF tables and store the sizes in the PMDF *options file*. It is recommended that BITNET sites repeat this step annually, to tune the size of PMDF tables to the amount of data to be stored.

To create a new option file with the correct size parameters for your configuration, enter:

```
$ PMDF CNBUILD/NOIMAGE/MAXIMUM/OPTION
```

Additional information on this process is in Section 3.5.2 of the *PMDF System Manager's Guide*.

6.3.6.2 Install compiled configuration

If you use a compiled PMDF configuration (as should all BITNET nodes), you must recompile and reinstall the PMDF configuration each time you change the PMDF configuration, alias, or options file. Since you must do this at least monthly, when the DOMAIN NAMES and XMAILER NAMES files are updated, it speeds your work and reduces the chance of errors if you use a command procedure for these tasks.

Consider using a command procedure called COMPILE_INSTALL.COM, which can be conveniently kept in the directory PMDF_ROOT:[TABLE]. This procedure can be used whenever PMDF.CNF or ALIASES. is changed. For incorporating monthly table updates into the PMDF configuration, call this procedure from another command procedure, described in Section 7.4.

COMPILE_INSTALL compiles the PMDF configuration with the CNBUILD utility, sets the correct file protections on the compiled configuration file (an important and easily forgotten step), installs the compiled configuration on every node of the VAXcluster of which your system is a member, and purges the compiled configuration file to one version. (If your system is not a member of a VAXcluster and you don't anticipate that will change, you can easily modify the procedure to work slightly faster on a single node by executing INSTALL commands directly instead of via SYSMAN.) The procedure follows:

```
$ PMDF CNBUILD
$ SET PROTECTION=W:RE PMDF_CONFIG_DATA
$ SYSMAN
SET ENVIRONMENT/CLUSTER
SET PROFILE/PRIVILEGES=ALL
DO IF F$FILE_ATTRIBUTES ("PMDF_CONFIG_DATA","KNOWN") THEN -
        INSTALL REPLACE PMDF_CONFIG_DATA /OPEN /HEADER /SHARED
DO IF .NOT. F$FILE_ATTRIBUTES ("PMDF_CONFIG_DATA","KNOWN") THEN -
        INSTALL CREATE PMDF_CONFIG_DATA /OPEN /HEADER /SHARED
DO PMDF RESTART BN_SLAVE
$ PURGE PMDF_CONFIG_DATA
```

6.3.7 Move LMD.COM

In order for PMDF to handle all incoming BITNET mail, the Local Mail Delivery command procedure provided with Jnet, JAN_COMMON:[SYS]LMD.COM, must be replaced with one of the versions distributed with PMDF. This important step is described in Section 5.9.1 of the *PMDF System Manager's Guide*, and must be repeated every time you upgrade either Jnet or PMDF.

Use the correct version of LMD.COM for the version of Jnet installed on your system. Compare the PMDF-supplied version with the Jnet supplied version and review all discrepancies. There may be customizations by the person who installed Jnet, and if they are still required, the changes must be merged into the version of LMD.COM provided with PMDF.

After you have copied the correct version of LMD.COM to the Jnet directory tree, stop and restart the Jnet local daemon (on each cluster node if your system is a member of a Jnet cluster). The *PMDF System Manager's Guide* incorrectly calls this ''shutting down Jnet's local servers''. The Jnet documentation reserves the term *shut down* for the stopping of *all* the link daemons on a node, not just the local daemon.

6.3.8 PMDF configuration steps to avoid

Many of the instructions in Chapter 5 of the *PMDF System Manager's Guide* should be skipped because the procedure is not recommended or because the automatic configuration utility has made the required changes automatically. This section provides a list of ''don't''s to help the new BITNET Postmaster skip over these instructions confidently. After you have your mailer configured and operating successfully, feel free to return to these sections of the PMDF documentation to increase your understanding of how PMDF works.

- **Don't** add a BITNET channel to your configuration (*PMDF System Manager's Guide*, Section 5.3 and 5.4). The autoconfiguration process does this for you.
- **Don't** set up any option files for BITNET channels (*PMDF System Manager's Guide*, Section 5.5). Take the defaults to send class N PUNCH-type files, expand tabs to spaces, and handle long lines. These defaults were designed specificly for BITNET.
- **Don't** define systems accessible to NJE (*PMDF System Manager's Guide*, Section 5.6). The autoconfiguration process does this for you.
- **Don't** set up a channel for all addresses ending in *.BITNET* (*PMDF System Manager's Guide*, Section 5.6). The autoconfiguration process defines each registered BITNET node to PMDF individually, and so eliminates the need for such a channel. The *PMDF System Manager's Guide* lists the disadvantages of configuring a channel for all addresses ending in *.BITNET* (a ''catch-all'' channel).
- **Don't** set up channels for each BITNET node and gateway (*PMDF System Manager's Guide*, Section 5.7). The autoconfiguration process does this for you.

- **Don't** define JAN_BN_MASTER_FLAGS as 1 for Jnet V3.5 and later versions (*PMDF System Manager's Guide*, Section 5.7). You already have:

  ```
  $ DEFINE/EXEC/SYSTEM JAN_DEFAULT_IMAGE_FLAGS 1
  ```

  in JAN_COMMON:[SYS]JANSITECOMMON.COM if you configured a Jnet cluster.

- **Don't** write directly to Henry Nussbacher about registering a domain (*PMDF System Manager's Guide*, Section 5.8). The correct address and procedure for setting up a domain is covered in Section 6.6 of this book.
- **Don't** edit BITNET_DOMAINS.COM. You may need to edit the version of BITNET_DOMAINS_DRIVER.COM created by CONFIGURE to define addition symbols from the list in Section 5.8 of the *PMDF System Manager's Guide* to get the optimal configuration for your system. You can also set these symbols before running CONFIGURE and they will be passed through to BITNET_DOMAINS_DRIVER.
- **Don't** run BITNET_DOMAINS.COM directly. Always run it from PMDF_ROOT:[EXE]CONFIGURE.COM or BITNET_DOMAINS_DRIVER.COM to set up symbol definitions that control customization.
- **Don't** follow the procedure in Section 5.8.1 of the *PMDF System Manager's Guide* to register your mailer. The *:MAILER* tag mentioned in that section is obsolete. Instead follow the instructions in Section 6.6 to operate as a trusted mailer.
- **Don't** use the BSMTP commands *VERB* and *TICK* (*PMDF System Manager's Guide*, Section 5.8.2). Most gateways return undeliverable mail with an explanation of why it could not be delivered, so the messages resulting from the use of *VERB* and *TICK* are superfluous.
- **Don't** attempt to use the MULTIGATE keyword (*PMDF System Manager's Guide*, Section 5.8.3). Leave this complex configuration task to BITNET_DOMAINS, which sets up your mailer tables with MULTIGATE automatically.
- **Don't** simulate mail delivery by NJE to systems that have no NJE software (*PMDF System Manager's Guide*, Section 5.10). Instead, establish domain-style names for the non-NJE systems in the same domain as your BITNET node, and configure PMDF to forward mail to the node over a non-NJE network link (for example, MAIL-11 and DECnet or SMTP and TCP/IP). See Appendix B for further information.
- **Don't** set up your mailer manually (*PMDF System Manager's Guide*, Section 5.11.2). BITNET_DOMAINS automatically puts the lines

  ```
  ! Rewrite for BITNET gateways
  !
  BITNET-GATEWAY                          $U@BITNET-GATEWAY
  ```

  and

```
! BITNET gateway channel
!
bit_gateway nox_env_to period 4
BITNET-GATEWAY
```

in your PMDF.CNF file and the line

```
mailer:                                 mailer@bitnet-gateway
```

in your ALIASES. file.

6.4 Start up PMDF on all VAXcluster nodes

After PMDF is installed and configured, start it running. First start all networking software, then run the command procedures listed in Section 6.2.5 in the correct order. If you are configuring a VAXcluster system, run PMDF_STARTUP and PMDF_START_QUEUES on each node of the cluster that is licensed for PMDF.

When PMDF is started, test your configuration by sending mail to each of the names of the local system or VAXcluster, and through each type of channel to remote systems. If you find any problems, review your configuration and the documentation. If you require help, call Innosoft or send mail to the INFO-PMDF mailing list (Section 6.7).

6.5 Update BITNET registration

When PMDF is fully operational, register your mailer by sending an UPDATE job to BITNET. Include a *:SERVERS1* tag (which replaced the *:MAILER* tag in BITEARN NODES in 1991) to register your mailer and an *:INTERNET* tag to inform LISTSERV of the domain-style host name of your node. (LISTSERV uses this information to determine the NJE address for users accessing LISTSERV by mail. See Section 6.6.1 for additional information.) The file NEWTAGS DESCRIPT[3], available from LISTSERV@BITNIC[2], describes these tags in more detail.

A sample update job step to update the entry for a stand-alone VAX/VMS system is shown in Example 6–5. The UPDATE job steps to update node entries for a two-node VAXcluster with a Jnet cluster name are shown in Example 6–6. Features of the job steps are explained in the following list.

Example 6–5 UPDATE job to register a mailer and Internet address in BITEARN NODES for a standalone VAX system

```
MODIFY NODE ARNOLD
:SERVERS1❶.MAILER❷@ARNOLD❸(MAIL❹,❺,,,P_POSTMAST❻)
:INTERNET.Arnold.Com❼
```

❶ The *:SERVERS1* tag defines the network services provided by servers such as mailers.

Example 6–6 UPDATE job to register a mailer and Internet address in BITEARN NODES for a two-node VAXcluster system

```
MODIFY NODE DECUS
:SERVERS1❶.MAILER❷@DECUS❸(MAIL❹,❺,,,P_POSTMAST❻)
:INTERNET.Sympos.DECUS.Org❼

MODIFY NODE DECUSA
:SERVERS1❶.MAILER❷@DECUS❸(MAIL❹,❺,,,P_POSTMAST❻)
:INTERNET.Sympos.DECUS.Org A.Sympos.DECUS.Org❼

MODIFY NODE DECUSB
:SERVERS1❶.MAILER❷@DECUS❸(MAIL❹,❺,,,P_POSTMAST❻)
:INTERNET.Sympos.DECUS.Org B.Sympos.DECUS.Org❼
```

❷ Specify the recommended user name: *MAILER*. This is the ‘‘name of the mailbox the BITNET gateway uses’’ in the terminology of the PMDF autoconfiguration procedure. Use of other names is outside the scope of this book.

❸ Specify the NJE name of the Jnet cluster, or if the mailer does not run on a cluster, the node itself. Specify the NJE name of another node if that node is the mail handler for this node. Include the node name even if it is the node defined by this entry. Code no spaces after the nodename.

❹ *MAIL* specifies that this is a mail server, or mailer. At press time, mailers are the only recognized type of servers.

❺ There is no need to specify the arguments omitted in this example. The defaults for these arguments (*PUNCH* for the output file format, *M* for the output class, and *BSMTP* for the message transfer protocol) are the correct values for VAX/VMS systems running Jnet and PMDF.

❻ Specify the name of the people tag of the Postmaster. If you followed the recommendation in Section 5.7.3, specify the people tag you added to your member entry for the postmaster user, *P_POSTMAST*.

❼ Specify the TCP/IP host name of the node or VAXcluster. If this entry is for a member of a Jnet cluster, specify the TCP/IP host name of the VAXcluster host alias, then the individual member.

6.6 Register domain gateway with BITNIC

To inform other networked systems that your domain (including a domain-style name for a BITNET-only node) exists and how to reach it, you must register your domain. Internet hosts find out how to reach your domain through the *domain name system* (*DNS*). Providing DNS information to other hosts on the network is called *name service*.

BITNET nodes find out how to reach your domain through entries in local mailer tables. These table entries are generated from DOMAIN NAMES, which is centrally maintained by BITNIC and available from LISTSERV@BITNIC. The entries in DOMAIN NAMES are made up of tags that have the same syntax as the tags in BITEARN NODES. These tags are described in DOMAIN GUIDE, with updates and clarifications in Section 6.6.1 of this book.

There are two possible situations:

1. If your system is or will soon be connected to the Internet, you have already registered a domain name with the DDN NIC and arranged for name service for your domain, as described in Section 3.4.5. Sites in this situation arrange for name service themselves as part of the process of connecting to the Internet, and need only establish an entry in DOMAIN NAMES. A sample mail file to register a domain for a site on both BITNET and the Internet is described in Section 6.6.2.
2. If you have no immediate plans to connect to the Internet, CREN will register your domain name with the DDN NIC for you at the same time it is added to DOMAIN NAMES, and arrange for Harvard University and the University of California–Berkeley to provide name service for your domain. Sites in this situation must provide additional information so that the BITNIC can register your domain name with the DDN NIC. A sample mail file to register a domain for a BITNET-only site is described in Section 6.6.3.

If you have not received a copy of DOMAIN GUIDE in the TECHREP packet or over the network, obtain a copy from LISTSERVE@BITNIC.

The procedures described in DOMAIN GUIDE may be used by:

- Members and affiliates of BITNET
- Members of Cooperating Networks that use the BITNET Network Information Center (BITNIC) as the BITNET registration authority
- Country coordinators of other Cooperating Networks, such as EARN

Participants in Cooperating Networks that do not use the services of the BITNIC should register with their national registration authority using the procedures established for their country, which are outside of the scope of this book.

To register a domain name with BITNET, and optionally, with the DDN NIC, a file must be mailed from the TECHREP address for your organization to DOMAINS@BITNIC. Only sites registered in BITEARN NODES have a TECHREP, so your organization must already have a member entry in BITEARN NODES to use this procedure. Accepting domain registrations from the TECHREP only provides an additional check that only a single domain name is ever registered for any organization. For additional information, see Section 3.4.4.

This section provides supplementary information to the procedure in Part 2 of DOMAIN GUIDE (the version dated April 1992) and two additional examples.

6.6.1 Tags in DOMAIN NAMES

To register a domain with BITNIC, your mail to DOMAINS@BITNIC must specify values for the *:NICK*, *:MAILER*, *:SERVED*, *:SITE*, *:GATEMAST*, and *:INTERCONNECT* tags in DOMAIN NAMES. This section provides clarification of the permitted values of these tags. This information supplements the descriptions of the tags at the end of DOMAIN GUIDE.

The *:MAILER* tag should indicate the same NJE address for the mailer as the *:SERVERS1* tag in the BITEARN NODES entry. (The *:SERVERS1* tag in the BITEARN NODES replaced the *:MAILER* tag in BITEARN NODES in 1991, and is still translated to a *:MAILER* tag in XMAILER NAMES.)

The value of the *:GATEMAST* should be the NJE address of the Postmaster for the domain. (It is not necessary to store the Internet address of the Postmaster; it is always ‘‘Postmaster@’’ and the fully-qualified domain name.) Register the POSTMAST mailbox instead of the mailbox of a specific person to make it easier to delegate Postmaster duties to a different person by forwarding mail for the POSTMASTER user on your system.

There has been much discussion among BITNET network managers concerning the interpretation of the *:INTERCONNECT* tag in DOMAIN NAMES, described in DOMAIN GUIDE, and the *:INTERNET* tag in BITEARN NODES, described in NEWTAGS DESCRIPT.

The *:INTERNET* tag, described in Section 6.5, is to allow NJE and domain-style addresses of users of the LISTSERV application to be associated, and must not be used for mail routing. The *:INTERCONNECT* tag is used to indicate that mailers on BITNET and Internet may route mail to hosts in this domain over the Internet, either unconditionally (*:INTERCONNECT.YES*) or only if the sending mailer and TCP/IP software supports MX records (*:INTERCONNECT.MX*).

Postmasters of IBM nodes on both BITNET and the Internet and running VM and the VM Mailer V2 should run John Voigt’s DOMAIN EXEC to tailor their VM Mailer configurations if they prefer to send mail to domains that have Interconnect YES or MX over the Internet. PMDF does this automatically during autoconfiguration unless the domain name is included in the value of the symbol *FORCE_BITNET*. (See the *PMDF System Manager’s Guide*, Section 5.8, for further information on the the *FORCE_BITNET, FORCE_INTERNET,* and *FORCE_INTERBIT* symbols.)

If your organization prefers inbound mail to arrive by BITNET, code *:INTERCONNECT.NO*, even if all your hosts are directly connected to the Internet.

Note that this preference only applies to mail addressed to domain-style names. Mail to NJE addresses should always be routed directly over BITNET from another BITNET node or to an INTERBIT gateway from an Internet host and finally delivered by BITNET. If inbound routing via BITNET is not what your organization prefers, make sure all outbound mail has a domain-style address return address, and ask users to inform their correspondents that domain-style addressing is preferred.

6.6.2 Registering an Internet domain name with BITNIC

This section provides a partially hypothetical example of the registration of a BITNET mail gateway by a CREN affiliate that already has registered a domain with the DDN NIC. For an example involving a member that has not already registered with the DDN NIC, see Section 6.6.3 of this book.

Arnold Consulting anticipates a direct Internet connection, so it registered its domain name with the DDN NIC directly, and arranged for name service for its domain, as described in Section 3.4.5. Example 6–7 shows the content of the mail message that must be sent to DOMAINS@BITNIC from ARNOLD@ARNOLD (the TECHREP address for Arnold Consulting) to register the company's BITNET mail gateway to the domain Arnold.Com.

Example 6–7 Mail to DOMAINS@BITNIC to register the Arnold.Com domain with BITNET

```
Domain:     Arnold Consulting
Name:       Arnold Consulting Local Area Network
Gateway:    MAILER@ARNOLD
Gatemaster: POSTMAST@ARNOLD
-------------------------------------------------------------
:NICK.Arnold.Com :MAILER.MAILER@ARNOLD BSMTP 3 :SERVED.NO
:SITE.Arnold Consulting Local Area Network
:GATEMAST.POSTMAST@ARNOLD :INTERCONNECT.YES
-------------------------------------------------------------
```

In comparing Example 6–7 to Example 6–8, notice these differences:

- The value of the *:SERVED* is *NO* because Arnold Consulting has arranged for name service itself. BITNIC, Berkeley, and Harvard will not automatically provide this service.
- The value of the *:INTERCONNECT* is *YES* because Arnold Consulting will be directly connected to the Internet, and nodes on both the Internet and BITNET may send mail to the domain via the Internet if they prefer.
- Items 1-10 are omitted because Arnold.Com is already registered with the DDN NIC, and provided the necessary information to the DDN NIC directly.

To avoid the loss or return of mail, the example file must not be mailed to DOMAINS@BITNIC until Arnold's primary and secondary name service and Internet connection are functional.

6.6.3 Registering a new domain name with BITNIC and the DDN NIC

This section provides a partially hypothetical example of the registration of a BITNET mail gateway by a CREN member that has not registered a domain with the DDN NIC. For an example involving an affiliate that has already registered with the DDN NIC, see Section 6.6.2 of this book.

Boston College is a member of CREN, and has no immediate plans to connect its VAX systems to the Internet. Nevertheless, to allow transparent mail addressing from the Internet to users of the Computer Center, the college is registering a domain name with BITNET and with the DDN NIC through BITNIC. Example 6–8 shows the content of the mail message that must be sent to DOMAINS@BITNIC from

MCCARTHY@BCVMCMS (the TECHREP address for Boston College) to register the domain BostonCol.Edu with BITNET.

Note in Example 6–8 that even though BCVMS is a Jnet cluster consisting of BCVAX1 and BCVAX2, it is only necessary to register the domain once. BCVMS, the Jnet cluster name, is given as the NJE node name of the gateway for the domain, and all users of BCVAX1, BCVAX2, and any future nodes in the BCVMS cluster can receive all there mail through PMDF running on either cluster node. Items 1-10 provide information required by the DDN NIC to register the domain, and will be passed from BITNIC through to the DDN NIC as part of the registration process.

6.7 Subscribe to relevant network discussions

Most of the information required to keep BITNET and the Internet running smoothly comes over the networks themselves. (An exception is notifications of unscheduled failures of nearby network connections. For reporting and repairing these, the telephone numbers in BITEARN NODES are used.) Much of this information travels as part of *LISTSERV lists*, *Internet discussion groups*, and network *news*.

The role of LISTSERV as a provider of public BITNET files has already been mentioned. While LISTSERV has many functions, the other main function is to support a form of group discussion called a LISTSERV list. A full discription of LISTSERV is outside the scope of this book, but in summary, sending mail to the list address causes everyone who is subscribed to the list to receive a copy. Many lists support files as well as mail. LISTSERV lists use several sophisticated distribution algorithms to conserve network bandwidth and allow remote network users to manage their own subscriptions by sending messages, mail, or even files to the LISTSERV NJE address.

Most discussions specific to BITNET and its cooperating networks take place on lists supported by LISTSERV. The most important LISTSERV lists and directions for subscribing are discussed in Section 6.7.1.

Like LISTSERV lists, the user interface for Internet discussions is electronic mail. However, simple electronic mail exploder software and a willing list coordinator are all that is required to host an Internet discussion. Subscription is usually manual. The most important Internet discussions and directions for subscribing are discussed in Section 6.7.2.

Most LISTSERV lists and many Internet discussions are gatewayed to network news. News uses a flooding algorithm to send all articles to most news servers, and is most useful when many different users on one node participate in a discussion. News has a separate user interface from electronic mail, an advantage for users that want to keep urgent or personal mail separate from network discussions. Investigate installing ANU (Australian National University) News and obtaining a news feed if you find that many individual users are participating in LISTSERV or Internet discussions that are also available as news. News feeds can come over BITNET, the Internet, and other network transports. Further

Example 6–8 Mail to DOMAINS@BITNIC to register the BostonCol.Edu domain with BITNIC and the DDN NIC

```
Domain:     BostonCol.Edu
Name:       Boston College Local Area Network
Gateway:    MAILER@BCVMS
Gatemaster: POSTMAST@BCVMS
--------------------------------------------------------------
:NICK.BOSTONCOL.EDU :MAILER.MAILER@BCVMS BSMTP 3 :SERVED.YES
:SITE.Boston College Local Area Network
:GATEMAST.POSTMAST@BCVMS :INTERCONNECT.NO
--------------------------------------------------------------
1.   Top-level domain:      Edu
2.   Complete Domain Name:  BostonCol.Edu
3a.  Organization name:     Boston College
3b.  Organization address:  Boston College
                            Chestnut Hill, MA  02167  USA
4.   Date operational:      1 July 1992

         Administrative Contact
5a.  NIC Handle (if known):
5b.  Name (Last, First):    Jeff Jeffers
5c.  Organization:          Boston College
5d.  Mail Address:          Network Services
                            Computer Center
                            Chestnut Hill, MA  02167  USA
5e.  Phone Number:          (617) 552-8507
5f.  Net Mailbox:           JJeff@BostonCol.Edu

         Technical and Zone Contact
6a.  NIC Handle (if known): John McCarthy
6b.  Name (Last, First) :   (617) 552-4629
6c.  Organization:          Boston College
6d.  Mail Address:          Network Services
                            Computer Center
                            Chestnut Hill, MA  02167  USA
6e.  Phone Number:          (617) 552-8507
6f.  Net Mailbox:           McCarthy@VMCMS.BostonCol.Edu

         Primary Server

7a.  Primary Server Hostname:  Harvard.Harvard.Edu
7b.  Primary Server Netaddress:  128.103.1.1
7c.  Primary Server Hardware:  MicroVAX II
7d.  Primary Server Software:  4.3 BSD UNIX

         Secondary Server

8a.  Secondary Server Hostname:  Lilac.Berkeley.Edu
8b.  Secondary Server Netaddress:  128.32.136.12, 31.4.0.10
8c.  Secondary Server Hardware:  VAX
8d.  Secondary Server Software:  4.3 BSD UNIX

         If any currently registered hosts will be renamed
         into the new domain, please specify old hostname,
         netaddress, and new hostname.

9.   None

         Please describe your organization briefly

10.  Boston College is an institution of higher education.
```

information on ANU News is available from the DECUS library, and is outside of the scope of this book.

6.7.1 Subscribing to LISTSERV lists

After your BITNET link is operational and your nodes have appeared in BITEARN NODES, you can subscribe to LISTSERV lists by sending messages to the server address (for example, LISTSERV@nodename). *Do not* send administrative messages or mail to a list address (for example, LINKFAIL@nodename). Such message will be sent to hundreds or thousands of other users who must delete them, and will not have the intended administrative effect.

To subscribe to a LISTSERV list, send the LISTSERV command SUBSCRIBE to the server address as an interactive message, in the body of mail, or as a record in a file. For example, to subscribe to LINKFAIL@BITNIC, I entered:

```
$ SEND LISTSERV@BITNIC
        (BITNIC)LISTSERV: SUBSCRIBE LINKFAIL Stephen L. Arnold
        (BITNIC)LISTSERV: Ctrl/Z
```

LISTSERV preserves the case of my name; the case of the command doesn't matter. LISTSERV determines my NJE address from the command itself, so it's not necessary to enter it.

If any of the links on the BITNET path to the node hosting the LISTSERV are not connected, you will receive a message, for example:

```
%SEND-E-NOTCONNECT, Link WISCMAC3 not connected
```

If a link is down, you can still send mail to subscribe to a list. Your subscription request will be delivered when the communications link comes back up. In the example above, I entered:

```
$ MAIL

MAIL> SEND/NOSELF/NOEDIT/NOCC/SUBJECT=""
To:     IN%"LISTSERV@BITNIC"
Enter your message below. Press CTRL/Z when complete, or CTRL/C to quit:
SUBSCRIBE LINKFAIL Stephen L. Arnold
Ctrl/Z
```

If the lists are on the same server, you enter multiple subscriptions by entering additional interactive commands or additional lines in a mail message.

As a BITNET Postmaster, you should subscribe to these lists:

- LINKFAIL@BITNIC, annoucements about network, host, and server service interruptions
- JNET-L@BITNIC, a discussion on Joiner's Jnet software
- BITNEWS@BITNIC, news about BITNET for general and management audiences
- TECHNEWS@BITNIC, technical news about BITNET
- NODMGT-L@BITNIC, a discussion of routing and mailer tables, protocols, and other matters of concern to Postmasters

Institutional representatives, TECHREPs, and INFOREPs are automatically subscribed to lists maintained by BITNIC for people serving in those roles. There are also many other LISTSERV lists on a myriad of subjects, which are beyond the scope of this book. See the TECHREP or INFOREP information packets to learn more about these.

When you subscribe to a LISTSERV list, LISTSERV automatically sends you a welcome note that explains how to set certain list options and how to sign off the list. Consider saving these notes in a special mail folder to document what lists to which you've subscribed.

To sign off a list, send the SIGNOFF command to the server as a message or mail. For example, to sign off the LINKFAIL list, I can enter:

```
$ SEND LISTSERV@BITNIC SIGNOFF LINKFAIL
```

6.7.2 Subscribing to Internet discussions

After your BITNET link is operational, your nodes have appeared in BITEARN NODES, and your domain has appeared in DOMAIN NAMES, or, if applicable, after your Internet connection is operational, you can join Internet discussion groups. This is normally a manual process, and is initiated by mailing a request to the list coordinator.

By convention, the list coordinator of an Internet discussion can be reached on the same node as the list itself, at a mailbox named by adding ''-Request'' to the name of the list mailbox. For example, to join the discussion of TGV's MultiNet TCP/IP software, Info-MultiNet@TGV.Com, send your request to Info-MultiNet-Request@TGV.Com.

To sign off of an Internet discussion, send mail to the -Request mailbox for the list requesting that you be removed from the list. Do not send your request to the list itself.

In general, BITNET-oriented discussions are hosted by LISTSERV servers, but there are two Internet discussions that you should join: for PMDF and for your TCP/IP software, if any. To join the PMDF discussion, Info-PMDF@Ymir.Claremont.Edu or IPMDF@YMIR (on BITNET), send your request to Info-PMDF-Request@Innosoft.Com or RPMDF@YMIR, respectively. Notice that the PMDF list does not follow the convention of having the discussion and request mailboxes on the same node. Also, do not attempt to send LISTSERV commands to RPMDF@YMIR. Not all lists on BITNET nodes are LISTSERV lists.

Contact your TCP/IP software vendor to find out if there is a network discussion on the product. The address for TGV MultiNet is Info-MultiNet-Request@TGV.Com. Wollongong WIN/TCP is discussed on the LISTSERV list WINTCP-L@UBVM.CC.Buffalo.Edu.

If you use Digital's TCP/IP software and have contracted for software support, Digital's DSNlink support network provides this function. If you do not have software support, you will find friendly, knowledgeable users of Digital's products on DECUServe, a computer conferencing service sponsored by the United States chapter of the Digital Equipment Computer Users Society (DECUS), Digital's user group. PMDF, Jnet, third-party TCP/IP software, ANU News, and many other products and programs of interest to BITNET Postmasters are also discussed on DECUServe. For information on DECUServe, dial 1 (800) 521-8950 with a VT terminal and modem, or Telnet to the Internet host Eisner.DECUS.Org, and log in with user name INFORMATION (no password).

Both Info-PMDF and Info-Multinet are available as network news groups. If a news feed is justified for your site, you may wish to consider participating in the discussions via news rather than through mail.

7 On-going Management of BITNET Nodes

Congratulations! You have implemented BITNET for your organization, complete with a fully-functional, BSMTP-compliant mailer, as required by CREN for all members and affiliates.

To keep your software running smoothly, provide the best BITNET services for your users, and remain a good network citizen, certain maintenance tasks must be performed on a regular basis or when circumstances require. This chapter summarizes these tasks, and is organized by their required frequency: initially and when you add new users (Section 7.1), constantly (Section 7.2), daily on weekdays (Section 7.3), monthly (Section 7.4), when changing system clock (Section 7.5), and irregularly, in response to certain changes (Section 7.6).

7.1 Initially and when adding new users

When you first bring up a BITNET connection, and whenever you add users to your system in the future, you have two management responsibilities: to assign user names (Section 7.1.1) and to train or orient the new users in the user of the network (Section 7.1.2).

7.1.1 Assigning user names

When adding new users, follow the user name policies you developed while working through Chapter 3. If you must assign VMS user names longer than eight characters, check for conflicts, add an eight-character alias to the PMDF ALIASES. file, and recompile and install the PMDF configuration (on all VAXcluster nodes if your system is a VAXcluster).

7.1.2 User training

Your organization must have procedures for orienting new users to computers and networks, to help them learn of possible applications and to comply with acceptable use agreements and applicable laws. The liason between CREN and the users at your organization for this purpose is the INFOREP. The INFOREP packet should contain starter information to help you.

Instruct your users on computer and network security, and proper network behavior (*netiquette*). Any mail user can find an immediate audience of 50,000 or more readers of a single list, and can become a source of pride or embarrassment to your organization.

Explain that the networks do not guarantee the confidentiality of mail or other data, and remind them to avoid compromising the security of their VMS password by sending it over BITNET in a VMS batch job.

There are several guides to good electronic mail manners published in books on networking and circulated monthly in internet discussions, including Info-VAX, the VAX/VMS discussion. One or more of these will provide a good starting point for developing your new user training.

The Electronic Mail Association (EMA), an industry group, publishes several guides to privacy and security of electronic mail, such as *Access to and Use and Disclosure of Electronic Mail on Company Computer Systems: A Tool Kit for Formulating Your Company's Policy*. The EMA can be reached at 155 Wilson Boulevard, Suite 300, Arlington VA 22209-2405, (703) 875-8620, fax (703) 552-0241, or send Internet mail to EMA@MCImail.MCI.Com.

7.2 Constantly

Operating a BITNET node makes you responsible for prompt and reliable delivery of network data, not only to local users, but to their correspondents and to others whose network data must be transmitted through your system. The CREN Terms and Conditions of Membership and Affiliation require your organization to monitor the network and respond to problems constantly.

You must strive to make your Principal Node and any other major nodes available around the clock. Specifically, your nodes and the links to adjacent sites should always be up.

Consider developing a simple *line monitor*, a program which periodically checks for the correct configuration and state of your system and network links. If you do not have operators on duty at all times, you can program the line monitor to call a pager or a security desk when it determines that the network is down. For more on line monitors, see Section 5.4.2.9.

Some of the things an operator or line monitor should periodically check include:

- Are all links in the Connect state?
- Do link queue counts go back to zero after a file is queued?
- Are data link or device error counters increasing too quickly?
- Is there enough disk space on important disk devices?
- Are traffic counters increasing at the usual rate for the time of day?

In addition to NJE software, operators or monitor programs should check for failures in the underlying networking software (for example, TCP/IP or DECnet-VAX software) and if possible, monitor the condition of the system itself.

7.3 Weekdays

The tasks in this section should be done each business day: review JANTIDY output (Section 7.3.1), dispose of files sent to POSTMASTER (Section 7.3.2), read mail to POSTMASTER (Section 7.3.3), check PMDF channel queues (Section 7.3.4), check PMDF batch queues (Section 7.3.5), and read relevant network discussions (Section 7.3.6). Consider automating as many of these tasks as possible and merging them into JANTIDY or another daily command procedure.

7.3.1 Review JANTIDY output

If you run the JANTIDY management procedure, as suggested in Section 5.4.2.9, you will have mail each morning from the JANTIDY run on each of your VAX BITNET nodes. Review each of these mail messages for problem symptoms, then delete the mail.

7.3.2 Dispose of files sent to POSTMASTER

JANTIDY warns you if there are any files for the POSTMASTER to receive. Most of these were sent to user names that do not exist on your system. Examine the file tag data with Jnet's RECEIVE utility, either by logging in as POSTMASTER or by using the */USER=POSTMASTER* qualifier from a privileged account. You may be able to determine the user for whom the file was intended and send it along with RECEIVE's *FORWARD/ORIGINAL/NOKEEP* command. Do not, however, review the file contents. To do so would be to violate the sender's privacy.

7.3.3 Read mail to POSTMASTER

As Postmaster, you should read mail addressed to POSTMASTER or POSTMAST as it arrives. You can do this by logging in as POSTMASTER, but it is easier to delegate the Postmaster duties by forwarding POSTMASTER's mail to the personal account of the individual currently on Postmaster duty.

PMDF and most other mail software return entire undelivered mail messages back to the sender or, if the sender cannot be reached, to the Postmaster. PMDF also sends, optionally and by default, a *copy* of bounced mail to the local Postmaster. This places a burden of confidentially on the Postmaster. Use your best effort to avoid reading any more of a mail message than necessary to diagnose any problems and send the message on to the proper destination.

If you followed the recommendation in Section 6.3.3 to set the *SENDHEAD* channel keyword (in PMDF V4.0, renamed to *POSTHEADONLY* in PMDF V4.1) as a default for all channels, it is much easier to maintain the privacy of mail, because the text of at least some undeliverable messages is not sent to the Postmaster. Setting the *HEADERBOTTOM* channel keyword as the default makes privacy especially difficult to maintain, because the Postmaster must scroll through the entire text of returned messages to get to the headers needed to diagnose delivery failures.

7.3.4 Check PMDF channel queues

Check PMDF channel queues daily with PMDF's Qman command procedure. Except on very busy systems, PMDF queues should usually be empty, or contain mail that has been held only a short time. If mail begins to build up or messages are remaining on queue for more than a half day, investigate the cause of the delivery delay.

Used Qman to check for *held* messages. PMDF puts messages on hold if it finds more than forty *Received* lines, as a loop-prevention measure. Operators can also put messages on hold manually.

7.3.5 Check PMDF batch queues

Each day, check that the PMDF batch queues are defined and started, that the message bouncer and delivery jobs are holding until their next regularly scheduled run time, and that any other jobs are executing and soon leave the queue.

7.3.6 Read relevant network discussions

Read the network discussion and LISTSERV lists pertaining to BITNET, including JNET-L, Info-PMDF, TECHREP, TECHNEWS, BITNEWS, LINKFAIL, and relevant TCP/IP lists. If you have network news feeds or VAX Notes conferences on BITNET-related topics, monitor those daily as well. Try to answer questions about your site for remote users and about the networks for local users, and try to run down any reported problems.

7.4 Monthly

The tasks in this section should be done monthly: install Jnet routing tables (Section 7.4.1) and build mailer tables from DOMAIN NAMES[1] and XMAILER NAMES (Section 7.4.2).

7.4.1 Install Jnet routing tables

Receive Jnet routing tables when they arrive at the beginning of each month. Compare each table to the previous month's tables to check for corruption, changes in format, or errors by the servers in generating your tables.

Move the tables into JAN_SPECIFIC:[SYS] (or JAN_COMMON:[SYS] if Jnet cluster members share a copy) where JANTIDY will install them on its next morning run. You can also use JANTIDY to install new tables immediately by releasing the queued JANTIDY job with the DCL command *SET ENTRY/RELEASE*.

7.4.2 Build mailer tables

When both DOMAIN NAMES and XMAILER NAMES have arrived for a month, *RECEIVE* them into PMDF_ROOT:[TABLE], inspect them for correct format and damage in transit, and run the BITNET_DOMAINS_DRIVER and COMPILE_INSTALL procedures to generate and install new mailer tables, as described in Section 6.3.6.2. The recommended procedure automatically restarts the Jnet local mail delivery process so that the new mailer tables are available to route incoming mail.

7.5 When changing system clock

If you change your system clock to a new time zone, because of the observation of daylight time, for example, you must inform any software that needs to know the time zone. These are usually products that use wide area networks, and include PMDF, Jnet, Message Router, TCP/IP software, ALL-IN-1 and other mail user agents, and Message Router. See the PMDF and Jnet documentation for details.

If you observe daylight time in your locality and if your policy is to change the system clock to conform to local time, you will have to change all of these products twice a year. As alternatives, consider running your system clock on local standard time (or Universal Time) all year around and letting users make the necessary mental adjustment, or develop a daylight time command procedure that changes all your time-zone-sensitive products at once.

You can also encourage your software vendors to modify their products to accept both the time and time zone from an external source, preferably the Internet Network Time Protocol (NTP) or Digital's Distributed Time Service.

7.6 Management activities with no regular schedule

The tasks in this section must be done whenever circumstances warrant: update Jnet and PMDF configurations (Section 7.6.1), modify software dependent on the SCSNODE and DECnet node names when they change (Section 7.6.2), adjust queue configurations when first upgrading to VMS V5.5 (Section 7.6.3), and respond to mail from NETSERV servers (Section 7.6.4).

7.6.1 Update Jnet and PMDF configurations

Update your PMDF and/or Jnet configuration to reflect any changes in your system or network configuration. If you use a compiled configuration, recompile your configuration after making any change to the PMDF configuration or alias files.

7.6.2 Modify software when SCSNODE names change

If SCS/DECnet node names change, review Jnet directories, PMDF configuration files, PMDF queue names, queue initializations, and the definition of Jnet's JAN_MASTER_NODE logical name, as well as any other configuration parameter dependent on the DECnet-VAX or SCSNODE name of your system. Finding all the things that must be changed if you change your SCSNODE and DECnet node names is beyond the scope of the book.

7.6.3 Adjust queues when upgrading to VMS V5.5

When upgrading to VMS V5.5, edit JAN_SYS:JANSITECOMMON.COM to comment out the initialization of any queues for NJE symbionts. Under VMS V5.5 and later versions, queues do not need to be initialized each time the system is booted. Under VMS V5.5 and later, attempts to initialize queues when starting Jnet result in the message

```
%JBC-I-QUENOTMOD, modifications not made to running queue
```

for each queue (after the first attempt). For more information, see Section 5.4.2.7.

If you followed the recommendations in Section 6.2.3 to create the command procedure SYS$STARTUP:PMDF_INIT_QUEUES.COM to initialize PMDF queues at each boot, you must disable this command procedure as well. Either comment out the line in SYS$MANAGER:SYSTARTUP_V5.COM that starts the procedure, or remove the procedure from the SYSMAN STARTUP database, depending on how you initially set up PMDF.

7.6.4 Respond to mail from NETSERV

For a description of the NETSERV network server, see Section 3.4.7.3. For further information on NETSERV, obtain the file NETSERV INFO from LISTSERV@BITNIC, or the files NETSERV REFCARD and NETSERV HELPFILE from the nearest NETSERV or NETSERV@BITNIC.

NETSERV uses passwords to control access to certain privileged server functions, such the fetching of restricted files. Although these functions are not normally used by *node administrators* (NADs) whose organizations are served by BITNIC, NADs should keep track of their NETSERV passwords in case they are needed.

When a new node is created in BITEARN NODES, NETSERV automatically assigns the NAD a password and sends the password to the NAD by electronic mail. (NETSERV recognizes the person on the *:USERADM* tag as the node administrator (NAD). If that tag does not exist it uses the *:ADMIN* tag.) NADs can also nominate other privileged NETSERV users, who in turn get their passwords from NETSERV by mail.

If you receive a NETSERV password by mail, save the message, with the password and the server address, with your important BITNET mail where you will be able to find it a year or more later.

NETSERV passwords expire after a certain number of months and must be changed. To change your NETSERV password you must know its current value.

If you receive mail from NETSERV requesting that you change your password, get out the mail from NETSERV with your NETSERV password from safe keeping and use it to pick a new one according to the instructions that came in the mail requesting the password change.

If you cannot remember your NETSERV password, you can request it from the *controller* (the human manager) of the NETSERV server that services your node. To find out the address of the NETSERV controller of any NETSERV, send a *QUERY CONTROLLER* command to that NETSERV. To find out which NETSERV serves your node, send a *QUERY SERVICE* command to NETSERV@BITNIC, and it will respond with various information about the NETSERV service area, including the node of the NETSERV that services your node.

A Adding an Internet Connection to a BITNET Node

Note: This appendix is a draft, and serves primarily to provide an outline for material for a future edition of this book. Your experiences and other contributions are welcome. To submit material or ideas for this appendix, follow the instructions on the copyright page for submitting comments.

This appendix does not attempt to provide complete instructions for connecting to the Internet. Instead, it focuses on those tasks required of BITNET sites to maintain BITNET services while adding the complementary Internet services.

A.1 Assumptions for this appendix

This appendix assumes that your system is on BITNET and runs a mailer, as described in the first seven chapters of this document. In particular, I assume that you have registered a domain name for your system, either directly through the DDN NIC or indirectly through BITNIC.

If you have not completed the tasks in the main part of this book, work through the book from the beginning, following the instructions for implementing an Internet connection as well as a BITNET connection. Do not use this appendix.

A.2 Obtain a network number from the DDN NIC

Complete the Internet number template, INTERNET-NUMBER-TEMPLATE.TXT, which can be obtained by sending mail to Service@NIC.DDN.MIL the same way you obtained DOMAIN-TEMPLATE.TXT. The template contains instructions. You will need an assigned Internet network number to install TCP/IP software and to connect to the Internet.

Most commercial IP service providers and consortia will help you with this process, but it's easy enough to do yourself if you want to get started with local TCP/IP networking while you arrange for connection to the Internet.

A.3 Review acceptable use and other policies

Obtain and read the acceptable use policies of the NSFnet-affiliated regional or state network serving your area. (If you are in a border area, you may be eligible to join more than one such network. If so, request general information from each of them.) Policies on acceptable use vary among consortia, and you must carefully compare them to your expected use of the network. Also review the acceptable use policy of NSFnet itself.

Colleges and universities should normally have no problems with the policies of any NSFnet-affiliated consortium. Libraries, hospitals, and other non-profit organizations may have to restrict certain potential uses of the network to conform to the guidelines. For-profit companies are usually better served by commercial IP service providers, unless their business is strictly serving government and higher education.

Also review prices and other policies.

A.4 Join a consortium or arrange for commercial IP service

Select the most applicable service or consortium and complete the administrative steps that are prerequisite to obtaining service.

A.5 Install a physical connection

Arrange for telecommunications lines and data communications equipment. Sometimes these arrangements are made by the consortium or service provider. Connect your local area network to the wide-area backbone.

A.6 Install and configure TCP/IP software

Obtain licenses and media for TCP/IP software. Available software ranges from robust and full-featured commercial products to inexpensive or free software provided by universities or by system vendor programs for education.

Install and test the software.

A.7 Arrange for name service

When you connect your organization to the Internet, you must provide primary name service for your domain and arrange for another Internet host to provide secondary name service. The host(s) providing secondary name service should be geographically and logically remote from your primary name server. Often secondary name service is provided by your consortium or service provider.

If you advertise mail exchanger (MX) records to the Domain Name Service (DNS), they should be higher priority MX records than those advertised for your domain by Harvard and Berkeley, so that mail from other Internet sites starts coming to you directly immediately rather than coming via INTERBIT mail gateways and BITNET.

A.8 Reconfigure your MAILER

Rerun the PMDF autoconfiguration procedure to take advantage of your Internet link for mail. Compare the automatically generated configuration with the BITNET-only configuration you have been using, and make sure you understand the reason for all the differences. Copy any needed customizations from the old configuration to the new one. Test the new configuration thoroughly.

A.9 Update DOMAIN NAMES

When your name service is operational, change the value of the *:SERVED* tag in DOMAIN NAMES from *YES* to *NO*. This will cause BITNIC to remove the mail exchanger (MX) records from the name servers at Harvard and Berkeley that point your mail to INTERBIT mail gateways.

When you add an Internet connection to a BITNET node, if all the hosts in your domain are now directly connected to the Internet, or can receive Internet mail via MX records (other than MX records served by Harvard and Berkeley), you should change the value of the *:INTERCONNECT* tag in DOMAIN NAMES from *NO* to *YES* or *MX*, respectively. This will allow other dual-connected BITNET-Internet sites to route mail to your domain over Internet if they prefer. Mail addressed to your BITNET address will continue to come in via BITNET.

Request all changes to DOMAIN NAMES by sending mail to DOMAINS@BITNIC. Explain the reason for the change and request the new values you need for any affected tags.

A.10 Adjust BITNET topology

When your Internet connection is stable, consider switching your BITNET link from BSC to TCP NJE. Retain your BSC line as a backup unless the funding of your Internet connection is totally under the control of your organization and the line itself proves reliable for several months. You will benefit from higher throughput, redundancy, and fewer BITNET hops to most other sites.

If you choose to drop your BSC connection, you will also realize telecommunications cost savings.

A.11 Train users on new services

Users need to be trained on the new services available, including FTP and TELNET. Continue to provide training on complementary services unique to BITNET, including interactive commands and messages, LISTSERV, SEND and RECEIVE for file transfer, and remote batch service.

If your mailer was properly configured before adding the Internet connection, the only change end users should notice in electronic mail service is faster delivery and the lost of ‘‘file progress’’ messages for some addressees. Mail should no longer go through INTERBIT mail gateways.

A.12 Switch to Internet News feed

If you have been receiving a news feed over BITNET or UUCP, consider moving the feed to TCP/IP protocols to take advantage of higher speed lines and path redundancy.

B Operating BITNET Mail Gateways

Note: This appendix is a draft, and serves primarily to provide an outline for material for a future edition of this book. Your experiences and other contributions are welcome. To submit material or ideas for this appendix, follow the instructions on the copyright page for submitting comments.

The PMDF configuration described in Chapter 6 provides a ‘‘gateway’’ between BITNET mail and the domain name of your own system. This appendix is concerned with gateways on your system that route mail between BITNET and *other* systems.

This appendix does not attempt to provide complete instructions for operating mail gateways for third parties. It attempts to provide frequently needed information on providing such gateways for an organization’s own use rather than for the global networking community at large. If you intend to provide such a service between BITNET and the entire Internet, see Section B.3 in a future edition of this appendix.

B.1 Mail gateways to domains with mailers

This section covers two common situations. Your system or VAXcluster provides a mail gateway between BITNET and:

1. other VAX systems running PMDF, via a DECnet network, and/or
2. other hosts running SMTP, over a local TCP/IP network.

In the second situation, I presume that the TCP/IP network is not connected to the Internet. If the TCP/IP systems are connected to the Internet, then use the instructions in the main part of this book.

The gateway function requires a mailer on each system for which your system will accept mail. In the first case, the mailer function is provided by PMDF; in the second case, SMTP software, such as the SMTP mailer provided with MultiNet or the *sendmail* component of the UNIX operating system, provides the mailer function.

Assign a domain name in your organization’s domain to each TCP/IP host or DECnet node to be served.

Using the instructions provided in the PMDF documentation, configure a SMTP-over-DECnet or SMTP channel to connect to the non-BITNET systems. Add rewrite rules to your PMDF configuration file to route mail received by your system from BITNET to the appropriate channel.

Do not attempt to set up NJE node names for the non-BITNET nodes. If you do, remote BITNET users will then expect the non-BITNET systems to support other BITNET applications, such as interactive messages and NJE file transfer. All mail to the non-BITNET nodes should go to their domain names.

B.2 Providing name service for connected domains

If your system will be a domain name server, consider providing name service for any BITNET-only (that is, non-Internet) nodes reachable through your organization. To provide name service for BITNET-only nodes, your system will advertise mail exchange (MX) records pointing to your organization's BITNET-Internet mail gateway to other servers in the Domain Name System. When your domain name server and your organization's BITNET-Internet mail gateway are operational, Internet users anywhere can send mail to domain addresses of the BITNET-only nodes that can be reached through the BITNET-Internet mail gateway at your organization.

An example may serve to clarify this configuration. Suppose your organization is Bay College, the hypothetical institution described in Section 3.5, and that Acme Corporation has registered the domain Acme.Com for a VAXcluster on BITNET connected to your BITNET hub BAYACB. If you configure a BITNET-Internet mail gateway on your VAXcluster BAYACA (also called Aca.Bay.Edu) that accepts mail for the Acme.Com domain and provide name service for the Acme.Com domain, any Internet user can send mail to Acme mail boxes.

For further information on providing domain name service for other domains, see the documentation for your domain name server software (usually part of your TCP/IP software). The configuration of domain names servers is outside the scope of this book.

B.3 Operating an INTERBIT mail gateway

The requirements for operation of an INTERBIT gateway on a VAX system running VMS have not yet been clarified, as all official INTERBIT hosts currently run the VM operating system. The CREN rules for INTERBIT gateways are in the file INTERBIT STANDARD, available from LISTSERV@BITNIC. Discussion of INTERBIT operational issues occurs on a LISTSERV list that closed to subscriptions from the BITNET community at large.

An attempt will be made to compete this section in a future edition.

B.4 Mail gateways to Mail-11 domains

When PMDF exchanges mail with VAX systems running only VMSmail, it must use the Mail-11 protocol (a DECnet application protocol). Mail-11 is a very old protocol, and has many problems that make it unsuitable for production mail, some of which are listed here. Therefore, only undertake to set up this configuration if you cannot get mailer software installed on the remote VAX systems.

The principle reason to attempt this configuration is save the cost of PMDF licenses. Another reason is to exchange mail with non-VAX/VMS systems that have Mail-11 software, such as Digital PDP-11 minicomputers.

Here are some reasons to avoid this approach, if at all possible. The *remote system* is the system running only Mail-11 software (for example, a VAX running VMS and VMSmail but without PMDF, MX, or TCP/IP sofware).

- Users of the remote system cannot use IN% as their address prefix, as described in the documentation. They must use IN: instead.
- Users of the remote system cannot use PMDF utilities, SEND/FOREIGN, and other PMDF features. In the future, this will prevent them from using the new Internet standard multi-media mail, which is not supported by Mail-11.
- Mail-11 systems have six-character DECnet node names, and cannot support domain style names. The DECnet node names must be distinguished some how from BITNET node names and TCP/IP relative (also called ‘‘short form’’) host names.

A Mail-11 mail gateway is often considered for a mixed interconnect VAXcluster with many satellites, to avoid running PMDF on each satellite. There are additional reasons that apply only to Mail-11 to BITNET mail gatewas serving a single VAXcluster.

- The MAIL$SYSTEM_FLAGS logical name must be set to 0 to indicate the VAXcluster is hetergeneous; that forces all mail between cluser members to go through DECnet. (Normally, such mail should be written into the recipients MAIL.MAI file locally, just like mail within a single member.)
- Mail replies only work if the sending node (say, a workstation) is on the network, even if the sending user is logged into another satellite.
- All PMDF batch queues must run on boot node (which is already a single point of failure for cluster due to single system disk) instead of running on any idle node.
- All messaging jobs must run on the boot node, and there will be many more such jobs, because every mail message sent or received on a satellite will require a DECnet job.

One way to avoid the problems of Mail-11 transport within a VAXcluster is to prohibit mail on the satellites. All satellite users must use SET HOST or X-clients on boot node to send and receive their mail.

If at all possible, avoid Mail-11 to BITNET mail gateways. If you must use this type of configuation, refer to the *PMDF System Manager’s Guide* for additional information.

C

Migration from Gmail

Note: This appendix is a draft, and serves primarily to provide an outline for material for a future edition of this book. Your experiences and other contributions are welcome. To submit material or ideas for this appendix, follow the instructions on the copyright page for submitting comments.

GMAIL should no longer be used. Its primary purpose is to send mail to INTERBIT and other mail gateways. The CREN Terms and Conditions of Membership and Affiliation require that all CREN members that use INTERBIT gateways must install a BSMTP-compliant mailer. GMAIL produces correct BSMTP-format messages, but cannot accept them.

To remove GMAIL from your system, perform the following tasks:

1. Log into a privileged account.
2. Find the location of the GMAIL directory:

   ```
   $ SHOW SYMBOL GMAIL
   ```

3. Note the directory specification in the symbol value, and set your default directory there.
4. Create a new GMAIL command procedure in the same directory that prints a message to users requesting that they use VMSmail and PMDF instead. Here is one way to enter such a message:

   ```
   $ CREATE GMAIL.COM
   $ TYPE SYS$INPUT
   GMAIL has been removed.  Please send all mail using the VMSmail
   Utility (MAIL).  To send to Internet and BITNET addresses, enter
   addresses of the form
       IN%"username@host.subdomain.domain"
   and
       IN%"USERNAME@nodename.BITNET"
   respectively.  If you have any questions, please contact the System
   Manager.
   Ctrl/Z
   ```

5. You may also want to use your regular procedures to announce the change to all system users.
6. Now delete all the other files in the current directory.
7. Finally, send electronic mail to author of GMAIL, Ed Miller, GMAIL@SLACVX.BITNET, to ask him to remove your name from the GMAIL list because you will not be using the program in the future, and to give him a well-deserved ‘‘Thank you!’’ for making GMAIL available to the networking community through the years.

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