CLEARINGHOUSE SERVICE

XEROX

Network Administration Library

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Preface

Purpose

The Clearinghouse Service booklet describes all that you need to know to set up and maintain your Clearinghouse Service. This booklet explains all the service commands and shows how these commands are used to perform service-related tasks. In addition, this booklet lists messages that can be generated while running this service and tells you what to do when a message is displayed.

Intended audience

This publication is intended for System Administrators who are responsible for starting up and keeping the Clearinghouse Service running efficiently.

Before you read this booklet

There is some general information about services that you will need to be familiar with before you can understand this booklet. Read the "Services Executive" section in the *Server Operation and Maintenance* booklet, and the *Introduction to Network Administration* booklet. All of these publications can be found in the *Network Basic Services* Volume.

Before you can use this service

As part of the preparation for setting up the Clearinghouse Service, you need to perform the procedures described in the *Server Software Installation* booklet. This booklet is also part of the *Network Basic Services* volume.

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Table of contents

List of figures

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1. Introduction

The Clearinghouse Service is one of the fundamental services of a network system. It is used to keep track of all its users on the network, as well as the services available to them. The Clearinghouse Service routes requests from workstations to the intended network resource. In this way, the Clearinghouse is similar to a switchboard. Network resources include file drawers, mailboxes, and other services (such as printers). When a user logs on to a workstation, the Clearinghouse verifies the name and password before the user can continue. Protected resources such as file drawers can be accessed only after the Clearinghouse validates the user's credentials.

All information registered and stored in the Clearinghouse Service is collectively referred to as the Clearinghouse database. The database contains such information as server names, server network numbers and processor identification numbers, and user passwords and aliases. Once information is registered into the database, the Clearinghouse associates this information with the name assigned to that resource. A printer, for example, is known simply by its name, rather than by a lengthy processor identification number.

It is your role as System Administrator to add and update information to the Clearinghouse database.

Clearinghouse Service configuration requirements

A Clearinghouse Service runs on any server with adequate free disk space and processor resources. There are no special peripherals or non-standard hardware configurations required. However, there are certain service inter-dependencies, depending on the configuration of your network.

- For small installations where domain replication (described in the next section) is not possible, a File Service is used to manually backup and restore the Clearinghouse database.
- For multiple network internets, the Clearinghouse depends on the Internetwork Routing Service (and indirectly, the External Communication Service) to communicate through the internet. Clearinghouse updates are transmitted using the Mail Service.
- For multiple server networks, domain replication is used to protect the database. You must determine the proper arrangement of the replicated database among several Clearinghouse Services.

Using replication

Because many network activities depend upon the Clearinghouse Service, it is important that the Clearinghouse Service runs continually. This is possible using domain replication. Domain replication allows you to copy each domain on multiple servers to provide continued reliability, availability, and efficiency. If there is a failure on a Clearinghouse database, you can obtain a copy of the domains in that database from another server holding a replica of the information.

Once the replication configuration is set up, the Clearinghouse Service software automatically coordinates any updates to the replicated data to ensure inter-server consistency.

Refer to "What is domain replication?" in the "Setting up your Clearinghouse Service" section for additional information about database replication, and to the "Replicating domains" procedure to perform this task.

Fully-qualified names

Every network object has a name. A user is known by his full name, such as Thomas J. Taylor. For a service, it might be a name that indicates its function or location, such as "Printer 1."

The Clearinghouse Service requires that all network objects have three-part names, or "fully-qualified" names. The parts consist of the local name of an object or person, a domain name, and an organization name.

Local name The distinguished name of an object, such as a user (Thomas J. Taylor). A distinguished name for a user typically consists of a FirstName, MiddleInitial, and LastName.

Domain name Represents a geographical grouping (a building or city), for example, Chicago. All objects within a domain have the same domain name.

Organization name Typically the company's name or equivalent, such as Xerox.

All objects (whether they are printers, users, or services) are registered in a domain, with domains registered in the organization. Normally, every domain contains at least one Clearinghouse Service, which holds the database containing information about the objects in that domain.

Thus, the object name is followed by the domain name, followed by the organization name, using this format:

Name:Domain:Organization

Example The fully-qualified name of the user for the above is:

Thomas J. Taylor:Chicago:Xerox

For your convenience, there are some shortcuts. If the user is currently using a remote network with the same organization name, the organization name can be omitted.

Example Thomas J. Taylor:Chicago

If you are entering information from a "home" network, both the organization and domain names can be omitted and the distinguished name alone can be used. For example:

Example Thomas J. Taylor

Using aliases

For mailing or logging onto workstations more quickly, the Clearinghouse Service provides the support of aliases.

Example Instead of using the distinguished name Thomas J. Taylor, you can use the alias TTaylor.

Thus, the options for mailing or logging onto workstations can be addressed as either:

TTaylor or Thomas J. Taylor

Note: Users must log on using their fully-qualified name the very first time they log on to their workstations to create a valid desktop.

Fully-qualified names as well as aliases must be unique. No two objects in the same domain can have the same local name.

Refer to the procedure "Adding users" in the "Setting up your Clearinghouse" section for information to add aliases.

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2. Commands

This chapter lists all the Clearinghouse Service commands. The commands below are listed in alphabetical order, followed by a brief explanation. To address the Clearinghouse Service commands, you must be in the Clearinghouse Service context.

Add Alias Available to the enabled user when the Clearinghouse Service is started or stopped. Assigns an alias for a specific object registered in the Clearinghouse database. This is especially convenient in the case of users, who are typically given at least one alias matching their last names.

Add Domain Available to the enabled user when the Clearinghouse Service is stopped. Used to add a new domain to the local database through replication or creation.

Add Group Available to the enabled user when the Clearinghouse Service is started or stopped. Used to create user groups.

Add Member Available to the users who have Administrative or Self access to a group when the Clearinghouse Service is started or stopped. Used to add members to user groups. The wild card asterisk can be used with this command.

Add Print Service Available to the enabled user when the Clearinghouse Service is started or stopped. Allows you to manually register a service, such as a 9700 Electronic Printing System, which is not capable of self-registration. Requires the preceding use of the **Enable Manual Registration** command.

Add User Available to the enabled user when the Clearinghouse Service is started or stopped. Used to create user entries.

Add Workstation Available to the enabled user when the Clearinghouse is started or stopped. Used to identify workstations by name rather than by their net and processor numbers.

Backup Available to the enabled user when the Clearinghouse Service is stopped. Enables manual backup of a Clearinghouse database. This command is disabled when the Clearinghouse Service detects other Clearinghouse Services on the same internetwork.

Change Default Available to the logged on user when the Clearinghouse Service is started or stopped. Used to modify the default domain and organization names for Clearinghouse Service commands to any domain and organization in the internet. System Administrators can then perform operations on any domain without having to connect to the corresponding Clearinghouse Service.

The default domain is initially the domain of the server housing the Clearinghouse Service. Does *not* change the domain or organization names of the server, only the defaults for

Clearinghouse Service commands. System Administrators sometimes believe they are inquiring about one domain when the default is actually set for a different domain. Before performing an operation that will change any data, use the **Show Default** command to ensure that the operation will be performed on the desired domain.

Note: You cannot gain access to Clearinghouse Service commands requiring System Administrator access unless you are a logged on and enabled user who has Administrative access to the server's domain. If you find that the "enable" operation fails, you are probably logging on and enabling at a server which is registered in a domain to which you do not have domain access.

Change Domain Access — Available to the enabled user when the Clearinghouse Service is started or stopped. Used to grant or revoke System Administration access for a specific domain. Requires Administrative access to the specified domain.

Change Group Access — Available to the logged on user when the Clearinghouse Service is started or stopped. Grants or revokes access to a user group. Any user having Administrative access to the group can revoke the Administrative access of any other user (including Domain Administrators).

Change Organization Access — Available to the enabled user when the Clearinghouse Service is started or stopped. Grants or revokes Administrative access to an organization so that access controls of an organization can be changed. An Organization Administrator has the power to create new domains within that organization, and to designate other Organization Administrators. It requires that the involving user has Administrative access to the organization.

Change Password — Available to the logged on user when the Clearinghouse Service is started or stopped. Allows a user to change his or her own password, or a Domain Administrator to change the passwords of others.

Change Print Service — Available to the enabled user when the Clearinghouse Service is started or stopped. Allows you to manually modify information on a service, such as a 9700 Electronic Printing System, which is not capable of self-registration. Requires the preceding use of the **Enable Manual Registration** command.

Change User — Available to the enabled user when the Clearinghouse Service is started or stopped. Allows you to modify a user entry.

Compare Databases — Available to the enabled user when the Clearinghouse Service is started or stopped. Merges two Clearinghouse Systems following the establishment of an Internetwork Routing Service link between their respective internetworks. The **Compare Databases** command can also be manually typed to correct inconsistencies (for example, when a password is changed, but the change does not take effect).

Delete — Available to the enabled user when the Clearinghouse Service is started or stopped. Applies to all object types. Its primary use is to delete objects that are manually registered by the System Administrator, such as users and groups.

Delete Alias — Available to the enabled user when the Clearinghouse Service is started or stopped. Eliminates an alias for a specific object

registered in the Clearinghouse database without disturbing the object itself.

Delete Domain Available to the enabled user when Clearinghouse Service is stopped. Removes all copies of the specified domain from the Clearinghouse Service in which the command is invoked. When the last copy is deleted, the domain ceases to exist. If the domain was the last one in its organization, the organization is deleted as well. Requires Administrative access to the domain and organization if the last copy of the domain or organization is deleted.

Delete Member Available to the logged on user when the Clearinghouse Service is started or stopped. Deletes a member of a group. Requires the appropriate access (Administrative or self) to the group.

Enable Manual Registration Available to the enabled user when the Clearinghouse Service is started or stopped. Enables a single manual registration command (such as **Add Print Service** or **Change Print Service**), and must be repeated if multiple manual commands are to be invoked.

List <Service Type> Available to any user when the Clearinghouse Service is started or stopped. Displays a list of the services of the specified type registered with the Clearinghouse Service.

Note: This command is not available for the Server Monitor Service.

List Domains Available to the logged on user when the Clearinghouse Service is started or stopped. Displays a list of all domains in the database that match a specified pattern. The pattern supplied to this command is a two-part pattern (domain and organization) that can have the wild card asterisk in the domain part only. The organization part, if supplied, must be a literal name (for example, "*: Acme").

List Groups Available to the logged on user when the Clearinghouse Service is started or stopped. Displays a list of the groups registered with the Clearinghouse Service that match a specified pattern. The pattern supplied to this command can only have the wild card asterisk in the local name. The domain and organization parts, if supplied, must be literal names (for example, "*:Boston:Acme").

List Members Available to the logged on user when the Clearinghouse Service is started or stopped. Displays a list of group members that match a specified pattern. The pattern supplied to this command can have the wild card asterisk, if desired.

List Organizations Available to the logged on user when the Clearinghouse Service is started or stopped. Displays a list of organizations registered with the Clearinghouse Service that match a specified pattern. The pattern supplied to this command is a one-part organization name pattern; it can contain the wild card asterisk, if desired.

List Users Available to the logged on user when the Clearinghouse Service is started or stopped. Displays a list of the users registered with the Clearinghouse Service that match a specified pattern. The pattern supplied to this command can only have the wild card asterisk in the local name. The domain and organization parts, if supplied, must be literal names (for example, "*:Chicago:Acme").

Restore Available to the logged on user when the Clearinghouse Service is stopped. Similar to the **Backup** command, it enables manual restoration of a Clearinghouse database. This command is disabled when the Clearinghouse Service detects that there are other Clearinghouse Services on the same internetwork.

Show <Service Type> Available to the logged on user when the Clearinghouse Service is started or stopped. Displays detailed information on a specific service of the specified type.

Show Default Available to the logged on user when the Clearinghouse Service is started or stopped. Used to examine the default domain and organization names for Clearinghouse Service commands.

Show Domain Available to the logged on user when the Clearinghouse Service is started or stopped. Displays the size in disk pages, replication status, and access control settings of the specified domain.

Note: It is not recommended to use asterisks when specifying a domain (example: *:Los Angeles). This could occupy the server anywhere from 15 minutes to 3 hours. The information displayed would correspond to an unidentified domain with a name matching the pattern.

Show Group Access Available to the logged on user when the Clearinghouse Service is started or stopped. Allows any user to examine the access controls of a specified group.

Show Organization Available to the logged on user when the Clearinghouse Service is started or stopped. Displays the replication status and access control settings of the specified organization.

Show Status Available to any user when the Clearinghouse Service is started or stopped. Displays the status of the Clearinghouse Service and its local database, including database usage and time since last restart.

Show User Available to the logged on user when the Clearinghouse Service is started or stopped. Allows you to inspect the information for a given user.

3. Setting up your Clearinghouse Service

After you have installed Clearinghouse Service software as described in the *Server Software Installation* booklet in the *Network Basic Services* volume, you can set up the Clearinghouse Service. If your network has more than one server, you are strongly encouraged to replicate your local domain. After replication procedures are completed, you can add users and information to the Clearinghouse Service database.

The section titled "What is domain replication?" provides information on replication. This feature enables you to duplicate the total Clearinghouse database to multiple servers, providing enhanced reliability, availability, and efficiency. In the event that a Clearinghouse is damaged, it can be quickly restored by copying the information from another server holding a copy of the database.

Two additional sections titled "What are access controls?" and "What are groups?" provide the information needed before you set up and maintain your Clearinghouse Service.

It is important that you read through these sections before you do the procedures.

This information is contained in this section:

- What is domain replication?
- What are access controls?
- What are groups?
- Initializing the Clearinghouse Service
- Replicating domains
- Adding users
- Adding user groups

After these procedures are completed, refer to the "Maintaining your Clearinghouse Service" section for tasks to keep your Clearinghouse Service running, as well as a listing of Clearinghouse Service commands.

Comment: Use the forms contained in Appendix A to organize the information you need to set up your network.

What is domain replication?

The various Clearinghouse Services located around the internetwork actively cooperate to form a unified Clearinghouse System. The main benefit of this distributed approach is domain replication. Domain replication is the preferred means of insuring reliable storage of its database.

Domain replication enables duplication of each domain on multiple servers. That means you can store a collection of information about users and servers in a specific domain on two or more other servers. If the database of any Clearinghouse is damaged, it can be restored by copying the information from another server holding a copy of the domain. In this way, replication provides:

- Availability of the domain information despite server or communication failures.
- Efficiency of access to the database despite geographically dispersed access patterns.
- Reliability of the database despite inadvertent damage to any copy of the domain information. Replication also eliminates the need for manual backup of the database.

If a Clearinghouse Service database is lost, it can be rebuilt by reinitializing the Clearinghouse Service and then copying into it all the domains which previously resided there.

Note: In very small installations, there may be only a single server on which the Clearinghouse Service can run. In these circumstances, manual backup and restoration of the database on a File Service must be performed. (Refer to the "Backing up a single Clearinghouse Service" procedure in the "Maintaining your Clearinghouse Service" section for complete details.)

Replication configuration

When to create a new domain

A domain usually holds a collection of users and their associated resources to form a community that interacts with each other. Domain and organizational boundaries should correspond to stable groupings. Often when a new Ethernet and its equipment are installed, it is better to expand to a nearby existing domain than to create a new one. In cases where there is no appropriate existing domain (for example, the site's first Ethernet network is installed, or when a new Ethernet will connect to its parent company) a new domain should be created.

- Refer to the "Running and initializing the Clearinghouse Service" procedure in the *Server Software Installation* booklet (part of the *Network Basic Services* volume) to create a new domain.

- Refer to the "Renaming or merging domains" section in this booklet for complete information about renaming or merging domains.

When to add a copy of a domain

The need for increased reliability, availability and efficiency, described earlier, are all factors that may influence the decision to replicate domains.

- Reliability - If many user, group, and machine entries for a domain are being changed each day, and the disk on the only Clearinghouse server in the internetwork fails, it would be time consuming to re-enter all the changes that occurred between the time of the last backup and the time of the failure.

- Availability - Many network resources are unavailable when all Clearinghouse Services for a domain are unavailable. Adding the domain to many Clearinghouse Services increases availability of the domain. However, it also increases both the amount of disk space devoted to the Clearinghouse system and the amount of work that the system must do to answer user queries, and still maintain consistency of the distributed database. For these reasons, it is important to balance the need for availability and the desire to make the best use of available resources.

- Efficiency - Users accessing a domain that does not reside on their local Ethernet need to wait longer to access the domain across internetwork lines. Replication helps to eliminate this time delay.

Configuration guidelines

A domain can reside at multiple Clearinghouse Services. Each Clearinghouse Service can hold multiple domains in its local database. You need to select an appropriate configuration of domains at each Clearinghouse Service. Here are several considerations to help you determine your replicating configuration:

- Each Ethernet network should have an attached Clearinghouse Service containing its local domain.
- Each domain must be replicated on at least two Clearinghouse Services to provide reliability and availability in case of server malfunction.
- Heavily used remote domains should be replicated near the site of their usage. If a particular remote domain is popular among local users, it is a good idea for the local System Administrator to arrange for a copy of that domain to be placed on the local Clearinghouse Service.
- It is important to occasionally monitor the global configuration of the Clearinghouse System's total database, checking for reasonable distribution of the various replicated domains. In general, a domain should be replicated on two to five Clearinghouse Services.

Note: Failure to replicate a domain on at least two Clearinghouse Services leaves it vulnerable, while over-replication (on more than five Clearinghouse Services) consumes excessive amounts of server disk space and increases the overhead of update propagation.

How to add a copy of a domain

A domain can be copied as long as there is at least one Clearinghouse Service available that serves that domain. Refer to the procedure entitled "Replicating domains."

What are access controls?

Most Clearinghouse Service tasks are done by the System Administrator. However, users can access the Clearinghouse to change their own passwords or to change group membership when authorized to do so.

This is done by administering access controls. Access controls are used to grant users the privilege of changing limited information in the Clearinghouse database. There are two kinds of access privileges to Clearinghouse data. Users are granted:

- *Administrative (Admin) access* - Allows users to change any information on a given object in the Clearinghouse database.
- *Self access* - Allows users to add themselves to, or remove themselves from groups, without allowing any other kind of changes. (Applies to user group entries only.)

Every user that is added to the Clearinghouse database inherits self access privileges for their own password only. Users may wish to change their passwords for general security.

Refer to the "Changing information about users" procedure in the "Maintaining your Clearinghouse Service" section for commands to update user entries.

Description of Clearinghouse Service access controls

The types of access to be controlled include:

Access to domains

Administrative access to a domain allows creation and deletion of entries in the domain. It allows copying of the domain among multiple Clearinghouse Services, deletion of copies of the domain, and changing the access controls for the domain.

A user with administrative access to a domain is called a *Domain Administrator.* A Domain Administrator can create and delete entries in the domain, copy the domain among multiple Clearinghouse Services, and delete the entire domain.

The access controls for a domain can be changed by a Domain Administrator through the **Change Domain Access** command.

Access to organizations

A user with administrative access to an organization is called an *Organization Administrator.* An Organization Administrator can create domains in the organization, as well as change access controls for the organization. The last copy of a domain of the organization can only be deleted by the Organization Administrator.

Access for an organization can be changed by an Organization Administrator through the **Change Organization Access** command.

Note: The creation of organizations themselves is controlled and authorized using a special organization-specific password issued by Xerox.

Access to users

A user has both administrative and self access controls to their own user password.

A Domain Administrator is given admin access to all user entries in the domain. A Domain Administrator can modify the fields of the user entry (description, password, and so forth) and change user mailboxes.

Users are given self access to their own entries. Self access allows the user to modify his or her password.

The access controls on a user entry cannot be changed.

Access to user groups

A user group has both administrative and self access controls.

A user with Administrative access to a group is called a *Group Administrator.* A Group Administrator can add and delete members of the group. When a group is first created, no one has administrative access. The Domain Administrator is given administrative access until an explicit assignment is made.

Self access to a group allows its possessors to add or delete only themselves as members.

The access controls for a group (both administrative and self) can be changed by a Group Administrator through the **Change Group Access** command.

Refer to the following section "What are Groups?" for information on group usage.

Access to Services and other entries

Entries in a domain (other than users and user groups) have only administrative controls.

A variety of entries are registered in the Clearinghouse Service by the self-registration of other services. The registration of these entries requires that the administrator invoking the self-registration have administrative access to the containing domain. Thereafter, administrative access to the domain gives administrative access to the entries themselves, allowing deletion and changes through the appropriate commands supported by the respective services.

The access controls on entries in a domain (other than user groups) cannot be changed.

What are groups?

You can register a collection of users as a user group in the Clearinghouse Service. Creating a group allows the entire collection of users to be specified by group name, eliminating the need to enter names separately. For example, a group named "Training" might include the members J.Harold, B. Smith, and T. Watson, and so forth. Create groups for:

- File drawer access control
- Mailing distribution lists
- Members of larger groups

The following paragraphs provide guidelines for setting up and using groups. (Refer to the "Adding user groups" procedure to register user groups in the Clearinghouse database.)

Membership in a group

A group consists of a collection of members, which can include individual users, other groups, and/or patterns. Use the **Add Member** command to:

- Add an individual user as a member by entering the user's name at the "Member" prompt. For convenience, you can use the user's alias.
- Add a smaller group as a member of a larger one by entering its name at the "Member" prompt. In this case, all members of the smaller group will be considered members of the larger one.

  Note: Using an alias when adding a smaller group to a larger group can cause incorrect results when the **List Members** command is directed to the larger group. For example, if "DocCtrl:Baltimore" is an alias for the group called "Documentation Control:Baltimore," and "DocCtrl:Baltimore" is a member of the "Everybody:New York" group, inaccurate results may occur when the **List Members** command is directed to "Everybody:New York." This problem occurs because "DocCtrl" and "Documentation Control" are in a different domain than "Everybody."

- Add a pattern as a member of a group. A pattern is a name containing one or more asterisks. The asterisk is treated as a wild card and matches any character or group of characters. (This is for the addition of user names only, and does not apply for the addition of group names.) For example, if just an asterisk is typed at the "Member" prompt, all users in the default domain are considered members of the group.

Example The following examples illustrate more general forms of patterns in groups:

- If *:Chicago:Acme is entered at the "Member" prompt, all users in the domain Chicago:Acme are considered members of the group.
- If *:*:Acme is entered at the "Member" prompt, all users in the organization Acme are considered members of the group.
- If *:*:* is entered at the "Member" prompt, all users in the entire internetwork are considered members of the group.

There are some restrictions on the patterns that can be added to groups. If you use an asterisk for the domain name, an asterisk must also be used for the local name. Similarly, if you use an asterisk is used for the organization name, an asterisk must also be used for both the domain and local names. Thus:

Patterns that can be used	**Patterns that cannot be used**
*:Chicago:Acme	*Smith:Chicago:Acme
::Acme	Smith:*:Acme
::*	*:Chicago:*

Refer to the "Access controls on groups" paragraphs for further guidelines for using patterns in groups intended for mail distribution.

It is recommended that a group contain only a single pattern and be named to reflect this fact.

Example A group named "All Chicago" could contain the single pattern *:Chicago:Acme, representing all users in the domain Chicago:Acme.

Another recommended convention for setting up groups is to follow a hierarchical structure. Your own departmental organization, typically detailed in an organization chart, is a good example.

For instance, suppose your Customer Support Division contains a Training Department and a Service Department. You can create two groups, "Training" and "Service," and add the appropriate individuals as members of each group. To represent the division, you create a third group called "Customer Support" and add the "Training" and "Service" groups as members. Later, if you delete a member from the "Training" group, he or she automatically ceases to be a member of the larger "Customer Support" group. It is easier to maintain a hierarchical set of groups than an equivalent number of unstructured groups.

Access controls on groups

Each user group has one or a few individuals who are responsible for the group and have Administrative access to it. They are referred to as the Group Administrators, and they can change both the membership and the access controls of the group. By choosing a setting for the group's self access controls, the Group Administrators effectively place the group into one of three categories:

- *Open group* - Self access allows users to join or leave the group at will.
- *Closed group* - Self access is granted only to the group itself, allowing members to leave the group, but preventing non-members from joining. New members can be added only by the administrators.
- *Controlled group* - Self access is not granted to anyone. Members join and leave the group only by action of the administrators.

The Domain Administrator is granted implicit administrative access automatically. When a user (other than the Domain Administrator) is granted explicit administrative access, the Domain Administrator loses his or her implicit administrative access. If the Domain Administrator wishes to retain administrative access to the group, he or she should first grant explicit administrative access to himself or herself.

Usage of groups

Use the groups for mailing and/or for file drawer access control. The following paragraphs provide guidelines for using groups in these ways.

- *Mail groups* - Groups used as mail distribution lists can contain patterns with asterisks in the local name part only; asterisks in the domain or organization field are not allowed. Thus:

  Patterns that can be used/Patterns that cannot be used

*:Chicago:Acme	*:*:Acme
	::*

  In terms of access control, you can use any type of group for mail distribution: open, closed or controlled.

- *Access control groups* - Groups used for access control can contain any type of members: users, groups or patterns. It would probably be unwise to use an open group for access control, since anyone could join such a group and obtain the group's access privileges. Generally, only closed and controlled groups should be used as access control groups.

  Note: The average time required to decide if a name is a member of some group increases with the number of names contained directly or indirectly (by nesting) in the group. A group containing 100 individual names will probably lead to

unacceptable access checking times. Patterns can be used to efficiently describe a large number of individuals. Using heavily nested groups (i.e., groups containing groups containing groups) for popular access control groups is not recommended.

- *Combination mail and access control groups* - Groups used for both mail distribution and access control should follow both sets of guidelines given above.

Initializing the Clearinghouse Service

The first time the Clearinghouse Service runs, you are prompted to name it. When it is named, an empty database is created.

Be sure you have performed the procedures described in the *Server Software Installation* booklet in the *Network Basic Services* volume before you begin.

Procedure

1. After running the Clearinghouse Service, you will be prompted to type the one-part name for the Clearinghouse Service in response to the "Name" prompt. Press <RETURN>. The name you enter must be a unique name among all Clearinghouse Services in the entire internetwork. (Do not type in domain and organization names.)

2. Type **Y** or **N** to the "Is this the first Clearinghouse server on the internet?" prompt and press <RETURN>.

   - If you respond **Y**, it initializes its database as the beginning of an entirely new Clearinghouse System.

   CAUTION: Do *not* respond **Y** if you are adding a new Clearinghouse Service to an existing internetwork.

   - If you respond **N**, your Clearinghouse Service must wait until another Clearinghouse Service can be located so that it can obtain information regarding the existing Clearinghouse system of which it is becoming a new member. (In this case, it is important to install the Internetwork Routing Service connection to the existing internetwork before attempting installation of the Clearinghouse Service. Refer to the *Internetwork Routing Service* booklet for details.)

```
Opening Clearinghouse Service database.
This Clearinghouse Service has not been named. Please enter its name.
    Name: Angel[RETURN]
Is this the first Clearinghouse server on the internet? (Y/N): N[RETURN]
```

Note: The "Is this the first Clearinghouse server on the internet?" prompt appears only if no other Clearinghouse Service can be contacted.

At this point, the message "Clearinghouse Service functions are now available to network" displays. Its new database is of little use until one or more domains have been loaded into it. Continue with the following procedure specific to your situation:

- If this is the first Clearinghouse Service on a new network, perform the procedure entitled "Making a Clearinghouse domain available" in the *Server Software Installation* booklet in the *Network Basic Services* volume, and then continue with the "Replicating domains" procedure.

- If you already have a Clearinghouse Service installed on your network, continue with the "Replicating domains" procedure.

Once your Clearinghouse Service is initialized, it should never again ask for its name when it is run. If this happens, you must boot the server, select a non-normal startup, interrrupt before running services, and enter the **Show Backstop Log** command.

- If the last entry in the log is an uncaught signal from the "CHAdminAImpl" module, and the signal index is 14B (12 in decimal) or the program counter is within 10 of 64141B or 65651B, type **Proceed**. When the Clearinghouse prompts for its name, enter a new name.

- If this signal is not mentioned, type **Proceed**. When the Clearinghouse prompts for its name, enter its previous name.

Replicating domains

You can increase the reliability, availability, and efficiency of your Clearinghouse system by replicating your domain to one or more Clearinghouse Services.

Note: Be sure you read the section titled "What is domain replication?" for a basic understanding of database replication before you continue with this procedure.

The destination Clearinghouse Service must contain sufficient space before you replicate your domain. If the Clearinghouse Service is on another network, replication involves two administrators: the System Administrator of the other domain, and you as the Domain Administrator.

Before you replicate your Clearinghouse database, keep the following information in mind.

- These same steps are used to copy another domain to your Clearinghouse Service.
- The Clearinghouse Service must be stopped while adding (or deleting) a domain. Therefore, this should be done at off-peak hours.
- If you plan to add a copy of an existing Clearinghouse domain residing on a different network, you must take steps to initialize the Internetwork Routing Service before you copy the domain. Have the Domain Administrator on the other network give you temporary Domain Administrator access to his or her domain.

Use Procedure A to prepare for replication to a remote Clearinghouse; then use Procedure B to replicate the domain.

Procedure A. Preparation for replication

To prepare for database replication, contact the remote System Administrator and supply the following information:

1. The size of your Clearinghouse database, to verify that adequate space is available on their Clearinghouse database. (The commands **Show Status** and **Show Domain** can be used to determine if adequate space is available.)

2. The name of your domain.

Note: The System Administrator of the destination domain (the domain which is to receive a replicated copy of the source domain) must first be given temporary Domain Administrator access to the source domain. If the source domain resides in a different organization than the destination domain, the System Administrator must also be given temporary Organization Administrator access to the source organization.

Procedure B. Replicating domains

This procedure is performed by the System Administrator where the new copy of the domain is to reside.

1. Type **Clearinghouse Service** and press <RETURN>.

2. Type **Stop Service** and press <RETURN>.

3. Type the number corresponding to the Clearinghouse Service and press <RETURN>.

4. Type **Y** to the "Stop Immediately?" prompt and press <RETURN>. Answering **Y** means all Clearinghouse Service functions will be unavailable to the network.

```
CHS! Stop ServiceRETURN
    Select Choices
    1  Clearinghouse Service
    2  Internetwork Routing Service
    Enter one or more choices: 1RETURN
    CHS: Stop Immediately? (Y/N): YRETURN
    Stopping Clearinghouse Service.
    Clearinghouse Service functions are now unavailable to the network.
CHS!
```

5. Type **Add Domain** and press <RETURN>.

   Note: When a new domain is replicated, this information propagates to all database instances that include the containing organization.

6. Type the name of the domain you wish to copy and press <RETURN>. If the domain is accessible, it will be copied to the server.

   Note: Be sure the system is copying and not creating a new domain.

7. Type **Y** to the confirmation prompt and press <RETURN>. An example appears below.

```
CHS!Add DomainRETURN
    Domain Name: DetroitRETURN
Size = 302 pages
    Copying Domain Detroit.Acme to this CHS. Confirm? (Y/N): Y
    RETURN
    Done.
```

8. Type **Start Service** and press <RETURN>.

9. Type the number corresponding to Clearinghouse Service and press <RETURN>.

If the resulting copy is 10 pages or smaller, and the domain you just copied contains entries, then delete that copy and add it again. Check the size of the domain using the **Show Domain** command.

```
CHS!Start ServiceRETURN
    Select Choices
    1   Clearinghouse Service
    Enter one or more choices: 1RETURN
    Starting Clearighnouse Service
Clearinghouse Service functions are now available to network.
CHS!
```

Adding users

The Clearinghouse Service is where information about network users is registered. Only after a user is registered can he or she use the services available on the network.

In this procedure, you add users to the Clearinghouse database. Use CHS Form 1, Directory of Users on Your Network in Appendix A to record all user information. Check for proper spelling and discuss passwords and aliases with each person. Encourage users to select passwords they will easily remember since they will use them often when logging on. To prevent other users from guessing passwords, non-obvious passwords of six to eight characters are recommended.

Each user may also want at least one brief alias for use in mailing or logging on to his or her workstation more quickly. Make sure that no two users have the same user name or alias. The Clearinghouse Service will not allow a name or alias that is already in use to be added again.

The maximum length for each name, alias, or password is 40 characters. It is recommended that only those characters accessible through the default keyboard be used to compose the name. This excludes the following characters: neutral double quote ("); apostrophe ('); back slash (/); circumflex; grave; vertical bar (|); and tilde (~).

Procedure

1. Complete CHS Form 1, Directory of Users on Your Network, and take it with you to the server running the Clearinghouse Service.

2. Log on and enable in the Clearinghouse Service context.

3. Type **Add User** and press <RETURN>. Respond to the prompts, pressing <RETURN> after each step. The following prompts display:

   - First name (and middle initial, if desired) - Enter the user's first name and middle initial.

   - Last name - Enter the last name of the user.

   - Password - Enter the password. Asterisks appear in place of the actual password to ensure confidentiality.

   - Description - Enter any information you wish, such as the person's office number and telephone number. The maximum length for a description is 100 characters.

   - "Home" File Service - Enter the name of the File Service on which the user will be storing his or her 6085/8010 desktop.

   - Alias - Enter as many aliases as requested by the user. Keep in mind, however, that no two aliases can be the same. When you enter a final alias for a user, press <RETURN> an additional time.

4. Next, the "Confirm this user information?" prompt is displayed. Type **Y** and press <RETURN> to display the following information.

5. If you type **Y** to the "Add another user?" prompt, all the prompts for information are repeated for another user.

6. Continue this process until you have added all the names listed on CHS Form 1, Directory of Users on Your Network.

```
CHS!Add UserRETURN
    First Name (and Middle Initial, if desired): Joyce MRETURN
    Last Name: SmithRETURN
    Password: ******RETURN
    Description: Extension 2082RETURN
    "Home" File Service: FoxdaleRETURN
    Alias: JSmithRETURN
    Alias: JMSRETURN
    Alias: RETURN
Confirm this user information? (Y/N): YRETURN
Done. Joyce M. Smith:Unit1:GemSysCo (User) added.
Add Another User? (Y/N): NRETURN
```

Adding user groups

Create user groups in the Clearinghouse Service to enable a collection of users to be specified by one name. User group names can be used to specify file drawer access controls and mailing distribution lists.

Note: Refer to the section entitled "What are user groups?" for information on using groups, and to the "Changing group access controls" section in "Maintaining your Clearinghouse Service" chapter to set access controls on groups.

If you are a Clearinghouse Group Administrator attempting to add yourself to your group's membership list, you must have self access privileges, or the operation will fail.

Procedure

1. Complete CHS Form 2, Group/Distribution List in Appendix A, and take this form with you to the server supporting the Clearinghouse Service.
2. Log on and enable in the Clearinghouse Service context.
3. Type **Add Group** and press <RETURN>.
4. Type the name of the group at the "Name" prompt and press <RETURN>.
5. Type any information you wish at the "Description" prompt and press <RETURN>. (The default is "None.")
6. Type **Add Member** and press <RETURN>.
7. Use your completed CHS Form 2 to respond to the prompts. Press <RETURN> after each response.
8. Use the **Change Group Access** command to create group access lists if desired.

Note: The members of a group may be registered in the same domain as the group itself, or they can be registered in another domain or organization. The group commands are **Add Group**, **List Groups**, **Show Group Access**, and **Change Group Access**. Use the global **Delete** command to delete groups (and other objects). The member commands are **Add Member**, **Delete Member**, and **List Members**.

4. Maintaining your Clearinghouse Service

This section describes tasks that are necessary to keep your Clearinghouse Service running smoothly. Domain replication is used for large network systems. If you have a very small network where domain replication is not possible, it is essential that you perform the "Backing up a single Clearinghouse Service" procedure.

Other maintenance activities include updating information in the database, such as changing information about users or adding members to groups. Remaining procedures, such as removing unwanted Clearinghouse Services from a server and expanding the size of the Clearinghouse database, are done on an as-needed basis only.

Note: Refer to the "Setting up your Clearinghouse Service" section if you wish to replicate your domain or add users to the Clearinghouse database.

These topics are contained in this section:

- Backing up a single Clearinghouse Service
- Restoring a damaged local database
- Changing information about users
- Maintaining groups
- Changing group access controls
- Deleting users, groups, or other registered objects
- Merging internetworks
- Removing the Clearinghouse Service from a server
- Expanding the Clearinghouse database
- Deleting copies of domains
- Creating domains
- Correcting domain inconsistency
- Manually updating Clearinghouses connected via dial-up links

Backing up a single Clearinghouse Service

This procedure describes how to back up a single Clearinghouse Service. The Clearinghouse Service **Backup** and **Restore** commands are used only for single networks consisting of one Clearinghouse Service. They let you manually create up-to-date backup copies of the local Clearinghouse database.

This backup procedure causes the entire Clearinghouse database to be saved in the Clearinghouse file drawer on a File Service. As regular File Service backup is run, the Clearinghouse database is saved along with all other files contained in the File Service.

If your network contains multiple Clearinghouse Services or is part of a larger internetwork, this feature will be disabled. Refer to the "Replicating domains" procedure to replicate your Clearinghouse Service to protect the Clearinghouse data.

Frequency of running backup

Run backup when your Clearinghouse Service is first created, and then again whenever the database is updated or changed. This ensures that you maintain a current file of all database information. This information is used if a major problem occurs, such as damage to the server housing your Clearinghouse Service.

Note: Before you run backup, create a Clearinghouse file drawer in the File Service on which you wish to back up the Clearinghouse database, specifying 0 for storage limit. (This implies that there is no limit on the number of pages the file drawer can occupy.) Give yourself full access to the Clearinghouse file drawer (read, write, add, and remove) so that you can perform backup and other related functions. If you have established an administrative user group, grant full access to this group so that other administrators will also be able to perform Clearinghouse backup.

Backup cannot complete successfully if there is not enough free space. Routinely check the free space which remains in your backup file drawer by using the File Service command **List File Drawers**. Refer to the "Listing file drawers" section in the *File Service* booklet for details.

Procedure

1. Log on and enable in the Clearinghouse Service context.
2. Type **Backup** and press <RETURN>.
3. Type the File Service name next to the prompt and press <RETURN>.
4. Log off from the Clearinghouse context.

```
CHS!Backup[RETURN]
    File Service: Dartmouth[RETURN]
Opening connection to File Service...Done
Storing this database on the File Service...Done
Database backed up.
```

Note: The Clearinghouse Service keeps one or two copies of the most current backup data, depending on space available, and discards older versions with each backup process.

Restoring a damaged local database

If the Clearinghouse Service has a damaged local database, the server will usually malfunction. When this occurs, you need to restore the database. Follow the appropriate procedure to restore the damaged database, depending on the configuration of your Clearinghouse Service.

- If your domain is replicated, recover a lost database by using the **Add Domain** command to get a copy of your domain stored on another Clearinghouse Service. Refer to Procedure A below.
- If your Clearinghouse Service is the only Clearinghouse Service on a single network, use the **Restore** command to get a copy of the latest Clearinghouse backup data stored in the File Service. Refer to Procedure B below.

Note: If the server rigid disk was irretrievably damaged, you need to repartition the disk, reinstall required software, and then activate the Clearinghouse Service. If only the Clearinghouse Service database was damaged, you need to expunge the Clearinghouse Service as instructed below, and then reinstall it using the steps in either Procedure A or B.

Procedure A. Restoring a replicated domain

1. Log on and enable.
2. Type **Stop Service** and press <RETURN>.
3. Type the number(s) corresponding to all services running on the server and press <RETURN>.
4. Boot the server.
5. Type **N** to the "Normal Startup?" prompt and press <RETURN>.
6. Type the number corresponding to the "Interrupt before running services" option and press <RETURN>.
7. Log on and enable.
8. Type **Expunge Service** and press <RETURN>. The list of services installed on the server is displayed.
9. Type the number corresponding to the Clearinghouse Service and press <RETURN>.
10. Boot the server again.

    Note: The server must be rebooted to complete the expunge operation.
11. Type **N** to the "Normal Startup?" prompt and press <RETURN>.

12. Type the number corresponding to the "Interrupt before running services" option and press <RETURN>.

13. Log on and enable again.

14. Reinstall software for the Clearinghouse Service. (Refer to the steps in the *Server Software Installation* booklet in the *Network Basic Services* volume.)

15. Type **Run Service** and press <RETURN>.

16. Type the number corresponding to the Clearinghouse Service and press <RETURN>.

17. Type **N** to the "Normal Startup" prompt and press <RETURN>.

18. Type the number corresponding to the "Run, but don't start" option and press <RETURN>.

19. Type a *new name* Clearinghouse Service to replace the damaged Clearinghouse Service in response to the "Name" prompt and press <RETURN>.

    Note: Be sure the name is different from the one used for the previous Clearinghouse Service. This is important because the old name remains in the database for 30 days after the expunge.

20. Type **N** to the "Is this the first Clearinghouse on the net?" prompt.

21. Type **Clearinghouse Service** and press <RETURN>.

22. Type **Add Domain** and press <RETURN>. Enter the name of the first domain you wish this Clearinghouse Service to serve. Repeat this step for each domain that is to reside on the restored Clearinghouse Service. (This may require expanding the database; refer to the procedure entitled "Expanding the Clearinghouse database.")

23. Type **Start Service** and press <RETURN>.

24. Type the number corresponding to Clearinghouse Service and press <RETURN>.

25. Type **Compare Databases** and press <RETURN>.

    Note: The first time you use **Compare Databases**, press <RETURN> to the "Remote CHS name" prompt. The system will then ask for the Remote CHS address (the net number and processor number).

```
CHS!Add Domain[RETURN]
    Domain: Los Angeles[RETURN]
Size = 902 pages
Copying Domain Los Angeles:Acme to this CHS. Confirm? (Y/N): Y[RETURN]
Done.

CHS!Start Service[RETURN]
    Select Choices
    1  Clearinghouse Service
    2  Internetwork Routing Service
    3  File Service
    Enter one or more choices: 1[RETURN]
Starting Clearinghouse Service.
Clearinghouse Service functions are now available to network.
CHS!
```

26. Type **Proceed** and press <RETURN> if you have other services running on your server.

Procedure B. Restoring a single Clearinghouse database

CAUTION: If the Clearinghouse database and the File Service on which it is backed up are on the same server, and if that server had a major failure, it is necessary to restore the File Service before restoring the Clearinghouse database. Refer to the "Restoring the File Service data" procedure in the *File Service* booklet.

1. Perform steps 1–12 in Procedure A. Skip step 13, and then do steps 14–18.

2. Type the *previously used* Clearinghouse Service name in response to the "Name" prompt and press <RETURN>.

3. Type **Y** to the "Is this the first Clearinghouse on the net?" prompt.

4. Type **Clearinghouse Service** and press <RETURN>.

5. Type **Add Domain** and press <RETURN>. Respond to the prompts to recreate the lost domain and organization, naming both exactly as they were before. Press <RETURN>.

6. Type **Add User** and press <RETURN>. Respond to the additional prompts to add yourself as a user of this domain.

7. Type **Change Domain Access** and press <RETURN> to retain Domain Administrator privileges.

8. Type **Change Organization Access** and press <RETURN> to regain Organization Administrator privileges.

9. Log on and enable in the Clearinghouse context.

10. Type **Start Service** and enter the number corresponding to the Clearinghouse Service.

11. In order to register the File Service with the newly created Clearinghouse domain, proceed with the appropriate option:

    - If the File Service holding the backup copy is on another server, go to that server and stop all services. Reboot the server and run all services normally.

    - If the File Service is co-resident with the Clearinghouse Service, type **Run Service** and run the File Service. Then type **File Service** to get into the File Service context, type **Offline Volume**, and then type **Online Volume**.

12. Return to the Clearinghouse Service. Type **Restore** and press <RETURN>.

13. In response to the prompt, enter the name of the File Service on which the Clearinghouse database was backed up and press <RETURN>.

14. Next to the "Service name" prompt, enter the name of the Clearinghouse *that you originally backed up* and press <RETURN>. It is very important that you enter the correct name here.

15. In response to the "Please confirm or change this Clearinghouse Service's name" prompt, press <RETURN> to confirm the name.

```
CHS!Restore[RETURN]
    File Service: Dartmouth:LA South[RETURN]
Enter the name of the service to be restored.
    Service name: Melon[RETURN]
Opening connection to File Service. . .Done.
Retrieving database from the File Service...Done.
Restarting the Clearinghouse Service with the new database.
Opening Clearinghouse Service with the new database.
Opening Clearinghouse Service database.
The Clearinghouse database has just been restored; its name may
be wrong.
Please confirm or change this Clearinghouse Service's name.
    Name: Melon[RETURN]
Service is registered.
Warning! The domain LASouth:GemSysCo is not replicated.
Done. Clearinghouse database open.
Clearinghouse Service functions are now available to network.
CHS!
```

When the restoration is complete, you see a message indicating that the Clearinghouse Service functions are now available to the network.

16. Type **Proceed** if there are co-resident services on the server.

17. Log off from the Clearinghouse Service context.

Changing information about users

When you add a user to the Clearinghouse database, you are prompted to supply the following information: full name, password, description, "home" File Service, and alias. Any of this information can be changed when necessary.

The four commands used to change information about a user in the Clearinghouse Service are:

Change User To change description and/or "home" File Service information (for example if a user changes offices). Refer to Procedure A.

Add/Delete Alias To change the set of aliases for a user. Refer to Procedure B.

Change Password To change a user's password. Can be done by the Domain Administrator or by the user. Refer to Procedure C.

Add User/Delete To change a user's existing name. If you wish to change a user's registered name (for example, to reflect a change in marital status), you must give the user a new identity using the **Add User** command and later remove the old identity using the **Delete** command. During the time that both identities exist, you can change all occurrences of the old name to the new one (for example in groups) without loss of data. Refer to Procedure D.

Note: Because a user's fully-qualified name (his or her full name: for example, Matthew W. Bennett) can appear as a member of any number of groups as well as identify his or her desktop and mailbox, changing the distinguished name also involves removing the old name and adding the new user name to all groups of which he or she is a member.

Procedure A. Changing user information

1. If the user's "home" File Service is changed, tell the user to retrieve his or her desktop to a workstation and leave it there until the Clearinghouse Service change has been completed and all Clearinghouse Services serving the domain have noted the change (up to one week for large internets).

2. Log on and enable in the Clearinghouse Service context.

3. Type **Change User** and press <RETURN>.

4. Respond to the system prompts, changing the name and other information as desired. For each prompt, the currently registered information is displayed. If that piece of information:

   - Remains the same, press <RETURN>.

   - Needs to be changed, enter the new information. As you type, the old information will be replaced.

5. Type **Y** and press <RETURN> to confirm the new information.

```
CHS!Change User[RETURN]
    Name: Citizen:Boston[RETURN]
Changing User John Q. Citizen:Boston:Acme
    Description: Software Project Manager[RETURN]
    "Home" File Service: Rose:Boston[RETURN]
    Confirm this User Information? (Y/N): Y[RETURN]
Done. John Q. Citizen:Boston:Acme (User) changed.
```

6. Log off from the Clearinghouse Service context.

Procedure B. Changing a user's alias

1. Log on and enable in the Clearinghouse Service context.
2. Type **Delete Alias** and press <RETURN>.
3. Type the alias and press <RETURN>.
4. Type **Y** and press <RETURN> to confirm the deletion.

```
CHS!Delete Alias[RETURN]
    Alias: JQC[RETURN]
Deleting alias JQC, which stands for John Q. Citizen:Boston:Acme
    Confirm? (Y/N): Y[RETURN]
```

5. Type **Add Alias** and press <RETURN>.
6. Type the user's name and press <RETURN>.
7. Type the new alias and press <RETURN>.
8. Type **N** to the "Add another alias?" prompt and press <RETURN>.

```
CHS!Add Alias[RETURN]
    Add alias for name: Trevor M. Moorehead[RETURN]
Existing aliases are: Moorehead, TMoorehead
    New alias to be added: TMM[RETURN]
Done TMM now stands for Trevor M. Moorhead:Boston:Acme
    Add another alias? (Y/N): N[RETURN]
```

9. Log off from the Clearinghouse Service context.

Procedure C. Changing a user's password

1. Have the user store his or her 6085/8010 desktop at the File Service before the password is changed. The desktop will be retrieved from the File Service at logon, using the new password.

2. Log on and enable in the Clearinghouse Service context. (Users can change their own passwords.)

3. Type **Change Password** and press <RETURN>.

4. Type the user's name and press <RETURN>.

5. Type the new password and press <RETURN>.

6. Type **Y** and press <RETURN> to confirm this information.

```
CHS!Change PasswordRETURN
    Name: Citizen:BostonRETURN
Changing User John Q Citizen:Boston:Acme
    Password: *******RETURN
    Confirm new password? (Y/N): YRETURN
Done. Password changed.
```

7. Log off from the Clearinghouse Service context.

Procedure D. Changing a user's registered name

1. Log on and enable in the Clearinghouse Service context.

2. Type **Add User** and press <RETURN>.

3. Respond to the prompts to add the new information and press <RETURN>.

```
CHS!Add UserRETURN
    First Name (and Middle Name, if desired): Janet L.RETURN
    Last Name: Marigold:Boston:AcmeRETURN
    Password: *******RETURN
    Description: Software Project LeaderRETURN
    "Home" File Service: Whitehorse:DetroitRETURN
    Alias: MarigoldRETURN
    Alias: JLMRETURN
    Alias: RETURN
    Confirm this User information? (Y/N): YRETURN
Done. Janet L. Marigold:Boston:Acme (User) added.
    Add another User (Y/N): NRETURN
```

4. Perform the steps pertinent to the user's situation:

   - If the user is in a group, remove the old name and add the new name to all groups.
   - Make access list changes to the file drawers in which the user has explicit access.
   - If the user has a mailbox, have the user read all his or her mail. Delete the user's current mailbox from the Mail Service, then add the new mailbox with the new name. Inform users on the network of the user's new name so they can address electronic mail properly.

- If the user has a 6085/8010 workstation, ask him or her to store all documents, record files, and folders that are to be saved by moving them to the File Service or copying them to floppy disks. He or she can retrieve these items after the name change is made.

5. Type **Delete** and press <RETURN>.

6. Type the user's old name and domain, separated with a colon, and press <RETURN>.

7. Type **Y** and press <RETURN> to confirm this deletion.

```
CHS!Delete[RETURN]
    Name: Smith:Boston[RETURN]
Deleting Janet L. Smith:Boston:Acme.  This User will no longer be registered.
    Confirm? (Y/N): Y[RETURN]
Done
```

8. Log off from the Clearinghouse Service context.

Maintaining groups

In the "Setting up your Clearinghouse Service" section, you learned how to add groups and members. When you delete or change a user name, these changes must be made to all groups of which the user is a member. To efficiently perform this task, you can maintain a written log listing the registration of members and groups. As members and groups change with your network, this list can help you determine the groups in which an individual is a member. Refer to the "What are groups?" section in the introduction to this booklet.

Note: Keep the following in mind as you maintain group information:

- The Remote System Administration feature can be used to make hardcopy versions of your logs. This can eliminate the need for maintaining handwritten logs.
- When a pattern is added to a group, any user whose name matches the pattern is considered a member of the group, even if the user was registered after the pattern was added. In general, it is best to place each pattern in a special group containing only that pattern (for example, the group titled "All Boston" contains only the pattern "*:Boston:Acme").
- You can enable users to maintain groups. Refer to the "Changing group access controls" procedure. If you wish to add a member, refer to the "Adding user groups"procedure.

Use Procedure A to delete a member, Procedure B to delete a group, Procedure C to display members within a specified group, and Procedure D to display the groups registered in the database.

Procedure A. Deleting a member

1. Log on and enable in the Clearinghouse Service context.
2. Type **Delete Member** and press <RETURN>.
3. Type the name of the group and press <RETURN>.
4. Type the name of the member (members can be users, another group, or a pattern) and press <RETURN>.

   Note: Be sure to use the fully-qualified name. Aliases are not accepted.
5. Repeat steps 2 to 4 for every group from which the member is to be removed. An example appears on the following page.

```
CHS>Delete MemberRETURN
    Group: SysAdmin:BostonRETURN
    Member: John Q. Citizen:Boston:AcmeRETURN
Deleting John Q. Citizen:Boston:Acme from SysAdmin:Boston:Acme
```

6. Log off from the Clearinghouse Service context.

Procedure B. Deleting a specific group

1. Log on and enable in the Clearinghouse Service context.
2. Type **Delete** and press <RETURN>.
3. Type the name of the group to be deleted and press <RETURN>. The group need not be empty to be deleted.
4. Type **Y** and press <RETURN> to confirm this deletion.

```
CHS!DeleteRETURN
    Name: SysAdmin:BostonRETURN
Deleting SysAdmin:Boston:Acme
    This Group will no longer be registered. Confirm (Y/N): YRETURN
```

5. Log off from the Clearinghouse Service context.

Procedure C. Displaying members within a specified group

1. Log on and enable in the Clearinghouse Service context.
2. Type **List Members** and press <RETURN>.
3. Type the group name (members can be users, another group, or a pattern) and press <RETURN>.
4. Log off from the Clearinghouse Service context.

```
CHS>List MembersRETURN
    Group: SysAdmin:BostonRETURN
John M. Catts:Boston:Acme
Jane R. Denker:Boston:Acme
    .
    .
    .
```

Procedure D. Displaying the groups registered in the database

1. Log on and enable in the Clearinghouse Service context.
2. Type **List Groups** and press <RETURN>.
3. Specify the groups by entering the appropriate pattern.

   For example:

   - If you wish to see a list of all groups within the local domain, press <RETURN> after the "Pattern" prompt.
   - If you wish to see specific groups, type the first letter of the group name and the wild card asterisk (for example, for all groups beginning with the letter "A," type **A*** after the "Pattern" prompt) and then press <RETURN>.
4. Log off from the Clearinghouse Service context.

```
CHS>List GroupsRETURN
    Pattern: A*RETURN
A-Team:Boston:Acme
Applications:Boston:Acme
```

Changing group access controls

Users can access the Clearinghouse Service to change their own passwords or group membership when you give them the authorization to do so. This can help free your time for more advanced System Administration duties.

The **Change Group Access** command allows the granting or revoking of administrative or self access to a user group. Administrative access is required for every user group. Initially, Domain Administrators have such access and can use the **Change Group Access** command to delegate the authority to other users.

Note: Domain Administrators always retain the power of deletion of any user group, whether they have Administrative access to it or not.

Refer to the sections entitled "What are access controls?" and "What are groups?" for a description of access controls and how they are used for groups.

Procedure

1. Log on and enable in the Clearinghouse Service context.
2. Type **Change Group Access** and press <RETURN>.
3. Type the name of the group you wish to change the access controls for and press <RETURN>.
4. Type the name to the "Access by" prompt and press <RETURN>.
5. Type **Y** or **N** to the "Admin Access?" prompt and press <RETURN>.
6. Type **Y** or **N** to the "Self Access?" prompt and press <RETURN>.
7. Type **Y** if you wish to change another access list entry and press <RETURN>.
8. Log off from the Clearinghouse Service context.

Deleting users, groups, or other registered objects

Use the **Delete** command when you no longer wish to have a user or object registered in the Clearinghouse database. The **Delete** command applies to all object types. Its primary use is to delete objects that you manually register, such as users and groups. You can also use it to eliminate entries registered automatically by service self-registration.

Note: If you are a Clearinghouse Group Administrator attempting to delete yourself from your own group, you must have self-access privileges.

Procedure

1. Log on and enable in the Clearinghouse Service context.
2. Type **Delete** and press <RETURN>.
3. Type the object name and press <RETURN>

   Note: You can enter an alias to the "Name" prompt to delete the object named by that alias, as shown in the example below. If only the alias is to be removed and the object left registered, use the **Delete Alias** command.
4. Type **Y** and press <RETURN> to confirm the deletion.

```
CHS:Delete[RETURN]
    Name: Citizen:Boston[RETURN]
Deleting John Q. Citizen:Boston:GemSysCo. This User will no longer be registered.
    Confirm? (Y/N): Y[RETURN]
Done
```

5. Log off from the Clearinghouse Service context.

Merging internetworks

At some point you may want to combine your internetwork with another to form one large internetwork. You can do this by establishing a link between a pair of Internetwork Routing Services (one on each internetwork). The Clearinghouse software merges the two internetworks' Clearinghouse databases into one. Merging internetworks is considered a permanent connection and should never be done for temporary situations. There is no procedure to divide the merged database back into two separate databases. Note the following considerations:

- Merging two disjoint XNS networks by bringing up an Internetwork link between one IRS on one of the networks, and one IRS on the other network places a heavy burden on all of the Clearinghouses in both networks. This is because the globally distributed portion of every Clearinghouse database in the resulting merged network must be updated. Before attempting a merge, consult your Xerox representative.

- Because all Clearinghouse services work to keep each other informed about changes to the distributed databases, it is imperative that communication links be maintained and routinely checked for reliability. Refer to the *Internetwork Routing Service* booklet for guidelines on maintaining reliable links.

- This procedure is not an alternate to replicating Clearinghouses.

- This procedure should be done during off-peak hours. The Domain Administrator of each domain must perform this procedure. The two individuals should be in contact by telephone to ensure they use the **Compare Databases** command simultaneously.

- Two internets which have one or more domain names in common cannot be merged.

Procedure

To merge internetworks, both Domain Administrators must perform this procedure at the same time.

1. Obtain the network number and processor number of the Clearinghouse Service in the other internetwork.

2. Be sure both networks have their Internetwork Routing Services running, linked as the connection path joining the two internetworks.

3. Log on and enable in the Clearinghouse Service context.

4. Type **Compare Databases** and press <RETURN>.

5. Press <RETURN> to the "Remote CHS name" prompt. Do not enter a name.

6. Type the Clearinghouse address from step 1 (network number and processor number) and press <RETURN> after responding to each prompt.

   When the procedure is completed, you see the message "Done. Databases are consistent."

7. Log off from the Clearinghouse Service context.

```
CHS!Clearinghouse ServiceRETURN
CHS! Compare DatabasesRETURN
    Remote CHS name:RETURN
    Enter remote CHS address:
    Network Number: 1-510RETURN
    Processor Number: 2-852-002-092 RETURN
    Comparing databases
Done. Databases are consistent.
```

Removing the Clearinghouse Service from a server

You can remove the Clearinghouse Service from a server by using the **Expunge Service** command. This command erases its local database. As a result, the server recovers the disk space consumed by the database and then removes itself from the distributed Clearinghouse system.

This command should be performed if you move a Clearinghouse Service to another server. Be sure to replicate the domains contained in the Clearinghouse database to another server before it is removed.

Note: You must remove unwanted Clearinghouse Services by using the **Expunge Service** command, rather than by using the **Deactivate** command. The **Deactivate** command is used only to put a service out of operation temporarily and does not recover disk space. Failure to properly remove an unwanted Clearinghouse Service causes problems to the distributed Mail and Clearinghouse systems.

Note: Before performing the following procedure, enter the **Show Status** command to view a list of all domains which are served locally. Be absolutely sure that they are replicated at one or more other Clearinghouse Services, or that they are no longer needed in the internet. Once the expunge operation is completed, the entire database which was formerly maintained by the expunged Clearinghouse Service will have been deleted.

Procedure

1. Log on and enable.
2. Type **Stop Service** and press <RETURN> at the server running the Clearinghouse Service.
3. Type the number(s) corresponding to all services running on the server and press <RETURN>.
4. Boot the server.
5. Respond **N** to the "Normal Startup?" prompt and press <RETURN>.
6. Type the number corresponding to the "Interrupt before running services" option and press <RETURN>.
7. Type **Expunge Service** and press <RETURN>. The list of services installed on the server now displays.
8. Type the number corresponding to the Clearinghouse Service and press <RETURN>.
9. Type **Y** and press <RETURN> to confirm that you wish to expunge the Clearinghouse Service.

   Note: If you decide to abort the operation by entering **N** to the confirm prompt, or by canceling the command using <CTRL-C>, the Services Executive prompt

reappears. If you type **Proceed** or manually run the Clearinghouse Service at this point, the server will crash.

The recovery is to boot the server after the aborted expunge service operation. After the server is restarted, the Clearinghouse Service can be returned to normal operation because the expunge process never began.

10. Type **Y** to verify the "Destroy the domains known only this this server" prompt and press <RETURN>.

11. Boot the server again.

    Note: The server must be rebooted in order to fully complete the **Expunge** command.

12. Type **Y** to the "Normal Startup?" prompt and press <RETURN>.

Note: If the **Expunge Service** command does not complete, boot the server and use the command again until the process completes successfully.

- After a Clearinghouse Service is expunged, the name of that service cannot be used again for 30 days.

  The CHS user interface prevents the user from reusing the same CHS name for 30 days after it has been expunged. The CHS prompts with:

```
This Clearinghouse Service has not been named. Please enter its name.
    Name: CHSRETURN
The name CHS was deleted within the last 30 days and cannot be used.
Please enter another name.
    Name: ClearinghouseRETURN
The name Clearinghouse was deleted within the last 30 days and cannot be used.
Please enter another name.
    Name: Vienna CHSRETURN
```

The Clearinghouse repeats the prompt for a valid name until one is entered, then continues startup. The Clearinghouse does not check to see if the valid name is currently in use on another CHS. Later on in its initialization process, it may find that the Clearighouse name provided currently applies to another Clearinghouse on the internet. If this happens, the server will crash.

Expanding the Clearinghouse database

If your Clearinghouse domain expands, or if you add new replicated domains to your local database, you will need to expand the database to accommodate the additional data. You increase this space by choosing the Clearinghouse Service non-normal startup option "Expand Database."

Note: The Clearinghouse database should have about 25 percent free space at all times in order to allow for a network safety margin, as well as for copies of additional domains.

Generally, expansion is done for one of two reasons:

- The database has filled due to gradual expansion of existing domains. Expansion should provide a reasonable amount of free disk pages, based on the amount of further anticipated growth.
- The database is about to have a new copy of a replicated domain added to it. Use the **Show Domain** command to determine the size of the domain, add a reasonable number of disk pages (for example, 25 percent) and expand the database to that size.

Procedure

1. Log on and enable.
2. Type **Stop Service** and press <RETURN> to the server running the Clearinghouse Service.
3. Type the number(s) corresponding to all services running on the server and press <RETURN>.
4. Boot the server.
5. Type **N** to the "Normal Startup?" prompt and press <RETURN>.
6. Type the number corresponding to the "Interrupt before running services" prompt and press <RETURN>.
7. Log on and enable if the Clearinghouse is replicated. If you have a single Clearinghouse network, skip this step and proceed to step 8.
8. Type **Run Service** and press <RETURN>.
9. Type the number corresponding to the Clearinghouse Service and press <RETURN>.
10. Type **N** to the the "Normal Startup?" prompt and press <RETURN>.
11. Type the number corresponding to the "Expand Database" option and press <RETURN>.

12. Type the number of pages you wish to add to the "Disk pages to add to database" prompt and press <RETURN>.

    The system displays "Database size will be XXXX pages." ("XXXX" is the number calculated by your system. The Clearinghouse database size is always in multiples of six pages. Numbers are rounded down automatically to meet this requirement.)

13. Type **Y** to the confirmation prompt and press <RETURN>.

```
!Run ServiceRETURN
    Select Choices
    1   Clearinghouse Service
    Enter one or more choices:  1RETURN
    Clearinghouse Service:  Normal Startup? (Y/N):  NRETURN
Running Clearinghouse Service.
    Select CHS non-normal option:
    1   Expand Database
    2   Run, but don't start
    Enter choice:  1RETURN
    Opening and Expanding Clearinghouse Service database.
    Current database size is 4002 pages (23% of the disk).
        3850 pages used out of 4002.
        Disk pages to add to database (0..3890):  1600RETURN
    Database size will be 5598 disk pages.
        Confirm (Y/N):  YRETURN
Service is registered.
Done.  Clearinghouse database open.
Clearinghouse Service functions are now available to network.
Clearinghouse Service run.
```

14. Type **Proceed** and press <RETURN>.

Deleting copies of domains

If a given domain is no longer needed on your Clearinghouse Service, you can delete the local copy of the domain from the Clearinghouse Service database, as authorized by the Domain Administrator.

The **Delete Domain** command, which deletes a copy of a domain on the local Clearinghouse Service, is useful for two reasons:

- To rearrange the replication pattern of the domain. Usually, the local System Administrator has determined that the copy on the local Clearinghouse Service is no longer needed.
- To eliminate the domain altogether. The System Administrators for all Clearinghouse Services holding the domain must perform the **Delete Domain** command. When the last copy of a domain is deleted, a domain or organization cannot be recreated with the same name for approximately one month.

Note: Deleting a domain involves stopping the Clearinghouse Service for the duration of the operation. It is advisable to perform this task at off-peak hours. You must have Domain Administrator status in order to delete a domain, and Organization Administrator status to delete the last domain in an organization.

CAUTION: Never delete a domain unless you are absolutely positive that it is served elsewhere, or no longer needed in your internet. To ensure that a domain is replicated, type the **Show Domain** command at the server and connect to each server listed. Use the **Show Status** command to list the domains that are served by each Clearinghouse Service. If the results indicate that the domain is served on another Clearinghouse Service, then the domain is replicated.

Procedure

1. Log on and enable in the Clearinghouse Service context.
2. Type **Stop Service** and press <RETURN>.
3. Type the number corresponding to the Clearinghouse Service and press <RETURN>.
4. Type **Y** to the "Stop Immediately?" prompt and press <RETURN>.
5. Type **Delete Domain** and press <RETURN>.
6. Type the name of the domain you wish to delete (for example, Pittsburgh:GemSysCo) and press <RETURN>.
7. Type **Y** if the "Confirm destruction of this domain?" prompt appears and press <RETURN>. If **Delete Domain** is used to delete the last (or next to last) copy of a domain, a confirmation is needed. In either case, the **Y**

confirmation should be given only if the goal is complete elimination of the domain from the Clearinghouse System.

Note: If an attempt is made to delete the last domain in its organization, an attempt is also made to delete the organization. Only an Organization Administrator can delete an organization. Once deleted, a domain or organization cannot be recreated with the same name for approximately one month.

```
CHS!Delete Domain[RETURN]
    Domain: Pittsburgh:GemSysCo[RETURN]
Deleting Domain Pittsburgh:GemSysCo from this CHS.
    Confirm? (Y/N)?: Y[RETURN]
Warning: This is the only copy of Domain Pittsburgh:GemSysCo
    Confirm destruction of this domain? (Y/N): Y[RETURN]
Done.
```

8. Type **Start Service** and press <RETURN>.

9. Type the number corresponding to the Clearinghouse Service and press <RETURN>.

10. Log off from the Clearinghouse Service context.

Creating domains

Under certain circumstances, you may need to create a new Clearinghouse domain. One such circumstance is the creation of the first domain in your internetwork This is handled using the special "Genesis" procedure described in the *Server Software Installation* booklet in the *Network Basic Services* volume.

When a new network is about to join your internetwork via the Internetwork Routing Service, an alternate procedure is used during normal (non-Genesis) operation to create a new domain. In this situation, the remote System Administrator of the new network will need your assistance, not only to set up the internetwork link, but also to gain access to the new network's Clearinghouse domain.

There are two ways to create a domain in non-Genesis mode:

- If the new network is to share your domain, you need only make the remote System Administrator a Domain Administrator of your existing domain, as described in steps 9 and 10 below.

- If the new network is to have a new domain of its own, you must create the new domain on your Clearinghouse Service, following steps 1 through 13 below.

Refer to the *Introduction to Network Administration* booklet for help in deciding which situation applies. In either situation, the remote System Administrator will then replicate the domain onto a Clearinghouse Service on the new network.

Note: If you wish to rename or merge domains within an organization, refer to the "Renaming or merging domains" section.

Note: When adding a domain, a message may appear warning you that the database is full. You must boot immediately, and expand the Clearinghouse Service database. The Clearinghouse Service will complete the **Add Domain** operation as soon as the database has been expanded. Refer to the "Expanding the Clearinghouse database" section for the procedure.

Note: You must be an Organization Administrator to create a new domain.

Procedure

1. Log on and enable in the Clearinghouse context.

2. Type **Stop Service** and press <RETURN>.

3. Type the number corresponding to the Clearinghouse Service and press <RETURN>.

4. Type **Y** to the "Stop Immediately?" prompt and press <RETURN>. Answering **Y** means all Clearinghouse Service functions will be unavailable to the network.

```
CHS! Stop ServiceRETURN
    Select Choices
    1  Clearinghouse Service
    2  Internetwork Routing Service
    Enter one or more choices: 1RETURN
    CHS: Stop Immediately? (Y/N): YRETURN
    Stopping the Clearinghouse Service.
    Clearinghouse Service functions are now unavailable to the network.
CHS!
```

5. Type **Add Domain** and press <RETURN>.

6. Type the name of the domain you wish to create and press <RETURN>. (Normally, the new domain will be in your organization. In the unlikely case that you wish to create a new organization, you will be prompted to type the organization password, as described in the *Server Software Installation* booklet in the *Network Basic Services* volume.)

7. Type **Y** and press <RETURN> to the confirmation prompt.

```
CHS! Add DomainRETURN
    Domain Name: TheirDomainRETURN
    Domain TheirDomain:OurOrg does not exist.
    Creating new Domain TheirDomain:OurOrg on this CHS. Confirm? (Y/N):
     YRETURN
    Done.
```

8. Type **Change Default** and press <RETURN>. Respond to the "Default Domain" prompt with the name of the new domain.

9. Type **Add User** and press <RETURN>. Respond to the prompts to add the remote System Administrator as a user of the domain.

10. Type **Change Domain Access** and press <RETURN>. Respond to the prompts to give the remote System Administrator administrative privileges for the domain.

11. Type **Start Service** and press <RETURN>.

12. Type the number corresponding to Clearinghouse Service and press <RETURN>.

Note: If you do not wish to have the default domain set to the newly created domain, repeat step 8 and enter the name of the desired default domain.

```
CHS!Add User[RETURN]
    First Name (and Middle Initial, if desired): John B[RETURN]
    Last Name: Williams[RETURN]
    Password: ****[RETURN]
    Description: System Administrator for Their Domain[RETURN]
    "Home" File Service: Chipmonk[RETURN]
    Alias: JBW[RETURN]
    Alias:[RETURN]
Warning: No File Service named Chipmonk:TheirDomain:OurOrg is registered.
    Confirm this User information? (Y/N): Y[RETURN]
Done. John B Williams:TheirDomain:OurOrg (User) added.
    Add another user? (Y/N): N[RETURN]
CHS!
```

```
CHS!Change Domain Access[RETURN]
    Domain Name: TheirDomain[RETURN]
    Name: JBW[RETURN]
    Admin Access? (Y/N): Y[RETURN]
Done. John B Williams:TheirDomain:OurOrg granted
Admin Access to TheirDomain:OurOrg.
CHS!
```

```
CHS!Start Service[RETURN]
    Select Choices
    1  Clearinghouse Service
    Enter one or more choices: 1[RETURN]
Starting Clearinghouse Service.
Clearinghouse Service functions are now available to network.
CHS!
```

13. Log off from the Clearinghouse Service context.

Note: If an organization was also created, type **Change Organization Access** to access System Adminstration privileges for the organization.

Correcting domain inconsistency

To ensure consistency, the Clearinghouse Service software runs background processes during the night to cross-check replicated copies of the various domains. Inconsistencies are sometimes caused by interrupted server operation. If you notice inconsistencies lasting longer than 24 hours, you can manually correct them using the **Compare Databases** command.

Use this command when a Clearinghouse Service has been down for an extended period (more than a day) and shortly after the establishment of an Internetwork Routing Service link joining the two internetworks (refer to the "Merging internetworks" procedure).

This operation is also necessary if the network address of two Clearinghouses change simultaneously in the event of a large-scale move where multiple servers containing Clearinghouse Services are moved to new Ethernets, or when multiple servers containing Clearinghouse Services gain new processor IDs. In such a rare circumstance, the Clearinghouse Services with the new addresses should not be brought on-line until each is compared with a Clearinghouse which has not been moved or had its processor ID changed. If all Clearinghouses on an entire internet have been moved, pick one and use it as the target for a compare operation.

Note: Never manually update multiple copies of a domain by going to each Clearinghouse Service that serves the domain, and adding or changing the same piece of information. Inconsistencies between instances of a domain are sometimes caused by slow update propagation. Doing this could cause cancellation of earlier updates concerning the piece of information. For example, if you think a user entry has been lost, and you add it again, the user's mailbox location would be canceled. The mailbox would have to be added again before the new user could receive mail. The **Compare Database** operation is the only useful remedy for slow update propagation.

Procedure

1. Log and and enable in the Clearinghouse Service context.
2. Type **Compare Databases** and press <RETURN>.
3. Type the name of the Clearinghouse Service with which comparison should be performed and press <RETURN>. (This is generally the nearest Clearinghouse Service containing a copy of the affected domain.)

```
CHS!Clearinghouse ServiceRETURN
CHS! Compare DatabasesRETURN
     Remote CHS name: TontoRETURN
     Comparing databases.
Done. Databases are consistent.
```

Note: The very first time you use the **Compare Databases** command between two Clearinghouse Services, one of the administrators must enter the network address instead of the Clearinghouse name. To do this, press <RETURN> instead of providing the name of the Clearinghouse Service as described above. The network address prompts will appear.

4. Log off from the Clearinghouse Service context.

The Compare Database operation is complete when a message is posted indicating this. If this message does not appear, repeat the operation and verify that the completion message is posted.

Note: The **Compare Databases** command does not cause a change in the configuration of domain replication among the Clearinghouse Services involved. Instead, it causes the various existing copies of the replicated domains to be compared and any differences reconciled.

Manually updating Clearinghouses connected via dial-up links

Xerox Network System services are designed to take advantage of continuous internetwork links and continuous operation of all servers. If servers and internetwork links are not left operational 24 hours a day, Clearinghouse updates are missed, resulting in informational inconsistencies.

Some network communities do not keep their Internetwork Routing Service links continually interconnected between Ethernet sites because it is not viewed as cost effective. In some cases, servers are powered down each night, and on weekends and vacations. The following procedure provides steps for maintaining the consistency of distributed Clearinghouse databases that are not continuously interconnected.

There are other options for ensuring consistency between internets connected via internetwork links:

- Establishing continuous internetwork links using leased or X.25 media.
- Establishing your transient links at least every day between the hours of 12:00 midnight and 6:00 AM. If your internet spans different time zones, it is difficult to ensure that all necessary dial-up links are up during the specified hours within their local times. If your internet community spans time zones, elect one of the other two options, or depend on manually Comparing Databases as outlined in the procedure below.
- Permanently decommissioning some or all of your transient links and replacing them with the External Mail Gateway capability.

Background

All objects on the internet (servers, services, workstations) depend on the Clearinghouse Service for up-to-date information about network resources. When multiple Clearinghouse Services exist in an internet, it is important that each is able to provide accurate and up-to-date information to its network clients. All Clearinghouses in an internet communicate to ensure consistency of the distributed Clearinghouse database.

When a new Clearinghouse is introduced to the internet, it notifies all Clearinghouses of its name and the domains it serves. Additionally, Clearinghouses that serve the same domain as other Clearinghouses automatically send update messages to each other when changes are made to the domain.

To ensure that all Clearinghouses are consistent and have received all necessary update messages, an automatic consistency check is done by each Clearinghouse Service between the hours of 12:00 midnight and 6:00 AM local time. Internets that depend on transient links do not benefit consistently, if at all, from these automatic consistency checks.

Because of this, manual consistency checks must be initiated by appropriate System Administrators.

Manual consistency checks are done by Comparing Databases. This must be done every other day at internets that use dial-up links or have servers that are powered down at night. You need to decide which Clearinghouses to compare so that domains which are served on opposite sides of dial-up links are consistent, and all Clearinghouses that are separated by transient links obtain a consistent view of other Clearinghouses in the internet. It is important that each Clearinghouse knows the addresses of the other Clearinghouses, and the domains they serve.

Manually Comparing Databases is a background function, which means that Clearinghouse Services can serve their network clients while the operation is running. System Administrators must coordinate with each other so that the necessary links are up during the operation, and select the appropriate target Clearinghouses for comparison. After the operation is finished, the links must be left up for an 15 additional minutes to ensure that all resulting update messages are propagated to other Clearinghouses in the internet that were not directly involved in the operation.

Choosing Clearinghouses to compare

The following examples show different internet configurations and explain which compare database operations should be done for each.

On the following page is an internet with two networks interconnected by a dial-up Internetwork Routing Service link. Domain A is served on both sides of the dial-up link and Domain B is served only at Network 1. A single compare database operation, done every other day between CHS X and CHS Y will take care of all necessary consistency checks.

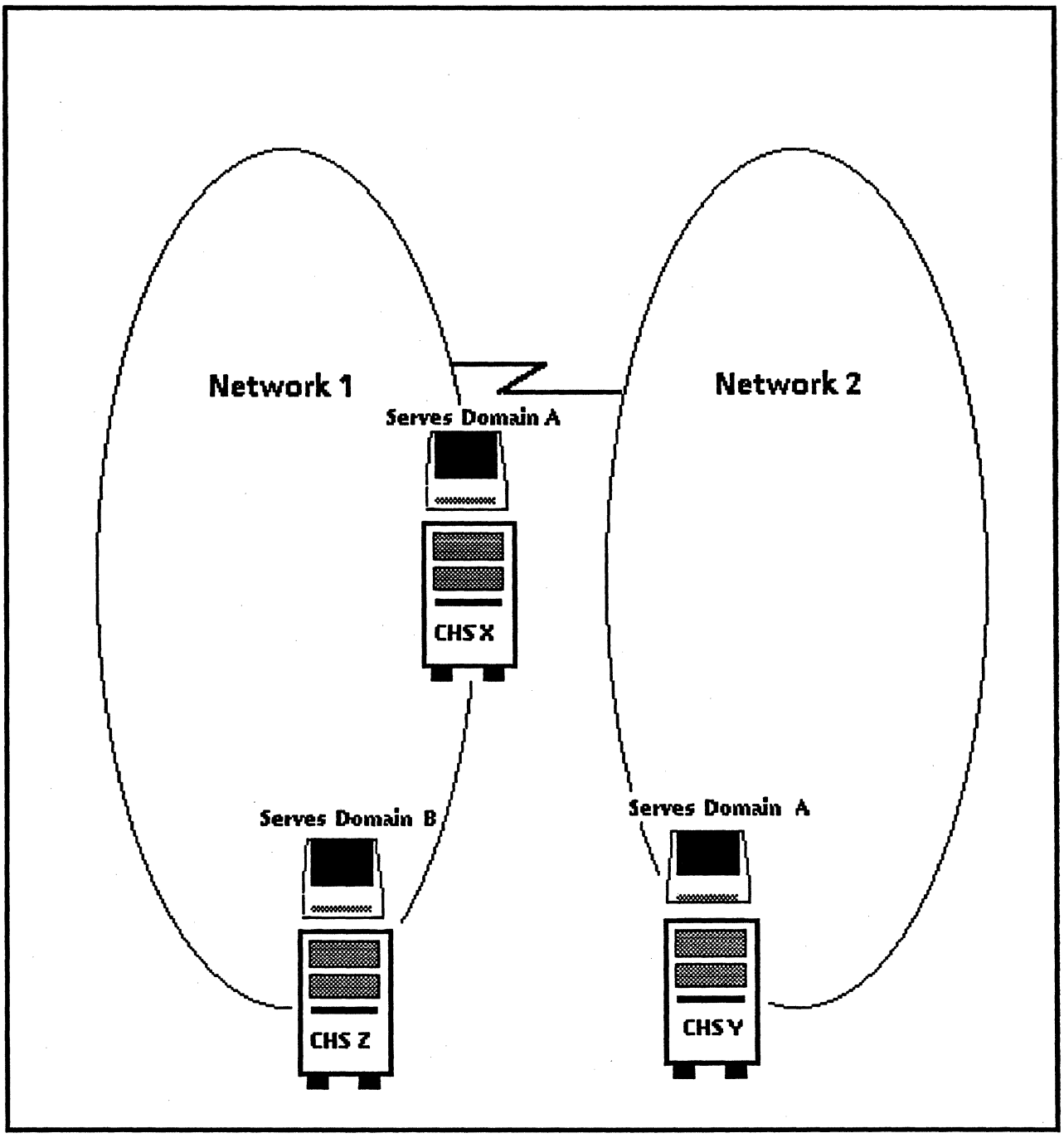

Figure 1: Internet with 2 networks

The drawing on the following page shows an internet with 3 networks that is interconnected only by dial-up Internetwork Routing Service links. Domains A and B are served at all sites, and Domain C is served at sites 2 and 3. The following schedule for Comparing databases should be used for this configuration:

On Monday, compare CHS W with CHS Z.
On Monday, compare CHS X with CHS Y.

On Wednesday, compare CHS X with CHS Z.
On Wednesday, compare CHS X with CHS Y.

Continue to alternate between these two operations every other day. Since domains A and B are served at all three sites, they are compared between CHS W and CHS Z on one day and between CHS X and CHS Z two days later. This way all instances of the domains are regularly involved in a compare operation. This insures that any updates that occur to any copy of the domain while the dial-up links are not up are eventually acquired by the other copies.

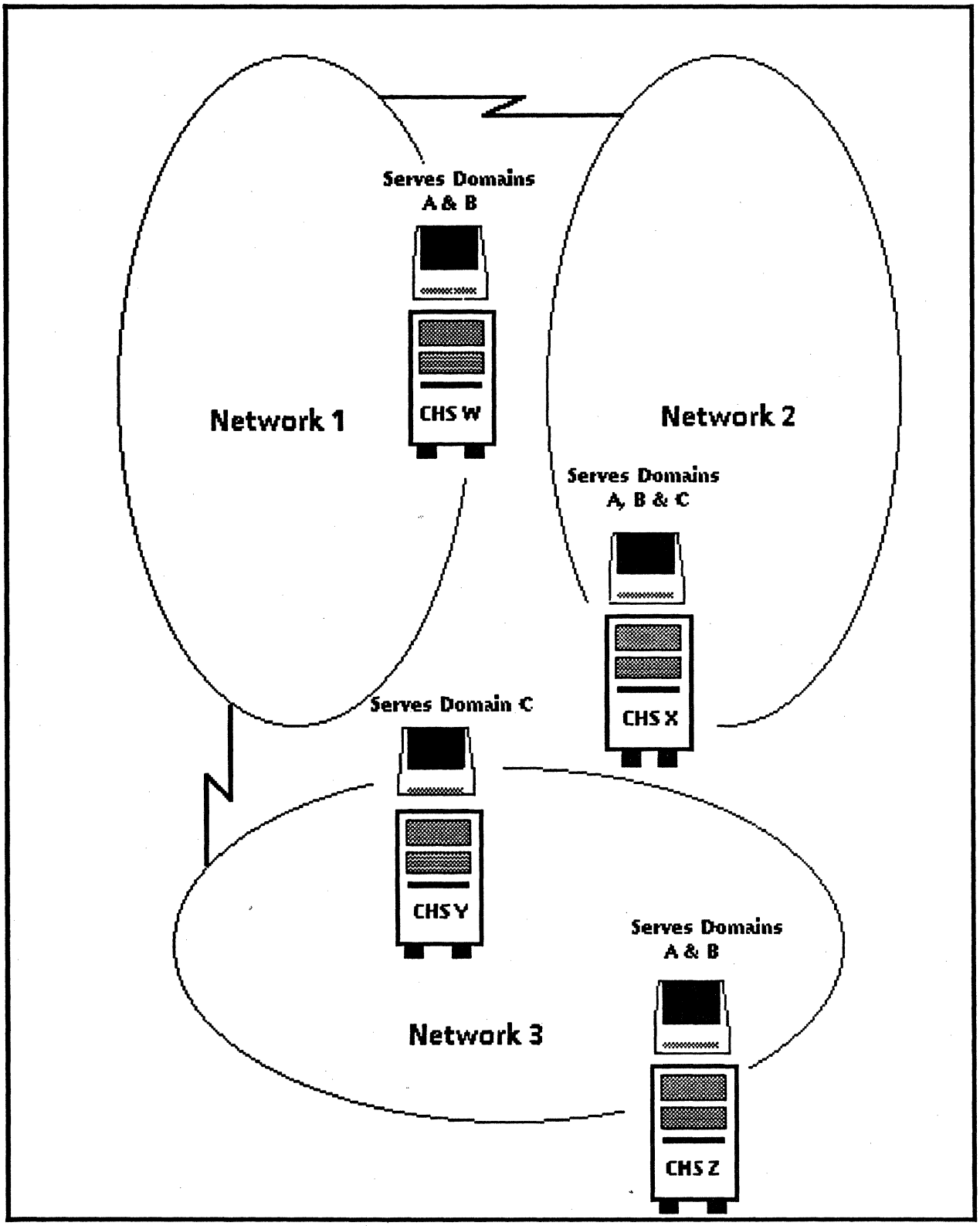

Figure 2: Internet with 3 networks

The following example shows an internet with two ethernet networks that are interconnected by a dial-up Internetwork Routing Service link. Although there is no domain that is served on both sides of the internetwork link, one compare

database operation should be done between any two Clearinghouses that are on opposite sides of the dial-up link. This ensures that all Clearinghouses in the same internet are kept up-to-date about the addresses of the other Clearinghouses and domains they serve.

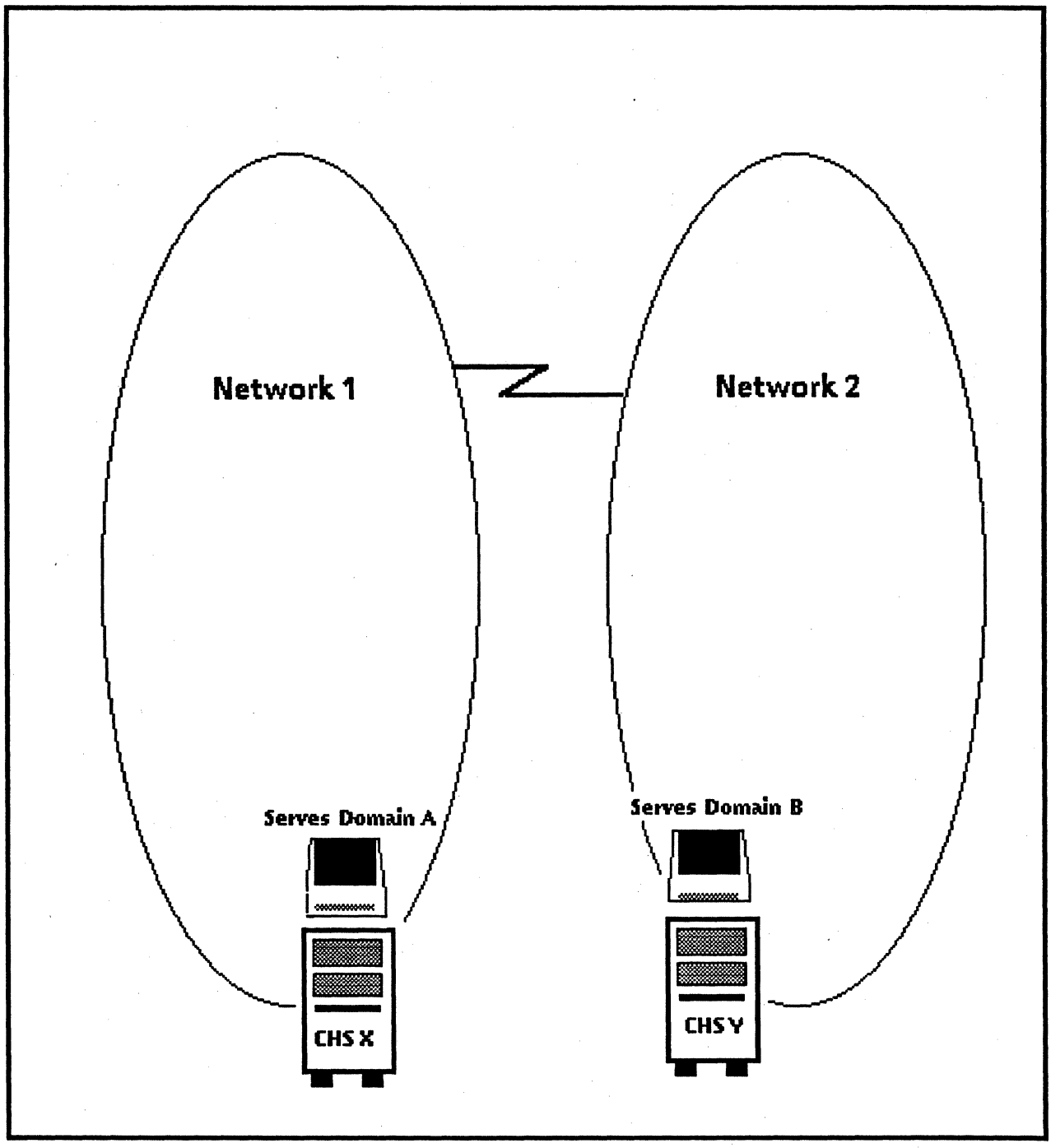

Figure 3: Internet with 2 networks

Procedure

1. Determine which domains are served on both sides of a transient link, and record the names of the Clearinghouses which serve these domains. If there isn't one domain that is served on both sides of a dial-up link, record the names of Clearinghouse Services that reside on opposite sides of dial-up links.

2. Coordinate the responsibility of initiating compare database operations every other day with appropriate System Administrators so that domains which are served on both ends of a transient link are checked for consistency.

   Note: All transient links required for successful completion of the compare database operation must remain up for the duration of the operation and for 15 minutes following its completion. Although all Clearinghouses are not necessarily directly involved in the operation, they may receive update messages as a result.

   It doesn't matter which of the two Clearinghouses involved in a compare database operation is the initiator or the target.

3. Log on and enable in the Internetwork Routing Service context. Type the **List Routes** command immediately before the operation to verify that all transient links are currently up.

4. Issue the **Compare Databases** command with the coordinating System Administrator. You will be prompted to specify the name of the Clearinghouse Service that is to be the target of the compare operation.

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5. Renaming or merging domains

This section contains the procedures necessary to rename or merge domains and organizations. You should carefully follow the information provided. The planning, coordination, synchronization, and step-by-step procedures are provided in this section.

Renaming or merging domains and organizations includes many activities which take approximately six to nine days to complete, depending on the size of your total network community, the nature of your renaming or merging requirements, and the degree of importance your user community places on minimizing user disruptions. This section is carefully designed so that the merging or renaming procedures can be done with a minimum of disruption to the network community.

The following provides a very general description on how the merging or renaming procedures can be done with a minimum of disruption to the network community.

Renaming domains within a single organization consists of:

- Creating the domains that are to replace the old domains
- Moving everything from the old domains to the new ones
- Deleting the old domains

Renaming an organization consists of:

- Creating the new organization as a part of creating the first domain in that new organization
- Creating any other domains that are to be in that new organization
- Moving everything from the domains in the old organization to the appropriate domains in the new organization
- Deleting the old domains in the old organization

Once the last domain is deleted from an organization, the Clearinghouse will automatically delete that old organization from the distributed Clearinghouse Service database.

Merging domains within an organization consists of:

- Selecting an existing domain that is to contain other domains, or creating a new domain that is to contain existing domains
- Moving everything from the domains that are to be contained into the replacement domain
- Deleting the domains whose contents have been included

Merging organizations is the same as renaming an organization, except that the replacement organization may already exist and may already have domains into which everything in the old domains can be merged.

Role of Coordinating System Administrator

To make sure that your community can successfully carry out this procedure, appoint a Coordinating System Administrator who is knowledgeable about Services Software and its administration.

- In small network communities comprised of only one Ethernet, there may be only one System Administrator involved in the whole procedure. In this case, one System Administrator will be the coordinator, and will do all the activities in the specified stages.
- In a larger network community, one System Administrator must coordinate the activities of all other System Administrators.

For the remainder of this section, the term "Coordinating System Administrator" refers to the System Administrator appointed to do the entire procedure at a single-Ethernet site, or the System Administrator in charge of coordinating a larger effort that involves System Administrators at multiple sites.

Making decisions

Important decisions must be made by the Coordinating System Administrator. Most of these have a direct effect on the degree of interruption to user activities that will be experienced throughout the network community. The procedures in this section ensure that the change-over will be as smooth and non-disruptive as possible, but also allow for trade-offs to be made by the Coordinating System Administrator in case the cost of continuous interconnection of Ethernet sites is a major concern.

At several points, the Coordinating System Administrator can decide to delay progress in order to ease the transition for users. Alternatively, the Coordinating System Administrator can decide to minimize most of these optional delays in order to cut the cost of phone service.

Example If the internet community normally uses dedicated or X.25 links between Ethernet sites, there is no additional cost to consider. The Coordinating System Administrator should make these decisions in favor of the user. If, however, the internet

normally uses one or more dial-up (transient) links, the cost of continuous interconnection may be a concern. The Coordinating System Administrator should determine which is more important to the community as a whole--minimizing user disruption or minimizing cost. The System Administrator should read this document thoroughly and make decisions that are in line with the priorities of the network community.

Regardless of the scope of your particular change-over procedure, it will not be automatic. There are manual data entry tasks to be done across the network. These tasks can be easily optimized by using the Remote System Administration feature of the 6085/8010 workstation. Using this feature, the Coordinating System Administrator can gather data about all servers at all sites, create data folders for each of the other System Administrators, and then distribute the folders via the Mail Service or by storing them in a File Service. The procedure assumes that these electronic aids will be used by the Coordinating System Administrator and by the other System Administrators involved in the procedure. Equivalent manual procedures can also be done at sites that do not have 6085/8010 workstations.

Before you begin

Each network community must appoint a Coordinating System Administrator. An internet community can accomplish this procedure far more easily if the Coordinating System Administrator has access to a 6085/8010 workstation. This should be a consideration when selecting the coordinator.

The Coordinating System Administrator must do the following preparation before beginning Stage 1 activities:

1. Read the section titled "Ground rules" describing the use of the procedures. If there are any questions about the ground rules, notify your Xerox representative. Begin this procedure only after you can comply with all ground rules.

2. Obtain administrative access to the organization that is to be retired (if this is the goal). One of the System Administrators who currently has administrative access to that organization must grant you these privileges. Do this two days (or up to one week in large internets) before the start of the procedure so that the change can propagate to all copies of the organization in your internet.

3. Read the section titled "Reasons for renaming or merging domains" and identify your community's reasons.

4. Read the instructions for each stage of the procedures. This is the best way to understand the procedures. The Coordinating System Administrator should understand the information before beginning Stage 1 so that he or she will have the long-term objectives in mind while doing Stage 1 activities.

Ground rules

There are four ground rules for completing these procedures:

1. The internet community involved in these procedures should stop any re-configuration activity (adding users, adding services, adding servers, adding groups, replicating domains, and so forth) except for those that are specifically called for in this procedure. This temporary freeze on network flux minimizes confusion during the renaming or merging of domains.

2. All servers at your internet must be running Services 10.0 software. If this is not the case, delay the renaming or merging of domains or organizations until after the upgrade.

3. All internetwork links in the entire internet community must be brought up before Stage 1 is started, and run continually for the duration of the procedure, and for one day following its completion. If there are transient (dial-up) links in use in your internet, those links must be brought up and run continually during this procedure and for one day following its completion. One day after the procedure has been completed, you can resume your normal use of transient links, as well as the special administrative procedures for maintaining consistent Clearinghouse databases.

4. All responsible System Administrators must have the *Network Administration Library* on hand and should understand how it is organized in case they need to reference it.

Reasons for renaming or merging domains

Two possible reasons for renaming or merging domains or organizations are:

Company Flux

Xerox 8000 Network communities should attempt to adopt domain and organization names that are likely to have longevity. Flux is always expected within business and professional communities. It is important to take careful consideration in naming domains and organizations to reduce the possibility of having to rename them. The *Introduction to Network Administration* booklet in the *Network Administration Library* provides guidelines for selecting domain and organization names that are likely to be effective for the long term.

However, unexpected events in a network community, such as moves or company reorganizations, may require that network entities be relocated to a new domain. In some cases, it may even be necessary to rename an organization and all of its domains.

Consolidation

Significant enhancements to the OS 5.0 (Services 8.0) Clearinghouse Service, and to the OS 5.0 (Services 8.0) Services Software may force some internet communities to modify their current Clearinghouse structure.

Formerly, each Ethernet in an internet had to have a local Clearinghouse Service. Multiple instances of the same domain could not be run on different servers at the same time. These limitations of OS 4.x Software meant that each Ethernet site had to have its own unique domain(s) served only by its own Clearinghouse(s).

These restrictions have been removed. It is now possible for workstations and servers attached to multiple Ethernets to be registered in the same domain, and for this domain to be served simultaneously by multiple Clearinghouse Services on multiple Ethernets. (Refer to the "Setting up your Clearinghouse Service" section for tips about when and where to replicate Clearinghouse Service domains.)

These are some reconfiguration possibilities that may interest your network community:

- Network communities might find that consolidation (merging) of resources into fewer domains would result in a Clearinghouse structure that more closely complements the needs of the working groups within that network community. This consolidation would consist of:

    a. Replicating one domain to multiple Clearinghouses on multiple Ethernets that are located within a single geographical area (for example, a campus or a single metropolitan area).

    b. Registering all resources and users within a single domain.

    c. Deleting obsolete domains that were used by a single Ethernet site. This plan does not prohibit each site from having its own System Administrator who can manipulate data in a given domain. Multiple administrators managing a single domain must cooperate so that naming conventions are consistent and appropriate to all of the Ethernet sites that share the same domain.

- Very small Ethernets (those which include a minimal number of servers and workstations) with continuous access to a remote Clearinghouse Service via an internetwork link, can now operate without a local Clearinghouse Service. It is still recommended that all Ethernets have their own Clearinghouse Service to ensure continuous accessibility and optimum efficiency.

  However, some network communities may contain Ethernet sites that are so small that it is not necessary to have a System Administrator who is on site at all times. In these cases, it might be more efficient if most network resources

are located at a remote site where they are administered by that site's System Administrator.

The small Ethernet community that requires only local Print and Internetwork Routing Services can access all other network resources, such as File Services, emulation, gateways, and Clearinghouse Services, through the internetwork link. This would minimize the administrative tasks at the small network site, and would allow optimum resource sharing with other interconnected sites.

If a small network site is to be restructured in this way, it must be merged into a domain on a remote Clearinghouse Service. The local domain is then deleted and the local Clearinghouse Service expunged. Since this motivation for retiring a domain is rare, it is not specifically covered in this section. Once you understand the procedures presented here, you may wish to amend them to fit this exceptional case. Be sure you are completely familiar with these procedures and with the operation of the Clearinghouse Service.

Using the renaming or merging domain procedures

Below are the instructions for accomplishing each stage of the "Renaming or merging domains" procedure.

- If you are a Coordinating System Administrator, or are the System Administrator responsible for a single-Ethernet network, read all of the material before you begin Stage 1.
- If you are one of the System Administrators in an internet community, and you are not the Coordinating System Administrator, do not do any of the activities until you receive your instructions from the Coordinating System Administrator. Wait for the Coordinating System Administrator to tell you what stages you are expected to do, and then read the instructions for these stages. Wait for the go-ahead from the Coordinating System Administrator before you begin the first stage assigned to you.

Overview for using "stage" information

The procedures for renaming or merging domains are organized by stages. The following topics are covered for each stage.

Responsible System Administrators Specifies who is responsible for doing the stage. If a network community has only one Ethernet site, all stages will be done by a single System Administrator. If a network community includes multiple Ethernet networks (multiple sites), some stages will be done by the Coordinating System Administrator and some by other System Administrators at specific sites.

Goal Describes the purpose of the stage.

Interruption to network services Describes the duration and nature of the interruption to network services caused by the activities included in the stage.

Local access requirement Specifies whether the activities in the stage can be done via the 6085/8010 Remote System Administration feature, or whether they must be done directly at one or more servers' local consoles. Some activities cannot be done from the 6085/8010 workstation because the administrator must boot the server, or manipulate the server during a non-normal server initialization.

Synchronization requirement

Explains if:

- The stage can begin immediately after completion of previous stage.
- There is a specified time interval before the next stage can begin.
- All sites must have completed the previous stage before any one site can begin the next stage.

Also specifies other synchronization concerns relevant to the stage.

Stage 1. Planning and information distribution

Responsible System Administrator(s)

The participants for this stage are the Coordinating System Administrators.

Goal

To plan an overall strategy and an estimated schedule for the renaming or merging procedure, and gather and distribute pertinent data to appropriate System Administrators. (Refer to "Strategy decisions" below.)

Interruption to network servicess

There is no interruption to any network service caused by this stage.

Local access requirement

The Remote System Administration capability is most helpful during this stage. Otherwise, the Coordinating System Administrators have to travel to each site to accomplish some of the data collection activities.

Synchronization requirement

This stage can begin when the Coordinating System Administrator feels it is appropriate. It can progress as quickly as the Administrator wishes.

There are two strategy decisions that you must make involving the assignment of new passwords, and the replacement of the Mail Service. The following information will help you determine how to make these decisions.

Assigning new passwords

Use one of the following methods to select the means for assigning new passwords to users who will be registered in a different domain.

1. *Non-unique password method* - You can issue the same temporary password to each user and then allow them to change it later after they have begun logging on with their new user name.

2. *Unique password method* - Alternatively, you can ask each user who must be re-registered to supply their own password.

Advantages and drawbacks

Non-unique method

The non-unique password carries some risks for companies who are concerned with secrecy of protected files or limiting access to protected resources such as emulation ports. For a short transition period, users will have the same password, and can log on as other users and gain access to otherwise inaccessible resources.

However, once users are ready to permanently log on with their new user name, he or she can change the non-unique password to a unique one. If the domain is replicated, it may take up to two days for these unique user passwords to propagate to all instances of the domain. Because of this, users may notice that they are unable to access resources that they are usually able to access. When this happens, the user

can usually overcome the problem by logging off and logging back on using the non-unique password.

Unique method

If you assign unique passwords to each user who is to gain a new user name, the difficulties and risks of the non-unique method can be avoided. The only disadvantage is that you must obtain the new passwords from each affected user.

Regardless of which method is selected, users who wish to change their passwords again can do so after they begin logging on with their new user name. Consult with responsible persons in your company and decide on the strategy that is best for you.

Phasing out the Mail Service

Mail Services cannot be renamed. Mail Services existing on a domain that is to be renamed or merged into another organization must be replaced. There are two approaches to replace the Mail Service: abrupt and gradual. Decide which one of the following replacement methods is best for you:

1. *Abrupt approach* - This approach involves expunging the Mail Services, and then installing new Mail Services on the same server.

2. *Gradual approach* - Involves the installation of a replacement Mail Service on a different server at the same site as the Mail Service that is to be phased out. During a temporary interval, each Mail Service is left in operation, while its replacement Mail Service is also in operation.

Advantages and drawbacks

Abrupt approach

The abrupt approach requires that all users empty their mailboxes before the scheduled phase-out. If this is not done, all of their mailbox contents will be lost. If the mail community is large and its members are out of the office often, this may be difficult.

The abrupt approach involves eliminating and replacing all mailboxes on the old Mail Service, regardless of whether or not the owners of the mailboxes are gaining new user names.

Gradual approach

The gradual approach allows users to use the new mailbox at their convenience during a transition period determined by the Coordinating System Administrator. During this transition period the renaming or merging procedure can progress toward the final warning stage. In the meantime, it does not have to be held up by users who cannot retrieve their mail, or cannot have it deleted.

The gradual approach requires deletion of only those mailboxes owned by users who will have name changes. Users who have mailboxes on a server being phased out, but do not receive name changes, will be unaffected.

The primary advantage of the gradual approach is that it allows an interval for gradual transition. If you normally use transient links, you have to leave these links up during the entire procedure. If cutting the length of the procedure to minimize

these costs is more important to you than allowing users to retrieve their mail at their own convenience, select the abrupt approach.

Another disadvantage of the gradual approach is that it requires the use of another server at the same site. This may not be feasible at all sites that must phase out Mail Services. Details about Mail Service disk space and co-residency issues are discussed below. This will help you determine if you have another server that is a viable location for the replacement Mail Service.

Recommendation

If the use of the Mail Service by your network community is not extensive and is not absolutely critical to your company's day-to-day business, use the abrupt approach. It does not cause mail service to cease unless you only have one Mail Service. (The total down-time of the Mail Service is approximately 1 1/2 hours.) Minor abnormalities may persist for two days or more, but this is experienced with the gradual method as well.

The gradual method is more workable when you have many users that are difficult to coordinate on a tight schedule and who cannot afford to lose any mail in their old mailboxes.

If your network community has multiple Mail Services that must be phased out, you can mix the approaches so that each site is best accommodated, given its dependency on the Mail Service and on the availability of a second server.

Procedure

Since the Coordinating System Administrator will be gathering data for all domains that are to be replaced, he or she should obtain domain access privileges for each of these domains. Contact the System Administrator for each domain that is to be replaced and ask to be added to the domain access list. The System Administrator will use the **Change Domain Access** command to accomplish this.

Check off each step as you complete it. Review the information for each stage as necessary.

1. Determine which domains or organizations are to be replaced. Determine which replacement domains or organizations must be created.

   - If new domains or organizations are to be created, decide on names for each. If domains are to be merged, decide which domains will be phased out and which will contain the ones which are to be phased out.

   - If new organizations are to be created, phone the Software Control Center to obtain the organization-specific password for each. This password must be obtained before a new organization can be introduced to the system.

- If new domains or organizations are to be created, decide who should create them. This decision should be based on locality and on current or desirable administrative access privileges. Note that an organization is created the first time that a corresponding domain is created. You cannot create the first copy of an organization without introducing its first domain at the same time.

2. Prepare instructions for the System Administrators who will perform Stage 2 activities. (Refer to the section titled "Preparing instruction sheets.") The System Administrators for this stage are responsible for creating or replicating the replacement domain at their respective, local Clearinghouse Services.

   The instructions you give to each System Administrator for Stage 2 must indicate whether he/she is to create or to replicate the domain. The normal instructions are for each System Administrator to replicate the replacement domain to their local Clearinghouse Service database.

   If the replacement domain does not yet exist, one System Administrator will have to create it and the other Stage 2 System Administrators will have to wait for your go-ahead before replicating the newly created domain, or domain and organization.

   Make sure the System Administrator who is to create a domain has administrative access for the containing organization. The System Administrator who creates the replacement domain might also be creating the first copy of a new organization. If this is the case, that System Administrator will automatically gain default administrative access to the new organization. Your instructions to him/her must include the requirement to issue the **Change Organization Access** command in order to establish long-term administrative access.

Preparing instruction sheets

You should prepare instruction sheets to organize information that will be used in Stage 2. Here is the information you need to gather:

If renaming a domain, or a domain and organization is the goal:

The replacement domain, or domain and organization must be created and then replicated so that there is a copy at each Ethernet where there are users and resources registered in the domain being renamed.

Information For each of these sites, prepare instruction sheets containing the following information:

- The System Administrator's name.
- The name of the domain being renamed. (Name of the organization being renamed if appropriate.)
- The name of the replacement domain. (Name of the replacement organization, if appropriate.)
- Whether or not the System Administrator is creating a new domain, replicating an existing one, or should wait for another System Administrator to create the new domain so that it can be replicated to the local site. (If the System Administrator is creating a new domain and must create the first copy of the containing organization as well, include the password necessary to create the organization.)
- The expected size of the replacement domain. This should be the same size as the current domain, plus 50 percent of the size of the current domain. (Use the Clearinghouse Service **Show Domain** command to determine the size of the domain.)
- The name of the server currently housing the old domain. This is the server that will also house the replacement domain.
- The names of the users who are to gain administrative access to the new domain, if appropriate.
- Names of the users who are to gain administrative access to the new organization, if appropriate.

If merging two or more domains into an existing domain-and-organization is the goal:

Information Determine the names of the System Administrators for the sites that are to be merged into the replacement domain. Find out if these sites already have a copy of the replacement domain, or if they will need to replicate it during Stage 2.

Prepare an instruction sheet with the following information:

- The name of the System Administrator.
- The name of the domain to be merged.
- The name of the replacement domain.
- Whether the System Administrator is to replicate the domain, or already has it locally.
- The expected size of the replacement domain after all users, groups, and resources have been merged into it. Obtain this figure by adding the current size of the replacement domain to the current, cumulative size of all domains that are to merge into it. Increase this total by 50 percent. This is the expected size of the replacement domain. (Use the **Show Domain** command to find out the size of each domain that is to be merged.)

If merging domains into a new domain, or into a new domain and organization is the goal:

Determine the names of the System Administrators for the sites that are to be merged into the replacement domain. Choose one of these System Administrators to create the new domain or the new domain and organization.

Information

Prepare Stage 2 instruction sheets for each of these System Administrators and include the following information:

- The name of the System Administrator.
- The name of the domain that the System Administrator is responsible for merging.
- The name of the domain into which the System Administrator's users and resources are to merge. (Name of the new organization if appropriate.)
- Instructions about whether the System Administrator is to create the domain, or domain-and-organization; or wait for it to be created at another site and then replicate it.
- If the System Administrator is to create the domain and a new organization as well, include the password for the organization.
- The names of the users who are to gain Administrative access to the new domain if appropriate.
- The names of the users who are to gain Administrative access to the new organization if appropriate.
- The expected size of the new domain after all users, groups, and resources have been merged into it. Obtain this size estimate by totaling the current sizes of all domains that are to be merged, and increasing this total by 50 percent. (Use the Clearinghouse Service **Show**

Domain command to find out the size of each domain that is to be merged.)

3. When you have created the necessary Stage 2 instruction sheets, drop them into folders which you create for each of the Stage 2 System Administrators. You are now about to add more documents to each of these folders.

4. Using the 6085/8010 Remote System Administration feature, initiate a remote session with a local server that houses a Clearinghouse. Do the following for each domain that is to be replaced.

   a. Type **Change Default** and press <RETURN> to specify the domain (for example, Dallas:Acme).

   b. Type **List Users** and press <RETURN> using the asterisk (*) default.

   c. Type **List Groups** and press <RETURN> using the asterisk (*) default.

   d. Type **List Members** and press <RETURN> for each group in the above listing.

   e. Type **Show Group Access** and press <RETURN> using the asterisk (*) default to view the current access controls on each group. Repeat the command for each group in the above listing.

   f. Type **List** and specify a service. Press <RETURN>. Repeat this for each service (Print, File, Mail, Remote Batch, Internetwork Routing, External Communication, Interactive Terminal, and 850/860 Gateway Services)

   g. Type **List Servers** and press <RETURN> using the asterisk (*) default.

   h. Use the "Make Document" feature to capture all of the information displayed as a result of the above operations. Drop the resulting document in the appropriate folder.

   i. Repeat the above steps for each domain that is to be replaced.

5. Create a password instruction document for each domain that is to be replaced. It should contain your strategy for assigning new passwords. Refer to the "Changing information about users" section.

   - If you have decided to temporarily use the same password for each user, indicate what that password should be, or allow the responsible System Administrator to choose a password for all the users at his or her site.

   - If you have decided to apply unique passwords for each user that is to gain a new user name, include a list of all users currently in the domain (copy this from the

Step 4 results above). Enter the new password supplied to you by each user.

6. Refer to the lists of services you derived for each domain that is to be replaced. For each Mail Service that is in an old domain, you need to decide which is the best phase-out strategy, and you need to gather data that the appropriate System Administrator will use when configuring the replacement Mail Service. To accomplish this, do the following at the 6085/8010 workstation.

   a. Obtain the Remote System Administration icon for the server that houses the Mail Service.

   b. Connect to the server housing the Mail Service. Log on and enable in the Mail Service context.

   c. Type **Show Status** and press <RETURN> to determine the size of the Mail Service database.

   d. Type **List Mailboxes** and press <RETURN> to see which users currently have mailboxes at this Mail Service.

   e. Type **List Foreign Gateways** and press <RETURN> for a listing of all foreign mail gateways served by that Mail Service, if this option is enabled.

   f. Type **List Foreign Domain** and press <RETURN> for a listing of the current domains served by the mail gateways, if this option is enabled.

   g. Type **Show Foreign Gateway** and press <RETURN> for a display showing the current foreign gateway configuration parameters.

   h. Type **List all RS232C Ports** and press <RETURN> to obtain a display of parameters applicable to the local port configuration, including phone number, baud rate, and so forth.

   i. Use the "Make Document" feature to capture all of the above. Drop the resulting document in the folder for the domain containing that Mail Service.

   j. Create a Mail Service phase-out instruction sheet that specifies which approach is to be applied to that Mail Service. If you decide on the gradual approach, be sure to specify which server is to contain the replacement Mail Service. Include this phase-out instruction sheet in the appropriate domain folder. To decide on an appropriate server consider the following:

      - *Does it have enough disk space?* Connect to the server and issue the **List Volumes** command to see how much unused space the server has. Compare this figure with the current size of the Mail Service database (obtained above using the Mail Service **Show Status** command).

      - *Is its local port used by another service (such as for IRS X.25, or 850/860 Gateway Service?* If so,

it will not accommodate a Mail Service that is also used as an External Mail Gateway.

- *Does the server house the Remote Batch Service or the External Communication Service with either 3270 BSC or SNA option?* If so, it will not accommodate the Mail Service.

- *Will the Mail Service co-reside well with the service(s) already running on the server?*

If the server has any combination of: Server Monitor Service, External Communication Service (supporting Asynchronous CIU ports only), File Service, or Interactive Terminal Service, and has enough space, it is the best candidate.

If the server has the Clearinghouse or Print Service, and has enough space, it is the next best candidate. If the server has Internetwork Routing Service and/or 850/860 Gateway Service, and has enough space, it is an acceptable candidate as long as the Mail Service does not use the local port.

If no server qualifies, you should adopt the abrupt phase-out method.

k. Repeat the above steps for each Mail Service that is registered in a domain that is to be replaced.

7. If an old domain contains a Remote Batch Service, connect to the server that houses the Remote Batch Service and do the following:

   a. Log on and enable in the Remote Batch Service context.

   b. Type **Show Partner** and press <RETURN> to invoke a display of the current configuration of each defined partner. This configuration includes the names of the File Services used for input and output bins, as well as the names of these input and output bins. Capture this information and drop it in the appropriate domain folder.

8. If an domain contains an 850/860 Gateway Service, the administrator of that domain will have to re-configure the 850/860 Gateway Service in order to change its name. Capture the current configuration information and place it into the appropriate domain folder. Connect to the server that houses the 850/860 Gateway Service and do the following:

   a. Log on and enable in the 850/860 Gateway Service context.

   b. Type **List Configuration** and press <RETURN> to invoke a display of the current configuration. Capture this information and place it in the appropriate domain folder.

9. Using the information for each stage as a guide:

   a. Prepare a rough schedule which specifies the date on which each stage will begin. Be sure to accommodate the synchronization requirements for each stage. Distribute this schedule to all System Administrators on the internet, making sure they understand that the schedule is only a rough plan. It does not replace the need for them to wait for your go-ahead at various points in the procedure. The schedule may have to be adjusted if some sites are slower than others during some stages.

   b. Distribute this document to each participating System Administrator. These procedures are written in a modular fashion so that non-participating System Administrators do not need to read the entire document. Coordinating System Administrators, however must fully understand the full document. Other System Administrators can adequately participate by reading and following the instructions pertaining to the specific stages for which they are responsible. You can assist by identifying for each System Administrator the stages they are to do.

   c. Also distribute each domain data folder (prepared by you during the activities above) to the System Administrators who administrate that domain and who will be responsible for replacing it.

10. Using the data sheets you have already created, prepare a document to be distributed to every member of your internet community. This document should contain a list of:

   - All users who are to have new names because their current domains are being replaced.
   - The old and new names of all user groups that are to change because they are currently registered in old domains.
   - All servers and services that are to be renamed.
   - All users who will lose their current mailbox in the change-over procedure. These are all users who have mailboxes on Mail Services that are to be replaced using the abrupt approach, and all users who are to receive new user names. All users who will lose their current mailbox will have advance warning that their mailboxes are about to be deleted. This warning will come later in the procedure.

   Users need not be involved in the renaming or merging procedure until later on. Let them know the approximate date that they may be affected by the change-over. (This date should be the estimated date for entry to Stage 8.)

Stage 2. Creating or replicating replacement domains

Responsible System Administrator(s)

The participants in this stage are the System Administrators directly responsible for a domain change-over. (These are all System Administrators who normally administer sites that contain users, servers, and services registered in a domain that is to be renamed or merged into another domain.)

Goal

Create or replicate the necessary replacement domain, or domain and organization at the Clearinghouse that currently serves the old domain. If the domain you are renaming or merging exists at more than one of your local servers, do this stage at the server that has the most unused space in its Clearinghouse database. (Use the Clearinghouse Service **Show Status** command to determine this.)

Do not replicate the replacement domain to your other server(s) until Stage 16. If your old domain is currently replicated at other sites (to improve its accessibility and reliability) the System Administrators at those other sites should not replicate the replacement domain until Stage 16.

IMPORTANT CLARIFICATION: The domain change-over procedure will progress more quickly and easily if there is only one copy of the replacement domain. Therefore, no new instances of any domain should be created at any site unless the new domain or replicated copy is essential to that site's specific change-over procedure. During Stage 16, the replacement domains, or domains and organizations can be replicated as appropriate to maximize efficiency, accessibility, and reliability.

If the goal of your change-over procedure is to merge multiple domains into a single domain, there will be multiple copies of your replacement domain, since multiple sites will be directly affected by the merger. Other sites may wish to have copies of this replacement domain. These may all be sites that currently have copies of the domain(s) in which it is contained. These sites should not replicate the domain until Stage 16.

Additionally, register yourself as a user of the replacement domain and then add your new user name to the Domain Administrator lists of the replacement domain and of the old domain. This will allow you to administer the domain using your new user name and password for the remainder of the procedure.

Local access requirement

Accomplish this stage directly at the server that is to gain the new or replicated domain. You may need to enlarge the Clearinghouse Service database at the server.

Interruption of network services

This stage results in approximately a half hour interruption in the Clearinghouse Service that is to gain a domain, or domain and organization. Additionally, co-resident services are off-line for a few minutes during and after the boot. Therefore, it is best to do this during off-peak hours.

Synchronization requirement

Begin after the Coordinating System Administrator gives the go-ahead. This can happen as soon as the Coordinating System Administrator has prepared the material required.

Read your Stage 2 instruction sheet. Decide which of the following situations apply to you:

- If you are introducing a new replacement domain, or replacement domain and organization at your local Clearinghouse Service, refer to Procedure A below.
- If you are replicating an existing replacement domain, or replacement domain and organization to your local Clearinghouse Service, refer to Procedure B below.
- If your replacement domain already exists in your local Clearinghouse database, refer to Procedure C below.

Procedure A

1. Determine whether there is enough space for the replacement domain by typing **Show Status** and pressing <RETURN> on the local Clearinghouse Service which will have the newly created domain. This command will display the total amount of free disk pages in your Clearinghouse database.

   Compare the total number of free disk pages in the database with the expected size of the replacement domain. If the database has enough space to accommodate the replacement domain, go on to step 2. If not, subtract the total number of free data base pages from the expected size of the replacement domain. You will need to enlarge the database by this amount.

   To enlarge a Clearinghouse Service Database:

   a. Stop all services.

   b. Boot the server and select a non-normal startup. Type the number corresponding to "Interrupt before running services" and press <RETURN>.

   c. Log on and enable in the Clearinghouse Service context. The Services Executive ! prompt will reappear.

   d. Type **Run Service** and press <RETURN>. Run only the Clearinghouse Service. Specify a non-normal startup of the Clearinghouse.

   e. Select the "Expand Database" option from the non-normal startup menu.

f. Enter the number of additional pages needed. The Clearinghouse will expand the database and bring it on-line for network access.

g. Type **Proceed** and press <RETURN> to cause all other activated services to run.

2. You now need to create the replacement domain at your local server. If your Stage 2 instruction sheet indicates that you are to introduce a new organization as well as a new domain, have the necessary organization password on hand before you do the following steps.

   a. Type **Stop Service** and press <RETURN>. Select the Clearinghouse Service. Type **Y** to the "Stop Immediately?" prompt. Set the context to Clearinghouse Service.

   b. Type **Add Domain** and press <RETURN>. Respond to the prompt for domain name. Specify the organization name if it is different than the current default.

      Note: Do not use a domain name that has been used within the last 30 days.

      If you are adding a new organization to the internet, you are prompted to enter the corresponding organization password. (You must be logged on as an Organization Administrator to create an organization.)

   Carefully re-check the spelling and case of domain and organization names before confirming.

3. You must now add yourself and one other assistant System Administrator as users of the new domain.

   a. Type **Change Default** and press <RETURN>. Specify your newly created domain and organization.

   b. Type **Add User** and press <RETURN>. Respond to user name, alias, home File Service, and password prompts and for yourself and your assistant System Administrator by entering the information in the data sheets. Since you have set the domain and organization defaults to be consistent with that of the domain you have just created, the only change to this user data (the domain and possibly the organization names) is made automatically.

   When confirming the user information, you may be notified that the File Service you specified does not exist. The prompt is correct since you have not changed the File Service name yet.

4. Next you need to give yourself domain access to the domain you have just created. You must do this before you log off.

a. Type **List Users** and press <RETURN> to verify that your newly created users have been added.

b. Type **Change Domain Access** and press <RETURN>. Specify the domain that you have just created.

   Enter your new name and the name of the assistant System Administrator.

c. Type **Change Domain Access** and press <RETURN> again, but this time specify the domain that you are replacing. Once again, specify your new user name. Now that your new user name is on both domain access lists, you can enable System Administrator privileges for servers and services in either domain while logged on with your new identity. Repeat this for your assistant System Administrator.

5. If you created a new organization as a part of creating the first copy of a domain, you must also establish administrative access to the new organization by using the **Change Org Access** command.

   a. Type **Change Org Access** and press <RETURN>. Specify the organization you just created. Enter your name and the name of of the assistant System Administrator. Changes may be made later on, but this ensures that there are two individuals that can administer the new organization.

      Normally, it is not necessary to have more than one Organization Administrator at each site. However, since this is the first copy of the organization, and you do not want to take the risk that it will be inaccessible in your absence, you should temporarily grant this access right to your local assistant.

   b. Type **Change Org Access** and press <RETURN> again, but this time specify the organization that you are replacing. Once again, enter your new user name. Now that your new user name is on the organization and domain access lists, you can enable System Administrator privileges for servers and services in either domain. Repeat this for your assistant System Administrator.

   c. Type **Show Domain** and press <RETURN> on both domains to insure that each is administered by the System Administrators you have just designated.

   d. Type **Show Org** and press <RETURN> on both organizations to ensure that each is administered by the System Administrators you have just designated.

   e. Type **List Organizations** and press <RETURN> if you have created a new organization to insure that it appears in the list of organizations.

   f. Type **Start Service** and press <RETURN>. Select the Clearinghouse Service and then log off.

6. Proceed to Stage 3.

Procedure B

1. Type **Show Status** at the Clearinghouse that is to hold the replicated domain to ensure that there are enough disk pages to accomodate it.

   Compare the total number of free disk pages in the database with the expected size of the replacement domain. The size of the replacement domain will be larger than the old domain because you are merging your domain with one or more others. If the database has enough space to accommodate the replacement domain, go on to step 2. If not, subtract the total number of free database pages from the expected size of the replacement domain. You will need to enlarge the database by this amount.

   To enlarge a Clearinghouse Service database:

   a. Stop all services.

   b. Boot the server and select a non-normal startup. Type the number corresponding to "Interrupt before running services" and press <RETURN>.

   c. Log on and enable in the Clearinghouse Service context. The Services Executive ! prompt will reappear.

   d. Type **Run Service** and elect to run only the Clearinghouse Service. Specify a non-normal startup of the Clearinghouse.

   e. Select the "Expand Database" option from the non-normal startup menu.

   f. Enter the number of additional pages needed.

   g. The Clearinghouse will expand the database and bring it on line for network access.

   h. Type **Proceed** and press <RETURN> to cause all other activated services to be run.

2. To replicate the domain:

   a. You need to have administrative access privileges for the replacement domain before you can replicate it to your local Clearinghouse Service. Enter the Clearinghouse Service **Show Domain** and **Show Org** commands, specify the name of your replacement domain and organization, and examine the list of administrators. If your name is not on the list, call a System Administrator who is on the list and ask him or her to enter the **Change Domain Access** and **Change Org** commands and enter your soon-to-be-obsolete fully-qualified name.

b. Type **Stop Service** and press <RETURN>. Select the Clearinghouse Service.

c. Use the **List Org** and **List Domain** commands to ensure that the Clearinghouse Service recognizes the replacement domain and organization. Contact the Coordinating System Administrator if the domain and organization names are not listed.

d. Type **Add Domain** and press <RETURN>. Specify your replacement domain (include organization name if different than current default).

3. You must now add yourself as a user of your replacement domain.

a. Type **Change Default** and press <RETURN> to match the domain (and organization) you just replicated.

b. Type **Add User** and press <RETURN>. Respond to prompts for user name, aliases, home file service, password, and so forth, by entering the same information currently in the data sheets. Since you have set the domain and organization defaults to be consistent with the domain you have just created, the only changes to this user data (the domain and possibly the organization names) are made automatically.

When confirming the user information, you may be notified that the File Service specified within this user information does not exist. The prompt is correct since you have not yet renamed the File Service.

c. Type **Change Domain Access** and press <RETURN> to specify the domain that you have just replicated. Specify your new user name.

d. Type **Change Org Access** and press <RETURN> to specify the organization that you have just replicated.

e. Type **Change Domain Access** and press <RETURN> again, but this time specify the domain that you are replacing. Specify your new user name. Now that your new user name is on both domain access lists, you can enable System Administrator privileges for servers and services in either domain while logged on with your new user name.

f. Type **Change Org Access** and press <RETURN> again to specify the organization that you have just replicated.

g. Type **Show Domain** and press <RETURN> on both domains to insure that each is administered by you under your new user name. Your old user name should also appear.

h. Type **Show Org** and press <RETURN> on both organizations to ensure that each is administered by the System Administrators you have just designated.

i. Type **Start Service** and press <RETURN>. Select the Clearinghouse Service.

4. Proceed to Stage 3.

Procedure C

1. You need domain and organization access privileges to the replacement domain which already exists on your local server. Use the Clearinghouse Service **Show Domain** and **Show Org** command and examine the list of Administrators. If you are not in this list, contact someone who is and arrange to be added to it by means of the **Change Domain Access** and **Change Org Access** commands.

2. Log on and enable at the server housing the replacement domain.

3. Now determine if your database will accommodate the replacement domain once it reaches its final size. Type **Show Status** and press <RETURN> on the local Clearinghouse Service which has the replacement domain. This command will display the total amount of free disk pages in your Clearinghouse database.

   Compare the total number of free disk pages in the database with the expected size of the replacement domain. If the database has enough space to accommodate the replacement domain once it reaches its expected final size, go on to step 5. If not, subtract the total number of free database pages from the expected size of the replacement domain. You will need to enlarge the database by this amount.

4. To enlarge a Clearinghouse Service database:

   a. Stop all services.

   b. Boot the server and select a non-normal startup. Interrupt before running services.

   c. Log on and enable in the Clearinghouse Service context. The Services Executive ! prompt will reappear.

   d. Type **Run Service** and press <RETURN>. Elect to run only the Clearinghouse Service. Specify that you do not want a normal startup of the Clearinghouse.

   e. Select the "Expand Database" option from the non-normal startup menu.

   f. Enter the number of additional pages needed.

   g. The Clearinghouse will expand the database and bring it on-line for network access.

   h. Type **Proceed** and press <RETURN> to cause all the activated services to run.

5. Add yourself as a user of the replacement domain. You are currently on the Domain Administrator's list, but your user name contains your old domain, or old domain and organization name. Since you are replacing this old domain, you need a new user name.

   a. Type **Change Default** and press <RETURN>. Enter the name of your replacement domain and organization.

   b. Type **Add User** and press <RETURN>. Enter your distinguished name as it appears in your domain data sheet. Respond to all of the subsequent prompts with the same information that is currently in your old user entry, as shown on your domain data sheet. Approve the information if you have typed it correctly. You may be told that your home File Service does not exist. This is normal because you have not yet changed its name.

6. You now need to add your new user name to the domain access lists of the old domain, and the domain which you are using as the replacement domain.

   a. Type **Change Domain Access** and press <RETURN>. Enter the name of the replacement domain. Enter your new fully-qualified name.

   b. Type **Change Domain Access** and press <RETURN> again, but specify the domain you are replacing. Enter your new fully-qualified name. Now you can enable System Administrator privileges for servers and services in either domain while you are logged on with your new name.

   c. Type **Show Domain** and press <RETURN>. Enter the name of the domain you are replacing. Make sure your new user name is on the Administrator's list for that domain.

   d. Type **Show Domain** and press <RETURN> again, but enter the name of the replacement domain. Make sure your new user name is on its Administrator's list.

7. Log off from the Clearinghouse Service context.

8. Proceed to Stage 3.

Stage 3. Registering users and user groups in replacement domains

Responsible System Administrators(s) The participants in this stage are System Administrators who are directly responsible for a domain change-over.

Goal Add users and groups to the appropriate replacement domain. Add each user who is currently registered in the domain you are replacing to the replacement domain. Add each user group that is currently in the old domain to the replacement domain. Add each member that is currently in a user group in the old domain to the corresponding new user group in the replacement domain.

Local access requirement It is easier for you to use the 6085/8010 Remote System Administration feature to accomplish this stage. Otherwise, obtain hardcopies of your user data sheets and accomplish this stage directly at the server.

Interruption of network services There is no interruption to any network service by this stage.

Synchronization requirement You can begin this stage as soon as you have completed Stage 2.

Procedure

1. Log on and enable in the Clearinghouse Service context (with your **new** user name). Work from your domain data sheets. If you have trouble logging on with your new user name, it is because your replacement domain exists at more than one location, and your workstation has contacted an instance of the domain that does not know about you yet. You can try booting your workstation. This may cause it to contact a different, up-to-date instance of the replacement domain. If this does not help, wait about 20 minutes to one hour and try again.

2. Type **Change Default** and press <RETURN> to set the default to match the name of your replacement domain. Remember that you can use the Clearinghouse Service **Show Default** command to verify that the current default is what you want. Once the default is set appropriately, you will not need to specify any domain or organization names for the remainder of this stage.

3. Type **Add User** and press <RETURN> to add each user currently registered in the domain you are replacing.

4. Type **List Users** and press <RETURN> to verify that all users are correctly registered.

5. Type **Add Group** and press <RETURN> to add each group currently registered in the domain you are replacing.

6. Type **Add Member** and press <RETURN> to add all members to the newly created groups. The goal is to establish exactly the same group memberships which exist in the domain you are replacing. The only difference should be the domain, or the domain and organization names. Your domain data sheets show the current access privileges for the members in the groups you are recreating. Retain those same access privileges.

7. Type **Change Group Access** to establish access lists to the newly created group.

Note: When users log on with their new names for the first time, they must use their fully-qualified names.

Stage 4. Updating file drawer access lists

Responsible System Administrator(s) The participants in this stage are all System Administrators on the internet who administer a File Service.

Goal Update all file drawer access control lists with entries that contain replacement domain, or domain and organization names. Users, patterns and groups included in these access control lists may contain old domain, or old domain and organization names. For each of these names, add a new name which has the appropriate replacement domain name, or domain and organization names. Do not delete the old names yet. You will do this in a later stage.

Local access requirement This stage can be done with equal ease directly at the server's local console, or at the Remote System Administration window.

Interruption of network services There is no interruption to any network service.

Synchronization requirement All System Administrators responsible for Stage 3 must have completed their activities before any System Adminstrator can begin this stage. The Stage 4 through 6 go-ahead should be given by the Coordinating System Administrator so that System Administrators responsible for one or more stages from 4 through 6 know when they can begin.

Special logon requirement You will have to log on with your old user name because your access privileges to file drawers specify your old user name. It is possible that others with change access privileges on file drawers have removed you from the access list, or have limited your privileges. If you are not listed as having change access privileges, contact one of the users who does. This user will either have to reinstate your change access privileges, or update that drawer's list for you.

Procedure

1. For each File Service that you administer, type **List File Drawers** and press <RETURN>. Specify that you wish to see the access lists for each. Check each access list for patterns, group names, or user names which have old domain, or old domain and organization names. For each such entry do step 2.

2. Type **Change File Drawer** and press <RETURN> to add a new equivalent for each of the patterns, groups, or user names found in Step 1. The new equivalent should have the appropriate new domain, or domain and organization name. Your complete list of all new user and user group names will help you. Do not delete the soon-to-be-obsolete patterns, groups, or user names. Capture your activities for each drawer as they will help you when you accomplish a later stage.

Stage 5. Updating user group members in long-term domains

Responsible System Administrator(s)

The participants in this stage are System Administrators who administer a long-term domain (one that existed prior to Stage 2 and which will exist after the completion of the renaming or merging procedure). Note that all domains that existed prior to Stage 2 and which are being used as replacement domains for the merging procedure should also be checked and updated if necessary.

Goal

Update all group-memberships in the long-term domain you administer. This requires that you check all long term user groups for user names, patterns, or groups which include soon-to-be-obsolete domain, or domain and organization names. For each such member, add the same member again, but change the domain name, or the domain and organization names. Do not delete old members. You will do so in a later stage.

Interruption to network services

There is no interruption to any network service.

Synchronization requirement

You can begin this stage as soon as you have completed Stage 4. When you finish, you can go immediately to Stage 6 if applicable. Otherwise, notify your Coordinating System Administrator that you are done and wait until the next go-ahead.

Procedure

1. Log on and enable in the Clearinghouse Service context.
2. Type **Change Default** and press <RETURN> to match the name of the long-term domain you administer.
3. Type **List Groups** and press <RETURN>. Then type **List Members** and press <RETURN> for each of these groups. Check the membership of each group to see if any of the users, patterns, or groups contain old domain, or old domain and organization names.
4. Working from your data sheet showing new user and group names for your network community, use the **Add Member** command to add additional members to correspond to each group, user, or pattern that contains an old domain, or an old domain and organization name. Do not delete the patterns, groups, and users that have old domain and organization names. You will delete them in a later stage.
5. Log off from the Clearinghouse Service context.

Stage 6. Adding mailboxes to long-term Mail Services, if necessary

Responsible System Administrator(s)

The participants in this stage are System Administrators who administer Mail Services in long-term domains.

Goal

This stage may not be necessary in your network community. It only affects Mail Services that are registered in long-term domains (Mail Services not being replaced), and which contain mailboxes for users registered in soon-to-be-obsolete domains. Check your Mail Service's mailboxes and do this stage if there are any mailbox names which will soon be obsolete.

(Explanation: A given Mail Service might contain mailboxes for users who are registered in domains other than the domain of that Mail Service. Therefore, if your long-term Mail Service has any mailboxes for users who are to receive name changes, you must create new mailboxes for each of these users. You will leave both the old and new mailboxes at the Mail Service and delete the old ones in a later stage.)

Local access requirement

This stage can be done with equal ease at the server's local console, or at the 6085/8010 Remote System Administration window.

Interruption to network services

There is no interruption to any network service.

Synchronization requirement

This stage can begin as soon as Stage 5 is completed. Inform the Coordinating System Administrator as soon as you have completed this stage.

Procedure

1. Log on and enable in the Mail Service context.
2. Type **List Mailboxes** and press <RETURN>. Note which mailboxes have old domain, or old domain and organization names.
3. Type **Add Mailbox** and press <RETURN> for each user that currently has a box at your server and is to receive a new user name. Check your listing of new user names to find the correct new domain, or domain and organization name for each user. Do not delete the old mailboxes yet.
4. Log off from the Mail Service context.

Stage 7. First general announcement

Responsible System Administrator(s)

The participants in this stage are the Coordinating System Administrators.

Goal

Inform the network community that all services and servers currently in domains that are being replaced are about to be renamed and will therefore be off-line for one-half hour or more. Distribute a schedule indicating when Stage 8 will be completed.

Warn all users that are to lose mailboxes (by means of the abrupt approach) of the final deadline for retrieving their mail. Users who will lose mailboxes because their user name is changing, but who have mailboxes on long-term Mail Services or on Mail Services that are being phased out gradually, do not need to retrieve their mail until after the Stage 10 general announcement.

If any of your domains are replicated, warn your users of the irregularities that they may experience. These are described under the "Interruption to network services" heading in Stage 8.

Local access requirement

Not applicable.

Interruption to network services

There is no interruption to any network service.

Synchronization requirement

As soon as System Administrators who are responsible for Stages 4 through 6 have reported they are done, the schedule for Stage 8 can be finalized and distributed. The System Administrators can begin Stage 8 according to the schedule. You can give as much advanced warning about the start of Stage 8 activities as you feel is appropriate. Stage 8 can advance at a convenient pace for you and the other System Administrators. They must report that they are completely done before you can send out the next announcement described in Stage 9.

Procedure

There are no procedures for this stage.

Stage 8. Renaming servers and services/installing and configuring replacement Mail Service(s)

Responsible System Administrator(s)

The participants in this stage should all be System Administrators directly responsible for a domain change-over.

Goal

Rename all servers and services at your site that are currently registered in a domain you are replacing. If your site has a Mail Service that is registered in a domain you are replacing, you cannot rename it. You must apply the phase-out approach that your Coordinating System Administrator selected for you. Both approaches are described in Procedure C.

Local access requirement

Accomplish these activities at the server's local consoles. If you are renaming more than one server, move on to the next server only after you are finished with the first one.

Interruption to network services

Each server that is to be renamed will be off-line for approximately a half hour. During this time, you will rename the server and each of its services, and verify that they register their new names. After this, the server and the services it houses can be brought back on-line and will be accessible by their new names.

Since the addresses of the services and servers that are being renamed do not change, 6085/8010 desktop users do not need to retrieve new icons for any service other than the File Service. However, if a user's fully-qualified name is not changing and the user's mailbox is resident on a Mail Service that is being phased out gradually, they will have to retrieve a new in-basket icon.

If you are responsible for starting the gradual phase out of a Mail Service, there is no additional interruption in mail service beyond the half-hour delay for renaming the servers housing the old Mail Service.

Once the servers and services have been renamed and brought back on-line, some users in the network community may experience the following types of errors which persist for up to two days after the completion of Stage 8:

- *Erratic service access difficulties* - If any of the replacement domains are replicated, a user trying to access a newly renamed service may find that the service is not yet recognized by the instance of the service's domain. In this case an error message will be displayed stating that there is no such service. This error condition will cease two days after completion of Stage 8. It should not be a common problem as most users need to access services which are local to their site, and it is likely that their local Clearinghouse Service will be the one that is contacted when they attempt to access a service.

- *Temporary inconveniences caused by abrupt phase out of a Mail Service* - If you are responsible for an abrupt phase out of a Mail Service, the following may be noticed in your network community:

  - For an abrupt phase-out of one or more Mail Services, there will be up to an hour delay between the time that the old Mail Service is expunged, and the new Mail Service is ready to post and receive mail.

  - Users who have mailboxes on Mail Services that are being phased out abruptly will lose their current mailboxes. New mailboxes will be created for them at the replacement Mail Service. This means that these users must read their mail before the abrupt phase-out occurs.

  - Users who wish to direct mail to other users or groups who are to gain new names will not be able to do so until after the Stage 9 announcement.

  - Users who direct mail to those who have received new mailboxes will notice irregular error conditions that seem to indicate that some users do not have mailboxes. These irregular errors will only occur if the domain of the user who has a new mailbox is replicated. Since it takes about 24 hours for each instance of a domain to learn about a given update, the fact that a new mailbox exists for a particular user may not be known to all instances of a domain. This irregular error condition will disappear about 24 hours after the new mailboxes have been created.

Synchronization requirement

This stage is accomplished according to the schedule distributed by the Coordinating System Administrator during Stage 7. You should issue one final warning to users directly affected by the abrupt Mail Service phase out (those who must read their mail or lose it). Tell your Coordinating System Administrator when you have completed this stage.

Procedure A. Renaming the server

Do the following on each server according to the schedule distributed by the Coordinating System Administrator.

1. Log on and enable using your new, fully-qualified name.

2. Type **Change Profile** and press <RETURN>. Select the server portion of profile. Select the number corresponding to the server name.

3. Enter the new, fully-qualified server name.

4. Type **Stop Service** and press <RETURN>. Select all services to be stopped.

5. Boot the server. Select a non-normal startup. Type the number corresponding to "Interrupt before running services" and press <RETURN>.

6. If your server does not enter Genesis Mode, you are prompted to log on. Enter your new, fully-qualified user name. The server will change its registration and inform you when it is done. You may see the error

message "Ill-formed name in server profile." If so, you are prompted to enter the server's fully-qualified name. Enter the new name again.

7. If your server enters Genesis Mode, you will not be prompted to log on. It will do this if it houses the only copy of the domain in which it is to register. If this happens, type **Run Service** and press <RETURN>. Then run only the Clearinghouse Service, specifying a normal Clearinghouse startup. When the Clearinghouse Service is on-line and the prompt reappears, log on with your new user name and enable yourself. Then enter the **Register Server** command. The server will change its registration and will inform you when it is finished.

8. Do not type **Proceed** yet.

Procedure B. Renaming all the services

Rename all of the services in the following order. Skip over the steps for services not resident on the server you are renaming.

Internetwork Routing Service(IRS)

To rename the IRS, you must use an IRS non-normal startup option. Type **Run Service** and press <RETURN>, then select only the IRS to be run. Specify a non-normal startup. Type **Rename**. You will be prompted to enter the new name. After this, the IRS will register itself with the new name. Start the IRS, type **Start Circuits** and press <RETURN>.

Type **Proceed** and press <RETURN>. All other active services are run in priority order. When the ! prompt reappears. Continue with the External Communication Service.

External Communication Service(ECS)

Set the context to External Communication Service, type **Rename** and press <RETURN>. The ECS will delete its old Clearinghouse entry and prompt you to specify the new ECS name. The ECS will update the new domain with its new name, new description, and port configuration data.

Interactive Terminal Service(ITS)

Set the context to Interactive Terminal Service, type **Rename** and press <RETURN>. The ITS will delete its old Clearinghouse entry and prompt you to specify the new ITS name. The ITS will update the new domain with its new name and description.

File Service

Type **Run Service** and press <RETURN>, then select the File Service to be run. Set the context to File Service. Type **Offline** and press <RETURN>. Place all volumes off-line. Next, type **Change Volume** and press <RETURN>. Specify the first File Service volume you wish to rename. Enter the new name. The old File Service entry will be deleted. Type **Online** and press <RETURN>. Specify the volume which you have renamed. It will be registered in the new domain and brought on-line. Repeat this for each volume that is used as a File Service.

Print Service

Set the context to Print Service. Stop the Print Service. Enter the Print Service **Rename Print Service** command. The current name is deleted from the Clearinghouse and you are prompted for the new name. The Print Service will update the new domain with its new name and description. When registration is complete, re-start the Print Service.

850/860 Gateway Service(GWS)

Set the context to Gateway Service. Use the GWS **Delete Configuration** command. Refer to the 850/860 Gateway Service data sheet provided to you. Use the GWS **Add Configuration** command. Re-enter old configuration data, making the name change at the same time. The new data will be stored in the Server Profile and the name will be registered with the Clearinghouse.

Remote Batch Service(RBS)

Set the context to Remote Batch Service, type **Rename** and press <RETURN>. The old Clearinghouse entry will be deleted and you will be asked to supply the new name. The new name will be registered. See Step 3 for instructions about configuration changes you should make.

Use the RBS **Change Partner** command to change the name of the File Service that the RBS uses for its input and output bins if the name of that File Service has been changed. If the RBS uses a File Service that is registered in a different domain, and that domain is also being changed, enter the appropriate new File Service name. Depending on the progress of the rename at the site containing this File Service, you may not be able to complete this operation, as the RBS may not find the new name in the Clearinghouse Service.

Note: You cannot rename the Mail Service, Clearinghouse Service, Boot Service, or the Server Monitor Service.

Procedure C. Phasing out the Mail Service

Abrupt phase out

Check the schedule to confirm the planned time for this abrupt phase out. Remind all users that they have only a few more minutes to read their mail. When you are ready to expunge the Mail Service, do the following:

1. Type **Stop Service** and press <RETURN>. Select all services to be stopped.

2. Boot the server. Select a non-normal startup. Type the number corresponding to "Interrupt before Running Services" and press <RETURN>.

3. Log on and enable. If the server enters Genesis Mode because it houses the only copy of the domain, you will not be able to log on, but you will be able to continue with this operation anyway.

4. Type **Expunge Service** and press <RETURN>. Select the Mail Service and enter **Y** to the "Confirm?" prompt. When the operation is completed, boot the server again, select a non-normal startup, type the number corresponding to "Interrupt before Running Services" and press <RETURN>. Log on and enable. **Do not use the Proceed command yet.** If the server enters Genesis Mode, you will not be able to enable. However, you can still do the following steps.

5. Place the Mail Service installation floppy disk in the disk drive. Type **Install Service** and press <RETURN>. Select the Mail Service to be installed. Approve activation of the Mail Service. (If your server is in Genesis Mode, type **Run Service** and press <RETURN>. Select only the Clearinghouse Service to be run and specify a normal startup. After it has been run, log on and enable.)

6. Type **Proceed** and press <RETURN>. The Mail Service will initialize. As a part of the initialization, you will be naming it and waiting for it to register with the replacement domain. If it is to support External Mail Gateways, you will be prompted for the local gateway telephone number and baud rate of the modem. Refer to your domain data sheets for this information.

   Go on to the "Configuring the Mail Service" and "Configuring the Mail Gateway" sections on the next page.

Gradual phaseout

If you administer a Mail Service that is to be phased out gradually, do the following to install and configure your replacement Mail Service.

1. Log on and enable at the server that is to house the Mail Service.

2. Type **Show Software Options** and press <RETURN>. The resulting display shows which options are currently enabled on the server. If the Mail Service and External Mail Gateway Option (if you require it) are not currently enabled, type **Set Software Options** and press <RETURN>. Record the current software serial number effective on the server, phone the Software Control Center, and provide them with this number. They will provide a new serial number which you can enter and thereby gain the Mail Service, and External Mail Gateway option (if appropriate).

   Note: If your Xerox Representative is present, you do not need to use the **Set Software Options** command. Instead, the Xerox Representative can insert the Xerox Configuration Utility diskette, boot while the Maintenance Panel displays 0002, and then enable the necessary options at the server.

3. Boot the server and specify a non-normal startup. Type the number corresponding to "Interrupt before Running Services" and press <RETURN>.

4. Log on and enable. (If the server has entered Genesis Mode, you won't be able to log on. To remedy this, type **Run Service** and press <RETURN>. Elect to run only the Clearinghouse Service, and approve a normal startup. After the Clearinghouse Service is on-line, you will be able to log on and enable.)

5. Type **Install Service** and press <RETURN>. Select the Mail Service.

6. Type **Proceed** and press <RETURN>. The Mail Service will prompt you for its name and initialization data. During initialization, you will be naming the Mail Service and waiting for it to register with the replacement domain.

Go to the sections below to configure the Mail Service and its External Mail Gateway. Stage 14 completes the gradual Mail Service phase-out. After you complete the sections below, continue with the following stages in the order specified. Do not go directly to Stage 14.

Configuring the Mail Service

1. Log on and enable in the Mail Service context, if necessary.

2. Type **Add Mailbox** and press <RETURN> to add (or move) a mailbox for every user that has (had) a mail box on the old Mail Service. Be sure to enter a new identity for each user. If you are following the gradual phase-out approach, only those users whose names are going to change as a result of the domain rename or merger will get new mailboxes. Other users with mailboxes on the Mail Service that is being gradually phased out can keep their mailboxes, but you must move them from the old Mail Service to the new one. When you use the **Add Mailbox** command and specify a name to be added, it will check for a mailbox of that same name on the old Mail Service and will move it to the new Mail Service.

3. Type **Set Backup Parameters** and press <RETURN> to establish the target for backups.

   Re-configure your foreign gateway just as it was configured on the old Mail Service. Your data sheets provide the gateway configuration information you will need. If you used the gradual phase-out approach, do not start the foreign gateway until you have disabled it at the old Mail Service.

Configuring the Mail Gateway

1. Type **Add Foreign Gateway** and press <RETURN> to add the same foreign gateways served by the old Mail Service's External Mail Gateway. Refer to the *Mail Service* booklet for details on configuring foreign gateways.

2. Type **Add Foreign Domain** and press <RETURN> to add the same foreign domain served by the old Mail Service's

External Mail Gateway. Refer to the *Mail Service* booklet for details on configuring foreign gateways.

Notify foreign internets if you had to change the phone number of your local port due to the change to a different server.

Stage 9. Starting user change-over

Responsible System Administrator(s)

The primary participants for this stage are all Coordinating System Administrators. All System Administrators directly responsible for a domain change-over should assist users who are changing profiles and backing up folders, documents, and in-baskets. Users who received name changes are involved in this stage as well.

Goal

Notify the user community that the servers and services have been renamed. Users who are to have new user names now have new mailboxes. Users can begin to use their new names as soon as they complete the following:

- 6085/8010 users must back up their in-baskets, folders, and documents. They can back up to a File Service or to floppy, but cannot "save" their desktop, as they will not be able to retrieve it when they log on with their new name. Once these backups have been completed, the desktop should be deleted. 6085/8010 users will be able to log on with their new user names and passwords.

  All 6085/8010 users must retrieve new file drawer and reference icons because of the name change. Other icons will still be accessible despite the name change.

- IBM PC, 820, and 860 workstation users must change their workstation user profile.

All members of the network community can begin sending mail to the new user and group names.

Local access requirement

Not applicable.

Interruption to network services

None. However, if the abrupt Mail Service phase-out approach was taken, users who have new user names will not be able to read their mail until they are ready to begin logging on with their new names. Other members of the network community should be notified that some recipients may be slow in responding to mail messages.

Irregularities

There may be discrepancies between the different instances of the same domain if a replacement domain is replicated. These discrepancies could cause the following problems.

- Users may not be able to log on with their new user name because the local Clearinghouse may not have their new user entry. Users should boot their workstations and try to log on again to correct the problem.

- Users may not be able to access protected file drawers at File Services because the domain that the File Service contacts may not be up to date. Users should make another attempt to access the file drawer later.

- Users who send mail to new user or group names may be informed that the mail is undeliverable. This is because the domain that is contacted by the Mail Service does not yet know about the new mailboxes. By the time the user receives this message, the instances of the domain will probably have become consistent and the message can be successfully re-sent.

- Users who attempt to access newly renamed resources (services, servers) may be told that the service does not exist. This is because the domain their workstation contacts may not have the new entry for the specific service or server. There is no remedy other than trying again later on.

All of the above except for the last instance can be minimized or eliminated by delaying the start of this stage 24 hours after completing Stage 8. The irregularities described in the last instance will be experienced no matter how quickly or slowly you progress, but should cease 24 hours or so after the completion of Stage 8.

Synchronization requirement

If none of your replacement domains are replicated, you can begin this stage as soon as all System Administrators responsible for Stage 8 have notified you that they are done.

If one or more of your replacement domains are replicated, you should consider delaying the start of this stage by 24 hours. In other words, you may want to delay before users begin logging on with their new names. Read the following explanation of the impacts of shortening or prolonging the delay between completion of Stage 8 and the start of this stage. Then make your decision.

Prolonged delay

If your network community includes a replacement domain that is replicated, it is a good idea to allow 24 hours to lapse between the end of Stage 8 and the beginning of Stage 9. Since users will be logging on with their new user names after the Stage 9 announcement, every instance of the replacement domain should be consistent so that users who have received name changes will be able to successfully log on, receive mail at their new mailboxes, and access protected resources to which they have access.

Shortened delay

If you begin Stage 9 less than 24 hours after completing Stage 8, your users are more likely to experience the irregularities described under "Interruption to network services" above. If these occasional interruptions to normal network service are not a major concern, proceed as quickly as is practical for your network community. Your motivation for shortening this interval would be to reduce the cost of continuous interconnection between sites. This cost is only an issue if your network community normally uses transient (dial-up) links. Otherwise, there is no increased cost.

Procedure

There are no specific instructions for this stage. However, each System Administrator at a site that is directly affected by a change-over should log on to each local File Service, and use the **List Desktops** command to record which users currently have stored their desktops. These users should be told to retrieve these desktops and store their files, folders, and in-baskets, or they will not be able to access them once the change-over is complete.

Stage 10. Third general announcement

Responsible System Administrator(s)

The participants for this stage are the Coordinating System Administrators. System Administrators directly responsible for a domain change-over should make sure that their users are aware of the warning.

Goal

Issue a final warning specifying when all users with new names must change-over permanently to use their new names and passwords. This means that all users who have not retrieved all mail from their old mailboxes must do so before the specified time. Specify a date and time that is convenient for the user community as a whole.

The renaming or merging domains procedure is carefully designed to allow the interval between the start of Stage 9 and the time specified in this final warning to be as long as is needed to allow a gradual change-over. Users who are traveling, or for some other reason unable to change over quickly, can be accommodated by this interval at the Coordinating System Administrator's discretion.

Interruption to network services

There are no interruptions to network services.

Synchronization requirement

This stage is done at an appropriate time in advance of the date and time specified in its final warning. See *Goal* above. The four subsequent stages can be started immediately at the date and time announced in this final warning. You can wait as long as is convenient for your user community before all users log on with new user names. If you wish to cut the cost of continuous phone interconnection, you may wish to hurry your users along so that this stage can begin as soon as possible. If this is not a concern, consider the convenience of your user community, and the concerns of you and the other System Administrators responsible for completing this procedure.

Procedure

There are no procedures for this stage.

Stage 11. Removing obsolete entries from file drawer access lists

Responsible System Administrator(s)

The participants for this stage are all System Administrators that administer File Services. These are all the System Administrators who participated in Stage 4.

Goal

Remove all obsolete entries in file drawer access lists. Stage 4 involved entering redundant user names, patterns, and group names into access lists. These contained replacement domains, or domain and organization names, and corresponded to those already in the access list but which contained old domain, or old domain and organization names. During this stage, the obsolete user names, patterns, and groups are removed. At the end of this stage, all user names, patterns, and groups in file drawer access lists must contain only new or long-term domain and organization names.

Local access requirement

This stage can be done either directly at the server console, or from the 6085/8010 Remote System Administration window. If you did Stage 4 using this window, you have captured your input during that stage. This captured document will assist you in remembering which groups, users, and patterns you should delete from file drawer access lists.

Interruption to network services

There is no interruption to any network service.

Synchronization requirement

This stage can begin at each site containing a File Service at the time specified in the Stage 10 warning message. When you finish this stage, read the information for Stages 12 through 14. When you have completed all the stages you are responsible for up through Stage 14, inform your Coordinating System Administrator that you are ready for the final change-over. Await the go-ahead from the Coordinating System Administrator before you do any other activities after Stage 14.

Procedure

1. Log on and enable at the server housing your File Service.

2. Using the document you captured during Stage 4, enter the **Change File Drawer** command and remove obsolete users, patterns, and groups. This time, change the fully-qualified name in the "owner" field if that owner has received a new user name. Repeat this operation for each file drawer you updated during Stage 4.

Stage 12. Removing redundant members from user groups in long-term domains

Responsible System Administrator(s)

The participants in this stage are all System Administrators who administer long-term domains (domains which existed prior to Stage 2 and which will still exist after the rename or merging procedure is completed). These are all System Administrators who participated in Stage 5.

Goal

Remove obsolete group members from Clearinghouse user groups. In Stage 5, you added users, patterns, and groups to each user group that existed in your long-term domain and in your soon-to-be-obsolete domain. You now need to delete the obsolete members.

Local access requirement

This stage can be done either directly at the server console, or from the 6085/8010 Remote System Administration window.

Interruption to network services

There is no interruption to any network service.

Synchronization requirement

This stage can begin at the time announced in the final warning message issued in Stage 10. If you participated in Stage 11, you can begin this stage as soon as that stage is completed. When you have finished this stage, read the information for Stages 13 and 14. Determine if you are responsible for one or both of these stages. If you are, proceed to the next stage. If you are not responsible for either Stage 13 or 14, inform your Coordinating System Administrator that you are ready for the final change-over. Then wait for the go-ahead from the Coordinating System Administrator before you do any other activities after Stage 14.

Procedure

1. Connect to the server housing your long-term domain.
2. Log on and enable in the Clearinghouse Service context.
3. Using the document you captured during your Stage 5 activities, enter the **Delete Member** command and remove obsolete users, patterns, and groups. Repeat this operation for each group that you had to update during Stage 5.
4. Use the **Change Group Access** command and remove obsolete user names from the group access lists.

Stage 13. Deleting obsolete mailboxes from long-term Mail Services

Responsible System Administrator(s)

The participants in this stage are all System Administrators who participated in Stage 6. These are all System Administrators who administer Mail Services that are registered in long-term domains, and have redundant mailboxes for users who were previously registered in old domains but are now registered in the appropriate long-term domain.

Goal

Delete obsolete mailboxes from your long-term Mail Service (one which existed prior to Stage 8) which contains two mailboxes for each user that received a name change as a part of the change-over. Due to the warning issued during Stage 10, your affected users should have read all mail in their old mailbox. If this is not the case, you might want to give them additional time to do this before you delete their mailbox.

Local access requirement

This stage can be done either at the server console or from the 6085/8010 System Administration window. If you did Stage 6 via the System Administration window, you have captured your input during that stage. This captured document will assist you in remembering which mailboxes you added.

Interruption to network services

There is no interruption as long as the mailboxes you delete are empty.

Synchronization requirement

This stage can be started at the time specified in the Stage 10 warning message. When you finish this stage, wait for the next go-ahead from the Coordinating System Administrator before you do any activities in any subsequent stages. You may not be involved in Stages 14 through 15, but you should read the information for these stages to be sure.

Procedure

1. Connect to the server housing your long-term Mail Service.
2. Log on and enable in the Mail Service context.
3. Using the document you captured during your Stage 6 activities, enter the **Delete Mailbox** command and remove obsolete mailboxes.

Stage 14. Expunging Mail Services

This is the last activity in gradual phase out of a Mail Service.

Responsible System Administrator(s) The participants for this stage are all System Administrators responsible for the gradual phase out of a Mail Service.

Goal Expunge the Mail Service for which you installed a replacement in Stage 8 to complete the phase-out process.

Local access requirement This stage must be accomplished at the server's local console. It requires booting and use of commands during the non-normal server startup.

Interruption to network services There will be about a 20 minute interruption in service at the server housing the Mail Service. It is best to do this stage during off-peak hours.

Synchronization requirement This stage can begin at the time and date specified in the Stage 10 warning announcement. When you have finished this stage, inform the System Administrator that you are ready for the final change-over. Do not continue until you receive the go-ahead from the Coordinating System Administrator.

Procedure

1. Log on and enable at the server housing the Mail Service you are phasing out.
2. Type **Stop Services** and press <RETURN>. Boot the server and then select the non-normal server startup. Enter the number corresponding to "Interrupt before Running Services" and press <RETURN>.
3. Log on and enable unless the server has entered Genesis Mode. If the server has entered Genesis Mode, you can still do Step 4.
4. Type **Expunge Service** and press <RETURN>. Select only the Mail Service to be expunged.
5. Boot the server again to complete the expunge operation. Allow the server to start up normally. All of the active services will be run.

Stage 15. Deleting obsolete domains, or obsolete domains and organizations

Responsible System Administrator(s)

The participants for this stage are all System Administrators directly responsible for a domain change-over. These are the System Administrators who participated in Stages 2 and 3.

Goal

Delete all obsolete domains from your Clearinghouse Services. When this stage is complete, every copy of each obsolete domain will be deleted from the Clearinghouses where they resided. Organizations will be deleted automatically throughout the distributed Clearinghouse Service database once the last copy of every domain within that organization has been deleted.

CAUTION: Deletion of the last copy of a domain is permanent. Be very careful to delete only the domain(s) that have been renamed or merged (replaced). Check with your Coordinating System Administrator if you have any doubts.

NEVER DELETE A DOMAIN (OR PERFORM ANY SYSTEM ADMINISTRATION TASKS) FROM A SERVER WHILE THE SERVER IS UNPLUGGED FROM THE ETHERNET. Unplugging the server from the Ethernet, and leaving it unplugged while administering it, is a violation to network security and stability. Such a violation can result in serious damage to the distributed Clearinghouse database.

Possible complications

It takes approximately 24 hours for the distributed Clearinghouse database to learn that a domain or an organization is gone. Sometimes the distributed database cannot delete all knowledge of a former domain or organization. This may happen if an instance of a domain was deleted from a server that was unplugged from the Ethernet. This prevents the distributed Clearinghouse database from knowing that an instance of a domain has been deleted. The rest of the system retains the fact that the domain is served by that particular Clearinghouse Service and cannot be updated unless the same domain is re-created (or replicated) and then deleted properly.

If a domain or an organization was deleted from a server while the network was running OS 4.x software, the fact of the deletion may not have properly propagated.

To determine whether a complete deletion has occurred, use the Clearinghouse Service **List Domains** and **List Organizations** commands.

If a domain or organization that was deleted still appears with either of these commands, this does not mean that your change-over procedure was not a success. Once you have completed all of the stages in this procedure, the domain change-over has occurred for all practical purposes. The remaining abnormality should be of no consequence to your network community. No additional disk space is used, and it causes no additional load on any network service or hardware element.

If your company finds it unacceptable that the deleted domain or organization names appear in Clearinghouse Service list displays, contact your Xerox Representative for an assessment of the feasibility of removing these last traces from your distributed database.

Local access requirement Do this stage at the server's local console.

Synchronization requirement Wait for the Coordinating System Administrator to give the Stage 15 go-ahead. All previous stages must be completed at all sites before starting this stage.

Procedure

1. Log on and enable at the server housing the domain you are to delete.

2. Type **Stop Service**. Select the number corresponding to the Clearinghouse Service.

3. Get into the Clearinghouse context. Type **Delete Domain** and press <RETURN>. Specify the domain to be deleted. The domain will be removed from your local database. Additionally, it might be withdrawn from the internal map kept at all Clearinghouse databases. This is because you are deleting the only remaining copy of this domain. You will be asked to approve destruction of the domain.

   Note: You may find that you cannot delete the domain because you have insufficient access. This is because you are trying to delete the last copy of the only remaining domain in an organization. Since deletion of the last copy of the last domain from an organization causes deletion of the organization from the distributed database, you must have administrative access rights to the organization. You need to contact your Coordinating System Administrator to arrange for these privileges.

Stage 16. Replicating domains

Responsible System Administrator(s)

The participants for this stage are all System Administrators who had local copies of one or more domains which have been replaced, but who had these domains only for increased reliability and accessibility of the domain. These System Administrators are left without copies of the replacement domains. This stage remedies this.

Goal

The goal of this procedure is to establish the same domain locations that existed prior to the change-over. Domains which have been replaced have now been deleted from every server where they formerly resided.

The replacement domains do not necessarily exist on every server where the old domains formerly resided. Replication of replacement domains was not allowed for any site that did not need the replacement domain as the new location of its users and resources. Those sites that formerly had copies of the old domains for increased accessibility and reliability do not yet have copies of the corresponding replacement domain.

Local access requirement

This stage should be done at the server's local console.

Synchronization requirement

If none of the replacement domains are replicated, this stage can be started as soon as all sites have completed all previous stages. If any of the replacement domains are replicated, this stage should not start until 48 hours after the completion of Stage 8. This will insure that the replicated domain is up-to-date. The propagation of out-of-date domains will be minimized, thereby speeding up the time it takes for the distributed database to stabilize.

Procedure

Refer to "What is domain replication?" in the "Setting up your Clearinghouse Service" section to replicate the appropriate replacement domain to your local server that housed the old domain. The total number of free pages in your Clearinghouse Service database should be 50 percent greater than the size of the domain you wish to replicate. Use the Clearinghouse Service **Show Domain** and **Show Status** commands to determine these figures. If you need to enlarge the Clearinghouse Service database before replicating the domain, refer to the "Expanding the Clearinghouse database" section in this booklet.

Stage 17. Taking down dial-up links

Responsible System Administrators The participants for this stage are all System Administrators who administer Internetwork Routing Services which normally use dial-up links.

Goal To take down the links which have been up continuously since the start of this procedure.

Local access requirement This stage should be done at the server's local console.

Interruption to network services There is no interruption beyond that which is normally caused by temporary isolation of an Ethernet site. See the field bulletin called "Side-effects of use of Dial-up Internetwork Links."

Synchronization requirement This stage cannot begin until 24 hours after all sites have completed Stage 16.

Procedure

If you administer an IRS that normally uses dial-up (transient) links, wait for the go-ahead from your Coordinating System Administrator so that you can stop the appropriate IRS circuit.

5. Messages

This section contains an alphabetical listing of messages that may be displayed for the Clearinghouse Service. Each message is followed by a brief explanation of the probable cause, and if applicable, the action that may be taken to resolve the situation.

When you see an error or informational message that you do not understand or want additional information about, write it down. Then, look it up in the following Clearinghouse Service message list. If the listing does not provide the information you are looking for, contact the Network Support Center.

<Alias> is already an alias for <name>.

Probable cause: An **Add** command has been rejected because the specified name is already used as an alias. A given name can be the distinguished name of an object or it can be an alias, but it cannot be both.

Action: Choose another name for the new object, or use the **Delete Alias** command to eliminate the conflicting alias.

Bad Return code while enumerating sibling domain.

When executing the **Compare Database** or **Add Domain** command, the Clearinghouse Service receiving the command could not contact the other Clearinghouse.

Action: Contact the Network Support Center.

Clearinghouse problem. Code = [< >(75B), first].
Clearinghouse problem. Code = [< >(76B), first].

Probable cause: The server housing the Clearinghouse Service is operating with the incorrect time. This could cause inconsistency or loss of data files. Invoke the recovery procedure immediately.

Action: Type **Show Time** to verify that the time is incorrect. If it is, reboot the server immediately and specify a normal startup of all services. After the server has completed initialization, type **Show Time** again to verify that the time is correct.

Clearinghouse problem. Code = [< >(120B), first].

Probable cause: When executing the **Compare Database** or **Add Domain** command, the Clearinghouse Service receiving the command could not contact the other Clearinghouse. (The number or message in the angles < > will appear within the message text.)

Action: Anytime you receive a "Clearinghouse problem. Code = <code>" message, the Clearinghouse software has encountered an unexpected fatal error condition that should be noted and reported to the Network Support Center.

Clearinghouse Service still running with old database.

Probable cause: Any of following error messages: "Failed! Could not complete backup;" "Failed! Could not complete restore;" "Failed! Database not restored;" "Failed! Failure during file transfer," or "Unexpected Filing Error" is immediately followed by this message. The failed backup or restore operation does not damage the local database.

Action: Try the backup or restore opration again. If the error persists, contact the Network Support Center.

Command ignored. This is not the only Clearinghouse server.

Probable cause: The manual **Backup** and **Restore** commands are disabled when multiple Clearinghouse Services exist in the internetwork.

Action: Instead of a manual backup and restore, use domain replication to provide database reliability.

Database unchanged.

Probable cause: This message appears when a change to an object is already represented in the database. No change to the database occurs. No action required.

Domain <domain:org> does not exist.

Informative message indicating that the domain name does not exist.

Domain <domain:org> is not served by this machine.

Informative message indicating that the domain name is not served by this machine.

Failed! Cannot authenticate user: <name>.

Probable cause: A **Backup** or **Restore** command has failed because the File Service could not verify the identity of the logged-on System Administrator.

Another (unlikely) possibility if that your user entry in the Clearinghouse database has been changed or deleted.

Action: If necessary, log off and log on using your correct user name, or alter your user entry and try again.

Failed! "Clearinghouse" file drawer is full.

Probable cause: A **Backup** command has failed because there is insufficient disk space available on the server running the File Service.

Action: Eliminate some other files from the File Service (for example, move to floppy disks or to another File Service) to obtain sufficient space. Then try again.

Failed! Communications failure.

Probable cause: A **Backup** or **Restore** command has failed to complete successfully due to a network communications failure.

Action: Try again later. If the error persists and other network communications appear to be operational, contact the Network Support Center.

Failed! Could not complete backup.
Failed! Could not complete restore.
Failed! Database not restored.

Probable cause: This is an "umbrella" error. The error occurred for any number of reasons that did not enable the File Service to complete the backup operation.

Action: Try the backup operation again. If the error persists, contact the Network Support Center.

Failed! Failure during file transfer.

Probable cause: The Internetwork Routing Service link or Clearinghouse Service is experiencing communication failure.

Action: When this message appears, try again. If the error persists, contact the Network Support Center.

Failed! File Service is busy; try later.

Probable cause: A **Backup** or **Restore** command has failed because the File Service was too busy servicing other traffic at the time the command was attempted.

Action: Try again later when the load is lighter.

Failed! File Service not responding.

Probable cause: A **Backup** or **Restore** command has failed because the requested File Service is not responding.

Action: Check the state of the File Service, and take any steps needed to restore it to service. If the File Service appears to be operational, contact the Network Support Center.

Failed! File Service speaks an incompatible version of the protocol.

Probable cause: A **Backup** or **Restore** command has failed because the requested File Service is running an incompatible version of the protocol.

Action: Upgrade the File Service to the same release level as the Clearinghouse Service.

Failed! No backed up database for this domain on given File Service.

Probable cause: A **Restore** command has failed because there is no copy of the requested domain in the Clearinghouse file drawer on the requested File Service.

Action: Check that the proper File Service is being used, that the domain name is correct, and that the required backup snapshot has not been inadvertently deleted.

Failed! No "Clearinghouse" file drawer.

Probable cause: A **Backup** or **Restore** command has failed because the file drawer named "Clearinghouse" does not exist on the specified File Service.

Action: Use a different File Service, or create a Clearinghouse file drawer (with suitable access list) on the one that failed, and try again.

Failed! Not enough space on local disk to perform Restore.

Probable cause: A **Restore** command has failed because there is insufficient disk space available on the server running the Clearinghouse Service. This is invariably the result of excessive space usage by a co-resident File or Mail Service.

Action: If the co-resident service is a File Service, eliminate some files from the File Service (move them to floppy disks or to another File Service) to obtain sufficient space. The **List File Drawers** commands can be used to determine the most promising places to recover disk space.

Failed! No File Service at the given address.

Probable cause: A **Backup** or **Restore** command has failed because no File Service is in operation at the specified address.

Action: Verify that the desired File Service is actually in operation. If the File Service was specified by name (normal case), check the File Service entry in the Clearinghouse database. Correct its address if necessary by starting the Clearinghouse Service and forcing the File Service to re-register itself. If the File Service was specified by manually entering its address (abnormal case), verify the address and type it correctly.

Failed! Problem: Incorrect access rights.

Probable cause: A **Backup** or **Restore** command has failed because the access list of the Clearinghouse file drawer does not permit access by the logged-on System Administrator.

Action: Modify the access list on the file drawer to permit access, and try again.

Failed! The backed up version of this database is not compatible with this software release.

Probable cause: A **Restore** command has failed because it encountered a backup snapshot that was backed up by a release of the Clearinghouse Service prior to OS 5.0. The installation instructions specify that the database should be backed up immediately after conversion to OS 5.0. If no OS 5.0 backup is available, the only alternatives are to re-enter the database manually, or revert to OS 4.x, restore the old format backup, re-do the conversion to OS 5.0, and re-do the conversion to Services 10.0.

Action: When this message appears, try again. If the error persists, contact the Network Support Center.

Failed! The database that was restored is corrupted.

Probable cause: A **Restore** command has failed because the copy of the requested domain in the Clearinghouse file drawer was found to contain damaged or otherwise incorrect information.

Action: If an older backup snapshot is available, use it. Otherwise, re-enter the lost information.

Failed! Unexpected filing error.

Probable cause: This is an "umbrella" error, which means that there are several possible reasons why the File Service was unable to complete the operation.

Action: Try the procedure which caused the error message again. If the error persists, contact the Network Support Center.

First, Middle, and Last names together (including blanks) must total 40 characters or less.

Probable cause: Names cannot exceed a total of 40 characters.

Action: Enter a name with the correct number of characters.

Incorrect access rights.

Probable cause: The user may have tried an incorrect logon, or tried to gain access rights to a domain in which he or she is not a System Administrator.

Action: Try logging on again. Type **Show Default** to ensure that the user is attempting access to the desired domain. Also ensure that the user has correct access rights to perform the operation.

<Name> is already a registered <object>.

Probable cause: An **Add** command was rejected because an object of the same name was already registered in the database.

Action: Choose another name.

<Name> is not registered.

Probable cause: A **Delete** command was rejected because the named object was not registered in the database.

Action: Check the spelling of the name, or use the appropriate **List** command to verify the object's existence.

<Name> has no members.

Probable cause: You attempted to list the members of a group that has no members.

Name may not contain any of these characters: * [ ] < > , ; : @ "

Probable cause: The indicated characters are being used in a name. These special characters are reserved for other purposes and cannot appear in names.

Action: Type the name in an acceptable form.

No <object> has been registered.

Informative message indicating that a **List** command found no objects of the specified type registered in the database.

No <object> matching <pattern> is registered.

Informative message indicating that a **List** command found no objects of the specified type registered in the database.

Organization <name> does not exist.

Informative message that appears when domain <name> does not exist. It may appear while you are using the **Add Domain** or **Delete Domain** commands, or while you are deleting an organization.

Organization <name> is not served by this machine.

Informative message indicating that the domain <name> is not served by this machine. The message may appear while you are using the **Add Domain** or **Delete Domain** commands, or while you are deleting an organization.

Problem: Bad return code while enumerating object in sibling.

Probable cause: This message appears while you are adding a domain. It usually is accompanied by another message indicating the problem. The addition of the failed domain, along with any other work that was partially done, will not be completed.

Action: Depending on the problem, you can attempt the addition again.

Problem: Cannot delete self from access list.

Informative message indicating that you cannot remove yourself from the list of administrators for a domain.

Problem: Incorrect access rights to add <member> to <name> group.

Probable cause: An **Add Member** or **Delete Member** command could not be completed because the logged-on user does not have sufficient access privileges to modify the group in question.

Action: Use the **Show Group Access** command to examine the access controls for the group, and determine the appropriate action to take.

Problem: Incorrect access rights to delete <member> from <name> group.

Probable cause: An **Add Member** or **Delete Member** command could not be completed because the logged-on user does not have sufficient access privileges to modify the group in question.

Action: Use the **Show Group Access** command to examine the access controls for the group, and determine the appropriate action to take.

Problem: Insufficient access privileges.

Probable cause: This message may appear when you are executing a Clearinghouse Service command that requires additional access privileges.

Action: If you believe that you have sufficient access privileges, try logging on again. Make sure that you are attempting access to the correct domain by typing **Show Default.** Also check to see if you are on the proper access list. If you are, retry the operation later. The Clearinghouse required for checking the access list may be too busy at the moment.

Problem: Malformed Domain name.

Probable cause: The domain name that was entered is not in an acceptable format.

Action: Refer to the name size and character limitations in creating domain names, and enter the name again.

Problem: Malformed name.

Probable cause: The Clearinghouse Service ran into a problem in recognizing a user, domain, or organization name.

Action: Refer to the name size and character limitations for all types of names, and enter the name again.

Problem: Malformed Organization name.

Probable cause: The organization name that was entered is not in an acceptable format.

Action: Refer to the name size and character limitations in creating organization names, and enter the name again.

Problem: Necessary CHSs unavailable.

Probable cause: Occurs when all of the Clearinghouses serving the domain are down or unavailable.

Action: Ensure that the server running the Clearinghouse you are attempting to access is running properly. Also check the Internetwork Routing Service links.

Problem: No such Domain.

Probable cause: When entering a domain name, the user most likely misspelled the name, or the domain is not registered in the Clearinghouse.

Action: Enter the name again. If the message appears, check the Clearinghouse database for the domain entry by typing **Show Domain.**

Problem: No such Organization.

Probable cause: When entering an organization name, the user most likely misspelled the name, or the organization is not registered in the Clearinghouse.

Action: Enter the name again. If the message appears, check the Clearinghouse database for the organization entry by typing **Show Organization.**

Problem: No such registered object.

Probable cause: The Clearinghouse was unable to recognize a name that was entered as a registered object.

Action: Enter the name again. If the message appears, check the Clearinghouse database for the entry.

Problem: The database is full.

Probable cause: An attempt was made to add something to the Clearinghouse database when it was too full.

Action: Type **Show Status**. If the database is less than 75% full, retry the operation. If the database is greater than 75% full, expand the Clearinghouse database. Refer to the section entitled "Expanding the Clearinghouse database" for the procedure.

Problem: The domain name has incorrect length or an incorrect character in it.

Informative message that appears when the domain name is longer than 40 characters or has an incorrect character in it. It may appear while you are using the **Add Domain** or **Delete Domain** commands, or while you are deleting an organization.

Problem: The organization name has incorrect length or an incorrect character in it.

Informative message that appears when the organization name is longer than 40 characters or has an incorrect character in it. It may appear while you are using the **Add Domain** or **Delete Domain** commands, or while you are deleting an organization.

Problem: You must be a domain administrator to change passwords other than your own.

Probable cause: A **Change Password** command was used to change another user's password and the user entering the command is not a Domain Administrator. Only Domain Administrators are allowed to change other users' passwords.

Action: Contact the Domain Administrator to change the password.

The CHS database is no longer full.

Informative message indicating that the database is no longer full due to space made available.

The Mail Service has been started.

Informational message that appears when the Clearinghouse Service has noticed that the Mail Service has been started. The message appears only if the Mail Service was stopped longer than one hour and the message "Warning: Mail Service has been stopped. Please start the Mail Service" displays.

Warning: CHS database is full.

Probable cause: It may be necessary to enlarge the database.

Action: Reboot the server. Set the Clearinghouse Service context and then use the **Show Status** command. If the database is greater than 75%, reboot and expand the database.

Warning: <name> is not a member of group <group>.

Informative message indicating that you have attempted to remove a non-member from a group.

Warning: Mail Service has been stopped. Please start the Mail Service.

Probable cause: The co-resident Mail Service has been stopped for longer than one hour.

Action: Start the Mail Service.

Warning: No <object> named <name> is registered.

Probable cause: A command was directed to the named object, but the object was not found to be registered in the database. It is also possible that an object is unexpectedly found or missing due to update propagation problems.

This message may also appear when an **Add** or **Change** command found that <name> (provided as a parameter in the operation) was not registered in the local database as an object of the indicated type. The command succeeded, but the resulting new or changed database entry includes <name>, which still needs to be defined.

For example, **Add User** will succeed even if the File Service specified for the new user's desktop has not yet registered itself. A File Service of the given name must be be installed before the user can store/retrieve a desktop.

Action: Check the spelling of the object name, and try the command again, if appropriate.

Warning: The domain <domain:organization> does not exist.

Probable cause: A command (typically an **Add** or **Change** command) required a full three-part name as a parameter (for example, File Service name in **Add User**), but the domain and organization components of the name did not correspond to any existing domain.

Action: Check for correct spelling (including spaces and punctuation) of the domain and organization names. Use the **List Domains** command if correct spelling is in doubt. If the spelling appears to be correct, or if the desired domain is not shown by the **List Domains** command, contact the System Administrator of the (alleged) domain.

Warning: The local Clearinghouse will suffer if the Mail Service is stopped for any length of time.

Probable cause: The Mail Service was stopped for an unreasonable amount of time. This is reported to encourage the System Administrator to start the Mail Service.

Action: Start the Mail Service to allow Clearinghouse database operations to perform normally.

Warning: There is only one other copy of Domain <Domain:Organization>.

Probable cause: A **Delete Domain** command was applied to one of only two existing copies of the specified domain. A confirmation means there is only a single copy of the domain.

Warning: This is the only copy of Domain <Domain:Organization>.

Probable cause: A **Delete Domain** command was initiated for the only existing copy of the specified domain. A confirmation permanently removes the domain from the database.

Warning: Use only according to instructions.

Informative message indicating that an **Enable Manual Registration** command was invoked. This message is a reminder to use the manual registration commands only as directed by the documentation.

Warnings requiring special handling

At times, uncommon warnings have a more cryptic format. They often indicate problems that require special handling. You should write the message down, along with other messages related to the operation that is not succeeding, and then contact the Network Support Center. These warnings have the form:

Clearinghouse problem. Code = [xxx, first]

where "xxx" might be a word from the following list, or a number:

rejectedTooBusy

badProtocol

illegalPropertyID

propertyIDNotFound

wrongPropertyType

outOfDate

overflowOfName

credentialsInvalid

credentialsTooWeak

wasUpNowDown

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Access list A list of users and/or groups of users who have granted access to specific services.

Availability The property of a Clearinghouse domain to be accessible via the network. Availability is enhanced by domain replication, since the failure of any single server cannot make the domain unavailable.

Clearinghouse database The database is organized by domains, which consist of 200-300 users resident in the same geographical location. A domain can reside in multiple Clearinghouses, and each Clearinghouse can hold multiple domains. (See ***Domain*** for more information.)

Clearinghouse Service (CHS) The specialized database held by the Clearinghouse Service, that serves as a global directory for the entire internetwork. A lookup directory service that maintains a database of all users, services, and servers, in a network. The Clearinghouse Service cooperates to provide a single unified database system among other Clearinghouse Services.

Domain A logical grouping (usually geographical) of registered objects in the Clearinghouse database. Domains serve as units of name, scope, administrative responsibility, and replicated database configuration. The data maintained for a particular domain includes the list of administrators of that domain, plus the names and relevant information about all objects that are registered in the domain.

Domain Administrator The System Administrator-assigned access privileges to control the changes to entries within a given domain.

Note: Only the Organization Administrator can create a domain.

Mail System The global system made up of all the Mail Services in an internetwork. The Mail Services cooperate to provide a single, unified mail transport system.

Organization A high-level logical grouping of domains in the Clearinghouse database (usually corresponding to an entire company or equivalent). Most internetworks contain only a single organization. For each organization which it serves, a Clearinghouse Service maintains the following data: the list of administrators for the that organization, the list of all domains contained by the organization, and names of all Clearinghouse Services that serve each of these domains.

Organization Administrator The individuals or groups that are granted administrative access to an organization. The tasks consist of adding and deleting persons to and from the Organization Administrator's list, creating the first instance of a new domain, deleting the last instance of an obsolete domain, and deleting the last instance of the only domain in a given organization.

Reliability The property of a Clearinghouse domain of being recoverable in the face of permanent disk failure and resulting data loss. Domain replication allows each copy to serve as a "standby backup" for the others, greatly enhancing data reliability.

Replication Each domain in the database is stored on two or more servers, improving reliability, availability, and efficiency of access.

Server A processor on which one or more services can run.

System Administrator A user with specific network privileges, responsible for setting up and maintaining the network services.

Update propagation An automatic activity initiated by a Clearinghouse Service when it receives an update to its database that is then sent to other Clearinghouse Services. Any update to a:

- Domain portion of the database must eventually propagate to all other Clearinghouse Services that serve that particular domain.
- Particular organization portion of the database must eventually propagate to all other Clearinghouse Services which serve that particular organization.
- Global portion of the database must eventually propagate to all other Clearinghouse Services.

A. Forms

This section contains forms for setting up and maintaining your Clearinghouse Service. You may make copies of these forms and fill them out by hand. It is important to update the forms with service or network configuration changes as they occur.

- CHS Form 1. Directory of Users on Your Network
- CHS Form 2. Group/Distribution List

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