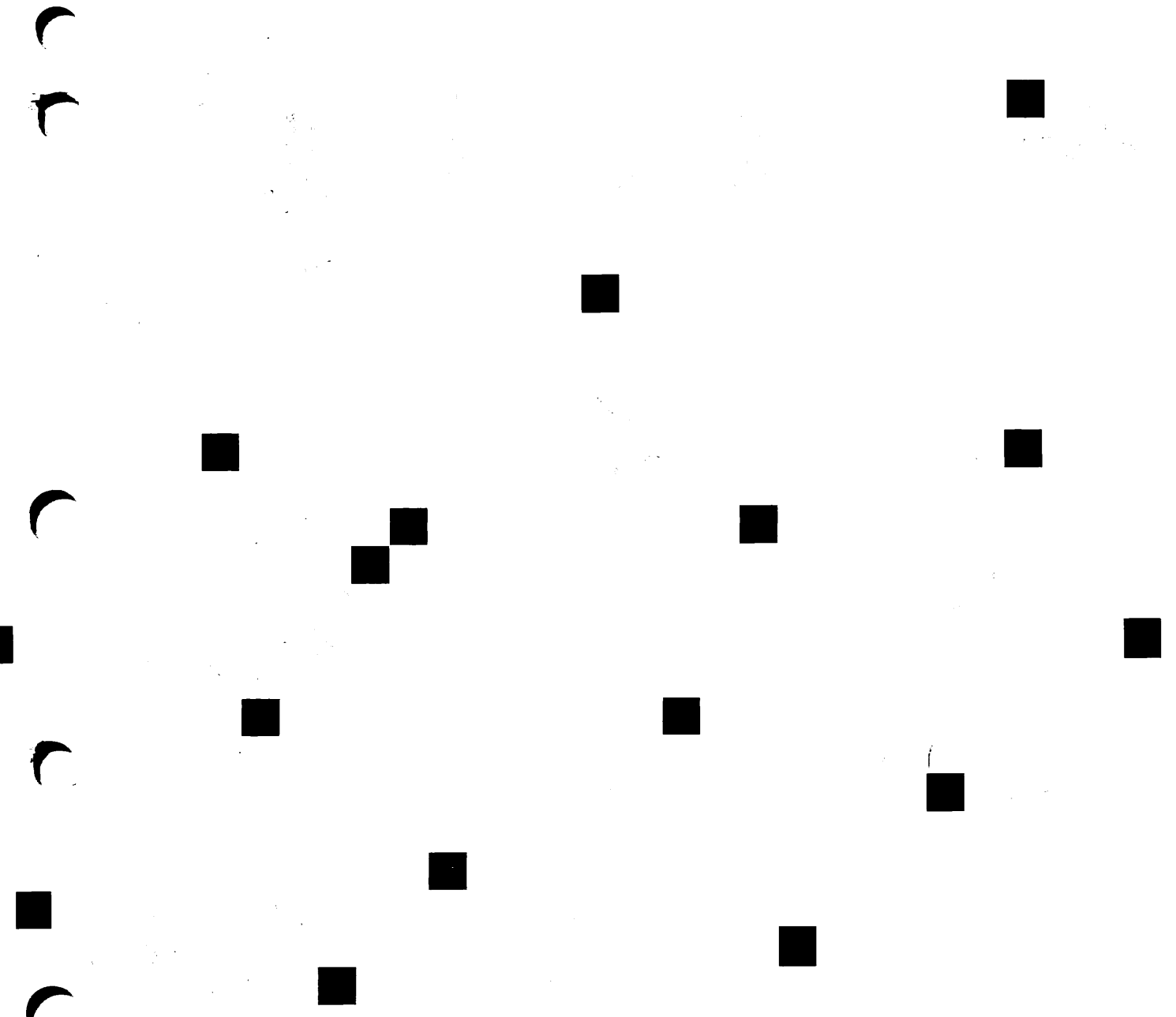

Prime

Prime X.400 Administrator's Guide

Release 1.2

DOC11276-2LA

X.400 Administrator's Guide

Second Edition

Brian Todd

This book documents the use of Prime X.400 at Release 1.2, which runs on PRIMOS® Master Disk Revision Levels 21.0.3 and above, and 22.0 and above.

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ABOUT THIS BOOK

The *X.400 Administrator's Guide* is a reference and guide to the administration and control of Prime X.400 on a system or network.

The guide gives an overview of X.400 protocols, introduces the product, and describes in detail how to start, stop, configure, monitor, and control Prime X.400, together with relevant examples.

Chapter Contents

Chapter 1	Introduction to Prime X.400, provides a general introduction to X.400, Prime X.400 and Prime X.400 configuration. It also describes Prime X.400 security, and introduces the operator commands.
Chapter 2	Prime X.400 Configuration, is a reference to the principles and procedures of configuring Prime X.400 on a network. It describes how to invoke the configurator using the CONFIG_X400 command, and contains details of the configurator menus and forms.
Chapter 3	Operation and Monitoring, describes the operator command ADMIN_X400, starting and stopping Prime X.400, and the display and control subcommands.
Chapter 4	CONFIG_X400 EXAMPLES, provides examples of how to configure Prime X.400 on your system or network.
Appendix A	Installation and Diagnostics, explains how to install Prime X.400, describes the PRIME_X400* product directory, and outlines how to use the error logs and journals to monitor X.400 sessions and diagnose problems.
Appendix B	Error Messages, lists and describes the hexadecimal error codes produced by Prime X.400.

Related Documentation

The companion volume to this book is:

- *X.400 Programmer's Guide (DOC11277-1LA)*

Other Prime manuals which you may find useful for reference are:

- *PRIFORMA Forms Design and Admin Guide (DOC10240-1LA)*
- *Network Planning and Administration Guide (DOC7532-3LA)*
- *Operator's Guide to Prime Networks (DOC10114-LA)*
- *System Administrator's Guide Vol. I, System Configuration (DOC10131-1LA)*

You may also find the following useful for reference:

- *CCITT Red Book Volume VIII Fascicle VIII.7, Recommendations X.400 - X.430*

Prime Documentation Conventions

The following conventions are used in command formats, statement formats, and in examples throughout this document. Examples illustrate how you use these commands and statements in typical applications.

Convention	*Explanation*	*Example*
UPPERCASE	In command formats, words in uppercase indicate the names of commands, options, statements, and keywords. Enter them in either uppercase or lowercase.	DISPLAY-USER
lowercase	In command formats, words in lowercase indicate variables for which you must substitute a suitable value.	CONFIG_X400 filename
Abbreviations in option descriptions	If an uppercase word in a command format has an abbreviation, the name and abbreviation are placed within braces.	{-HELP / -H}
Underscore in examples	In examples, user input is underscored but system prompts and output are not.	OK,display-user user=all
Angle brackets in messages < >	In messages, text enclosed within angle brackets indicates a variable for which the program substitutes the appropriate value.	<filename> not found.
Boldface	When they first appear in text, new terms are entered in boldface.	**applications**
Italics	In text, italics indicate variable user input or emphasis. Where Prime documentation is referred to in text, the title of the manual is entered in italics.	*pathname* the *default* file *Prime Programmer's Guide* *X.400*
MONOSPACE	User examples and program listings are displayed in monospace.	OK,admin_x400 X400:

1

INTRODUCTION TO PRIME X.400

This chapter gives an overview of the X.400 message handling system, introduces the Prime X.400 product, and outlines the procedures for configuring Prime X.400. It also introduces user security on Prime X.400 services, and the ADMIN_X400 operator command.

Introduction

Prime X.400 is a set of communication software services which enable users of Prime systems to connect to, and interchange data with, X.400 applications on X.25 networks. It contains the support services for all X.400 applications, and forms the basis on which electronic mail applications can be designed and built for Prime systems.

Prime X.400 implements the CCITT 1984 X.400-series recommendations for message handling systems. For details of these recommendations, refer to the *CCITT Red Book, Volume VIII Fascicle VIII.7* covering CCITT Recommendations X.400-X.430.

Overview of X.400

X.400 is a series of protocols that define a store-and-forward Message Handling System (MHS) for the exchange of messages between computer network users. It primarily addresses the requirements of electronic mail applications.

The X.400 Model

The X.400 series of definitions and protocols define a logical network model to which all X.400-compatible message handling systems must conform.

The model contains two types of software processes, known as **User Agents** (UAs) and **Message Transfer Agents** (MTAs).

User Agents are processes that assist the user with message preparation, the dispatch of outgoing messages and the display of incoming messages.

Message Transfer Agents are the store-and-forward nodes on an X.400 network. MTAs act as relay points for the exchange of messages across a network, cooperating with each other to ensure delivery. MTAs act as the intermediaries between User Agents, determining destinations, controlling routing, delivering messages, and signalling errors.

The model consists of several systems, illustrated in Figure 1-1:

- Message Transfer System (MTS), comprising a number of Message Transfer Agents (MTAs). The MTAs relay messages and deliver them to recipient User Agents (UAs).
- Message Handling System (MHS), comprising all the UAs and MTAs of the X.400 network.
- The Message Handling Environment (MHE), comprising the MHS and all the users of the MHS.

Users are known as **originators** when sending messages, and **recipients** when receiving them.

Note

A user can be either a person or a computer application.

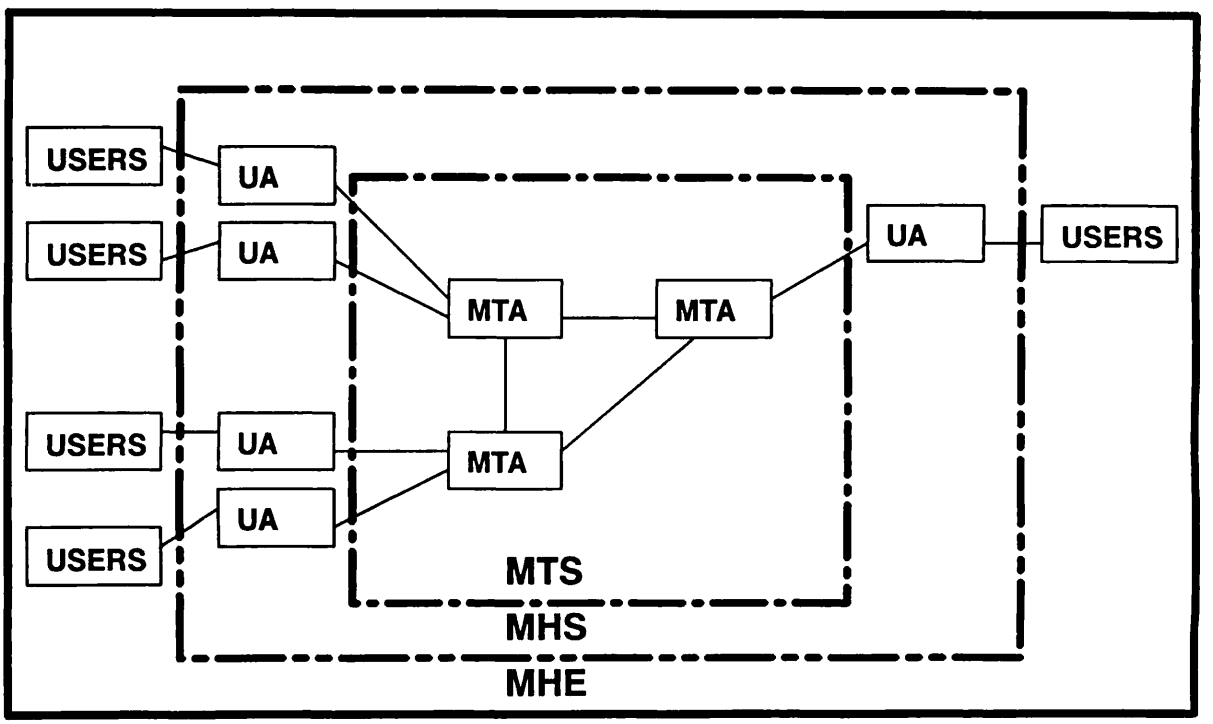

FIGURE 1-1. The X.400 model

X.400 User Addresses

Users are identified on X.400 networks by **Originator/Recipient** Addresses, commonly called O/R Addresses. These are unique addresses assigned by network administrators. The O/R addresses have certain restrictions.

Firstly, the addresses may be controlled at a national level by the Telecommunication Authority (PTT) or similar national body. Secondly, X.400 does not define any standard for *displaying* the X.400 address. X.400 addresses are presented to an X.400 mailing application as a set of **attributes** that make up a particular address. The attributes are then manipulated by the application.

X.400 uses two forms of O/R Address:

- An address composed of multiple attributes, known as **Form 1.**
- An X.121 Address, with optional telematic terminal identifier (such as a telex answer-back string, or teletex terminal identifier), known as **Form 2.**

Form 1 is the most common form of O/R Address, and is used by Prime X.400.

The most commonly used X.400 address attributes used for O/R Addresses are

- Country (C)
- Administration Management Domain (ADMD)
- Private Management Domain (PRMD)
- Organization name (O)
- Organizational Unit (OU)
- Personal name, consisting of one or more from:
    - Surname (S)
    - Given Name (GN)
    - Initial (I)
    - Generation Qualifier (GQ)
- Domain defined attribute.

Normally a subset of these attributes is used to make up an O/R address.

A Form 1, Variant 1 O/R address, as defined in the CCITT Red Book, is made up of C and ADMD plus at least one of PRMD, O, OU, Personal Name attributes, or domain defined attribute. The additional attributes are used to identify a specific user, or, in the case of the domain defined attribute, used to accommodate the naming conventions of other message systems. In this manual, attributes and their associated values are presented as **attribute=value** pairs. Example attributes for the X.400 users could be

```
C=XA
ADMD=WHITE-PTT
PRMD=Mongol-Horde
```

In addition, an O/R address for a user would have to include a **personal name** made up from at least one of S, GN, I or GQ. For example, user Ghengis Khan could have the address attributes:

```
C=XA
ADMD=WHITE-PTT
PRMD=Mongol-Horde
O=Leaders
S=Khan
GN=Ghengis
```

For more details of X.400 address components, and how Prime X.400 uses them, refer to Chapter 3, PRIME X.400 Configuration.

Prime X.400 Concepts

This section describes how Prime X.400 implements the X.400 design principles and protocols.

The Prime X.400 Logical Network

In accordance with the X.400 model, Prime X.400 consists of Message Transfer Agents that act as store-and-forward nodes for the exchange of messages over the network, and User Agents that interface with users to provide the message transfer service. User Agents are implemented using services provided by the Application Programming Interface (API).

Figure 1-2 shows the main components of the logical Prime X.400 network.

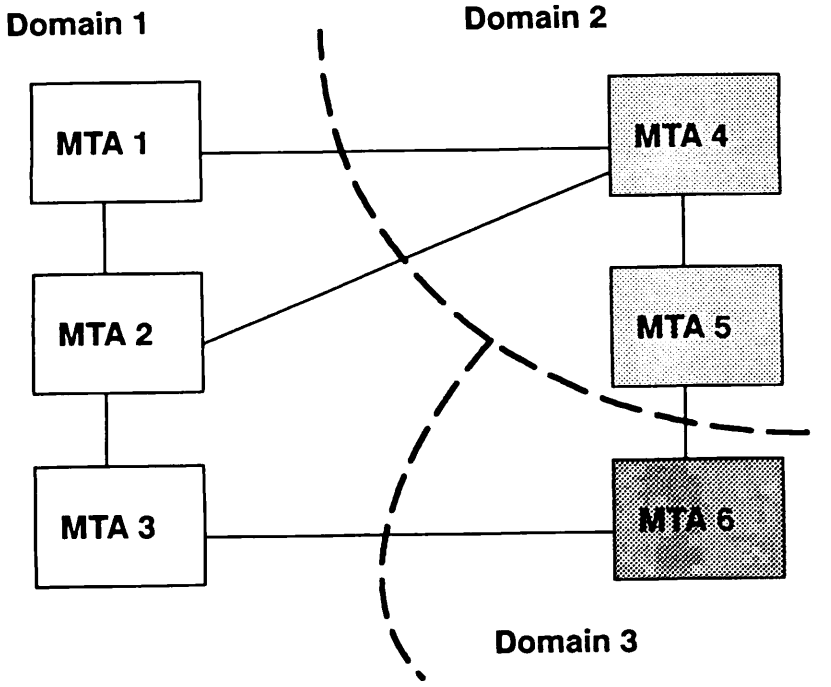

FIGURE 1-2. The Prime X.400 Logical Network

Local and Remote MTAs

Message Transfer Agents can be defined as **local** or **remote.**

Local MTAs are those that are controlled as part of one administrative unit, sometimes referred to as **local domains.** Typically, a local domain is configured on a group of systems controlled by a single administrator, such that there is no conflict of user names. In many cases there will be just a single MTA on a single PRIMENET ring. Within such a unit, you need access to the Prime X.400 directories and configuration files on all systems, in order to define or modify the configuration. You need to have DALRWU access to these directories and files. MTAs in the same local group share a set of default attributes, such as the type of logical link (association), between them, the default address space (local domain), and inter-MTA passwords.

Remote MTAs are defined as being on systems, or groups of systems, referred to as **remote domains**, that are under the control of other administrators. The administrators of remote domains must supply you with various parameters, discussed below, so that your users can communicate with the remote domains.

The parameters that must be supplied by the administrators of remote MTAs includes:

- MTA network address
- remote and local passwords,
- protocols for communicating with the local MTA group,

- remote user address space (remote domain)

Local and remote domains are types of **subdomain** below a larger domain, normally the country in which the local or remote domain is located.

Figure 1-3 shows the association between local and remote MTAs.

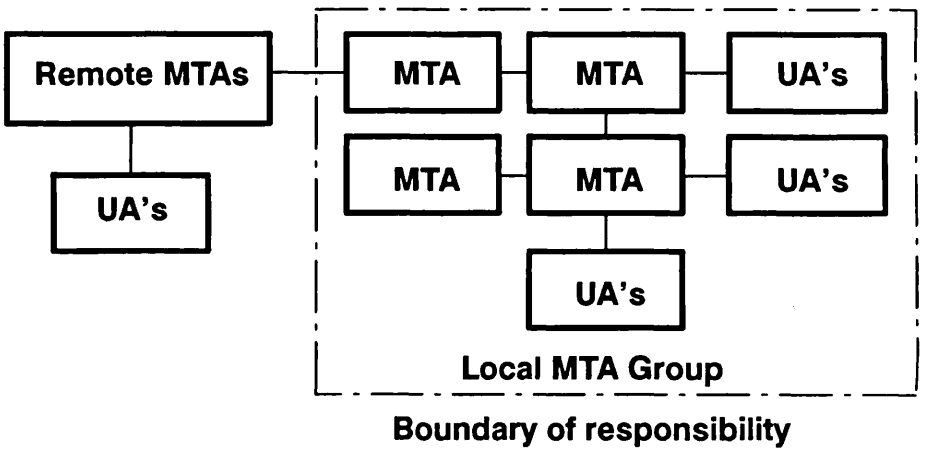

FIGURE 1-3. The Local and Remote MTA Network

Each domain in figure 1-3 is local to itself, and considers all other domains as remote domains. Normally, each domain would have a separate administrator.

Domain 1 has the remote domains 2 and 3, which contain the remote MTAs 4, 5 and 6. UAs attached to the MTAs are not considered, as they have no effect on the routing or delivery of messages.

For X.400 purposes, within the country, the domain may be broken down into subdomains by ADMD or by a combination of ADMD and PRMD. Companies may breakdown the subdomain identified by the combination of C, ADMD and PRMD into further subdomains using the O/R address attributes O and OU.

Domain names, whether they include a single MTA or several, are O/R address spaces. An address space is a partial O/R address, through which users of the domain can be accessed.

For example, the following users have the O/R addresses:

```
C=XA                        C=XA
ADMD=WHITE-PTT              ADMD=WHITE-PTT
```

```
PRMD=Mongol-Horde          PRMD=Mongol-Horde
O=Leaders                  O=Allies
S=Khan                     S=Uzbek
GN=Ghengis                 GN=Pech
```

These addresses are both in the O/R address space defined by C=XA, ADMD=White-PTT, PRMD=Mongol-Horde.

If the following user is considered:

```
C=XA
ADMD=WHITE-PTT
PRMD=Free Company
O=Leaders
S=DeFlor
GN=Roger
```

The O/R address space including all three users is C=XA, ADMD=White-PTT.

Associations

Associations are the logical links between MTAs. Associations are created at runtime, either automatically, from data contained in the configuration defaults (default associations), or from data specified by the system administrator (non-default associations). Default parameter settings are described in Chapter 3. Unless specifically stated, references to associations throughout the rest of this manual refer to both default and non-default associations.

An association can be permanent or temporary. A temporary association is created in response to a message being transmitted, and ceases to exist after an inactivity timeout period. Temporary associations are not preserved across network failures. A permanent association is always preserved, even across failures of the underlying network.

Typically, a permanent association is used on a local network or PRIMENET ring where a lot of traffic is expected.

Temporary associations are normally used between remote machines connected through a public data network, or local MTAs where little traffic is expected.

An association can be set to inbound, or outbound. This links the MTAs joined by the association as shown in Figure 1-4.

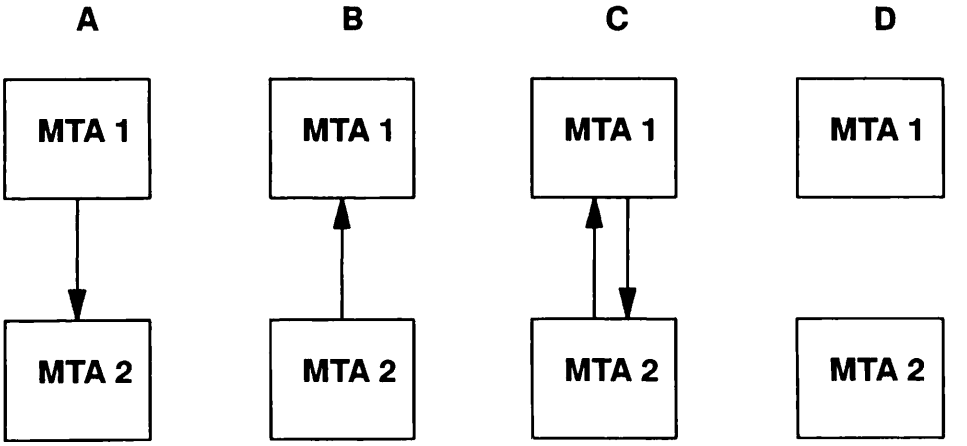

FIGURE 1-4. Associations and MTAs

In example A, the MTA 1 is linked by an outbound association to MTA 2, in B, MTA 1 is linked by an inbound association, in C, MTA 1 is linked by both inbound and outbound associations, which give bidirectional flow of data. In D, no associations have been defined, resulting in the MTAs being isolated.

Any of the associations in Figure 1-4 can be temporary or permanent.

When Prime X.400 is installed, the default settings of the association parameters are:

- Default temporary inbound and outbound association between every local MTA defined.
- No associations defined to any remote MTA.
- No permanent associations defined.
- No non-default associations defined.

This gives the connectivity shown in Figure 1-5. In this example, every MTA in a single domain is connected to every other MTA in the domain. Associations between the domains must be explicitly defined (non-default associations).

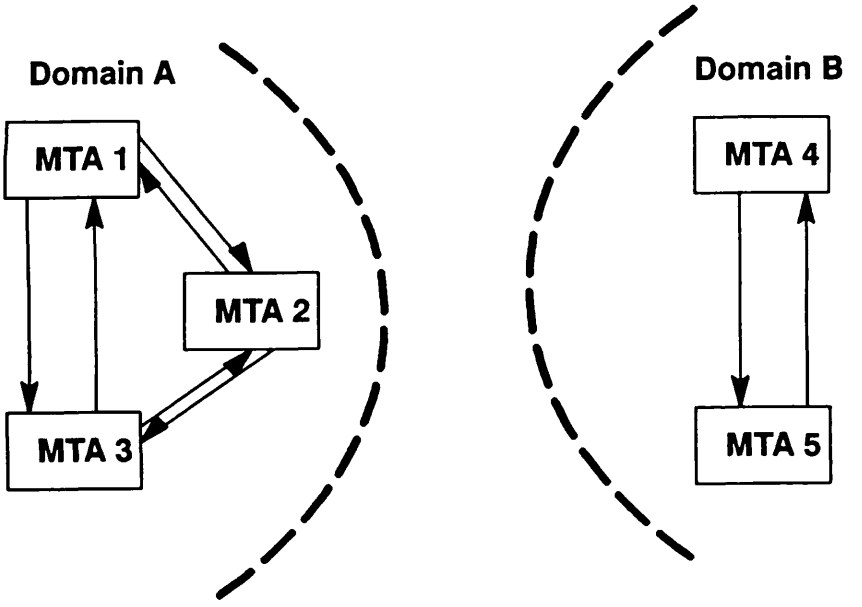

FIGURE 1-5. Default Associations for Prime X.400

Assuming that MTA 1 has inbound and outbound non-default associations to MTA 4, and MTAs 2 and 3 have similar non-default associations to MTA 5, the connectivity diagram would look like that in Figure 1-6. The administrator for the domain containing MTAs 4 and 5 would have to configure the associations in the Domain B configuration to match those in Domain A.

A non-default association is specified as either inbound or outbound, refering to the direction of data transfer. Bidirectional data flow uses one association of outbound and one of inbound.

Introduction to configuration

The first stage in configuring a network is setting up a single local MTA and the users attached to it. You will need to define:

- Configuration domain name, consisting of:
  - Country
  - ADMD, unless you are connecting to a private network
  - PRMD, usually specified by the public carrier or national X.400 administrative body

- MTA name
- MTA domain (also known as the MTA O/R Address Space) consisting of:
    - Country
    - ADMD
    - PRMD
    - organisation
    - organisational unit (optional)

  Users of the MTA

We recommend that the MTA name is the same as the PRIMENET node name, as this reduces the amount of configuration information that you will have to enter when adding MTAs.

Defined configuration domain names and MTA domain names will help you when entering configuration details. The configuration domain name is automatically filled in as the default domain name for MTAs as you define them. The MTA domain name is automatically filled into the component parts of the user information as you add users.

Once a single local MTA is configured, you can expand the configuration by adding additional local MTAs. You must either supply an MTA network address, also known as a Network Service Access Point (NSAP) or use the default MTA network address; the MTA name. As you add a local MTA, define the users attached to it. You do not need to supply any information on how to route messages between local MTAs. All message routing is handled automatically.

Under normal circumstances you do not need to define associations for local MTAs as this is handled automatically by the configuration defaults. The standard connectivity is shown in Figure 1-5. This connectivity can be changed to any number of temporary or permanent associations.

Typically, non-default local associations are used to isolate an MTA from all but one of the other MTAs on a local network.

Having added all the local MTAs, you must add the remote MTAs. The information required for remote MTA configuration is:

- local and remote passwords (if any) - remote passwords must be obtained from the administrator of the remote machine
- TSAPs (Transport Service Access Points): used to identify a particular program on a machine - the NSAP just identifies the machine
- O/R address spaces that are reachable on the remote MTA
- non-default associations between the local MTAs and the remote MTAs

Sometimes a subnetwork definition will be required for some remote MTAs. This is common when the remote MTA has different inbound and outbound NSAPs, or requires call user data on a 1980 X.25 network connection.

An example network with simple default and non-default associations is shown in Figure 1-6.

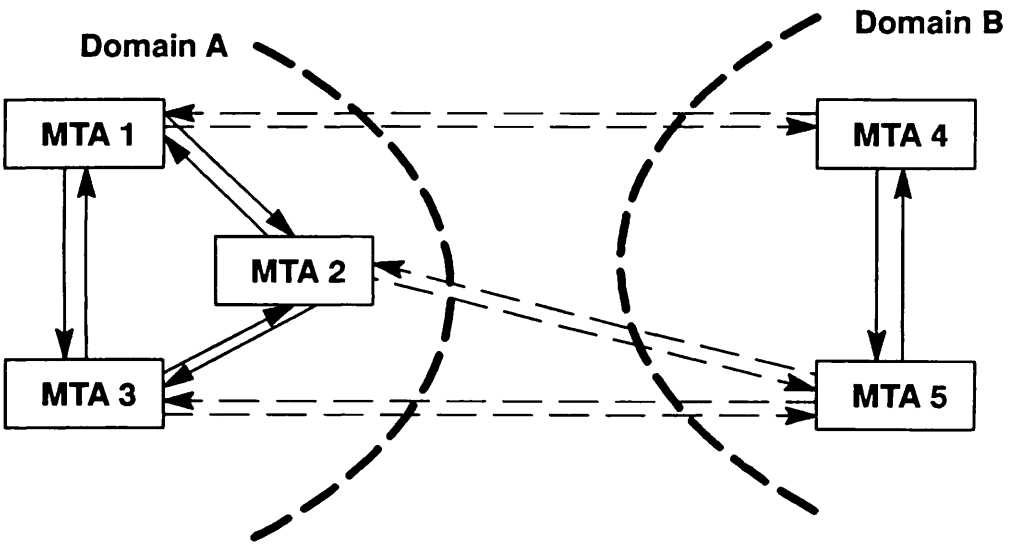

FIGURE 1-6. Simple Default and Non-Default Associations

Configuring a non-default association between any two MTAs overrides any default association between them. For example, assume that you wish to isolate a single local MTA, say MTA 1, such that it can receive, but not send mail, etc.. Rather than change the default settings before you configure the X.400 network, just define non-default associations between MTA 1 and all other MTAs that are linked by default associations. The non-default associations can be set to neither inbound nor outbound (no connection) or inbound only. This situation is shown in Figure 1-7.

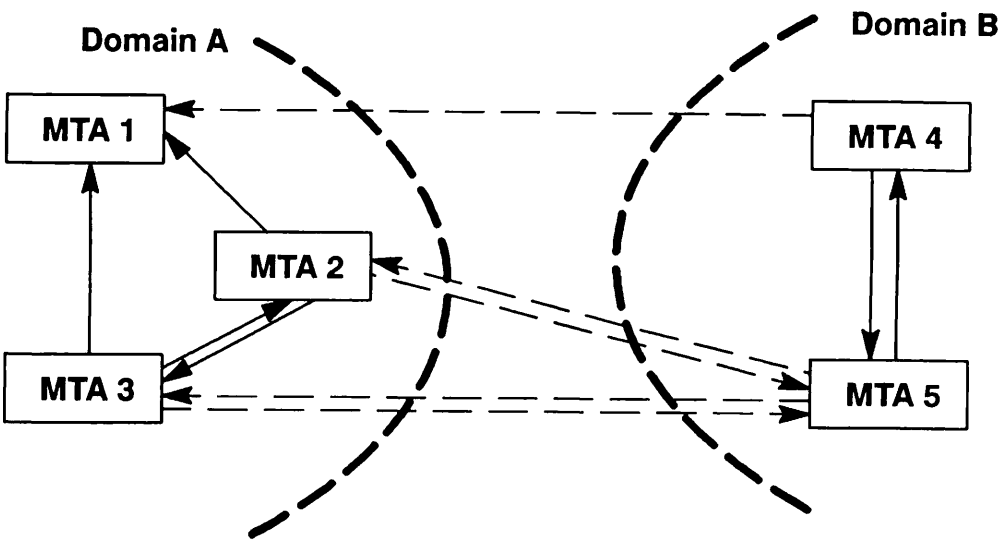

FIGURE 1-7. Complex Default and Non-Default Associations

Alternative default settings for associations that you might wish to consider before configuring your X.400 network are:

- No associations configured - all MTAs, both local and remote, must be linked by non-default associations defined by the administrator.
- Local permanent default associations configured, no default associations to remote MTAs - similar to the standard defaults, but with permanent associations rather than temporary associations.
- Default associations configured to local and remote MTAs - this gives you total interconnectivity. It is recommended that you do not set default permanent associations to remote MTAs.

Reasons for using non-default associations

The main reason for using non-default associations is control over access both to and from local MTAs, particularly to remote MTAs. Whether you want to configure permanent or temporary associations is a local matter, depending on

- amount of data to be sent - more associations mean higher throughput
- cost - each association will take an extra network connection

Non-default associations give you the flexibility to control traffic flow between MTAs in the local network.

Routing and associations to remote MTAs

Under normal circumstances, you would configure associations between your local X.400 network and the ADMD MTA you are connected to. The ADMD MTA is responsible for the routing of messages to other domains. Under these circumstances, you would have to ensure that: the domain you wish to reach is connected to the ADMD you are connected to, or that a link exists between your ADMD and the recipients ADMD. However, you must be aware that national policy may influence the way in which you configure associations to remote MTAs.

When you are connection to a private network, you do not have to configure the ADMD. Routing is the resposibility of the network administrator.

Within your local domain, you might wish to restrict associations from outside domains to just one MTA. An example of this is shown in Figure 1-7. In this case, the outside world only knows about MTA 2. It is up to you how you handle the routing of messages received by MTA 2 for users located at other MTAs within your domain.

Subnetworks

Prime X.400 lets you define sets of network data and protocols to identify networks of any type that may be encountered when a user connects to other X.400 products and applications. These are known as **subnetworks.**

Subnetworks are defined separately for each particular configuration. Once the subnetwork is defined, you can identify the network protocols for a specific MTA simply by giving a subnetwork name.

During subnetwork definition, you specify subnetwork parameters for use by PRIMENET.

For brief descriptions of the parameters see Chapter 3, Configuration Data, and for further details consult the relevant PRIMENET documentation.

Gateways and Users

There are two types of Prime X.400 User Agents; users mail applications and gateways.

A user is a particular instance of a User Agent, having a single unique O/R address. Only mail addressed to that O/R address is received by the user. All mail sent by the user, is automatically labelled as originating from that O/R address.

Gateways can have multiple O/R addresses, much the same as remote MTAs: mail for O/R addresses that have attributes matching those specified for a gateway, are sent to that gateway user.

Mail IDs

Every Prime X.400 User Agent is assigned a Mail ID. Consequently, as both users and gateways only support a single Mail ID, neither can have the same Mail ID. Likewise, within a configuration, all users must have a unique Mail ID, which can only be used with a single MTA.

Prime X.400 Configuration

The Prime X.400 Configuration is configured using an interactive configurator provided by the CONFIG_X400 subsystem. You use the configurator to specify the parameters that enable Prime X.400 to operate on the local network, and to communicate with X.400 applications on other networks.

The parameters needed by Prime X.400 include:

- Local and remote MTA names
- O/R Addresses of local users
- O/R Addresses of remote users
- The protocols necessary for communicating with specific MTAs (local or remote)

Some of these parameters must be supplied by the administrators of the remote systems you wish to communicate with. You need to inform the administrators of the remote systems of the local parameters from the above list.

The CONFIG_X400 Command

The CONFIG_X400 command invokes the CONFIG_X400 subsystem. This subsystem supplies you with an interactive configurator. The configurator lets you create or modify a Prime X.400 configuration, perform verification checks on the configuration, and save the configuration in a configuration file, within a single terminal session. Prime X.400 builds its routing tables from the configuration file when it is started on the system.

For further details of the CONFIG_X400 subsystem, refer to Chapter 3, Prime X.400 Configuration, and Chapter 5, CONFIG_X400 Examples.

Control and Monitoring

The ADMIN_X400 command lets you start and stop the X400 Server, and monitor the activity of Prime X.400 on the system. Startup and shutdown of the Server are invoked by command-line options. Monitoring facilities are provided within a subcommand environment, which lets you display the status of users, MTAs and message queues, and to control the error message display.

For details of the subcommands, refer to Chapter 6, Operation and Monitoring.

2

CONFIGURATION PLANNING

Introduction

This chapter discusses the decisions you need to take before starting to configure your network, and the steps necessary to achieve an efficient configuration. An example network configuration, illustrating typical problems, is used as a basis. Where possible, a recommended course of action is given.

Initial Planning

The first steps in the X.400 configuration process are:

- Assessing your current network configuration, and how this will influence your X.400 configuration.
- Obtaining basic X.400 address attributes, such as Country, ADMD and PRMD.
- Choosing a X.400 network topology that is suited to your physical network.

Assessing your current network

The first stage in assessing your network is whether it is a large or small network. If your network is more than a single PRIMENET ring, or the configuration file for the network cannot be shared using Remote File Access (RFA), you have a large network. Note that a small network could have a very large number of users.

For a small network, the single ring constitutes your local domain. For large networks, the recommended course of action is to treat each PRIMENET ring as a single local domain. It is likely that the local domains will have different address attributes if they are located in different countries, or connect to different carriers.

Nominate one MTA on each PRIMENET ring as a **hub.** A hub is the single point on a ring for the transmission and reception of all messages from outside of the local domain. Note that a ring can have just one MTA, which is automatically the hub.

It is possible for all MTAs on a ring to communicate on an individual basis with external MTAs, however, this has the drawback that the configuration file for each MTA will have to be updated regularly, as each new destination must be added to each individual configuration file.

A first stage configuration diagram for a large network is shown in Figure 2-1

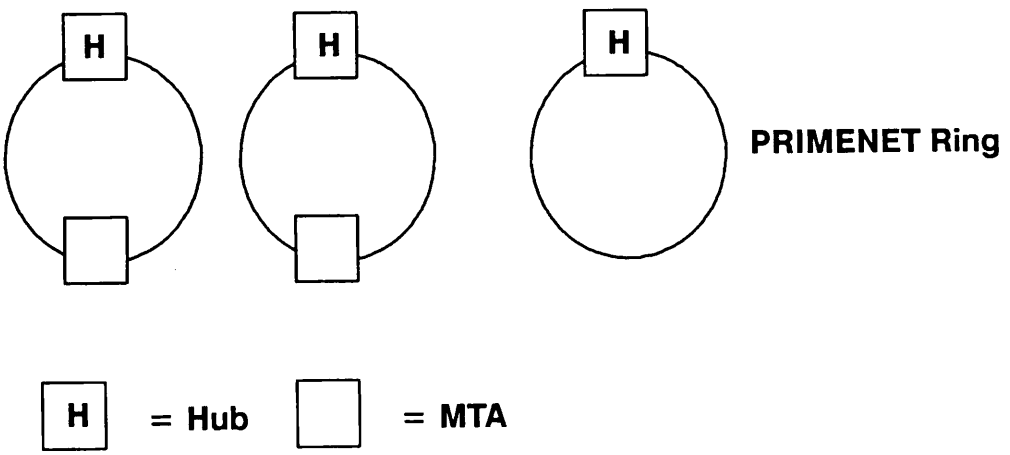

FIGURE 2-1. First stage of configuration

The second and subsequent stages of this subsection apply to large networks only.

The second stage is determining the style of configuration you want to achieve. The main criteria are:

- route costs
- flexibility
- existing network restrictions
- restrictions caused by the carriers you connect to

Route costs are a major factor for configuring X.400 networks that traverse large distances, particularly if several national borders are crossed. In this case, a tree topology, combined with the use of private lines for major trunk routes, is recommended.

There may be good reasons for siting an MTA at a specific node. For example, a node that acts as a PSDN (Public Switched Digital Network) entry point should contain a resident MTA in order to ensure that incoming mail from a chargeable network can be received with maximum reliability. PSDN operators often charge for the storage of mail that is awaiting delivery.

The recommended configuration is shown in Figure 2-2.

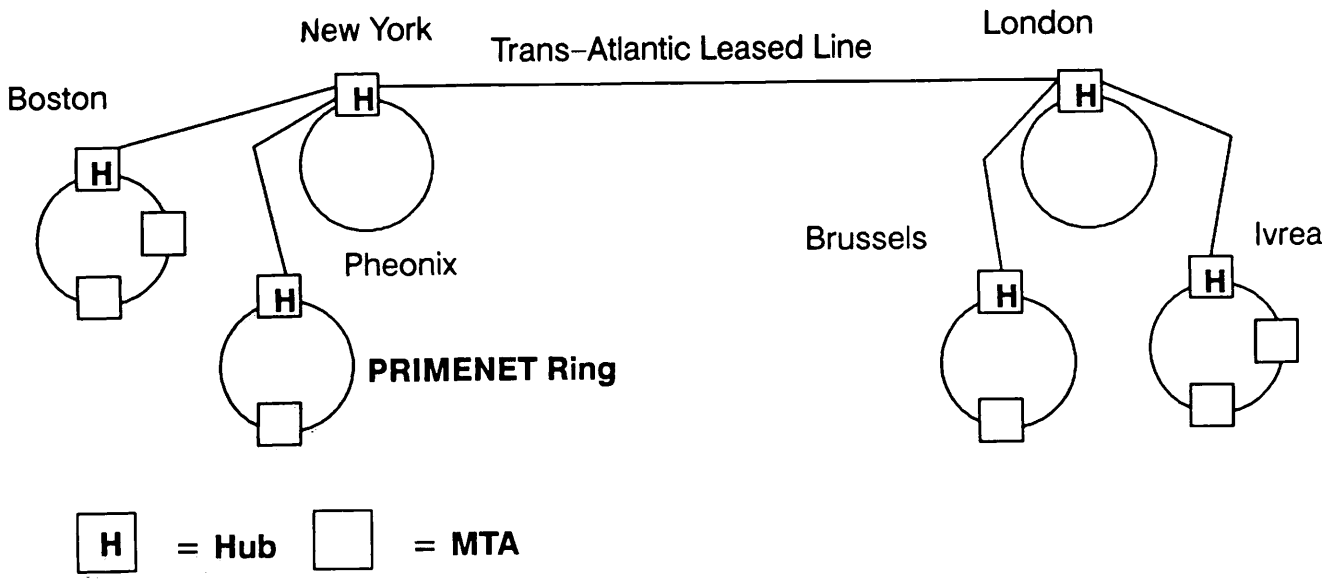

FIGURE 2-2. Second stage of configuration

The private line connection across the Atlantic is used for all US/European traffic. Fanout of the traffic at both ends is performed by the centres in New York and London.

In some cases you may wish to use just one point (the root) in your total network as the connection point for all outside traffic. This has a major advantage for administration, in that data to be exchanged with other administrators is kept to a minimum, and one administrator controls and maintains the major part of the network, but can have drawbacks for reliability, for example, if the carrier connections to the single point are unreliable.

A typical large network is shown in Figure 2-3.

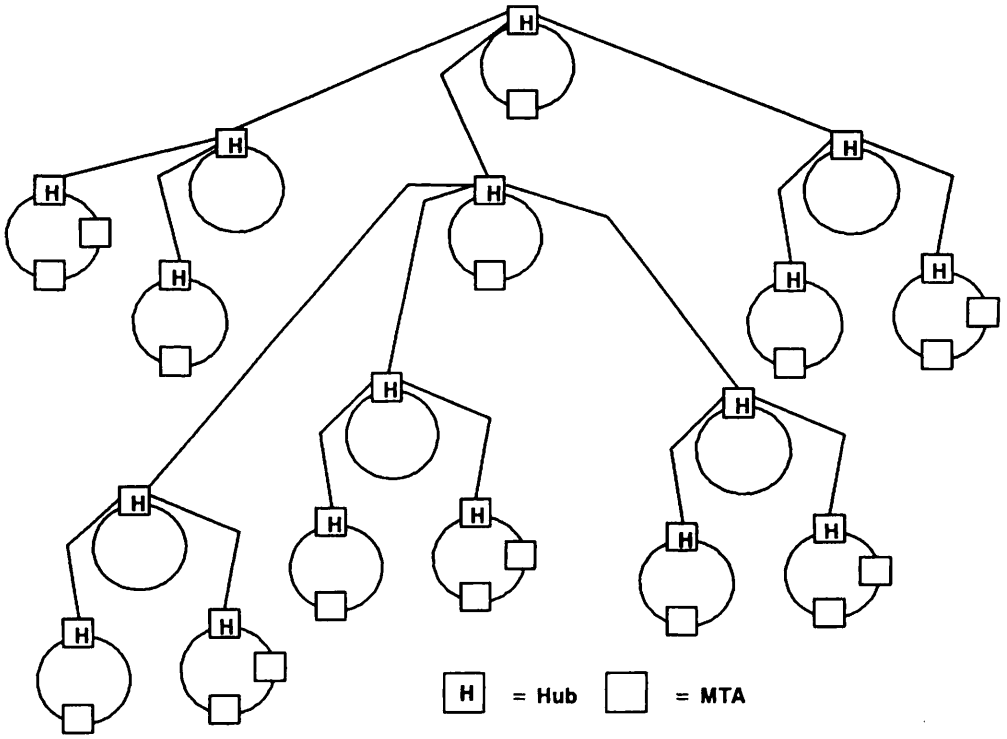

FIGURE 2-3. Large network configuration

Each MTA in a local domain routes mail for non-local destinations to the local domain hub. The hub then routes either to a known destination, or to the hub of the next higher domain (the geographical hub). The geographical hub routes to either a known local domain, or to the root. The root routes to one of; a known geographical hub, an ADMD MTA, or an MTA of an outside organisation.

Basic address attributes

The Country attribute is fixed by the location of the local domain, since a PRIMENET ring does not normally span a national border.

The ADMD is either fixed by the public carrier you connect to, or, if you use a private network, left blank.

The PRMD is normally fixed, after negotiation, with the public carrier that you use. If you use more than one public carrier, for example because your network spans more than one country, you should attempt to get the same PRMD in all countries. This greatly simplifies administration.

If you use a private network, the PRMD can be set, subject to field restrictions, to anything you want.

With the above information, you will be able to sketch out a basis for your local configuration. A typical example is shown in Figure 2-4.

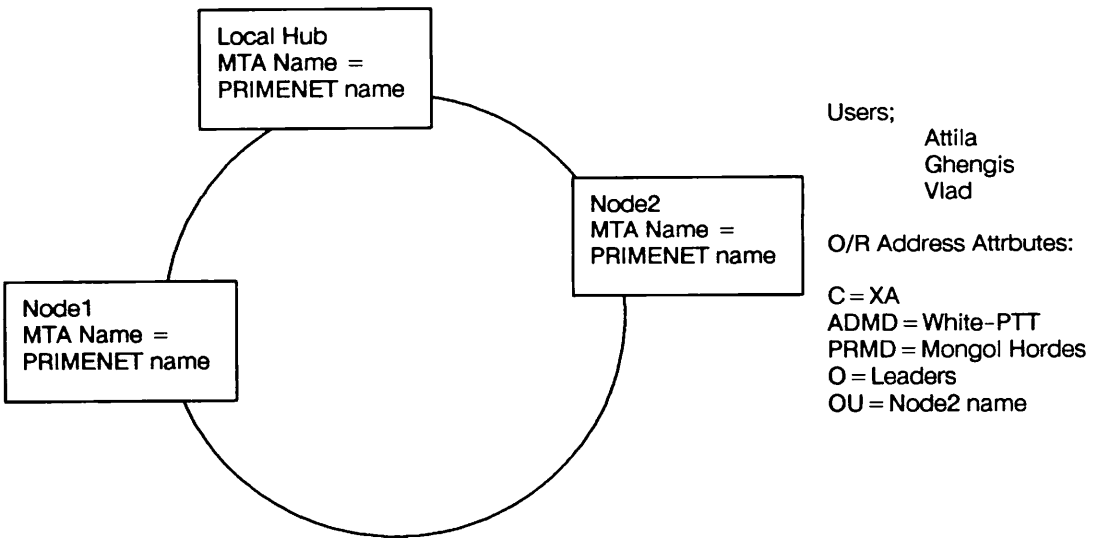

FIGURE 2-4. Typical Local Domain

MTA Naming

MTA naming can have a major influence on how easy configuration process is to complete. The ideal situation is to have MTAs named the same as the computer where the MTA resides (using the PRIMENET node name). In case you have to compromise, ensure that MTA names are:

- unique within your configuration
- understandable
- are unlikely to clash with user names, gateway names, etc

Choosing Organisation and Organisational Units

Where possible, the O component should reflect the local domain name, but O and OU must be unique within your local domain.

The OU component should reflect the department or function of the users associated with it, or, as an alternative, use the machine name.

Local Connectivity

By default, the X.400 configuration subsystem configures associations between local MTAs such that every MTA is connected to every other MTA in the local domain. This gives 100% connectivity, as shown in Figure 2-5.

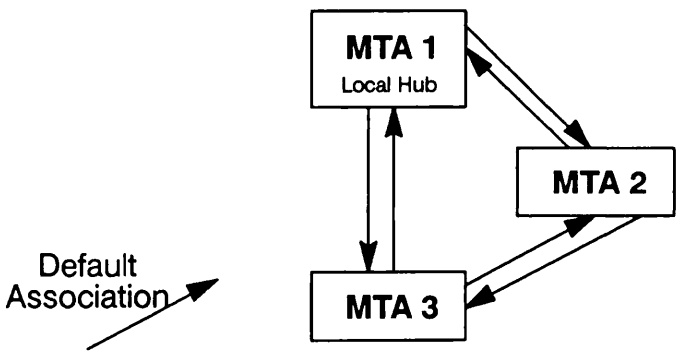

FIGURE 2-5. Typical Local Connectivity

Non-default associations

Non default asociations are used to connect to remote MTAs, covered in the next section, and to reconfigure or modify the local configuration, for example to isolate MTAs from the network, or restrict the flow of traffic between certain MTAs.

Always map out the connectivity you want before you start to configure non-default associations. Trying to configure from memory can be difficult.

Configuration of Local Users

It is strongly recommended that users' X.400 Mail IDs are the same as their PRIMOS login IDs. This has a major advantage

- Security does not have to be configured for the X.400 network, as PRIMOS takes care of it

If you choose not to use the login IDs as the Mail IDs, details of the extra data you must load are found in chapter 4.

User details are either loaded for a single user at a time, or bulk loaded, from previously prepared data files.

Bulk loading

Bulk loading of user details into the X.400 configuration is a viable option if you have:

- large numbers of users associated with single MTAs
- you can configure all your MTAs before you start to load the users' data

If you do not bulk load users, the best way of entering user data is on a per MTA basis. As you configure each MTA, configure the users that are associated with it. The function for configuring users available from the main menu of the X.400 Configurator is intended for use as a maintenance tool.

Note that the preparation of the user details for bulk loading can appear daunting, but can save great amounts of time when compared to entering individual user details.

Moving users around

If users move around within their original PRIMENET ring, you have to change the MTA entry associated with the user. The user X.400 address does not change, provided that the MTA name is not used as the OU component of the O/R address. If the user changes local domains, the X.400 address does change.

Connections to Remote Systems

When you are ready to configure connections to remote systems, you must:

- decide which MTAs will be able to communicate with the outside world
- give and receive information about your domain and the remote domains you want to connect to
- decide how you will implement network security
- decide how your domain is presented to the remote domains

Where you have choosen to implement a tree topology, all local domains are considered remote to each other, although they are all part of the same corporate network.

Each local domain needs to have the O/R address space configured such that:

- All non-local traffic is routed to the local domain hub.
- All traffic at the hub is routed to either:
    - The next level above (the geographic hub or root)

- An ADMD MTA

All traffic at the geographic hub is routed to one of:

- A lower level hub
- The root
- An ADMD MTA

All traffic at the root is routed to one of:

- An MTA in a different organisation
- An ADMD MTA
- A Geographical hub

Restrictions imposed by carriers

Connections to ADMD MTAs usually have the following restrictions:

- The ADMD MTA will only deliver messages containing a pre-registered PRMD
- The country and ADMD attributes of the message must match those of the ADMD.

This means that the ADMD MTAs must be configured at a level in the tree below which all addresses fall into the domain of the ADMD in question.

Using a Gateway

Gateways are used as access points to non-X.400 networks, for example, SMTP networks. When you are configuring your X.400 network to allow for a gateway, ensure that only one gateway of a particualr type is associated with any single PRIMENET ring. It is recommended that you use the default gateway login id as the Mail ID in the X.400 configuration.

3

INSTALLATION

Introduction

This chapter covers the installation procedure for Prime X.400.

Installation

To install Prime X.400 on the system,

- Mount the tape.
- Restore the tape using MAGRST.
- Run the program PRIME_X400>PRIME_X400.INSTALL.CPL.

The install program builds the PRIME_X400* runtime directory, updates the system's CMDNC0, and LIBRARIES*, HELP*, and LIB directories, and updates the system search rules.

If Rev. 2.0 (or later) of Priforma is not already installed on your system, then this must also be installed from the supplied tape.

The PRIME_X400* Directory

PRIME_X400* is the runtime product directory. It holds the server runfiles, security files, and miscellaneous data files, and contains subdirectories for the routing tables, journal log files, and other essential data files.

Files and subdirectories in PRIME_X400* are described as follows:

File	*Contents*
X400_[DATE].COMO	The como file for the Prime X.400 server. This contains startup information, subsystem error messages, trace, and diagnostic information.
X400_SERVER.RUN	The program that runs the Prime X.400 server. It is invoked by X400_SERVER.CPL.
X400_SERVER.CPL	The CPL file that controls server initialization.
X400_CACHE.RUN	The program that builds the runtime routing tables. It is invoked by X400_SERVER.CPL.
X400_SECURITY.RUN	The program that sets the ACL's for Prime X.400 logon IDs. It is invoked by X400_SERVER.CPL.
PRIME_X400.CONFIG	The Prime X.400 default configuration file.
X409.TXT	Contains parameters used in X.400 message parsing.
CST.INP	Contains parameters used by the ADMIN_X400 command interface.
SCT.INP	Contains parameters used by the Prime X.400 server.
ADMIN.ACAT	The access category that controls access to the ADMIN_X400 command.
Subdirectory	*Contents*
OBJECTS	Contains files OMRDTABL, which is the runtime routing table, and the data files for all messages being processed.
EVENQ	Contains the details of messages waiting to be delivered to users and MTAs. EVENQ is used alternately with ODDQ to implement recovery after system crashes.
ODDQ	Contains the details of messages waiting to be delivered to users and MTAs. ODDQ is used alternately with EVENQ to implement recovery after system crashes.
SECURITY	Defines ACLs for Prime X.400 logon IDs.
ADMIN	Contains the help file for the ADMIN_X400 command.
X400_CACHE	Contains local language help text and messages.

FORMS	Contains the data files for the CONFIG_X400 forms.
SERVER.TEXT	Contains text strings output by the Prime X.400 server.

Making the first Configuration File

Prime X.400 is equiped with a simple configurator, called init_config, which can provide you with a simple configuration file, suitable for use with the Prime OSI-Mail user interface, or as a basis for your own (more complex) configuration file.

The configuration produced by the init_config configurator consists of

- Global Domain ID for the local domain
- Basic local MTA definitions
- Optional MTA name for the receipt of all undelivered mail (the **backstop** MTA)

The configuration does not include individual users, as these are supplied by one of the following:

- Bulk loading
- CONFIG_X400 configurator

In addition, Gateways, modifications to configuration defaults, remote MTAs, non-default associations and non-default security parameters are handled by CONFIG_X400.

Before you start

You will need the following configuration information before you start the init_config configurator:

- The configuration filename for the local installation. The default is PRIME_X400*>PRIME_X400.CONFIG.
- The C, ADMD, PRMD and O components of the installation's local domain.
- The PRIMENET node names of the machines where local MTAs will be installed.
- The C, ADMD, and PRMD components of the backstop MTA if you intend to use one. In addition, you will need the PRIMENET node name or X.121 address of the MTA and the MTA name.
- The name of the local MTA that communicates with the backstop MTA. This is usually the hub of the local ring.

Defaults Used

The following list describes the defaults used by init_config:

- All local MTAs are linked with a pair of default association, one inbound and one outbound.
- The local MTA OU component of the O/R address space is set to the MTA name, which is the same as the PRIMENET node name (network address).
- The Session protocol data unit (SPDU) size is set to 1024 k for both transmit and receive. This is described in the next chapter.

Starting init_config

Login and enter

```
r prime_x400*>init_config
```

You are prompted to enter:

1. C, ADMD and PRMD
2. PRIMENET node names of all machines that will have MTAs running on them
3. Backstop MTA O/R address attributes
4. Local node used for communication with the backstop MTA

4

CONFIGURATION DATA

This chapter describes the various data types that you must enter during configuration with the CONFIG_X400 subsystem. Each data item is explained in detail, together with any restrictions and recommended values where appropriate.

Examples of various configurations are shown in Chapter 5, CONFIG_X400 Examples.

Prime X.400 Configuration Concepts

This section introduces some configuration concepts that you, the administrator, should be familiar with before configuring Prime X.400 on your system or network. Full details of specific parameters are given later.

Local MTAs

Each PrimeNet ring on which you install Prime X.400 must create at least one local MTA. A local MTA routes mail between local users, and acts as a store and forward node on a larger network.

Each local MTA needs parameters specifying the following data:

- MTA network address
- Global domain ID - the basic address information of the local domain

Remote MTAs

Remote MTAs are MTAs on nodes, on a different ring, outside your immediate control. They act as routes to users in other X.400 domains. You, and the administrator of a remote MTA, must exchange information about your respective MTAs.

This includes:

- MTA network address
- remote and local passwords,
- protocols for communicating with the local MTA group,
- remote user address space (remote domain)

Subnetworks

Prime X.400 lets you define sets of network data and protocols to identify networks of any type that may be encountered when a Prime X.400 MTA connects to other X.400 products and applications. These are known as **subnetworks.**

Subnetworks are defined separately for each particular configuration. Once the subnetwork is defined, you can identify the network protocols for a specific MTA simply by giving a subnetwork name.

During subnetwork definition, you specify parameters for lower-level protocols in the OSI model. For local links, these parameters can usually be ignored.

Domains

Prime X.400 domains are X.400 name spaces through which users can be addressed. Each domain is described by a set of high-level O/R address components (see O/R Address Components, below). Local domains are those associated with local MTAs, and remote domains are those associated with remote MTAs. The standard X.400 term **Global Domain ID** is used to refer to the domain name on the screen forms associated with setting the domain.

Gateways and Users

Gateways and users are described in Chapter 1. There are two types of Prime X.400 User Agents; users mail applications (such as OSI-Mail) and gateways such as the Prime SMTP/X.400 Gateway).

Default Configuration Data

CONFIG_X400 provides defaults for many Prime X.400 configuration parameters. Default values, if present, are displayed in the relevant fields.

The default parameters operate for most installations. Only change them if you have special reasons for configuring Prime X.400 in a different way.

X.400 Addresses

Users are identified within Prime X.400 directly by unique X.400 O/R addresses (Refer to Chapter 1, INTRODUCTION TO PRIME X.400).

Prime X.400 supports the following O/R address components:

Country (C)
Administration Management Domain (ADMD)
Private Management Domain (PRMD)
Organization (O)
Organizational Units (OU)
Personal Name:

Surname (S)
Given Name (GN)
Initials (I)
Generation Qualifier (GQ)

Domain Defined Attributes (DDA)
X.121 - Terminal ID
User Agent (UA) Unique Numeric ID

The user address has three variants, all of which require Country and ADMD as mandatory components, plus one or more additional components. The following shows the complete breakdown of all three variants:

- Country and ADMD plus one or more of

  PRMD
  Personal Name
  Organization
  Organizational Unit
  Domain Defined Attributes

- Country and ADMD plus a UA Unique Numeric Identifier, and optionally Domain Defined Attributes.
- Country and ADMD plus an X.121 Address, and optionally Domain Defined Attributes.

Prime X.400 supports all three variants, for sending, receiving and relaying mail.

The X.400 recommendation specifies a limited character set for O/R addresses. This character set consists of: a-z, A-Z, 0-9, and the punctuation marks ?,.'()-=/: and space.

Configuring Local MTAs

The MTA group that you configure for your local domain is known as the local MTA group. This group could be a single node, or a group of local nodes, such as a local network, which you administer.

You must supply a number of parameters for local MTAs. These parameters include

- MTA network addresses (the node address where the MTA is located)
- link type (association) between MTAs (either local or remote)
- passwords used for security purposes across the associations
- service protocols and routing information
- X.400 O/R addresses for local users
- MTA attachments

You will have to supply this information to administrators of remote MTAs that your users wish to communicate with.

MTAs define specific addressing spaces on the X.400 network. You can configure them to suit your installation, and the mail needs of your users.

Global Domain ID

The Global Domain ID is the combination of C, ADMD and PRMD that identifies the domain of all the local MTAs in a single configuration. The three components specified for the Global Domain ID are always the same for all the local MTAs associated with this installation.

Country is allocated by the X.400 international controlling authorities. It represents the country in which the network operates. It can specified in one of two ways:

- A three-digit code as defined by CCITT X.121. (For example, the UK code is 234, the US code is 311).
- A two-letter code as defined by ISO 3166/ALPHA-2. (For example, GB, US). This is the recommended method.

ADMD is an X.400 administrative domain within the country. The ADMD field is mandatory. If you are connecting to an X.400 service provided by a public carrier, they will specify the ADMD to be used. For private message handling systems that are not linked to other carriers, you may choose to leave this field blank. This results in the insertion of a single space into the ADMD field.

The ADMD name can contain a maximum of 16 characters.

PRMD is a private administration domain within a country. For mail applications that connect to ADMDs, the PRMD is a matter of negotiation with the ADMD administrator.

Where possible, the PRMD should be the same for all systems used by the same organization throughout the world.

If you are connecting to a private network, agree the name with the main network administrator responsible for the application.

The PRMD name can contain a maximum of 16 characters.

For example, the following set of names could be allocated to Sprocket Company networks within the UK:

Country : GB

ADMD : Gold 400

PRMD : SprocketCo

The domain name also identifies the MTA to any remote MTAs with which it is associated.

Local MTA Addresses

Local MTAs inherit the C, ADMD and PRMD components of their addresses from those specified for the configuration Global Domain ID.

You can define other components to suit your administrative structures.

For example, an administrator of a PRIMENET™ network on several sites could assign organization names to individual sites, leaving the administrators of those sites to define their own organizational unit names for departments within the site. Hierarchical naming schemes of this kind are likely to be the most commonly encountered in practice, but any naming system can be used.

Organization Name

A name assigned to an organization within a PRMD.

Organization Name can contain a maximum of 64 characters. Ideally, the Organization name should reflect the name or function of the PrimeNet ring associated with the configuration. However, any naming scheme is permitted, subject to any restrictions imposed by either the public carrier, or the national body responsible for X.400 in your country.

Organizational Unit(s)

Names of units within an Organization. Up to 4 Organizational Units per Organization can be defined.

Organizational Unit names can contain a maximum of 32 characters. The recommended values of the organizational units are the PrimeNet node names of the various machines on the PrimeNet ring.

Domain Defined Attributes
A group of attributes that are used to map an existing mail service directory to the O/R addressing scheme.

Attribute names (Type) can contain a maximum of 8 characters, and attribute values (Value) a maximum of 128 characters. Nonprinting characters are allowed.

Unique Numeric ID
A unique ID, identifying a device with a numeric keypad, and no keyboard.

The Unique Numeric ID can contain a maximum of 10 digits.

X.121 Address
An address that identifies a users Teletex-type terminal.

The X.121 address can contain a maximum of 15 digits.

MTA Attributes

Local MTA attributes are described in the following list.

Attribute	*Description*
Password	The password that controls communication with the MTA. The MTA only accepts associations from other MTAs, if they quote this password when requesting the association. Password can contain a maximum of 42 characters. The default value is no password.
Network Address	The network address of the MTA. Specify the address in one of the following formats: • PRIMENET nodename. It is recommended that the PRIMENET nodename is the same as the MTA name. • An X.121 address. Can contain a maximum of 15 digits.
Transport Service Access Point (TSAP)	Selects the transport address to be used by this MTA. The attribute must be entered as two hexadecimal digits per byte. For example, if you agree on the 2-byte code that corresponds to ASCII 17, then you must enter 3137. The maximum size is 32 bytes. The default is 3432.

RTS Values

Checkpoint Size: A four-digit number representing the maximum number of 1024-byte data units, that can be transferred between adjacent MTAs before confirmation is required.

The minimum is zero, the default is 1.

Window Size: A four-digit number representing the maximum number of 1024-byte data units that are allowed to be outstanding during data exchange over an active association.

The minimum is 1, and the default is 3.

SPDU Values

Maximum transmit size
The maximum permitted data unit size in transmit mode.

Maximum receive size
The maximum permitted data unit size in receive mode.

Note

The Reliable Transfer Service (RTS) and Session Protocol Data Unit (SPDU) parameters, represent initial negotiating values. Runtime values are determined by negotiation between MTAs.

User Addresses

User addresses for local MTAs are entered by:

- bulk loading
- Individually, using the configurator

Gateway Addresses

The Global Domain ID is used as the default address space for X.400 users within your configuration, and contains Country, ADMD, and PRMD names. The addresses of all local users contain this set of names.

Defining Remote MTAs

You must specify the following data when defining remote MTAs:

- The remote global domain ID
- MTA protocols and passwords
- O/R address spaces on specific MTAs
- Non-default associations

Remote MTAs are MTAs controlled by other administrators, with which you wish to communicate. They form the access points through which users in your configuration exchange messages with users in other configurations. Since Remote MTAs are the responsibility of other administrators, you will need to cooperate with them to obtain MTA configuration attributes.

Data is transferred between local and remote MTAs across the non-default associations that you configure. Whenever you add a new remote MTA, ensure that you define the non-default associations with existing local MTAs. Failure to do this will result in error messages being generated by the configurator.

Define Remote Global Domain ID

Define the domain for a particular remote MTA by specifying Country, ADMD, and PRMD. Details and explanations of these fields can be found in the section Set Global Domain ID, earlier in this chapter. This information must be supplied by the administrator of the remote MTA.

Define O/R Address Space

Define the remote O/R address space by completing as many of the address component fields as necessary, to ensure that there is no ambiguity in O/R addresses. A full O/R address, including the name of a particular user, is not normally required. However, you must ensure that the O/R address space defined for the MTA is unique, compared with all other remote MTA O/R address spaces that are associated with your local domain through non-default associations.

Define MTA Attributes

Remote MTA attributes are described in the following list.

Attribute	*Description*
Remote Password	The password required to access the remote MTA. Obtain the password from the remote MTAs' administrator. The remote MTA password can contain a maximum of 42 characters.
Local Password	The password that the remote MTA must supply in order to communicate with the local MTA. You assign this password, and must ensure that the administrator of the remote MTA is informed, so that the parameters of the remote MTA can be set correctly.

The Local Password can contain a maximum of 42 characters.

Network Address — The ISO network address (NSAP) of the remote MTA. Specify the address in one of the following formats:

- PRIMENET Nodename.
- An X.121 address: upto 15 digits long.

Transport Service Access Point (TSAP)

Selects the transport address. Obtain this parameter from the administrator of the remote MTA.

The TSAP is entered as two hexadecimal digits per byte. For example, if you agree on the 2-byte code that corresponds to ASCII 17, then you must enter 3137.

The maximum permitted size of this parameter is 32 bytes, and the default value is none.

Remote O/R Addresses

Remote O/R addresses must be supplied by the administrator of the remote MTA. The format of X.400 Addresses is described in the section X.400 Addresses, in this chapter.

Set Configuration Defaults

You can specify defaults for subnetwork definitions, and default associations between MTAs.

Network Parameters

Prime X.400 subnetworks are sets of protocol data and parameters that define specific subnetworks and subnetwork types.

Note

Unless you specify a subnetwork, the Network Provider is assumed to be X.25, and the X.25 Year, 1980, with Protocol ID of 03010100. Other subnetwork parameters are left undefined. It is recommended that you do not change the defaults.

The subnetwork definition fields are described in the following list.

Field	*Description*
Subnetwork Name	Your name for the subnetwork. Subnetwork Name can contain a maximum of 15 characters.
X.25 Year	The X.25 year, either 80 (1980) or 84 (1984). Enter two digits. For example, 1980 is entered as 80. The default is 1980.

Fast Select Selects the X.25 Fast Select facility. NO is the normal and default setting. Enter YES to select Fast Select.

Destination Address (X.121)
The X.121 address on outgoing calls. By default, this is computed from the remote Network Service Access Point (NSAP).

The destination address can be entered as a PRIMENET node name, or a maximum of 15 characters.

Destination Protocol ID The X.25 protocol ID used by the remote MTA.

Four bytes, entered as hexadecimal digits. You must get this data from the remote MTA system administrator.

Destination Facility The X.25 Facilities to define to make an X.25 call to the remote system which operates the remote MTA. For details of how to encode X.25 Facilities, refer to the *PRIMENET Programmer's Guide.* Destination facilities are not normally required for correct operation.

Destination Facility can contain a maximum of 32 hexadecimal digits.

Source Address (X.121) The X.121 address to be transmitted as the original address on outgoing calls. This is normally the same as one of the local PRIMENET addresses.

Source Address can be entered as a PRIMENET node name, or a maximum of 15 decimal digits.

Source Address should be distinct from any sub-address used for PRIMENET Route-through. (Refer to the *PRIMENET Programmer's Guide*).

Source Protocol ID The X.25 protocol ID used by the local MTA.

Enter as four bytes in hexadecimal format. The default (03010100) is suitable for most applications. However, should you wish to input your own protocol ID, you must ensure that the 4-byte hexadecimal ID does not conflict with any other application you configure.

Associations

Associations are the logical links between MTAs over which the data is transmitted. A pair of MTAs can be connected by more than one association to increase throughput, but at the expense of increasing the number of network connections. These extra associations can be either inbound or outbound.

Associations are either permanent or temporary. A permanent association is always open, and is preserved under all circumstances. Unless you are configuring associations for private networks, or the local (private) part of a network, it is not recommended that permanent associations are used, as the cost of keeping the network connections open can be prohibitive.

Temporary associations are the normal type of association between MTAs. The temporary association is instigated when there is data to send, and timesout after a period of inactivity. When more data is ready for sending, the association is reopened.

Specify the number of temporary and permanent associations for local and remote MTAs, and the name of a previously defined subnetwork. The default values are usually suitable for all applications.

The special name, DEFAULT, may be used to refer to the default network definition.

For temporary associations only, specify the inactivity timeout period (temporary associations are only maintained while messages are being exchanged).

The maximum number of associations that can be specified is 999.

The maximum timeout period for temporary associations is 999 minutes.

Non-default Associations

If you are adding a new adjacent MTA, you are initially presented with a list of existing MTAs in a form-like environment. Selection of one of these MTAs results in that MTA being added to the non-default associations for the current MTA. When the Select Non-default Associations form is redisplayed, select an adjacent MTA for modification, if required. The Configure Associations form is displayed.

To configure non-default associations, specify the numbers of inbound and outbound associations, the type of subnetwork, and, for temporary associations, the inactivity timeout period.

Outbound associations are those that carry data from the local MTA to the adjacent MTA. **Inbound** associations are those that carry data from the adjacent to the local MTA.

Configuring Users

User Access Control

By default, X.400 User Mail IDs are assumed to be the same as PRIMOS User Logon IDs; users thus have access to both send and receive mail services.

If the X.400 User Mail ID is different to the PRIMOS User Logon ID, or the access required is other than the default, then the PRIMOS User Logon ID and mail service access rights for that mail user have to be explicitly stated.

User Supported Data Types

The default user supported data type is IA5 (International Alphabet, Number 5, as defined by the CCITT). If your users need other data types, you will have to refer to the documentation accompanying your mail application or other product, as the range of data types that are supported depends on the application that uses Prime X.400.

Bulk loading of users

Users on existing mail lists can be included in the configuration using the bulk loading procedure. Briefly, this involves editing the existing list to produce user records of the correct format, appending the edited list to the configuration file, and invoking the configurator to save the new configuration.

Configuring Gateways

Gateway Domain

If values for Country, ADMD, PRMD, and Organization, have been defined for the MTAs local domain, then these will appear as the default values.

O/R Address Space

The data types required for a Gateway are the same as for a user. The Gateway mail ID must be unique to the configuration.

Gateway Security

By default, X.400 Gateway Mail IDs are assumed to be the same as PRIMOS User Logon IDs; gateways can then send and receive mail.

If the X.400 Gateway Mail ID is different to the PRIMOS User Logon ID, or the access required is other than the default, then the PRIMOS User Logon ID and mail service access rights for the gateway must be explicitly stated.

Alternate Recipients and Backstop MTAs

The fields of the Fallback Message Routing form are described below:

Field	*Description*
User's Mail ID	The mail ID of a previously configured alternate recipient, either a user or gateway, who will receive all nondeliverable mail addressed to your local domain. The User's Mail ID can contain a maximum of 15 characters.
MTA Name	The MTA Name of a remote MTA, used as the backstop. The MTA name can contain a maximum of 32 characters.

5

CONFIG_X400 EXAMPLES

Introduction

This chapter details the step-by-step procedure of how to set the following configurations:

- Set local domain and default configurations
- Configure a single local MTA, including new Users and Gateways
- Add other local MTAs
- Configure a remote MTA
- Configure large numbers of local users
- Define an alternative mail recipient

Each sequence is shown with examples of the screen dialogue.

Refer throughout this chapter to Chapter 3, PRIME X.400 CONFIGURATION, for further details.

The examples that illustrate the features of Prime X.400 configuration are based around the following section of a large network.

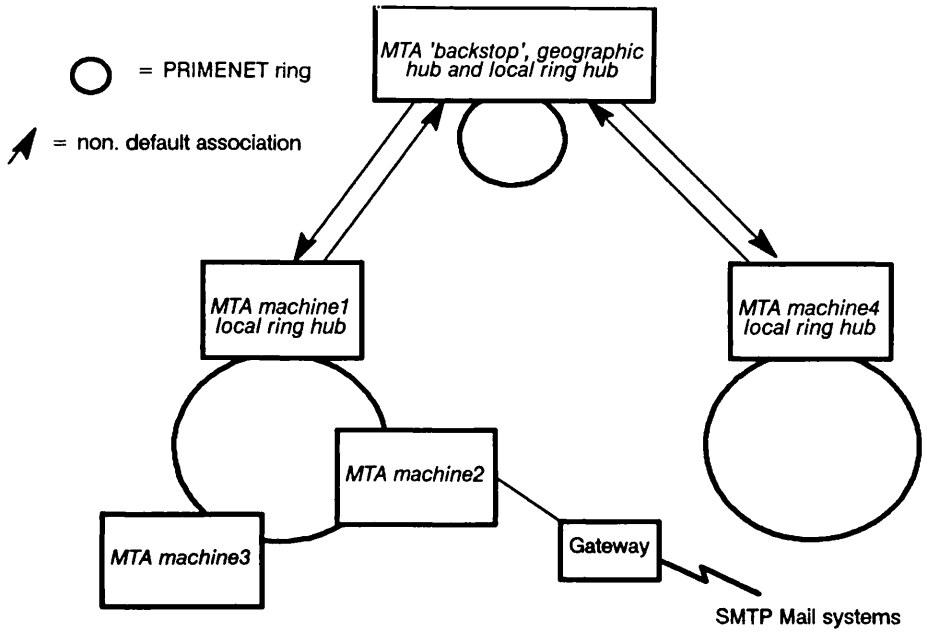

FIGURE 5-1. Example Network

The section of network in Figure 5-1 consists of:

- A geographical hub (a **G-hub**), that routes messages from lower level nodes to higher level nodes and vice versa. The G-hub also routes data from and to the ADMD MTA.
- A single PRIMENET ring with three MTAs, one of which is the ring hub (machine1). Each MTA is on a single machine.
- A single PRIMENET ring with just one MTA. There could be more than one machine on this ring. All users on this ring are associated to the single MTA, which is the hub for this ring.
- A Gateway between the MTA machine2 and SMTP mail networks.

The stages in configuring this section of the network are:

1. Run init_config to generate an initial configuration file for the two PRIMENET rings, or set configuration defaults if init_config is not used.
2. Use config_x400 to add the non-default associations between the MTAs on the two PRIMENET rings.
3. Configure the users on the two PRIMENET rings.
4. Add the non-default associations between the geographic hub *backstop* and the new ring hubs

5. Configure the gateway

O/R Address Spaces for Remote MTAs

For a local MTA to send messages to a UA or user attached to remote MTA, there must be a specified route to the remote MTA that is unambiguous. There are two methods of achieving this.

Use the fallback routing mechanism to route mail from a lower level MTA to a higher level hub MTA. This method only works on network configurations that follow the tree hierarchy described in Chapter 2.

Define an unambiguous O/R Address space associated with the remote MTA at the local MTA. This method is the only one that can be used to route mail from higher level MTAs to lower level MTAs.

Using the Fallback MTA for Routing Purposes

The fallback MTA (or backstop) is used as a collecting point for all undeliverable mail from local MTAs that have the backstop configured. The backstop MTA is always a remote MTA in relation to the local MTA using the services of the backstop.

In the network shown in Figure 5-1 the backstop MTA *backstop* collects all non-local mail from both the PRIMENET rings, provided that both local ring hubs have the backstop configured. The backstop then attempts to route the mail. Within the configuration for *backstop*, there will be entries for the remote MTAs *machine1* and *machine4*, defining the O/R Address spaces reachable from *backstop*, together with a backstop for collecting all mail that cannot be delivered to known O/R Address spaces.

Using Explicit O/R Address spaces for Routing

If the backstop facility is not used, each local MTA must have explicit O/R Address spaces configured. Each address space will be associated with a remote MTA, connected to the local MTA by either a default association, or more commonly, a non-default association.

Whenever a new destination is required for outgoing mail, the O/R address space that describes the mail's destination must be added to the configuration.

Using init_config for Initial Configuration

The following example of an initial configuration is based on the local ring containing the three MTAs *machine1*, *machine2* and *machine3*, as shown in Figure 5-1.

Before you start init_config, you will need the following data:

- The X.400 address components for the local domain:
  - Country - the two letter or three digit code associated with the country that the ring is located in.
  - ADMD - the code or name identifying the public carrier used. If you are not connected to a public carrier, leave this field blank.
  - PRMD - the code or name identifying the company or other institution that owns the ring.
  - Organization - the department within the owning institution, for example Sales or Marketing, that controls the ring. By default, init_config sets the O component of all MTAs on a single ring to the same value. If this is not the case, use config_x400 to change individual MTA attributes.

  The PRIMENET node names of the machines that will run MTAs, in this example, machine1 machine2 and machine3.
- The MTA name of the fallback, or backstop, MTA, used for routing all mail to unknown destinations. This facility is optional.
- The X.400 O/R address components and PRIMENET node name for the backstop, if used.
- The name of the local machine used in all transactions between the backstop MTA and the local ring. This is normally the local ring hub.

Starting the Initial Configuration

Login and, at the PRIMOS prompt, enter the following command:

```
r prime_x400*>init_config.cpl
```

Note

The installation of the X.400 software automatically creates a PRIMOS group called .X400_ADMIN. This group automatically has the correct ACLs for all X.400 administration functions. It is recommended that the X.400 administrator, and any other MTA administrators, be members of this group.

The following screens show the configuration of the example ring.

```
[INIT_CONFIG Rev 1.2 Copyright (c) 1990, Prime Computer, Inc.]

PRIME_X400 INITIAL CONFIGURATION GENERATOR

This program will generate an initial configuration file for your local
network.  It will prompt you for the following:

     The domain name of your configuration:

          Country, ADMD, PRMD, Organisation

     Machine name (primenet node name) of each node to have an MTA

     Details of the 'backstop' MTA for your configuration:

          MTA name, MTA Domain Name, Network address (NSAP)

You  will have to obtain this last information from the administrator of
the MTA.  You will also have  to  nominate  the  local  node  that  will
perform all communication with the backstop MTA.

If you are ready to continue type Y, otherwise enter N to terminate
this program.

Are you ready to continue? y
```

The next screen of data prompts for the configuration filename, and the basic components of the domain name for this configuration. Each ring within a single network could have different components.

```
You can terminate this program at any time by typing CTRL-P (QUIT).

To accept default values at any prompt, simply press the RETURN key.

Enter the pathname of the config file to create.
Default = PRIME_X400*>PRIME_X400.CONFIG

Config Pathname: cfg.bri

Enter the components of the domain name of your configuration at each
prompt. Country and PRMD are mandatory. ADMD and Organisation name
can be blank (simply press RETURN). You can only use letters, digits,
or the following punctuation characters in these fields: '()+,-./:=?

Country (2 letters or 3 digits): gb
ADMD (max 16 characters): gold 400
PRMD (max 16 characters): sprocketCo
Organisation (max 64 characters): R and D
```

The next screen prompts for the node names of the all the machines that will be used for running MTAs. The node name is automatically used as the name of the MTA. If you want the MTA name to be something else, for whatever reason, you will have to change the MTA name using CONFIG_X400.

```
You will now be prompted for the primenet node names of all machines
that you wish to run MTAs on. At each prompt enter a single node name.
Terminate by pressing RETURN to a prompt.

Node Name (32 characters): machine1
Node Name (32 characters): machine2
Node Name (32 characters): machine2
Your have already entered that node. Please re-enter.
Node Name (32 characters): machine3
Node Name (32 characters):
```

The next screen prompts for the component data for the fallback routing MTA (also known as a backstop MTA). If you implement a configuration similar to that shown in figure 5-1, you can specify the next higher node on the network as the backstop. Doing this means that the O/R address spaces reachable from individual MTAs on the ring can be left blank, as all non-local messages will be routed to the backstop. In addition, init_config automatically creates the non-default associations between the backstop MTA and the local MTA specified as the hub.

```
You can choose to direct all mail with unrecognised recipient addresses
to a remote MTA - the backstop MTA. Enter the name of this MTA or
press RETURN if you do not wish to make use of this facility...

Backstop MTA (32 Characters): backstop

Please enter the domain name components of the Backstop MTA. Country
is mandatory. One of ADMD or PRMD may be blank. You can only use
letters, digits, or the following punctuation characters in these
fields: '()+,-./:=?

Country (2 letters or 3 digits): gb
ADMD (max 16 characters): gold 400
PRMD (max 16 characters): sprocketCo

Enter the NSAP address of the backstop MTA. This should either be a
primenet node name or an X.121 address comprising of upto 15 decimal
digits.

Backstop NSAP: backstop

Please enter the name of the local node which will be used for
communication with the 'backstop' MTA:

Local node: machine1
```

The next screen displays the contents of the configuration file that you have specified.

```
Your initial configuration file will now be generated with the
following parameters:

     Country      = GB
     ADMD         = gold 400
     PRMD         = sprocketCo
     Organisation = R and D

MTAs will be on the following nodes:
          MACHINE1
          MACHINE2
          MACHINE3


Backstop MTA = backstop , Address = backstop

The config file pathname is:

    cfg.bri

You can now start the MTAs on each node specifying this file as the
config file for each.
```

Before you start the MTAs, you should configure any users. Use either CONFIG_X400 or bulk loading.

Setting Configuration Defaults with Config_X400

This example shows how you Set Configuration Defaults for a new configuration. Each stage of the configuration is briefly described, together with information about the data you must enter.

The CONFIG_X400 Command

You configure Prime X.400 using the CONFIG_X400 command. This command enables you to create and maintain information about the Prime X.400 configuration on your network. The configuration is maintained in an ASCII file. An in-memory version of the configuration is built when Prime X.400 is started on the system.

The syntax of the CONFIG_X400 command is shown below.

```
▶ CONFIG_X400  [ filename -TERMINAL_TYPE terminaltype ]
               [ -HELP [ -NO_WAIT ]                   ]
               [ -USAGE                               ]
```

filename

The pathname of an existing configuration file or the name of a new file to be created. If you do not specify a suffix, the suffix .CONFIG is added automatically.

To modify an existing configuration, specify an existing configuration file.

To create a new configuration, specify a filename. If the file does not already exist, a new file is created to contain the configuration.

Filename is optional. If you do not specify a filename, your configuration is written to the file PRIME_X400*>PRIME_X400.CONFIG by default.

{-TERMINAL_TYPE / -TTP} terminaltype

Specifies the terminal type you are using. Typical Prime terminal-types supported are

PT45
PT200
PT200W (132 Character wide terminal)
PT200-C (PT200 color terminal)
PT200W-C (132 character wide, color terminal)
PST100

There is no default terminal type. If you omit the terminal type, the command uses your global variable, .TERMINAL_TYPE$. If you have not set this, and the terminal type is omitted, the command aborts with an error message.

{-HELP / -H} [{-NO_WAIT / -NW}]

Explains command usage, and cancels any other options on the command line. The -NO_WAIT option stops display pagination at your terminal. The same information is available through the PRIMOS® HELP subsystem.

-USAGE Gives you the command syntax in brief.

When you invoke the CONFIG_X400 command, information about the configuration input file is displayed, as in Figure 5-1.

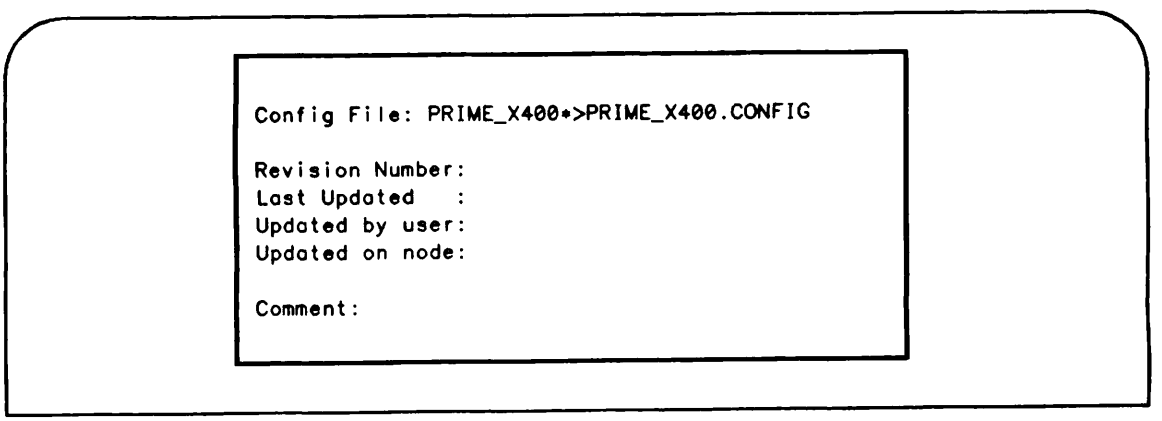

FIGURE 5-2. Configuration File Information

The following prompt is displayed on screen:

```
Config file does not exist.
Do you wish to create a new configuration? (y/n):
```

Type Y, then press return. You are now ready to start the configuration process.

The CONFIG_X400 Subsystem

CONFIG_X400 is a screen-based interactive subsystem through which you define your configuration step by step, verify its correctness, and save it to disk. You select options, and input data and parameters, through a linked hierarchy of screen forms that you navigate using special function keys.

Function Keys

Function keys allow you to perform operations such as moving between fields, selecting options, and committing changes. The functions that are available, and the keys to use to perform these functions on the PT200™ and PST100™ keyboards are listed in table 5-1.

Functions that are available on specific screen forms, and the keys that correspond to them, are also displayed at the bottom of screen.

TABLE 5-1. CONFIG_X400 Function Keys

Function	*PT200*	*PST100*	*Operation*
TAB	[TAB]	[TAB]	Move to next field
BACK TAB	[Back Tab]	[BACK TAB]	Move to previous field
TOPSCR	[F8]	[F8]	Return to main menu
TRANSMIT	[Enter]	[PF10]	Commit a change
HELP	[Help]	[HELP]	Display Help
PRINT-SCREEN	[Prt Scn]	Shift [AUX SEND]	Print screen, or write to file
EXIT	[Cancel]	[PF14]	Return to previous screen, quit program, or clear error message
ADD	[F3]	[F3]	Add a new entry to a list
REMOVE	[F4]	[F4]	Remove an entry from a list
PRVPAGE	[F5]	[F5]	Display the previous page of a multi-page form
NXTPAGE	[F6]	[F6]	Display the next page of a multi-page form
GATE	[F1]	[F1]	Add a gateway to a list

Screen Forms

There are two types of screen display: **Menus**, and **Data Input/Display forms.** To move between screens, forms, and fields, use the function keys defined in Table 2-1.

Menus, and Option Selection: Menus, such as the CONFIG_X400 Main Menu shown in Figure 5-5, consist of a list of processing options. The options are selected by either of the following methods:

- Position the cursor/highlight on the option, and press the TRANSMIT key.
- Type the number of the option you require, and press the TRANSMIT key.

Data Input/Display Forms

Data Input/Display forms consist of labelled fields where you view or specify data, such as name identifiers and protocol parameters. Fields are shown on the form by underlines, and input data is typed within the confines of the field.

In some cases, a field can be longer than it appears on the form. In this instance, when the available visible field is full, the symbols <, and >, appear at the left and/or right of the field, respectively. This indicates that additional data may be viewed or entered. To view additional data, use the left or right arrowed cursor keys to scroll in the required direction.

The EXIT key

The EXIT key has several functions, all of which basically terminate one situation and return you to another. The EXIT key is pressed to terminate CONFIG_X400.

Typical EXIT key uses, are:

- Cancel error and operational, messages or prompts.
- Return to a higher-level menu or form.
- Abort or terminate a function.

Selecting Entries From Help Screens

Entries for some fields can be selected from Help screens. To display Help for a particular field, position the cursor on the field, and press the HELP key. Selectable entries, if available, are listed on the Help screen.

To select an entry from the Help display, position the cursor on the entry, and press TRANSMIT. Press EXIT to return to the last screen.

Option Selection and Data Input

On the menus and forms that follow, select options by either positioning the cursor or highlight bar on the required option, and pressing TRANSMIT, or, typing the option number and pressing TRANSMIT.

Select an entry from a list by positioning the cursor or highlight bar on the required entry and pressing TRANSMIT.

On Data Input forms, use the tab, back tab, or arrowed cursor keys, to move from field to field; use the TRANSMIT key to save your data.

Use the EXIT key to terminate or abort a function, and to return to a higher level menu or form.

Stages in Setting Configuration Defaults

1. Invoke CONFIG_X400 Command.

   Data required for this stage:

   The new configuration *filename.*
   The terminal type

2. Set (Local) Global Domain.

   Data required for this stage:

   Country.
   ADMD.
   PRMD.

3. Define subnetwork addresses.

   Data required for this stage:

   Subnetwork Name.
   Destination Protocol ID.
   Destination Facility.
   Source Address.
   Source Protocol ID.

4. Define MTA associations.

   Data required for this stage:

   Temporary, local and remote - Number of associations, subnetwork names, and timeout periods.

   Permanent, local and remote - Number of associations, and subnetwork names.

Stage 1 - Invoke CONFIG_X400 Command

To start your configuration, enter the following command at the supervisor terminal:

```
CONFIG_X400 new_filename -TTP terminal_type
```

Variable	*Description*
new_filename	The name of the new configuration file to be created. If you omit the filename, the default configuration file is used.
terminal_type	Specifies the terminal type you are using. Typical Prime terminal-types supported are PT45 PT200 PT200W (132 Character wide terminal) PT200-C (PT200 color terminal) PT200W-C (132 character wide, color terminal) PST100 If you have a .TERMINAL_TYPE$ global variable defined, then this option can be omitted.

The Configuration File Information form is displayed, showing your new filename, as shown in Figure 5-2. All other fields are blank.

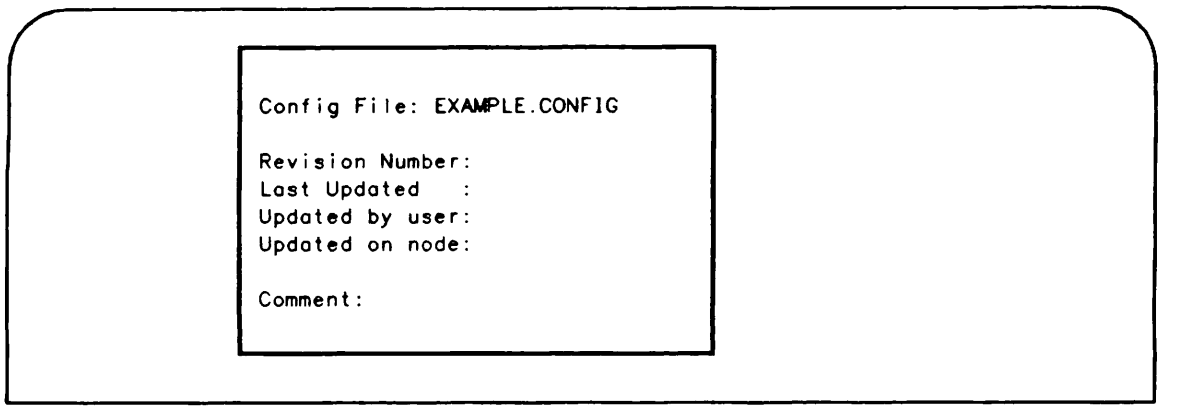

FIGURE 5-3. Configuration File Information Form

The following prompt is displayed on screen:

```
Config file does not exist.
Do you wish to create a new configuration? (y/n):
```

Type Y. You are presented with the Set Global Domain ID form, as shown in Figure 5-4.

Stage 2 - Set the (Local) Global Domain

Enter your data in the relevant fields; sample entries are shown.

```
                ) Set Global Domain ID (

        Country: GB
        ADMD   : GOLD 400
        PRMD   : COMPANY X

      Press:  <TRANSMIT>  to save domain ID.
              <EXIT>      to abort change.
```

FIGURE 5-4. Set Global Domain ID Form

Field	*Description*
Country	The country in which the network operates. Specify either a 3-digit or 2-letter code.
ADMD	The main administration domain with which you are associated. Maximum of 16 characters.
PRMD	The private administration domain with which you are associated. Maximum of 16 characters.

To save your local domain data, press TRANSMIT.

The CONFIG_X400 Main Menu is displayed, as shown in Figure 5-5.

Note

If you specified an existing configuration filename in the CONFIG_X400 command, the Configuration File Information form is again displayed, showing the last-updated information, and prompting you to confirm that this is the correct file for modification. Typing N terminates X400 and returns you to PRIMOS. Typing Y presents you with the CONFIG_X400 Main Menu, as shown in Figure 5-5

```
                )CONFIG X400 - Main Menu (

Select configuration option:

        1.  Set Global Domain ID
        2.  Set Configuration Defaults

        3.  Configure Local MTAs
        4.  Configure Local Users/Gateways

        5.  Define Remote MTAs
        6.  Define Remote O/R addresses

        7.  Fallback Message Routing

        8.  Verify Configuration
        9.  Save Configuration
        0.  List Configuration

Press:  <TRANSMIT>  to invoke selected option.
        <EXIT>      to exit the configurator.
```

FIGURE 5-5. CONFIG_X400 Main Menu

Select option 2, `Set Configuration Defaults`, from the CONFIG_X400 Main Menu (Figure 5-5), and press TRANSMIT.

You are presented with the Set Configuration Defaults menu as shown in Figure 5-6.

```
                )CONFIG X400 - Main Menu (

               ) Configuration Defaults (

          Select option:

                    1.  Network Parameters
                    2.  Associations

          Press:  <TRANSMIT>  to invoke selected option.
                  <EXIT>      to return to main menu.
```

FIGURE 5-6. Configuration Defaults Menu

Stage 3 - Define Subnetwork Addresses

Define your subnetwork, so that you can identify the protocols for this MTA simply by specifying the subnetwork name. In this example, the name GALAXY is used.

To define subnetwork addresses, select option 1, Network Parameters from the Set Configuration Defaults menu. The Select Subnetwork form is displayed as shown in Figure 5-7.

```
                    )CONFIG X400 - Main Menu (

                  ) Set Configuration Defaults (

                    ) Select Subnetwork (

Select Subnetwork:




Press:  <ADD>       to add a new subnetwork.
        <REMOVE>    to remove selection.
        <TRANSMIT>  to modify selection.
        <EXIT>      to abort function.
```

FIGURE 5-7. Select Subnetwork Form

Press ADD to define a new subnetwork. The Define Subnetwork form is displayed, as shown in Figure 5-8.

```
                    )CONFIG X400 - Main Menu (

                  ) Set Configuration Defaults (

                     ) Select Subnetwork (

                     ) Define Subnetwork (

Subnetwork Name: GALAXY

Network Provider: X25     X25 Year: 80     Fast Select: no

Destination Address (X121): (Default is computed from NSAP address)
Destination Protocol ID   : 03010100
Destination Facility      : 42

Source Address (X121): :1234567
Source Protocol ID   : 03010100

Press:  <TRANSMIT>  to save definition.
        <EXIT>      to abort change.
```

FIGURE 5-8. Define Subnetwork Form

The Define Subnetwork form is used to set up communication parameters between a local Prime MTA and another MTA (local or remote).

The subnetwork definition fields are described in the following list.

Field	*Description*
Subnetwork Name	Your name for the subnetwork.
Network Provider	Always defaults to X.25.
X.25 Year	Enter the X.25 year. Defaults to 1980 (80).
Fast Select	Selects the X.25 Fast Select facility. Enter YES or NO. The default is NO.
Destination Address (X.121)	The X.121 address of the MTA you are calling. This address is on outgoing calls. By default, this is computed from the NSAP address.
Destination Protocol ID	Also known as Call User Data for outgoing calls. The X.25 protocol at the destination MTA. Enter four bytes of Hex.
Destination Facility	The X.25 Facilities to define when to make an X.25 call to the remote system which operates the Remote MTA. For details of how to encode X.25 Facilities, refer to the *PRIMENET*

Programmer's Guide. Facilities are not normally required for correct operation.

Source Address (X.121) The X.121 address used by the other MTA for sending calls to your MTA.

Note

The Source and Destination Addresses are both at the other MTA. In most cases they will be identical, but some implementations use different addresses for sending and receiving.

Enter as a full X.121 address, or as an X.121 subaddress in the form +<digits> , which is concatenated with the PRIMENET address to form the full X.121 address.

Source Address should be distinct from any subaddress used for PRIMENET Route-through.

Source Protocol ID Also known as Call User Data for incoming calls. The X.25 protocol at the source MTA. Enter four bytes in hexadecimal.

Complete the Define Subnetwork form and press TRANSMIT. The Select Subnetwork form is resumed, displaying the subnetwork just created.

Stage 4 - Define MTA Associations

Select option 2, `Associations` from the Set Configuration Defaults menu (Figure 5-6). Figure 5-9 illustrates the Define Default MTA Associations form.

```
                    )CONFIG X400 - Main Menu (

                  ) Set Configuration Defaults (

                ) Define Default MTA Associations (

Temporary:                  Local              Remote
   Number of Associations: 1                   0
   Subnetwork Definition : DEFAULT             DEFAULT
   Timeout (minutes)     : 15                  2

Permanent:
   Number of Associations: 0                   0
   Subnetwork Definition : DEFAULT             DEFAULT

Press:  <TRANSMIT>  to save default values.
        <EXIT>      to abort change.
```

FIGURE 5-9. Define Default MTA Associations Form

Complete the details on the Define Default Associations form by specifying the number of temporary and permanent associations required for local and remote MTAs and, the type of subnetwork involved.

For temporary associations only, specify the inactivity timeout period (temporary associations are only maintained while messages are being exchanged). The maximum timeout period is 999 minutes.

The maximum number of associations for either local or remote MTAs is 999.

When you have completed the form, press TRANSMIT to save the details, and return to the CONFIG_X400 Main Menu.

Stage 5 - Verify Configuration

To check that all information has been entered correctly, select option 8, `Verify Configuration` from the CONFIG_X400 Main Menu, Figure 5-5.

While verification is taking place, one of the following messages may appear on screen:

```
Verifying configuration... please wait...
```

Or

```
Validation complete.  No errors.
```

Press the EXIT key to return to the Main Menu.

Note

If the verification fails, the configuration is invalid and cannot be used to start Prime X.400 on the system. Repeat Stages 1 - 4; check and modify your input, then repeat Stage 5 to verify the data.

Stage 6 - Save Configuration

Select option 9, `Save Configuration` from the CONFIG_X400 Main Menu (Figure 5-5). You are presented with the Save Configuration form as illustrated in Figure 5-10.

```
                    )CONFIG X400 - Main Menu (

                      ) Save Configuration (

Configuration File: EXAMPLE.CONFIG

Comment: First configuration example

Press:  <TRANSMIT>  to save configuration.
        <EXIT>      to abort save.
```

FIGURE 5-10. Save Configuration Form

Enter your new configuration filename and complete the Configuration Form by entering a comment (if required) and pressing TRANSMIT to save the data. You are prompted to create the file. Type Y.

Press the EXIT key to return to the Main Menu.

Configuring a Single Local MTA

This example shows, in stages, how to configure a single local MTA.

Stages in Configuring a Single Local MTA

1. Invoke CONFIG_X400 Command (Refer to Stage 1 of Setting Configuration Defaults)
2. Define a local MTA.

   Field entries required for this stage are:

   MTA Name.
   Organization.
   Organization Unit(s).

3. Configure local users.

   Field entries required for this stage are:

   Users Mail ID.
   Surname.
   Given Name.
   Initials, and Generation Qualifier (Optional)
   Other field entries default to previously defined values.

4. Verify and save your configuration. (Refer to Stages 5 and 6 of Setting Configuration Defaults)

Local MTAs

The Prime X.400 administrator is responsible for configuring Prime X.400 on a single node, or a group of local nodes, such as a local network. The MTAs that the administrator defines within this group, are known as the local MTA group.

MTAs in the same local group share a set of default attributes, such as the type of logical link between them, the association, or the default address space, the domain, and inter-MTA passwords.

The following information can be optionally specified when configuring local MTAs:

- Network addresses
- Associations between local MTAs
- Passwords
- Service protocols and routing information
- MTA names

- User and gateway X.400 addresses and MTA attachments

Stage 1 - Invoke CONFIG_X400 Command

Refer to the previous section, Setting Configuration Defaults, Stage 1.

Stage 2 - Define a Local MTA

Select option 3 - `Configure Local MTAs` from the CONFIG_X400 Main Menu and press TRANSMIT. You are presented with the Select Local MTA form as shown in Figure 5-11. The `Select MTA:` field remains blank until an MTA is defined.

```
                    )CONFIG X400 - Main Menu (

                      ) Select Local MTA (

Select MTA:




Press:  <ADD>       to add a new MTA.
        <REMOVE>    to remove selection.
        <TRANSMIT>  to configure selection.
        <EXIT>      to return to previous menu.
```

FIGURE 5-11. Select Local MTA Form

Define a local MTA by pressing ADD. You are presented with the Define Local Domain form, as shown in Figure 5-12. Sample entries are shown.

```
                )CONFIG X400 - Main Menu (

                   ) Select Local MTA (

                   ) Define MTA Domain (

MTA Name: SALES

Country: GB
ADMD    : GOLD 400
PRMD    : COMPANY X

Organization: SALES

Organizational Units:
                          CUSTOMER LIAISON



Press:  <TRANSMIT>  to save details.
        <EXIT>      to abort change.
```

FIGURE 5-12. Define Local Domain Form

The Country, ADMD and PRMD attributes are filled in automatically. Complete the definition of the local domain by entering an MTA name (often the PRIMENET node name) and optionally, the organization and organizational units.

Field	*Description*
MTA Name	Name of the local MTA you wish to create. It can contain a maximum of 32 characters.
Organization	A name assigned to an organization within a PRMD. It can contain a maximum of 64 characters.
Organizational Units	Names of units within an organization. Organizational units can contain a maximum of 32 characters.

When you have defined the local domain, the Select Local MTA form is resumed, and displays the MTA that you have just created.

Stage 3 - Configure Local Users/Gateways

Press the TRANSMIT key to select the MTA you have just created, and the Configure Local MTA menu is displayed as in Figure 5-13. The local MTA name is displayed.

```
                    ) CONFIG X400 - Main Menu (

                       ) Select Local MTA (

                       ) Configure Local MTA (

MTA: SALES

Select configuration option:

        1.  Define MTA Domain
        2.  Configure Users/Gateways at MTA
        3.  Change MTA attributes
        4.  Non-default Associations

Press:  <TRANSMIT>  to invoke selected option.
        <EXIT>      to leave this menu.
```

FIGURE 5-13. Configure Local MTA Menu

Select option 2 - Configure Users/Gateways at MTA from the Configure Local MTA menu, then press TRANSMIT. You are presented with the Select Local User/Gateway form as shown in Figure 5-14.

```
                    )CONFIG X400 - Main Menu (

                      ) Select Local MTA (

                     ) Configure Local MTA (

                  ) Select Local User/Gateway (

MTA Name: SALES

Select User:




Press:  <ADD>       to add a new user.
        <GATE>      to add a new gateway.
        <REMOVE>    to remove selection.
        <TRANSMIT>  to configure selection.
        <EXIT>      to return to previous menu.
```

FIGURE 5-14. Select Local User/Gateway Form

Initially this form is blank. Users, and gateways, are displayed in the `Select User:` field as you add them to the configuration.

Configuring a User

To add a user, press the ADD key. You are presented with Page 1 of 4, of the Configure User form, as shown in Figure 5-15. Sample entries are shown.

```
                        )CONFIG X400 - Main Menu (

                            ) Select Local MTA (

                           ) Configure Local MTA (

                          ) Select Local User Agent (

                    ) Configure User (        ) Page 1 of 4 (

MTA Name: SALES

Users Mail ID: DIRECTOR

O/R Address:
   Personal Name:
     Surname : WINDSOR                Given Name: CHARLES
     Initials:              Generation Qualifier:

   Organization Name:
     Organization: SALES
     Units: CUSTOMER LIAISON

                      Country: GB   ADMD: GOLD 400          PRMD: COMPANY X

Press:  <TRANSMIT>  to save user details.
        <EXIT>      to abort changes.
        <NXTPAG>    to view next page.
        <PRVPAG>    to view previous page.
```

FIGURE 5-15. Configure User Form, Page 1 of 4

O/R address components and their meanings are described in Chapter 1. If Country, ADMD, PRMD, and Organization and Organizational Unit(s), have been previously defined, they appear as default values. Overwriting these values results in validation errors when you verify the configuration.

When you have completed the form, press TRANSMIT to save your data.

The Select Local User/Gateway form is redisplayed, showing the user you have just created. An example of the Select Local/Gateway form is shown in Figure 5-16.

```
                )CONFIG X400 - Main Menu (

                   ) Select Local MTA (

                  ) Configure Local MTA (

                ) Select Local User/Gateway (

MTA Name: SALES

Select user:
                        DIRECTOR




Press:  <ADD>        to add a new user.
        <GATE>       to add a new gateway.
        <REMOVE>     to remove selection.
        <TRANSMIT>   to configure selection.
        <EXIT>       to return to previous menu.
```

FIGURE 5-16. Select Local User/Gateway Form

For each user you wish to enter, press ADD, and complete the Configure User form as already described.

Stage 5 - Verify, Save and List Configuration

Refer to Stages 5 and 6 of Setting Configuration Defaults.

Stage 6 - Start Prime X.400

Configuring a Remote MTA

All remote MTAs with which you want to communicate must be configured using CONFIG_X400. This example shows in stages, how to configure a single remote MTA. Each stage of the configuration is briefly described, below, indicating the data you will be required to supply for that stage, such as field entries.

Stages in Configuring a Remote MTA

1. Invoke CONFIG_X400 Command (Refer to Stage 1 of Setting Configuration Defaults)
2. Define remote MTA.

   Field entries required for this stage are:

   MTA Name
   Country
   ADMD
   PRMD

3. Define remote MTA O/R address space.

   Field entries required for this stage are:

   Organization
   Organization Unit
   Surname
   Given Name
   Initials and Generation Qualifier (Optional)

4. Define remote MTA attributes.

   Field entries required at this stage are:

   Remote and Local Passwords
   Network Address
   Other field entries default to previously defined values.

5. Define an association between a local MTA and the remote MTA. You must determine the associations for the remote MTA, either permanent or temporary.
6. Verify and save your configuration (refer to Stages 5 and 6 Setting Configuration Defaults)
7. Start Prime X.400.

Remote MTAs

Remote MTAs are outside your immediate control, and act as store and forward nodes to other user domains on the X.400 network.

The following information can be optionally specified when defining remote MTAs:

- Network addresses
- Protocols for communicating with the local MTA group
- Remote MTA's domain name

- Remote user/gateway address space (domain) associated with the MTA

Stage 1 - Invoke CONFIG_X400 Command

Refer to Stage 1 of Setting Configuration Defaults.

Stage 2 - Define a Remote MTA

Select option 5, `Define Remote MTAs`, from the CONFIG_X400 Main Menu (Figure 5-5), and press TRANSMIT. You are presented with the Select Remote MTA form as shown in Figure 5-17. The `Select MTA:` field is blank until a remote MTA is defined).

```
                    )CONFIG X400 - Main Menu (

                       ) Select Remote MTA (

Select MTA:




Press:  <ADD>       to add a new MTA.
        <REMOVE>    to remove selection.
        <TRANSMIT>  to modify selection.
        <EXIT>      to return to previous menu.
```

FIGURE 5-17. Select Remote MTA Form

To define new remote MTA, press ADD. You are presented with the Define Global Domain ID form as shown in Figure 5-18. Sample entries are shown.

```
)CONFIG X400 - Main Menu (

   ) Select Remote MTA (

) Define Global Domain ID (

MTA Name: PURCHASE

Country: 311
ADMD:    DIALCOM
PRMD:    COMPANY Y

Press:  <TRANSMIT>  to save details.
        <EXIT>      to abort change.
```

FIGURE 5-18. Define Global Domain ID Form

You must define the domain by entering an MTA name, Country, ADMD, and PRMD. (Details of how to complete these fields can be found in the previous section, Configuring a Single Local MTA, Stage 2). Press TRANSMIT to save your data.

The Select Remote MTA form is resumed and displays the MTA you have created. Use the ADD key to enter more remote MTAs as required.

Stage 3 - Define Remote MTA O/R Address Space

Select an existing remote MTA from the Select Remote MTA form by pressing TRANSMIT. You are presented with the Define Remote MTA menu as shown in Figure 5-19. The remote MTA selected is shown.

```
                    )CONFIG X400 - Main Menu (

                       ) Select Remote MTA (

                       ) Define Remote MTA (

MTA: PURCHASE

Select definition option:

                1.  Define Global Domain ID
                2.  Define O/R Address Space
                3.  Define MTA Attributes
                4.  Non-default Associations

Press:  <TRANSMIT>  to invoke selected option.
        <EXIT>      to return to previous menu.
```

FIGURE 5-19. Define Remote MTA Menu

At this stage, you must define the O/R addresses accessible via the MTA, plus any other MTA attributes. Select option 2, `Define O/R Address Space`. You are presented with the Select Remote MTA O/R Address Space form as shown in Figure 5-20.

```
                    )CONFIG X400 - Main Menu (

                ) Select Remote MTA O/R Address Space (

Remote MTA: PURCHASE

Select O/R Address Space:




Press:  <ADD>       to add a new O/R address space.
        <REMOVE>    to remove selection.
        <TRANSMIT>  to modify selection.
        <EXIT>      to return to previous menu.
```

FIGURE 5-20. Select Remote MTA O/R Address Space Form

To enter an O/R address for the remote MTA, press ADD. You are presented with the Select Remote O/R Address Space form as shown in Figure 5-21.

```
                    )CONFIG X400 - Main Menu (

                ) Select Remote MTA O/R Address Space (

            ) Select Remote O/R Address Space (  ) Page 1 of 2 (

MTA: PURCHASE

O/R Address Space:
   Country: 311  ADMD: DIALCOM          PRMD: COMPANY Y

   Organization Name:
     Organization: PURCHASE
     Units: SUPPLIER LIAISON

   Personal Name:
     Surname : JEFFERSON            Given Name: GEORGE
     Initials:             Generation Qualifier:

Press:  <TRANSMIT>  to save user details.
        <EXIT>      to abort changes.
        <NXTPAG>    to view next page.
```

FIGURE 5-21. Select Remote O/R Address Space Form

Note

It is not necessary to enter a full O/R address; simply supply sufficient attributes to uniquely identify the O/R addresses that can be reached via the MTA.

For example, to reach the users on the MTAs *machine1*, *machine2* and *machine3*, the following O/R address components are sufficient:

```
Country = GB
ADMD = Gold 400
PRMD = sprocketCo
O = Sales
```

Routing to individual users is undertaken by the local ring hub, *machine1*.

Meanings and descriptions of O/R address components can be found in Stage 3, of the previous example, under the section Configuring a User. When you have completed the form, press TRANSMIT.

The Select Remote MTA O/R Address Space form is resumed. Use ADD to enter other O/R addresses, as required.

Stage 4 - Define Remote MTA Attributes

When you have entered the O/R addresses for the MTA, select option 3, `Define MTA Attributes` from the Define Remote MTA menu, Figure 5-19.

You are presented with the Define Remote MTA Attributes form as shown in Figure 5-22.

Remote MTA attributes are described in the following list:

Attribute	*Description*
MTA Name	The name you must use to communicate with the remote MTA. Obtained from the remote MTA's administrator.
Remote Password	The password that identifies the remote MTA. Obtain from the remote MTAs' administrator.
Local Password	The (optional) password that the remote MTA must supply in order to communicate with the local MTA. It is assigned locally. You must supply this password to the administrator of the remote MTA if you set a local password.
Network Address	The ISO network address (NSAP) of the MTA. Specify the address in one of the following formats: • PRIMENET Nodename • 15 digits preceded by a colon (X.121 address) **Note** If in doubt, allow the default to be selected.
Transport Protocol Selector	Selects the ISO transport protocol. This should be obtained from the remote MTAs administrator. Enter as two hexadecimal digits per byte. For example, if the application uses printable characters, and you agree on the 2-byte code that corresponds to ASCII 17, then you must enter 3137. The maximum permitted size is 32 bytes, and the default value is 3432.

```
                    )CONFIG X400 - Main Menu (

                       ) Select Remote MTAs (

                       ) Define Remote MTA (

                   ) Define Remote MTA Attributes (

MTA Name: PURCHASE

Remote Password: REMOTE_ADMIN_SET Local Password: LOCAL_ADMIN_SET

Network Address              : USNODE01
Transport Protocol Selector (hex): 3432

Press:  <TRANSMIT>  to save changes.
        <EXIT>      to abort changes.
```

FIGURE 5-22. Define Remote MTA Attributes Form

When you have completed the form, press TRANSMIT.

Stage 5 - Define Association Between a Local MTA and the Remote MTA

When all remote MTAs are defined, the associations between the remote MTAs and the local MTAs must be set up.

Select option 4, `Non-default Associations` from the Define Remote MTA menu (Figure 5-19). You are presented with the Define Non-default Associations form, as shown in Figure 5-23.

```
)CONFIG X400 - Main Menu (

    )Select Remote MTA (

    ) Define Remote MTA (

) Select Non-default Associations (

MTA Name: PURCHASE

Adjacent MTAs:




Press:  <ADD>       to add a new adjacent MTA.
        <REMOVE>    to remove selection.
        <TRANSMIT>  to modify selection.
        <EXIT>      to return to previous menu.
```

FIGURE 5-23. Define Non-default Associations Form

Press the ADD key. You are presented with a list of all possible MTAs to which the selected MTA may be associated.

Position the cursor to the desired local MTA and press TRANSMIT. Pressing TRANSMIT saves the local MTA and resumes the Define Non-default Associations form.

Further local MTAs can be added by pressing the ADD key.

Stage 6 - Verify, Save and List Configuration

Refer to Stages 5 and 6 of Setting Configuration Defaults.

Stage 7 - Start Prime X.400

Adding a Local MTA

This example shows in stages, how to add other local MTAs to your configuration. Each stage of the configuration is briefly described below, indicating the data you are required to supply for that stage, such as field entries. Detailed descriptions of these fields, can be found at the relevant points throughout this example.

Stages in Adding a Local MTA

1. Invoke CONFIG_X400 Command (Refer to the section, Setting Configuration Defaults, Stage 1).
2. Define a local MTA (Refer to the section, Configuring a Single Local MTA, Stage 2).
3. Configure local users (Refer to the section, Configuring a Single Local MTA, Stage 3).
4. Change the default association between adjacent MTAs, if necessary. Field entries that may be required for this stage are:

   Temporary - Number of Associations
   - Timeout periods

   Permanent - Number of Associations
   - Timeout periods

5. Verify, save and list your configuration. (Refer to Stages 5, 6 and 7 respectively of Setting Configuration Defaults.)
6. Start Prime X.400 (Refer to Stage 8 of EXAMPLE I - Setting Configuration Defaults.)

Stage 1 - Invoke CONFIG_X400 Command

Refer to the section, Setting Configuration Defaults, Stage 1.

Stage 2 - Define a Local MTA

Refer to the section, Setting Configuration Defaults, Stage 2.

Stage 3 - Configure Local Users/Gateways

Refer to the previous section, Setting Configuration Defaults, Stage 3.

Stage 4 - Changing Default Associations between MTAs

Select option 4, `Non-default Associations` from the Configure Local MTA menu (Figure 5-13).

You are presented with the Non-default Associations form as shown in Figure 5-24.

Note

The MTA, *ENGINEERING*, must be assumed to have been configured prior to this example; that is, there must be at least one other configured MTA for there to be an association.

```
                    )CONFIG X400 - Main Menu (

                        )Select Local MTA (

                       ) Configure Local MTA (

                    ) Select Non-default Associations (

MTA Name: SALES

Adjacent MTAs:
       ENGINEERING




Press:  <ADD>       to add a new adjacent MTA.
        <REMOVE>    to remove selection.
        <TRANSMIT>  to modify selection.
        <EXIT>      to return to previous menu.
```

FIGURE 5-24. Non-default Associations Form

Press TRANSMIT to modify the association. You are presented with the Configure Associations form as shown in Figure 5-25.

```
                    )CONFIG X400 - Main Menu (

                        ) Select Local MTA (

                       ) Configure Local MTA (

                    ) Non-default Associations (

                     ) Configure Associations (

Current MTA : SALES
Adjocent MTA: ENGINEERING

Temporary Associations:
   Number Outbound:       : 0
   Number Inbound         : 0
   Subnetwork Name        : DEFAULT
   Timeout (minutes)      : 2

Permanent Associations:
   Number Outbound        : 1
   Number Inbound         : 1
   Subnetwork Name        : GALAXY

Press:  <TRANSMIT>  to save details.
        <EXIT>      to abort change.
```

FIGURE 5-25. Configure Associations Form

This form shows two non-default permanent associations (one inbound, one outbound) configured between the local MTAs SALES and ENGINEERING. The non-default associations use the subnetwork GALAXY to transfer data.

Defining the subnetwork name is shown within Stage 3, Define Subnetwork Address, of Setting Configuration Defaults.

Stage 5 - Verify, Save and List Configuration

Refer to Stages 5, 6, and 7 respectively, of Setting Configuration Defaults.

Stage 6 - Start Prime X.400

Refer to Stage 8 of Setting Configuration Defaults.

Configuring Large Numbers of Users

This example shows in stages, how to configure large numbers of users. It is not expected that bulk loading of gateways is required. Each stage of the configuration is briefly described below, indicating the data you are required to supply for that stage, such as the additional User Mail IDs.

Stages in Configuring Large Numbers of Local Users

1. Create a configuration all the local MTAs defined.
2. Edit the text configuration file to add local users.
3. Invoke the CONFIG_X400 command, using the configuration just created. (Refer to Setting Configuration Defaults, Stage 1.)
4. Verify, save and list your configuration. (Refer to Stages 5, 6 and 7 respectively, of Setting Configuration Defaults.)
5. Start Prime X.400. (Refer to Stage 8 of Setting Configuration Defaults.)

Stage 1 - Invoke CONFIG_X400 Command

Refer to Stage 1 of Setting Configuration Defaults.

Stage 2 - Editing the Text Configuration File

The .CONFIG file is a text file. Figure 5-26, shows part of a .CONFIG file; extraneous data, on the right of the file, has been ignored.

```
#version 3
#date 600438643
#user X400_ADMIN
#node ADMIN
#comment Sample file for examples in Chapter 5
#file EXAMPLE.CONFIG
L "COMPANY X".GOLD 400.GB
SND GALAXY X.25  -PR 03010100 -SA 1234567 -SP 03
M ENGINEERING -LP UKENG01 -RTS 1 3 1024 1024 -P
M PURCHASE  -LP  "REMOTE ADMIN SET" -RP "LOCAL
M SALES -LP UKSL01 -RTS 1 3 1024 1024 -PR 1 -AD
AS $LOCAL 0 1 15 DEFAULT DEFAULT
AS $REMOTE 0 1 2 DEFAULT DEFAULT
AS ENGINEERING SALES 0 1 15 DEFAULT GALAXY
AS PURCHASE SALES 0 1 15 DEFAULT GALAXY
AS SALES ENGINEERING 0 1 15 DEFAULT GALAXY
AS SALES PURCHASE 0 1 15 DEFAULT GALAXY
U DIRECTOR@SALES CHARLES.WINDSOR%"CUSTOMER LIAI
SE DIRECTOR@SALES SALESUK RECEIVE SEND
U MANAGER@ENGINEERING HENRY.TUDOR%"SOFTWARE DEV
SE MANAGER@ENGINEERING ENGINEERINGUK RECEIVE SE
G SMTP@SALES -CO 1 -DO "COMPANY X".GOLD 400.GB
G SMTP@SALES WILLIAM NORMAN%"CUSTOMER LIAISON".
SE SMTP@SALES SALESUK RECEIVE SEND
R PURCHASE GEORGE.JEFFERSON%"SUPPLIER LIAISON".
AR SMTP@SALES
```

This is only part of a .CONFIG file.

Some of the lines shown are not complete.

FIGURE 5-26. .CONFIG File Example

If you have an online list of users, such as a telephone list, that is required within your configuration, then you can use an editing system to modify the list into a form acceptable to the configurator.

Create a list, one user per line, using the following format as a guide:

```
U <User Mail ID>@<MTA>  or <O/R Address>
```

Append the list to the bottom of the .CONFIG file. Figure 5-27 shows an edited .CONFIG file with two additional users. Please note that data, extraneous to this example and on the right of the file, has been ignored.

```
#version 3
#date 600438643
#user X400_ADMIN
#node ADMIN
#comment Sample file for examples in Chapter 5
#file EXAMPLE.CONFIG
L "COMPANY X".GOLD 400.GB
SND GALAXY X.25  -PR 03010100 -SA 1234567 -SP 03
M ENGINEERING -LP UKENG01 -RTS 1 3 1024 1024 -P
M PURCHASE  -LP  "REMOTE ADMIN SET" -RP "LOCAL
M SALES -LP UKSL01 -RTS 1 3 1024 1024 -PR 1 -AD
AS $LOCAL 0 1 15 DEFAULT DEFAULT
AS $REMOTE 0 1 2 DEFAULT DEFAULT
AS ENGINEERING SALES 0 1 15 DEFAULT GALAXY
AS PURCHASE SALES 0 1 15 DEFAULT GALAXY
AS SALES ENGINEERING 0 1 15 DEFAULT GALAXY
AS SALES PURCHASE 0 1 15 DEFAULT GALAXY
U DIRECTOR@SALES CHARLES.WINDSOR%"CUSTOMER LIAI
SE DIRECTOR@SALES SALESUK RECEIVE SEND
U MANAGER@ENGINEERING HENRY.TUDOR%"SOFTWARE DEV
SE MANAGER@ENGINEERING ENGINEERINGUK RECEIVE SE
G SMTP@SALES -CO 1 -DO "COMPANY X".GOLD 400.GB
G SMTP@SALES WILLIAM NORMAN%"CUSTOMER LIAISON".
SE SMTP@SALES SALESUK RECEIVE SEND
R PURCHASE GEORGE.JEFFERSON%"SUPPLIER LIAISON".
AR SMTP@SALES
U SUPERVISOR@ENGINEERING DAVID.KOSHER%
U HEADofDEPT@SALES ROGER.KITSON%
```

This is only part of a .CONFIG file.

Some of the lines shown are not complete.

FIGURE 5-27. Example .CONFIG file with additional Users

Note

Only the personal name attributes of the new users have been entered in the Figure 5-27 example. The full O/R address is constructed by the configurator from the MTA domain name.

Enter the **%** character at the end of each personal name.

Stage 3 - Invoking CONFIG_X400 Command to Check Users

Invoke the CONFIG_X400 command using the .CONFIG file created in Stage 2, and select option 4, `Configure Local Users/Gateways` from the CONFIG_X400 Main Menu, (Figure 5-5.) You are presented with the Select Local User or Gateway form as shown in Figure 5-28. The display should include those users that you have added to the .CONFIG file.

```
                    )CONFIG X400 - Main Menu (

                  ) Select Local User/Gateway (

Select User:

   Mail ID              MTA Names
   DIRECTOR             SALES
   HEADofDEPT           SALES
   MANAGER              ENGINEERING
   SMTP                 SALES
   SUPERVISOR           ENGINEERING



Press:  <ADD>        to add a new user.
        <GATE>       to add a new gateway.
        <REMOVE>     to remove selection.
        <TRANSMIT>   to modify selection.
        <EXIT>       to return to previous menu.
```

FIGURE 5-28. Select Local User or Gateway Form

Stage 4 - Verify, Save and List Configuration

Refer to Stages 5, 6, and 7 respectively of Setting Configuration Defaults.

Stage 5 - Start Prime X.400

Refer to Stage 8 of Setting Configuration Defaults.

Fallback Message Routing

This example shows how to define an alternate recipient for undelivered mail, if the fallback routing mechanism provided by init_config has not been used. Each stage of the configuration is briefly described, below, indicating the data you are required to supply for that stage.

Stages in Defining Fallback Message Routing

1. Invoke CONFIG_X400 Command. (Refer to Stage 1 of Setting Configuration Defaults.)
2. Define a fallback message route.

   Field entries required for this stage are:

   Mail ID of the alternate recipient
   Remote MTA Name where all undelivered messages should be sent

3. Verify, save and list your configuration. (Refer to Stages 5, 6, and 7 respectively, of - Setting Configuration Defaults.)
4. Start Prime X.400. (Refer to Stage 8 of Setting Configuration Defaults.)

Stage 1 - Invoke CONFIG_X400 Command

Refer to Stage 1 of Setting Configuration Defaults.

Stage 2 - Fallback Message Routing

Select option 7, `Fallback Message Routing`, from the CONFIG_X400 Main Menu (Figure 5-5.) You are presented with the form shown in Figure 5-29. Sample entries are shown.

```
                    )CONFIG X400 - Main Menu (

                   ) Fallback Message Routing (

Alternate Recipient of all undeliverable mail:

   User Mail  ID: DIRECTOR
   MTA Name     : SALES

Press:  <TRANSMIT>  to save details.
        <EXIT>      to abort change.
```

FIGURE 5-29. Fallback Message Routing Form

In order to define an alternate recipient, you enter the mail ID of an existing User Agent.

Enter the name of a remote MTA for backstop routing if required.

Stage 3 - Verify, Save and List Configuration

Refer to Stages 5, 6, and 7 respectively of Setting Configuration Defaults.

Stage 4 - Start Prime X.400

Refer to Stage 8 of Setting Configuration Defaults.

Meanings and descriptions of O/R address components are described in Chapter 1.

```
                    )CONFIG X400 - Main Menu (

                       ) Select Local MTA (

                      ) Configure Local MTA (

                   ) Select Local User/Gateway (

                       ) Configure Gateway (

                  ) Select Gateway O/R Address Space (

             ) Define Gateway O/R Address Space - Page 1 of 2 (

User Mail ID: SMTP

O/R Address Space:
   Country: GB   ADMD: GOLD 400          PRMD: COMPANY X

   Organization Name:
     Organization: SALES
     Units:  CUSTOMER LIAISON

   Personal Name:
     Surname :                        Given Name:
     Initials:              Generation Qualifier:

Press:  <TRANSMIT>  to save address details.
        <EXIT>      to abort changes.
        <NXTPAG>    to view next page.
```

FIGURE 5-30. Define Gateway O/R Address Space Form, Pages 1 & 2

Complete the form and press TRANSMIT to save your data. When the Configure Local MTA menu is redisplayed, press EXIT to return to the CONFIG_X400 Main Menu.

6

OPERATION AND MONITORING

Introduction

This chapter describes the ADMIN_X400 command, its options and subcommands. ADMIN_X400 is used to start, stop, monitor, and control Prime X.400 on your system.

Release 1.2 Syntax.

Release 1.2 introduces a more concise style of subcommand syntax, which permits an abbreviated form of the subcommand verb and less complex options. Release 1.2 supports the syntax used in previous releases.

Conventions for Subcommand Syntax

The following conventions are used in subcommand descriptions:

- Uppercase letters are used throughout for the subcommands
- User required variables are shown entirely in lowercase.

However, at your terminal, subcommands may be typed in upper or lower case, or a combination of both upper and lower case.

Command Line Editing

The Erase and Kill characters defined within your PRIMOS environment are used to edit command or subcommand line entries.

The ADMIN_X400 Command

The ADMIN_X400 command lets you control and monitor Prime X.400. You can use the command in two ways.

- Use the command *with* options to start and stop Prime X.400 on your system.
- Use the command *without* options to invoke the subcommand environment, which lets you
  - Display user status and O/R addresses
  - Display gateway status and O/R addresses
  - Display MTA configuration data
  - Display queues
  - Display all errors at your terminal
  - Suspend or resume communication with other MTAs

User Access

Access to the ADMIN_X400 subcommands, and the -STOP option, is enabled using the access category ADMIN.ACAT in the PRIME_X400* directory. Users with at least U, (Use) access assigned in this category, can invoke the subcommands from a normal terminal. (Refer to the *PRIMOS Commands Reference Guide* for access rights.)

Command Syntax

The syntax of the command is shown below.

▶ **ADMIN_X400 [options [suboptions]]**

The options and suboptions, are described in the following list.

Option *Description*

-START [mta_name] **[-CONFIG filename | { -TRACE service level [address] | -MAX_USERS max_users }]**

Starts a specific Prime X.400 MTA on this node. If you do not give an MTA name, the local node name is used.

The CONFIG, TRACE, and MAX_USERS suboptions of the -START option, are described below.

Option *Option Description*

-CONFIG

To start the MTA with a particular configuration, specify -CONFIG followed by the configuration filename. If you do not specify a filename, the default configuration file, PRIME_X400*>PRIME_X400.CONFIG is used. If the startup configuration file is corrupt, Prime X.400 starts with its most recent, valid configuration.

-TRACE service level [address]

Enables tracing of various activities within the X.400 Server. The TRACE output is written to the Server .COMO file, which resides within the PRIME_X400* UFD.

The two *service* parameters are X25 and MSG. The *level* of tracing available for each, is described below.

X.25 Service

Level	*TRACE*
0	The default. Tracing disabled.
1	Gives notification of network connections to other MTAs.
2	Gives full hexadecimal dumps of all messages sent and received over the network.

The optional *address* can be used to enable tracing of a single network address.

MSG Service

Level	*TRACE*
0	No tracing.
1	Gives notification of all Interpersonal Message transfers, conducted by the MTA.

-MAX_USERS max_users

Specifies the percentage of configured users at the MTA, that are permitted to log on at any one time.

The default value is 25.

-STOP [-FORCE] Shuts down Prime X.400 on the system. To forcibly stop the server, specify -FORCE.

-ON nodename Invokes the subcommand environment for the MTA on the specified node. This option cannot be used with the -START option, or with the -STOP option when -FORCE is used.

{-HELP | -H} [{-NO_WAIT | -NW}]

Explains how to use the command. This option cancels any other options on the command line. If you specify -NO_WAIT, the display is not paginated at your terminal. The same information is available through the PRIMOS HELP subsystem.

-USAGE Gives you the command syntax in brief. This option cancels all others on the command line.

Starting and Stopping Prime X.400

To start Prime X.400 on your system, type the following command at the system terminal:

```
ADMIN_X400 -START
```

This starts Prime X.400 with the default configuration. To use a specific configuration, specify the -CONFIG *filename* option.

Prime X.400 may take a few minutes before it has gained a mail processing state.

The ADMIN_X400 -START command can be included in your PRIMOS.COMI system startup file if required.

To stop Prime X.400 on your system, type the following command at your system terminal:

```
ADMIN_X400 -STOP
```

This shuts down all MTA associations and logs the server out, after ensuring that all active sessions are closed.

Note

Refer also, to the ADMIN_X400 subcommand - X400_TERMINATE - described later in this chapter.

Display and Control Subcommands

This section gives a general description of the display and control subcommands: detailed descriptions are given in the subsequent sections.

Invoking the Subcommand Environment

You can enter the display and control subcommand environment by invoking the ADMIN_X400 command with no options. This is shown below; user input is shown underlined.

```
OK, ADMIN_X400

[ADMIN_X400 Rev. 1.1.0-21.0.3 Copyright (c) 1988, Prime Computer, Inc.]

Establishing connection to X400... please wait

Welcome.
X400:
```

The prompt, X400: indicates the system is ready to receive subcommands.

Quitting the Subcommand Environment

To quit from the ADMIN_X400 subcommand environment and return to PRIMOS, type Q or QUIT. For example:

```
X400: Q                    Or          X400: QUIT
```

Display and Control Subcommands

The subcommand environment supports display and control commands.

The display commands give you up to the minute status information about MTAs, users, and gateways, within the configuration. The display subcommands and their abbreviated forms are shown below:

- DISPLAY_USER
  or DU
- DISPLAY_GATE
  or DG
- DISPLAY_MTA
  or DM
- DISPLAY_ASSOC
  or DA
- DISPLAY_QUEUE
  or DQ

- DISPLAY_ORNAME
  or DOR

The Control subcommands enable you to control the operation of Prime X.400 on the system. The Control subcommands and their abbreviated forms are shown below:

- X400_LOGGING
  or L
- X400_TERMINATE
  No abbreviated form.
- SUSPEND_MTA
  SMTA

Help

To obtain help on display or control subcommand syntax and usage, type -HELP or -H, within the subcommand environment.

Syntax

Subcommands consist of a hyphenated verb or pertinent abbreviation, usually followed by an operand.

The operand identifies the entity on which the command operates; for example, in DISPLAY commands, the operand identifies the entity to display.

Operands for subcommands consist of qualified keywords that identify a specific entity or group of entities, such as Prime X.400 routing table identifiers, that is, Mail IDs or MTA names. Keyword qualifiers are further keywords prefixed by the hyphen character, (-).

Below are examples of the full and abbreviated subcommand syntax:

```
DISPLAY_USER JOE                  or...   DU JOE

DISPLAY_QUEUE -INQUEUE -FULL      or...   DQ -I -F
```

The Display Subcommands

This section describes the ADMIN_X400 display subcommands and their syntax. Each subcommand is fully described, and examples of its usage are included.

These subcommands enable you to display:

- The X.400 communication status of users
- Adjacent MTAs

- Details of MTA Associations
- Gateway connections
- Users' and Gateways' full O/R addresses
- Status of user, gateway and MTA send/receive queues.

The Display subcommands and their functions are described in the following list.

Subcommand	*Function*
DISPLAY_USER or **DU**	Displays the X.400 communication status of local users.
DISPLAY_GATE or **DG**	Displays the configuration data for gateway users.
DISPLAY_MTA or **DM**	Displays the names of adjacent MTAs, and the numbers of associations they have with the local MTA.
DISPLAY_ASSOC or **DA**	Displays the status of associations with adjacent MTAs. Data returned includes ownership, type, and current status of the connection.
DISPLAY_QUEUE or **DQ**	Displays details of send/receive queues for both users, gateways and MTAs.
DISPLAY_ORNAME or **DOR**	Displays the full O/R address of a specific user or gateway.

Primary and Secondary Subcommands

Display subcommands are of two types: primary and secondary.

Primary commands give direct information about the main configuration entities: users, MTAs, and gateways. DISPLAY_USER, DISPLAY_GATE and DISPLAY_MTA are primary commands.

Secondary commands give specific information about the main configuration entities, and require the prior specification of a user, MTA, or gateway. DISPLAY_ORNAME, DISPLAY_QUEUE and DISPLAY_ASSOC are secondary commands.

The requirements of the secondary display commands are illustrated in Figure 6-1.

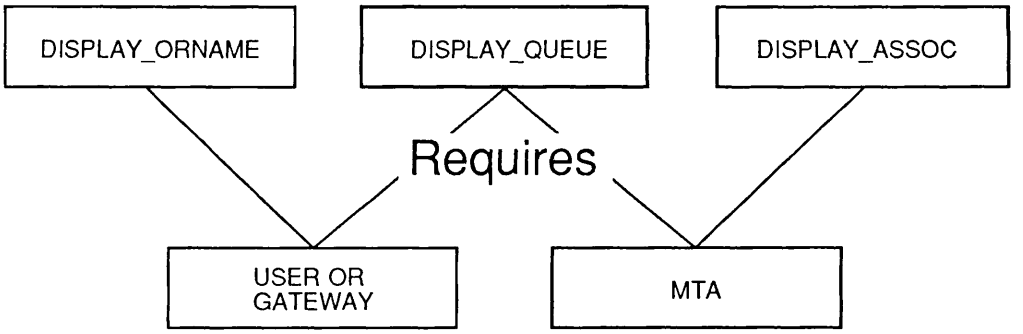

FIGURE 6-1. Requirements of Display Commands

Display Defaults

ADMIN_X400 stores the last primary and the last secondary display argument that you specify. These become the defaults for all subsequent commands until you change them.

For example, if you use the subcommand DISPLAY_USER JOE to display the status of mail user JOE, the user name JOE is stored as the default display argument. If you then use the subcommand DISPLAY_ORNAME -DEFAULT, the command displays the O/R address of user JOE.

When using secondary DISPLAY subcommands, specify either the default entity using the DEFAULT keyword, or one of your choice.

Note

The following sections give details of the display commands, their syntax, operands and codes, together with examples of displays.

The DISPLAY_USER Subcommand

The DISPLAY_USER subcommand displays the communication status of Prime X.400 users.

▶ **DISPLAY_USER** {**mail_id** | **-All** | **-Default**}
DU

Operand	*Description*
mail_id	Displays data about the specified Mail ID. This operand updates the default user.
-All	Displays data about all users in the MTA's configuration.
-Default	Displays data about the default user.

Status Codes

When you use the DISPLAY_USER subcommand, user and status information is displayed on your terminal. Communication status codes indicate the current state of the user's X.400 session. The status codes are described in the following list.

Code	*Description*
FREE	User not logged in
IN USE	User logged in
PND RSP	Awaiting reply from user
PND CNF	User awaiting confirmation from system
PND ACK	System awaiting acknowledgement from user
PND CLS	Logoff (from Prime X.400) in progress

Example Displays

User input is shown underlined.

```
DISPLAY-USER -All                    Or    DU -All          Or    DU -A

USER              STATUS
BILL              IN USE
JOE               IN USE
End-Of-Table

DISPLAY-USER bill                    Or    DU bill
User bill not found.

DISPLAY-USER BILL                    Or    DU BILL

USER              STATUS
BILL              IN USE
End-Of-Table

DISPLAY_USER -Default                Or    DU -Default      Or    DU -D

USER              STATUS
BILL              IN USE
End-Of-Table
```

In this last example, as the user BILL was the last defined *primary* argument, it has become the default.

Messages From DISPLAY_USER

The following message appears if the specified user does not exist within the configuration.

```
User <Mail ID> not found.
```

The DISPLAY_GATE Subcommand

The DISPLAY_GATE subcommand displays a list of *all* gateways configured at the specified MTA, and the number of connections to the MTA. There is only one operand with this subcommand.

▶ **DISPLAY_GATE** {**-All**}
DG

Operand	*Description*
-All	Displays gateway names and the number of connections with the local MTA.

When you use the DISPLAY_GATE subcommand, a display appears on your terminal showing all the configured gateway names.

Example Display

User input is shown underlined.

DISPLAY_GATE -All Or DG -All Or DG -A

```
GATEWAY
gate1
gate2
End-of-Table
```

Messages From DISPLAY_GATE

The following message appears if the specified gateway does not exist within the configuration.

```
Gateway <Mail ID> not found.
```

The DISPLAY_MTA Subcommand

The DISPLAY_MTA subcommand displays the number of associations configured from adjacent MTAs to your local MTA.

▶ **DISPLAY_MTA** { **mta_name** / **-All** / **-Default** }
DM

Operand	*Description*
mta_name	Displays the number of associations for a specific adjacent MTA. This operand updates the default MTA.
-All	Displays the number of associations for all adjacent MTAs.
-Default	Displays the number of associations for the default MTA.

When you use the DISPLAY_MTA subcommand, a display appears on your terminal showing ADJACENT MTA names and the number of ASSOCIATIONS.

Example Displays

User input is shown underlined.

```
DISPLAY-MTA -All                    Or    DM -All          Or    DM -A

ADJACENT MTA      ASSOCIATIONS        MTA STATE
NODE1             0002                ACTIVE
NODE2             0002                ACTIVE
End-Of-Table

DISPLAY-MTA NODE1                   Or    DM NODE1

ADJACENT MTA      ASSOCIATIONS        MTA STATE
NODE1             0002                INACTIVE
End-Of-Table

DISPLAY-MTA -Default                Or... DM -Default      Or... DM -D

ADJACENT MTA      ASSOCIATIONS        MTA STATE
NODE1             0002                INACTIVE
End-of-Table
```

In the last example, as NODE1 was the last defined primary argument, it is used as the default.

Messages From DISPLAY_MTA

The following message appears if the specified MTA does not exist within the configuration.

```
Adjacent mta <MTA name> not found.
```

The DISPLAY_ASSOC Subcommand

The DISPLAY_ASSOC command displays details about associations configured to a specific adjacent MTA.

▶ **DISPLAY_ASSOCDA** { **mta_name** | **-Default** }

Operand	*Description*
mta_name	Displays association data about a specific MTA. This operand updates the default MTA entry.
-Default	Displays association data about the default MTA.

When you use the DISPLAY_ASSOC subcommand, the following fields of information are displayed on your terminal:

NAME	Name of the associated MTA
TYPE	Association type (permanent, temporary, remote)
STATE	Association state (open, closed, opening, closing, sending, receiving, error, or aborted)

The following paragraphs describe the NAME, TYPE and STATE data fields that are shown on your terminal display.

Association Type (TYPE)

Association type is the capacity to control message transfer between two associated MTAs.

There are three possible association types.

Type	*Description*
TEMP	Locally owned and temporary
PERM	Locally owned and permanent
REMOTE	Remotely owned

Association States (STATE)

Association state is the current, runtime state of the association.

There are eight possible association states.

State	*Description*
OPEN	The association is open and idle.
CLOSED	The association is closed.
OPENING	The association is in the process of being opened.
CLOSING	The association is in the process of being closed.
SENDING	A message is being sent on the association.
RECEIVING	A message is being received on the association.
ERROR	The association cannot be opened.
ABORTED	The association has been aborted.

Example Displays

User input is shown underlined.

```
DISPLAY-ASSOC -Default          Or    DA -Default      Or    DA -D

Adjacent_mta : NODE1
NAME              TYPE      STATE
ASSOC1            REMOTE    CLOSED
ASSOC2            TEMP      CLOSED
End-Of-Table
```

The DISPLAY_ORNAME Subcommand

The DISPLAY_ORNAME command displays the full O/R address of a specific user, in a tabulated format.

▶ **DISPLAY_ORNAME** { **mail_id** / **-Default** }
DOR

Operand	*Description*
mail_id	Displays O/R address data for a specific *mail_id*. This operand updates the default user.
-Default	Displays O/R address data for the *default* user.

O/R Address Components

The following describe the eleven possible address components that can be displayed on your terminal.

Component	*Description*
COUNTRY	Country Name. This is assigned by the X.400 regulatory authorities.
ADMD	Administration Domain Name. This is assigned by the X.400 regulatory authorities.
PRMD	Private Domain Name.
ORG	Organization Name.
ORU	Organization Unit.
SURNAME	Surname.
GIVEN	Given Name.
INI	Initials.
GEN	Generation Qualifier.
DDA-TYPE	Domain Defined Attribute Type.
DDA-VAL	Domain Defined Attribute Value.

Example Displays

User input is shown underlined.

```
DISPLAY-ORNAME BILL          Or     DOR BILL

User : BILL
O/R NAME
COUNTRY : UK
ADMD : MHS
PRMD : PRIME
ORG  : DC
ORU : OSI
SURNAME : SHAKESPEARE
GIVEN : WILLIAM
End-Of-Table
```

Messages From DISPLAY_ORNAME

The following message is displayed if the specified User does not exist within the configuration.

```
User <Mail ID> not found.
```

The DISPLAY_QUEUE Subcommand

The DISPLAY_QUEUE command lists the status of send and receive message queues (IN and OUT queues) for users and adjacent MTAs.

▶ **DISPLAY_QUEUE**
DQ

{**-M mta_name** | **-U mail_id** | **-G gate_id** | **-DUser** | **-DMta**} {**-Outqueue** | **-Inqueue** | **-Queue**} {**-Summary** | **-Full**}

There are three categories of operand used by this subcommand; Entities, Queues and Display Levels.

Entity Operands

Operand	*Description*
-M mta_name	Displays the queue status of a specific adjacent MTA. This option resets the default MTA.
-U mail_id	Displays the queue status of a specific mail_id. This option resets the default user.
-G gate_id	Displays the queue status of a specific gate_id. This option resets the default gateway.
-DUser	Displays the queue status of the default user.
-DMta	Displays the queue status of the default adjacent MTA.

Queue operands

-Outqueue	Displays the status of the out, or send queue. This option resets the display default queue type.
-Inqueue	Displays the status of the in, or receive queue. This option resets the display default queue type.
-Queue	Displays the existing default queue type.

Display Level Operands

There are two operands which enable you to determine the type of display required.

-Summary Displays the following information:

- Queue type (IN/OUT)
- Total number of messages on the queue
- Numbers of high, medium, and low priority (URGENT, NORMAL, NON-URGent) messages

-Full Displays the Summary information, plus the following fields of information:

- MSG ID: A serial number that identifies the message uniquely.
- DATE and TIME: The date and time the message was added to the queue.
- TYPE: There are four message types; these are described below.

Type	*Description*
IM-UAPDU	Interpersonal Message in a User Agent Protocol Data Unit.
SR-UAPDU	Status Report in a User Agent Protocol Data Unit. This is user acknowledgement to the system.
DR-MPDU	Delivery Report in a Message Protocol Data Unit. This is system acknowledgement to the user.
PR-MPDU	Probe Report in a Message Protocol Data Unit. This is system message to verify an MHS route.

For further information about message types, refer to the CCITT X.400 series documentation.

- PRIORITY: Message priorities are NORMAL, URGENT, and NON-URGent.
- ISSUE: The issue state. A message can be off or on. On issue means that the message is being actively processed by Prime X.400.

Example Displays

User input is shown underlined.

```
DISPLAY-QUEUE -Outqueue -Summary                    Or    DQ -O -S

User : BILL
Queue: OUT Tot: 0000 High: 0000 Normal: 0000 Low: 0000

DISPLAY-QUEUE -Inqueue -Full                        Or    DQ -I -F

User  : BILL
Queue : IN Tot: 04 High: 01 Normal: 02 Low: 01
MSG-ID  DATE        TIME       MSG-TYPE   PRIORITY  ISSUE
0012    01:15:89    10:25      IM-UAPDU   NORMAL    ON
End-Of-Table
```

Control Subcommands

This section describes the ADMIN_400 control subcommands, X400_LOGGING and X400_TERMINATE. You use the commands to

- Control the display of error messages at the operator's terminal
- Stop the X400 Server
- Suspend the operation of an MTA

The X400_LOGGING Subcommand

Error messages from Prime X.400 are normally logged only in the Prime X.400 journal (COMO) log. When error logging is enabled, error messages are also echoed to the terminal.

The X400_LOGGING command enables and disables full error logging at the user's terminal. It is also used to display logging status.

▶ **X400_LOGGING** { **-Current** | **-Begin** | **-End** }
L

Operand	*Description*
-Current	Displays current logging status (enabled or disabled).
-Begin	Enables error logging to the user's terminal.
-End	Disables error logging to the user's terminal.

The X400_TERMINATE Subcommand

The X400_TERMINATE subcommand stops the Prime X400 Server.

▶ **X400_TERMINATE**

There are no operands for this subcommand.

All users who are logged on, are logged off; associations to other MTAs are severed, and the Server is logged out.

The X400_SUSPEND Subcommand

The X400_SUSPEND subcommand suspends the transmission of messages out of or into an MTA, while allowing the circulation of messages wholly within the MTA to continue.

▶ **X400_SUSPEND_MTA [-m <mta_name>]** { **-Current** | **-Begin** | **-End** }

Operand	*Description*
-Current	Displays current status (enabled or disabled).
-Begin	Enables suspension of specified MTA.
-End	Disables suspension of specified MTA.

APPENDICES

A

PRIME X.400 ERROR LOGGING AND ERROR MESSAGES

Error and Event Logging

Error Logging

Errors detected by, or originating from, the Prime X.400 subsystem are logged in the server COMO file. Major events, such as startup, are also recorded in this file.

Error messages are recorded in a standard format. For example:

```
09 Nov 89 00:00:44  Error: F400  Severity: 12  Param 1:    15  Param 2:     1
```

Heading	*Description*
Error	The error reference number.
Severity	An indication of the importance of the event to PRIME_X400 operation. This is a value 1 (least severe) through 15 (most severe - causes the server to abort).
Param 1 and Param 2	Additional error parameters for certain error codes. Check the error desriptors below to determine use, if any.

Some error reports are followed by further information about the error. For example:

```
Error accessing file: *>EVENQ>OMU00600
```

Error Messages

Error: 0B46
Internal buffer shortage. Recovery action (buffer sequestration) is attempted by the server. As buffers are released, the shortage condition will cease. No user recovery action required.

Error: 0B48
Internal buffer shortage, severity increased. Param 1 contains the new severity level. No user action is required.

Error: 0BC1
Internal buffer pool corrupt. This error is fatal: the server terminates. Restart the server. If the error continues to occur, contact Prime.

Error: 0BC3
Internal buffer pool corrupt. This error is fatal: the server terminates. Restart the server. If the error continues to occur, contact Prime.

Error: 0BC4
Internal buffer shortage. Severity has reached maximum value (4). The server has been unable to recover from its buffer shortage. This error is fatal: the server terminates. Restart the server. If the error continues to occur, contact Prime.

Error: 0BC5
Internal buffer shortage. The server has been unable to recover from its buffer shortage. This error is fatal: the server terminates. Restart the server. If the error continues to occur, contact Prime.

Error: 0BC4
Internal buffer shortage. The server has been unable to recover from its buffer shortage. This error is fatal: the server terminates. Restart the server. If the error continues to occur, contact Prime.

Error: 2100
Message received whilst initializing. Message rejected.

Error: 2101
Unrecognized message received. Message rejected.

Error: 2109
Received TPDU too big. Message rejected.

Error: 210B
Passenger message received while pending close response. Message rejected.

Error: 2132
Unknown called TSAP address on a TCON request.

Error: 2133
Unknown calling TSAP address on a TCON request.

Error: 2134
Too many bytes of user data on a primitive.

Error: 2135
Illegal attempt to select expedited data.

Error: 2136
Illegal attempt to select a nonzero QOS.

Error: 2137
Illegal attempt to request receipt confirmation.

Error: 2138
Bad originator on NDIS indication.

Error: 2139
Unknown called NSAP address on an NCON indication.

Error: 213A
Unknown calling NSAP address on an NCON indication.

Error: 213C
Remote NSAP address too long on an NCON indication.

Error: 213D
Unknown responding TSAP address on a TCON response.

Error: 2156
Received NCON confirmation but NC (Network Connection) not waiting for NCON confirmation.

Error: 2157
Bad TC (Transport Connection) state to receive an NCON confirmation.

Error: 2158
Received NCON confirmation but TC not in wait for NCON confirmation state.

Error: 2180
TPDU header length invalid (larger than 255 bytes).

Error: 2181
TPDU header length invalid (larger than the remaining space in the NSDU.)

Error: 2182
TPDU header length invalid (smaller than 3 bytes).

Error: 2183
Bad state for a CC TPDU.

Error: 2184
CC TPDU received from initiator, *or* duplicate CC received on a non class 4 connection.

Error: 2185
CC TPDU received from initiator, *or* duplicate CC received on a non class 4 connection.

Error: 2186
DR TPDU received in WFTRESP state.

Error: 2187
Invalid state to receive a DC TPDU.

Error: 2188
Invalid state to receive a DT TPDU.

Error: 2189
DT TPDU has too many elements for a TSDU.

Error: 218A
Invalid state to receive an AK TPDU.

Error: 218B
Arrival of an EA/ED TPDU when expedited data has not been selected.

Error: 218C
Invalid state to receive an ED TPDU.

Error: 218E
Invalid state to receive an EA TPDU.

Error: 218F
Arrival of an ER TPDU whilst awaiting a TCON response.

Error: 2194
Arrival of a TPDU for a lost TS user.

Error: 2195
RJ TPDU received.

Error: 2196
Arrival of an unrecognized TPDU.

Error: 2197
Bad destination reference on a TPDU.

Error: 2198
Illegal attempt to split a TC onto an NC.

Error: 219B
EOT badly set on an ED or DT TPDU.

Error: 219C
Checksum failed on received TPDU.

Error: 219D
TPDU header is longer than stated.

Error: 219E
TPDU contains an illegal or unrecognized parameter.

Error: 219F
TPDU size is larger than the negotiated maximum.

Error: 21A0
Length of user data is illegal.

Error: 21A1
Arrival of an illegal AK TPDU on a Class 0 connection.

Error: 21A2
Arrival of an AK TPDU that makes an illegal window change.

Error: 21A4
Header too short for the fixed part of a TPDU.

Error: 21A5
Invalid destination reference on a DC TPDU.

Error: 21A6
Arrival of an illegal DC TPDU on a Class 0 connection.

Error: 21A7
Invalid references on a DR TPDU.

Error: 21A8
Arrival of a TPDU that cannot be associated.

Error: 21A9
Bad attempt at class negotiation on a CC TPDU.

Error: 21AA
Bad option parameter on a CC TPDU.

Error: 21AB
Arrival of a bad duplicate CC.

Error: 21AD
Bad Value for the credit to send on a CC TPDU.

Error: 21AE
Bad parameter on a CC TPDU.

Error: 21AF
Arrival of an illegal duplicate CR.

Error: 21B0
Bad parameter on a CR TPDU.

Error: 21B1
Arrival of a CR with a bad source reference.

Error: 21B3
Arrival of a CR without a TSAP.

Error: 21B4
An attempted association between Network and Transport entities has failed.

Error: 21C0
Illegal LPI-STATE combination.

Error: 21C1
Connection affected by server buffer shortage.

Error: 21C2
Connection affected by lost network connection.

Error: 21C6
Internal queue corruption.

Error: 21D3
Internal queue corruption.

Error: 21D4
Internal queue corruption.

Error: 2200
The transport connection has been lost. Session recovery mode is entered.

Error: 2201
A user who is already logged on has tried to log on again. The logon attempt is rejected.

Error: 2202
An attempt has been made to logon by an unknown user. (The user is not specified in the configuration file). The logon attempt is rejected.

Error: 2203
Insufficient resources to service a logon request. The logon request is rejected. If this error persists, the server should be retstarted with a higher MAX_USERS value.

Error: 2204
A logon request has been received whilst initialization is still in progress. The request is rejected.

Error: 2205
A logon request has been received whilst termination is in progress. The request is rejected.

Error: 2207
A message received via the API has been rejected because it contains errors.

Error: 2208
Failed to secure a message from the API onto internal queues. The message is rejected.

Error: 220C
A passenger request has been received when it expects a close. The message is discarded. Param 1 contains the Passenger message type.

Error: 2210
A syntax error was detected when parsing an MPDU. Param 1 contains the Syntax Error code:

```
Invalid X409 type byte (1),

Invalid X409 length byte (2),

Indefinate length primitive (3),

Too many bytes at  this level (4),

Mandatory item missing (6),

Unchosen Choice (7),

Choice chosen twice (8),

Unexpected type byte (9),

Repeated item in set  (A),

Originator O/R name unrecognised (D),

Loop Detected for Delivery Report MPDU (E),
```

(List continues on next page)

Param 1 contains the Syntax Error code: (Continued)

```
P1 contents too long (F),

P1 contents too short (10),

Syntax Error in P2 (11),

Missing descriptor for contents (13),

Missing start of sequence (14),

Read past end of descriptors (15).
```

Error: 2211

A semantic error was detected when parsing an MPDU. A delivery report MPDU is generated. Param 1 contains the Semantic Error Code:

```
Error in content type (4),

Illegal presence of trace information (5),

Error in trace information (6),

Loop detected for user or probe MPDU (7).
```

Error: 2212

A message for an invalid recipient or a messages containing Encoded Information Types that the user does not support has been received. A non-delivery report is generated. Param 2 contains the nondelivery reason and diagnostic codes for the recipient, coded as: 128 + 16*(Reason Code) + Diagnostic Code, in Hex.

Error: 2213

A message has been received for a user that does not support the body types contained in the message. A non-delivery report is generated.

Error: 2220

A bad concatenation of SPDUs has been received. An S-P-ABORT.ind and an ABORT SPDU is sent.
Param 2 contains the SPDU identifier.

Error: 2229

Error detected in SPDU. An S-P-ABORT.ind and an ABORT SPDU is sent.
Param 1 contains the format error (1), SPDU-id error (2).
Param 2 contains the SPDU identifer.

Error: 222A

Protocol Error due to a received session primitive. An S-P-ABORT.ind, and an ABORT SPDU is sent.
Param 1 contains the session state.
Param 2 contains the Session primitive type.

Error: 222C

A session layer protocol error has been detected, for example, a primitive collision. Session recovery mode is entered.
Param 1 contains the session state.
Param 2 contains the SPDU identifer.

Error: 222D

A TSDU has arrived at Message Transfer Layer, whose length is greater than the negotiated maximum TSDU size. An S-P-ABORT.ind, and an ABORT SPDU is sent.
Param 1 contains the TSDU length.
Param 2 contains the negotiated maximum TSDU size.

Error: 222E

Error detected in session primitive. An S-P-ABORT.ind, and an ABORT SPDU is sent.
Param 1 contains the Format error (1), SPDU-id error (2).
Param 2 contains the primitive type.

Error: 222F

A T-Connect indication has been rejected because the remote TSAP was not recognised. The connection is rejected.

Error: 2231

An S-connect indication has been received that has no SS-User data. The indication is rejected.

Error: 2232

An S-connect indication for a new connection has been refused because there are no free RTS control blocks. The indication is rejected.

Error: 2233

An S-connect indication has been rejected because the the SS-user data is invalid.
Param 1 contains the current offset in SS-User data. The indication is rejected.

Error: 2234

An S-connect indication for a recovery has been refused because the RTS was unable to validate the session connection identifier. The indication is rejected.

Error: 2235

An exception report has been received for the current activity.

Param 1 contains the action taken:

```
0 = discard current activity,

1 = interrupt current activity.
```

Param 2 contains the reason code on exception report:

```
0 = non-specific error,

1 = receiving ability jeopardised,

3 = sequence error,

5 = local SS-user error,

6 = unrecoverable procedure error.
```

Error: 2236

Message Transfer Layer has detected a sequence error on the last received checkpoint. Param 1 contains the action taken:

```
0 = discard current activity,

1 = interrupt current activity
```

Error: 2237

An error has been detected in an incoming message, at the RTS level. Parameter 1 indicates the type of message:

```
1 = P-CONNECT

2 = P-ACCEPT

3 = P-REFUSE  The session will be aborted.
```

Error: 2240

The Remote MTA has rejected an attempt to open an association. If the reason code specifies that the attempt should be retried (eg. busy), it will be. Otherwise, the attempt is aborted.

Param 1 contains the association control block index.

Param 2 contains the reason code:

```
0 = busy,

1 = cannot recover,

2 = authentication failure,

3 = unacceptable dialogue mode,

4 = invalid SSAP.
```

Error: 2245

An ROPEN indication has been received that contains an error. A negative ROPEN response is sent.

Param 1 contains the error code:

```
0 = busy,

1 = cannot recover,

2 = authentication failure,

3 = unacceptable dialogue mode,

4 = invalid SSAP.
```

Error: 2246
An ROPEN confirmation has been received whose RTS user data has failed the validation test. The association is closed.

Error: 2258
Insufficient server resources to generate a body file. A negative data confirm message is sent.

Error: 2259
An attempt to rename a body file has failed. A negative data confirm message is sent.

Error: 22A0
Error opening file. All operations on the affected file will be suspended.

Error: 22A1
Read failure. All operations on the affected file are suspended.

Error: 22A2
Error deleting file. All operations on the affected file are suspended.

Error: 22A3
Error closing file. All operations on the affected file are suspended.

Error: 22A4
Error opening file. All operations on the affected file are suspended.

Error: 22A5
Write failure. All operations on the affected file are suspended.

Error: 22A6
Error deleting file. All operations on the affected file are suspended.

Error: 22A7
Error closing file. All operations on the affected file are suspended.

Error: 22A8
Error in queue directory. If this error occurs during initialization the server terminates; otherwise all operations on the queue are inhibited.

Error: 22A9
Queue activity suspended after previous error.

Error: 22AA
Error in data read from queue or queue directory. All operations on the queue are suspended.

Error: 22BB
Failed to open the routing and directory file (PRIME_X400*>OBJECTS>OMRDTABL.CACHE). The server terminates. Restart the server. If the error continues to occur, contact Prime.

Error: 22D0
The number of users exceeds the maximum suported The server terminates. Restart the server with a smaller MAX_USERS value.

```
Param 1 contains the seleted number of users.

Param 2 contains the maximum suported.
```

Error: 22D1
The number users exceeds the maximum suported The server terminates. Restart the server with a smaller MAX_USERS value.

```
Param 1 contains the seleted number of users.

Param 2 contains the maximum suported.
```

Error: 22D2
The number of MTAs exceeds the maximum supported. The server terminates. Restart the server. If the error continues to occur, contact Prime.

```
Param 1 contains the current number of MTAs.

Param 2 contains the maximum suported.
```

Error: 22D3
The number of Associations exceeds the maximum supported. The server terminates. Restart the server. If the error continues to occur, contact Prime.

```
Param 1 contains the current number of associations.

Param 2 contains the maximum supported.
```

Error: 22D4
The number of Associations exceeds the maximum supported. The server terminates. Restart the server. If the error continues to occur, contact Prime.

```
Param 1 contains the current number of associations.

Param 2 contains the maximum suported.
```

Error: 22D5

The number of Remote Associations exceeds the maximum supported. The server terminates. Restart the server. If the error continues to occur, contact Prime.

```
Param 1 contains the current number of associations.

Param 2 contains the maximum supported.
```

Error: 22D9

The number of MD control blocks in the exceeds the maximum supported. The server terminates. Decrease one or both of the number of MTAs and Users configured.

```
Param 1 contains the current value.

Param 2 contains the maximum supported.
```

Error: 22E0

Error while reading in the Routing and Directory table (PRIME_X400*>OBJECTS>OMRDTABL.CACHE). The server terminates. Restart the server. If the error continues to occur, contact Prime.

Error: 22E3

The number of gateway users configured is greater than the number supported. The server terminates. Restart the server. If the error continues to occur, contact Prime.

```
Param 1 contains the current number of gateways.

Param 2 contains the maximum supported.
```

Error: 22E4

The number of gateway users configured is greater than the number supported. The server terminates. Restart the server. If the error continues to occur, contact Prime.

```
Param 1 contains the current number of gateways.

Param 2 contains the maximum supported.
```

Error: 22EB

A mismatch between the queue directories and the configuration has been detected. The server terminates. Restart the server. If the error continues to occur, contact Prime. After checking for corrupted or missing files.

Param 1 contains the logical name for which the mismatch was found. (The logical name list can be found in PRIME_X400*>OBJECTS>LNF).

Param 2 indicates the mismatch:

```
Previously unused logical name now assigned to Message Transfer Agent
(MTA) (2),

Previously unused logical name now assigned to an User Agent
(UA)(3),

Previously unused logical name now assigned to a gateway (GW) (4),

Logical name already in use but now assigned to an MTA (5),

Logical name already in use but now assigned to an UA (6),

Logical name already in use but now assigned to an GW (7),

Logical name was in use but is now unassigned (8).
```

Error: 22EC
A failure has occured when Message Transfer Layer attempted to rename the R&D table (PRIME_X400*>OBJECTS>OMRDTABL.CACHE) at the end of initialisation. The server terminates. Restart the server. If the error continues to occur, contact Prime.

Error: 22EF
Insufficient resources to handle aborted associations. Server attempts to recover associations.

Error: 22F7
Insufficient resources to process ADMIN_X400 command.

Error: 22F8
Reference to unknown entity detected in a DISPLAY command issued via ADMIN_X400.

Param 2 contains the error code:

```
Invalid_primary_entity (1),

Invalid_primary_parameter (2),

Invalid_secondary_entity (3).
```

Error: 22F9
Insufficient resources to send log message.

Error: 22FA
Failed to respond to ADMIN_X400 request due to an internal error.

Error: F006
Failed to register server with ISC. The server terminates. Check if there is a server already running. If not, restart the server. If the error continues to occur, contact Prime.

Error: F009
Connection attempt from API or ADMIN_X400 whilst initialisation still in progress. The connection is rejected.

Error: F00B
Connection attempt from API or ADMIN_X400 whilst initialisation still in progress. The connection is rejected.

Error: F00C
Error when picking up a new connection request from API or ADMIN_X400. The request is ignored. User Data 1 contains the ISC error code.

Error: F00D
Error when picking up a session event. The connection may have been lost. Param 1 contains the ISC error code.

Error: F00E
Error when accepting an ISC Session. The connection may have been lost. Param 1 contains the ISC error code.

Error: F011
Insufficient free memory to accept a session connection from API or ADMIN_X400.

Error: F201
Failed to clear X.25 VC (X$CLR) User Data 1 contains the Primenet status code.

F202 Call to X.25 failed.

Error: F203
X.25 VC cleared by network or remote MTA.

Error: F204
X.25 VC cleared by local MTA.

Error: F205
Failed to setup X.25 connection.

Error: F206
X.25 reset received.

Error: F207
Incoming X.25 call cannot be accepted due to lack of resources.

Error: F208
X.25 packet received with Q-bit set or interrupt packet. Possibly caused by connecting to PAD/Remote Login Service. Either configuration problem or (prior to Revision 22) the remote MTA is not available.

Error: F209
Failed to accept X.25 call (XLACPT)

Error: F20A
NS-user violated protocol

Error: F20B
Failed to pick up call (XLGC$)

Error: F306
Error reading message from API.

Error: F307
Error sending message to API.

Error: F400
File system error detected.
Param 1 contains the Primos error code.

Param 2 indicates the operation being performed:

```
Open file for read (1),

Open file for write (2),

Open file for append (3),

Close file (4),

Delete file (5).
```

Error: F608
The configuration contains more subnetwork definitions than are supported.

Error: F609
The number of active users requested (via -MAX_USER parameters to ADMIN_X400) exceeds the maximum supportable.

```
Param 1 contains the number of active local users requested.

Param 2 contains the maximum supported.
```

B

GLOSSARY

ADMD
Administration Management Domain. A management domain managed by a national body.

ANSI
American National Standards Institute. The U.S.A representative to ISO.

Association
The logical channel used for data transfer between MTAs in an X.400 network. An association can be default or non-default, temporary or permanent.

BSI British Standards Institute. The U.K. representative to ISO.

C Country. One of the components making up an O/R address. C is usually specified as a two-letter code, defined in ISO 3166/ALPHA-2. Alternatively, C can be specified as a three-digit code, as defined by CCITT recommendation X.121.

DDA
Domain Defined Attribute. A set of attributes. DDAs are used to map an existing mail service to the O/R addressing scheme.

Gateway
A device that provides a route into some other mail system. The Gateway performs translation of data from one format into another, for example, the Prime SMTP/X.400 Gateway translates between Prime X.400 mailers, and SMTP mailers. Shares the same *name* space as *Users*. Together with Users, a Gateway is a *User Agent*.

Hub The point on a local network where all traffic in and out of the network is centralized.

ISO International Standards Organisation. See also OSI.

LAN
Local area network. Generally taken to mean any or all of the following local area networking media, as specified first by individual vendors, then by IEEE and finally by ISO.

- IEEE802.3 CSMA/CD. Also specified as IS8802.3. Developed from Ethernet.
- IEEE802.4 Token Bus.
- IEEE802.5 Token Ring.

MHS
Message Handling System. A set of UAs plus MTAs.

MTA
Message Transfer Agent. The functional component that, together with other MTAs, constitutes the MTS. The MTAs provide message transfer elements by:

1. Interacting with originating User Agents via the submission dialogue.
2. Relaying messages to other MTAs based upon recipient addresses.
3. Interacting with recipient User Agents via the delivery dialogue.

MTS
Message Transfer Service. Comprises a collection of MTAs, which provide the following elements:

Transport
Layer 4 of the OSI Reference Model. Provides reliable transfer of data between its users. Comes in five classes:

0. Simple Class. Requires a Network Service with (very) low residual error-rate.
1. Basic Error Recovery Class.
2. Multiplexing Class.
3. Error Recovery and Multiplexing Class.
4. Error Detection and Recovery Class. Needed for running over unreliable Network Services.

NSAP
Network Service Access Point.

PrimeNet Ring
The basic unit of a Prime network. Typically, a single PrimeNet ring is a local domain.

PRMD
Private Management Domain. A management domain managed by a company or non-commercial organisation.

PTTPost, Telephony and Telegraphy. The national body controlling public communications in a country.

O Organization. An O/R address component identifying a functional part of the PRMD.

OU Organizational Unit. An O/R address component identifying a part of the organization specified by O.

O/R Address
Originator/Recipient Address. The unique address related to a a user, a User Agent, or an MTA. As the title suggests, this address is used in both the transmitting and receiving of messages.

UA User Agent. Typically a set of processes that are used to create, inspect, and manage the storage of messages. There is typically one user per UA.

USER
A single, unique name and O/R address space. Often a users login ID.

X.400
A generic name for a set of CCITT standards which describe the interface to a store-and-forward messaging service primarily designed to support electronic mail.

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SURVEYS

READER RESPONSE FORM

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