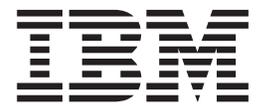
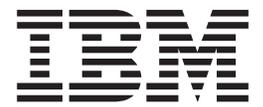


z/OS



LANRES Installation Guide

z/OS



LANRES Installation Guide

Note

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 235.

First Edition, March 2001

This edition applies to Version 1 Release 1 of z/OS (5694-A01) and to all subsequent releases and modifications until otherwise indicated in new editions.

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About This Book

This book describes how to set up, install, start, and use z/OS LANRES.

Who Should Use This Book

This book is for the system programmer responsible for installing and maintaining z/OS LANRES.

A *user* in this document is regarded as the system administrator. Most tasks are performed by the system administrator and are transparent to a *general user*. A general user may be interested in two topics discussed in this document — distribution and printing.

You should be familiar with the concepts, terminology, and use of Novell NetWare servers and the z/OS system. It is equally important to have an understanding of the communications method you are going to use for z/OS LANRES.

Using LookAt to look up message explanations

LookAt is an online facility that allows you to look up explanations for z/OS messages and system abends.

Using LookAt to find information is faster than a conventional search because LookAt goes directly to the explanation.

LookAt can be accessed from the Internet or from a TSO command line.

You can use LookAt on the Internet at:

<http://www.ibm.com/servers/eserver/zseries/zos/bkserv/lookat/lookat.html>

To use LookAt as a TSO command, LookAt must be installed on your host system. You can obtain the LookAt code for TSO from the LookAt Web site by clicking on **News and Help** or from the *z/OS Collection*, SK3T-4269.

To find a message explanation from a TSO command line, simply enter: **lookat** *message-id* as in the following example:

```
lookat iec192i
```

This results in direct access to the message explanation for message IEC192I.

To find a message explanation from the LookAt Web site, simply enter the message ID. You can select the release if needed.

Note: Some messages have information in more than one book. For example, IEC192I has routing and descriptor codes listed in *z/OS MVS Routing and Descriptor Codes*. For such messages, LookAt prompts you to choose which book to open.

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5. Click on **z/OS**.
6. Access the licensed book by selecting the appropriate element.

Chapter 1. Introducing z/OS LANRES

z/OS LAN Resource Extension and Services (z/OS LANRES) integrates NetWare** LANs and System/390* (S/390*) or ESA/370* environments. z/OS LANRES extends and expands data availability. NetWare workstation users benefit from workstation response and interworkstation communication on the LAN and from a powerful S/390 or ESA/370 computing environment. With z/OS LANRES, a single NetWare server can communicate with a VM and z/OS host processor at the same time. NDS support for the distribution and print functions of LANRES is provided.

z/OS LANRES lets:

- Host users administer multiple NetWare servers.
- In the NDS environment, one login to the network gives access to data from multiple servers in a tree.
- Host users and NetWare workstation users print documents or data on printers located anywhere in your site.
- Host users manage NetWare files and directories.
- NetWare workstation users store data on host direct access storage devices (DASD).

Administering Multiple NetWare Servers

With minimal training, an z/OS administrator can easily function as the LAN administrator for an almost unlimited number of LANs connected by z/OS LANRES. This administrator can quickly and easily:

- Add and delete LAN users
- Modify trustee rights
- Change users passwords
- Administer print queues and print servers
- Limit the amount of disk space available to users
- Create and delete directories
- Create and delete NetWare NFS** group and user mappings
- Display user bindery, identification, and trustee rights information
- Start a chain of commands
- Save and restore the NetWare bindery
- Rename groups, users, print queues, and print servers
- Limit the number of concurrent user logins
- Set password limits

These tasks can help increase the productivity of your z/OS administrator.

Here are some situations that may sound familiar. z/OS LANRES provides an effective and efficient solution to each situation.

Situation 1: Your LAN administrator must add trustee rights for 50 users who all need access to a specific directory. The administrator can write a REXX program to assign all 50 users trustee rights simultaneously, eliminating the need to enter each trustee right assignment individually.

Situation 2: You have NFS UNIX** clients and you want them to capitalize on the benefits of being logged in to the NetWare server. The administrator can map the NFS user IDs of the NFS UNIX clients to an existing NetWare user. This means, anything a NetWare user can do, the NFS user can do.

Administration

Situation 3: Periodically administrators need to perform “housekeeping” tasks. Many times these tasks involve deleting directories that do not contain files or subdirectories, deleting files in a specific path, deleting a NetWare group, or deleting a NetWare user, the user directory (including all files in the directory), and the user’s membership from all groups. The administrator can use z/OS LANRES to group or chain individual commands and have each of these tasks done at one time.

Situation 4: At a moment’s notice, the administrator may need to provide information about the trustee rights for a specific user. z/OS LANRES lets an administrator search all volumes and display a list of directories, files, and corresponding trustee rights for the user.

Situation 5: From time to time, you may have been concerned about saving and restoring your bindery files. What would you do if your bindery files were destroyed? With z/OS LANRES, you do not need to worry about the answer to that question. Your administrator can easily back up each file. And, if necessary, the bindery files can easily be restored.

Administration of Remote Servers

z/OS LANRES supports administration of both local NetWare servers (servers directly connected to z/OS) and remote NetWare servers (servers not directly connected to z/OS but accessible to a local server through the LAN). The administration function lets you log in to either a local or remote server to perform your administration commands.

Automating Administration

You can automate administration by grouping administration commands together in user-written REXX programs. To perform a single administrative task, you can create a REXX program that issues several administrative commands.

For example, REXX programs can be created for each required type of user (for example, engineer, secretary, and financial analyst). Each procedure would establish different trustee rights, security equivalences, and login restrictions for its class of users.

Central Administration

If you have multiple LANs connected to an S/390, the administration function provides several commands for administering NetWare servers from a central focal point.

Multiple Administration Sessions

z/OS LANRES administration lets multiple copies of the z/OS LANRES administration NetWare Loadable Module** (NLM**) run in the server. When you load multiple copies of the administration NLM, each separate copy loaded has its own connection to a single user on z/OS who is administering NetWare LANs. This lets multiple systems run administration functions at the same time. Some of these systems could be dedicated to batch administration, others could be used interactively by z/OS administrators.

Printing Documents or Data

z/OS LANRES's print function helps you to efficiently use printers on your local LAN as well as host printers. NDS support is available for both of the print components of LANRES.

Host-to-LAN Print

The following situations may be common in your company. z/OS LANRES provides useful solutions.

Situation 1: Sometimes your z/OS users need to print short files on the LAN printers close to their desks. The host-to-LAN print function gives them access to LAN printers. These users do not need a NetWare user ID to print their files. After a job is sent to the LAN printer, the users can query the print queue to see how their job is progressing. Print tasks can be automated using REXX programs.

Situation 2: Suppose you have a PostScript file containing bitmap information of scanned pictures that require high resolution printing. You do not have the PostScript-to-Advanced Function Printing Interpreter or the PC File Transfer Program (FTP) installed. Using z/OS LANRES and your LAN-attached high-quality printer, you can print the PostScript file.

Host-to-LAN Printing to Remote Servers

z/OS LANRES supports host-to-LAN printing to both local NetWare servers (servers directly connected to z/OS) and remote NetWare servers (servers not directly connected to z/OS but accessible to a local server through the LAN). The host-to-LAN print function lets you send print jobs to a local or a remote server.

What You Can Print

The host-to-LAN print function will translate data from EBCDIC to ASCII, convert SCS data to ASCII, or leave the data alone, whichever the user requests. Exactly what z/OS data you can print on a LAN printer is determined by the capabilities of the LAN printers and the availability of data on z/OS that is suitable for printing on LAN printers.

Printers You Can Use

The host-to-LAN print function allows you to use any printer that the NetWare server supports. You will need to ensure that the data you are printing is supported by your LAN printers.

Printer Exits

You can use the following host-to-LAN printer exits:

- Host AFPDS to LAN PCL or PostScript exit
This exit converts a host generated Advanced Function Printing* Data Stream (AFPDS) text object to a Hewlett-Packard** Print Control Language** (PCL**) data stream or a PostScript data stream. Only text objects in the AFPDS will be processed. The PCL data stream or PostScript data stream can be printed on a LAN-attached printer.
- Installation-defined exit
You can define customized print exits for different types of printing processes that you use.
- Line exit
This exit converts data from EBCDIC to ASCII and directs the data to a printer. Tailoring this exit to use Print Services Facility*/MVS (PSF*/MVS) lets you print

Print

line data on appropriate PSF supported printers. This exit can also transform ANSI or machine carriage control characters to ASCII control characters.

- SNA Character Stream (SCS) exit
This exit converts SCS data to ASCII.

Host-to-LAN Print for JES and VTAM

If your z/OS applications can use a JES local printer, with z/OS LANRES, these applications can print data on a LAN-attached NetWare printer. Your z/OS operating system provides a functional subsystem interface to allow communication between JES and a functional subsystem. The functional subsystem can drive a simple process or device like the z/OS LANRES host-to-LAN print server. Your z/OS LANRES host-to-LAN print server looks like a JES printer to your z/OS applications.

z/OS LANRES's host-to-LAN print function can be set up to act like a VTAM attached printer. The host-to-LAN print server emulates VTAM LU1 (SCS) printers. This printer does not support VTAM compression or compaction. z/OS LANRES provides a host-to-LAN print exit to convert SCS data to ASCII data.

LAN-to-Host Print

The following situations may sound familiar. z/OS LANRES provides excellent solutions.

Situation 1: At the end of the month, the NetWare workstation users in your busiest department print monthly reports. The printers attached to the workstations take too long to print the reports. This department is connected to your company's S/390. This department can use z/OS LANRES's LAN-to-host print function. The LAN-to-host print function lets NetWare workstation users print output on centrally located printers for faster turnaround.

Situation 2: You have large softcopy documents on your NetWare server. You could print them on your IBM* 4029 LaserPrinter, but it can only print single-sided. Using the z/OS LANRES LAN-to-host print function, you can duplex the document on a host Advanced Function Printing (AFP*) page printer. Not only will duplex printing save paper, but the documents will be less cumbersome.

Using LAN-to-Host Print from Remote Servers

z/OS LANRES supports LAN-to-host printing from users on both local NetWare servers (servers directly connected to z/OS) and remote NetWare servers (servers not directly connected to z/OS but accessible to a local server through the LAN). Users on remote servers can access the local server's print queue and submit print jobs for the LAN-to-host print function to process.

What You Can Print

You can use exits provided by IBM or user-written programs to translate client data into data for host printers. The capabilities of the host printers and these conversion routines determine what types of client data can be printed on the host. You can print ASCII (text) files or other data. ASCII files can be converted to EBCDIC and printed on standard line printers. Other types of data, such as plot files, can also be processed by the installation-wide exits. You can create your own installation-wide exits to process these files appropriately.

Printers You Can Use

The LAN-to-host print function allows you to use any z/OS-supported printer.

Printer Exits

You can use the following LAN-to-host printer exits:

- Installation-defined exit
You can define customized print exits for different types of printing processes that you use.
- Job exit.
This exit submits a user defined job to process printer data. You can use this exit without TSO or ISPF, and your data can be translated or binary.
- Line exit
This exit converts data from ASCII to EBCDIC and directs the data to a printer. Tailoring this exit to use Print Services Facility/MVS (PSF/MVS) lets you print line data on appropriate PSF supported printers. To use this exit, you must have TSO and ISPF.
- Line Printer exit
This exit prints data on a line printer. You can use this exit without TSO or ISPF.
- PostScript exit
This exit lets you print client PostScript files on host printers using the PostScript Interpreter. Tailoring this exit to use PSF/MVS lets you print line data on appropriate PSF printers. To use this exit, you must have TSO and ISPF.
- Sendfile exit
This exit is actually a REXX exec that you can use to send a file to a specific user ID. The file that you send can be in binary format or translated to EBCDIC. To use this exit you must have TSO.

Multiple Print Servers

The LAN-to-host print server processes one job at a time. To increase throughput, you can create multiple LAN-to-host print servers, allowing multiple jobs to be processed at once. If your installation has a mixture of print queues, some requiring extensive processing and some that do not, starting multiple LAN-to-host print servers can keep the fast jobs from being trapped behind the slow ones. In this situation, slow print queues can be associated only with slow print servers, and fast print queues can be associated only with fast print servers.

Managing Files and Directories on LANs from One Host Location

As time passes and your company grows, distributing data can become more difficult. The distribution function of z/OS LANRES lets authorized z/OS users perform a variety of centralized tasks, such as:

- Distribute company forms from the host to various LANs
- Route output from host based batch processing to servers
- Consolidate reports on the host
- Copy important LAN data on the host
- Copy important host data on the NetWare server
- Distribute messages to NetWare users
- Create, delete, rename, and display NetWare files and directories
- Display NetWare server volumes, directories, and file information
- Compress data on the S/390

These tasks let your z/OS users work efficiently with data in both the bindery and NDS modes of operation.

The following are some data distribution situations that may describe your environment. z/OS LANRES's distribution function provides solutions.

Distribution

Situation 1: You have important data files on your S/390. Members of your engineering department need copies of the data to complete a proposal. Data from the S/390 can be copied to the NetWare server using z/OS LANRES. The engineering department can now access a copy of the data on the NetWare server.

Situation 2: One of your S/390 printers will be shut down at 3:00 o'clock in the afternoon for maintenance. You want to let all of the NetWare workstation users with access to the printer know that the printer will be down. Using z/OS LANRES's distribution function, the administrator can send a message to all logged in NetWare workstation users. The NetWare workstation users can route print jobs to other printers to avoid delays.

Situation 3: Your financial department must maintain records for each month for the past 10 years. Currently, the records are stored on workstations. You know they are running out of space. z/OS LANRES's distribution function can store these files on the host in compressed format. Storing the files on the host in compressed format will save valuable space on workstations and on the host.

ES/9000 Data Compression for Distribution

If you have an ES/9000 Data Compression processor and you are concerned about conserving space on the host and your workstations, an enhancement of z/OS LANRES's distribution function will be helpful to you. This enhancement stores workstation files in compressed format in an z/OS data set. Using this enhancement, you will save valuable space on your host processor and on your workstations. When the data is returned to the NetWare server, it is automatically decompressed.

Your records department has many files that it must keep. You want to archive the files and use minimal disk space. The disk serving function of z/OS LANRES can create a compressed disk image for these files.

z/OS LANRES disk serving has two parts, the disk driver and the disk server.

The disk driver is an NLM that runs in an attached NetWare server. The disk driver registers itself as a disk controller to NetWare and sends all I/O requests to the host disk server.

The z/OS disk server maps the NetWare disk sectors into VSAM data sets such that the data sets become a disk image of the NetWare disk. Although it resides on the host, the VSAM data set looks like a local hard disk to NetWare; it acts as, and appears to be, a NetWare disk.

Because the VSAM data set is transparent to NetWare, it is also transparent to the client workstation. Users can enter the NetWare commands to access data on the host data set as if it was data on a disk attached locally to the NetWare server.

Distribution on Remote Servers

z/OS LANRES supports distribution to both local NetWare servers (servers directly connected to z/OS) and remote NetWare servers (servers not directly connected to z/OS but accessible to a local server through the LAN). The distribution function lets you log in to a local or a remote server to perform distribution commands.

Distribution in the NDS Environment

NDS is a distributed database containing information for resources (users, printers, and servers), such as physical location and the resource's properties. The NDS is not stored on one server, rather all servers on the network, providing one global database.

With the introduction of NDS, the concept of log in to an individual server has changed to log in to a network, and resources (objects) are not managed on a server basis, but rather globally for the whole network. The distribution function lets you login to the network and perform distribution commands to all the servers in the directory tree.

Storing Data on S/390 DASD

You may have found that getting space to store data can be a problem. The following situations provide solutions using z/OS LANRES's disk serving function.

Situation 1: Your accounting department stores its files on a NetWare server. The disk space on that server is almost full, but workload is increasing. This NetWare server can easily be connected to your S/390 and you can use z/OS LANRES's disk serving function to use reliable S/390 DASD to supplement the LAN-based server's disk storage. The workstation users still operate on their data with the same tools and methods that they used before. But now, although the environment appears unchanged, the physical location of the data and applications may be on the System/390 or on the NetWare server.

Situation 2: Suppose you have several CD-ROMs containing documentation for your IBM products and you have some procedural manuals that people at your site have written. You want to eliminate the need for multiple CD-ROM drives, reduce workstation storage requirements, and ensure all users are accessing the same information. Using z/OS LANRES, you can create shared read-only disk images for storing all of your documentation. All of your LAN users attached to NetWare servers can access the same information.

Situation 3: Your records department has many files that it must keep. You want to archive the files and use minimal disk space. The disk serving function of z/OS LANRES can create a compressed disk image for these files.

ES/9000 Data Compression for Disk Serving

With your ES/9000 Data Compression processor and z/OS LANRES's disk serving function, you can make a backup copy of a host disk image by compressing the host disk image (a VSAM Linear Data Set (LDS)) into a sequential data set. The sequential data set can be stored on a disk or on a tape. The compressed disk image cannot be used in its compressed format, but you can easily use the disk image if you decompress and rebuild the VSAM LDS.

If users will use a disk image to archive workstation files, you can create a compressed disk image for them. When your users read from the compressed disk image, each disk block is automatically decompressed. When the compressed disk image is written to, each disk block is compressed.

Data Integrity and Security

Data integrity and security are important aspects of data management. z/OS LANRES disk serving provides for client data storage on host DASD to take

Disk Serving

advantage of its high level of security. You can secure the disk images from unauthorized host access and you can secure LAN access to data in the disk images.

An external security manager can also be used to limit access rights to the disk images on the host and to secure Advanced Program-to-Program Communication (APPC) connections.

Multiple Disk Servers

Sometimes it is necessary for the disk driver on the NetWare server to communicate with one or more host disk server jobs. z/OS LANRES lets your administrator set up multiple disk servers. Additional disk servers can be used for distribution, backup, read-only disk sharing, or to improve performance. Read-only disk sharing lets one disk server communicate with one NetWare file server and another disk server with a different NetWare file server, but shares the same disk image in a read-only fashion.

Combining z/OS LANRES Functions

You can use z/OS LANRES functions separately or in combination. If the only z/OS LANRES function you need to use is disk serving, you can set up your environment to use disk serving by itself. If you need to use disk serving and LAN-to-host print, you can set up your environment to use both disk serving and LAN-to-host print.

The following situation describes an environment that uses a combination of disk serving and LAN-to-host print.

Situation: The ACME Insurance Company uses the z/OS LANRES disk serving and LAN-to-host print functions on a daily basis. Three spindles of DASD are reserved for z/OS LANRES's disk serving function. LAN users store their data on this host DASD. LAN users print their output on a host-attached printer.

ACME Insurance has the following z/OS LANRES configuration:

- ES/9000* 9021-720 running z/OS
- IBM Personal System/2* (PS/2*) Model 90 acting as the NetWare file server
 - This NetWare server has the following configuration:
 - 10 DOS clients
 - 12 Windows** clients
 - 3 Macintosh** clients
 - 160 MB hard disk
 - 48 MB of read access memory (RAM)
 - A MicroChannel to Mainframe Connection (MMC) to one of the ES/9000 channels set to 4.5 MB/sec.
- Three spindles of 3380 DASD reserved for z/OS LANRES
- All LAN user data is kept on the host for DOS and Windows clients. Macintosh "file space" is also allocated. The PS/2 hard disk is reserved for NetWare-related files. A DOS partition is reserved for DOS-related files.
- LAN-to-host Print
 - To accommodate large print requests, the z/OS address space has a region size of 16 MB of virtual storage. The server handles between 25 and 40 requests per day for LAN-to-host printing. Files range in size from 200 bytes to 3 MB.

The ACME Insurance Company benefits from using z/OS LANRES in the following ways:

Combining Functions

- They can increase their LAN technology without worrying about PC technology limitations.
- By using host disks to add additional volume space for LAN users, the work load for the system administrator is minimized, and end-user down time is almost eliminated.
- Because LAN users can send all large output to fast host-attached printers, the LAN-attached printers provide quick response for smaller jobs.
- With z/OS LANRES's disk serving data compression enhancement, ACME Insurance saves valuable space on the host.
- Because the host is connected to an uninterrupted power supply, z/OS LANRES eliminates worry about a power failure during backup.

NetWare for SAA Channel Driver Connection

z/OS LANRES now provides a NetWare for SAA channel driver connection. NetWare for SAA customers can use this connection to communicate with their host processor at channel speeds. Your NetWare servers act as a channel-attached SNA gateway. The NetWare for SAA channel driver connection supports dependent and independent LU2 and LU6.2 connections.

You can benefit from the NetWare for SAA channel driver connection in the following ways:

- Minimize the number of channel connections by configuring z/OS LANRES functions to use LU6.2 communications.
- Use 3270 emulators on your NetWare clients with NetWare for SAA for SNA connections to your host processor.
- Use your NetWare applications that use NetWare for SAA for APPC or CPI-C communications with your host processor.

Combining Functions

Chapter 2. Migration Considerations

The following items should be considered when migrating from a previous release.

Command Changes

For example, in LANRES 1.2.2, it was possible to do the following under TSO BATCH IKJEFT01:

```
//SYSTSIN DD *  
PROFILE NOPREFIX  
PROFILE MSGID  
LANRES LINK DIST POKLANRES/SUPERVISOR pw (MMC B20
```

A connection will be established and the connection will remain active until LANRES DROP is issued.

In z/OS LANRES, connection will also be established. However, it will get DROPPED before you can do the next command. Make sure to include EWXEXEC before the LANRES LINK to keep the connection active.

```
//SYSTSIN DD *  
PROFILE NOPREFIX  
PROFILE MSGID  
EWXEXEC  
LANRES LINK DIST POKLANRES/SUPERVISOR pw (MMC B20
```

Translation Tables

At LANRES 1.2.1 and 1.2.2, you could run a simple ZAP job to get the translations you need, but in z/OS LANRES, enhancements were made to make this available without having to zap the code.

Starting the LANDISK/DISK SERVER

When starting the LANDISK/DISK SERVER, if you get the message, 'MSGGEWXDSK1635E error opening file Dataset not found', and you know the dataset exists and is cataloged, check the name specified in the parm statment. If the LANDISK server is started as a started task, then it prefixes the dataset name passed to it with the user's prefix.

Message Changes

The messages being displayed by the EWXDISKX EXEC have changed. The content of the messages is different, and the timing has subtly changed. In LANRES 1.2.2, the UP message was displayed after the host disk was ready to be mounted. In z/OS LANRES, the UP message is displayed after the host disk server has linked to the NetWare server, but before the host disk is ready to be mounted. This can be a concern if a series of disk servers are automatically started via a batch job which is dependent on these messages to trigger the start of the next disk server.

z/OS LANRES provides a new 'ready' message which will be displayed after the host disk was ready to be mounted.

English is the default language. To specify a different language, you must install the additional language FMID(s) and also allocate the EWXMSGGS data set to the desired data set. For example, to allocate Japanese messages:

```
//EWXMSGGS DD DSN=EWX140.EWXMSGJ, DISP=SHR
```

Host Command Name Changes

The names of the host commands have changed. For example, the LANRES LINK command has changed to EWXCONN LINK, and LANDS and EWXDIST have changed to EWXDS. The old commands are still supported to minimize the impact to existing customers.

EWXHLINE REXX

The REXX exit EWXHLINE in LANRES 1.2.x was easily modifiable because HLPRT ran as either a batch job or started task under TSO. In LANRES version 1.3, this may not work since HLPRT runs as a JES or VTAM printer and does not run under TSO. Users who have modified their EWXHLINE exit under LANRES 1.2.x may not be able to carry their changes forward to z/OS LANRES.

Post-Install Job

With z/OS LANRES, the post-install job is no longer required during installation.

LANRES and NetWare Directory Services

- Bindery

LANRES uses the bindery emulation capability of NetWare 4 and Netware 5 to log into the NetWare Directory Tree and access objects like print queues. Because of this, there is a limitation on where these objects can reside in the directory tree. This applies to the distribution, administration, host-to-LAN print and LAN-to-host print components of LANRES. All user IDs, print queues, and the LANRES object must reside in the container defined as the bindery context for a server. Each server can reside in a different container or the same container on the directory tree.

For distribution and administration, LANRES is limited to being able to log on to user IDs which exist in the bindery context defined for the server. LANRES can access any data and directories which exist in the bindery context as long as those user IDs are authorized.

For host-to-LAN print, LANRES is limited to printing only to print queues which exist in the bindery context. For LAN-to-host print, LANRES can only service queues which exist in the bindery context. Any authorized user ID can print to the print queues serviced by LANRES, even if those user IDs are not in the bindery context.

- NDS

In the NDS environment, the limitations described above do not exist for the distribution, host-to-LAN print, and LAN-to-host print components. The limitations for the administration component are the same as described above.

Chapter 3. Installing z/OS LANRES

For a complete list of hardware and software requirements, see *z/OS Up and Running!*, GC28-1726.

For the step-by-step instructions that will guide you through the z/OS LANRES installation on z/OS, see the z/OS Program Directory.

Installing z/OS LANRES on the NetWare Server

To install z/OS LANRES on the NetWare server, perform the following steps at the NetWare server console:

Note: Any diskette drive can be used for installation. The following examples use the a: drive.

1. **Ensure the NetWare server is running.**

2. **Ensure the CLIB NLM is loaded on the NetWare server.**

Enter the following command on the NetWare server console:

```
MODULES
```

This displays loaded modules. Check the display for the CLIB NLM.

3. **Put the z/OS LANRES program diskette in a diskette drive.**

4. **Is z/OS LANRES being installed for the first time?**

If yes, go to **Step 5**.

If you are replacing an existing version of z/OS LANRES, go to **Step 6**.

5. **Installing z/OS LANRES on the NetWare server.**

a. To install **without** Kanji, enter the following command on the NetWare server console:

```
load a:ewxinst
```

b. To install **with** Kanji, enter the following command on the NetWare server console:

```
load a:ewxinst /k
```

This installs z/OS LANRES code in the SYS:\EWXNLM\ directory. For more information about LOAD EWXINST, see *z/OS LANRES Configuration Files and Commands*.

6. **Are you replacing and installing z/OS LANRES on the NetWare server?**

If no, skip this step.

If yes, enter one of the following command on the NetWare server console:

• To replace an existing version of z/OS LANRES **without** Kanji, enter:

```
load a:ewxinst /r
```

• To replace an existing version of z/OS LANRES **with** Kanji, enter:

```
load a:ewxinst /r /k
```

This installs z/OS LANRES and replaces existing z/OS LANRES code that currently exists in the SYS:\EWXNLM\ directory. The configuration files are left intact.

Installing z/OS LANRES

Checkpoint

At this point, the z/OS LANRES installation is complete on both z/OS and the NetWare server. Next, we will set up z/OS LANRES communications on the NetWare server and on z/OS.

If you are going to set up the host-to-LAN print or distribution functions, keep the installation diskette handy. You will need it later to install a LANRES object.

Chapter 4. Setting Up Communications

Communications Overview

This chapter provides the steps to help you set up communications that enable z/OS LANRES on z/OS to communicate with z/OS LANRES on the NetWare server. Usually, problems encountered in getting z/OS LANRES to work turn out to be communications problems, not problems with z/OS LANRES itself.

You have several choices of how to connect your host computer to your LAN servers.

The following are the communication methods that work with z/OS LANRES and z/OS:

- Channel attachment
 - Serial channel with fiber optic cable and:
 - The IBM ESCON Adapter feature (feature number 2800) of the 3172 Model 3 Interconnect Controller (feature 2501) or
 - A server with the IBM Model 9663–01 PCI ESCON Adapter.
 - Parallel channel with:
 - The IBM Personal System/2 MicroChannel to Mainframe Connection.
- Systems Network Architecture Logical Unit 6.2 (SNA LU 6.2)
- Transmission Control Protocol/Internet Protocol (TCP/IP)

The following section briefly describes each communication method and its advantages.

Using a Channel Connection

NetWare servers can be channel-attached to the z/OS processor by these types of channels:

- A serial channel using fiber-optic cable
- A parallel channel

Serial Channel Connection Using Fiber-Optic Cable

If your NetWare server will be attached to the z/OS processor using fiber-optic cable, you must have either an IBM 3172 Model 3 Interconnect Controller with the IBM ESCON Adapter feature or a server with a PCI bus and the IBM 9663–01 PCI ESCON adapter as your NetWare server.

Advantages:

- Using the ESCON Adapter connection allows communication over greater distances than when using a parallel channel. Servers are no longer restricted to being located in your data center.
- There is less buffer contention during high data activity than with a parallel channel.
- The ESCON Adapter runs as fast as it can (it has no speed setting).
- The absence of the speed setting allows for less configuration.

In addition, the 3172-3 Interconnect Controller itself provides significant advantages as your communications platform:

- Rack-mounted
- Fully installed and serviced by your IBM Customer Engineer

- Provides high reliability and continuous availability

Parallel Channel Connection

If your NetWare server will be attached to the z/OS processor using parallel channels, you can use the IBM Personal System/2 MicroChannel to Mainframe Connection (MMC).

Advantage:

- Using the parallel channel attachment provides higher speeds than the non-channel communication methods described in this book.

Using a SNA LU 6.2 Connection

If you will be connecting your NetWare server to the z/OS host by way of a SNA LU 6.2 network, you need:

- NetWare for SAA 2.0, or later
- Advanced Communications Function for Virtual Telecommunications Access Method (ACF/VTAM) on the host computer
- A SNA gateway to your LAN

Advantages:

- Allows remote access to wide-area networks (WANs)
- Allows access to existing SNA networks

Using TCP/IP

If you will be using TCP/IP to connect your server and host, you need:

- TCP/IP on the server (TCP/IP is part of NetWare)
- TCP/IP for z/OS on the host
 - The z/OS TSO user ID that submits the JCL to bring up a LANRES function (for example, distribution) using TCP/IP connectivity must be defined in the Open Edition (OMVS) segment and have an associated RACF profile. See your System Programmer for details.

Advantages:

- Allows access to wide-area networks (WANs)
- Allows access to existing TCP/IP networks
- Is a well-established communication method

Communications Protocols

Refer to the page listed in Table 1 to set up your communications.

Table 1. Communication Protocols

If you are using:	See Page:
Parallel Channel Adapters; IBM Personal System/2* Micro Channel* to Mainframe Connection (MMC)	17
Serial Channel connection using IBM ESCON adapters	20
NetWare for SAA Channel Driver	24
Transmission Control Protocol/Internet Protocol (TCP/IP)	63
IBM* System Network Architecture logical unit 6.2 (SNA LU 6.2)	16

Parallel Channel Adapter Configuration

You will need to install the MMC adapter card in your server.

Your IBM service representative must physically attach the server to the host channel. This is because the host processor must be stopped or isolated by a channel switch before the physical connection can be made. Here, the Select/Bypass switch on the cable connector is set to B (Bypass).

If you are using a 3172-3 with the S/370 Parallel Channel Feature, the adapter is already installed.

The following steps describe:

- How to define the subchannels that z/OS LANRES will use for the MMC communications method on z/OS. These subchannels are specified when you start an z/OS LANRES connection.
- How to set up the MMC channel adapter configuration files for the NetWare server to recognize and use these subchannels.
- How to load the MMC adapter driver.

For details about sharing MMC configuration files, see *z/OS LANRES Configuration Files and Commands*.

Defining Subchannels on z/OS

Perform the following steps to define subchannels on z/OS in order for z/OS LANRES to use the MMC communication method.

1. **Determine the total number of device addresses that you want to be configured for all of your NetWare servers.**

An even, odd pair of subchannel addresses is needed for each z/OS LANRES function that is going to be used concurrently, whether it is being used in batch, interactively by a TSO user, or as a server.

For example, suppose you have the following situation and you want all of the following to be used concurrently:

- Administration is going to be used by two TSO interactive users
- Distribution is going to be used by four TSO interactive users
- 1 batch machine for administration
- 1 batch machine for distribution
- 2 host-to-LAN print servers
- 3 LAN-to-host print servers
- 8 disk servers

This means that you need 21 subchannel pairs. In other words, you need to define 42 addresses.

Notes:

- a. Ensure that you do not define subchannel addresses that are defined for other control units on the same channel.
- b. You cannot define unit address X'FF' for the MMC adapter.
- c. If you are going to use the z/OS LANRES NetWare for SAA channel driver, then you will need up to two additional subchannels. The NetWare for SAA channel driver communications method requires a single subchannel (with a device number that is even or odd) for PU type 2.1 connections for z/OS LANRES and a single subchannel (with a device number that is even or odd) for PU type 2 connections for 3270 emulation. See "NetWare for SAA 2.0 Channel Driver Configuration for PU 2.0/LU 2.0" on page 24 for details.

Parallel Channel Adapter Configuration

2. **Perform the following steps using HCD:**
 - a. Open the HCD from ISPF.
 - b. Select Define I/O Device Data.
 - c. Select Device Type CTC.
 - d. On the Add Device panel, enter the device number and number of devices.
This defines your MVS I/O configuration information.
3. **Create the appropriate entries defining the number of 3172 device addresses for each NetWare server in the I/O configuration data set (IOCDs).**

Configure the addresses as follows:

 - Block multiplexing
 - Data streaming (preferred) or Data Control Interlock (DCI) mode. Document this because you'll need it when configuring the NetWare server.
 - Non-shared or SHARED=NO

For serial channels this statement is ignored.

This defines the new I/O device addresses to the host processor.
4. **Activate the I/O configuration changes.**

This makes the changes take affect.

Defining Subchannels on the NetWare Server

Perform the following steps so that the NetWare server will recognize the subchannels you just set up on z/OS. Most of these steps describe how to set up the MMC channel adapter configuration files. For more information and an example of the files, see *z/OS LANRES Configuration Files and Commands*.

1. **Determine whether you will need one or two channel adapter configuration files.**

If you have two MMC cards connected to two different hosts or two channels on the same host, then you will need two channel adapter configuration files; PSCA1.CFG and PSCA2.CFG. If you have only one, then you will only need the PSCA1.CFG configuration file.

2. **Copy the z/OS LANRES sample configuration file (or files)**

From a client, login to the NetWare server as a user having authority to the SYS:\EWXNLM and SYS:\SYSTEM directories (such as, the SUPERVISOR user ID) and enter the following command (or commands) assuming the F drive is mapped to SYS:

```
copy f:\ewxn1m\psca1.sam f:\system\psca1.cfg
copy f:\ewxn1m\psca2.sam f:\system\psca2.cfg
```

This places one (or both) of the configuration files in the SYS:\SYSTEM\ directory.

3. **Update the configuration file or files (PSCAx.CFG).**

Edit the configuration file or files (PSCA1.CFG, PSCA2.CFG) and define the following:

- a. **Set a value for the DSPD field.**

If the data streaming speed of the channel is not the same as one of the following speeds, then use a DSPD value that defines a speed just **below** the channel speed.

The DSPD values are defined as follows:

DSPD Value	Definition
------------	------------

Parallel Channel Adapter Configuration

- 0 Data Control Interlock (DCI) mode
- 1 Data streaming at 1.9 MBytes/second
- 2 Data streaming at 2.7 MBytes/second
- 3 Data streaming at 3.4 MBytes/second
- 4 Data streaming at 4.5 MBytes/second

This defines how the channel is to be run.

b. **Set the XLEN value to a 0.**

This defines the size of the transmit buffers used by the adapter.

c. **Set the RLEN value to a 0.**

This defines the size of the receive buffers used by the adapter.

d. **Set the XNUM value to a 0.**

This defines the number of transmit buffers used by the adapter.

e. **Set the RNUM value to a 0.**

This defines the number of receive buffers used by the adapter.

f. **Set one ADDR statement for each subchannel that the adapter will use.**

Notes:

- 1) The maximum number you can specify is 128 (or 64 pairs) for each adapter.
- 2) Ensure that you do not define unit addresses that are defined for other control units on the same channel.
- 3) You cannot define unit address X'FF' for the MMC adapter.
- 4) If you are going to use the z/OS LANRES NetWare for SAA channel driver, then you will need up to two additional subchannels. The NetWare for SAA channel driver communications method requires a single subchannel (with a device number that is even or odd) for PU type 2.1 connections for z/OS LANRES and a single subchannel (even or odd) for PU type 2 connections for 3270 emulation. See "NetWare for SAA 2.0 Channel Driver Configuration for PU 2.0/LU 2.0" on page 24 for details.

For example:

```
ADDR=10 1 2
```

This example defines an z/OS device number that might be X'610'. Only the rightmost two digits of the device number are defined here. Should these two digits not correspond to the unit address on the CNTRLUNIT definition, then the unit address must be used here instead. The numbers 1 and 2 identify the command decode tables which are loaded into the adapter. These numbers, 1 and 2, correspond to the first and second command decode tables (B and E) defined in the TABL statement (next step).

g. **Set two TABL statements for z/OS LANRES.**

```
TABL=1 SYS:\EWXNLM\CU3088B.STD  
TABL=2 SYS:\EWXNLM\CU3088E.STD
```

This loads the command decode tables B and E and gives them identifying numbers 1 and 2, respectively. The numbers 1 and 2 are used by the ADDR statement previously described.

4. **Ensure the Select/Bypass switch on the cable connector is on S (Select).**

Parallel Channel Adapter Configuration

This enables the MMC channel connection. (It may already be set to S (Select), if the MMC was already installed.)

5. Load the MMC adapter driver on NetWare.

Do you have one or two MMC channel adapter configuration files?

If you have one, do **only** Step a following.

If you have two, do **only** Step b following.

a. Enter the following command on the NetWare server console:

Note: This commands must be entered all on one line.

```
load sys:\ewxn1m\acpwpc m=psca.abs  
c1=sys:\ewxn1m\config_file
```

Where *config_file* is the MMC channel adapter configuration file.

b. Enter the following command on the NetWare server console:

Note: This command must be entered all on one line.

```
load sys:\ewxn1m\acpwpc m=psca.abs  
c1=sys:\ewxn1m\config_file1  
c2=sys:\ewxn1m\config_file2
```

Where:

- *config_file1* is the first MMC channel adapter configuration file, which is usually PSCA1.CFG.
- *config_file2* is the second MMC channel adapter configuration file, which is usually PSCA2.CFG.

This loads the MMC adapter driver program on the NetWare server. Note that this may take about two or three minutes to complete, so wait for the initialization message to display. This step must be done before the z/OS LANRES communication layer is started.

For details about the LOAD ACPWPCA command, see *z/OS LANRES Configuration Files and Commands*.

Checkpoint

At this point, the MMC card is physically attached and the subchannels are defined on both the host and NetWare server. Also, the MMC adapter driver program is loaded on the NetWare server.

We'll have to identify which subchannels are to be used by z/OS LANRES in an EWXCOMM initialization file and set up the NetWare server. If you're not using the NetWare for SAA channel driver, you can go to "Chapter 5. Setting Up the NetWare Server" on page 97 now. If you are using the NetWare for SAA channel driver, you'll need to set that up, so go to "NetWare for SAA 2.0 Channel Driver Configuration for PU 2.0/LU 2.0" on page 24 first.

Serial Channel Adapter Configuration

The following steps describe:

- How to define the subchannels that z/OS LANRES will use for the ESCON communications method on z/OS. These subchannels are specified when you start an z/OS LANRES connection.

Serial Channel Adapter Configuration

- How to set up NetWare ESCON channel adapter configuration file for the NetWare server to recognize and use these subchannels.
- How to load the ESCON adapter driver.

You are limited to one IBM ESCON Adapter Feature card or one IBM PCI ESCON card. In addition, you cannot have both the ESCON and Parallel Channel Adapter cards in the same machine.

Defining Subchannels on z/OS

Perform the following steps to define subchannels on z/OS in order for z/OS LANRES to use the ESCON communication method. Before you perform these steps, ensure the ESCON adapter is installed.

1. Determine the total number of device addresses that you want to be configured for all of your NetWare servers.

An even, odd pair of subchannel addresses is needed for each z/OS LANRES function that is going to be used concurrently, whether it is being used in batch, interactively by a TSO user, or as a server.

For example, suppose you have the following situation and you want all of the following to be used concurrently:

- Administration is going to be used by two TSO interactive users
- Distribution is going to be used by four TSO interactive users
- 1 batch machine for administration
- 1 batch machine for distribution
- 2 host-to-LAN print servers
- 3 LAN-to-host print servers
- 8 disk servers

This means that you need 21 subchannel pairs. In other words, you need to define 42 addresses.

Notes:

- a. Only one ESCON card per machine is supported, but you can use up to 128 subchannels (or 64 pairs) on that one card.
 - b. Ensure that you do not define subchannel addresses that are defined for other control units on the same channel.
 - c. You cannot define unit address X'FE' and X'FF' for the ESCON adapter.
 - d. If you are going to use the z/OS LANRES NetWare for SAA channel driver, then you will need up to two additional subchannels. The NetWare for SAA channel driver communications method requires a single subchannel (with a device number that is even or odd) for PU type 2.1 connections for z/OS LANRES and a single subchannel (with a device number that is even or odd) for PU type 2 connections for 3270 emulation. See “NetWare for SAA 2.0 Channel Driver Configuration for PU 2.0/LU 2.0” on page 24 for details.
- ### 2. Perform the following steps using HCD:
- a. Open the HCD from ISPF.
 - b. Select Define I/O Device Data.
 - c. Select Device Type 3172.
 - d. On the Add Device panel, enter the device number and number of devices.

This defines your z/OS I/O configuration information.

Serial Channel Adapter Configuration

3. **Create the appropriate entries defining the number of 3172 device addresses for each NetWare server in the I/O configuration data set (IOCDs).**

Configure the addresses as follows:

- Non-shared or SHARED=NO

For serial channels this statement is ignored.

This defines the new I/O device addresses to the host processor.

4. **Activate the I/O configuration changes.**

This makes the changes take affect.

Defining Subchannels on the NetWare Server

Perform the following steps so that the NetWare server will recognize the subchannels you just set up on z/OS. Most of these steps describe how to set up the ESCON channel adapter configuration files. For more information and an example of the file, see *z/OS LANRES Configuration Files and Commands*.

1. **Copy the z/OS LANRES sample configuration file.**

From a client, log in to the NetWare server as a user having authority to the SYS:\EWNLM and SYS:\SYSTEM directories (such as, the SUPERVISOR user ID) and enter the following command assuming the F drive is mapped to SYS:

```
copy f:\ewxn1m\nsca1.sam f:\ewxn1m\nsca1.cfg
```

This places the configuration file in the SYS:\EWNLM\ directory.

2. **Update the configuration file.**

Edit the file and define the following:

- a. **Set the XLEN value to a 0.**

This defines the size of the transmit buffers used by the adapter.

- b. **Set the RLEN value to a 0.**

This defines the size of the receive buffers used by the adapter.

- c. **Set the XNUM value to a 0.**

This defines the number of transmit buffers used by the adapter.

- d. **Set the RNUM value to a 0.**

This defines the number of receive buffers used by the adapter.

- e. **Set one ADDR statement for each subchannel that the adapter will use.**

Notes:

- 1) Only one ESCON card per machine is supported, but you can use up to 128 subchannels (or 64 pairs) on that one card.
- 2) Ensure that you do not define unit addresses that are already defined for this control unit.
- 3) You cannot define unit address X'FE' and X'FF' for the ESCON adapter.
- 4) If you are going to use the z/OS LANRES NetWare for SAA channel driver, then you will need up to two additional subchannels. The NetWare for SAA channel driver communications method requires a single subchannel (with a device number that is even or odd) for PU type 2.1 connections for z/OS LANRES and a single subchannel (with a device number that is even or odd) for PU type 2 connections for 3270 emulation. See "NetWare for SAA 2.0 Channel Driver Configuration for PU 2.0/LU 2.0" on page 24 for details.

Serial Channel Adapter Configuration

For example:

```
ADDR=10 DC1 0 1 2
```

These ADDR values are explained (respectively) as follows:

- Set to the unit address of the corresponding device number. To continue with our host example, we defined 12 subchannel pairs starting at 0A10. Here, we defined unit address 10 of our first subchannel.
- For the Port/CUADD, set the 9032 port that the z/OS accessible channel plugs in to, concatenated with the CUADD value defined for the control unit. In our example, our 9032 port is DC, and we defined our CUADD value for the control unit as 1.
Set this to 010 if you aren't going through a 9032 to connect to z/OS, and you have an ESCON card directly attached.
- If the channel connection to the ESCON card is a non-shared ESCON channel, set this value to 0. Otherwise, if the channel is a SHared or EMIF channel, this value must be set to the logical partition number that the ESCON card is connecting to using a value from 0 to F.
- Set the command decode tables that are loaded into the adapter, which are 1 and 2 in this example. These values, 1 and 2, correspond to the first and second command decode tables (S and R) defined in the TABL statement (next step).

f. **Set two TABL statements for z/OS LANRES.**

```
TABL=1 SYS:\EWXNLM\CS3088S.STD  
TABL=2 SYS:\EWXNLM\CS3088R.STD
```

This loads the command decode tables S and R found in the SYS:\EWXNLM\ directory and gives them identifying numbers 1 and 2, respectively. The numbers 1 and 2 are used by the ADDR statement previously described.

g. **Set the SERIAL statement (optional).**

Set the serial number of the 3172 that the ESCON adapter is in, using an ASCII string from 1 to 12 characters. For example:

```
SERIAL=23CF644
```

For the PCI ESCON card this statement is ignored.

3. **Load the ESCON adapter driver on NetWare.**

Enter the following command on the NetWare server console:

```
load sys:\ewxn1m\driver c1=sys:\ewxn1m\config_file
```

Where *config_file* is the ESCON channel adapter configuration file, which is usually NSCA1.CFG and *driver* is the device driver corresponding to the ESCON adapter type (acpwnc for MCA or acpwslc for PCI).

This loads the ESCON adapter driver program on the NetWare server. Note that this may take about two or three minutes to complete, so wait for the initialization message to display. This step must be done before the z/OS LANRES communication layer is started.

For details about the LOAD ACPWNSC and the LOAD ACPWSLC commands, see *z/OS LANRES Configuration Files and Commands*.

To prevent a loss of light condition, you must unload all the NLMs loaded after EWXCOMM. Then you must unload EWXCOMM and then unload the channel driver.

Serial Channel Adapter Configuration

Checkpoint

At this point, the ESCON card is physically attached and the subchannels are defined on both the host and NetWare server. Also, the ESCON adapter driver program is loaded on the NetWare server.

We'll have to identify which subchannels are to be used by z/OS LANRES in an EWXCOMM initialization file and set up the NetWare server. If you're not using the NetWare for SAA channel driver, you can go to "Chapter 5. Setting Up the NetWare Server" on page 97 now. If you are using the NetWare for SAA channel driver, you'll need to set that up, so go to "NetWare for SAA 2.0 Channel Driver Configuration for PU 2.0/LU 2.0" first.

NetWare for SAA 2.0 Channel Driver Configuration for PU 2.0/LU 2.0

This section describes how to set up the NetWare for SAA 2.0 channel driver to gain the communications speed of channel attachment for your NetWare for SAA 2.0 Server for PU 2.0.

- VTAM connections that allow 3270 emulators on the LAN

This channel driver requires that VTAM be channel attached to a NetWare Server with NetWare for SAA 2.0.

The following steps describe:

- Customizing VTAM on z/OS for 3270 terminal emulation
- Customizing NetWare for SAA 2.0 for SAA on the NetWare Server for 3270 terminal emulation
- Varying on the subchannel from z/OS
- Varying on the VTAM LIST's

The NetWare for SAA 2.0 channel driver uses one subchannel for a PU 2.0 connection.

Note: If you are setting up both a PU 2.0 and PU 2.1 connection, read this chapter first; then go to the PU 2.1 chapter.

Customizing VTAM for 3270 Emulation

In general, to use LU 2.0, the following VTAM information is configured:

1. **Ensure VTAM is installed and running on z/OS.**
2. **Create the XCA VTAM LIST Member.**

The VTAM LIST is a network definition member that brings up the connection between z/OS and the NetWare for SAA 2.0 Server. This member must be stored where VTAM can access it (usually SYS1.VTAMLST).

The following is an example of our XCA VTAM LIST network definition whose member name is LRXCA20.

```

*
SNA20  VBUILD  TYPE=XCA
*
PORT20  PORT    MEDIUM=RING,
              APAPNO=0,
              SAPADDR=4,
              CUADDR=E02,
              VNAME=CN3172,
              VNGROUP=GROUP20

*
GROUP20  GROUP  DIAL=YES,
                ISTATUS=ACTIVE,
                ANSWER=ON,
                CALL=INOUT,
                DYNPU=YES,
                DYNPUFX=U1,
                AUTOGEN=(1,L,P)
*
    
```

Note that the sample cannot be used as is. It contains values that are specific to our environment. Customize these values to meet the needs of your environment:

- Our subchannel address is E02, which is one of the subchannels that the channel adapter card on the NetWare for SAA 2.0 Server is attached to. This address will be used later on the NetWare for SAA 2.0 Server as one of the LOAD EWXLSA parameters.
- The number of stations (LINE/PU pairs) that VTAM enables is one. You can add these as necessary.

3. Create the Switched Net VTAM LIST Member.

The Switched Net VTAM List is a network definition member that defines the emulated terminals on the LAN. This member must be stored where VTAM can access it (usually SYS1.VTAMLST).

The following is an example of our SWITCHED NET VTAM LIST network definition whose member name is LRSWNT20.

NetWare SAA 2.0 Channel Driver for PU 2.0

```
*
SWNET20  VBUILD  TYPE=SWNET,
              MAXNO=50,
              MAXGRP=10
*
PU20     PU      ADDR=01,
              PUTYPE=2,
              IDNUM=00100,
              IDBLK=05D,
              MAXPATH=5,
              DISCNT=NO,
              DYNLU=YES,
              MAXDATA=265,
              ANS=CONTINUE
*
PATH20   PORT    DIALNO=010410005A6C4CCD,
              GRPNM=GROUP21
*
LU02     LU      LOCADDR=2
              MODETAB=ISTINCLM,DLOG=#INTER,USSTAB=USSTABLE
LU03     LU      LOCADDR=3
              MODETAB=ISTINCLM,DLOG=#INTER,USSTAB=USSTABLE
LU04     LU      LOCADDR=4
              MODETAB=ISTINCLM,DLOG=#INTER,USSTAB=USSTABLE
LU05     LU      LOCADDR=5
              MODETAB=ISTINCLM,DLOG=#INTER,USSTAB=USSTABLE
LU06     LU      LOCADDR=6
              MODETAB=ISTINCLM,DLOG=#INTER,USSTAB=USSTABLE
LU07     LU      LOCADDR=7
              MODETAB=ISTINCLM,DLOG=#INTER,USSTAB=USSTABLE
LU08     LU      LOCADDR=8
              MODETAB=ISTINCLM,DLOG=#INTER,USSTAB=USSTABLE
LU09     LU      LOCADDR=9
              MODETAB=ISTINCLM,DLOG=#INTER,USSTAB=USSTABLE
*
```

Note that the sample cannot be used as is. It contains values that are specific to our environment. Customize these values to meet the needs of your environment:

- We have 8 (LU LOCADDR) LUs defined per server. This number can be increased to the dependent session limit of the NetWare for SAA 2.0 license. LOCADDR 0 cannot be used because it is defined as an independent LU.
- We noted our IDBLK value 05D and IDNUM value 00100 because we'll need to specify them later on the NetWare for SAA 2.0 Server in the CSCON utility.
- We are using the logon mode table entry MODETAB=ISTINCLM which is an entry in a default logmode table, provided by VTAM.
- We are using the logon mode DLOGMOD=#INTER which is an default logmode provided by VTAM.
- We are using the usstab USSTAB=USSTABLE which is provided by VTAM.

4. Set up the Active Start member.

Browse the ATCSTRxx VTAMLST definition member of the SYS1.VTAMLST member and document your NETID value.

The following is an example of our VTAM Start Member (ATCSTRxx):

```
*****
***          VTAM STARTUP OPTIONS          ***
*****
HOSTSA=148,
  CSALIMIT=0,
  CONFIG=ES,
  SSCPID=5397,
  SSCPNAME=N2ESM,
  NETID=NET1,
  PPOLOG=YES,
  IOBUF=(350,288,19,,50,50),
  CRPLBUF=(350,,15,,20,18),
  LFBUF=(150,,0,,10,1),
  LPBUF=(280,,15,,50,50),
  SFBUF=(600,,0,,50,1),
  NOTRACE,TYPE=VTAM
```

This example shows that the NETID value is NET1. Later on we'll need to define this value as the Network ID in the CSCON utility on the NetWare for SAA 2.0 Server.

Customizing NetWare for SAA 2.0 on the NetWare Server for 3270 Emulation

1. **Ensure that you are running compatible versions of NetWare and NetWare for SAA 2.0.**
 - a. Load the Install Utility from the NetWare Server console.
 - b. Choose Product Options from the screen.
 - c. Check the information that displays to ensure the Communication Executive 2.0 product is v2.0.22 or later and the NetWare for SAA 2.0 product is v2.0.23 or later.

If you do not have the required level of NetWare for SAA 2.0, contact your Novell** representative to obtain the proper level. You may need to obtain PTFs (fixes) from Novell and apply them to your system to get to the correct level.

2. **Create a PU 2.0 Service Profile on the NetWare for SAA 2.0 Server.**

A NetWare *service profile* is a stored set of parameters that defines a particular communication service configuration. In this step, we will create a service profile for communications with the z/OS host system.

To create a service profile, use the NetWare CSCON utility. Create a service profile for PU Type 2.0.

The Communication Executive must be running on the server before the CSCON utility can be used. Start the Communication Executive on the server by entering the following command on the NetWare console:

```
LOAD COMMEEXEC
```

Run the CSCON utility from a NetWare for SAA 2.0 client, as instructed in the *Novell NetWare for SAA 2.0 Administration Guide for Mainframes and Peer Nodes*.

3. **Configure the Net ID value.**
 - From a client, run the CSCON utility.
 - Select the server you want to configure.
 - Select Configure Communication Services.
 - Select NetWare for SAA 2.0PTF Refresh.

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- Select Configure SNA Network ID.
 - Enter NET1, as per ATCSTRxx VTAMLST.
 - Press the escape key to save.
4. **Select Configure Data Link Adapter.**
- Select Configure Data Link Adapters.
 - Press the insert key.
 - Enter EWXLSA1.
 - Select custom link.
 - Enter the values A thru J, shown below.
 - Press the escape key to save.

Set the fields pointed to by items A to J as follows:

```
Configure Custom Link Adapter
=====
```

```
Logical adapter name:           EWXLSA1      (A)
Logical adapter number:         0              (B)
Adapter service status:         In Service   (C)
Custom link type;               MMCADA       (D)
Multiple logical link support   Yes        (E)
Balanced protocol:              Yes        (F)
Protocol stack name:            EWXLSA    (G)
Local station role for peer links: Secondary  (H)
Receiver window size:           7            (I)
Terminate peer link if no active APPC sessions: No (J)
```

The following describes the fields in the above screen:

- A** Logical adapter name, EWXLSA1, corresponding to the S1 parameter of the LOAD EWXLSA command
 - B** Logical adapter number, set to 0
 - C** Adapter service status, which should be set to In Service
 - D** Custom link type, set to MMCADA
 - E** Multiple logical link support, which MUST be set to Yes
 - F** Balanced protocol, which MUST be set to Yes
 - G** Protocol stack name, which MUST be set to EWXLSA
 - H** Local station role for peer links, which MUST be set to Secondary
 - I** Receiver window size, which in this example is set to 7. See the Netware for SAA publications for more information.
 - J** Terminate peer link if no active APPC sessions, set to No
5. **Select Configure for Host Connection.**
- Select Configure for Host Connections.
 - Select Configure Host Profiles.
 - Press the insert key.
 - Enter new PU Profile name, ours is MVS20.
 - Enter the values K thru V, shown below:

```

Configure PU Profile MVS20
=====

Configure default LU attributes          <See panel>
Start dependent LU address:             2           (K)
Number of dependent LUs:                8           (L)
Peripheral node control point name:     MVS20       (M)
Offline test mode:                      Disabled    (N)
Assign only LUs activated by the host:  Yes         (O)
Call host on workstation attach:        No          (P)
PU profile startup status:              Enabled     (Q)
Logical adapter name:                   EWXLSA1     (R)
Maximum frame size to transmit inbound: 2057       (S)
Node ID (block ID/PU ID):               05D 00100 hex (T)
Custom data link target name:           EWX         (U)

Local station role:                     Secondary   (V)
    
```

The following describes the fields in the above screen:

- K** Start dependent LU address. The example reflects the switched net starting LU address, set to 2.
- L** Number of dependent LUs, which is set to 8, the dependent session license limit of our NetWare for SAA 2.0
- M** Peripheral node control point name, set to MVS20
- N** Offline test mode, set to Disabled
- O** Assign only LUs activated by the host, set to Yes
- P** Call host on workstation attach, set to No
- Q** PU profile startup status, set to Enabled
- R** Logical adapter name, set to EWXLSA1
- S** Maximum frame size to transmit inbound, set to 2057
- T** Node ID (block ID/PU ID). The Block ID is set to 05D and the PU ID is set to 00100, per our LRXCA20 VTAM LIST.
- U** Custom data link target name, which MUST be set to EWX
- V** Local station role, which must be set to Secondary

6. **Configure Default LU Attributes.** .

- Select Configure default LU attributes, the <See Panel> option above.
- Verify that options W thru AA match ours.
- Press the escape key twice to save.

```

LU category:                Public           (W)
LU type:                    Display (LU type 2) (X)
Model:                      Model 2 (24 x 80)  (Y)
VTAM LU name prefix:       MVS20             (Z)
Append LU address to prefix using: Hex       (AA)
    
```

The following describes the fields in the above screen:

- W** LU category, set to Public
- X** LU type, MUST be set to Display (LU type 2) for LU 2.0

NetWare SAA 2.0 Channel Driver for PU 2.0

- Y** Model, set to Model 2 (24 x 80) screen size
- Z** VTAM LU name prefix, set to MVS20.
- AA** Append LU address to prefix using, set to Hex.

7. Configure Host Profile.

- Under Configure Host PU Profile
 - Select Configure Dependent LUs.
 - Select first LU address.
 - Change the VTAM LU's name to match those in the Switched Net VTAM LIST.
 - Do this for all LUs.
- Press the escape key to save as you exit CSCON.

We get the following screen:

LU Address	LU Type	Model	VTAM LU Name	Lock	Category:	Name
002 (0x02)	Display	2	LU02	No	Public	
003 (0x03)	Display	2	LU03	No	Public	
004 (0x04)	Display	2	LU04	No	Public	
005 (0x05)	Display	2	LU05	No	Public	
006 (0x06)	Display	2	LU06	No	Public	
007 (0x07)	Display	2	LU07	No	Public	
008 (0x08)	Display	2	LU08	No	Public	
009 (0x09)	Display	2	LU09	No	Public	

8. Automate the loading of the Communication Executive, the Channel Driver, the NetWare for SAA 2.0 Channel Driver and NetWare for SAA 2.0 for PU 2.0/LU 2.0.

In this step, we will set up the NetWare server so that the above programs are automatically loaded when the server is booted. Commands have to be added to the AUTOEXEC.NCF and the EWXSTART.LST files in order to do this.

Add a search path to the AUTOEXEC.NCF so that the z/OS LANRES directory is in the search path, and add a LOAD command for a module named EWXSTART. For example:

```
search add sys:\ewxn1m
load sys:\ewxn1m\ewxstart
```

When the EWXSTART module is loaded, it processes commands in a file named EWXSTART.LST. To complete the automation of the loading of Communication Executive, update the EWXSTART.LST file that contains the necessary NetWare LOAD commands.

Update the EWXSTART.LST file in the SYS:\EWXNLM directory. A sample EWXSTART.LST file is in this directory. The sample file name is EWXSTART.SAM. Copy this file as EWXSTART.LST and modify as shown for a MMC connection.

```
load acpwpc m=sys:\system\psca.abs c1=sys:\system\psca1.cfg
delay 90
load commexec
delay 90
load ewx1sa s1=02
delay 30
load nwsaa
```

The LOAD ACPWPCA statement loads the MMC Channel Driver.

NetWare SAA 2.0 Channel Driver for PU 2.0

The LOAD DELAY statement delays the NetWare server for a value, specified in seconds. This allows the previous LOAD statement to finish.

The LOAD COMMEEXEC statement loads the NetWare for SAA 2.0's Communication Executive.

The LOAD EWXLSA statement loads the Netware for SAA 2.0 Channel Driver; our subchannel address is E02 as per our LRXCA20 VTAM LIST. If your subchannel address is not E02, substitute your appropriate address. Remember that the subchannels must be defined in the appropriate channel configuration file.

The LOAD NWSAA statement loads Netware for SAA 2.0 for PU 2.0 connection and LU 2.0 support.

The subchannel address used in the EWXLSA command cannot be used in the EWXCOMM.INI.

Note: The NetWare Server has to be rebooted in order for the above changes to take place. Perform a reboot and return to Step 9.

9. Vary on the subchannel from z/OS.

For example, we entered the following command:

```
/V E02,ONLINE
```

10. Activate the Switched Net and XCA VTAM LISTs. For example, we entered the following commands:

```
/V NET,ACT,ID=LRSWNT20
```

```
/V NET,ACT,ID=LRXCA20
```

This establishes the VTAM connection from z/OS to the NetWare Server.

Checkpoint

At this point, the NetWare for SAA 2.0 channel driver communications support is set up on both the z/OS system and NetWare for SAA 2.0 Server for 3270 Emulation.

NetWare for SAA 2.2 Channel Driver Configuration for PU 2.0/LU 2.0

This section describes how to set up the NetWare for SAA 2.2 channel driver to gain the communications speed of channel attachment for your NetWare for SAA 2.2 Server for PU 2.0.

- VTAM connections that allow 3270 emulators on the LAN

This channel driver requires that VTAM be channel attached to a NetWare Server with NetWare for SAA 2.2.

The following steps describe:

- Customizing VTAM on z/OS for 3270 terminal emulation
- Customizing NetWare for SAA 2.2 for SAA on the NetWare Server for 3270 terminal emulation
- Varying on the subchannel from z/OS
- Varying on the VTAM LIST's

NetWare SAA 2.2 Channel Driver for PU 2.0

The NetWare for SAA 2.2 channel driver uses one subchannel for a PU 2.0 connection.

Note: If you are setting up both a PU 2.0 and PU 2.1 connection, read this chapter first, then go to the PU 2.1 chapter.

Customizing VTAM for 3270 Emulation

In general, to use LU 2.0, the following VTAM information is configured:

1. **Ensure VTAM is installed and running on z/OS.**
2. **Create the XCA VTAM LIST Member.**

The VTAM LIST is a network definition member that brings up the connection between z/OS and the NetWare for SAA 2.0 Server. This member must be stored where VTAM can access it (usually SYS1.VTAMLST).

The following is an example of our XCA VTAM LIST network definition whose member name is LRXCA20.

```
*
SNA20  VBUILD  TYPE=XCA
*
PORT20  PORT    MEDIUM=RING,
           APAPNO=0,
           SAPADDR=4,
           CUADDR=E02,
           VNAME=CN3172,
           VNGROUP=GROUP20
*
GROUP20  GROUP  DIAL=YES,
           ISTATUS=ACTIVE,
           ANSWER=ON,
           CALL=INOUT,
           DYNPU=YES,
           DYNPUFX=U1,
           AUTOGEN=(1,L,P)
*
```

Note that the sample cannot be used as is. It contains values that are specific to our environment. Customize these values to meet the needs of your environment:

- Our subchannel address is E02, which is one of the subchannels that the channel adapter card on the NetWare for SAA 2.2 Server is attached to. This address will be used later on the NetWare for SAA 2.2 Server as one of the LOAD EWXLSA parameters.
- The number of stations (LINE/PU pairs) that VTAM enables is one. You can add these as necessary.

3. **Create the Switched Net VTAM LIST Member.**

The Switched Net VTAM List is a network definition member that defines the emulated terminals on the LAN. This member must be stored where VTAM can access it (usually SYS1.VTAMLST).

The following is an example of our SWITCHED NET VTAM LIST network definition whose member name is LRSWNT20.

```

*
SWNET20  VBUILD  TYPE=SWNET,
              MAXNO=50,
              MAXGRP=10
*
PU20     PU      ADDR=01,
              PUTYPE=2,
              IDNUM=00100,
              IDBLK=05D,
              MAXPATH=5,
              DISCNT=NO,
              DYNLU=YES,
              MAXDATA=265,
              ANS=CONTINUE
*
PATH20   PORT    DIALNO=010410005A6C4CCD,
              GRPNM=GROUP21
*
LU02     LU      LOCADDR=2
              MODETAB=ISTINCLM,DLOG=#INTER,USSTAB=USSTABLE
LU03     LU      LOCADDR=3
              MODETAB=ISTINCLM,DLOG=#INTER,USSTAB=USSTABLE
LU04     LU      LOCADDR=4
              MODETAB=ISTINCLM,DLOG=#INTER,USSTAB=USSTABLE
LU05     LU      LOCADDR=5
              MODETAB=ISTINCLM,DLOG=#INTER,USSTAB=USSTABLE
LU06     LU      LOCADDR=6
              MODETAB=ISTINCLM,DLOG=#INTER,USSTAB=USSTABLE
LU07     LU      LOCADDR=7
              MODETAB=ISTINCLM,DLOG=#INTER,USSTAB=USSTABLE
LU08     LU      LOCADDR=8
              MODETAB=ISTINCLM,DLOG=#INTER,USSTAB=USSTABLE
LU09     LU      LOCADDR=9
              MODETAB=ISTINCLM,DLOG=#INTER,USSTAB=USSTABLE
*

```

Note that the sample cannot be used as is. It contains values that are specific to our environment. Customize these values to meet the needs of your environment:

- We have 8 (LU LOCADDR) LUs defined per server. This number can be increased to the dependent session limit of the NetWare for SAA 2.2 license. LOCADDR 0 cannot be used because it is defined as an independent LU.
- We noted our IDBLK value 05D and IDNUM value 00100 because we'll need to specify them later on the NetWare for SAA 2.2 Server in the NWSAA Administrator.
- We are using the logon mode table entry MODETAB=ISTINCLM which is an entry in a default logmode table, provided by VTAM.
- We are using the logon mode DLOGMOD=#INTER which is a default logmode provided by VTAM.
- We are using the usstab USSTAB=USSTABLE which is provided by VTAM,

4. **Set up the Active Start member.**

Browse the ATCSTRxx VTAMLST definition member of the SYS1.VTAMLST member and document your NETID value.

The following is an example of our VTAM Start Member (ATCSTRxx):

NetWare SAA 2.2 Channel Driver for PU 2.0

```
*****  
***          VTAM STARTUP OPTIONS          ***  
*****  
HOSTSA=148,  
  CSALIMIT=0,  
  CONFIG=ES,  
  SSCPID=5397,  
  SSCPNAME=N2ESM,  
  NETID=NET1,  
  PPOLOG=YES,  
  IOBUF=(350,288,19,,50,50),  
  CRPLBUF=(350,,15,,20,18),  
  LFBUF=(150,,0,,10,1),  
  LPBUF=(280,,15,,50,50),  
  SFBUF=(600,,0,,50,1),  
  NOTRACE,TYPE=VTAM
```

This example shows that the NETID value is NET1. Later on we'll need to define this value as the Network ID in the NWSAA Administrator on the NetWare for SAA 2.2 Server.

Customizing NetWare for SAA 2.2 on the NetWare Server for 3270 Emulation

1. **Ensure that you are running compatible versions of NetWare and NetWare for SAA 2.2.**
 - a. Load the Install Utility from the NetWare Server console.
 - b. Choose Product Options from the screen.

If you do not have the required level of NetWare for SAA 2.2, contact your Novell** representative to obtain the proper level. You may need to obtain PTFs (fixes) from Novell and apply them to your system to get to the correct level.

2. **Create a PU 2.0 Service Profile on the NetWare for SAA 2.2 Server.**

A NetWare *service profile* is a stored set of parameters that defines a particular communication service configuration. In this step, we will create a service profile for communications with the z/OS host system.

To create a service profile, use the NetWare NWSAA Administrator. Create a service profile for PU Type 2.0.

The Communication Executive must be running on the server before the NWSAA Administrator can be used. Start the Communication Executive on the server by entering the following command on the NetWare console:

```
LOAD COMMEXEC
```

Start the NWSAA Administrator from a NetWare for SAA 2.2 Windows client, as instructed in the *Novell NetWare for SAA 2.2 Administration Guide*.

3. **Double click on the SAA Server and login to the server..**
4. **Create the Data Link Adapter object.**
 - Click on Object from the Menu Bar.
 - Click on Create from the pull down menu.
 - Click on Data Link Adapter.
 - Click on OK.
 - Enter EWXLSA1 in the Logical Adapter name field.
 - Select Custom in the Adapter Type field.

NetWare SAA 2.2 Channel Driver for PU 2.0

The Custom Settings input area is added to the screen. Fill in the Custom Settings input area as follows:

- Enter MMCADA in the Custom link type field.
 - Enter 0 in the Logical adapter number field.
 - Select Secondary in the Local station role field.
 - Enter 7 in the Receive window size field.
 - Enter EWXLSA in the Protocol stack name field.
 - Put a check in the box in front of the line "Balanced protocol".
 - Put a check in the box in front of the line "Multiple logical links".
 - Leave the box in front of the line "Terminate peer link if no active APPC session" blank.
 - Put a check in the box in front of the line "Enable adapter at startup".
 - Click on OK.
5. **Create Host PU Profiles.**
- Click on Object from the Menu Bar.
 - Click on Create from the pull down menu.
 - Click on Host PU Profile.
 - Enter MVS20 in the PU Profile name field.
 - Enter 8 in the Number of dependent LUs field.
 - Enter 2 in the Starting dependent LU number field.
 - Enter MVS20 in the Peripheral node control point name field.
 - Enter 05D 00100 in the Node ID (block ID/PU ID) field.
 - Leave the box in front of the line "Offline test mode" blank.
 - Put a check in the box in front of the line "Assign only LUs activated by the host".
 - Select EWXLSA1 in the Logical adapter name field.
 - Select 2057 in the Maximum frame size to transmit inbound field.
 - Enter EWX in the Custom data link target name field.
 - Select Secondary in the Local station role field.
 - Put a check in the box in front of the line "Enable PU profile at startup".
 - Click on OK.
6. **Automate the loading of the Communication Executive, the Channel Driver, the NetWare for SAA 2.2 Channel Driver and NetWare for SAA 2.2 for PU 2.0/LU 2.0.**

In this step, we will set up the NetWare server so that the above programs are automatically loaded when the server is booted. Commands have to be added to the AUTOEXEC.NCF and the EWXSTART.LST files in order to do this.

Add a search path to the AUTOEXEC.NCF so that the z/OS LANRES directory is in the search path, and add a LOAD command for a module named EWXSTART. For example:

```
search add sys:\ewxn1m
load sys:\ewxn1m\ewxstart
```

When the EWXSTART module is loaded, it processes commands in a file named EWXSTART.LST. To complete the automation of the loading of Communication Executive, update the EWXSTART.LST file that contains the necessary NetWare LOAD commands.

NetWare SAA 2.2 Channel Driver for PU 2.0

Update the EWXSTART.LST file in the SYS:\EWXNLM directory. A sample EWXSTART.LST file is in this directory. The sample file name is EWXSTART.SAM. Copy this file as EWXSTART.LST and modify as shown for a MMC connection.

```
load acpwpc m=sys:\system\psca.abs c1=sys:\system\psca1.cfg
delay 90
load commexec
delay 90
load ewxlsa s1=02
delay 30
load nwsaa
```

The LOAD ACPWPCA statement loads the MMC Channel Driver.

The LOAD DELAY statement delays the NetWare Server for a value, specified in seconds. This allows the previous LOAD statement to finish.

The LOAD COMMEXEC statement loads the NetWare for SAA 2.2's Communication Executive.

The LOAD EWXLSA statement loads the Netware for SAA 2.2 Channel Driver; our subchannel address is E02 as per our LRXCA20 VTAM LIST. If your subchannel address is not E02, substitute your appropriate address. Remember that the subchannels must be defined in the appropriate channel configuration file.

The LOAD NWSAA statement loads Netware for SAA 2.2 for PU 2.0 connection and LU 2.0 support.

The subchannel address used in the EWXLSA command cannot be used in the EWXCOMM.INI.

Note: The NetWare Server has to be rebooted in order for the above changes to take place. Perform a reboot and return to Step 9.

7. **Vary on the subchannel from z/OS.**

For example, we entered the following command:

```
/V E02,ONLINE
```

8. **Activate the Switched Net and XCA VTAM LISTS.** For example, we entered the following commands:

```
/V NET,ACT,ID=LRSWNT20
```

```
/V NET,ACT,ID=LRXCA20
```

This establishes the VTAM connection from z/OS to the NetWare Server.

Checkpoint

At this point, the NetWare for SAA 2.2 channel driver communications support is set up on both the z/OS system and NetWare for SAA 2.2 Server for 3270 Emulation.

NetWare for SAA 2.0 Channel Driver Configuration for PU 2.1/LU 6.2

This section describes how to set up the NetWare for SAA 2.0 channel driver to gain the communications speed of channel attachment for your NetWare for SAA 2.0. server for PU 2.1/LU 6.2.

- Applications that use NetWare for SAA 2.0 for SAA APPC or CPI Communications with z/OS, such as z/OS LANRES

NetWare for SAA 2.0 Servers running z/OS LANRES can act as a channel-attached SNA gateway.

This channel driver requires that VTAM be channel attached to a NetWare server with NetWare for SAA 2.0.

The NetWare for SAA 2.0 channel driver uses one subchannel for PU type 2.1.

For example, without the NetWare for SAA 2.0 channel driver, an individual z/OS LANRES distribution session communicating through a channel needs a pair of subchannels, and the z/OS session needs channel connection privileges. However, with the NetWare for SAA 2.0 channel driver, you can have multiple distribution sessions communicating over a single subchannel without special privileges. You may want to note that the performance may not be as good as a direct channel attached connection using a dedicated subchannel pair, and an LU 6.2 configuration is not recommended for high performance disk serving applications.

After the NetWare for SAA 2.0 channel driver is loaded and running and the CUSTOM option is defined, APPC (SNA LU 6.2) can be specified as the z/OS LANRES communications protocol when establishing a connection using z/OS LANRES.

The following steps describe:

- Customizing VTAM and the DLU for z/OS LANRES
- Customizing NetWare for SAA 2.0 on the NetWare server for z/OS LANRES
- Varying on the subchannel from z/OS
- Varying on the VTAM LIST's

Note: This setup builds upon a PU 2.0 configuration, as described in the previous section. If PU 2.1 is solely being used, the documentation will note changes for sole PU 2.1.

Customizing VTAM and the DLU for z/OS LANRES

In general, to use SNA LU 6.2, the following APPC, z/OS, and VTAM information is configured:

1. The APPCPMxx member of SYS1.PARMLIB, which is used when the APPC address space is started
2. The ASCHPMxx member of SYS1.PARMLIB, which is used when the ASCH address space is started
3. The side information that is contained in a VSAM Key Sequenced Data Set (KSDS), which handles outbound requests

Because z/OS LANRES performs only outbound allocates (or connects), which means the connection requests only flow from z/OS to the NetWare for SAA 2.0 server, you will only need to customize the APPCPMxx member (1. above) and the side information (3. above) for z/OS LANRES.

NetWare SAA 2.0 Channel Driver for PU 2.1

Note: However, you will still need to start the APPC and ASCH address spaces as described in a later step.

With this in mind, perform the following steps on z/OS:

1. **Ensure VTAM and, if you are using z/OS LANRES across this connection, APPC/MVS is installed and running on z/OS.**
2. **Create the XCA VTAM LIST Member.**

You'll need to add the VTAM list for the communications adapter.

The VTAM LIST is a network definition member that brings up the connection between z/OS and the NetWare for SAA 2.0 server. This member must be stored where VTAM can access it (usually SYS1.VTAMLST). For more information on this member, see the "Defining an External Communication Adapter (XCA) Major Node" section in the *VTAM Resource Definition Reference*.

The following is an example of our VTAM LIST network definition whose member name is LRXCA21.

```
*
SNA21  VBUILD TYPE=XCA
*
PORT21  PORT    MEDIUM=RING,
          APAPNO=0,
          SAPADDR=4,
          CUADDR=E03
          VNNAME=CN3172,
          VNGROUP=GROUP21
*
GROUP21 GROUP   DIAL=YES,
                ISTATUS=ACTIVE,
                ANSWER=ON,
                CALL=INOUT,
                DYNPU=NO,
                AUTOGEN=(1,L,P)
*
```

Note that the sample cannot be used as is. It contains values that are specific to our environment. Customize these values to meet the needs of your environment:

- Our subchannel address is E03, which is one of the subchannels that the channel adapter card on the NetWare for SAA 2.0 server is attached to.
- This address will be used later on the NetWare for SAA 2.0 as one of the LOAD EWXLSA parameters.
- The number of stations (LINE/PU pairs) that VTAM enables is one. You can add more pairs as necessary.

3. **Create the Switched Net VTAM LIST Member.**

Create the appropriate Switched Net Major Node member. This member must be stored where VTAM can access it (usually SYS1.VTAMLST). This defines your NetWare for SAA 2.0 server to VTAM.

The following is an example of our SWITCHED NET VTAM LIST network definition, without a CPNAME, whose member name is LRSWNT21.

```

*
SWNET21  VBUILD  TYPE=SWNET,
              MAXNO=50,
              MAXGRP=10
*
PU21     PU      ADDR=01,
              PUTYPE=2,
              IDNUM=00101,
              IDBLK=05D,
              MAXPATH=5,
              DISCNT=NO,
              DYNLU=YES,
              MAXDATA=265,
              ANS=CONTINUE,
              CPCP=YES,
              CONNTYPE=APPN
*
PATH21   PATH    DIALNO=010410005A6C4CCD,
              GRPNM=GROUP21
*
NWSAA    LU      LOCADDR=0,
              DLOGMOD=APPCHOST,
              MODETAB=APPCTAB
    
```

Note that the sample cannot be used as is. It contains values that are specific to our environment. Customize these values to meet the needs of your environment:

- We have 1 (LU LOCADDR) LU defined. This number can be increased to the independent session limit of the NetWare for SAA 2.0 license. LOCADDR 0 is used because it is defined as an independent LU.
- We noted our IDBLK value 05D and IDNUM value 00101 because we'll need to specify them later on the NetWare for SAA 2.0 server.
- We are using the logon mode DLOGMOD=APPCHOST.
- We are using the logon mode table entry MODETAB=LOGMODES.

4. **Configure the Logmode Table.**

Modify SYS1.SAMPLIB(ATBLMODE) as shown below:

```

*****
LOGON MODE TABLE ENTRY FOR LU 6.2 APPLICATIONS
*****
APPCTAB  MODETAB
          MODEENT LOGMODE=APPCHOST,
              RUSIZES=X'8989',
              SRCVPAC=X'00',
              SSNDPAC=X'01'
          MODEND
          END
    
```

- This example shows the logmode is APPCHOST, as per our Switched Net VTAM LIST. Later on we will need to define this value as the Logmode Name on the NetWare for SAA 2.0 server in the CSCON utility.
- This example also shows the RUSIZE = X'8989'. Later on we will need to define this value as the RU Size of 4096 on the NetWare for SAA 2.0 server in the CSCON utility.

5. **Determine the NETID value.**

Browse the ATCSTRxx VTAMLST definition member of the SYS1.VTAMLST data set and document your NETID value.

The following is an example of our ATCSTRxx VTAMLST:

NetWare SAA 2.0 Channel Driver for PU 2.1

```
*****
***      VTAM STARTUP OPTIONS      ***
*****
HOSTSA=148,
  CSALIMIT=0,
  CONFIG=ES,
  SSCPID=5397,
  SSCPNAME=N2ESM,
  NETID=NET1,
  PPOLOG=YES,
  IOBUF=(350,288,19,,50,50),
  CRPLBUF=(350,,15,,20,18),
  LFBUF=(150,,0,,10,1),
  LPBUF=(280,,15,,50,50),
  SFBUF=(600,,0,,50,1),
  NOTRACE,TYPE=VTAM
```

- This example shows the NETID value is NET1. Later on we will need to define this value as Network ID on the NetWare for SAA 2.0 server in the CSCON utility.

Note: Only one NETID value is needed for both PU 2.0 and PU 2.1.

6. Do you have an existing destination logical unit (DLU) defined?

If yes, then you can use that DLU.

If no, then create one by building a VTAM APPL definition statement, such as the following, and place it in SYS1.VTAMLST. For example:

```
*
      VBUILD  TYPE=APPL
*
LRAPPC1  APPL  ACBNAME=LRAPPC1,
          APPC=YES,
          AUTOSES=5,
          DDRAINL=NALLOW,
          DLOGMOD=APPCHOST,
          DMINWNL=3,
          DMINWNR=6,
          DRESPL=ALLOW,
          DSESLIM=9,
          EAS=32,
          MODETAB=APPCTAB,
          SECACPT=CONV,
          SRBEXIT=YES,
          VERIFY=NONE,
          VPACING=0
```

In this example, LRAPPC1 is the APPL entry and the ACBNAME value. You can choose your own value, however, the ACBNAME value and the APPL entry must be the same. If this is not already in your VTAM control file ATCCONxx, then add it so that it will automatically start when VTAM is started.

- This example shows the ACBNAME is LRAPPC1. Later on we will need to define this value as the Partner LU on the NetWare for SAA 2.0 server in the CSCON utility.
- This example shows the DLOGMODE=APPCHOST, as per our Switched Net VTAM LIST. Later on we will need to define this value as the Mode Name on the NetWare for SAA 2.0 server in the CSCON utility.
- This example shows the DMINWNR=6. Later on we will need to define this value as the Minimum Contention Winners on the NetWare for SAA 2.0 server in the CSCON utility.

NetWare SAA 2.0 Channel Driver for PU 2.1

- This example shows the DMINWNL=3. Later on we will need to define this value as the Number of Autoactivated Sessions on the NetWare for SAA 2.0 server in the CSCON utility.
- This example shows the VPACING=0. Later on we will need to define this value as the Receive Pacing Count on the NetWare for SAA 2.0 server in the CSCON utility.

7. Create and add the side information.

Create the following entries with the SIADD utility command of the ATBSDLF MU APPC/MVS administration utility either through the APPC/MVS administration dialog or in JCL:

```
DESTNAME(nwserver)
TPNAME(EWXCOMM)
MODENAME(modename)
PARTNER_LU(nwserverlu)
```

Where:

- *nwserver* is the symbolic destination name of the NetWare for SAA 2.0 server. The symbolic destination name is the name used when starting your APPC connection. Each symbolic destination name must be unique in the side information.
- The TPNAME *must* be EWXCOMM.
- *modename* is the LOGMODE value in Step 4 on page 39. This is the logon mode for the SNA session.
- *nwserverlu* is the LU name for the NetWare for SAA 2.0 server as per the Switched Net VTAM LIST.

To continue with our example, we used the ATBSDLF MU utility through JCL calling the SIADD command to add the side information to a VSAM data set:

```
//*****
//STEP      EXEC  PGM=ATBSDLF MU
//SYSPRINT  DD    SYSOUT=A
//SYSSDLIB  DD    DSN=SYS1.APPCSI,DISP=SHR  <= Side Information data set
//SYSSDOUT  DD    DSN=SYS1.APPCOUT,DISP=SHR
//SYSIN     DD    *
SIADD
           DESTNAME(NWSERV1)
           TPNAME(EWXCOMM)
           MODENAME(APPCHOST)
           PARTNER_LU(NWSAA)
```

This example means our:

- VSAM KSDS SIDEINFO DATASET points to SYS1.APPCSI.
- Symbolic destination name of NetWare for SAA 2.0 server is NWSERV1.
- Logon mode is APPCHOST, which is the logon mode for the SNA session connecting the DLU to the NetWare for SAA 2.0 server LU.
- LU name for the NetWare for SAA 2.0 server is NWSAA, per our LRSWNT21 VTAM LIST.

For a sample of this JCL, see the ATBUTIL member of the SYS1.SAMPLIB.

This defines the side information identifying the NetWare for SAA 2.0 server that z/OS will connect to. In addition, it defines a target (DESTNAME value) and mode (MODENAME value) that the z/OS LANRESStart commands need to establish an z/OS LANRES connection.

NetWare SAA 2.0 Channel Driver for PU 2.1

8. Make the DLU the BASE LU, and identify the side information data set.

Add the following entries to the APPCPMxx member of SYS1.PARMLIB:

```
LUADD
ACBNAME(hostdlu)
BASE
SIDEINFO
DATASET(sideinfo)
```

Where:

- *hostdlu* is the name of your local LU, which you defined as the BASE LU in Step 6 on page 40.
- *sideinfo* is your side information data set; the data set that contains your side information entries created in Step 7 on page 41.

To continue with our example, we defined the following:

```
LUADD
ACBNAME(LRAPPCC1)
BASE
SIDEINFO
DATASET(SYS1.APPCSI)
```

This means that all of the z/OS LANRES connections from z/OS to the NetWare for SAA 2.0 server will use a session or sessions from the defined BASE LU when connecting to the NetWare for SAA 2.0 server LU. These changes do not take effect until the APPC address space is started (next step).

9. Start the APPC address space.

Enter the following operator command:

```
START APPC,SUB=MSTR,APPC=xx
```

Where *xx* is the last two characters of the APPCPMxx member.

This activates the LUs.

10. Start the ASCH address space.

Enter the following operator command:

```
START ASCH,SUB=MSTR,ASCH=xx
```

Where *xx* is the last two characters of the ASCHPMxx member.

Customizing NetWare for SAA 2.0 on the NetWare Server for PU 2.1

1. Ensure that you are running compatible versions of NetWare and NetWare for SAA 2.0.

- a. Load the Install Utility from the NetWare server console.
- b. Choose Product Options from the screen.
- c. Check the information that displays to ensure the Communication Executive 2.0 product is v2.0.22 or later and the NetWare for SAA 2.2 product is v2.0.23 or later.

If you do not have the required level of NetWare for SAA 2.0, contact your Novell** representative to obtain the proper level. You may need to obtain PTFs (fixes) from Novell and apply them to your system to get to the correct level.

2. Create a PU 2.1 Service Profile on the NetWare for SAA 2.0 server.

NetWare SAA 2.0 Channel Driver for PU 2.1

A NetWare *service profile* is a stored set of parameters that defines a particular communication service configuration. In this step, we will create a service profile for communications with the z/OS host system.

To create a service profile, use the NetWare CICON utility. Create a service profile for a PU Type 2.1. PU Type 2.1 is required for z/OS LANRES. LU 6.2 communications.

The Communication Executive must be running on the server before the CICON utility can be used. Start the Communication Executive on the server by entering the following command on the NetWare console:

```
LOAD COMMEEXEC
```

Run the CICON utility from a NetWare for SAA 2.0 client as instructed in the *Novell NetWare for SAA 2.0 Administration Guide for Mainframes and Peer Nodes*.

3. Configure the Net ID value.

- From a client, run the CICON utility.
- Select the server you want to configure.
- Select Configure Communication Services.
- Select NetWare for SAA 2.0PTF Refresh.
- Select Configure SNA Network ID.
- Enter NET1 as per ATCSTRxx VTAMLST.
- Press the escape key to save.

4. Select Configure Data Link Adapter.

- Select Configure Data Link Adapters.
- Press the insert key.
- Enter EWXLSA2.

Note: For sole PU 2.1, set the logical adapter name to EWXLSA1.

- Select custom link and press enter.
- Enter the values A thru J, shown below.
- Press the escape key to save.

```
Configure Custom Link Adapter
=====

Logical adapter name:           EWXLSA2           (A)
Logical adapter number:        1                       (B)
Adapter service status:        In Service            (C)
Custom link type;              APPC                  (D)
Multiple logical link support   Yes              (E)
Balanced protocol:             Yes              (F)
Protocol stack name:           EWXLSA           (G)
Local station role for peer links: Secondary        (H)
Receiver window size:         7                      (I)
Terminate peer link if no active APPC sessions: No    (J)
```

The following describes the fields in the above screen:

- A** Logical adapter name, EWXLSA2, corresponding to the S2 parameter of the LOAD EWXLSA command, as EWXLSA1, corresponding to the S1 parameter, is already used for PU 2.0.

NetWare SAA 2.0 Channel Driver for PU 2.1

Note: For sole PU 2.1, set the logical adapter name to EWXLSA1, corresponding to the S1 parameter of the LOAD EWXLSA command.

- B** Logical adapter number, set to 1, as 0 is used for PU 2.0.
Note: For sole PU 2.1 set this number to 0.
- C** Adapter service status, which should be set to In Service
- D** Custom link type, set to APPC
- E** Multiple logical link support, which MUST be set to Yes
- F** Balanced protocol, which MUST be set to Yes
- G** Protocol stack name, which MUST be set to EWXLSA
- H** Local station role for peer links, which MUST be set to Secondary
- I** Receive window size, which in this example is set to 7. See the NetWare for SAA publications for more information.
- J** Terminate peer link if no active APPC session, set to No

5. Configure the Default Peer PU Profile.

- Select Configure for Peer Connections.
- Select Configure Peer PU Profile.
- Select NWSAA (DEFAULT).
- Enter the values K thru N, shown below.
- Press the escape key to save.

```
Configure Default Peer PU Profile
=====
```

```
Default Peer PU profile name:           NWSAA           (K)
Peripheral node control point name:     CPNAME          (L)
Node ID (block ID/PU ID):              05D 00101   hex   (M)
Default local/remote SAP for independent LUs:  04 hex       (N)
```

The following describes the fields in the above screen:

- K** Default Peer PU profile name, which is set to NWSAA
- L** Peripheral node control point name, which is set to CPNAME
- M** Node ID (block ID/PU ID), which is set to 05D 00101, as per our LRXCA21 VTAM LIST
- N** Default local/remote SAP for independent LUs, which is set to 4

6. Configure the Peer PU Profile.

- Under Configure for Peer Connection
- Select Configure Peer PU Profile.
- Press the insert key.
- Enter a name; ours is MVS21.
- Enter the values O thru R, shown below.
- Press the escape key twice to save.

```

Configure Peer PU Profile
=====

For backward compatibility with NWSAA 1.3 PU2.1 profiles, you can
optionally define additional Peer PU profiles, each with a unique
CPName and a specific adapter.

Peer PU profile name:                MVS21            (O)
Peripheral node control point name:  CPNAME          (P)
Logical adapter name:                EWXLSA2         (Q)
Node ID (block ID/PU ID):           05D 00101    hex (R)
    
```

The following describes the fields in the above screen:

- O** Peer PU profile name, which is defined as MVS21
 - P** Peripheral node control point name, which is set to CPNAME
 - Q** Logical adapter name, which is set to EWXLSA2
- Note:** For sole PU 2.1, set the Logical Adapter Name to EWXLSA1.
- R** Node ID (block ID/PU ID), which is set to 05D 00101, as per our LRXCA21 VTAM LIST

7. **Configure the Local LU.**

- Under Configure for Peer Connection
- Select Configure APPC Application Subsystem.
- Select Configure Local LUs.
- Press the insert key.
- Select Local LU Category, Independent.
- Enter Name for Local LU; ours is NWSAA.
- Enter the values S thru V, shown below:

```

Configure Local LU
=====

Local LU name:                NWSAA            (S)
Default LU:                   No                (T)
Partner LU:                   <see list> LRAPPC1  (U)
Local LU startup status       Enabled           (V)
    
```

The following describes the fields in the above screen:

- S** Local LU name, which is set to NWSAA, as per the host's Side Information PARTNER_LU definition
- T** Default LU, which is set to No
- U** Partner LU, which is set to LRAPPC1, as per the host's DLU ACBNAME definition
- V** Local LU startup status, which is set to Enabled

8. **Configure the Partner LU.**

NetWare SAA 2.0 Channel Driver for PU 2.1

- Select Partner LU Name.
- Enter Partner LU Name; ours is LRAPPC1.
- Enter Name for Local LU; ours is NWSAA.
- Enter the values X thru CC, shown below:

```
Configure Partner LU
=====

Partner LU name:           LRAPPC1           (W)
SNA network ID:           NET1              (X)
Immediate link activation: Yes              (Y)
Conversation security support: No          (Z)

Mode names:               <See list> APPCHOST (AA)
Logical adapter name:     EWXLSA2          (BB)

Custom data link target name: EWX          (CC)
```

The following describes the fields in the above screen:

W Partner LU name, which is set to LRAPPC1, as per the host's DLU ACBNAME definition

X SNA network ID, which is set to NET1

Y Immediate link activation, which is set to Yes

Z Conversation security support, which is set to No

AA Mode names, which is set to APPCHOST, as per the host's MODENAME definition

BB Logical adapter name, which MUST be set to EWXLSA2

Note: For sole PU 2.1, set the Logical adapter name to EWXLSA1.

CC Custom data link target name, which MUST be set to EWX.

9. Configure the Mode.

- Select Mode Name.
- Enter Mode Name; ours is APPCHOST.
- Enter the values DD thru II, shown below.
- Keep pressing the escape key to save data until you are at the Configure APPC Application Subsystem.

```
Configure Mode
=====

Mode name:                 APPCHOST         (DD)
Number of sessions:        9                (EE)
Minimum contention winners: 6                (FF)
Number of auto activated sessions: 3        (GG)

Maximum RU size:           4096            (HH)
Receive pacing count:      4                (II)
```

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The following describes the fields in the above screen:

- DD** Mode name, which is APPCHOST, as per the host's MODENAME definition
- EE** Number of sessions, which is set to 9, as per the host's DLU definition of DSESLIM=9
- FF** Minimum contention winners, which is set to 6, as per the host's DLU definition of DMINWNR=6
- GG** Number of auto activated sessions, which is set to 3, as per the host's DLU definition of DMINWNL=3
- HH** Maximum RU size, which is set to 4096, as per the host's MODETAB entry definition of RUSIZES=X'8989'
- II** Receive pacing count, which is set to 0, as per the host's DLU definition of VPACING=0

10. Configure the Local Transaction Program.

- Select Configure APPC Application Subsystem.
- Select Configure Local Transaction Programs.
- Press the insert key.
- Select Standard Transaction Program.
- Enter name for Transaction Program, MUST be EWXCOMM.
- Enter the values JJ thru MM, shown below.
- Press the escape key to save data and exit out of CSCON.

```
Configure Local Transaction Program
=====

Local TP name:                EWXCOMM      (JJ)
Sync level:                   None          (KK)
Conversation type:            Basic          (LL)
Conversation security:        No            (MM)
```

The following describes the fields in the above screen:

- JJ** Local TP name, MUST be set to EWXCOMM
- KK** Sync level, MUST be set to None
- LL** Conversation type, MUST be set to Basic
- MM** Conversation security, set to No

11. Configure LU 6.2 on the Netware.

- Load NWSAA on the NetWare server.
- Go to directory SYS:/SYSTEM/NWSAA/APIS/DOS and enter APICFG.
- Set Configuration File Path/File Name to SYS:/SYSTEM/NWSAA/NWSAAAPI.INI.
- Select Configure LU6.2.
- Select Configure Server List.
- Enter the values OO thru PP, shown below, as they pertain to your NetWare for SAA 2.0 server
- Press the escape key to save.

NetWare SAA 2.0 Channel Driver for PU 2.1

```
Server List
=====

Server Name:          PU Profile
LRES1      (00)      MVS21      (PP)
```

The following describes the fields in the above screen:

OO Server Name, name of NetWare for SAA 2.0 server

PP PU Profile, set to MVS21

12. Configure CPI-C Side Information Records.

- Select Configure CPI-C Side Information Records.
- Press the insert key.
- Enter the values QQ thru YY, shown below.
- Press the escape key twice to save.

```
CPI-C Side Information Record Contents
=====

Symbolic Destination Name:      NWSERV1      (QQ)
Partner TP:                     EWXCOMM      (RR)
TP Type:                        Standard         (SS)
Local LU:                       NWSAA         (TT)
Partner LU:                     LRAPPC1      (UU)
Mode:                           APPCHOST      (VV)
Security Type:                  None          (WW)
Security User ID:               (XX)
Security Password:              (YY)
```

The following describes the fields in the above screen:

QQ Symbolic Destination Name, which is set to NWSERV1, as per the host's DESTNAME definition

RR Partner TP, which MUST be set to EWXCOMM

SS TP Type, which MUST be set to Standard

TT Local LU, which is set to NWSAA, as per the host's PARTNER_LU definition

UU Partner LU, which is set to LRAPPC1, as per the host's ACBNAME definition

VV Mode, which is set to APPCHOST, as per the host's MODENAME definition

WW Security Type, which is set to None

XX Security User ID, left blank

YY Security Password, left blank

13. Configure Attach Manager Records.

- Select Configure Attach Manager Records.

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- Press the insert key.
- Enter the values ZZ thru DDD, shown below.
- Press the escape key to save data.
- Select Exit Configuration Program.
- Verify that there is a NWSAAPI.INI file in the SYS:\SYSTEM\NWSAA subdirectory.

```
Attach Manager Record Contents
=====

TP Name:                EWXCOMM                (ZZ)
TP Type:                Standard                (AAA)
Local LU:              NWSAA                    (BBB)
Program Path and Filename: SYS:\EWXNLM\EWXCOMM.NLM (CCC)
Program Operation:    Attach Manager Started (DDD)
Program Parameters:
```

The following describes the fields in the above screen:

ZZ TP Name, which MUST be set to EWXCOMM

AAA TP Type, which MUST be set to Standard

BBB Local LU, which is set to NWSAA, as per the host's PARTNER_LU definition

CCC Program Path and Filename, set to SYS:\EWXNLM\EWXCOMM.NLM

DDD Program Operation, set to Attach Manager Started

14. **For sole PU 2.1 only: Automate the loading of the Communication Executive, the Channel Driver, the NetWare for SAA 2.0 Channel Driver, NetWare for SAA 2.0 and the Attach Manager, for PU 2.1/LU 6.2 support.**

In this step, we will set up the NetWare server so that the above programs are automatically loaded when the server is booted. Commands have to be added to the AUTOEXEC.NCF and the EWXSTART.LST files in order to do this.

Add a search path to the AUTOEXEC.NCF so that the z/OS LANRES directory is in the search path, and add a LOAD command for a module named EWXSTART. For example:

```
search add sys:\ewxn1m
load sys:\ewxn1m\ewxstart
```

When the EWXSTART module is loaded, it processes commands in a file named EWXSTART.LST. To complete the automation of the loading of Communication Executive, update the EWXSTART.LST file that contains the necessary NetWare LOAD commands.

Update the EWXSTART.LST file in the SYS:\EWXNLM directory. A sample EWXSTART.LST file is in this directory. The sample file name is EWXSTART.SAM. Copy this file as EWXSTART.LST and modify as shown for a MMC connection.

```
load acpwpca m=sys:\system\psca.abs c1=sys:\system\psca1.cfg
delay 90
load commexec
delay 90
load ewx1sa s1=03
delay 30
```

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```
load nwsaa
load cpic_saa
delay 15
load pb_nwsaa
load attmgr
```

The LOAD ACPWPCA statement loads the MMC Channel Driver.

The LOAD DELAY statement delays the NetWare server for a value, specified in seconds. This allows the previous LOAD statement to finish.

The LOAD COMMEEXEC statement loads the NetWare for SAA 2.0's Communication Executive.

The LOAD EWXLSA statement loads the NetWare for SAA 2.0 Channel Driver; our subchannel address is E03 as per our LRXCA21 VTAM LIST. If your subchannel address is not E03, substitute your appropriate address. Remember that the subchannels must be defined in the appropriate channel configuration file.

The LOAD NWSAA statement loads NetWare for SAA 2.0.

The LOAD CPIC_SAA statement loads NetWare for SAA 2.0's CPIC interface for LU 6.2.

The LOAD PB_NWSAA and LOAD ATTMGR statements load NetWare for SAA 2.0's Attach Manager function.

Note: The NetWare server has to be rebooted in order for the above changes to take place. Perform a reboot and return to Step 16.

15. **For both PU 2.0 and PU 2.1: Automate the loading of the Communication Executive, the Channel Driver, the NetWare for SAA 2.0 Channel Driver, NetWare for SAA 2.0 and the Attach Manager, for PU 2.1/LU 6.2 support.**

In this step, FIVE changes are needed in the EWXSTART.LST file, from a PU 2.0/LU 2.0 definition.

- The addition of a s2= parameter, corresponding to EWXLSA2, for the LOAD EWXLSA command
- The addition of a LOAD CPIC_SAA
- The addition of a DELAY 15 after CPIC_SAA is loaded
- The addition of a LOAD PB_NWSAA
- The addition of a LOAD ATTMGR

The new ewxstart.lst should look as shown:

```
load acpwpc m=sys:\system\psca.abs c1=sys:\system\psca1.cfg
delay 90
load commexec
delay 90
load ewxlsa s1=02 s2=03
delay 30
load nwsaa
load cpic_saa
delay 15
load pb_nwsaa
load attmgr
```

NetWare SAA 2.0 Channel Driver for PU 2.1

The LOAD EWXLSA statement loads the NetWare for SAA 2.0 Channel Driver; our subchannel addresses are E02 and E03.

- The s1=02 parameter is specified for LU 2.0 communications, mapped to EWXLSA1. The subchannel address is E02 per our LRXCA20 VTAM LIST.
- The s2=03 parameter is specified for LU 6.2 communications, mapped to EWXLSA2. The subchannel address is E03 per our LRXCA21 VTAM LIST.

If your subchannel addresses are not E02 and E03, substitute the appropriate addresses. Remember that the subchannels must be defined in the appropriate channel configuration file.

The LOAD CPIC_SAA statement loads NetWare for SAA 2.0's CPIC interface for LU 6.2.

The LOAD PB_NWSAA and LOAD ATTMGR statements load NetWare for SAA 2.0's Attach Manager function.

Note: The NetWare server has to be rebooted in order for the above changes to take place. Perform a reboot and return to Step 16.

16. Vary on the Subchannel from z/OS.

For example, we entered the following command:

```
/V E03,ONLINE
```

17. Activate the Switched and XCA VTAM LISTS.

For example, we entered the following commands:

```
/V NET,ACT,ID=LRSWNT21
```

```
/V NET,ACT,ID=LRXCA21
```

This establishes the VTAM connection from z/OS to the NetWare server.

Note: For NetWare for SAA 2.0, the APPC sessions are not established until the host application is started.

Checkpoint

At this point, the NetWare for SAA 2.0 Channel Driver communications support is set up on both the z/OS system and the NetWare for SAA 2.0 server for LU 6.2 communications.

NetWare for SAA 2.2 Channel Driver Configuration for PU 2.1/LU 6.2

This section describes how to set up the NetWare for SAA 2.2 channel driver to gain the communications speed of channel attachment for your NetWare for SAA 2.2. server for PU 2.1/LU 6.2.

- Applications that use NetWare for SAA 2.2 for SAA APPC or CPI Communications with z/OS, such as z/OS LANRES

NetWare for SAA 2.2 Servers running z/OS LANRES can act as a channel-attached SNA gateway.

This channel driver requires that VTAM be channel attached to a NetWare server with NetWare for SAA 2.2.

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The NetWare for SAA 2.2 channel driver uses one subchannel for PU type 2.1.

For example, without the NetWare for SAA 2.2 channel driver, an individual z/OS LANRES distribution session communicating through a channel needs a pair of subchannels, and the z/OS session needs channel connection privileges. However, with the NetWare for SAA 2.2 channel driver, you can have multiple distribution sessions communicating over a single subchannel without special privileges. You may want to note that the performance may not be as good as a direct channel attached connection using a dedicated subchannel pair, and an LU 6.2 configuration is not recommended for high performance disk serving applications.

After the NetWare for SAA 2.2 channel driver is loaded and running and the CUSTOM option is defined, APPC (SNA LU 6.2) can be specified as the z/OS LANRES communications protocol when establishing a connection using z/OS LANRES.

The following steps describe:

- Customizing VTAM and the DLU for z/OS LANRES
- Customizing NetWare for SAA 2.2 on the NetWare server for z/OS LANRES
- Varying on the subchannel from z/OS
- Varying on the VTAM LIST's

Note: This setup builds upon a PU 2.0 configuration, as described in the previous section. If PU 2.1 is solely being used, the documentation will note changes for sole PU 2.1.

Customizing VTAM and the DLU for z/OS LANRES

In general, to use SNA LU 6.2, the following APPC, z/OS, and VTAM information is configured:

1. The APPCPMxx member of SYS1.PARMLIB, which is used when the APPC address space is started
2. The ASCHPMxx member of SYS1.PARMLIB, which is used when the ASCH address space is started
3. The side information that is contained in a VSAM Key Sequenced Data Set (KSDS), which handles outbound requests

Because z/OS LANRES performs only outbound allocates (or connects), which means the connection requests only flow from z/OS to the NetWare for SAA 2.2 server, you will only need to customize the APPCPMxx member (1. above) and the side information (3. above) for z/OS LANRES.

Note: However, you will still need to start the APPC and ASCH address spaces as described in a later step.

With this in mind, perform the following steps on z/OS:

1. **Ensure VTAM and, if you are using z/OS LANRES across this connection, APPC/MVS is installed and running on z/OS.**
2. **Create the XCA VTAM LIST Member.**

You'll need to add the VTAM list for the communications adapter.

The VTAM LIST is a network definition member that brings up the connection between z/OS and the NetWare for SAA 2.2 server. This member must be stored where VTAM can access it (usually SYS1.VTAMLST). For more

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information on this member, see the “Defining an External Communication Adapter (XCA) Major Node” section in the *VTAM Resource Definition Reference*.

The following is an example of our VTAM LIST network definition whose member name is LRXCA21.

```
*
SNA21  VBUILD TYPE=XCA
*
PORT21  PORT  MEDIUM=RING,
          APAPNO=0,
          SAPADDR=4,
          CUADDR=E03
          VNNAME=CN3172,
          VNGROUP=GROUP21
*
GROUP21 GROUP  DIAL=YES,
               ISTATUS=ACTIVE,
               ANSWER=ON,
               CALL=INOUT,
               DYNPU=NO,
               AUTOGEN=(1,L,P)
*
```

Note that the sample cannot be used as is. It contains values that are specific to our environment. Customize these values to meet the needs of your environment:

- Our subchannel address is E03, which is one of the subchannels that the channel adapter card on the NetWare for SAA 2.2 server is attached to.
- This address will be used later on the NetWare for SAA 2.2 as one of the LOAD EWXLSA parameters.
- The number of stations (LINE/PU pairs) that VTAM enables is one. You can add more pairs as necessary.

3. Create the Switched Net VTAM LIST Member.

Create the appropriate Switched Net Major Node member. This member must be stored where VTAM can access it (usually SYS1.VTAMLST). This defines your NetWare for SAA 2.2 server to VTAM.

The following is an example of our SWITCHED NET VTAM LIST network definition, without a CPNAME, whose member name is LRSWNT21.

```
*
SWNET21  VBUILD  TYPE=SWNET,
           MAXNO=50,
           MAXGRP=10
*
PU21     PU      ADDR=01,
           PUTYPE=2,
           IDNUM=00101,
           IDBLK=05D,
           MAXPATH=5,
           DISCNT=NO,
           DYNLU=YES,
           MAXDATA=265,
           ANS=CONTINUE,
           CPCP=YES,
           CONNTYPE=APPN
*
PATH21   PATH    DIALNO=010410005A6C4CCD,
                 GRPNM=GROUP21
*
NWSAA    LU      LOCADDR=0,
                 DLOGMOD=APPCHOST,
                 MODETAB=APPCTAB
```

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Note that the sample cannot be used as is. It contains values that are specific to our environment. Customize these values to meet the needs of your environment:

- We have 1 (LU LOCADDR) LU defined. This number can be increased to the independent session limit of the NetWare for SAA 2.2 license. LOCADDR 0 is used because it is defined as an independent LU.
- We noted our IDBLK value 05D and IDNUM value 00101 because we'll need to specify them later on the NetWare for SAA 2.2 server.
- We are using the logon mode DLOGMOD=APPCHOST.
- We are using the logon mode table entry MODETAB=LOGMODES.

4. Configure the Logmode Table.

Modify SYS1.SAMPLIB(ATBLMODE) as shown below:

```
*****
LOGON MODE TABLE ENTRY FOR LU 6.2 APPLICATIONS
*****
APPCTAB  MODETAB
          MODEENT LOGMODE=APPCHOST,
          RUSIZES=X'8989',
          SRCVPAC=X'00',
          SSNDPAC=X'01'
          MODEEND
          END
```

- This example shows the logmode is APPCHOST, as per our Switched Net VTAM LIST. Later on we will need to define this value as the Logmode Name on the NetWare for SAA 2.2 server in the NWSAA Administrator.
- This example also shows the RUSIZE = X'8989'. Later on we will need to define this value as the RU Size of 4096 on the NetWare for SAA 2.2 server in the NWSAA Administrator.

5. Determine the NETID value.

Browse the ATCSTRxx VTAMLST definition member of the SYS1.VTAMLST data set and document your NETID value.

The following is an example of our ATCSTRxx VTAMLST:

```
*****
***      VTAM STARTUP OPTIONS      ***
*****
HOSTSA=148,
  CSALIMIT=0,
  CONFIG=ES,
  SSCPID=5397,
  SSCPNAME=N2ESM,
  NETID=NET1,
  PPOLOG=YES,
  IOBUF=(350,288,19,,50,50),
  CRPLBUF=(350,,15,,20,18),
  LFBUF=(150,,0,,10,1),
  LPBUF=(280,,15,,50,50),
  SFBUF=(600,,0,,50,1),
  NOTRACE,TYPE=VTAM
```

- This example shows the NETID value is NET1. Later on we will need to define this value as Network ID on the NetWare for SAA 2.2 server in the NWSAA Administrator.

Note: Only one NETID value is needed for both PU 2.0 and PU 2.1.

6. Do you have an existing destination logical unit (DLU) defined?

If yes, then you can use that DLU.

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If no, then create one by building a VTAM APPL definition statement, such as the following, and place it in SYS1.VTAMLST. For example:

```
*
      VBUILD  TYPE=APPL
*
LRAPPC1  APPL  ACBNAME=LRAPPC1,
            APPC=YES
            AUTOSES=5,
            DDRAINL=NALLOW,
            DLOGMOD=APPCHOST,
            DMINWNL=3,
            DMINWNR=6,
            DRESPL=ALLOW,
            DSESLIM=9,
            EAS=32,
            MODETAB=APPCTAB,
            SECACPT=CONV,
            SRBEXIT=YES,
            VERIFY=NONE,
            VPACING=0
```

In this example, LRAPPC1 is the APPL entry and the ACBNAME value. You can choose your own value, however, the ACBNAME value and the APPL entry must be the same. If this is not already in your VTAM control file ATCCONxx, then add it so that it will automatically start when VTAM is started.

- This example shows the ACBNAME is LRAPPC1. Later on we will need to define this value as the Partner LU on the NetWare for SAA 2.2 server in the NWSAA Administrator.
- This example shows the DLOGMODE=APPCHOST as per our Switched Net VTAM LIST. Later on we will need to define this value as the Mode Name on the NetWare for SAA 2.2 server in the NWSAA Administrator.
- This example shows the DMINWNR=6. Later on we will need to define this value as the Minimum Contention Winners on the NetWare for SAA 2.2 server in the NWSAA Administrator.
- This example shows the DMINWNL=3. Later on we will need to define this value as the Number of Autoactivated Sessions on the NetWare for SAA 2.2 server in the NWSAA Administrator.
- This example shows the VPACING=0. Later on we will need to define this value as the Receive Pacing Count on the NetWare for SAA 2.2 server in the NWSAA Administrator.

7. Create and add the side information.

Create the following entries with the SIADD utility command of the ATBSDFMU APPC/MVS administration utility, either through the APPC/MVS administration dialog or in JCL:

```
DESTNAME(nserver)
TPNAME(EWXCOMM)
MODENAME(modename)
PARTNER_LU(nserverlu)
```

Where:

- *nserver* is the symbolic destination name of the NetWare for SAA 2.2 server. The symbolic destination name is the name used when starting your APPC connection. Each symbolic destination name must be unique in the side information.
- The TPNAME *must* be EWXCOMM.

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- *modename* is the LOGMODE value in Step 4 on page 39. This is the logon mode for the SNA session.
- *nwserverlu* is the LU name for the NetWare for SAA 2.2 server as per the Switched Net VTAM LIST.

To continue with our example, we used the ATBSDFMU utility through JCL calling the SIADD command to add the side information to a VSAM data set:

```
/*******  
//STEP      EXEC  PGM=ATBSDFMU  
//SYSPRINT DD   SYSOUT=A  
//SYSSDLIB DD  DSN=SYS1.APPCSI,DISP=SHR <= Side Information data set  
//SYSSDOUT DD  DSN=SYS1.APPCOUT,DISP=SHR  
//SYSIN      DD   *  
SIADD  
  
          DESTNAME(NWSERV1)  
          TPNAME(EWXCOMM)  
          MODENAME(APPCHOST)  
          PARTNER_LU(NWSAA)
```

This example means our:

- VSAM KSDS SIDEINFO DATASET points to SYS1.APPCSI.
- Symbolic destination name of NetWare for SAA 2.2 server is NWSERV1.
- Logon mode is APPCHOST, which is the logon mode for the SNA session connecting the DLU to the NetWare for SAA 2.2 server LU.
- LU name for the NetWare for SAA 2.2 server is NWSAA, per our LRSWNT21 VTAM LIST.

For a sample of this JCL, see the ATBUTIL member of the SYS1.SAMPLIB.

This defines the side information identifying the NetWare for SAA 2.2 server that z/OS will connect to. In addition, it defines a target (DESTNAME value) and mode (MODENAME value) that the z/OS LANRES start commands need to establish an z/OS LANRES connection.

8. Make the DLU the BASE LU and identify the side information data set.

Add the following entries to the APPCPMxx member of SYS1.PARMLIB.

```
LUADD  
ACBNAME(hostdlu)  
BASE  
SIDEINFO  
DATASET(sideinfo)
```

Where:

- *hostdlu* is the name of your local LU, which you defined as the BASE LU in Step 6 on page 40
- *sideinfo* is your side information data set; the data set that contains your side information entries created in Step 7 on page 41.

To continue with our example, we defined the following:

```
LUADD  
ACBNAME(LRAPP1)  
BASE  
SIDEINFO  
DATASET(SYS1.APPCSI)
```

This means that all of the z/OS LANRES connections from z/OS to the NetWare for SAA 2.2 server will use a session or sessions from the defined

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BASE LU when connecting to the NetWare for SAA 2.2 server LU. These changes do not take effect until the APPC address space is started (next step).

9. Start the APPC address space.

Enter the following operator command:

```
START APPC,SUB=MSTR,APPC=xx
```

Where *xx* is the last two characters of the APPCPM*xx* member.

This activates the LUs.

10. Start the ASCH address space.

Enter the following operator command:

```
START ASCH,SUB=MSTR,ASCH=xx
```

Where *xx* is the last two characters of the ASCHPM*xx* member.

Customizing NetWare for SAA 2.2 on the NetWare Server for PU 2.1

1. Ensure that you are running compatible versions of NetWare and NetWare for SAA 2.2.

- a. Load the Install Utility from the NetWare server console.
- b. Choose Product Options from the screen.

If you do not have the required level of NetWare for SAA 2.2, contact your Novell** representative to obtain the proper level. You may need to obtain PTFs (fixes) from Novell and apply them to your system to get to the correct level.

2. Create a PU 2.1 Service Profile on the NetWare for SAA 2.2 server.

A NetWare *service profile* is a stored set of parameters that defines a particular communication service configuration. In this step, we will create a service profile for communications with the z/OS host system.

To create a service profile, use the NetWare NWSAA Administrator. Create a service profile for a PU Type 2.1. PU Type 2.1 is required for z/OS LANRES. LU 6.2 communications.

The Communication Executive must be running on the server before the NWSAA Administrator can be used. Start the Communication Executive on the server by entering the following command on the NetWare console:

```
LOAD COMMEEXEC
```

Start the NWSAA Administrator from a NetWare for SAA 2.2 Windows client, as instructed in the *Novell NetWare for SAA 2.0 Administration Guide* .

3. Double click on the SAA Server and login to the server.

4. Create the Data Link Adapter object.

- Click on Object from the Menu Bar.
- Click on Create from the pull down menu.
- Click on Data Link Adapter.
- Click on OK.
- Enter EWXLSA2 in the Logical Adapter name field.
- Select Custom in the Adapter Type field.

The Custom Settings input area is added to the screen. Fill in the Custom Settings input area as follows:

- Enter APPC in the Custom link type field.

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- Enter 1 in the Logical adapter number field.
 - Select Secondary in the Local station role field.
 - Enter 7 in the Receive window size field.
 - Enter EWXLSA in the Protocol stack name field.
 - Put a check in the box in front of the line "Balanced protocol".
 - Put a check in the box in front of the line "Multiple logical links".
 - Leave the box in front of the line "Terminate peer link if no active APPC session" blank.
 - Put a check in the box in front of the line "Enable adapter at startup".
 - Click on OK.
5. **Configure the Default Peer PU Profile.**
- Click on the Server object to be configured.
 - Double click on NWSAA Node.
The NWSAA Node Information screen is displayed.
 - In the Peer PU profile default settings section:
 - Enter *your SNA network ID* in the SNA network ID field.
 - Enter CPNAME in the Peripheral node CP name field.
 - Enter 05D 00101 in the Node ID (block/PU ID) field.
 - Enter 04 in the Local/partner SAP for independent LUs field.
 - Click on OK.
6. **Create the Peer PU Profile object.**
- Click on Object from the Menu Bar.
 - Click on Create from the pull down menu.
 - Click on Peer PU Profile.
 - Click on OK.
 - Enter MVS21 in the Peer PU Profile name field.
 - Enter CPNAME in the Peripheral node control point name field.
 - Enter 05D 00101 in the Node ID (block ID/PU ID) field.
 - Select EWXLSA2 in the Logical Adapter name field.
 - Click on OK.
7. **Create the Modes object.**
- Click on Object from the Menu Bar.
 - Click on Create from the pull down menu.
 - Click on Mode.
 - Click on OK.
 - Enter APPCHOST in the Mode name field.
 - Enter 9 in the Number of sessions field.
 - Enter 6 in the Minimum contention winners field.
 - Enter 3 in the Number of auto activated sessions field.
 - Enter 4096 in the Maximum RU size field.
 - Enter 4 in the Receive pacing count field.
 - Click on OK.
8. **Create the Partner LU object.**
- Click on Object from the Menu Bar.
 - Click on Create from the pull down menu.

- Click on Partner LU.
 - Click on OK.
 - Enter LRAPPC1 in the Partner LU name field.
 - Enter NET1 in the SNA network ID field.
 - Put a check in the box in front of the line "Immediate link activation".
 - Leave the box in front of the line "Conversation security support" blank.
 - Under Mode Information
 - Click on APPCHOST.
 - Click on Add.
 - Select EWXLSA2 in the Logical Adapter name field.
 - Enter EWX in the Custom data link target name field.
 - Click on OK.
9. **Create the Local LU object.**
- Click on Object from the Menu Bar.
 - Click on Create from the pull down menu.
 - Click on Local LU.
 - Click on OK.
 - Select Independent in the Local LU type field.
 - Enter NWSAA in the Local LU name field.
 - Leave the box in front of the line "Selected LU as default" blank.
 - Under Partner LU Information
 - Click on LRAPPC1 in the available field.
 - Click on Add.
 - Put a check in the box in front of the line "Enable LU at startup".
 - Click on OK.
10. **Create the Transaction Program object.**
- Click on Object from the Menu Bar.
 - Click on Create from the pull down menu.
 - Click on Transaction Program.
 - Click on OK.
 - Select Standard in the Transaction Program type field.
 - Enter EWXCOMM in the Local TP name field.
 - Select None in the Sync level field.
 - Select Basic in the Conversation type field.
 - Leave the box in front of the line "Require conversation security" blank.
 - Click on OK.
11. **Configure LU 6.2 on the NetWare.**
- Invoke NWADMIN from a client.
 - Select *ServerName_NWSAA* object.
 - Select APPC Configuration.
12. **Configure CPI-C Side Information Records.**
- Under Configure CPI-C Side Information Records
 - Select Add.
 - Enter the values QQ thru YY, shown below.
 - Select OK to save the information.

NetWare SAA 2.2 Channel Driver for PU 2.1

```
CPI-C Side Information - Add
=====
```

```
Symbolic Name:           NWSERV1           (QQ)
Partner TP Name:        EWXCOMM           (RR)
Partner TP Type:        Standard          (SS)
Partner LU Name:        LRAPPC1          (TT)
Local LU Name:          NWSAA            (UU)
Mode Name:              APPCHOST         (VV)
Security Type:          None             (WW)
Security UserID:        (blank)          (XX)
Security Password:      (blank)          (YY)
```

The following describes the fields in the above screen:

- QQ** Symbolic Name, which is set to NWSERV1, as per the host's DESTNAME definition
- RR** Partner TP Name, which MUST be set to EWXCOMM
- SS** Partner TP Type, which MUST be set to Standard
- TT** Partner LU Name, which is set to LRAPPC1, as per the host's ACBNAME definition
- UU** Local LU Name, which is set to NWSAA, as per the host's PARTNER_LU definition
- VV** Mode Name, which is set to APPCHOST, as per the host's MODENAME definition
- WW** Security Type, which is set to None
- XX** Security UserID, left blank.
- YY** Security Password, left blank.

13. Configure Attach Manager Records.

- Under Attach Manager Records
- Select Add.
- Enter the values ZZ thru DDD, shown below.
- Select OK to save the information.
- Select OK to return to NetWare Administrator.

```
Attach Manager - Add
=====
```

```
TP Name:                 EWXCOMM           (ZZ)
TP Type:                 Standard          (AAA)
TP Operation:            Attach Manager Started (BBB)
TP Filename:             SYS:\EWXNLM\EWXCOMM.NLM (CCC)
TP Parms:
TP Presentation:
TP Icon Filename:
LU Name:                 NWSAA            (DDD)
```

The following describes the fields in the above screen:

NetWare SAA 2.2 Channel Driver for PU 2.1

- ZZ** TP Name, which MUST be set to EWXCOMM
- AAA** TP Type, which MUST be set to Standard
- BBB** TP Operation, set to Attach Manager Started
- CCC** TP Filename, set to SYS:\EWXNLM\EWXCOMM.NLM
- DDD** LU Name, which is set to NWSAA, as per the host's PARTNER_LU definition

14. **For sole PU 2.1 only: Automate the loading of the Communication Executive, the Channel Driver, the NetWare for SAA 2.2 Channel Driver, NetWare for SAA 2.2 and the Attach Manager, for PU 2.1/LU 6.2 support.**

In this step, we will set up the NetWare server so that the above programs are automatically loaded when the server is booted. Commands have to be added to the AUTOEXEC.NCF and the EWXSTART.LST files in order to do this.

Add a search path to the AUTOEXEC.NCF so that the z/OS LANRES directory is in the search path, and add a LOAD command for a module named EWXSTART. For example:

```
search add sys:\ewxnlm
load sys:\ewxnlm\ewxstart
```

When the EWXSTART module is loaded, it processes commands in a file named EWXSTART.LST. To complete the automation of the loading of Communication Executive, update the EWXSTART.LST file that contains the necessary NetWare LOAD commands.

Update the EWXSTART.LST file in the SYS:\EWXNLM directory. A sample EWXSTART.LST file is in this directory. The sample file name is EWXSTART.SAM. Copy this file as EWXSTART.LST and modify as shown for a MMC connection.

```
load acpwpc m=sys:\system\psca.abs c1=sys:\system\psca1.cfg
delay 90
load commexec
delay 90
load ewxlsa s1=03
delay 30
load nwsaa
load cpic_saa
delay 15
load pb_nwsaa
load attmgr
```

The LOAD ACPWPCA statement loads the MMC Channel Driver.

The LOAD DELAY statement delays the NetWare server for a value, specified in seconds. This allows the previous LOAD statement to finish.

The LOAD COMMEXEC statement loads the NetWare for SAA 2.2's Communication Executive.

The LOAD EWXLSA statement loads the NetWare for SAA 2.2 Channel Driver; our subchannel address is E03 as per our LRXCA21 VTAM LIST. If your subchannel address is not E03, substitute your appropriate address. Remember that the subchannels must be defined in the appropriate channel configuration file.

The LOAD NWSAA statement loads NetWare for SAA 2.2.

NetWare SAA 2.2 Channel Driver for PU 2.1

The LOAD CPIC_SAA statement loads NetWare for SAA 2.2's CPIC interface for LU 6.2.

The LOAD PB_NWSAA and LOAD ATTMGR statements load NetWare for SAA 2.2's Attach Manager function.

Note: The NetWare server has to be rebooted in order for the above changes to take place. Perform a reboot and return to Step 16.

15. **For both PU 2.0 and PU 2.1: Automate the loading of the Communication Executive, the Channel Driver, the NetWare for SAA 2.2 Channel Driver, NetWare for SAA 2.2 and the Attach Manager, for PU 2.1/LU 6.2 support.**

In this step, FIVE changes are needed in the EWXSTART.LST file, from a PU 2.0/LU 2.0 definition.

- The addition of a s2= parameter, corresponding to EWXLSA2, for the LOAD EWXLSA command
- The addition of a LOAD CPIC_SAA
- The addition of a DELAY 15 after CPIC_SAA is loaded
- The addition of a LOAD PB_NWSAA
- The addition of a LOAD ATTMGR

The new ewxstart.lst should look as shown:

```
load acpwpca m=sys:\system\psca.abs c1=sys:\system\psca1.cfg
delay 90
load commexec
delay 90
load ewxlsa s1=02 s2=03
delay 30
load nwsaa
load cpic_saa
delay 15
load pb_nwsaa
load attmgr
```

The LOAD EWXLSA statement loads the NetWare for SAA 2.2 Channel Driver; our subchannel addresses are E02 and E03.

- The s1=02 parameter is specified for LU 2.0 communications, mapped to EWXLSA1. The subchannel address is E02 per our LRXCA20 VTAM LIST.
- The s2=03 parameter is specified for LU 6.2 communications, mapped to EWXLSA2. The subchannel address is E03 per our LRXCA21 VTAM LIST.

If your subchannel addresses are not E02 and E03, substitute the appropriate addresses. Remember that the subchannels must be defined in the appropriate channel configuration file.

The LOAD CPIC_SAA statement loads NetWare for SAA 2.2's CPIC interface for LU 6.2.

The LOAD PB_NWSAA and LOAD ATTMGR statements load NetWare for SAA 2.2's Attach Manager function.

Note: The NetWare server has to be rebooted in order for the above changes to take place. Perform a reboot and return to Step 16.

16. **Vary on the Subchannel from z/OS.**

For example, we entered the following command:

```
/V E03,ONLINE
```

17. **Activate the Switched and XCA VTAM LISTS.**

For example, we entered the following commands:

```
/V NET,ACT,ID=LRSWNT21
/V NET,ACT,ID=LRXCA21
```

This establishes the VTAM connection from z/OS to the NetWare server.

Note: For NetWare for SAA 2.2, the APPC sessions are not established until the host application is started.

Checkpoint

At this point, the NetWare for SAA 2.2 Channel Driver communications support is set up on both the z/OS system and the NetWare for SAA 2.2 server for LU 6.2 communications.

TCP/IP Configuration

You will need to install the Transmission Control Protocol/Internet Protocol for z/OS on the host processor if it is not already installed.

If you do not have z/OS Open Edition, the C/370* Version 2 runtime library must be available to your address space. It is equally important to ensure the TCP/IP client common code (containing the TCPIP.HOSTS.SITEINFO, TCPIP.HOSTS.ADDRINFO, and TCPIP.ETC.SERVICES data sets) are in the z/OS search order.

The following steps describe:

- How to set up TCP/IP as the communications method for z/OS LANRES on z/OS
- How to set up TCP/IP as the communications method for z/OS LANRES on the NetWare server

Customizing TCP/IP on z/OS

Perform the following steps on z/OS to set up TCP/IP for z/OS LANRES to use as the communication method:

1. **Ensure z/OS LANRES user and address spaces will be freed if the NetWare server abnormally ends or is powered off.**

Add the following entry to (or ensure the entry exists in) the configuration data set used by the TCP/IP address space that runs on z/OS.

```
KEEPALIVEOPTIONS INTERVAL min ENDKEEPALIVEOPTIONS
```

Where *min* is the number of minutes. Do not make this *min* value less than three.

This frees user or address space of an open TCP/IP session after waiting for the specified number of minutes to pass if, for example, the NetWare file server abnormally ends or is powered off.

2. **Configure the NetWare server as a remote host.**

Perform the following:

- a. **Define the Internet address for the NetWare server to z/OS using either Name Server or Static Services.**
- b. **Optionally, edit the ETC.SERVICES data set.**

TCP/IP Configuration

Add the following entry in **lowercase**:

```
lanres 385/tcp
```

This step is optional because 385 is the default value.

Note: If the port number of 385 is already used in the ETC.SERVICES data set, then use any valid port number in place of 385. This port number **must** be the same port number that appears in the SYS:\ETC\SERVICES file on the NetWare server.

Customizing TCP/IP on the NetWare Server

Perform the following steps on the NetWare server to set up TCP/IP for z/OS LANRES to use as the communication method.

1. **Load and configure TCP/IP.**
2. **Edit the SERVICES file.**

Edit the SERVICES file from the NetWare server console by entering the following command:

```
load edit sys:\etc\services
```

Or, by logging in to the NetWare server from a client and editing the file.

Note: If you have just installed TCP/IP, the SERVICES file initially resides in the SYS:\ETC\SAMPLES directory.

3. **Add the service name, port number, and protocol name to the SERVICES file.**

Add the following entry in **lowercase**:

```
lanres 385/tcp
```

Note: If you change the port number on the host, use the same port number here.

4. **Ensure TCP/IP is running on the server.**

Load the necessary NLMs.

Checkpoint

At this point, the TCP/IP communications is set up on both z/OS and the NetWare server for z/OS LANRES. Now, see “Chapter 5. Setting Up the NetWare Server” on page 97.

NetWare for SAA 2.0 SNA LU 6.2 for Indirect Channel Attachment

This section describes how to set up for LU 6.2 as the communications method between z/OS LANRES and LANRES on the NetWare server running NetWare for SAA 2.0.

You may want to note that the performance may not be as good as using a direct channel connection using a dedicated subchannel pair, and an LU 6.2 connection is not recommended for high performance disk serving applications.

The following steps describe:

- Customizing VTAM and the DLU for z/OS LANRES
- Customizing NetWare for SAA 2.0 on the NetWare server for z/OS LANRES

Customizing VTAM and the DLU for z/OS LANRES

In general, to use SNA LU 6.2, the following APPC, z/OS, and VTAM information is configured:

1. The APPCPMxx member of SYS1.PARMLIB, which is used when the APPC address space is started
2. The ASCHPMxx member of SYS1.PARMLIB, which is used when the ASCH address space is started
3. The side information that is contained in a VSAM Key Sequenced Data Set (KSDS), which handles outbound requests

Because z/OS LANRES performs only outbound allocates (or connects), which means the connection requests only flow from z/OS to the NetWare for SAA 2.0 server, you will only need to customize the APPCPMxx member (1. above) and the side information (3. above) for z/OS LANRES.

Note: However, you will still need to start the APPC and ASCH address spaces as described in a later step.

With this in mind, perform the following steps on z/OS:

1. **Ensure VTAM and, if you are using z/OS LANRES across this connection, APPC/MVS is installed and running on z/OS.**
2. **Create the PU and LU Definitions.**

You'll need to add the VTAM list for the communications adapter.

The VTAM LIST is a network definition member that brings up the connection between z/OS and the NetWare for SAA 2.0 server. This member must be stored where VTAM can access it (usually SYS1.VTAMLST).

There are many ways to define an indirect channel attachment to a NetWare for SAA 2.0 server. This is a generic example:

```
*
SNA21  VBUILD TYPE=SWNET
*
NOVELL  PU      ADDR=01,
          ANS=CONTINUE,
          DISCNT=NO,
          IDBLK=05D,
          IDNUM=00101,
          MAXOUT=1,
          PASSLIM=1,
          PUTYPE=2
*
NWSAA  LU      LOCADDR=0.
          DLOGMOD=APPCHOST,
          MODETAB=LOGMODES
*
```

- We have one (LU LOCADDR) LU defined. This number can be increased to the independent session limit of the NetWare for SAA 2.0 license. LOCADDR 0 is used because it is defined as an independent LU.
- We noted our IDBLK value 05D and IDNUM value 00101 because we'll need to specify them later on the NetWare for SAA 2.0 server.
- We are using the logon mode DLOGMOD=APPCHOST.
- We are using the logon mode table entry MODETAB=LOGMODES.

3. **Create the Logmode Table.**

Modify SYS1.SAMPLIB(ATBLMODE) as shown below:

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```
*****
LOGON MODE TABLE ENTRY FOR LU 6.2 APPLICATIONS
*****
APPCTAB  MODETAB
          MODEENT LOGMODE=APPCHOST,
          RUSIZES=X'8989',
          SRCVPAC=X'00',
          SSNDPAC=X'01'
          MODEND
          END
```

- This example shows the logmode is APPCHOST as per our Switched Net VTAM LIST. Later on we will need to define this value as the Logmode Name on the NetWare for SAA 2.0 server in the CICON utility.
- This example also shows the RUSIZE = X'8989'. Later on we will need to define this value as the RU Size of 4096 on the NetWare for SAA 2.0 server in the CICON utility.

4. Determine the NETID value.

Browse the ATCSTRxx VTAMLST definition member of the SYS1.VTAMLST data set and document your NETID value.

This is an example of our ATCSTRxx VTAMLST:

```
*****
***          VTAM STARTUP OPTIONS          ***
*****
HOSTSA=148,
  CSALIMIT=0,
  CONFIG=ES,
  SSCPID=5397,
  SSCPNAME=N2ESM,
  NETID=NET1,
  PPOLOG=YES,
  IOBUF=(350,288,19,,50,50),
  CRPLBUF=(350,,15,,20,18),
  LFBUF=(150,,0,,10,1),
  LPBUF=(280,,15,,50,50),
  SFBUF=(600,,0,,50,1),
  NOTRACE,TYPE=VTAM
```

- This example shows the NETID value is NET1. Later on we will need to define this value as Network ID on the NetWare for SAA 2.0 server in the CICON utility.

5. Do you have an existing destination logical unit (DLU) defined?

If yes, then you can use that DLU.

If no, then create one by building a VTAM APPL definition statement, such as the following, and place it in SYS1.VTAMLST. For example:

```

*
      VBUILD  TYPE=APPL
*
LRAPPC1  APPL  ACBNAME=LRAPPC1,
              APPC=YES
              AUTOSES=5,
              DDRAINL=NALLOW,
              DLOGMOD=APPCHOST,
              DMINWNL=3,
              DMINWNR=6,
              DRESPL=ALLOW,
              DSESLIM=9,
              EAS=32,
              MODETAB=LOGMODES,
              SECACPT=CONV,
              SRBEXIT=YES,
              VERIFY=NONE,
              VPACING=0
    
```

In this example, LRAPPC1 is the APPL entry and the ACBNAME value. You can choose your own value. However, the ACBNAME value and the APPL entry must be the same. If this is not already in your VTAM control file ATCCONxx, then add it so that it will automatically start when VTAM is started.

- This example shows the ACBNAME is LRAPPC1. Later on we will need to define this value as the Partner LU on the NetWare for SAA 2.0 server in the CSCON utility.
- This example shows the DLOGMODE=APPCHOST as per our Switched Net VTAM LIST. Later on we will need to define this value as the Mode Name on the NetWare for SAA 2.0 server in the CSCON utility.
- This example shows the DMINWNR=6. Later on we will need to define this value as the Minimum Contention Winners on the NetWare for SAA 2.0 server in the CSCON utility.
- This example shows the DMINWNL=3. Later on we will need to define this value as the Number of Autoactivated Sessions on the NetWare for SAA 2.0 server in the CSCON utility.
- This example shows the VPACING=0. Later on we will need to define this value as the Receive Pacing Count on the NetWare for SAA 2.0 server in the CSCON utility.

6. **Create and add the side information.**

Create the following entries with the SIADD utility command of the ATBSDFMU APPC/MVS administration utility, either through the APPC/MVS administration dialog or in JCL:

```

DESTNAME(nwserver)
TPNAME(EWXCOMM)
MODENAME(modename)
PARTNER_LU(nwserverlu)
    
```

Where:

- *nwserver* is the symbolic destination name of the NetWare for SAA 2.0 server. The symbolic destination name is the name used when starting your APPC connection. Each symbolic destination name must be unique in the side information.
- The TPNAME *must* be EWXCOMM.
- *modename* is the LOGMODE value in Step 5. This is the logon mode for the SNA session.

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- *nwserverlu* is the LU name for the NetWare for SAA 2.0 server as per the Switched Net VTAM LIST.

To continue with our example, we used the ATBSDFMU utility through JCL calling the SIADD command to add the side information to a VSAM data set:

```
//*****  
//STEP EXEC PGM=ATBSDFMU  
//SYSPRINT DD SYSOUT=A  
//SYSSDLIB DD DSN=SYS1.APPCSI,DISP=SHR <= Side Information data set  
//SYSSDOUT DD DSN=SYS1.APPCOUT,DISP=SHR  
//SYSIN DD *  
SIADD  
        DESTNAME(NWSERV1)  
        TPNAME(EWXCOMM)  
        MODENAME(APPCHOST)  
        PARTNER_LU(NWSAA)
```

This example means our:

- VSAM KSDS SIDEINFO DATASET points to SYS1.APPCSI.
- Symbolic destination name of NetWare for SAA 2.0 server is NWSERV1.
- Logon mode is APPCHOST, which is the logon mode for the SNA session connecting the DLU to the NetWare for SAA 2.0 server LU.
- LU name for the NetWare for SAA 2.0 server is NWSAA, per our Switched Net VTAM LIST.

For a sample of this JCL, see the ATBUTIL member of the SYS1.SAMPLIB.

This defines the side information identifying the NetWare for SAA 2.0 server that z/OS will connect to. In addition, it defines a target (DESTNAME value) and mode (MODENAME value) that the z/OS LANRES start commands need to establish an z/OS LANRES connection.

7. Make the DLU the BASE LU, and identify the side information data set.

Add the following entries to the APPCPMxx member of SYS1.PARMLIB:

```
LUADD  
ACBNAME(hostdlu)  
BASE  
SIDEINFO  
DATASET(sideinfo)
```

Where:

- *hostdlu* is the name of your local LU, which you defined as the BASE LU in Step 5 on page 66.
- *sideinfo* is your side information data set; the data set that contains your side information entries created in Step 6 on page 67.

To continue with our example, we defined the following:

```
LUADD  
ACBNAME(LRAPP1)  
BASE  
SIDEINFO  
DATASET(SYS1.APPCSI)
```

This means that all of the z/OS LANRES connections from z/OS to the NetWare for SAA 2.0 server will use a session or sessions from the defined

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BASE LU when connecting to the NetWare for SAA 2.0 server LU. These changes do not take effect until the APPC address space is started (next step).

8. Start the APPC address space.

Enter the following operator command:

```
START APPC,SUB=MSTR,APPC=xx
```

Where *xx* is the last two characters of the APPCPM*xx* member.

This activates the LUs.

9. Start the ASCH address space.

Enter the following operator command:

```
START ASCH,SUB=MSTR,ASCH=xx
```

Where *xx* is the last two characters of the ASCHPM*xx* member.

Customizing NetWare for SAA 2.0 on the NetWare Server for PU 2.1/LU 6.2

1. Ensure that you are running compatible versions of NetWare and NetWare for SAA 2.0.

- a. Load the Install Utility from the NetWare server console.
- b. Choose Product Options from the screen.
- c. Check the information that displays to ensure the Communication Executive 2.0 product is v2.0.22 or later and the NetWare for SAA 2.0 product is v2.0.23 or later.

If you do not have the required level of NetWare for SAA 2.0, contact your Novell** representative to obtain the proper level. You may need to obtain PTFs (fixes) from Novell and apply them to your system to get to the correct level.

2. Create a PU 2.1 Service Profile on the NetWare for SAA 2.0 server.

A NetWare *service profile* is a stored set of parameters that defines a particular communication service configuration. In this step, we will create a service profile for communications with the z/OS host system.

To create a service profile, use the NetWare CSCON utility. Create a service profile for a PU Type 2.1. PU Type 2.1 is required for z/OS LANRES LU 6.2 communications.

The Communication Executive must be running on the server before the CSCON utility can be used. Start the Communication Executive on the server by entering the following command on the NetWare console:

```
LOAD COMMEEXEC
```

Run the CSCON utility from a NetWare for SAA 2.0 client, as instructed in the *Novell NetWare for SAA 2.0 Administration Guide for Mainframes and Peer Nodes*.

3. Configure the Net ID value.

- From a client run the CSCON utility.
- Select the server you want to configure.
- Select Configure Communication Services.
- Select NetWare for SAA 2.0 PTF Refresh.
- Select Configure SNA Network ID.

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- Enter NET1 as per ATCSTRxx VTAMLST.
 - Press the escape key to save.
4. **Select Configure Data Link Adapter.**
- Select Configure Data Link Adapters.
 - Press the insert key.
 - Enter the name of your token ring adapter name; ours is TOKENSNA.
 - Select custom link and press the enter key.
 - Enter the values A thru E, shown below.
 - Press the escape key to save.

```
Configure 802.2 Adapter
=====

Logical adapter name:                TOKENSNA      (A)
Logical adapter number:              0              (B)
Adapter service status:              In Service    (C)
Number of local service access points: 2            (D)
Terminate peer link if no active APPC sessions: No      (E)
```

The following describes the fields in the above screen:

- A** Logical adapter name, TOKENSNA, corresponding to the token ring adapter name for LU6.2 in the AUTOEXEC.NCF
- B** Logical adapter number, set to 0, as this is the first adapter
- C** Adapter service status, which should be set to In Service
- D** Number of local service access points, ours default to 2
- E** Terminate peer link if no active APPC sessions, set to No

5. **Configure the Default Peer PU Profile.**
- Select Configure for Peer Connections.
 - Select Configure Peer PU Profile.
 - Select NWSAA (DEFAULT).
 - Enter the values F thru I, shown below.
 - Press the escape key to save.

```
Configure Default Peer PU Profile
=====

Default Peer PU profile name:        NWSAA        (F)
Peripheral node control point name:  CPNAME       (G)
Node ID (block ID/PU ID):           05D 00101   hex (H)
Default local/remote SAP for independent LUs: 04 hex    (I)
```

The following describes the fields in the above screen:

- F** Default Peer PU profile name, which is set to NWSAA
- G** Peripheral node control point name, which is set to CPNAME

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H Node ID (block ID/PU ID), which is set to 05D 00101 hex as per our Switched Net VTAM LIST

I Default local/remote SAP for independent LUs, which is set to 4

6. Configure the Peer PU Profile.

Note: This is not the same panel as the above step.

- Under Configure for Peer Connections
- Select Configure Peer PU Profile.
- Press the insert key.
- Enter a name; ours is MVS21.
- Enter the values J thru N, shown below.
- Press the escape key twice to save.

```
Configure Peer PU Profile
=====

For backward compatibility with NWSAA 1.3 PU2.1 profiles, you can
optionally define additional Peer PU profiles, each with a unique
CPName and a specific adapter.

Peer PU profile name:                MVS21                (J)
Peripheral node control point name:  CPNAME                (K)
Logical adapter name:                TOKENSNA            (L)
Node ID (block ID/PU ID):            05D 00101    hex    (M)

802.2 service access point            04 hex                (N)
```

The following describes the fields in the above screen:

J Peer PU profile name, which is defined as MVS21

K Peripheral node control point name, which is set to CPNAME

L Logical adapter name, which is TOKENSNA

M Node ID (block ID/PU ID), which is set to 05D 00101 as per our Switched Net VTAM LIST

N 802.2 service access point; ours defaults to 04 hex

7. Configure the Local LU.

- Under Configure for Peer Connections
- Select Configure APPC Application Subsystem.
- Select Configure Local LUs.
- Press the insert key.
- Select Local LU Category, Independent.
- Enter Name for Local LU; ours is NWSAA.
- Enter the values O thru R, shown below:

NetWare SAA 2.0 SNA 6.2 Indirect Channel

```
Configure Local LU
=====

Local LU name:           NWSAA           (O)
Default LU:             No              (P)
Partner LU:             <see list> LRAPPC1 (Q)
Local LU startup status Enabled         (R)
```

The following describes the fields in the above screen:

- O** Local LU name, which is set to NWSAA, as per the host's Side Information PARTNER_LU definition
- P** Default LU, which is set to No
- Q** Partner LU, which is set to LRAPPC1, as per the host's DLU ACBNAME definition
- R** Local LU startup status, which is set to Enabled

8. Configure the Partner LU.

- Select Partner LU Name.
- Enter Partner LU Name; ours is LRAPPC1.
- Enter Name for Local LU; ours is NWSAA.
- Enter the values S thru AA, shown below:

```
Configure Partner LU
=====

Partner LU name:       LRAPPC1          (S)
SNA network ID:       NET1              (T)
Immediate link activation: Yes          (U)
Conversation security support: No       (V)
Mode names:           <See list> APPCHOST (W)
Logical adapter name: TOKENSNA         (X)

802.2 remote node address: 1000 5A6C4CCD (Y)
802.2 remote service access point: 04 hex (Z)
802.2 local service access point: 04 hex (AA)
```

The following describes the fields in the above screen:

- S** Partner LU name, which is set to LRAPPC1, as per the host's DLU ACBNAME definition
- T** SNA network ID, which is set to NET1
- U** Immediate link activation, which is set to Yes
- V** Conversation security support, which is set to No
- W** Mode names, which is set to APPCHOST, as per the host's MODENAME definition
- X** Logical adapter name, which is TOKENSNA
- Y** 802.2 remote node address, the MAC address of the token ring card

Z 802.2 remote service access point, ours defaults to 04

AA 802.2 local service access point, ours defaults to 04

9. **Configure the Mode.**

- Select Mode Name.
- Enter Mode Name; ours is APPCHOST.
- Enter the values BB thru GG, shown below.
- Keep pressing the escape key to save data until you are at the Configure APPC Application Subsystem.

```

          Configure Mode
          =====

Mode name:                APPCHOST      (BB)
Number of sessions:       9             (CC)
Minimum contention winners: 6           (DD)
Number of auto activated sessions: 3     (EE)

Maximum RU size:         4096          (FF)
Receive pacing count:    4             (GG)
```

The following describes the fields in the above screen:

BB Mode name, which is APPCHOST, as per the host's MODENAME definition

CC Number of sessions, which is set to 9, as per the host's DLU definition of DSESLIM=9

DD Minimum contention winners, which is set to 6, as per the host's DLU definition of DMINWNR=6

EE Number of auto activated sessions, which is set to 3, as per the host's DLU definition of DMINWNL=3

FF Maximum RU size, which is set to 4096, as per the host's MODETAB entry definition of RUSIZES=X'8989'

GG Receive pacing count, which is set to 0, as per the host's DLU definition of VPACING=0

10. **Configure the Local Transaction Program.**

- Select Configure APPC Application Subsystem.
- Select Configure Local Transaction Programs.
- Press the insert key.
- Select Standard Transaction Program.
- Enter name for Transaction Program, MUST be EWXCOMM.
- Enter the values HH thru KK, shown below.
- Press the escape key to save data and exit out of CSCON.

NetWare SAA 2.0 SNA 6.2 Indirect Channel

```
Configure Local Transaction Program
=====
```

```
Local TP name:           EWXCOMM      (HH)
Sync level:             None         (II)
Conversation type:      Basic        (JJ)
Conversation security:  No           (KK)
```

The following describes the fields in the above screen:

HH Local TP name, **MUST** be set to EWXCOMM

II Sync level, **MUST** be set to None

JJ Conversation type, **MUST** be set to Basic

KK Conversation security, set to No

11. Configure LU 6.2 on the Netware.

- Go to directory SYS:/SYSTEM/NWSAA/APIS/DOS and enter APICFG.
- Set Configuration File Path/File Name to SYS:/SYSTEM/NWSAA/NWSAAAPI.INI.
- Select Configure LU6.2.
- Select Configure Server List.
- Enter the values LL thru MM, shown below, as they pertain to your Netware for SAA 2.0 server.
- Press the escape key to save.

```
Server List
=====
```

```
Server Name:           PU Profile
LRES1      (LL)        MVS21      (MM)
```

The following describes the fields in the above screen:

LL Server Name, name of Netware for SAA 2.0 server

MM PU Profile, set to MVS21

12. Configure CPI-C Side Information Records.

- Select Configure CPI-C Side Information Records.
- Press the insert key.
- Enter the values OO thru WW, shown below.
- Press the escape key twice to save.

```

CPI-C Side Information Record Contents
=====

Symbolic Destination Name:      NWSERV1      (OO)
Partner TP:                     EWXCOMM      (PP)
TP Type:                         Standard      (QQ)
Local LU:                        NWSAA        (RR)
Partner LU:                      LRAPPC1      (SS)
Mode:                            APPCHOST     (TT)
Security Type:                   None         (UU)
Security User ID:                (VV)
Security Password:              (WW)
    
```

The following describes the fields in the above screen:

- OO** Symbolic Destination Name, which is set to NWSERV1, as per the host's DESTNAME definition
- PP** Partner TP, which MUST be set to EWXCOMM
- QQ** TP Type, which MUST be set to Standard
- RR** Local LU, which is set to NWSAA, as per the host's PARTNER_LU definition
- SS** Partner LU, which is set to LRAPPC1, as per the host's ACBNAME definition
- TT** Mode, which is set to APPCHOST, as per the host's MODENAME definition
- UU** Security Type, which is set to None
- VV** Security User ID, left blank
- WW** Security Password, left blank

13. **Configure Attach Manager Records.**

- Select Configure Attach Manager Records.
- Press the insert key.
- Enter the values XX thru BBB, shown below.
- Press the escape key to save data.
- Select Exit Configuration Program.
- Verify that there is a NWSAAAPI.INI file in the SYS:\SYSTEM\NWSAA subdirectory.

```

Attach Manager Record Contents
=====

TP Name:                         EWXCOMM      (XX)
TP Type:                         Standard      (YY)
Local LU:                        NWSAA        (ZZ)
Program Path and Filename:       SYS:\EWXNLM\EWXCOMM.NLM (AAA)
Program Operation:              Attach Manager Started (BBB)
Program Parameters:
    
```

NetWare SAA 2.0 SNA 6.2 Indirect Channel

The following describes the fields in the above screen:

- XX** TP Name, which MUST be set to EWXCOMM
- YY** TP Type, which MUST be set to Standard
- ZZ** Local LU, which is set to NWSAA, as per the host's PARTNER_LU definition
- AAA** Program Path and Filename, set to SYS:\EWXNLM\EWXCOMM.NLM
- BBB** Program Operation, set to Attach Manager Started

14. Automate the loading of the Communication Executive, NetWare for SAA 2.0 and the Attach Manager, for PU 2.1/LU 6.2 support.

In this step, we will set up the NetWare server so that the above programs are automatically loaded when the server is booted. Commands have to be added to the AUTOEXEC.NCF and the EWXSTART.LST files in order to do this.

Add a search path to the AUTOEXEC.NCF so that the z/OS LANRES directory is in the search path, and add a LOAD command for a module named EWXSTART. For example:

```
search add sys:\ewxnlm
load sys:\ewxnlm\ewxstart
```

When the EWXSTART module is loaded, it processes commands in a file named EWXSTART.LST. To complete the automation of the loading of Communication Executive, update the EWXSTART.LST file that contains the necessary NetWare LOAD commands.

Update the EWXSTART.LST file in the SYS:\EWXNLM directory. A sample EWXSTART.LST file is in this directory. The sample file name is EWXSTART.SAM. Copy this file as EWXSTART.LST and modify as shown.

```
load commexec
load nwsaa
load cpic_saa
load pb_nwsaa
load attmgr
```

The LOAD COMMEXEC statement loads the NetWare for SAA 2.0's Communication Executive.

The LOAD NWSAA statement, loads Netware for SAA 2.0.

The LOAD CPIC_SAA statement loads NetWare for SAA 2.0's CPIC interface for LU 6.2.

The LOAD PB_NWSAA and LOAD ATTMGR statements load Netware for SAA 2.0's Attach Manager function.

15. Activate the VTAM LISTs.

Vary on your VTAM LISTs to get a connection to the Netware for SAA 2.0 server.

Note: For NetWare for SAA 2.0, the APPC sessions are not established until the host application is started.

Checkpoint

At this point, the NetWare for SAA 2.0 communications support is set up on both the z/OS system and the NetWare for SAA 2.0 server for LU 6.2 communications.

NetWare for SAA 2.2 SNA LU 6.2 for Indirect Channel Attachment

This section describes how to set up for LU 6.2 as the communications method between z/OS LANRES and LANRES on the NetWare server running NetWare for SAA 2.2.

You may want to note that the performance may not be as good as using a direct channel connection using a dedicated subchannel pair, and an LU 6.2 connection is not recommended for high performance disk serving applications.

The following steps describe:

- Customizing VTAM and the DLU for z/OS LANRES
- Customizing NetWare for SAA 2.2 on the NetWare server for z/OS LANRES

Customizing VTAM and the DLU for z/OS LANRES

In general, to use SNA LU 6.2, the following APPC, z/OS, and VTAM information is configured:

1. The APPCPMxx member of SYS1.PARMLIB, which is used when the APPC address space is started
2. The ASCHPMxx member of SYS1.PARMLIB, which is used when the ASCH address space is started
3. The side information that is contained in a VSAM Key Sequenced Data Set (KSDS), which handles outbound requests

Because z/OS LANRES performs only outbound allocates (or connects), which means the connection requests only flow from z/OS to the NetWare for SAA 2.2 server, you will only need to customize the APPCPMxx member (1. above) and the side information (3. above) for z/OS LANRES.

Note: However, you will still need to start the APPC and ASCH address spaces as described in a later step.

With this in mind, perform the following steps on z/OS:

1. **Ensure VTAM and, if you are using z/OS LANRES across this connection, APPC/MVS is installed and running on z/OS.**
2. **Create the PU and LU Definitions.**

You'll need to add the VTAM list for the communications adapter.

The VTAM LIST is a network definition member that brings up the connection between z/OS and the NetWare for SAA 2.2 server. This member must be stored where VTAM can access it (usually SYS1.VTAMLST).

There are many ways to define an indirect channel attachment to a NetWare for SAA 2.2 server. This is a generic example:

NetWare SAA 2.2 SNA 6.2 Indirect Channel

```
*
SNA21  VBUILD TYPE=SWNET
*
NOVELL  PU      ADDR=01,
          ANS=CONTINUE,
          DISCNT=NO,
          IDBLK=05D,
          IDNUM=00101,
          MAXOUT=1,
          PASSLIM=1,
          PUTYPE=2
*
NWSAA   LU      LOCADDR=0,
          DLOGMOD=APPCHOST,
          MODETAB=LOGMODES
*
```

- We have one (LU LOCADDR) LU defined. This number can be increased to the independent session limit of the NetWare for SAA 2.2 license. LOCADDR 0 is used because it is defined as an independent LU.
- We noted our IDBLK value 05D and IDNUM value 00101 because we'll need to specify them later on the NetWare for SAA 2.2 server.
- We are using the logon mode DLOGMOD=APPCHOST.
- We are using the logon mode table entry MODETAB=LOGMODES.

3. Create the Logmode Table.

Modify SYS1.SAMPLIB(ATBLMODE) as shown below:

```
*****
LOGON MODE TABLE ENTRY FOR LU 6.2 APPLICATIONS
*****
APPCTAB  MODETAB
          MODEENT LOGMODE=APPCHOST,
          RUSIZES=X'8989',
          SRCVPAC=X'00',
          SSNDPAC=X'01'
          MODEND
          END
```

- This example shows the logmode is APPCHOST as per our Switched Net VTAM LIST. Later on we will need to define this value as the Logmode Name on the NetWare for SAA 2.2 server in the NWSAA Administrator.
- This example also shows the RUSIZE = X'8989'. Later on we will need to define this value as the RU Size of 4096 on the NetWare for SAA 2.2 server in the NWSAA Administrator.

4. Determine the NETID value.

Browse the ATCSTRxx VTAMLST definition member of the SYS1.VTAMLST data set and document your NETID value.

This is an example of our ATCSTRxx VTAMLST:

```
*****
***          VTAM STARTUP OPTIONS          ***
*****
HOSTSA=148,
  CSALIMIT=0,
  CONFIG=ES,
  SSCPID=5397,
  SSCPNAME=N2ESM,
  NETID=NET1,
  PPOLOG=YES,
  IOBUF=(350,288,19,,50,50),
  CRPLBUF=(350,,15,,20,18),
  LFBUF=(150,,0,,10,1),
  LPBUF=(280,,15,,50,50),
  SFBUF=(600,,0,,50,1),
  NOTRACE,TYPE=VTAM
```

- This example shows the NETID value is NET1. Later on we will need to define this value as Network ID on the NetWare for SAA 2.2 server in the NWSAA Administrator.

5. **Do you have an existing destination logical unit (DLU) defined?**

If yes, then you can use that DLU.

If no, then create one by building a VTAM APPL definition statement, such as the following, and place it in SYS1.VTAMLST. For example:

```
*
      VBUILD  TYPE=APPL
*
LRAPPC1  APPL  ACBNAME=LRAPPC1,
           APPC=YES
           AUTOSES=5,
           DDRAINL=NALLOW,
           DLOGMOD=APPCHOST,
           DMINWNL=3,
           DMINWNR=6,
           DRESPL=ALLOW,
           DSESLIM=9,
           EAS=32,
           MODETAB=LOGMODES,
           SECACPT=CONV,
           SRBEXIT=YES,
           VERIFY=NONE,
           VPACING=0
```

In this example, LRAPPC1 is the APPL entry and the ACBNAME value. You can choose your own value. However, the ACBNAME value and the APPL entry must be the same. If this is not already in your VTAM control file ATCCONxx, then add it so that it will automatically start when VTAM is started.

- This example shows the ACBNAME is LRAPPC1. Later on we will need to define this value as the Partner LU on the NetWare for SAA 2.2 server in the NWSAA Administrator.
- This example shows the DLOGMODE=APPCHOST as per our Switched Net VTAM LIST. Later on we will need to define this value as the Mode Name on the NetWare for SAA 2.2 server in the NWSAA Administrator.
- This example shows the DMINWNR=6. Later on we will need to define this value as the Minimum Contention Winners on the NetWare for SAA 2.2 server in the NWSAA Administrator.
- This example shows the DMINWNL=3. Later on we will need to define this value as the Number of Autoactivated Sessions on the NetWare for SAA 2.2 server in the NWSAA Administrator.

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- This example shows the VPACING=0. Later on we will need to define this value as the Receive Pacing Count on the NetWare for SAA 2.2 server in the NWSAA Administrator.

6. Create and add the side information.

Create the following entries with the SIADD utility command of the ATBSDFMU APPC/MVS administration utility, either through the APPC/MVS administration dialog or in JCL:

```
DESTNAME(nwserver)
TPNAME(EWXCOMM)
MODENAME(modename)
PARTNER_LU(nwservlu)
```

Where:

- *nwserver* is the symbolic destination name of the NetWare for SAA 2.2 server. The symbolic destination name is the name used when starting your APPC connection. Each symbolic destination name must be unique in the side information.
- The TPNAME *must* be EWXCOMM.
- *modename* is the LOGMODE value in Step 5. This is the logon mode for the SNA session.
- *nwservlu* is the LU name for the NetWare for SAA 2.2 server as per the Switched Net VTAM LIST.

To continue with our example, we used the ATBSDFMU utility through JCL calling the SIADD command to add the side information to a VSAM data set:

```
//*****
//STEP      EXEC  PGM=ATBSDFMU
//SYSPRINT DD   SYSOUT=A
//SYSSDLIB DD  DSN=SYS1.APPCSI,DISP=SHR  <= Side Information data set
//SYSSDOUT DD  DSN=SYS1.APPCOUT,DISP=SHR
//SYSIN     DD   *
SIADD
           DESTNAME(NWSERV1)
           TPNAME(EWXCOMM)
           MODENAME(APPCHOST)
           PARTNER_LU(NWSAA)
```

This example means our:

- VSAM KSDS SIDEINFO DATASET points to SYS1.APPCSI.
- Symbolic destination name of NetWare for SAA 2.2 server is NWSERV1.
- Logon mode is APPCHOST, which is the logon mode for the SNA session connecting the DLU to the NetWare for SAA 2.2 server LU.
- LU name for the NetWare for SAA 2.2 server is NWSAA, per our Switched Net VTAM LIST.

For a sample of this JCL, see the ATBUTIL member of the SYS1.SAMPLIB.

This defines the side information identifying the NetWare for SAA 2.2 server that z/OS will connect to. In addition, it defines a target (DESTNAME value) and mode (MODENAME value) that the z/OS LANRESStart commands need to establish an z/OS LANRES connection.

7. Make the DLU the BASE LU, and identify the side information data set.

Add the following entries to the APPCPMxx member of SYS1.PARMLIB:

```
LUADD
ACBNAME(hostdlu)
BASE
SIDEINFO
DATASET(sideinfo)
```

Where:

- *hostdlu* is the name of your local LU, which you defined as the BASE LU in Step 5 on page 79.
- *sideinfo* is your side information data set; the data set that contains your side information entries created in Step 6 on page 80.

To continue with our example, we defined the following:

```
LUADD
ACBNAME(LRAPP1)
BASE
SIDEINFO
DATASET(SYS1.APPCSI)
```

This means that all of the z/OS LANRES connections from z/OS to the NetWare for SAA 2.2 server will use a session or sessions from the defined BASE LU when connecting to the NetWare for SAA 2.2 server LU. These changes do not take effect until the APPC address space is started (next step).

8. Start the APPC address space.

Enter the following operator command:

```
START APPC,SUB=MSTR,APPC=xx
```

Where *xx* is the last two characters of the APPCPM*xx* member.

This activates the LUs.

9. Start the ASCH address space.

Enter the following operator command:

```
START ASCH,SUB=MSTR,ASCH=xx
```

Where *xx* is the last two characters of the ASCHPM*xx* member.

Customizing NetWare for SAA 2.2 on the NetWare Server for PU 2.1/LU 6.2

1. Ensure that you are running compatible versions of NetWare and NetWare for SAA 2.2.

- a. Load the Install Utility from the NetWare server console.
- b. Choose Product Options from the screen.
- c. Check the information that displays to ensure the Communication Executive 2.0 product is v2.0.22 or later and the NetWare for SAA 2.2 product is v2.0.23 or later.

If you do not have the required level of NetWare for SAA 2.2, contact your Novell representative to obtain the proper level. You may need to obtain PTFs (fixes) from Novell and apply them to your system to get to the correct level.

2. Create a PU 2.1 Service Profile on the NetWare for SAA 2.2 server.

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A NetWare *service profile* is a stored set of parameters that defines a particular communication service configuration. In this step, we will create a service profile for communications with the z/OS host system.

To create a service profile, use the NetWare NWSAA Administrator. Create a service profile for a PU Type 2.1. PU Type 2.1 is required for z/OS LANRES. LU 6.2 communications.

The Communication Executive must be running on the server before the NWSAA Administrator can be used. Start the Communication Executive on the server by entering the following command on the NetWare console:

```
LOAD COMMEEXEC
```

Start the NWSAA Administrator from a NetWare for SAA 2.2 Windows client, as instructed in the *Novell NetWare for SAA 2.0 Administration Guide*.

3. **Double click on the SAA Server and login to the server.**
4. **Create the Data Link Adapter object.**
 - Click on Object from the Menu Bar.
 - Click on Create from the pull down menu.
 - Click on Data Link Adapter.
 - Click on OK.
 - Enter EWXLSA2 in the Logical Adapter name field.
 - Enter Custom in the Adapter Type field.
 - Put a check in the box in front of the line "Terminate peer link if no active APP session".
 - Put a check in the box in front of the line "Enable adapter at startup".
 - Click on OK.
5. **Create the Peer PU Profile object.**
 - Click on Object from the Menu Bar.
 - Click on Create from the pull down menu.
 - Click on Peer PU Profile.
 - Click on OK.
 - Enter NWSAA in the Peer PU Profile name field.
 - Enter CPNAME in the Peripheral node control point name field.
 - Enter 05D 00101 in the Node ID (block ID/PU ID) field.
 - Enter EWXLSA2 in the Logical Adapter name field.
 - Click on OK.
6. **Create the Modes object.**
 - Click on Object from the Menu Bar.
 - Click on Create from the pull down menu.
 - Click on Mode.
 - Click on OK.
 - Enter APPCHOST in the Mode name field.
 - Enter 9 in the Number of sessions field.
 - Enter 6 in the Minimum contention winners field.
 - Enter 3 in the Number of auto activated sessions field.
 - Enter 4096 in the Maximum RU size field.
 - Enter 4 in the Receive pacing count field.
 - Click on OK.

7. Create the Partner LU object.

- Click on Object from the Menu Bar.
- Click on Create from the pull down menu.
- Click on Partner LU.
- Click on OK.
- Enter LRAPPC1 in the Partner LU name field.
- Enter NET1 in the SNA network ID field.
- Put a check in the box in front of the line "Immediate link activation".
- Under Mode Information
 - Click on APPCHOST.
 - Click on Add.
- Enter EWXLSA2 in the Logical Adapter name field.
- Click on OK.

8. Create the Local LU object.

- Click on Object from the Menu Bar.
- Click on Create from the pull down menu.
- Click on Local LU.
- Click on OK.
- Enter Independent in the Local LU type field.
- Enter NWSAA in the Local LU name field.
- Put a check in the box in front of the line "Selected LU as default".
- Under Partner LU Information
 - Click on LRAPPC1 in the available field.
 - Click on Add.
- Put a check in the box in front of the line "Enable LU at startup".
- Click on OK.

9. Create the Transaction Program object.

- Click on Object from the Menu Bar.
- Click on Create from the pull down menu.
- Click on Transaction Program.
- Click on OK.
- Enter Standard in the Transaction Program type field.
- Enter EWXCOMM in the Local TP name field.
- Enter None in the sync level field.
- Enter Basic in the Conversation type field.
- Click on OK.

10. Configure LU 6.2 on the Netware.

- Invoke NWADMIN from a client.
- Select *ServerName_NWSAA* object.
- Select APPC Configuration.

11. Configure CPI-C Side Information Records.

- Under Configure CPI-C Side Information Records
- Select Add.
- Enter the values QQ thru YY, shown below.
- Select OK to save the information.

NetWare SAA 2.2 SNA 6.2 Indirect Channel

```

CPI-C Side Information - Add
=====

Symbolic Name:           NWSERV1           (QQ)
Partner TP Name:        EWXCOMM           (RR)
Partner TP Type:        Standard          (SS)
Partner LU Name:        NWSAA             (TT)
Local LU Name:          LRAPPC1          (UU)
Mode Name:              APPCHOST         (VV)
Security Type:          None             (WW)
Security UserID:        (blank)          (XX)
Security Password:      (blank)          (YY)
    
```

The following describes the fields in the above screen:

- QQ** Symbolic Name, which is set to NWSERV1, as per the host's DESTNAME definition
- RR** Partner TP Name, which MUST be set to EWXCOMM
- SS** Partner TP Type, which MUST be set to Standard
- TT** Partner LU Name, which is set to NWSAA, as per the host's ACBNAME definition
- UU** Local LU Name, which is set to LRAPPC1, as per the host's PARTNER_LU definition
- VV** Mode Name, which is set to APPCHOST, as per the host's MODENAME definition
- WW** Security Type, which is set to None
- XX** Security UserID, left blank
- YY** Security Password, left blank

12. Configure Attach Manager Records.

- Under Attach Manager Records
- Select Add.
- Enter the values ZZ thru DDD, shown below.
- Select OK to save the information.
- Select OK to return to NetWare Administrator.

```

Attach Manager - Add
=====

TP Name:                 EWXCOMM           (ZZ)
TP Type:                 Standard          (AAA)
TP Operation:            Attach Manager Started (BBB)
TP Filename:             SYS:\EWXNLM\EWXCOMM.NLM (CCC)
TP Parms:
TP Presentation:
TP Icon Filename:
LU Name:                 NWSAA           (DDD)
    
```

The following describes the fields in the above screen:

NetWare SAA 2.2 SNA 6.2 Indirect Channel

- ZZ** TP Name, which MUST be set to EWXCOMM
- AAA** TP Type, which MUST be set to Standard
- BBB** TP Operation, set to Attach Manager Started
- CCC** TP Filename, set to SYS:\EWXNLM\EWXCOMM.NLM
- DDD** LU Name, which is set to NWSAA, as per the host's PARTNER_LU definition

13. Automate the loading of the Communication Executive, NetWare for SAA 2.2 and the Attach Manager, for PU 2.1/LU 6.2 support.

In this step, we will set up the NetWare server so that the above programs are automatically loaded when the server is booted. Commands have to be added to the AUTOEXEC.NCF and the EWXSTART.LST files in order to do this.

Add a search path to the AUTOEXEC.NCF so that the z/OS LANRES directory is in the search path, and add a LOAD command for a module named EWXSTART. For example:

```
search add sys:\ewxn1m
load sys:\ewxn1m\ewxstart
```

When the EWXSTART module is loaded, it processes commands in a file named EWXSTART.LST. To complete the automation of the loading of Communication Executive, update the EWXSTART.LST file that contains the necessary NetWare LOAD commands.

Update the EWXSTART.LST file in the SYS:\EWXNLM directory. A sample EWXSTART.LST file is in this directory. The sample file name is EWXSTART.SAM. Copy this file as EWXSTART.LST and modify as shown.

```
load commexec
load nwsaa
load cpic_saa
load pb_nwsaa
load attmgr
```

The LOAD COMMEXEC statement loads the NetWare for SAA 2.2's Communication Executive.

The LOAD NWSAA statement loads Netware for SAA 2.2.

The LOAD CPIC_SAA statement loads NetWare for SAA 2.2's CPIC interface for LU 6.2.

The LOAD PB_NWSAA and LOAD ATTMGR statements load Netware for SAA 2.2's Attach Manager function.

14. Activate the VTAM LISTS.

Vary on your VTAM LIST's to get a connection to the Netware for SAA 2.2 server.

Note: For NetWare for SAA 2.2, the APPC sessions are not established until the host application is started.

Checkpoint

At this point, the NetWare for SAA 2.2 communications support is set up on both the z/OS system and the NetWare for SAA 2.2 server for LU 6.2 communications.

NetWare for SAA 3.0 SNA LU 6.2 for Indirect Channel Attachment

This section describes how to set up for LU 6.2 as the communications method between z/OS LANRES and LANRES on the NetWare server running NetWare for SAA 3.0.

You may want to note that the performance may not be as good as using a direct channel connection using a dedicated subchannel pair, and an LU 6.2 connection is not recommended for high performance disk serving applications.

The following steps describe:

- Customizing VTAM and the DLU for z/OS LANRES
- Customizing NetWare for SAA 3.0 on the NetWare server for z/OS LANRES

Customizing VTAM and the DLU for z/OS LANRES

In general, to use SNA LU 6.2, the following APPC, z/OS, and VTAM information is configured:

1. The APPCPMxx member of SYS1.PARMLIB, which is used when the APPC address space is started
2. The ASCHPMxx member of SYS1.PARMLIB, which is used when the ASCH address space is started
3. The side information that is contained in a VSAM Key Sequenced Data Set (KSDS), which handles outbound requests.

Because z/OS LANRES performs only outbound allocates (or connects), which means the connection requests only flow from z/OS to the NetWare for SAA 3.0 server, you will only need to customize the APPCPMxx member and the side information for z/OS LANRES.

Note: However, you will still need to start the APPC and ASCH address spaces as described in a later step.

With this in mind, perform the following steps on z/OS:

1. **Ensure VTAM and, if you are using z/OS LANRES across this connection, APPC/MVS is installed and running on z/OS.**
2. **Create the PU and LU Definitions.**

You'll need to add the VTAM list for the communications adapter.

The VTAM LIST is a network definition member that brings up the connection between z/OS and the NetWare for SAA 3.0 server. This member must be stored where VTAM can access it (usually SYS1.VTAMLST).

There are many ways to define an indirect channel attachment to a NetWare for SAA 3.0 server. This is a generic example:

NetWare for SAA 3.0 SNA LU 6.2 for Indirect Channel Attachment

```
SNA21  VBUILD TYPE=SWNET
*
NOVELL  PU      ADDR=01,
          ANS=CONTINUE,
          DISCNT=NO,
          IDBLK=05D,
          IDNUM=00101,
          MAXOUT=1,
          PASSLIM=1,
          PUTYPE=2
*
NWSAA   LU      LOCADDR=0.
          DLOGMOD=APPCHOST,
          MODETAB=LOGMODES
*
```

In this example, we have one (LU LOCADDR) LU defined. This number can be increased to the independent session limit of the NetWare for SAA 3.0 license. LOCADDR 0 is used because it is defined as an independent LU. We noted our IDBLK value 05D and IDNUM value 00101 because we'll need to specify them later on the NetWare for SAA 3.0 server. We are using the logon mode DLOGMOD=APPCHOST and the logon mode table entry MODETAB=LOGMODES.

3. **Create the Logmode Table.** Modify SYS1.SAMPLIB(ATBLMODE) as shown below:

```
*****
LOGON MODE TABLE ENTRY FOR LU 6.2 APPLICATIONS
*****
APPCTAB  MODETAB
          MODEENT LOGMODE=APPCHOST,
          RUSIZES=X'8989',
          SRCVPAC=X'00',
          SSNDPAC=X'01'
          MODEND
          END
```

This example shows the logmode is APPCHOST as per our Switched Net VTAM LIST. We will need to define this value as the Logmode Name on the NetWare for SAA 3.0 server in the NWSAA Administrator.

This example also shows the RUSIZE = X'8989'. We will also need to define this value as the RU Size of 4096 on the NetWare for SAA 3.0 server in the NWSAA Administrator.

4. **Determine the NETID value.**

Browse the ATCSTRxx VTAMLST definition member of the SYS1.VTAMLST data set and document your NETID value.

This is an example of our ATCSTRxx VTAMLST:

NetWare for SAA 3.0 SNA LU 6.2 for Indirect Channel Attachment

```
*****  
***          VTAM STARTUP OPTIONS  
*****  
HOSTSA=148,  
  CSALIMIT=0,  
  CONFIG=ES,  
  SSCPID=5397,  
  SSCPNAME=N2ESM,  
  NETID=NET1,  
  PPOLOG=YES,  
  IOBUF=(350,288,19,,50,50),  
  CRPLBUF=(350,,15,,20,18),  
  LFBUF=(150,,0,,10,1),  
  LPBUF=(280,,15,,50,50),  
  SFBUF=(600,,0,,50,1),  
  NOTRACE,TYPE=VTAM
```

This example shows the NETID value is NET1. We will need to define this value as Network ID on the NetWare for SAA 3.0 server in the NWSAA Administrator.

5. Do you have an existing destination logical unit (DLU) defined?

If yes, then you can use that DLU.

If no, then create one by building a VTAM APPL definition statement, such as the following, and place it in SYS1.VTAMLST.

For example:

```
VBUILD TYPE=APPL  
*  
LRAPPC1  APPL  ACBNAME=LRAPPC1,  
             APPC=YES  
             AUTOSES=5,  
             DDRAINL=NALLOW,  
             DLOGMOD=APPCHOST,  
             DMINWNL=3,  
             DMINWNR=6,  
             DRESPL=ALLOW,  
             DSESLIM=9,  
             EAS=32,  
             MODETAB=LOGMODES,  
             SECACPT=CONV,  
             SRBEXIT=YES,  
             VERIFY=NONE,  
             VPACING=0
```

In this example, LRAPPC1 is the APPL entry and the ACBNAME value. You can choose your own value. However, the ACBNAME value and the APPL entry must be the same. If this is not already in your VTAM control file ATCCONxx, then add it so that it will automatically start when VTAM is started.

This example shows the ACBNAME is LRAPPC1. We will need to define this value as the Partner LU on the NetWare for SAA 3.0 server in the NWSAA Administrator.

This example shows the DLOGMODE=APPCHOST as per our Switched Net VTAM LIST. We will need to define this value as the Mode Name on the NetWare for SAA 3.0 server in the NWSAA Administrator.

This example shows the DMINWNR=6. We will need to define this value as the Minimum Contention Winners on the NetWare for SAA 3.0 server in the NWSAA Administrator.

NetWare for SAA 3.0 SNA LU 6.2 for Indirect Channel Attachment

This example shows the DMINWNL=3. We will need to define this value as the Number of Autoactivated Sessions on the NetWare for SAA 3.0 server in the NWSAA Administrator.

This example shows the VPACING=0. We will need to define this value as the Receive Pacing Count on the NetWare for SAA 3.0 server in the NWSAA Administrator.

6. Create and add the side information.

Create the following entries with the SIADD utility command of the ATBSDFMU APPC/MVS administration utility, either through the APPC/MVS administration dialog or in JCL:

```
DESTNAME(nwserver)
TPNAME(EWXCOMM)
MODENAME(modename)
PARTNER_LU(nwserverlu)
```

Where:

- nwserver is the symbolic destination name of the NetWare for SAA 3.0 server.
The symbolic destination name is the name used when starting your APPC connection. Each symbolic destination name must be unique in the side information.
- The TPNAME must be EWXCOMM.
- modename is the LOGMODE value in Step 5. This is the logon mode for the SNA session.
- nwserverlu is the LU name for the NetWare for SAA 3.0 server as per the Switched Net VTAM LIST.

To continue with our example, we used the ATBSDFMU utility through JCL calling the SIADD command to add the side information to a VSAM data set:

```
/******
//STEP      EXEC  PGM=ATBSDFMU
//SYSPRINT DD   SYSOUT=A
//SYSSDLIB DD   DSN=SYS1.APPCSI,DISP=SHR
//SYSSDOUT DD   DSN=SYS1.APPCOUT,DISP=SHR
//SYSIN      DD   *
SIADD
                DESTNAME(NWSERV1)
                TPNAME(EWXCOMM)
                MODENAME(APPCHOST)
                PARTNER_LU(NWSAA)
```

This example means our:

- VSAM KSDS SIDEINFO DATASET points to SYS1.APPCSI.
- Symbolic destination name of NetWare for SAA 3.0 server is NWSERV1.
- Logon mode is APPCHOST, which is the logon mode for the SNA session connecting the DLU to the NetWare for SAA 3.0 server LU.
- LU name for the NetWare for SAA 3.0 server is NWSAA, per our Switched Net VTAM LIST.

For a sample of this JCL, see the ATBUTIL member of the SYS1.SAMPLIB.

NetWare for SAA 3.0 SNA LU 6.2 for Indirect Channel Attachment

This defines the side information identifying the NetWare for SAA 3.0 server that z/OS will connect to. In addition, it defines a target (DESTNAME value) and mode (MODENAME value) that the z/OS LANRES Start commands need to establish an z/OS LANRES connection.

7. **Make the DLU the BASE LU, and identify the side information data set.**

Add the following entries to the APPCPMxx member of SYS1.PARMLIB:

```
LUADD
ACBNAME(hostdlu)
BASE
SIDEINFO
DATASET(sideinfo)
```

Where:

- hostdlu is the name of your local LU, which you defined as the BASE LU in Step 5.
- sideinfo is your side information data set; the data set that contains your side information entries created in Step 6.

To continue with our example, we defined the following:

```
LUADD
ACBNAME(LRAPP1)
BASE
SIDEINFO
DATASET(SYS1.APPCSI)
```

This means that all of the z/OS LANRES connections from z/OS to the NetWare for SAA 3.0 server will use a session or sessions from the defined BASE LU when connecting to the NetWare for SAA 3.0 server LU. These changes do not take effect until the APPC address space is started (next step).

8. **Start the APPC address space. Enter the following operator command:**

```
START APPC,SUB=MSTR,APPC=xx
```

Where xx is the last two characters of the APPCPMxx member. This activates the LUs.

9. Start the ASCH address space. Enter the following operator command:

```
START ASCH,SUB=MSTR,ASCH=xx
```

Where xx is the last the last two characters of the ASCHPMxx member.

Customizing NetWare for SAA 3.0 on the NetWare Server for PU 2.1/LU 6.2

1. **Ensure that you are running compatible versions of NetWare and NetWare for SAA 3.0.**
 - a. Load the Install Utility from the NetWare server console.
 - b. Choose Product Options from the screen.
 - c. Check the information that displays to ensure the Communication Executive 2.0 product is v2.0.22 or later and the NetWare for SAA 3.0 product is v2.0.23 or later.

NetWare for SAA 3.0 SNA LU 6.2 for Indirect Channel Attachment

If you do not have the required level of NetWare for SAA 3.0, contact your IBM NWSAA representative to obtain the proper level. You may need to obtain PTFs (fixes) from IBM and apply them to your system to get to the correct level.

2. Create a PU 2.1 Service Profile on the NetWare for SAA 3.0 server.

A NetWare service profile is a stored set of parameters that defines a particular communication service configuration. In this step, we will create a service profile for communications with the z/OS host system.

To create a service profile, use the Windows Explorer. Create a service profile for a PU Type 2.1. PU Type 2.1 is required for z/OS LANRES. LU 6.2 communications.

3. Login to the NetWare server.

- Map the NetWare for SAA server.
- Double click on the Windows Explorer.
- Click on system.
- Click on nwsaa.
- Click on private.
- Click on your pcg file.

4. Configure Node.

- Click on Basic from the Menu Bar.
- Enter USIBMT6 in the NetWork Name field.
- Enter CPNAME in the CPNAME field.
- Enter CPNAME in the CP alias field.
- Enter 05D in the BLOCK ID field.
- Enter 00351 in the PHYSICAL UNIT ID field.
- Put a check in the box in front of the line "End Node".
- Click on Apply.
- Click on OK.

5. Data Link Adapters.

- Click on Basic.
- Click on Data Link Adapters from Configuration Options.
- Enter EN000001 in the Port Name field.
- Enter 3C90X_1_E82 in the Adapter Name field.
- Enter 0 in the Adapter Number field.
- Enter 04 in the local SAP.
- Click on Performance.
- Enter 7 in the window size field.
- Put a check in the box in front of the line "Use adapter default for maximum PIU size".
- Click on Apply.
- Click on OK.

6. Configure Peer Link.

- Click on Basic
 - Enter LINK0000 in the Peer Link name field.
 - Enter EN000001 (3C90X_1_E82) 04 in the Port name (adapter) field.
 - Enter 00203512D94D in the Remote node address field.

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- Enter 04 in the remote SAP field.
 - Click on the Adjacent Node Parameters.
 - Enter USIBMT6.LINK0000 in the Adjacent CP name field.
 - Enter Back_Level LEN in the Adjacent CP type field.
 - Enter 1 in the TG number field.
 - Enter 000 in the Block ID field.
 - Enter 00000 in the Physical Unit ID field.
 - Click on Advanced.
 - Put a check in the box in front of the the line "Activate link at start."
 - Put a check in the box in front of the the line "Auto_activate support."
 - Put a check in the box in front of the the line "Auto_reactivate support."
 - Enter 05D in the Block ID field.
 - Enter 0351 in the Physical Unit ID field.
 - Click on Performance.
 - Put a check in the box in front of the the line "Use Adapter Maximum PIU size."
7. **Configure Host Link.**
- Enter MVS20 in the Host Link name field.
 - Enter Ethernet in the Adapter type or field.
 - Enter 0 in the Adapter number or field.
 - Enter 8 in the Number of LUs field.
 - Enter yes in the Activate at startup field.
 - Enter 05D in the block ID field.
 - Enter 00350 in the Physical Unit ID field.
8. **Configure a Partner LU 6.2.**
- Click on Basic from the Menu Bar.
 - Enter USIBMT6 in the NetWork Name field.
 - Enter T6FBLRES in the Partner LU name field.
 - Enter T6FBLRES in the Partner LU alias field.
 - Click on Advanced from the Menu Bar.
 - Enter 32767 in the Maximum LL record size.
 - Put a check in the box in front of the line "Parallel Session support"
 - Enter USIBMT6 in the Network name field.
 - Enter CPNAME in the CP name field.
9. **Configure Modes.**
- Click on View/Change/Add Bar.
 - Click on Basic from the Menu Bar.
 - Enter APPCHOST in the Mode name field.
 - Enter 9 in the Mode session limit field.
 - Enter 6 in the Minimum contention winner sessions.
 - Click on Advanced from the Menu Bar.
 - Enter 32767 in the Maximum negotiable session limit field.
 - Enter 4 in the Receive pacing window size field.
 - Enter 3 in the Auto activate sessions field.
 - Enter #CONNECT in the Class of service name field.

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- Enter None in the Compression field.
 - Enter 4096 in the Maximum RU size field.
 - Click on Apply.
 - Click on OK.
10. **Configure Independent LU 6.2.**
- Click on View/Change/Add Bar.
 - Click on Basic from the Menu Bar.
 - Enter FRONT in the Local LU name field.
 - Enter FRONT in the Local LU alias field.
 - Enter 9 in the LU session limit field.
 - Click on Apply.
 - Click on OK.
11. **Configure Transaction Program.**
- Click on View/Change/Add Bar.
 - Click on Basic from the Menu Bar.
 - Enter EWXCOMM in the TP name field.
 - Enter basic in the conversation type field.
 - Enter none in the synchronization level field.
 - Click on Advanced from the Menu Bar.
 - Enter 3600 second in the Receive allocate timeout field.
 - Enter 120 seconds in the Incoming allocate timeout field.
 - Enter 0 in the TP instance limit.
 - Click on Apply.
 - Click on OK.
12. **Configure CPI-C Side Information Records.**
- Under Configure CPI-C Side Information Records.
 - Select Add.
 - Enter the values QQ thru YY, shown below.
 - Select OK to save the information.

```
CPI-C Side Information - Add
=====
```

```
Symbolic Name:                NWSERV1      (QQ)
Partner TP Name:              EWXCOMM       (RR)
Partner TP Type:              Standard        (SS)
Partner LU Name:              NWSAA          (TT)
Local LU Name:                LRAPPC1       (UU)
Mode Name:                    APPCHOST      (VV)
Security Type:                None          (WW)
Security UserID:              (XX)
Security Password:            (YY)
```

The following describes the fields in the above screen:

- QQ** Symbolic Name, which is set to NWSERV1, as per the host's DESTNAME definition
- RR** Partner TP Name, which MUST be set to EWXCOMM
- SS** Partner TP Type, which MUST be set to Standard

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- TT** Partner LU Name, which is set to NWSAA, as per the host's ACBNAME definition
- VV** Mode Name, which is set to APPCHOST, as per the host's MODENAME definition
- WW** Security Type, which is set to None
- XX** Security UserID, left blank
- YY** Security Password, left blank

13. Configure Attach Manager Records.

- Under Attach Manager Records
- Select Add.
- Enter the values ZZ thru DDD, shown below.
- Select OK to save the information.
- Select OK to return to NetWare Administrator.

```
Attach Manager - Add
=====
TP Name:                EWXCOMM                (ZZ)
TP Type:                Standard                (AAA)
TP Operation:           Attach Manager Started (BBB)
TP Filename:           SYS:\EWXNLM\EWXCOMM.NLM (CCC)
TP Parms:
TP Presentation:
TP Icon Filename:
LU Name:                NWSAA                  (DDD)
```

The following describes the fields in the above screen:

- ZZ** TP Name, which MUST be set to EWXCOMM
- AAA** TP Type, which MUST be set to Standard
- BBB** TP Operation, set to Attach Manager Started
- CCC** TP Filename, set to SYS:\EWXNLM\EWXCOMM.NLM
- DDD** LU Name, which is set to NWSAA, as per the host's PARTNER_LU definition

14. Automate the loading of the Communication Executive, NetWare for SAA 3.0 and the Attach Manager, for PU 2.1/LU 6.2 support.

In this step, we will set up the NetWare server so that the above programs are automatically loaded when the server is booted. Commands have to be added to the AUTOEXEC.NCF and the EWXSTART.LST files in order to do this.

Add a search path to the AUTOEXEC.NCF so that the z/OS LANRES directory is in the search path, and add a LOAD command for a module named EWXSTART. For example:

```
search add sys:\ewxnlm
load sys:\ewxnlm\ewxstart
```

When the EWXSTART module is loaded, it processes commands in a file named EWXSTART.LST. To complete the automation of the loading of Communication Executive, update the EWXSTART.LST file that contains the necessary NetWare LOAD commands.

Update the EWXSTART.LST file in the SYS:\EWXNLM directory. A sample EWXSTART.LST file is in this directory. The sample file name is EWXSTART.SAM. Copy this file as EWXSTART.LST and modify as shown.

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```
load iwsaa  
load cpic_saa  
load pb_nwsaa  
load attmgr
```

The LOAD IWSAA statement loads Netware for SAA 3.0 and the NetWare for SAA 3.0's Communication Executive. The LOAD CPIC_SAA statement loads NetWare for SAA 3.0's CPIC interface for LU 6.2.

The LOAD PB_NWSAA and LOAD ATTMGR statements load Netware for SAA 3.0's Attach Manager function.

15. **Activate the VTAM LISTS.**

Vary on your VTAM LIST's to get a connection to the Netware for SAA 3.0 server.

Note: For NetWare for SAA 3.0, the APPC sessions are not established until the host application is started.

Checkpoint

At this point, the NetWare for SAA 3.0 communications support is set up on both the z/OS system and the NetWare for SAA 3.0 server for LU 6.2 communications.

NetWare for SAA 3.0 SNA LU 6.2 for Indirect Channel Attachment

Chapter 5. Setting Up the NetWare Server

This chapter contains information common to all z/OS LANRES functions that you need to understand and perform on the NetWare server. Some of these tasks are required, while others are optional. After this chapter is read, you'll need to perform some tasks on the z/OS system.

Refer to NetWare publications to calculate the requirements for each volume when using the LANRES DISK function.

About Component Passwords

Optionally, you can secure the use of z/OS LANRES functions by setting component passwords. If you want this added security, you'll need to set passwords on the server and have users specify matching passwords on z/OS. First, we'll explain how they work.

Each of the z/OS LANRES functions has a set of passwords associated with it. These passwords are referred to as *component passwords*. The passwords are defined on the NetWare server.

Users specify the passwords when starting z/OS LANRES functions on the host. The passwords specified on the host must match those defined on the NetWare server.

For each function, there are two component passwords on the NetWare server and two corresponding passwords on the host. On the NetWare server, there is an IN component password and an OUT component password. The host also has an IN component password and an OUT component password.

As an z/OS LANRES administrator, you define IN and OUT passwords on the NetWare server for each z/OS LANRES function. When host users try to connect to the server for a particular z/OS LANRES function, they must specify IN and OUT passwords. The host component IN password must be the same as the server component OUT password. The host component OUT password must be the same as the server component IN password (Figure 1). If the passwords do not match, the connection is not established.

Host component password IN = Server component password OUT
Host component password OUT = Server component password IN

Figure 1. Component Password Rules

When z/OS users connect to z/OS LANRES functions, they usually specify the passwords with Start commands, such as EWXCONN LINK for the administration and distribution functions, EWXLHSRV for LAN-to-host print, EWXHLPJE or EWXHLPVT for host-to-LAN print, and EWXLDDSK for disk serving. Later chapters on the z/OS LANRES functions describe how to specify the passwords. To avoid having users enter the passwords with the Start commands, you can put the passwords in z/OS data sets on the host. See "Creating Host Component Password Data Sets for Users" on page 121 for details.

Setting Up the NetWare Server

Note that component passwords are optional because z/OS LANRES initially sets them for you. The initial setting is PWIN=DOWN and PWOUT=UP on the NetWare server.

Setting Server Component Passwords

There are several ways to set the passwords on a NetWareserver:

- Setting passwords when loading z/OS LANRES NLMs

One way to set passwords is by using command options when starting z/OS LANRES functions on the NetWare server. Each z/OS LANRES function has a separate NetWare loadable module (NLM) on the NetWare server. To start an z/OS LANRES function on a NetWare server, you load the appropriate NLM by entering one of the following commands on the NetWare server console. The commands are described in the chapters devoted to each function.

- LOAD EWXADMIN command for administration
- LOAD EWXDISK command for disk serving
- LOAD EWXDIST command for distribution
- LOAD EWXHLPRT command for host-to-LAN print
- LOAD EWXLHPRT command for LAN-to-host print

When entering these commands, you can specify the options PWIN and PWOUT to define the IN and OUT component passwords. Both PWIN and PWOUT options must be specified at the same time, if they are specified at all.

- Specifying passwords in files

Instead of specifying passwords on the LOAD commands, you can put the passwords into files. Use a separate file for each z/OS LANRES function. Each file must contain both the IN component password and the OUT component password for a function. When entering the LOAD command, identify the password file to be used by specifying a PWFIL option.

When specifying passwords in a server file (PWFIL option), the passwords are specified on two separate lines. The PWIN password line must be before the PWOUT password line. Blank lines are ignored and comment lines are identified by a *, /, ;, or # in the first column. The maximum length for a line is 300 characters.

The PWFIL option cannot be specified if the PWIN or PWOUT options are specified.

- Specifying passwords when starting communications

An alternative is to specify passwords when starting z/OS LANRES communications on a NetWare server. To start z/OS LANRES communications, a LOAD EWXCOMM command is entered at the NetWare server console. LOAD EWXCOMM has a set of component password options for each z/OS LANRES function. See *z/OS LANRES Configuration Files and Commands*.

- Specifying passwords in the EWXCOMM initialization file

The LOAD EWXCOMM command reads an initialization file named EWXCOMM.INI. You can define the component passwords for all z/OS LANRES functions in the initialization file. However, the initialization file values are superseded by the previous LOAD command values. See *z/OS LANRES Configuration Files and Commands* for details.

- If the passwords are not set by any of the above methods, each z/OS LANRES NLM looks for its passwords in a default component password file. First, the NLM looks for the default component password file in the directory from which the NLM is loaded. If it cannot find the file there, it looks in the SYS:\EWXNLM\ directory, except for the EWXDISK.DSK NLM. The disk driver, EWXDISK.DSK, looks for the default component password file only in the SYS:\EWXNLM\

Setting Up the NetWare Server

directory. The disk driver does not look for the default component password file in the directory that it is loaded from unless it is loaded from the SYS:\EWXNLM\ directory.

Table 2 lists the server default component password files for each z/OS LANRES function.

Table 2. Server Default Component Password Files

If you are connecting to:	The server password default file is:
Administration	EWXADMIN.NPW
Disk serving	EWXDISK.NPW
Distribution	EWXDIST.NPW
Host-to-LAN print	EWXHLPRT.NPW
LAN-to-host print	EWXLHPRT.NPW

Component passwords are specified as an alphanumeric (a to z, A to Z, and 0 to 9) string of up to 8 characters. They are not case sensitive.

For reasons explained in the later chapters, you will probably be loading multiple copies of some NLMs. If multiple copies of the same z/OS LANRES NLM are to be loaded, the server component passwords need to be specified only for the first copy of that NLM. Subsequent copies of that NLM use the same passwords.

Although the different methods for setting passwords provide flexibility, you may be wondering about which method to use at the outset. We recommend specifying all the passwords in the EWXCOMM initialization file. The next section describes how to do this. If that method proves to be inconvenient, try using the individual password files for each function.

z/OS LANRES provides a sample of each of the server component password files in the SYS:\EWXNLM directory. The files z/OS LANRES provides are:

- EWXADMIN.SAM
- EWXDISK.SAM
- EWXDIST.SAM
- EWXHLPRT.SAM
- EWXLHPRT.SAM

If you choose to use the individual password files, you should rename the files as follows:

- EWXADMIN.SAM to EWXADMIN.NPW
- EWXDISK.SAM to EWXDISK.NPW
- EWXDIST.SAM to EWXDIST.NPW
- EWXHLPRT.SAM to EWXHLPRT.NPW
- EWXLHPRT.SAM to EWXLHPRT.NPW

Then, edit the files and change the passwords as desired.

Starting z/OS LANRES Communications on a NetWare Server

When z/OS LANRES is installed on a NetWare server, files are created in a directory named SYS:\EWXNLM. Some of the files in this directory are NetWare loadable modules, or NLMs. An NLM is a program that you can load and unload from NetWare server memory while the server is running.

Setting Up the NetWare Server

One of the NLMs provided with z/OS LANRES is a communication driver. The name of the communication driver is EWXCOMM.NLM. Until you load EWXCOMM on the NetWare server, it is not possible to start any of the z/OS LANRES functions.

Creating the EWXCOMM.INI Initialization File

When EWXCOMM is loaded, it reads a file that contains initialization information. You must create the initialization file before loading EWXCOMM. By default, EWXCOMM looks for a file named EWXCOMM.INI. EWXCOMM looks for the file in the directory from which EWXCOMM itself was loaded. If it can't find the file, it looks in the SYS:\EWXNLM directory. EWXCOMM is installed in SYS:\EWXNLM, so unless you copy EWXCOMM elsewhere, you should create the EWXCOMM.INI file in that same directory.

z/OS LANRES provides a sample of the initialization file, named EWXCOMM.SAM, in the SYS:\EWXNLM directory. You can copy this file giving it the name EWXCOMM.INI and modify it for your environment. You can set values for:

- z/OS LANRES sessions
- z/OS LANRES channel addresses
- Service
- Message logging
- Component passwords
- LANRES object password
- Host-to-LAN print NLM processing

The following sections describe the file format and provide some recommendations for setting the values.

Initialization File Format

The initialization file uses a simple "KEYWORD=value" format which is similar to formats used for many other workstation configuration files. The format rules are:

- Comment lines are ignored. A line is a comment line if it has one of the following characters in the first column:

* / ;

- Blank lines are ignored.
- Maximum length for a line is 275 characters.
- Information records should be in one of two formats:

KEYWORD

or

KEYWORD = VALUE

The keyword does not have to begin in column 1. One or more spaces can separate the keyword, equal sign, and value. Keywords and values are not case sensitive.

An example initialization file is shown in Figure 2 on page 101.

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```
*****
* Example of an EWXCOMM Initialization File
*****

* Maximum number of concurrently active z/OS LANRES sessions allowed at one time.
* Allow for 30 concurrent z/OS LANRES sessions
sessions=30

* Accept service from the host
accept_service = yes

* Turn on message logging and delete the log every 30 days
log_start=yes
log_age =30

* Set passwords for the major functions
admin_pwin = admdown
admin_pwout = admup

disk_pwin = diskdown
disk_pwout = diskup

dist_pwin = distdown
dist_pwout = distup

hlprt_pwin = hltdown
hlprt_pwout = hlup

lhprt_pwin = lhtdown
lhprt_pwout = lhup

* Set password for the LANRES object
lobj_password = lanresobjpass

* Set context for the LANRES object
lobj_context = lanresobjcontext
```

Figure 2. Example of EWXCOMM Initialization File

z/OS LANRES Sessions

By default, EWXCOMM allows 16 active z/OS LANRES communication sessions at one time. Each NetWare server connection to z/OS uses one z/OS LANRES session. You can estimate the number of z/OS LANRES sessions needed by considering your planned use of z/OS LANRES:

- How many disk servers do you plan to run on the host?
Each disk server that communicates with this NetWare server uses one z/OS LANRES session.
- How many users on the host will be allowed to use the administration function?
One session will be needed for each of those users if you anticipate that they will be using the administration function at the same time.
- How many users on the host will be allowed to use the distribution function?
Again, the number of sessions needed is equal to the number of users that will use the distribution function at the same time.
- Are you planning to use host-to-LAN or LAN-to-host print?
One session is used for each of the print serving jobs.

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APPC Users: Each z/OS LANRES session requires two independent SNA LU 6.2 sessions. To determine your independent SNA LU 6.2 session limit, refer to your NetWare for SAA licensing agreement and NetWare for SAA books.

TCP/IP Users: Each z/OS LANRES session requires one TCP/IP socket.

Channel Users: Each z/OS LANRES session requires one even, odd pair of subchannel addresses. An even, odd pair of subchannel addresses is needed for each z/OS LANRES function that is going to be used concurrently, whether it is being used in batch, interactively by a TSO user, or as a server.

NetWare for SAA Channel Driver Users: The NetWare for SAA channel driver communications method requires a single subchannel for multiple z/OS LANRES sessions. The resulting performance may not be as good as using a dedicated subchannel pair.

Combinations of channel and the NetWare for SAA channel driver communications can be used. For example, you may want to use MMC for disk serving and the NetWare for SAA channel driver for administration and distribution sessions.

If too many z/OS LANRES sessions are allocated, NetWare server memory is wasted. If too few are allocated, some host users may not be able to connect to the NetWare server. (They receive error messages instead.)

Initially, you may want to let EWXCOMM use the default value of 16. When you've used z/OS LANRES for a while and have a better idea of how it is being used at your installation, you may want to reconsider the sessions setting.

To specify your own value for SESSIONS, add a SESSIONS keyword and value to the EWXCOMM.INI file. For example, to set SESSIONS to 30, change the following line in EWXCOMM.INI:

```
sessions=30
```

z/OS LANRES Channel Addresses

If you are using MMC or ESCON adapter cards as the z/OS LANRES communication method, you have already defined the rightmost two characters of the fully defined z/OS subchannel addresses in the appropriate channel adapter configuration file or files. Because other products can be using subchannel addresses set in those configuration files, you *must* identify which subchannel addresses are to be used by z/OS LANRES.

You do this by setting the channel addresses and, optionally, their physical card number, using the following EWXCOMM options:

- SUBCHANNEL—For MMC subchannel addresses
- ESCON_SUBCHANNEL—For ESCON subchannel addresses

Any number of subchannel addresses and physical card numbers (1 or 2) can be specified, separated by a semicolon. If you do not specify the physical card number, the lower of the slots (1) is the default. For example:

```
subchannel=f0,1;f2,1;f4;f6;52,2;54,2
```

Consequently, the fully-defined z/OS subchannel addresses are entered with the z/OS LANRES Start commands (which are entered on z/OS) to establish a connection between z/OS LANRES on the NetWare server and z/OS LANRES on z/OS. The EWXCONN LINK command establishes a connection for administration and distribution, EWXLDDSK for disk serving, EWXHLPJE or EWXHLPVT for host-to-LAN print, and EWXLHSRV for LAN-to-host print. Alternatively, you can define these subchannel addresses in a user or system configuration data set. This is explained in the next chapter, but let's finish setting up the NetWare server.

Service

z/OS LANRES provides the EWXNWSRV command which sends a new z/OS LANRES service level to NetWare servers. By default, EWXCOMM rejects service from the host. You can, however, change this default by specifying `ACCEPT_SERVICE=YES` in the EWXCOMM.INI file as follows:

```
accept_service=yes
```

For more information about service, see “Applying Service to NetWare Servers” on page 123 and “Accepting Service from z/OS” on page 106.

Message Logging

EWXCOMM can log the messages generated by all z/OS LANRES NLMs. The messages are written to a file known as the *current log file*. The current log file, by default, is copied to an archive file at midnight. There are several values related to message logging that you can set in the initialization file:

- `LOG_AGE`—the number of days a log file is kept.
- `LOG_DELETE`—indicates what to do with the current log file at midnight.
- `LOG_DIRECTORY`—identifies the directory in which the current log file and archived log files are kept. (By default they are placed in the directory from which the EWXCOMM NLM is loaded.)
- `LOG_SEVERITY`—identifies the kinds of messages to be written to the current log.
- `LOG_SIZE`—indicates the maximum size allowed for the current log.
- `LOG_START`—indicates whether messages should be recorded in the current log.
- `LOG_THRESHOLD`—indicates that a warning message should be displayed when a specified percentage of remaining free space in the current log is reached.

You can defer setting these values until after you've been using z/OS LANRES for a while.

Specifying Server Component Passwords

There are several ways to set server component passwords, but putting the passwords in the EWXCOMM.INI file is most convenient. You can set the passwords for all z/OS LANRES functions from the EWXCOMM.INI file. All the passwords will be in one place and they won't need to be specified when each function is loaded.

The example in Figure 2 on page 101 demonstrates how to set the passwords. For each of the functions (administration, disk serving, distribution, LAN-to-host print, and host-to-LAN print) both the IN and OUT passwords are set. Specify your own component passwords as alphanumeric strings (a to z, A to Z, and 0 to 9). A password can be up to 8 characters in length. Passwords are not case sensitive.

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Specifying the LANRES Object Password

Notice in Figure 2 on page 101 that a password is set for the *LANRES object*. The LANRES object is a NetWare object that must be created *only once* on every NetWare server that processes distribution or host-to-LAN print requests. The chapters on distribution and host-to-LAN print describe the LANRES object and the use of the password. You can define the password now if you wish. Use up to 127 characters, but no blanks.

Specifying the LANRES Object Context

In the NDS environment, besides the LANRES object password, you must specify the context where the *lobj_context* belongs in the EWXCOMM.INI file. Notice in Figure 2 on page 101 that a context is set for the *LANRES object*. The context is the location of an object in the Directory tree and the name to identify that object. Current context is a logical pointer, pointing to the object's current Directory tree position. There can only be one current context and it can only be a container object. The context can use up to 255 characters, but no blanks.

Host-to-LAN Print NLM Processing

z/OS LANRES initially sets the following values for the host-to-LAN print NLM (EWXHLPRT):

- Up to 5 host-to-LAN print work requests can be processed at the same time.
- Up to 10 host packets can be received and processed at the same time.
- Queries are made every 60 seconds to find out if print jobs have been printed.

Perhaps you prefer different values. If so, define the following EWXCOMM options:

- HLPRT_PROCESSES—The number of work requests EWXHLPRT can process at the same time
- HLPRT_BUFFERS—The number of host packets EWXHLPRT can receive and process at the same time
- HLPRT_QUERYTIME—The number of seconds that must pass before EWXHLPRT queries NetWare servers to obtain status of completed print jobs. The value set here must be lower than the missing interrupt handler value on z/OS (IECIOSxx in SYS1.PARMLIB) for a channel connection, if you are using a channel connection.

These options are the same as the LOAD EWXHLPRT command's PROCESSES, BUFFERS, and QUERYTIME options. If you want to know more about these options, see *z/OS LANRES Configuration Files and Commands*.

Loading the EWXCOMM Communication Driver

After you have prepared an initialization file, as described in the preceding section, loading EWXCOMM is easy. Just enter the following command at your NetWare server console:

```
load sys:\ewxnlm\ewxcomm
```

If you've moved EWXCOMM out of the SYS:\EWXNLM directory, substitute the correct path in the above command.

You can override the values specified in the EWXCOMM.INI initialization file by specifying options on the LOAD EWXCOMM command. Suppose, for instance, that the EWXCOMM.INI includes SESSIONS=12 and you want 16 sessions temporarily. You can override the initialization file setting by specifying the SESSIONS option as follows:

```
load sys:\ewxnlm\ewxcomm sessions=16
```

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When EWXCOMM is loaded, your NetWare server is able to communicate with the host. EWXCOMM remains loaded until you unload it with a NetWare UNLOAD command.

Each of the z/OS LANRES functions has its own NLM. All of these NLMs use EWXCOMM to communicate with the host.

Ending Communications on a NetWare Server

When communications are started on a NetWare server, the communications programs run until you stop them.

To end z/OS LANRES communications on a NetWare server, unload the EWXCOMM communication driver. EWXCOMM can be unloaded only after all other z/OS LANRES NLMs are unloaded. (One or more NLMs are loaded for each of the major z/OS LANRES functions.) Use the NetWare UNLOAD command to unload EWXCOMM:

```
unload ewxcomm
```

Monitoring z/OS LANRES Connections on NetWare Servers

One of the NetWare loadable modules provided with z/OS LANRES is useful for monitoring z/OS LANRES operations. The NLM, named EWXCMD, has these uses:

1. To increase the number of sessions being used by the disk driver. Disk drivers are described in “Chapter 9. Disk Serving” on page 147.
2. To break a disk serving channel connection.
3. To display status information about the connections to LANRES NLMs.
4. To display the current and pending z/OS LANRES service levels.

We’re interested in monitoring connections. By monitoring the use of the connections, you can see when you need to load additional copies of NLMs or increase the available sessions for the disk driver.

To monitor connections, load the EWXCMD NLM with the options QUERY CONNECTIONS ALL, as follows:

```
load sys:\ewxnlm\ewxcmd query connections all
```

A screen similar to the following will be displayed:

Mon Jan 10 10:18:16	EWXCMD - Query Connections			Esc=Exit
Session	Function	ConnType	Partner	
0	DIST	TCPIP	9.130.25.200	
1	DISK	Channel	63,64	
2	HLPRT	-		
3	ADMIN	NFSAA	MVS	
4	ADMIN	-		
5	ADMIN	-		

The screen displays connection information for the z/OS LANRES functions that are loaded. The z/OS LANRES function is indicated in the Function column as follows:

ADMIN—administration
DISK—disk serving
DIST—distribution

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HLPRT—host-to-LAN print
LHPRT—LAN-to-host print

The ConnType column indicates the type of connection, if any. TCPIP denotes TCP/IP, NFSAA denotes “NetWare for SAA”, and Channel denotes an MMC or ESCON channel connection. A dash (-) indicates that no connection has yet been made from the host. The Partner column indicates the host name for TCP/IP, the partner LU name for NetWare for SAA, or the subchannel pair for the channel connection.

In the above example, the HLPRT line shows that host-to-LAN print was loaded and is available for the host to connect to it. The absence of an LHPRT line indicates that LAN-to-host print was not loaded. Because there are three ADMIN lines, we know that three copies of the EWXADMIN NLM were loaded. Currently, only one of those copies is being used.

To more specifically monitor subchannel status, load the EWXCMD NLM with the options QUERY SUBCHANNELS ALL as follows:

```
load sys:\ewxn1m\ewxcmd query subchannels all
```

A screen similar to the following will be displayed:

EWXCMD - Query Subchannel Status						
Function	Subchannels	Adapter	Read	Written	Average	
ADMIN	24,25	MMC 1	500	300	0.000	
DISK	26,27	MMC 1	40567000	32456780	0.000	
DIST	B0,B1	MMC 2	160	948	0.000	

The screen displays subchannel information for the z/OS LANRES functions that are loaded. The z/OS LANRES function is indicated in the Function column and has the same meaning as described in the first example. The Subchannels shows the subchannel address pair in use for the z/OS LANRES function. MMC denotes the MMC adapter card in use. The 1 indicates the lowest (default) physical card for the subchannel address. The 2 indicates the higher physical card for the subchannel address. The Read, Written, and Average fields show status about the transfer of data between z/OS and the NetWare server.

By default, the displays are refreshed every 20 seconds. You can change this setting and others by using EWXCMD options.

Accepting Service from z/OS

By default, the NetWare server rejects service from the host. To have a NetWare server accept service, specify `accept_service=yes` in its EWXCOMM.INI file. The setting takes effect the next time the EWXCOMM NLM is loaded. (For information about how the host applies the service, see “Applying Service to NetWare Servers” on page 123.)

When the service is received by the NetWare server, it does not immediately take effect. First, the files must be unpacked. Then, the z/OS LANRES NLMs must be reloaded.

To activate the service, use the EWXSTART NLM. EWXSTART checks for pending service and unpacks the service bundle before processing the list in the

EWXSTART.LST file. If you've set up the NetWare server as described in "Automatically Loading z/OS LANRES NLMs on a NetWare Server", the service will automatically take effect the next time the NetWare server is booted.

Automatically Loading z/OS LANRES NLMs on a NetWare Server

After you've decided which z/OS LANRES functions will be available through which NetWare servers, consider automating the z/OS LANRES startup. The best way to do this is by using the z/OS LANRES NLM named EWXSTART. EWXSTART can start other z/OS LANRES NLMs from a list stored in a file. EWXSTART itself can be loaded automatically by using the AUTOEXEC.NCF file. (If you are using NetWare for SAA and you have followed our steps, your AUTOEXEC.NCF file should already have a statement for loading EWXSTART.)

One major advantage to using EWXSTART is that EWXSTART also automatically activates pending service. By using EWXSTART to automate the loading of NLMs, you also automate the application of any future service. More information about service is located in "Applying Service to NetWare Servers" on page 123.

Here's how to automate start-up on the NetWare server:

1. Create the list of NLMs to be started.

z/OS LANRES provides a sample file named EWXSTART.SAM in SYS:\EWXNLM. If you don't already have an EWXSTART.LST file, make a copy of the sample file in the same directory and name it EWXSTART.LST. If you are using NetWare for SAA, you should already have an EWXSTART.LST file. (If you followed our instructions, you created it during z/OS LANRES installation on the NetWare server.) Edit the EWXSTART.LST file and make appropriate adjustments.

Channel Users: Ensure the channel adapter driver NLMs are loaded before EWXCOMM. Here, you'll need to take advantage of EWXSTART's DELAY function because these channel NLMs can take about two to three minutes to load.

NDS Users: Ensure the DSAPI NLM is loaded.

Regardless of the communications method you are using, EWXCOMM must be loaded before the z/OS LANRES function NLMs.

2. Update the AUTOEXEC.NCF file.

The AUTOEXEC.NCF file is a batch file (similar to a DOS batch file) that includes commands. The commands are processed after the NetWare operating system is booted and the STARTUP.NCF file is processed. z/OS LANRES provides a sample file named AUTOEXEC.SAM in the SYS:\EWXNLM directory. To automate the loading of z/OS LANRES NLMs, update the AUTOEXEC.NCF file so that the z/OS LANRES directory is in the search path. Also add a LOAD command for EWXSTART:

```
⋮
⋮
# Start LANRES
#
search add sys:\ewxn1m
load sys:\ewxn1m\ewxstart
⋮
```

If you are using NetWare for SAA, your AUTOEXEC.NCF file may already have these statements in it.

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The next time the NetWare operating system is booted, z/OS LANRES will automatically be started.

Booting the NetWare Server

At this point, boot the NetWare server. This activates the underlying communications support and completes the common z/OS LANRES customization on the NetWare server.

About NetWare Authorization

NetWare authorization may be needed to process an z/OS LANRES command. If so, you'll find the details in the "Usage Note" section in the reference portion of this manual. The following information can help you understand some of the security features for the NetWare server. The NetWare authorization needed to process the administration and distribution commands applies to both NetWare Versions 3.x and 4.x, unless otherwise stated.

Security System Levels

NetWare has a four-level security system that controls access to information stored on network volumes. The security levels are:

- Rights security or what resources can be accessed by users, such as directories and files
- Login security or who can access the network. NetWare users log in and log out of a NetWare server
- Attribute security or what users can do with network resources, such as reading, modifying, and deleting files
- File server security or who can perform tasks at the file server console

Trustee Rights

NetWare users are assigned trustee rights allowing them access to various types of data on the NetWare server. The types of rights include:

Access

User can change trustee rights.

Create

User can create files and subdirectories.

Erase User can erase files and subdirectories.

Filescan

User can see files and subdirectories in a directory.

Modify

User can modify file attributes and rename files and subdirectories.

Read User can read and open files.

Supervisory

User has all rights to a directory, its subdirectories, and its files.

Write User can write to and open files.

User Groups

User groups simplify the administration of NetWare user trustee rights. After the rights are assigned to a group, you can add one or more NetWare users to the group. All users added to that group will share the rights assigned to the group.

For example, you may want to create a group for those people who use the same applications, printers, or print queues, perform similar tasks, or those needing access to similar information, and so forth.

When NetWare users are created, they automatically become members of the EVERYONE group and have the trustee rights assigned to the group EVERYONE. (If you are using NetWare Version 4.x, the group EVERYONE may not exist.)

Login Scripts

Login script files are similar to configurable batch files and are processed as part of the NetWare login procedure. NetWare uses two types of login scripts as follows:

System

Lets the network Supervisor set network and search drive mappings for all users including commands that are usually run by all users or groups of users. The system login script is processed before the user login script.

User

Lets the user tailor their NetWare login procedure. For example, it may contain mappings to specific drives and define certain environment variables.

User Types

NetWare has several user types. Each user type is an *assignment*, meaning that a user is first created, and then assigned to a type.

Note: If you are using NetWare Version 4.x, you do not have to be one of these user types to use some commands. The network administrator can give you the required authority to perform a function. See the *NetWare Version 4.0 Utilities Reference* manual for utilities that can grant trustee assignments to users, groups, and other directory services objects.

Also, to see how to make a NetWare Version 4.x user a Supervisor Equivalent user type, see the following **Supervisor Equivalent** definition.

The NetWare user types are:

Supervisor

Has all rights everywhere on the system. No one can permanently restrict the Supervisor from any action or area. There is only one Supervisor on a file server, and it cannot be deleted or renamed.

Supervisor Equivalent

Supervisor Equivalents have all the rights of a Supervisor. Any user can be a Supervisor Equivalent. A Supervisor Equivalent can change the Supervisor's password and perform backups.

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To make a user a Supervisor Equivalent for NetWare Version 4.x, use the NetWare NWADMIN utility and create the user under the organizational unit where the user is going to issue commands. Then, make the user equivalent to the file server object.

For example, the following procedure creates a user that can:

- Log in to the NetWare server
- Run the NetWare CICON utility to configure NetWare for SAA service profiles
- Use z/OS LANRES commands requiring Supervisor Equivalent authorization

Note: You can also use the NetWare DOS utility NETADMIN to make a Supervisor Equivalent user by following a similar procedure.

Making a NetWare Version 4.x User a Supervisor Equivalent User Type:

1. Log in as the NetWork Administrator (Admin) on the NetWare Version 4.x server.
2. Load the NetWare NWADMIN utility from Windows** or OS/2.
3. Select the *Organizational Unit*.
4. Click on *OBJECT* from the NetWare Administrator screen.
5. Click on *CREATE*.
6. Select *USER* from the *NEW OBJECT LIST*.
7. Click on *OK*.
8. Type the:
 - *user information*
 - *login name*
 - *last name*
9. Select the *ADDITIONAL PROPERTIES* box.
10. Click on *OK*.
11. Click on the *PASSWORD RESTRICTIONS* box.
12. Click on the screen.
13. Check the *REQUIRE PASSWORD* box.
14. Click on the *CHANGE PASSWORD* bar.
15. Type the password in both boxes.
16. Click on *OK*.
17. On the same screen, in the lower right corner, click on the *SECURITY EQUIVALENCIES* box.
18. Click on the *ADD* box.
19. Select *FILE SERVER OBJECT*, where SAA is installed from the *OBJECTS LIST*.
20. Click on *OK*.
21. The file server object will now show in the *SECURITY EQUAL TP* window.
22. Click on *OK* to exit.

Workgroup Manager

A Workgroup Manager can create new users and groups, allowing a Supervisor to delegate responsibility to another user without having to make

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them a Supervisor Equivalent. Workgroup Managers can delete users and groups they have created and edit their security profiles.

A Workgroup Manager is an assistant supervisor who can create objects (such as users, groups, or print queues) and manage user accounts similar to a User Account Manager. A Workgroup Manager has supervisory privileges over a part of the server. They supplement, but do not replace, the network supervisor, managing only those users and groups they create or those assigned to them for account management (by designating a Workgroup Manager as the User Account Manager). The Supervisor still retains absolute control over the NetWare server.

A Workgroup Manager can be a user or a group. If a group is designated as a Workgroup Manager, each member of the group will have Workgroup Manager privileges. They do not automatically acquire rights to the directory structure and file system. To grant any rights to users they create, they must have trustee assignments in the directories where they want to grant them.

Workgroup Managers must have Create trustee rights to the SYS:\MAIL\ directory to add users. With the Create trustee rights, Workgroup Managers can create mail directories for users that they add.

Workgroup Managers, when they are created, are automatically assigned to manage the group EVERYONE (if this group exists).

For example, Workgroup Managers *can*:

- Create users and groups and manage their accounts
- Delete users they have created
- Add users they manage to groups they manage
- Make or modify the following options (provided the Workgroup Manager has file rights in the appropriate directory structure):
 - Trustee directory assignments
 - Trustee file assignments
 - Volume restrictions
 - Disk space restrictions

Workgroup Managers *cannot*:

- Create a user and make that user security-equivalent to Supervisor
- Manage users or groups they have not created unless they are also designated the User Account Manager
- Assign any rights that they have not been assigned
- Modify the login restrictions of their own accounts unless they are also assigned management of their own accounts.

User Account Manager

A User Account Manager is similar to a Workgroup Manager when it comes to editing user profiles, except a User Account Manager cannot create any new users or groups; they can only edit users that have been assigned to them. Similar to a Workgroup Manager, they must have trustee rights allowing them to grant rights to users they manage.

For example, User Account Managers are NetWare user IDs that *can*:

- Delete managed users and groups
- Assign a managed user to a managed group
- Assign a managed user or group as User Account Manager for another managed user or group
- Modify the following user options (as listed in SYSCON's USER INFORMATION menu) without requiring file rights:

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- Account Balance
- Account Restrictions
- Change Password
- Full Name
- Groups Belonged To (provided the groups are managed groups)
- Login Script
- Managed Users and Groups
- Managers
- Security Equivalences
- Station Restrictions
- Create or modify the following user options (provided the User Account Manager has file rights in the appropriate directory structure):
 - Trustee directory assignments
 - Trustee file assignments
 - Volume restrictions
 - Disk space restrictions

User Account Managers *cannot*:

- Create users or groups
- Assign managed users to a group the manager does not manage
- Modify the login restrictions of their own accounts, unless they are assigned management of their accounts

Console Operator

Console Operators can run and use the virtual console routine from a workstation (NetWare FCONSOLE utility). They can gather statistics, set server time, and so on. Console Operators can clear user connections and down the server.

Print Server Operator

A Print Server Operator supervises a print server on the network, such as mounting new form types, downing the print server, and so on.

Print Queue Operator

A Print Queue Operator maintains the print queue, re-sequences jobs, deletes jobs, and so on.

Network User

Network Users have no inherent rights other than their mailboxes. Their rights are received either as a member of a group or through trustee assignments. Most users are Network Users.

About NetWare Utilities

Some z/OS LANRES command information refers to NetWare utilities. NetWare utilities are used by network supervisors to maintain the network after an installation and by users to perform network tasks. Some of the NetWare utilities mentioned in this manual are:

Utility Function

BINDFIX

Corrects problems with the NetWare bindery. BINDFIX must be run from the SYS:\SYSTEM\ directory by a Supervisor or Supervisor Equivalent.

BINDREST

Restores a previous version of the bindery files after running the BINDFIX utility. BINDREST must be run from the SYS:\SYSTEM\ directory by a Supervisor or Supervisor Equivalent.

FCONSOLE

Sends messages, changes the current NetWare server, shuts down the NetWare server, and displays connection, status, and version information.

INSTALL

The main menu command for NetWare installation where configuration, hard disk, and volume tasks are performed.

LOGIN

Logs you in to the NetWare file server and automatically logs you out of any file server that you were previously logged in to.

NDIR Specifies the exact set of files you want to view in a directory.

NETADMIN

Lets you administer servers, users, groups, and other objects in a NetWare directory tree with Directory Services.

NWADMIN

Lets you administer servers, users, groups, and other objects in a NetWare directory tree with Directory Services.

PCONSOLE

Sets up the NetWare print server and print queues, controls network printing, and lets you view information about network printing.

SYSCON

Controls accounting, file server, group, and user information.

DSREPAIR

Repair and correct problems in the Directory database.

TIMESYNC

Ensure that the time reported by all servers is synchronized.

For complete details, see the NetWare documentation that applies to the NetWare Version you are using.

Chapter 6. Setting Up the z/OS System

This chapter contains information common to all z/OS LANRES functions that you need to understand and perform on the z/OS system. Some of these tasks are required, while others are optional.

Setting NetWare Connection Definitions for Reuse

For an z/OS LANRES function to connect to a NetWare server, the z/OS LANRES function needs information, such as what communication protocol to use, what server to communicate with, and so on. This information can be obtained by specifying options with the following commands:

- EWXCONN LINK—Start administration or distribution
- EWXLDDSK—Start disk serving
- EWXHLPJE—Start host-to-LAN print as a JES local printer
- EWXHLPVT—Start host-to-LAN print as a VTAM attached printer
- EWXLHSRV—Start LAN-to-host print

You can avoid specifying connection information each time you enter these Start commands by creating *configuration data sets*. You, as an administrator, can create a system configuration data set, and users can create a user configuration data set.

Configuration data sets are optional. z/OS LANRES uses them as follows:

1. If all the required connection information is specified with the Start command, a configuration data set is not used.
2. If some of the information is missing, the Start command looks in this order:
 - a. Configuration data sets allocated to the EWXCONFG DDname for the information. For a list of z/OS LANRES DDnames, see Table 8 on page 131.
 - b. In the EWXCONFG.LINK data set
 - c. In the configuration data set defined in the host configuration options data set, specifically, the Link_Connection_Configuration option. We'll explain more about how to set this option later.
 - d. If the required information still cannot be found, an error message is displayed.

For example, if you specify a connection through TCP/IP but do not specify the host name to use, the Start command looks in the configuration data set allocated to the EWXCONFG DDname. If there is no data set allocated to EWXCONFG, the Start command, by default, looks for the EWXCONFG.LINK data set. If you don't have an EWXCONFG.LINK data set, the Start command looks in the data set defined in the Link_Connection_Configuration option.

You, as a user, should set up your data set to contain information that augments or overrides the information in the system configuration data set. Therefore, if you have a user configuration data set, ensure it is the highest data set in the search order previously explained.

Users can add personal information to the user configuration data that the Start commands use, such as user IDs and user ID passwords. If passwords are in the data set, users may want to set the proper security for the user configuration data set.

Setting Up the z/OS System

You, as an administrator, should set up the system configuration data set to contain general connection information, avoiding personal information, such as user IDs and user ID passwords, because this data set should be accessible by all z/OS LANRES users. Place this data set lowest in the search order. For example, define the `Link_Connection_Configuration` option to read the system configuration data set.

If you find the `Start` command is not locating your data set, you may have more than one data set allocated to `EWXCONFIG`. Here, the data sets found lower in your search order are appended to the data sets higher in your search order. Then, the data sets found lower in the previously described search order are appended to the data sets higher in the search order. The first line that creates a match and connection is used. Examples of syntax and matching lines follow in “Examples” on page 120.

If you decide to use the configuration data sets, define the fields to meet your system and user needs. Ensure the data sets are found in the order that you want them searched.

Optionally, component passwords can be defined to ensure z/OS LANRES security. Host component passwords are not specified in these configuration data sets. See “Creating Host Component Password Data Sets for Users” on page 121 for details.

To help you get started, z/OS LANRES provides a sample configuration data set named `EWXLINK`, found in the `qual.SEWXSAMP` samples data set.

User/System Configuration Data Set Contents

This section describes the fields and values that can be specified in the user configuration data set. These fields correspond to options that may be specified with the `Start` commands. The `Start` command options are described in the reference portion of this manual.

Note: The system configuration data set has the same format as the user configuration data set. The information in this section applies to both kinds of configuration data sets.

Each line in the data set contains the connection information for a specific z/OS LANRES function. Each line contains fields. Different functions require different fields, all of which are described below. The lines do not have to be grouped by function or by nickname.

FUNCTION Field

Determine which function you are going to define and specify one of the values as described in Table 3.

Table 3. *FUNCTION ID Value*

Specify: To set up a line for the:

ADMIN	Administration function
DISK	Disk serving function
DIST	Distribution function
HLPRT	Host-to-LAN print function
LHPRT	LAN-to-host print function

Note: More than one line can have the same *function* value. If the connection to the NetWare server is unsuccessful, z/OS LANRES uses the next matching line. The search continues until all configuration data sets are read.

SERVER Field

For an ADMIN or DIST line, specify the name of the NetWare server here. As later chapters explain, these functions require the name of a NetWare server to log in to. You can specify the name of *local* or *remote* NetWare server. A local server is running the z/OS LANRES NLMs to directly connect to z/OS LANRES on z/OS through one of the z/OS LANRES communication methods. A remote server is not running z/OS LANRES NLMs. Because it is on the same LAN as the local server, it is indirectly connected to z/OS LANRES on z/OS. Only valid NetWare server names are accepted.

Consequently, because ADMIN and DIST are started by the EWXCONN LINK command, this value is only used by the EWXCONN LINK command.

USER Field

For an ADMIN or DIST line, specify the name of the NetWare user ID here. As later chapters explain, these functions require the NetWare user ID to log in to the NetWare server. Only valid NetWare user IDs are accepted.

Consequently, because ADMIN and DIST are started by the EWXCONN LINK command, this value is only used by the EWXCONN LINK command.

USEROBJECT Field

This is the complete name of the userID object including the common name and the NDS context. It must start with a period. It can be specified in the typeless format. The maximum length for this field is 255 characters.

PW Field

For an ADMIN or DIST line, specify the NetWare user ID's password here to log in to the NetWare server. As later chapters explain, these functions require the NetWare user ID password to log in to the NetWare server. Specify valid NetWare passwords, NULL to set a null password, or ? to prompt the user for their password. This value can be from 1 to 127 characters. A password cannot contain any blanks (characters entered using the space bar.)

Note: Prompting for a password is not allowed if a place holder (*) was entered for the user ID.

Consequently, because ADMIN and DIST are started by the EWXCONN LINK command, this value is only used by the EWXCONN LINK command.

PROTOCOL Field

To set up a protocol value for any of the functions, specify the protocol you are using to enable communications between z/OS LANRES on z/OS and z/OS LANRES on the NetWare server.

Specify:

For:

APPC Advanced Program-to-Program Communications protocol (for SNA LU 6.2 or NetWare for SAA channel driver)

CHANNEL

ESCON or MMC channel adapters

TCPIP Transmission Control Protocol/Internet Protocol

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This value is used by all the Start commands: EWXCONN LINK, EWXLDDSK, EWXHLPJE, EWXHLPVT, and EWXLHSRV.

TARGET Field

To set up the target value for any of the functions, specify the NetWare server that is the target for communications (the NetWare server running EWXCOMM). This depends on the PROTOCOL setting. This value can be from 1 to 63 characters.

If PROTOCOL is set to APPC, specify either the APPC fully-qualified partner LU name or the symbolic destination name (symdestname) that identifies the NetWare server. The symbolic destination name identifies the communication side information on z/OS that describes a NetWare server. Here, specify the DESTNAME value set in the side information created in Step 7 on page 41.

If PROTOCOL is set to CHANNEL, specify the *even* subchannel address of the defined subchannel pair. This enables TSO to allocate this address space. The subchannels are specified as the fully-defined z/OS even three or four character hexadecimal addresses. For example, 624 or 100A.

If PROTOCOL is set to TCPIP, specify the Internet address or the host name of the target NetWare server. The host name must have already been set by someone at your installation.

The TARGET value is used by all the Start commands: EWXCONN LINK, EWXLDDSK, EWXHLPJE, EWXHLPVT, and EWXLHSRV.

If you are unsure about what to specify, see the person who set up the communications at your installation.

NICKNAME Field

nickname1:

Specify a nickname for this line which can contain most of the required EWXCONN LINK command values.

When you specify an EWXCONN LINK *nickname1* command, the EWXCONN LINK command looks here to find a matching nickname and its corresponding FUNCTION value (ADMIN, DIST, DISK, HLPRT, LHPRT); then it obtains the connection information from this line. For example, if the following command is entered:

```
EWXCONN LINK MYFUNCTION
```

The EWXCONN LINK command looks for a line having the nickname MYFUNCTION and uses the values on this line to enable a connection to the function on the line.

The *nickname1* value can be from 1 to 47 characters.

Note: More than one line can have the same *nickname1* value. If the connection to the NetWare server is unsuccessful, z/OS LANRES uses the next matching line. The search continues until all configuration data sets are read.

nickname2:

Specify a nickname for this line which can contain most of the required Start command values.

When you specify a *nickname2* value with a Start command, the Start command looks here to find a matching nickname and its corresponding FUNCTION value (DISK, HLPRT, LHPRT); then it obtains the connection information from this line. For example, if the EWXLDDSK command is issued with the *nickname2* value of PUBSERV, the EWXLDDSK command looks for a line having the nickname PUBSERV and the function DISK and uses the values on this line to enable the connection.

The *nickname2* value can be from 1 to 47 characters.

Note: More than one line can have the same *nickname2* value. If the connection to the NetWare server is unsuccessful, z/OS LANRES uses the next matching line. The search continues until all configuration data sets are read.

Syntax

When you create an entry in this data set, use this syntax:

- The basic rules are:
 1. If the user ID = *, then the password must = *.
 2. If the server = *, then both the user ID and the password must = *.

If you put an asterisk in the first column, it is considered a comment line and is ignored.

- When you specify a line in the user or system configuration data sets, use this format:

1. Disk, host-to-LAN print, and LAN-to-host print look like this:

```
function nickname2 protocol target
function * protocol target
```

The *function* must be DISK, HLPRT, or LHPRT.

2. Administration and distribution lines in the bindery environment look like this:

```
function server/user pw protocol target
function server/* * protocol target
function */* * protocol target
function server/user pw protocol *
function server/user pw * *
```

Distribution lines in the NDS environment look like this:

```
dist .user.context pw protocol target
dist .cn=user.o=context pw protocol target
```

3. Nickname lines for the administration and distribution function in the bindery environment look like this:

```
nickname1 function server/user pw protocol target
nickname1 function server/* * protocol target
nickname1 function */* * protocol target
```

Nickname lines for the distribution function in the NDS environment look like this:

```
nickname1 dist .user.context pw protocol target
nickname1 dist .cn=user.o=context pw protocol target
```

- To enter comments, specify an asterisk (*), slash (/), semicolon (;), or pound sign (#) in the first column. Comment lines are ignored.
- Blank lines are ignored.
- You can specify up to 300 characters on a line.

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- The backslash (\) character is interchangeable with the slash (/) character. (When a backslash is specified in column one, the line is not considered a comment line.)
- More than one line can have the same *nickname1*, *nickname2*, or *function* value. If the connection to the NetWare server is unsuccessful, z/OS LANRES uses the next matching line. The search continues until all configuration data sets are read.

Examples

The following examples show EWXCONN LINK and EWXLDDSK commands followed by configuration data set lines. An explanation is provided for those lines that would not match the command. The EWXLDDSK command examples also apply to the EWXHLPJE, EWXHLPVT, and EWXLHSRV commands, because their corresponding file lines have the same format.

EWXCONN LINK ADMIN

The following lines would match, but only the first matching line is used:

ADMIN	SVR1/USR1	PW1	CHANNEL	F50
ADMIN	SVR2/USR2	NULL	APPC	SYMDEST2
ADMIN	SVR3/USR3	?	TCPIP	HOST3

The following lines would not match because the command requires SERVER/USER, PW, PROTOCOL, and TARGET values. The first line is missing USER and PW values. The second line is missing a TARGET value.

ADMIN	SVR1/*	*	TCPIP	HOST1
ADMIN	SVR2/USR2	NULL	APPC	*

EWXCONN LINK MYPGM

These two lines would match, but only the first matching line is used:

MYPGM	ADMIN	SVR1/USR1	PW1	TCPIP	HOST1
MYPGM	DIST	SVR2/USR2	PW2	TCPIP	HOST2

The following lines would not match because the command requires MYPGM as a *nickname1* value and SERVER/USER, PW, PROTOCOL, and TARGET values. The first line is missing PROTOCOL and TARGET values. The second line is missing MYPGM as a *nickname1* value:

MYPGM	DIST	SVR2/USR2	PW2	*	*
YOURPGM	DIST	SVR2/USR2	PW2	TCPIP	HOST2

Bindery environment:

EWXCONN LINK DIST SRV1/USR1 PW1

These three lines would match, but only the first matching line is used:

DIST	SVR1/USR1	PW1	TCPIP	HOST1
DIST	SVR1/*	*	TCPIP	HOST1
DIST	SVR1/USR1	NEWPW1	APPC	SYMDEST2

The following line would not match because the command needs PROTOCOL and TARGET values:

DIST	SVR1/USR1	PW1	*	*
------	-----------	-----	---	---

NDS environment:

EWXCONN LINK DIST

These lines would match, but only the first matching line is used:

DIST	.usr1.ibm	PW1	TCPIP	HOST1
DIST	.cn=usr1.o=ibm	PW1	TCPIP	HOST1

EWXLDDSK DISK

These two lines would match, but only the first matching line is used:

DISK	MYDISK	TCPIP	HOST1
DISK	*	TCPIP	HOST1

The following lines would not match because the command is looking for DISK as the FUNCTION value:

DIST	SVR1/USR1	PW1	TCPIP	HOST1
HLPRT	SVR2	APPC	SYMDEST2	

EWXLDDSK DISK DSNAME (NICKNAME MYDISK2

These two lines would match, but only the first matching line is used:

DISK	MYDISK2	TCPIP	HOST1
DISK	*	APPC	SYMDEST2

The following line would not match because the command is looking for MYDISK2 as the *nickname2* value:

DISK	YOURDISK	TCPIP	HOST1
------	----------	-------	-------

Setting Host Component Passwords

If you've decided to secure the use of z/OS LANRES functions by setting component passwords, read this section to understand how to set the host component passwords.

When host users connect to z/OS LANRES functions, they usually specify the passwords with the following Start commands:

- EWXCONN LINK for administration and distribution
- EWXLDDSK for disk serving
- EWXHLPJE or EWXHLPVT for host-to-LAN print
- EWLHRSRV for LAN-to-host print

Later chapters on the z/OS LANRES functions describe how to specify the passwords. To avoid having users enter the passwords with the Start commands, you can put the passwords in data sets on z/OS.

Creating Host Component Password Data Sets for Users

The following Start commands establish a connection between z/OS LANRES on z/OS and z/OS LANRES on the NetWare server:

- EWXCONN LINK for administration and distribution
- EWXLDDSK for disk serving
- EWXHLPJE or EWXHLPVT for host-to-LAN print
- EWLHRSRV for LAN-to-host print

However, if you've chosen to use the component passwords for securing z/OS LANRES functions, each of these Start commands (in other words, each z/OS

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LANRES function) needs host component passwords. These passwords must match the server component passwords that were set on the NetWare server.

Users can specify the passwords with the Start commands, or, to avoid this, there is an alternative: the passwords can be stored in data sets. Further, if passwords are not specified, there are defaults.

Use the following to understand the ways these passwords can be specified. The order in which they are explained is also the order that z/OS LANRES uses to search for them.

- PWIN and PWOUT options.

The PWIN value (the IN component password) on the host must match the PWOUT value (the OUT component password) on the NetWare server, and the PWOUT value on the host must match the PWIN value on the NetWare server. If either set of these passwords do not match, the connection is not established between z/OS LANRES on z/OS and z/OS LANRES on the NetWare server. Both PWIN and PWOUT options must be specified at the same time, if they are specified at all.

- PWFIL option.

Specifying a value for this option means you have placed the host component passwords in a data set. This value can be a DDname or data set name that contains the host component passwords for the z/OS LANRES function being requested. If the value specified is eight characters or less and not enclosed in quotation marks, it is assumed to be a DDname. If the DDname is not allocated, this name is assumed to be a data set name. The PWFIL option cannot be specified if the PWIN or PWOUT options are specified.

If these password options are not entered with the Start command, then the Start command, by default, looks for its specific DDname which Table 4 shows. The passwords in the data set allocated to the DDname are used.

Table 4. Host Default Component Password DDnames

If you are connecting to:	The data set allocated to this DD is used:
Administration	EWXADMPW
Disk serving	EWXDSKPW
Distribution	EWXDSTPW
Host-to-LAN print	EWXPHLPW
LAN-to-host print	EWXLHPPW

If the Start program does not find a data set allocated to the default DDname, then the Start program looks for the following data sets by default.

Table 5. Host Default Component Password Data Sets

Function	Default Data Set(Member)	Sample Data Set(Member)
Administration	MVSPW(EWXADMIN)	qual.SEWXSAMP(EWXADMHS)
Disk serving	MVSPW(EWXDISK)	qual.SEWXSAMP(EWXDSKHS)
Distribution	MVSPW(EWXDIST)	qual.SEWXSAMP(EWXDSTHS)
Host-to-LAN print	MVSPW(EWXHLPRT)	qual.SEWXSAMP(EWXPHLHS)
LAN-to-host print	MVSPW(EWXLHPRT)	qual.SEWXSAMP(EWXLPHHS)

Instead of using the MVSPW data set, you can specify your own partitioned data set. Just set the value for the Component_Password_File option in the host configuration options data set to your own data set name. (“Setting Host Configuration Options” on page 124 explains how to set this option.) Depending on which function you’re starting, the following member in the partitioned data set is used:

- ADMIN for administration
- DISK for disk serving
- DIST for distribution
- HLPRT for host-to-LAN print
- LHPRT for LAN-to-host print

In summary, if you want your users to avoid typing passwords with the Start commands, create password data sets and define (or change) the passwords as desired. Remember to either allocate the data sets to the appropriate DDname, place the appropriate members in MVSPW, or define the Component_Password_File option.

Syntax

When specifying passwords in a data set, the passwords are specified on two separate lines. The PWIN password line must precede the PWOUT password line. Blank lines are ignored and comment lines are identified by a *, /, ;, or # in the first column. The maximum length for a line is 128 characters.

Component passwords are specified as an alphanumeric (a to z, A to Z, and 0 to 9) string of up to 8 characters. They are not case sensitive.

Applying Service to NetWare Servers

z/OS LANRES lets you automate the application of z/OS LANRES service to NetWare servers. Instead of applying the service directly to NetWare servers from diskettes, you can apply the service from the z/OS host. From z/OS, the new service level can be sent to NetWare servers and unpacked. (The service is shipped in a compressed format.)

The way you send service from z/OS to the NetWare servers is to use the z/OS LANRESEWXNWSRV command. The EWXNWSRV command needs to know the communications protocol and which NetWare server to apply the service to. For the communications protocol, specify APPC, TCPIP, or CHANNEL (whatever is appropriate for your installation). What you specify for the target depends on your communication protocol. For:

- APPC, the target is the symbolic destination name or fully-qualified partner LU name
- TCP/IP, the target is the internet address or host name
- CHANNEL, the target is the fully-defined z/OS subchannel address

There is a FORCE option you can use which forces the service level to be applied even if it regresses the existing z/OS LANRES service level on the NetWare server. Without FORCE, service won’t be applied if the new z/OS LANRES service level is the same as or earlier than the service level already installed on the NetWare server.

The NetWare server rejects service from z/OS by default. However, it is possible to have the NetWare server accept the service being sent from z/OS. Use the ACCEPT_SERVICE option in the NetWare server’s EWXCOMM.INI file. By setting

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this option to YES, the NetWare server accepts service. This setting won't take effect until the EWXCOMM module is loaded again. See "Accepting Service from z/OS" on page 106 for details.

The service data set was installed as *qual*.SEWXSVC(EWXNWSRV), where *qual* is what you've determined to be your high-level qualifier for z/OS LANRES data sets. If the high-level qualifier here is not the same as the high-level qualifier for the z/OS LANRES load library, then you must provide the EWXNWSRV DDname to define the service data set. For a complete list of data set allocations, see Table 8 on page 131.

Setting Host Configuration Options

z/OS LANRES initially sets the z/OS LANRES host configuration. You can control some aspects of the z/OS LANRES configuration by setting your own values for the following options in a host configuration options data set:

Option Description

Application_ID

This is initially set to ISR, which is the application identifier used by the EWXISPF command when EWXISPF starts ISPF. If you want to change this, specify your own application ID.

For details about using the ISPF interface, see "ISPF" on page 135.

Component_Password_File

This is initially set to NONE, which means you are not using a host component password data set as the method for specifying host component passwords. If you want to use host component password data sets, as described in "Setting Host Component Passwords" on page 121, specify the fully-qualified name of the partitioned data set containing the members ADMIN, DISK, DIST, HLPRT, or LHPRT. These members have the host component passwords defined in them.

Dataset_Exit

This is initially set to NONE. You can specify a data set exit that lets you redirect z/OS LANRES I/O to a device or subsystem that z/OS LANRES does not support. You must specify an exit that is reentrant and reusable. For example, if you have an exit written to write data to a tape named MYEXIT, you could put the output from an EWXDS GET command to this tape device by setting the following:

```
Dataset_Exit=MYEXIT
```

This can also be helpful if you have an exit that compresses data before it gets written to a disk. For more information, see "Creating a Data Set I/O Exit" on page 128.

Default_Mode_Name

This is initially set to #BATCH as the mode name used for the APPC conversations when the fully-qualified partner LU name is specified when starting an z/OS LANRES function on z/OS. If you want to change this, specify your mode name. (Later chapters describe how to start functions.) If symbolic destination names are used instead of fully-qualified names, the mode name in the communications side information data set is used.

Initial_Panel

This is initially set to ISR@PRIM which is the ISPF panel that displays

when the z/OS LANRES EWXISPF command is issued. If you want to change this, specify the name of your ISPF panel.

Link_Connection_Configuration

This is initially set to NONE. Usually, this is set by the system administrator to define the system configuration data set for the Start commands as described in “Setting NetWare Connection Definitions for Reuse” on page 115.

Translation_Defaults

This is initially set to NONE which means there is no default translation table to be used for the z/OS LANRES distribution EWXDS GET and EWXDS PUT commands. If you want to set up a translation defaults data set, specify its fully-qualified name here. See “About Data Translation” on page 175 for more information about data translation.

Translate_Table

This is initially set to EWXLATE. If you want to change to a different translate table, you can specify any of the tables as described in “Changing the Default Translate Table”.

The z/OS LANRES host configuration options data set was installed as *qual*.SEWXSAMP(EWXCOMM), where *qual* is what you have determined to be your high-level qualifier for z/OS LANRES data sets. If you want to override the defaults, copy the sample to the *qual*.SEWXOPTS(EWXCOMM) data set or a data set allocated to the EWXOPTS DDname. z/OS LANRES looks for the data set allocated to the EWXOPTS DDname. If there is no data set allocated, then z/OS LANRES looks for the *qual*.SEWXOPTS(EWXCOMM) data set. If the high-level qualifier (*qual*) is not the same as the high-level qualifier for the z/OS LANRES load library, then you must provide the EWXOPTS DDname to define the options data set. For a complete list of data set allocations, see Table 8 on page 131.

A TSO data set name prefix is not added to the data set names that are specified in this options data set. Data set names require no quotation marks. To enter a comment in the data set, specify an *, /, or ; in the first column. Blank lines are ignored. You can specify up to 128 characters on a line. The options and their values are not case sensitive and are entered in this format:

option=value

Where *option* is one of the keywords previously described and *value* is the value you are setting for the option. The equal sign must separate the option from the value. Blanks on either side of the equal sign are optional. You don't have to define all the options, only those that you want to use.

The changes made to this host configuration data set will not take effect until all z/OS LANRES commands are ended for the current job step.

Changing the Default Translate Table

z/OS LANRES provides single-byte and double-byte translate tables which were installed as modules.

Of course, you can change the contents of these tables by modifying the tables found in the *qual*.SEWXSAMP samples data set and reassembling them. See the EWXASMXL member of the *qual*.SEWXSAMP for a sample of how to assemble a translate table.

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However, if you change the translate tables, you assume all responsibility for the integrity of the translate table data. IBM z/OS LANRES service personnel are not responsible for recovering data when a violation of data integrity is caused by an incorrectly modified single-byte or double-byte translate table.

The initial translate table that z/OS LANRES uses is EWXLATE. To change this default translate table, set the Translate_Table option. (See “Setting Host Configuration Options” on page 124 for information about setting the Translate_Table option.) Table 6 lists the single-byte translate tables that z/OS LANRES provides.

Table 6. Single-Byte Translate Tables Available

Table/Member Name	Client ASCII Table No.	Client Table Country	z/OS EBCDIC Table No.	z/OS Table Country
EWXENG1	437	USA/Latin-1	037	USA/Canada/Netherlands/Portugal/Brazil/Australia/New Zealand/Others
EWXGER1	437	USA/Latin-1	273	Austria/Germany
EWXITL1	437	USA/Latin-1	280	Italy
EWXSPN1	437	USA/Latin-1	284	Spain/Latin America (Spanish)
EWXUK1	437	USA/Latin-1	285	United Kingdom
EWXFRC1	437	USA/Latin-1	297	France
EWXENG2	850	Latin-1	037	USA/Canada/Netherlands/Portugal/Brazil/Australia/New Zealand/Others
EWXGER2	850	Latin-1	273	Austria/Germany
EWXITL2	850	Latin-1	280	Italy
EWXSPN2	850	Latin-1	284	Spain/Latin America (Spanish)
EWXUK2	850	Latin-1	285	United Kingdom
EWXFRC2	850	Latin-1	297	France

Table 7 lists the double-byte translate tables that z/OS LANRES provides.

Table 7. Double-Byte Translate Tables Available

Table/Member Name	Client ASCII Table No.	Client Table Language	z/OS EBCDIC Table No.	z/OS Table Language
EWXJAPAN	301	Japanese (valid first byte 81-9F, E0-FC)	300	Japanese (Kanji)
EWXKOREA	926	Korean (valid first byte 81-BF)	834	Korean
EWXCHINA	927	Traditional Chinese (valid first byte 81-FC)	835	Traditional Chinese

About Single-Byte Translate Table Format

If you find it necessary to change a single-byte translate table, you'll need to know the format of the single-byte translate tables that z/OS LANRES provides. These tables are listed in Table 6.

The z/OS LANRES single-byte translate table consists of 256 bytes. The input code point value is used as the offset into the table. The byte located in the table at the offset gives the output code point value.

About Double-Byte Translate Table Format

If you find it necessary to define User Defined Characters (UDC), you'll need to know the format of the double-byte translate tables that z/OS LANRES provides. These tables are listed in Table 7 on page 126.

Terminology

Ward Describes a section of a double-byte coded character set where the first byte of all the code points belonging in that section is the same.

Populated

Describes a ward where any characters in the double-byte coded character set have the same ward value as the first byte of the assigned code point value.

Unpopulated

Describes a ward if there are no characters in the double-byte coded character set which have the same ward value as their first byte. Each of the double-byte coded character sets contains many unpopulated wards.

Format

The z/OS LANRES double-byte translate table is a machine readable structure containing byte values that are interpreted correctly regardless of the processing environment.

A table consists of many 512 byte records. There is one record that acts as an index (the sub-table pointer) and one record for each of the populated wards in the source double-byte coded character set. Figure 3 shows this structure.

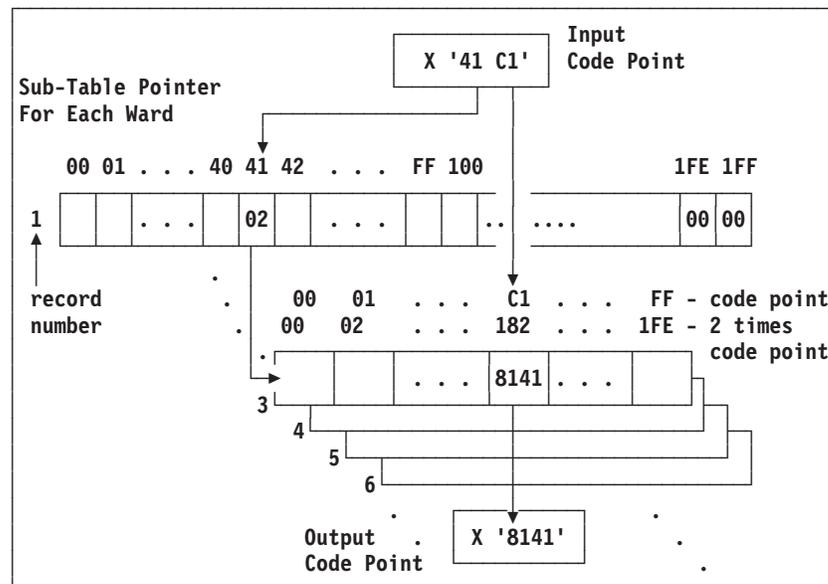


Figure 3. Double-Byte to Double-Byte Translate Table

Setting Up the z/OS System

The sub-table pointer is the first record in the double-byte table. The sub-table pointer record contains information in the first 256 bytes; the remaining 256 bytes contain zeros. Each of the 256 assigned bytes correspond to the first byte of an input code point. The byte value found at this location is a pointer, also known as the offset, to a subsequent record in the structure that contains the output code point. Each of the subsequent records contain information in all 512 bytes (256 double-byte code points).

Using the offset, a record is selected from the structure. The second byte of the input code point generates the index into this record. Because each output code point is two bytes long, the input byte value must be doubled to calculate the correct offset value. The two bytes located in the record, beginning at the index location, give the output code point value.

In the example shown in Figure 3 on page 127, the input code point is X'41C1'. The first byte, X'41', is the index into the sub-table pointer record. The byte value at this position, 2 in this case, gives the offset value into the remainder of the table structure. The record that is selected contains the 2 byte output code point value. In this case, record 3 is selected. The offset value of 2 is used to move down to record 3 in the table structure. The second byte of the input code point, X'C1', calculates the index into the selected record. Because each of the output code points found in the record is two bytes long, the index value is calculated by doubling the byte, X'C1' times 2 = X'182'. The output code point begins at byte number X'182' of the selected record. The byte values X'182' and X'183' are X'81' and X'41'. Thus, the input code point X'41C1' maps to output code point X'8141'.

Creating a Data Set I/O Exit

Programming Interface information

The data set I/O exit is a load module whose name is specified as a value for the Dataset_Exit option. This option is one of the options of the host configuration options data set that is defined by the EWXOPTS DDname. (See “Setting Host Configuration Options” on page 124 for details.)

The initial setting for the Dataset_Exit option is NONE. If a data set exit is specified, it is called for each z/OS LANRES data set I/O function: open, read, write, and close. The exit routine can handle the data set or the exit can provide its own I/O support. The load module specified must be reentrant and reusable.

If you are going to create or use a data set I/O exit, you'll need to know that the data set exit is called with register 1 pointing to the following parameter list:

Word 1

This is the address of a fullword function code.

- 0** = Open data set
- 4** = Close data set
- 8** = Read data set record
- 12** = Write data set record
- 16** = Reposition to first record
- 20** = Delete data set

Word 2

This is the address of the 8 byte DDname, left-justified with blank fill. The DDname will be blank if the data set has not been preallocated.

Word 3

This is the address of the 44 byte data set name, left-justified with blank fill.

Word 4

This is the address of the 8 byte member name, left-justified with blank fill. The member name is all blank if a sequential data set is being used.

Word 5

This is the address of the function parameter.

- For an open request, the function parameter consists of six fullwords:

1 This is an open code as follows:

0 = Open for input

4 = Open for update

8 = Open for output

12 = Open for append

2 This is the desired record format for a new data set, such as V, VB, F, FB, and so on

3 This is the desired logical record length for a new data set

4 This is the desired block size for a new data set

5 This is the desired data set size in blocks for a new data set

6 This must be set by the exit routine to the maximum data record length which will be supported for the data set. For example, if the data set is:

```
RECFM=VB,LRECL=260,BLKSIZE=6160
```

Then, the maximum data record length is 256. z/OS LANRES will not attempt to write a record greater than the maximum data record length.

- For a read request, the function parameter consists of two fullwords:

1 The exit routine must set this to the address of the data record.

2 The exit routine must set this to the length of the data record. The data record must remain valid until the next read request.

- For a write request, the function parameter consists of two fullwords:

1 This is the address of the data record.

2 This is the length of the data record.

- The function parameter is not used for close, reposition, and delete requests. A value of zero is passed for the address of the function parameter.

Word 6

This is the address of a fullword available to the user. This user word can be set on an Open request and is passed to the data set exit routine for all I/O requests for the open data set.

Setting Up the z/OS System

Data records are always treated as variable length. The actual length is passed to the exit routine on write requests and is returned by the exit routine for read requests. No control information (block or record descriptors) is included in the data record.

The dataset exit routine must return a return code in register 15 as follows:

- 0** = Successful completion.
- 4** = End of data for a read request.
The exit routine does not want to handle I/O for this dataset for an open request.
- 8** = Error occurred.

└ End of Programming Interface information _____

Making z/OS LANRES Available to TSO Users

To make z/OS LANRES available to TSO users, you can either set up a TSO/E logon procedure or create a CLIST that allocates the required z/OS LANRES data sets for the users. Because z/OS LANRES can be run in batch, the allocations can be done in the JCL of the batch job. The way you determine RACF authority to the z/OS LANRES data sets, logon procedures, or CLISTS is up to you.

Allocating z/OS LANRES Data Sets

Throughout this chapter, you may have allocated some z/OS LANRES data sets to take advantage of password data sets, user or system configuration data sets, host configuration options, and so on. However, to use all or some of the z/OS LANRES functions, you *must* allocate specific z/OS LANRES data sets as described in Table 8 on page 131.

Where you allocate the data sets depends on how you want your users to access z/OS LANRES. For example, you can allocate data sets in:

- A TSO/E logon procedure allowing users access from the TSO command line or ISPF
 - A logon CLIST that allows users access from the TSO command line or ISPF
- z/OS LANRES provides two sample z/OS LANRES logon CLISTS. These CLISTS only allocate and free z/OS LANRES data sets. You can tailor your logon CLIST to include the contents of the samples provided.

After you make the appropriate changes, you can make the CLIST available to z/OS LANRES users. Then, users can access z/OS LANRES by entering the CLIST data set name on the command line of the TSO logon screen. For example, if the CLIST was named SYS1.LOGON.CLIST, the TSO user would enter the following on the command line:

ex 'SYS1.LOGON.CLIST'

- JCL for running z/OS LANRES in batch
- Users may want to use z/OS LANRES commands in a batch job. For example, to create a disk image for z/OS LANRES disk serving. You may want to set up JCL templates for users of z/OS LANRES that contain the JCL needed to use z/OS LANRES.

Use Table 8 on page 131 to see possible DDnames and data set allocations. This table lists the z/OS LANRES DDnames in alphabetic order, z/OS LANRES data

sets, whether the allocation is required or optional, which function requires or can use the allocation, and a description of the data set contents. Many of these allocations have already been explained in this and previous chapters; others will be explained in the individual z/OS LANRES function chapters that follow. Remember that *qual* is the high-level qualifier name used when z/OS LANRES was installed.

Table 8. Allocations for z/OS LANRES Data Sets

DDname	Data set to allocate	Required or Optional	Functions that use:	Description/Contents
EPTRPRO	Your data sets	O	Host-to-LAN print	Data sets that the EWXHLTRN user exit requires
EWXADMPW	Your administration host component password data set	O	Administration	Administration host component passwords
EWXCONFIG	System or user configuration data set	O	All	Connection information for the EWXCONN LINK, EWXHLPJE, EWXHLPVT, EWXLHSRV, and EWXLDDSK commands
EWXDSESV	Your default print data set	O	Host-to-Lan print	Defines default print data set when printing from the LANRES panels
EWXDSPW	Your disk serving host component password data set	O	Disk serving	Disk serving host component passwords
EWXDSPRT	Your default printers data set	O	Host-to-LAN print	Defines printer and system names for the EWXCONN PRINT and EWXCONN QUERY PRINT commands
EWXDSTPW	Your distribution host component password data set	O	Distribution	Distribution host component passwords
EWXDUMP	Your sequential data set for dumping a disk image	R	Disk serving dump and restore	Sequential data set containing dumped disk image data created by the EWXLDDMP command and used by the EWXLDRST command
EWXFONT	Your fonts data set	O	Host-to-LAN print	Data set containing fonts for the EWXHLTRN user exit
EWXHLCFG	Your host-to-LAN print definitions data set	O	Host-to-LAN print	Defines printer definitions for host-to-LAN print
EWXHLTR	Your data sets	O	Host-to-LAN print	Data sets that the EWXHLTRN user exit requires
EWXINPUT	Your data set containing z/OS LANRES commands	R	EWXEXEC background batch session	z/OS LANRES commands

Setting Up the z/OS System

Table 8. Allocations for z/OS LANRES Data Sets (continued)

DDname	Data set to allocate	Required or Optional	Functions that use:	Description/Contents
EWXLHCFG	Your LAN-to-host print procedures data set	O	LAN-to-host print	Defines print procedures for LAN-to-host print
EWXLHJCL	Your data set for the EWXLHJOB user exit	O	LAN-to-host print	Contains any JCL you want to process
EWXLHPS	Your data set containing the NDS print server name.	O	LAN-to-host print	Defines the NDS print server.
EWXLHPPW	Your LAN-to-host print host component password data set	O	LAN-to-host print	LAN-to-host print host component passwords
EWXMLOG	Your data set to log messages	O	All	Contains z/OS LANRES messages
EWXMSG***	<i>qual</i> .SEWXMSG	O*	All	z/OS LANRES message repository
EWXOPTS	<i>qual</i> .SEWXOPTS(EWXCOMM)	O*	All	Sets z/OS configuration options
EWXPHLPW	Your host-to-LAN print host component password data set	O	Host-to-LAN print	Host-to-LAN print host component passwords
EWXPRINT	Your z/OS LANRES message log	O	All	Defines the message log when z/OS LANRES commands are run in a non-TSO environment
EWXTRANS	Your translation defaults data set	O	Distribution	Your data translation table for EWXDS GET and PUT
ISPMLIB	<i>qual</i> .SEWXMLIB	O	All using ISPF interface	ISPF messages
ISPPLIB	<i>qual</i> .SEWXPLIB	O	All using ISPF interface	ISPF panels
ISPSLIB	<i>qual</i> .SEWXSLIB	O	LAN-to-host print	ISPF skeletons for LAN-to-host print
ISPTLIB	<i>qual</i> .SEWXTLIB	O	All using ISPF interface	ISPF tables
EWXNWSRV	<i>qual</i> .SEWXSVC(EWXNWSRV)	O*	All	NetWare service package
STEPLIB	<i>qual</i> .SEWXLMOD**	R	All	Load modules
SYSEXEC	<i>qual</i> .SEWXEXEC	O	All using REXX procedures	REXX procedures
SYSTSIN	Your data set containing z/OS LANRES commands	R	EWXEXEC background TSO session	z/OS LANRES commands
SYSTSPRT	Your z/OS LANRES REXX procedures message log	R	All using REXX procedures	Defines the message log when REXX procedures are run in a non-TSO environment

*: This data set was installed having the same high-level qualifier name as the z/OS LANRESload library. This allocation is optional if the high-level qualifier of this data set is the same as the high-level qualifier of the z/OS LANRES load library. If the high-level qualifiers are not the same, then you must provide this DDname to define this data set.

** : You cannot place *qual*.SEWXLMOD in the LPA because some of the modules are not re-entrant. You can place *qual*.SEWXLMOD in the Linklist if you use the LNKAUTH=APFTAB z/OS system initialization parameter.

Table 8. Allocations for z/OS LANRES Data Sets (continued)

DDname	Data set to allocate	Required or Optional	Functions that use:	Description/Contents
--------	----------------------	----------------------	---------------------	----------------------

***: The default language for messages is English. To specify a different language, you must install the additional language FMID(s) and also allocate the EWXMSGJ dataset to the desired dataset. For example, to allocate the Japanese messages, use:

```
//EWXMSGJ DD DSN=EWX140.SEWXMSGJ,DISP=SHR
```

Note: You must put the z/OS LANRES modules found in *qual*.SEWXAUTH in an APF-authorized library or Linklist. You cannot place some of the modules found in *qual*.SEWXLMOD in the LPA because some of the modules are not reentrant.

Making the z/OS Disk Server Non-Swappable

If it is strongly recommended that you make the z/OS Disk Server (EWXLDDSK) non-swappable for performance reasons (improve z/OS LANRES response time), the following steps are needed:

1. Add EWXLDDSK to the Program Properties Table (PPT) in SYS1.PARMLIB(SCHEDxx) with the NOSWAP attribute.
2. The PGM=EWXLDDSK job step must be authorized to acquire the NOSWAP attribute. This can be accomplished by making *qual*.SEWXLMOD an authorized library by changing SYS1.PARMLIB(PROGyy) to include this library. If there are other libraries concatenated to *qual*.SEWXLMOD in the STEPLIB of the JCL for the Disk Driver (EWXLDDSK), or if a JOBLIB is used instead, those libraries will also have to be authorized to make the job step authorized.
3. The SCHEDxx changes can be activated without doing an IPL via the SET SCH=(...,xx,...) console command. The PROGyy changes can be activated without doing an IPL via the SET PROG=yy console command.

Note: If the EWXLDDSK job step is NOT properly authorized after activating the SCHEDxx changes, the message: "IEF188I PROBLEM PROGRAM ATTRIBUTES ASSIGNED" will be put in the z/OS Log and EWXLDDSK will run SWAPPABLE when the disk driver job is started.

Setting Up the z/OS System

Chapter 7. z/OS LANRES User Interfaces

This chapter describes the user interfaces for z/OS LANRES. You, as an z/OS LANRES user, can use z/OS LANRES through any of the following interfaces:

- ISPF user interface panels
- TSO command line (foreground)
- Background TSO session

Regardless of the interface you choose, you must have the appropriate RACF authority and data set allocations. To obtain authority and allocations, see the person who set up z/OS LANRES.

For general information about z/OS LANRES commands, such as what and when a data set name prefix is used, see *z/OS LANRES Configuration Files and Commands*.

ISPF

z/OS LANRES provides a panel interface using ISPF which is similar to other products that run on z/OS. ISPF makes it easier for you to access z/OS LANRES because you won't need to refer to or remember z/OS LANRES command syntax, and you can set up z/OS LANRES host configuration data sets.

To use the z/OS LANRES ISPF panel interface, ensure the ISPF data sets (such as messages, panels, and tables) are allocated as listed in Table 8 on page 131.

Then, enter the following command from the TSO READY prompt:

```
EWXISPF
```

This displays the initial ISPF panel which is ISR@PRIM. The default application is ISR. If you don't want this panel, it can be changed. For details, see "Setting Host Configuration Options" on page 124.

After this is complete, TSO/E users have access to z/OS LANRES without ever having to exit from ISPF. To access the z/OS LANRES ISPF interface from ISPF, enter the following REXX EXEC on the ISPF TSO command processor command line:

```
EWXLRSET
```

From here, select the z/OS LANRES function or task to perform. Figure 4 on page 136 shows the panel that displays when z/OS LANRES is selected and started. This example also shows a typical selection menu panel.

z/OS LANRES User Interfaces

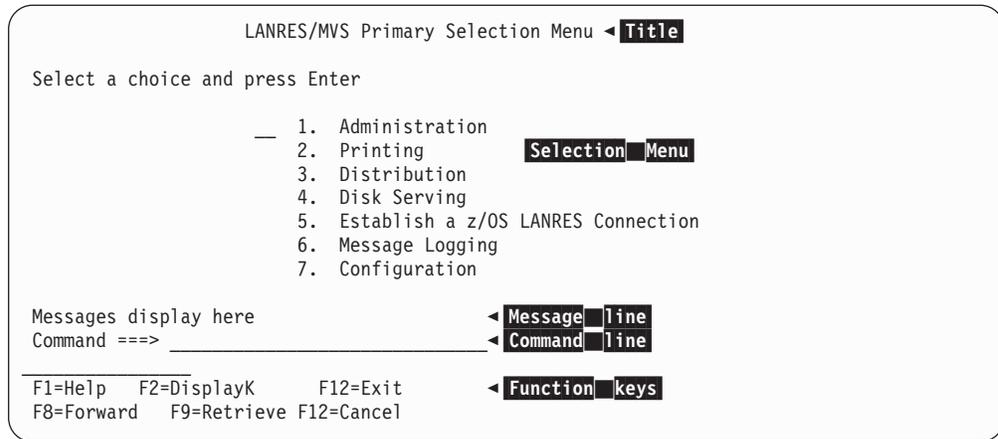


Figure 4. Example of Selection Menu Panel

Centered at the top of the panel, is the panel **Title** which describes the panel's function.

The body of the panel contains the **Selection Menu**. You can select any one of the numbered items by typing the number of the item at the cursor position located to the left of the first item and pressing Enter.

The **Command line** lets you enter commands by typing the command on the line provided and pressing Enter. Use the tab key to quickly move the cursor from the menu area to the command line.

A **Message line** is located immediately above the command line to tell you the results of your request. You can choose to expand messages to a longer, more explanatory version by using the F1=Help key.

The standard ISPF **Function keys** display at the bottom of the panel. You can toggle the function keys from basic, to extended, to off, by typing FKA on the command line and pressing Enter.

The Help function provides both panel and field help. You can obtain panel help by positioning the cursor on the command line and pressing Enter. Field help is obtained by positioning the cursor on the field and pressing the F1=Help key.

Figure 5 on page 137 is a panel that illustrates data entry fields along with two types of menus.

```

                                Add Trustee to Trustee List

Type the appropriate information and press Enter

A '<' denotes a required field

Trustee ID . . _____ <

Trustee type . 1   1. User
                  2. Group

Directory/File _____
                  _____
                  _____
                  _____ <

Use / to select  _ All           Trustee Rights           _ Read
                  _ Access        _ Erase                 _ Super
                  _ Create        _ Filescan            _ Write
                  _              _ Modify

Command ==> _____
F1=Help  F2=DisplayK  F3=Exit  F4=Prompt  F5=Refresh  F7=Backward
F8=Forward  F9=Retrieve F12=Cancel

```

Figure 5. Example of Data Entry and Menus

The Trustee ID and Directory/File fields are examples of fields that require text entry. The Trustee type field is a numbered menu similar to that in Figure 4 on page 136 where you select one item by typing the number of the item. The Trustee Rights menu on the lower portion of the panel is a menu that lets you select multiple options by entering a / next to each choice. As before, the tab key lets you quickly jump from field to field.

You can modify panels for your convenience using ISPF commands. For example, you might choose to move the command line to the top of the panel which would allow you to use the Home key to quickly jump to the command line. Refer to the ISPF documentation for information on modifying panels.

TSO Command Line

z/OS LANRES commands are available to you from the TSO or ISPF command line.

To use z/OS LANRES commands from the ISPF command line, either start ISPF using the z/OS LANRES EWXISPF command, or enter the z/OS LANRESEWXEXEC command from the ISPF command line.

To use z/OS LANRES from the TSO command line, you can enter the z/OS LANRES EWXEXEC command. EWXEXEC can process multiple commands or process one command at a time from TSO or in batch.

For example, from TSO enter:

```
EWXEXEC
```

The following message displays:

```
LANRES READY
```

z/OS LANRES User Interfaces

Here, you can enter any z/OS LANRES or TSO command. You can also enter the TSO, REXX, or PGM special commands by putting TSO, REXX, and PGM keywords before the command. In any case, after you enter the command, press enter to process it. To end EWXEXEC processing, type END. When EWXEXEC reads an END, you are returned to the TSO environment and a READY message is displayed. The resulting return code issued is the highest return code encountered during processing.

Alternatively, you can enter a command with EWXEXEC. For example:

```
EWXEXEC LANPROC
```

EWXEXEC processes the LANPROC TSO procedure, then displays the READY message. If EWXEXEC is used in a non-TSO environment, TSO commands are not supported; however, PGM and REXX special commands are.

Background TSO Session

You can use z/OS LANRES from a background TSO session using the EWXEXEC command. Here, the z/OS LANRES commands are read from the data set allocated to the SYSTSIN DDname.

The following is an example of batch TSO processing of the REXX DISTAMP program.

```
/*-----*//
/* BATCH TSO EXECUTION                               *//
/*-----*//
//BATHTSO EXEC PGM=IKJEFT01,TIME=(0,15),REGION=2048K
//STEPLIB DD DISP=SHR,DSN=LANRES.EWX130.SEWXLMO
//SYSEXC DD DSN=LANRES.PROCLIB, <== DISTAMP in here
// DISP=SHR
//EWXMSGG DD DSN=LANRES.EWX130.SEWMSGG, <== Our message repository
// DISP=SHR
//SYSTSPRT DD SYSOUT=* <== TSO output
//SYSTSIN DD * <== EWXEXEC as TSO input
EWXEXEC REXX (DISTAMP) DISTAMP program
/*
```

Running z/OS LANRES Samples

Before running the sample programs that z/OS LANRES provides, they must be tailored to meet the needs of your environment. It is equally important to note that the samples require TSO to run. Any of the previously described interfaces can be used to run your tailored sample programs with an additional step for the ISPF interface (EWXISPF command). To run the sample programs in an ISPF environment, you will need to select TSO after entering the EWXISPF command.

The sample programs that z/OS LANRES provides are:

- DISTAMP (only sample issuing an EWXCONN LINK command)
- EWXARV
- EWXBAK
- MAKEUSER
- REMVUSER

The DISTAMP, EWXARV, and EWXBAK are z/OS LANRES distribution function samples. The MAKEUSER and REMVUSER samples are z/OS LANRES administration function samples. Descriptions of the samples are provided in the administration or distribution chapters that follow.

Chapter 8. Administration

This chapter describes how to use the administration function of z/OS LANRES. The z/OS LANRES administration function lets you perform NetWare administration tasks from the system. You can manage NetWare users, groups, print servers, print queues, disk usage, and so on. Before anyone can use the z/OS LANRES administration function, however, z/OS LANRES needs to be installed and customized on and on the NetWare server. In addition, communications must be started on the NetWare server. The previous chapters described this in detail.

After this, a z/OS LANRES administration NetWare loadable module (NLM) must be loaded on the NetWare server. One copy of the NLM must be loaded for each user who will be performing administration functions at the same time. After the administration NLMs are loaded on the NetWare server, users can establish connections to the NetWare server and use the administration functions.

In summary, to use the z/OS LANRES administration function, do the following:

1. Ensure the required administration and z/OS LANRES data sets are allocated.
2. Ensure you have the proper and NetWare authority to use z/OS LANRES and z/OS LANRESadministration.
3. Ensure communications are started on the NetWare server.
4. Load one or more copies of the administration NLM on the NetWare server.
5. Establish a server connection from using the z/OS LANRES EWXCONN LINK command.
6. Perform NetWare administration from .
7. When running the LANRES administration function, you must use a BINDERY login. NDS login names are not supported.

Loading the Administration NLM on NetWare

To load the administration NLM on a NetWare server, use the NetWare LOAD utility:

```
load sys:\ewxn1m\ewxadmin
```

Note: If you are running NetWare Version 4.x, you need to load NetWare's DSAPI.NLM before you load the EWXADMIN.NLM.

The EWXADMIN NLM requires a certain NetWare operating system function that does not exist in earlier versions of NetWare Version 3.11's CLIB NLM. If your server's CLIB NLM does not have this function, the EWXADMIN NLM automatically loads a z/OS LANRES NLM stub, EWXADIMP NLM, as a place holder for the missing function.

If your server's CLIB NLM has this function, EWXADMIN NLM still attempts to load the NLM stub, but the attempt will be unsuccessful and result in the following server messages which are expected and can be ignored:

```
Public variables exported by this auto load file have already been defined.  
Module EWXADIMP.NLM NOT loaded.
```

The NLM stub, EWXADIMP.NLM, must be stored in the same directory as the EWXADMIN NLM, or in a directory in the server's search path.

When z/OS LANRES is installed on the NetWare server, the EWXADMIN NLM is placed in the EWXNLM directory of the SYS volume. If you've moved the NLM to a

Administration

different directory, substitute the correct path in the command above. The EWXADMIN NLM remains loaded until you enter a command to unload it.

If you're using component passwords, you can specify server component passwords for the EWXADMIN NLM by using the PWIN and PWOUT options, as follows:

```
load sys:\ewxnlm\ewxadmin pwin=admdown pwout=admup
```

If you set the passwords in the z/OS LANRES initialization file (EWXCOMM.INI), as recommended in "Specifying Server Component Passwords" on page 103, you don't need to specify them here.

The EWXADMIN NLM handles only one connection from . In other words, only one user at a time can connect to the NLM on the NetWare server and perform administration tasks. If you anticipate that more than one user will need to use the administration function at the same time, load multiple copies of the EWXADMIN NLM by repeatedly entering the LOAD EWXADMIN command. For more information about LOAD EWXADMIN, see *LANRES Configuration Files and Commands*.

Assuming you've specified the passwords in EWXCOMM.INI, each copy of EWXADMIN will use the same passwords. Users do not need to remember different passwords for different available EWXADMIN NLMs.

Remember that the total number of connections allowed to the NetWare server is governed by the SESSIONS option in EWXCOMM.INI. See "z/OS LANRES Sessions" on page 101 for more information.

You can automate the loading of EWXADMIN on the NetWare server. To learn how, see "Automatically Loading z/OS LANRES NLMs on a NetWare Server" on page 107.

Unloading the Administration NLM on NetWare

To unload the administration NLM, enter the following command on the NetWare server console:

```
unload ewxadmin
```

All copies of the administration NLM are unloaded. All administration connections with are broken.

Accessing z/OS LANRES

We're going to use the z/OS LANRES ISPF user interface to access z/OS LANRES administration from a TSO environment using the EWXISPF command. To access z/OS LANRES, enter the following command from the TSO READY prompt:

```
EWXISPF
```

To access the z/OS LANRES ISPF interface from ISPF, enter the following REXX EXEC from the ISPF TSO command processor command line:

```
EWXLRSET
```

The initial z/OS LANRES ISPF panel that displays is:

```

LANRES/MVS Primary Selection Menu

Select a choice and press Enter

  1. Administration
  2. Printing
  3. Distribution
  4. Disk Serving
  5. Establish an z/OS LANRES Connection
  6. Message Logging
  7. Configuration

Command ==> _____
F1=Help F2=DisplayK F3=Exit F4=Prompt F5=Refresh F7=Backward
F8=Forward F9=Retrieve F12=Cancel

```

Connecting to NetWare

To administer NetWare using z/OS LANRES, you must log in to a NetWare server. z/OS LANRES will log in to the NetWare server with your NetWare user ID and password. The NetWare login is necessary because NetWare verifies that you are authorized to do NetWare administration tasks, not z/OS LANRES. To make the connection, select Administration by typing a 1 in the blank field to the left of the menu list:

```

LANRES/MVS Primary Selection Menu

Select a choice and press Enter

_1 1. Administration
   2. Printing
   3. Distribution
   4. Disk Serving
   5. Establish a z/OS LANRES Connection
   6. Message Logging
   7. Configuration

Command ==> _____
F1=Help F2=DisplayK F3=Exit F4=Prompt F5=Refresh F7=Backward
F8=Forward F9=Retrieve F12=Cancel

```

After pressing Enter, the following Establish an z/OS LANRES Connection screen displays. The equivalent command that you would use to establish an z/OS LANRES connection is the EWXCONN LINK command.

Note: If you already have an administration connection established (for example, you already issued an EWXCONN LINK command), the following screen does not display. Instead, the z/OS LANRES Administration screen displays (shown later).

Administration

```
Establish a z/OS LANRES Connection

Type the appropriate information and press Enter. A '<' denotes a required
field.

Function _____ <

Login ID _____

Password _____
Protocol  _ 1. APPC      Target
          2. CHANNEL
          3. TCPIP

PWIN Password _____ PWOUT Password _____
Password Data Set _____
Message Logging  1. On, log messages with specified
                  line limit
                  2. On, log messages with no line limit
                  3. Off, no message logging

Maximum Line Limit _____
Command ==>
F1=Help F2=DisplayK F3=Exit F4=Prompt F5=Refresh F7=Backward
F8=Forward F9=Retrieve F12=Cancel
```

Figure 6. Establish an z/OS LANRES Connection Screen

Enter the appropriate information. For example:

```
Establish a z/OS LANRES Connection

Type the appropriate information and press Enter. A '<' denotes a required
field.

Function  ADMIN _____ <
More:

Login ID  nwserv/me _____

Password  secret _____
Protocol  2_ 1. APPC      Target target
          2. CHANNEL
          3. TCPIP

PWIN Password  down _____ PWOUT Password  up _____
Password Data Set _____
Message Logging  1. On, log messages with specified
                  line limit
                  2. On, log messages with no line limit
                  3. Off, no message logging

Maximum Line Limit _____
Command ==>
F1=Help F2=DisplayK F3=Exit F4=Prompt F5=Refresh F7=Backward
F8=Forward F9=Retrieve F12=Cancel
```

Figure 7. Example of the Establish an z/OS LANRES Connection Screen in Bindery Mode

```

Establish a z/OS LANRES Connection

Type the appropriate information and press Enter. A '<' denotes a required
field.

Function  ADMIN                                     <
Login ID  nwserv/me _____
Password  secret
Protocol  2_ 1. APPC      Target target
          2. CHANNEL
          3. TCPIP

PWIN Password down          PWOUT Password up
Password Data Set
Message Logging  1. On, log messages with specified
                  line limit
                 2. On, log messages with no line limit
                 3. Off, no message logging

Maximum Line Limit
Command ==>
F1=Help  F2=DisplayK  F3=Exit F4=Prompt  F5=Refresh F7=Backward
F8=Forward  F9=Retrieve F12=Cancel

```

Figure 8. Example of the Establish an z/OS LANRES Connection Screen in NDS Mode

The function we are requesting a connection for is the administration function, ADMIN. The NetWare server we are logging in to has a host name nwserv. The NetWare user ID for nwserv is me and me's password is secret. The communications protocol we're using to connect to z/OS LANRES on the NetWare server is APPC. The NetWare server to start communications is named target. This target NetWareserver must have the z/OS LANRES administration EWXADMIN.NLM running on it. The communications target can be the same as the NetWare server you log in to.

The component passwords have been set up. The administration component password that the NetWare server administration NLM is expecting from is down. The administration component password that is expecting from the NetWare server is up.

Of course, we could have placed this NetWare connection information in a configuration data set and we would not have to specify all this information, only the nickname value in the Server field. See "Setting NetWare Connection Definitions for Reuse" on page 115 for more information.

If you don't know what to specify for connection information, ask the person who set up the communications for z/OS LANRES.

After pressing Enter, the z/OS LANRES administration connection is made between z/OS LANRES on the NetWare server and z/OS LANRES on . Messages display stating whether the connection is successful.

Note: You may be able to connect to a NetWare server, but you can only perform NetWare tasks for which you have proper NetWare authorization.

The following z/OS LANRES Administration screen displays:

Administration

```
z/OS LANRES Administration

Select a service and press Enter
  — 1. User administration
     2. Group administration
     3. Print administration
     4. Display identification information
     5. Create/remove directory
     6. Remove one or more files
     7. Display bindery information
     8. Save the bindery
     9. Restore the bindery
    10. Restore the system

Command ==> _____
F1=Help F2=DisplayK F3=Exit F4=Prompt F5=Refresh F7=Backward
F8=Forward F9=Retrieve F12=Cancel
```

Example of Adding a NetWare Group

As an example, we will use z/OS LANRES administration to add a NetWare group to the NetWare server. The equivalent command that you would use to do this is the EWXADMIN ADDG command. (All administration commands begin with the EWXADMIN keyword.) From here, select Group Administration by typing a 2 in the blank space to the left of the menu list. For example:

```
z/OS LANRES Administration

Select a service and press Enter
  _2 1. User administration
     2. Group administration
     3. Print administration
     4. Display identification information
     5. Create/remove directory
     6. Remove one or more files
     7. Display bindery information
     8. Save the bindery
     9. Restore the bindery
    10. Restore the system

Command ==> _____
F1=Help F2=DisplayK F3=Exit F4=Prompt F5=Refresh F7=Backward
F8=Forward F9=Retrieve F12=Cancel
```

After pressing Enter, the following Group Administration panel displays:

```
z/OS LANRES Group Administration

Select a choice and press Enter

  — 1. Add/delete a group
     2. Rename group
     3. Add user to group/delete from group

Command ==> _____
F1=Help F2=DisplayK F3=Exit F4=Prompt F5=Refresh F7=Backward
F8=Forward F9=Retrieve F12=Cancel
```

From this panel, type a 1 in the blank space to the left of the menu list to add a group. When you press the Enter key, the following Add/Delete Group panel displays:

```

                                Add/Delete Group

Type the appropriate information and press Enter

A '<' denotes a required field

Group ID . . . . _____ <

Action . . . . 1   1. Add group
                  2. Delete group
User type . . . 2   1. NFS user
                  2. Not an NFS user

Command ==> _____
F1=Help  F2=DisplayK  F3=Exit F4=Prompt  F5=Refresh F7=Backward
F8=Forward  F9=Retrieve F12=Cancel

```

On this panel, enter the group ID in the space provided. The Action and User type fields have selections 1 (Add group) and 2 (Not an NFS user) already selected as defaults. If you don't want these defaults, type over these selections. For our example, these choices are fine.

When you press the Enter key, the panel verifies that the input is valid and the command is processed. When the command is completed, a message displays above the command line to indicate the result of the action as the following panel shows:

```

                                Add/Delete Group

Type the appropriate information and press Enter

A '<' denotes a required field

Group ID . . . . _____ <

Action . . . . 1   1. Add group
                  2. Delete group
User type . . . 2   1. NFS user
                  2. Not an NFS user

Processing Successful
Command ==> _____
F1=Help  F2=DisplayK  F3=Exit F4=Prompt  F5=Refresh F7=Backward
F8=Forward  F9=Retrieve F12=Cancel

```

There are many other administration tasks you can do from . If you are an experienced NetWare administrator, you will probably be able to select information from the panels without having to refer to documentation. Should you need information, however, remember to try F1 for help. Also, remember that you can use a command instead of the panels. You can read about the commands in the reference portion of this book.

Connection to NetWare

When you are done using z/OS LANRES administration functions, end your connection to the NetWare server. By ending your connection, you make a session available for another person. To end your connection, enter the EWXCONN DROP command.

Automating Administration

One way to automate administration is to group EWXADMIN commands together in REXX programs. Consider creating REXX programs that issue several EWXADMIN commands to perform a single administrative task. One of the features of administration is the ability to create new procedures for the system administrator.

You can use the EWXEXEC command to run the REXX programs in batch.

Automatically Enrolling and Removing Users

The EWXADMIN commands can be used to create different types of users such as an engineer, secretary, financial analyst, and so on. The commands would establish specific NetWare:

- Users
- Directories
- Login scripts

Later, you may need to remove those users.

To automate the task, you can use the sample REXX programs that z/OS LANRES provides named MAKEUSER and REMVUSER. Both programs can be found in the *qual.SEWXSAMP* data set. Remember that *qual* is the high-level qualifier that was used when z/OS LANRES was installed. Of course, you will need to tailor them to meet the needs of your environment and users.

The MAKEUSER program creates users, directories, and login scripts for a user or users. The REMVUSER program removes those users, directories, and login scripts created by the MAKEUSER program. See *LANRES Configuration Files and Commands*.

For information about running z/OS LANRES samples, see “Running z/OS LANRES Samples” on page 138.

Chapter 9. Disk Serving

This chapter describes how to use the disk serving function of z/OS LANRES. The first time you set up disk serving, there are several tasks you must do on z/OS and several on the NetWare file server. The following steps summarize the tasks you must do to set up disk serving. Each task is described in detail in this chapter.

1. Create a disk image on z/OS.

A *disk image* is a representation of a workstation hard disk on z/OS. From z/OS, disk images look like data spaces. From the NetWare file server, disk images look like additional hard drives. In reality, each disk image is one VSAM Linear Data Set (LDS).

2. Update the disk image definitions data set on z/OS.

To let an z/OS LANRES disk server know about a disk image, you must add information about the disk image to a disk image definitions data set named *prefix.EWXCONFIG.DISKS*. A sample data set is shipped as the DISKS member in the *qual.SEWXSAMP* samples data set. Remember that *qual* is the high-level qualifier that was used when z/OS LANRES was installed.

3. Ensure that z/OS LANRES communications are active between the NetWare server and z/OS.

As usual, the EWXCOMM communication driver must be loaded on the NetWare file server.

4. Load the disk driver program on the NetWare server.

The disk driver program on the NetWare server transmits NetWare disk requests to the z/OS disk server. It makes the z/OS disk image look like any other NetWare disk.

5. Start the disk serving program on z/OS.

At this point the NetWare side of disk serving is running, so you need to start the z/OS side. To start disk serving on z/OS, submit a batch job that runs the z/OS LANRES EWXLDDSK command. The EWXLDDSK command reads the disk image definitions data set.

6. Initialize the disk image on the NetWare server.

- a. Partition the disk image.

The disk image you created on z/OS looks like another formatted hard disk to the NetWare file server. You must initialize the disk image by loading the NetWare INSTALL utility and partitioning the disk image.

- b. Create a volume on the disk image.

After partitioning the disk image, use the NetWare INSTALL utility to create volumes, just as you would for any other NetWare partition.

- c. Mount the volumes.

Finally, use the NetWare MOUNT command to make the volume available to NetWare users. You can also automate the mounting of the volumes. We will describe how in this chapter.

After setting up disk serving, little intervention is required. You can manage the z/OS “volumes” just as you would manage any other NetWare volumes. To add a disk image, create the disk image on z/OS, update the disk image definitions data set information, and restart disk serving on z/OS. On NetWare, partition the new disk image, create volumes, and mount the volumes.

About Multiple Disk Images

The z/OS LANRES disk server can manage many disk images (see Figure 9). Information about the disk images is stored in a disk image definitions data set. When starting the disk server, you indicate which disk image definitions data set to use. You also indicate which NetWare file server to connect to.

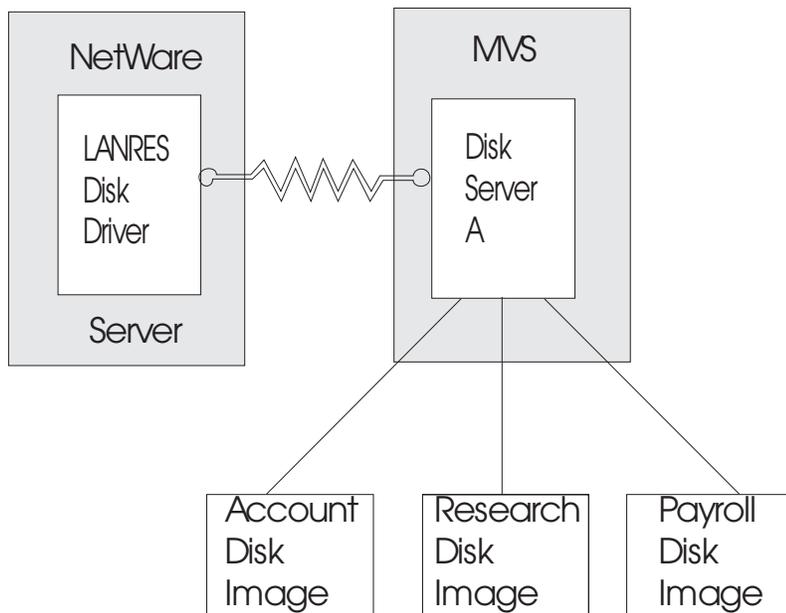


Figure 9. Disk Server Accessing Several Disk Images

About Multiple Disk Servers

There can be several z/OS LANRES disk servers running on your z/OS system at any time. Each z/OS LANRES disk server can communicate with only one NetWare server, but the NetWare server can communicate with more than one disk server. This provides many configuration possibilities.

For example, suppose there are several departments in your organization that want to manage their own data, but you have only one NetWare server. Each department can create its own disk images and associate those images with their own z/OS LANRES disk servers (see Figure 10 on page 149). Each department controls the availability of the data by starting or stopping its own disk server. All of the disk servers can communicate with the NetWare file server concurrently, so all the data can be made available through the single NetWare server.

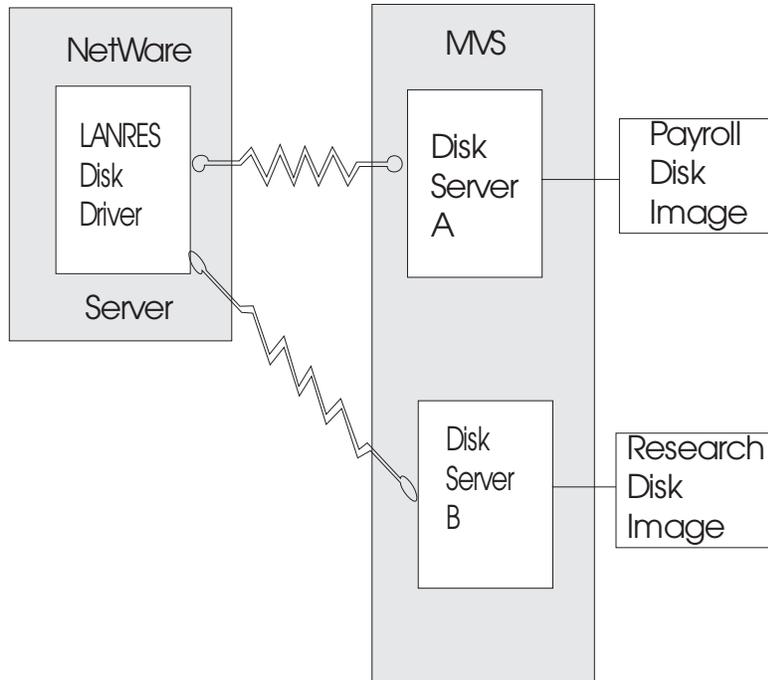


Figure 10. Disk Driver Communicating with Several Disk Servers

About Multiple Disk and NetWare Servers

In a larger organization, there may be several NetWare servers. Each of these NetWare servers can communicate with one or more disk servers running on z/OS (see Figure 11 on page 150). For example, each department may have its own NetWare server and may start a departmental z/OS LANRES disk server to communicate with it. Use the configuration that best suits your needs.

Disk Serving

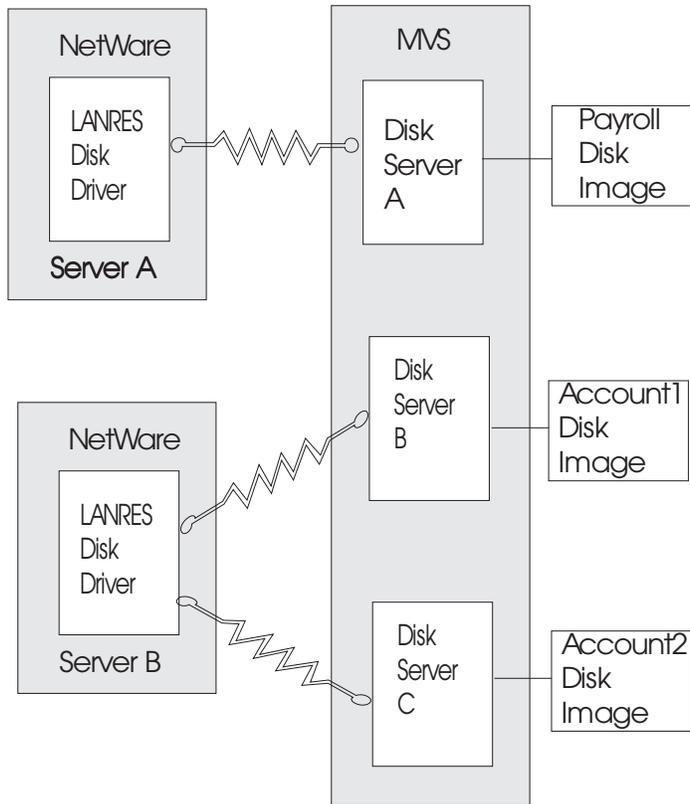


Figure 11. Multiple NetWare Servers and Disk Servers

Making Multiple Servers Available

You can make a disk image available through several z/OS LANRES disk servers to multiple NetWare servers (see Figure 12 on page 151). To do so, put an entry for the disk image in the disk image definitions data set for each of the z/OS LANRES disk servers. You must, however, ensure that all z/OS LANRES disk servers access the disk image in read-only mode.

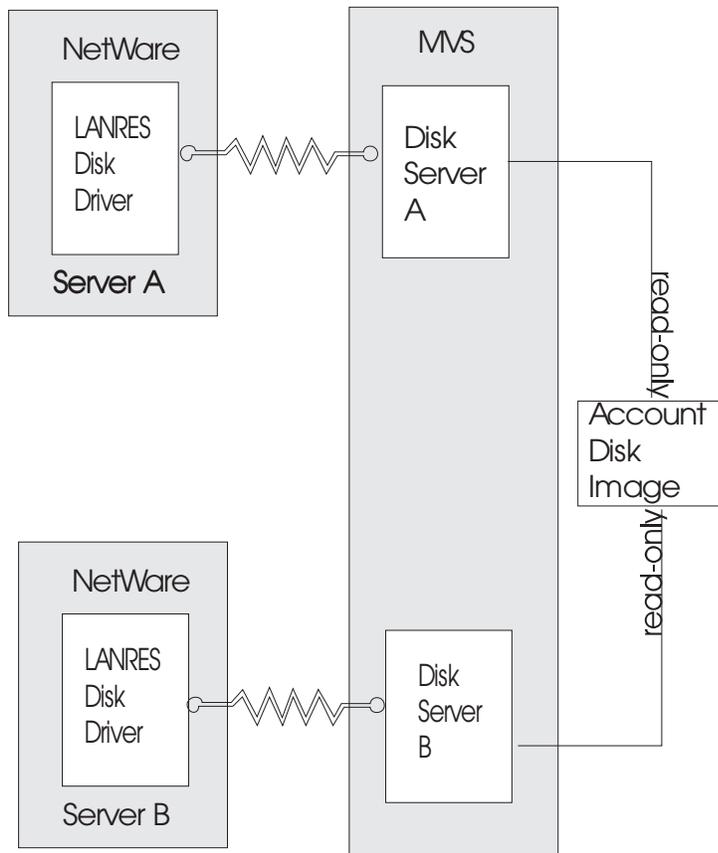


Figure 12. Two Disk Servers Accessing One Read-Only Disk Image

Setting Up Disk Serving

The following information provides the steps necessary to set up and use z/OS LANRES disk serving.

Creating a Disk Image

To create a disk image on z/OS, you will need to issue the z/OS LANRES EWXLD CRT command using any of the z/OS LANRES interfaces for each LDS entry you defined in the disk image definitions data set.

CAUTION:

Only issue the EWXLD CRT command *once* for each LDS defined. Running EWXLD CRT a second time reformats the LDS making the data on it unusable.

Before you run EWXLD CRT determine the following:

- A data set name for the disk image. This data set name will correspond to a NetWare name that we will define later.
- The size of the disk image you would like to create. The minimum size allowed is 2 megabytes (2M), while the maximum is 4 gigabytes (4G). You can specify the size in 512-byte blocks (for example, 4096B), kilobytes (360K), megabytes (690M), or gigabytes (1G).
- Whether the data set is new or already exists.
- Finally, whether you want to create a compressed disk image. For details, see “Compressing Data” on page 163.

Disk Serving

Suppose you want to create a new disk image named LANRES.PAYROLL with a size of 2 gigabytes. After issuing EWXEXEC at the LANRES READY prompt, enter:

```
EWXLCRT LANRES.PAYROLL 2G NEW PRV99
```

After pressing enter, the disk image is created and a message is displayed indicating whether the disk image was successfully created.

Note: Creating a disk from the command line can be time consuming. You may want to issue the EWXLCRT command in batch.

You can use regular z/OS panels and commands to display information about the disk image. One z/OS LANRES disk server can manage up to 50 disk images. Create as many disk images as you need for your NetWare users. After creating the images, update the disk definitions in the disk image definitions data set. To learn how, see the next section.

Creating the Disk Definitions

When the z/OS LANRES disk server is started (EWXLDDSK command) it looks in a disk image definitions data set to determine which disk images it is to make available to the NetWare file server. Consequently, when you create a disk image, you need to update the disk image definitions data set with information about the new disk image. Also, tuning parameters can be specified to improve the performance of the LANRES disk server.

To create the disk image definitions data set, you can copy the DISKS member from the *qual.SEWXSAMP* samples data set to your own data set. A disk image definitions data set must be a sequential and exist for *each* disk serving started task. You will specify the name of your disk image definitions data set with the EWXLDDSK command.

The updates to the disk image definitions data set become effective the next time a z/OS LANRES disk server is started (EWXLDDSK) using the specified disk image definitions data set.

When a disk image definition is removed, the corresponding disk image is not destroyed. Instead, it will no longer be available through the z/OS LANRES disk server that references the disk image definitions data set.

Specifying the Definitions

This section describes the fields and values that are specified in the disk image definitions data set. These values are used by the EWXLDDSK command when the disk serving function is started. There are two types of lines in a disk definition data set; disk definition lines and performance parameter lines.

Each disk definition line in the *prefix.EWXCONFIG.DISKS* data set contains the following:

NAME Field

Specify a name for the disk image. You can use 1 to 8 alphanumeric characters, but the first character must be alphabetic. The name you choose is the name by which NetWare will know the disk image. If you choose a name for the disk image that is the same as the NetWare volume name that NetWare clients map to and is 2 or more characters long, you can use the disk driver's (EWXDISK) AUTOMOUNT

option. This eliminates the need to manually enter the NetWare MOUNT command because the disk driver can do an internal mount. See “Automatic Mount Option” on page 155 for more information.

z/OS DATA SET NAME Field

Specify the name of the z/OS data set that you created with the EWXLD CRT command. This must be the fully-qualified z/OS data set name without enclosing quotation marks.

ACCESS MODE Field

Determine whether the disk image can be read from and written to.

Specify a *W* to allow users read/write access to the disk image. Because new disk images must be partitioned (using the NetWare INSTALL utility) before they can be used, you must specify *W* when you first add the disk image.

Specify an *R* to make the disk image data read only. You must specify *R* if more than one NetWare server will be accessing a disk image. If you don't specify anything in this field, *W* is the default.

If you specify a value for the DATA SPACE SIZE field (following), then you must specify a value here.

DATA SPACE SIZE Field

Determine the size of the disk image. If you don't specify anything in this field, the disk image size specified when you created the disk image (EWXLD CRT command) is used.

The size can be from 1 to 2048 megabytes. If you specify a value here that is less than the size specified when you created the disk image (EWXLD CRT command), z/OS LANRES uses a smaller amount of real storage at the cost of more CPU utilization.

Each performance parameter line consists of one parameter. The available parameters are as follows:

Subtask

When this option is specified, the disk serving function will start up a subtask for each disk segment specified in this configuration file. This will allow disk I/O to occur in parallel and generally will improve throughput.

Large Burst

This allows more packets to flow before an acknowledgement is required. This can improve throughput.

Large Buffer

This increases the size of the transmission unit across the interface to the server. This is only effective if the server is using EWXDISK.HAM. If this option is used and the server has EWXDISK.DSK loaded, this option is ignored. This option can reduce the overhead of handling transmissions across the interface and can reduce CPU utilization.

Mini Window

This decreases the data space size to reduce CPU overhead. This option is ignored if the data space size is set to a value other than 1 or 2.

Disk Serving

Syntax

When you want to enter a comment in the data set, specify an * in the first column. Blank lines are ignored. The maximum size of a line is 80 characters.

See “Recovering a File from a Backed Up Disk Image” on page 164 for an example of using disk definitions.

Loading the Disk Driver on the NetWare Server

The z/OS LANRES disk driver transmits NetWare file requests to the disk server running on z/OS. If the disk driver, EWXDISK.DSK, is not loaded, z/OS LANRES disk serving is not available to NetWare users.

Before loading the disk driver, ensure that the z/OS LANRES communication driver (EWXCOMM) is already loaded. If you don't know whether it is loaded, use the NetWare MODULES command to list the loaded modules. See the *NetWare Utilities Reference* manual for more about the MODULES utility. If you need to load the z/OS LANRES communication driver, see “Starting z/OS LANRES Communications on a NetWare Server” on page 99.

To load the z/OS LANRES disk driver, enter the LOAD EWXDISK command on the NetWare server console. A simple form of the command is shown in the following example:

```
load sys:\ewxn1m\ewxdisk
```

The EWXDISK.DSK module is located in the EWXNLM directory on the SYS volume. If you have moved the module to a different directory, substitute the correct volume and path on the above command. In addition, remember if you are using a server component password file to specify the server component passwords and you have also moved the password file with the module to a different directory, you will need to specify the PWFIL option when loading the EWXDISK module (or, as recommended in “Specifying Server Component Passwords” on page 103, update the EWXCOMM.INI file). This has to be done because the EWXDISK.DSK module looks for the server component password file only in the SYS:\EWXNLM\ directory.

The EWXDISK.DSK module remains loaded until you enter a command to unload it. You may receive the following messages on the NetWare system console when you enter the LOAD EWXDISK command:

```
Loader cannot find public symbol: GetSystemConsoleScreen
Loader cannot find public symbol: CYieldWithDelay
Load file referenced undefined public variable.
Module EWXDISK.DSK NOT loaded.
```

This means the EWXDISK program intending to run on NetWare Version 4.x is being loaded on a NetWare file server running NetWare Version 3.x. To correct the problem, copy the SYS:\EWXNLM\EWXDISK3.DSK file to the SYS:\EWXNLM\EWXDISK.DSK file and reissue the LOAD EWXDISK command.

You can specify IN and OUT component passwords for the EWXDISK module by using the PWIN and PWOUT options as shown in the following example. If, however, you set the passwords in the z/OS LANRES initialization file (EWXCOMM.INI) as recommended in “Specifying Server Component Passwords” on page 103, you don't need to specify them here.

```
load sys:\ewxn1m\ewxdisk pwin=diskdown pwout=diskup
```

When a disk server is started on z/OS, passwords must be specified that match these. For more information about passwords, see “About Component Passwords” on page 97.

The EWXDISK.DSK module has other options that you may need to specify depending on your system configuration. One of those options, DISK_SESSIONS, is necessary if you intend to have more than one disk server on z/OS connect to this NetWare server. If you don't specify DISK_SESSIONS, only one connection is allowed. Other attempted connections are denied. In the following example, three disk sessions are allowed:

```
load sys:\ewxnlm\ewxdisk pwin=down007 pwout=up007 disk_sessions=3
```

You can increase the number of disk sessions after the disk driver is loaded by using the EWXCMD START DISK command. Remember that the total number of connections allowed to the NetWare server is governed by the SESSIONS option in the EWXCOMM.INI file. See “z/OS LANRES Sessions” on page 101 for more information.

Automatic Mount Option

Another option you might consider using is AUTOMOUNT. When AUTOMOUNT is set to ON, all available volumes on disk images are automatically mounted when EWXDISK is loaded. This option requires the disk names and the volume names to be identical and two or more characters long. Here is an example with the AUTOMOUNT option specified:

```
load sys:\ewxnlm\ewxdisk disk_sessions=3 automount=on
```

If you are using channel communications, you can activate (or close) additional subchannels.

To activate automatic mount for a NetWare volume consisting of two or more volume segments, you need to ensure that the VSAM LDSs that make up the logical NetWare volume are listed in the configuration data set in the *opposite* order of how they were added to the volume using NetWare's INSTALL utility.

For example, if a NetWare volume, MULTIVOL, consisted of three volume segments and these segments were added to the volume using NetWare INSTALL in the order: segment 1, MULTIVOL; segment 2, VOLSEG02; and segment 3, VOLSEG03, then the configuration data set on z/OS must contain the following order for automatic mounting to work:

```
VOLSEG03 prefix.VOLSEG03.LDS  
VOLSEG02 prefix.VOLSEG02.LDS  
MULTIVOL prefix.MULTIVOL.LDS
```

Intermediate error messages may appear on the NetWare server console indicating that some or all volume segments cannot be located. This is normal because the disk driver has not found all the volume segments for the multi-segment volume. The volume will be mounted after all volume segments are found.

Note: AUTOMATIC MOUNT FOR MULTI-SEGMENT VOLUMES ONLY WORKS IF A SINGLE STARTED TASK CONTROLS ALL THE VOLUME SEGMENTS.

Note:

Note: all the volume segments.

Disk Serving

To completely automate the starting of the NetWare disk server, add the LOAD EWXDISK command to the list of commands processed by LOAD EWXSTART. See “Automatically Loading z/OS LANRES NLMs on a NetWare Server” on page 107 for more information.

Starting the Disk Server on z/OS

The disk server on z/OS receives disk requests from the NetWare disk driver and processes those requests. Before NetWare clients can use disk images, the disk driver, EWXDISK.DSK, must be loaded on the NetWare server and a disk server must be started on z/OS. You can start the disk server before or after loading the disk driver on the NetWare server.

It is strongly recommended to make the z/OS Disk Server (EWXLDDSK) non-swappable to improve z/OS LANRES response times and prevent hangs. See “Making the z/OS Disk Server Non-Swappable” on page 133 for the one time procedure that needs to be done prior to starting the z/OS Disk Server.

Use the z/OS LANRES EWXLDDSK Start command to start the disk server on z/OS. You will need to specify the communications protocol and name of the NetWare target server unless you have decided to set up this NetWare connection information in configuration data sets. If this is the case, you only need to specify the NICKNAME option and value. If you are using component passwords, you will need to specify PWIN and PWOUT values or set up component password data sets. (For information about setting up configuration and password data sets, see “Setting NetWare Connection Definitions for Reuse” on page 115 and “Creating Host Component Password Data Sets for Users” on page 121.)

For the communications protocol, specify TCPIP, APPC, or CHANNEL, whatever is used at your installation.

The target depends on your protocol. For example, for:

- APPC, the target is the symbolic destination name or fully-qualified partner LU name.

Note: For heavy disk serving loads, direct channel attachment is recommended.

- TCP/IP, the target is the host name or internet address of the NetWare server.
- CHANNEL, the target is the fully-defined z/OS channel address.

If you don't know what to specify, ask the person who set up the communications for z/OS LANRES.

For PWIN and PWOUT, specify passwords that match those defined for the disk driver (EWXDISK) of your target NetWare server. Suppose the PWIN password for EWXDISK was DISKDOWN and the PWOUT password was DISKUP. For the disk server, you would specify DISKUP for PWIN and DISKDOWN for PWOUT. Remember that the “output” component password of the z/OS disk server connects to the “input” component password of the disk driver on the NetWare server. The “input” component password to the z/OS disk server connects to the “output” component password of the NetWare disk driver. For complete descriptions of all the EWXLDDSK options, see the reference portion of this manual.

For further information on the parameter specifications for EWXLDDSK, refer to the *z/OS LANRES Configuration Files and Commands* book.

The following is a sample of the JCL used to start a disk server. This is the EWXDISK member of the *qual.SEWXSAMP* samples data set. You cannot use the sample as is. You will need to tailor the sample to meet the needs of your environment.

```
//EWXDISK JOB (ACCOUNTING-INFORMATION),G744275,
//CLASS=F,MSGCLASS=H,MSGLEVEL=(2,0),TIME=1440,REGION=4096K
//*-----*//
//* LANRES/MVS DISK SERVER *//
//*-----*//
//SERVER EXEC PGM=EWXLDDSK,
// PARM='''EWXDISK.DISKS''' (NICKNAME DISKSNA RETRY 300'
//STEPLIB DD DSN=LANRES.EWX130.SEWXLMOB,DISP=SHR
//* <-- LANRES/MVS DD STATEMENTS -->
//SYSEXEC DD DSN=LANRES.EWX130.SEWXEXEC,DISP=SHR
//EWXPRINT DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*
```

To monitor the disk server, use regular z/OS commands. To z/OS, the disk server is just another batch job.

Using a PDS

You can use a PDS to hold the disk image definition data sets if you use the fully qualified data set name (with member) as shown in the following JCL:

```
//SERVER EXEC PGM=EWXLDDSK,
// PARM='''LANRESR.EWXDISK.PDS(EWXDISKB)''' (CHANNEL B20'
```

If you don't use the fully qualified data set name as shown below, you will get the error messages that follow:

```
//SERVER EXEC PGM=EWXLDDSK,
// PARM='EWXDISK.PDS(EWXDISKB) (CHANNEL B20'
```

```
EWXDSK0008E Incorrect option(s) EWXCNFGB specified.
EWXDK1601E Error occurred while processing LANRES command options.
```

Initializing the Disk Images on the NetWare Server

The last step in making disk images available to NetWare users is initializing the disk images on the NetWare server. By “initializing”, we mean that you need to partition the disk image, create a volume on the partitioned disk image, and then mount the volume. These activities are a part of regular NetWare administration and are done whenever a new hard disk is added to the NetWare server. In our case, the hard disk is really a disk image on z/OS. The disk image appears to NetWare as a “NetWare Ready” hard disk.

To initialize a disk image, we will be using the NetWare INSTALL utility. The INSTALL utility is described in the *Novell NetWare System Administration* manual.

Are the Disk Images Accessible?

Before loading the INSTALL utility, verify that the z/OS disk images are accessible, as follows:

1. Load the NetWare MONITOR NLM at the NetWare console.
2. Select Disk Information.

The names of the disk images that you created on z/OS should match some of these disks. If they do not match, restart the z/OS disk server with the required disks. Verify that you have updated the disk image definitions data set correctly.

Disk Serving

Creating Partitions and Volumes

You should create a partition and then a volume for each disk image. If you have created several disk images, do them one at a time. Doing the disk images one at a time makes it easier to keep track of which volumes you are putting on which disk images.

The NetWare INSTALL command varies depending upon the level of NetWare. The next three sections provide instructions for NetWare 3.x servers and for NetWare 4.x and 5.x servers. Follow the instructions that apply to your NetWare server.

NetWare 3.x Servers

1. Partition an z/OS disk image.
 - a. On the NetWare server console, enter:

```
load install
```
 - b. Select Disk Options.
 - c. Select Partition Tables.
 - d. Select a host disk image to partition.
 - e. Press the Esc key when prompted.
 - f. Select Yes at the Create NetWare Partition Table? prompt.
 - g. Select Create NetWare Partition.
 - h. **IMPORTANT:** Make the Hot Fix area as small as NetWare will allow by changing the Redirection Area: field under the Change Hot Fix selection.
See the appropriate NetWare manual for more information.
 - i. Press the Esc key.
 - j. Select Yes at the Create Partition prompt.
2. Create a NetWare volume on the z/OS disk image.
 - a. Press the Esc key until you get back to Installation Options.
 - b. Select Volume Options.
 - c. Press the insert key to display which partitions are available for formatting.
 - d. Choose the partition you want to make a volume. (The new disk partition will be displayed as free space.)
 - e. Give the volume a name. If you are using or are planning to use the automatic mount option, give the volume the same name you used for the disk image on z/OS.
 - f. Select the blocking factor you feel is appropriate to the data that will be stored on the disk. Usually a larger block size improves performance and reduces memory usage in the NetWare server. However, a larger block size may also increase the amount of disk space needed to store files since each file must use at least one block.
 - g. Press the Esc key.
 - h. Select Yes at the Create Volume? prompt.
 - i. Press the Esc key until you exit Install.
3. Repeat the preceding two steps for each z/OS disk image.

NetWare 4.x Servers / Non-NSS 5.x Servers

1. Partition an z/OS disk image.
 - a. On the NetWare server console, enter:

```
load install
```
 - b. Select Disk Options.

- c. Select Modify Disk Partitions and Hot Fix.
 - d. Select a host disk image to partition.
 - e. Press Enter when a message is displayed indicating a partition table doesn't exist. This will allow a partition table to be created.
 - f. Select Yes at the Initialize the partition table? prompt.
 - g. Select Create NetWare Disk Partition.
 - h. IMPORTANT: Make the Hot Fix area as small as NetWare will allow by changing the "Redirection Area:" field under the Change Hot Fix selection. See the appropriate NetWare manual for more information. FOR NETWARE 5.X, SET THIS TO ZERO.
 - i. Press the Esc key.
 - j. Select Yes at the Create NetWare partition prompt.
2. Create a NetWare volume on the z/OS disk image.
 - a. Press the Esc key until you get back to Installation Options.
 - b. Select Volume Options.
 - c. Press the insert key to display which partitions are available for formatting.
 - d. Choose the partition you want to make a volume.
 - e. Select Make This Segment A New Volume.
 - f. Give the volume a name. If you are using or are planning to use the automatic mount option, give the volume the same name you used for the disk image on z/OS.
 - g. Press the Esc key until the Save Volume Changes? prompt.
 - h. Select Yes at the Save Volume Changes? prompt.
 - i. When NetWare prompts for the Administrator's Password, enter the password for Administrator.
 - j. Press the Esc key until you exit INSTALL.
 3. Repeat the preceding two steps for each z/OS disk image.

NetWare 5.x Servers

1. Partition an z/OS disk image.
 - a. On the NetWare server console, enter:
load NWCONFIG or NWCONFIG
 - b. Select Standard or NSS Disk Options. For Standard Disk options, continue with NetWare 4.x Servers, Step d. NOTE: A minimum of 10MB free space is needed to create an NSS Volume.
 - c. Select Modify Disk Partitions and Hot Fix.
 - d. From Available NSS Options panel, select the Optional Update Provider option. Hit enter for each Provider ID. This scans your storage for free space.
 - e. Select Assign Ownership.
 - f. Save size change and continue. Confirm action.
 - g. Select NSS Volume Options from available NSS Options screen.
 - h. Enter Administrator name and password.
 - i. Select Create.
 - j. Select Storage Group, verify entries, hit enter and confirm.
 - k. Select NSS Volume, verify entries and hit enter.
 - l. Enter name of NSS Volume and confirm action.

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2. Repeat the preceding steps for each z/OS disk image.

Mounting the Volumes

After volumes are created on the disk images, mount them just as you would mount any other NetWare volume. From the NetWare console, enter individual NetWare MOUNT commands for each volume, or enter MOUNT ALL.

If the z/OS LANRES disk driver program is loaded on a NetWare file server running Version 4.x and read-only z/OS disk images are being used, the following NetWare 2330 error message may display when the NetWare volumes that reside on z/OS disk images are mounted.

```
Error writing to the directory in <server>/<volume>.
```

This error message may display multiple times and can be ignored. The volume should have been successfully mounted and available for read access.

If you have opted to use AUTOMOUNT=ON when loading the EWXDISK disk driver, the only time you need to issue MOUNT commands is the first time you are mounting the volumes. Thereafter, the volumes are mounted automatically.

Also see “Automatic Mount Option” on page 155 for more information.

Adding Name Space Support

If you will be adding MAC, NFS, or OS2 name space support to any of the z/OS volumes, follow these steps:

1. Mount the z/OS volume if it is not already mounted:

```
MOUNT mvsvolume
```

2. Add the name space(s) to the z/OS volume:

```
ADD NAME SPACE name TO mvsvolume
```

For *name*, specify either MAC, NFS or OS2.

Repeat these steps for each z/OS volume for which name space support will be added.

The name space will be added to the z/OS volume or volumes after these steps.

The End of Set-Up

If you have been reading through the chapter and have been setting up z/OS LANRES disk serving, your set-up is complete. Both the NetWare disk driver and the z/OS disk server should be up and running. The z/OS disk images should be available to NetWare clients as mounted volumes.

The remaining sections in this chapter describe additional disk serving tasks.

Stopping a Disk Driver on a NetWare Server

To stop a disk driver on the NetWare server, dismount the z/OS LANRES volumes on the NetWare server. Then use the NetWare UNLOAD utility to unload the EWXDISK module.

Before stopping a disk driver, ensure that users close all files on all volumes supported by the disk driver. Use the NetWare BROADCAST command at the NetWare server console to broadcast a warning message. Allow sufficient time for users to end their work. Then dismount the volumes supported by the disk driver:

```
dismount volumename
```

For *volumename*, substitute the name of the z/OS LANRES volume. After dismounting all z/OS LANRES volumes, unload the disk driver:

```
unload ewxdisk
```

Then, you'll need to stop the disk server on z/OS as described in the following section.

Channel Users: If you have loaded EWXDISK with the AUTOMOUNT option set to ON, you can use the LOAD EWXCMD DROP DISK command to drop a disk serving session and leave other sessions running. For example, enter the following command from the NetWare server:

```
load sys:\ewxn1m\ewxcmd.n1m drop disk 20 quiesce
```

This command dismounts the volumes (QUIESCE option); then stops the disk server running on z/OS.

When the z/OS disk server is stopped, the following message displays on z/OS:

```
EWXDSK0205I EWXLDDSK HAS BEEN STOPPED
```

However, if you loaded EWXDISK with the AUTOMOUNT option set to ON, there is a time when you don't want to use the QUIESCE option to dismount specific volumes. Instead, use the NetWare DISMOUNT command and manually dismount the specific disk images. Then use the LOAD EWXCMD DROP DISK command with the FORCE option. For more information about the AUTOMOUNT option, see "Automatic Mount Option" on page 155.

For example, suppose you restored a disk image by replacing an existing disk image with a new disk image. You followed the steps to create a disk image, update the disk image definitions data set, and so on. You mounted the same volumes for the new disk image that the existing disk image currently had mounted. Here, if you dismounted the volumes for the old disk image using the LOAD EWXCMD DROP DISK QUIESCE command, it may result in the dismount of volumes for the new disk image instead.

Stopping a Disk Server on z/OS

Before stopping an z/OS LANRES disk server, stop the disk driver on the NetWare server (see "Stopping a Disk Driver on a NetWare Server" on page 160). By stopping the disk driver first, you ensure that NetWare clients are not using the volumes on the disk images. When no one is using the disk images, it is safe to stop the disk server.

To stop the z/OS LANRES disk server on z/OS, use the z/OS STOP command. Any user having operator authority can enter the following command:

```
/P taskorjob
```

Or, enter the following from the operator console:

```
P taskorjob
```

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Where *taskorjob* is the name of the started task or batch job that is running.

Channel Users: See the *Channel Users*: note in “Stopping a Disk Driver on a NetWare Server” on page 160.

Reconnecting after a System Failure

If the NetWare server fails or z/OS fails (perhaps because of a loss of power), the connections between the NetWare servers and z/OS are broken. Usually, NetWare’s error recovery procedures protect the disk images from becoming corrupted. On the rare occasion that a disk image does become corrupted, restore a backup of the image or run the NetWare VREPAIR utility to correct the problems (as you would for a regular hard disk). VREPAIR is described in the *NetWare System Administration* manual.

Setting Other Disk Serving Options

The EWXDISKX EXEC is a REXX exec that is called by the EWXLDDSK command when the disk server on z/OS detects that the server has established or lost connections and sends a message to the operator. This can be helpful if you want to know when a disk serving connection has been established (UP), when a connection is broken (DOWN), or when a disk serving connection has stopped (STOP).

You can change this exec to send the message to another user ID. For example, you may want the disk serving virtual machine to receive the message instead of the operator.

To change the exec, instead of using the actual EWXDISKX EXEC, copy and modify the sample that z/OS LANRES provides, which is the EWXDISKX member of the *qual.SEWXEXEC* samples data set (*qual* is the high-level qualifier that was used when z/OS LANRES was installed).

For REXX execs to run, ensure the *qual.SEWXEXEC* data set is allocated to the SYSEXEC DDname. For details about data set allocations, see “Allocating z/OS LANRES Data Sets” on page 130.

Deleting Disk Images

When a disk image is deleted, all data on the disk image is destroyed. When deleting a disk image, you should first ensure that it is no longer available through any disk server. Remove references to the disk image from all disk image definitions data sets.

To delete the disk image itself, use the EWXLDDLT command. We will delete the disk image created earlier. After issuing the EWXEXEC command, from the LANRES READY prompt, enter:

```
EWXLDDLT LANRES.PAYROLL
```

When you press the Enter key, z/OS LANRES deletes the disk image. All NetWare data on that disk image is destroyed.

Compressing Data

The EWXLDDMP command can be used to make a backup copy of a host disk image. Specifically, the EWXLDDMP command compresses the VSAM Linear Data Set (LDS) into a sequential data set that can be placed on a tape or stored on a disk. You won't be able to use the compressed sequential data set for z/OS LANRES disk serving. However, if you decompress the compressed sequential data set and rebuild the VSAM LDS using the z/OS LANRES EWXLDLDRST command, it can be used again.

When you create a disk image, optionally, you can create it in compressed format by specifying the COMPRESS option with the EWXLDCRT command. Using a compressed disk image means that each disk block is decompressed when it is read and compressed when it is written to. You won't want to create a compressed disk image if it is going to be frequently used or have stringent performance criteria associated with it. Instead, create a compressed disk image for those users that need to occasionally store large amounts of data, such as a disk image for archiving workstation files.

The EWXLDCRT command with the COMPRESS option creates a disk image which uses the run length encoding (RLE) compression method. RLE compression works well with strings of repeated characters, but doesn't work well with data containing repeated phrases. There is an alternative. You can use the ZIV-Lempel (ZIV) compression method. ZIV typically provides better compression ratios than RLE, and z/OS LANRES uses the COMPRESSION CALL hardware instruction, if it is available, which results in significant CPU savings.

If the z/OS Data Compression Services feature is available on your z/OS system, the EWXLDDMP command can be used to change from RLE compression to ZIV. The EWXLDDMP command needs a data sample to generate a dictionary which ZIV uses to translate phrases into compressed symbols. Consequently, you will need data on the disk image before you can change the compression method to ZIV. Also, you'll want to periodically run the EWXLDDMP command to create a new compression dictionary as the data stored on the disk image changes. Use the EWXLDLDRST command after the EWXLDDMP command to rebuild the VSAM LDS with the new compression dictionary.

CAUTION:

The actual amount of data stored on z/OS for a compressed disk image varies depending on the compression ratio. So it is possible to run out of host disk space before NetWare realizes this. Avoid this by periodically running the EWXLDDMP and EWXLDLDRST commands to reorganize the compressed disk image.

You can use the EWXLDIMG command to check the current compression ratio for the disk as well as the space utilization. Each of these commands is explained in the reference portion of this manual.

About Concurrent Copy

You can use concurrent copy to back up disk images. Using the 3990 concurrent copy control unit for back up lessens the downtime of the disk image. However, you should not use concurrent copy to back up a disk image that is in use. A disk image is considered in use when:

- NetWare clients or server NLMs are reading from or writing to the disk image
- NetWare cache buffers are writing to the disk image

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- NetWare compression is enabled for the disk image

Therefore, before you perform any backup, dismount the disk image from the NetWare server. This is the only way to ensure a valid backup without loss of data.

However, if you choose to backup without dismounting the disk image, the following should result in a valid backup, but there is no guarantee:

Perform the backup off-shift during a period when the following is true:

- NetWare disk compression is not enabled.
- There are no dirty cache buffers to be written to disk image.
- There are no NetWare users or server NLMs accessing the disk image.

If you do not verify these conditions which must hold true for the entire backup period, the result could be partial files being backed up. If this occurs, you will need to run the VREPAIR utility on the volume when the data is restored.

Recovering a File from a Backed Up Disk Image

Perhaps a LAN user accidentally deleted a file from a disk image. If the disk image containing the file was backed up (EWXLDMP), the file can be recovered. To do this:

1. Create a new disk image using a size that is the same as the backed up disk image. The size **must** be equal.

For example, our backed up disk image is named IMAGE and has a size of 400M. We will create a new data set TEMP.DATASET using a size of 400M:

```
EWXLCRT 'TEMP.DATASET' 400M NEW
```

Note: You may want to create the disk image in a batch session because creating a new disk image can be time consuming.

2. Copy the line in the disk image definitions data set that defines the disk image. You can keep all the values the same, except for the z/OS DATA SET NAME field. Set the new data set name and comment out the line you copied.

For example, our disk image named IMAGE has a line in the disk image definitions data set that looks like this:

```
IMAGE ORIG.DATASET W
```

We will copy this line, define our new data set TEMP.DATASET, and comment out the line we copied. Our new disk image definitions data set looks like this:

```
*IMAGE ORIG.DATASET W  
IMAGE TEMP.DATASET W
```

3. Restore the backup copy of the disk image.

For example,

```
EWXLRST 'TEMP.DATASET'
```

Note: The sequential dataset to restore from must be defined on the EWXDUMP DD statement.

4. Dismount all the host volumes.
5. Stop the z/OS LANRES disk server job.
6. Restart the LANRES disk server job with the new disk image definitions.
7. Mount the disk image.

For example, we entered the following from the NetWare server console:

```
MOUNT IMAGE
```

8. Copy the file that you need.
9. Dismount this backup copy of the disk image.

For example, we entered the following from the NetWare server console:

```
DISMOUNT IMAGE
```

10. Stop the z/OS LANRES disk server job.
11. Delete the line you copied and uncomment the original line in the disk image definitions data set.

For example, our disk image definitions data set looked like this (the way it looked originally):

```
IMAGE ORIG.DATASET W
```

12. Restart the z/OS LANRES disk server job with the original disk definitions.
13. Remount the original disk image.

For example, we entered the following from the NetWare server console:

```
MOUNT IMAGE
```

14. Remount any other host volumes.

This completes the file recovery and restores disk serving to its original state.

Expanding a NetWare Volume

This section describes the procedures for expanding NetWare volumes from the NetWare server and from the z/OS host.

Expanding NetWare Volumes from the NetWare Server

The following is the procedure for adding an z/OS Host BASED SEGMENT to INCREASE the size of a Novell volume under Novell V4.1. Before you start, backup the LDS using IDCAMS REPRO or any procedure you use to back up the LDS.

1. IDCAMS ALLOC the new CLUSTER or EWXLD CRT.
2. LDINIT the new LDS via EWXLD CRT.
3. Add the volume and DSN information to EWXCONFIG.DISKS.

Note: Add the new segment before the old. Otherwise, you will not be able to add this new segment to an existing volume.

The following example is for EWXCONFIG.DISKS:

```
test02 grech.NEW.lds2 w
test01 grech.OLD.lds1 w
```

4. START DISK SERVING using the modified EWXCONFIG.DISKS

On the server, you will see the connection established as follows:

```
Mounting 2 volumes...
Volume test02 could not be mounted. Some or all volume
segments cannot be located.
```

The same messages will appear for volume test01.

5. Load INSTALL.NLM on the file server.
 - Select DISK OPTIONS.
 - Select MODIFY DISK partitions.
 - Select NEW DEVICE test02.
 - Create NetWare Disk Partition.

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- Exit from disk options.
 - Select VOLUME OPTIONS.
 - Press insert. (You should see free space.)
 - Select *free space* and choose the option to make this segment part of another volume. You should now see the volume that you want to increase in size. Select this volume and the segment will be added to the volume.
 - Save the changes and mount the volume.
 - Map the new volume (MAP n testag:).
 - Now you should see that the volume size has increased.
6. For NetWare 5.x.
 - Load NWCONFIG on the file server.
 - Select MODIFY.
 - Select INCREASE.

Expanding NetWare Volumes from the z/OS Host

This procedure is used to create a larger z/OS volume when your NetWare volume runs out of space. Copy your existing files and directories to the new volume, and rename your new volume to match the original name of the volume that became full.

1. Allocate two new Linear Data Sets of the desired size using the EWXLD CRT JCL shown in Figure 13 on page 167.
2. Bring down the Disk Server task (if it is running) and add a definition in the EWXCONFIG.DISKS configuration dataset of one of the two new LDSs as a work volume to use during the update process. See Figure 14 on page 168.
3. Restart the disk server task on the host, and wait for the mount requests on the server console. Use the JCL shown in Figure 15 on page 169. Type MOUNT ALL on the server console, and note that the newly created volume does NOT mount.
4. On the server console, type LOAD INSTALL and NWCONFIG for NetWare 5.x and use the disk and volume options to define the new NetWare volume, create the NetWare Partition, etc; MOUNT the new volume at the completion of these activities.
5. Submit the sample JCL shown in Figure 16 on page 169 to copy all the files from the existing NetWare volume to the new work volume.
6. When the copying is complete, bring down the disk server task again and repeat step 2 to add the definition of the new LDS in place of the currently full LDS.
7. Repeat steps 3 and 4 for to define and initialize the LDS that is replacing the full NetWare volume.
8. Repeat step 5 after changing the JCL shown in Figure 4 to copy all the files from the work volume to the new LDS.

```

//LDCRT   JOB   (37TA),USER,MSGCLASS=A,MSGLEVEL=(1,1),NOTIFY=USER
//*
//*   ALLOCATE A DISK FOR z/OS Disk Serving
//*
//STEP1   EXEC   PGM=IKJEFT01,REGION=4096K
//STEPLIB DD   DSN=EWX.SEWXLMO,DISP=SHR
//SYSEXEC DD   DSN=EWX.SEWXPROC,DISP=SHR
//EWXLHCFG DD   DSN=EWX.EWXLHPRT.PROCS,DISP=SHR
//EWXCONFG DD   DSN=USER.EWXCONFG.LINK,DISP=SHR
//EWXDUMP DD   DSN=USER.LDSBKUP.DATA,DISP=OLD
//EWXPRINT DD   SYSOUT=*
//ISPLLIB DD   DSN=ISPF.ISPSLIB,DISP=SHR
//        DD   DSN=ISPF.ISRSENU,DISP=SHR
//ISPTLIB DD   DSN=ISPF.ISPTENU,DISP=SHR
//        DD   DSN=ISPF.ISRTLIB,DISP=SHR
//        DD   DSN=USER.ISPF.PROFILE,DISP=SHR
//ISPLOG  DD   DSN=&&ISPLOG;,,UNIT=SYSDA,DISP=(NEW,DELETE),
//        DCB=(RECFM=VB,LRECL=125,BLKSIZE=23476),
//        SPACE=(CYL,(1,0,10))
//ISPPROF DD   DSN=&&ISPPRF;,,UNIT=SYSDA,DISP=(NEW,DELETE),
//        DCB=(RECFM=FB,LRECL=80,BLKSIZE=6160),
//        SPACE=(CYL,(1,0,10))
//SYSPROF DD   DSN=ISPF.ISRCLIB,DISP=SHR
//SYSHELP DD   DSN=SYS1.HELP,DISP=SHR
//ISPLLIB DD   DSN=ISPF.ISPPENU,DISP=SHR
//        DD   DSN=ISPF.ISRPENU,DISP=SHR
//ISPSLIB DD   DSN=ISPF.ISPSLIB,DISP=SHR
//        DD   DSN=ISPF.ISRSENU,DISP=SHR
//ISPMLIB DD   DSN=ISPF.ISPMENU,DISP=SHR
//        DD   DSN=ISPF.ISRMENU,DISP=SHR
//SYSPRINT DD   SYSOUT=*
//SYSTSPRT DD   SYSOUT=*
//SYSTSIN DD   *
EWXEXEC
EWXLD CRT 'USER.WRKVOL.TEST' 10M NEW WPKK0C
EWXLD CRT 'USER.NEWVOL.TEST' 10M NEW WPKK0C
LISTC LEV(USER.WRKVOL) ALL
LISTC LEV(USER.NEWVOL) ALL
END
/*

```

Figure 13. EWXLD CRT JCL for Allocation of 2 New LDSs

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```

*****
*****
*?INCLUDE COPYRIGHT RELASSM *
*****

*****
* This is a sample EWXCONFIG.DISKS data set for the LANRES *
* Disk Serving function. The name of the data set is specified *
* when entering the EWXLDISK command. *
*****

*****
* This MVS configuration data set uses the following format:
* o The maximum line length is 80
* o Comment lines, which are ignored, must start with '*'
* Blank lines are also ignored
* o Maximum length for a NetWare volume is 8 characters
* o Access Mode is W (Write) or R (Read), if not specified
* W is the default
* o Data Space Size range is 1 to 2048 (in megabytes). If not
* specified the default is the size of the MVS linear data set.
*****

*NetWare MVS Data
*Volume Data Set Access Space
*Name Name Mode Size
*-----
BOOKMSTR LANRES.BOOKMSTR.DISK W 2
VOLUME1 LANRES.VOLUME01 W 2
VOLUME2 LANRES.VOLUME02 W 2

*****
* The following parameters are tuning options which can improve
* the performance of the LANRES Disk Serving function. Each can
* be enabled by removing the asterisk in front of the keyword.
* They are most effective when used in combination.
*
* SUBTASK
*
* When this option is specified, the Disk Serving function will start
* up a subtask for each disk segment specified in this configuration
* file. This will allow disk I/O to occur in parallel and generally
* will improve throughput.
*
* LARGE_BURST
*
* This allows more packets to flow before an acknowledgement is
* required. This can improve throughput.
*
* LARGE_BUFFER
*
* This increases the size of the transmission unit across the
* interface to the server. This is only effective if the server
* is using EWXDISK.HAM. If this option is used and the server
* has EWXDISK.DSK loaded, this option is ignored. This option
* can reduce the overhead of handling transmissions across the
* interface and can reduce CPU utilization.
*
* MINI_WINDOW
*
* This decreases the dataspace size to reduce the CPU overhead.
* This option is ignored if the dataspace size is set to a value
* other than 1 or 2.

```

Figure 14. Sample EWXCONFIG.DISKS Data Set - Disk Serving Function

```

//USRLDISK JOB NOTIFY=USER,MSGLEVEL=(2,1),MSGCLASS=H,REGION=4096K,
// CLASS=A,TIME=NOLIMIT
//*-----*//
//* z/OS LANRES Disk Server. *//
//*-----*//
//LIBSRV EXEC PGM=EWXLDISK,TIME=NOLIMIT,
// PARM='EWX.EWXCONFIG.DISKS (CHANNEL D14 RETRY 30'
//STEPLIB DD DSN=EWX.SEWXLMOD,DISP=SHR
//* z/OS LANRES STATEMENTS
//SYSEXEC DD DSN=EWX.SEWXPROC,DISP=SHR
//EWXMSGG DD DSN=EWX.SEWXMSGG,DISP=SHR
//EWXPRINT DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*

```

Figure 15. JCL to Restart the Disk Server Task on the Host

```

//USERD JOB NOTIFY=USER,MSGLEVEL=(2,1),MSGCLASS=H,REGION=4096K,
// CLASS=A
//COPISTEP EXEC PGM=IKJEFT01,TIME=1440,REGION=4096K
//STEPLIB DD DSN=USER.EWX.SEWXLMOD.NOSLM,DISP=SHR
// DD DSN=EWX.SEWXLMOD,DISP=SHR
//*****
//* SUPPORT LIBRARIES *
//* 7/15/96 USER. *
//*****
//SYSEXEC DD DSN=EWX.SEWXPROC,DISP=SHR
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//EWXPRINT DD SYSOUT=*
//SYSABEND DD SYSOUT=*
//SYSMDUMP DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//EWXOPTS DD DISP=SHR,DSN=USER.EWX.SEWXOPTS(EWXCOMM)
//EWXMSGG DD DISP=SHR,DSN=EWX.SEWXMSGG
//EWXCONFIG DD DSN=EWX.EWXCONFIG.LINK,DISP=SHR
//SYSTSIN DD *
PROFILE MSGID
EWXEXEC
EWXCONN LINK DIST SERVER/ADMIN +
PASSWORD (CHANNEL 0D16 DEBUG 5
EWXDS COPY KVOL1:\*.* WRKVOL:\*.* (SUBDIR
EWXDS LIST WRKVOL:\*.*
EWXCONN DROP
END

```

Figure 16. Copy Files from Work Volume to New LDS

Chapter 10. Distribution

This chapter describes how to use the distribution function of z/OS LANRES. The z/OS LANRES distribution function lets you work with NetWare files and directories from z/OS. You can copy files from z/OS to a NetWare server or from the NetWare server to z/OS. You can also send messages to NetWare users and load a NetWare NLM from z/OS.

Note: If you use RACF (or some other security product), you must allow the high level qualifier of EWXLR to allocate and delete datasets. EWXLR is the high level qualifier used by the distribution function to create and remove temporary datasets it needs while processing some commands.

Before the distribution function can be used, the LANRES object must be created on the NetWare server. If you plan to use NDS, the LANRES object must be manually created.

The LANRES object must be created on each server that processes z/OS LANRES distribution or host-to-LAN print requests. For added security, we suggest that you do not keep a copy of the LANRES object NLM on your NetWare servers. Instead, install it from the z/OS LANRES diskette when it is needed. This prevents users that are not authorized to use your server from logging in as the LANRES object, therefore gaining Supervisor Equivalent authority. A section in this chapter describes how to load the LANRES object.

After the LANRES object is created on the NetWare servers, z/OS LANRES communications must be started on z/OS and NetWare server. "Starting z/OS LANRES Communications on a NetWare Server" on page 99 describes how to start communications.

Next, an z/OS LANRES distribution NLM must be loaded on the NetWare server. One copy of the NLM should be loaded for each z/OS user who will be performing distribution functions at the same time. After the distribution program is loaded on the NetWare server, z/OS users can establish connections to the NetWare server and use the distribution function.

In summary, to use the z/OS LANRES distribution function, do the following:

1. Ensure the required distribution and z/OS LANRES data sets are allocated.
2. Create the LANRES object on each NetWare server that will process distribution requests. (This needs to be done *only once* per NetWare server.)
3. Ensure that communications are started on the NetWare server and on z/OS.
4. Load one or more copies of the distribution program on the NetWare server.
5. Establish a server connection from z/OS.
6. Perform distribution functions from z/OS.

Creating the LANRES Object

1. Bindery environment

Each NetWare server that processes z/OS LANRES distribution or host-to-LAN print requests requires the LANRES object. This includes NetWare servers that are directly connected to the z/OS through z/OS LANRES and remote servers that are not connected to z/OS and are not running z/OS LANRES. To create the LANRES object, load the EWXLOBJ NLM using the NetWare LOAD utility. If

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the EWXLOBJ NLM was not copied to the server, insert the LANRES product diskette into drive a: of the NetWare server and load the NLM from diskette:

```
load a:\ewxlobj add password=objpass
```

Note: Any NetWare drive can be used.

The ADD option indicates that you want to add the LANRES object to the NetWare server. The PASSWORD option defines a password for the LANRES object.

The password restricts access to the LANRES object. Any distribution program (EWXDIST.NLM) or host-to-LAN print program (EWXHLPRT.NLM) that attempts to communicate with the LANRES object on the server must supply the password.

There are several ways for the EWXDIST or EWXHLPRT NLMs to supply the password. One way is to specify the password in the initialization file for EWXCOMM. In that initialization file, which is named EWXCOMM.INI, specify the LOBJ_PASSWORD keyword; for example:

```
lobj_password = lanresobjpass
```

The password is used for both EWXDIST and EWXHLPRT. See “Specifying Server Component Passwords” on page 103 and “Specifying the LANRES Object Password” on page 104, for more information about specifying passwords in the EWXCOMM.INI file.

Another way to specify the password is by using the LOBJ_PASSWORD option when loading EWXDIST and EWXHLPRT.

2. NDS environment

Create the LANRES object using NETADMIN or NWADMIN. The LANRES object must have supervisor privileges and must be a user of the queues that it will access.

Loading the Distribution NLM on NetWare

The z/OS LANRES distribution NLM is EWXDIST. This NLM runs on NetWare and receives distribution requests from z/OS users; it uses NetWare functions to process those requests. The requests can be processed on the NetWare server on which the distribution NLM is running, or they can be processed on a remote NetWare server (if that is what the z/OS user specified).

When the user wants the distribution request to be processed on a remote NetWare server, EWXDIST logs in to the remote server. To log in to the remote server, the user must have a user ID on the remote server. This user ID must be specified with the EWXCONN LINK command on z/OS. The LANRES object must exist on the remote server so that NetWare can verify the login password. This EWXDIST login, if successful, merely allows communications between the EWXDIST NLM and the remote NetWare server. The z/OS users must have the proper NetWare privileges for the distribution functions they are trying to use. The remote NetWare server checks the authorization, not z/OS LANRES.

Before loading the distribution NLM, ensure that the LANRES communication driver (EWXCOMM) is already loaded. If you do not know whether it is loaded, use the NetWare MODULES command to list the loaded modules. See the *NetWare Utilities*

Reference manual for more about the MODULES utility. If you need to load the LANRES communication driver, see “Starting z/OS LANRES Communications on a NetWare Server” on page 99.

To load the LANRES distribution NLM, enter the LOAD EWXDIST command on the NetWare server console. A simple form of the command is shown in the following example.

```
load sys:\ewxnlm\ewxdist
```

The EWXDIST NLM is located in the EWXNLM directory of the SYS volume. If you have moved the NLM to a different directory, substitute the correct volume and path on the above command. The EWXDIST NLM remains loaded until you enter a command to unload it.

If you're using component passwords, you can specify server component passwords for the EWXDIST NLM by using the PWIN and PWOUT options, as follows:

```
load sys:\ewxnlm\ewxdist pwin=distdown pwout=distup
```

You can also specify the password for the LANRES object:

- Bindery environment:

```
load sys:\ewxnlm\ewxdist lobj_password=lanresobjpass
```

- NDS environment:

```
load sys:\ewxnlm\ewxdist lobj_password=lanresobjpass lobj_context=o=ibm
```

If you set the passwords in the z/OS LANRES initialization file (EWXCOMM.INI) as recommended in “Specifying Server Component Passwords” on page 103 and “Specifying the LANRES Object Password” on page 104, you don't need to specify them here.

The EWXDIST NLM handles only one connection from the z/OS system. In other words, only one z/OS user can connect to the distribution NLM at a time. If you want to support multiple z/OS users, load multiple copies of the EWXDIST NLM by repeatedly entering the LOAD EWXDIST command.

Assuming you've specified the passwords in EWXCOMM.INI, each copy of EWXDIST will use the same passwords. Users do not need to remember different passwords for different available EWXDIST NLMs.

Remember that the total number of connections allowed to the NetWare server is governed by the SESSIONS option in the EWXCOMM.INI file. See “z/OS LANRES Sessions” on page 101 for more information.

You can automate the loading of EWXDIST on the NetWare server. To learn how, see “Automatically Loading z/OS LANRES NLMs on a NetWare Server” on page 107.

Unloading the Distribution NLM on NetWare

To unload the distribution NLM, enter the following command on the NetWare server console:

```
unload ewxdist
```

All copies of the distribution NLM are unloaded. All distribution connections with z/OS are broken.

Connecting to NetWare from z/OS

You can use any of the z/OS LANRES user interfaces. We will use the command line interface and establish a z/OS LANRES command session with the EWXEXEC command. Enter the following z/OS LANRES command from the TSO READY prompt:

```
EWXEXEC
```

The following displays:

```
LANRES READY
```

Now to use the distribution function, you must log in to a NetWare server. EWXCONN LINK will log in to the NetWare server with your NetWare user ID and password. The NetWare login is necessary because NetWare verifies that you are authorized to do NetWare tasks, not z/OS LANRES.

We will connect to the NetWare server and establish a distribution connection to the NetWare server.

```
EWXCONN LINK MYDIST (PWIN DISTUP PWOUT DISTDOWN
```

Notice we used the nickname MYDIST. This means we have set up a configuration data set that looks like this:

- Bindery

```
MYDIST DIST SVR2/USR2 PW2 TCPIP HOST2
```

- NDS

```
MYDIST DIST .cn=beena.o=ibm TCPIP HOST2
```

This line provides the values that the EWXCONN LINK command needs to establish a connection to the distribution function. DIST means a distribution session is being requested. The NetWare server that we want to log in to is named SVR2 as NetWare user USER2 whose password is PW2. The TCP/IP communications protocol TCP/IP is used to communicate with the target NetWare server whose host name is HOST2. The communications target must have the z/OS LANRES distribution program (EWXDIST) running on it. The target NetWare server can be the same as the NetWare server you're logged in to.

If you don't know what to specify, ask the person who set up the communications for z/OS LANRES.

We've opted to use component passwords, so we specified DISTUP and DISTDOWN. These passwords match the server component passwords set for the distribution program (EWXDIST) on the target NetWare server whose host name is HOST2. Remember that the "output" component password of z/OS LANRES on z/OS connects to the "input" component password of the distribution program on the NetWare server. The "input" component password to z/OS LANRES on z/OS connects to the "output" component password of the NetWare distribution program.

When you press the Enter key, z/OS LANRES connects to the target NetWare server and logs in to the NetWare server for you. Some things to remember:

Notes:

1. You may be able to use the EWXCONN LINK command to connect to a NetWare server, but you can only perform tasks for which you have proper NetWare authorization.
2. You cannot have more than one z/OS LANRES function connection from the same host session. For example, you cannot have both an administration connection and a distribution connection from the same z/OS terminal session. If you already have an administration connection and try to start a connection for distribution, z/OS LANRES breaks the connection for administration. Then z/OS LANRES makes a connection for the distribution function.

Example of Displaying NetWare Data on z/OS

Now that we have a distribution connection established, we can use any of the EWXDS commands. Let's use the EWXDS GET command to display the contents of the EWXCOMM.SAM file residing on the NetWare server. Enter the following command from the LANRES READY prompt:

- Bindery environment:

```
EWXDS GET SYS:\EWXNLM\EWXSTART.SAM
```

- NDS environment:

```
EWXDS GET .NW3_SYS.IBM:\EWXNLM\EWXSTART.SAM
```

This displays the contents of the EWXSTART.SAM file at your z/OS console. Optionally, we could have specified a data set name and placed the EWXSTART.SAM file in a data set instead of displaying the contents on the z/OS console. For more details about the EWXDS GET command, see *z/OS LANRES Configuration Files and Commands*.

Ending Your Connection to NetWare

When you are done using z/OS LANRES distribution functions, end your connection to the NetWare server. By ending your connection, you make a session available for another person. To end your connection, enter the EWXCONN DROP command.

About Data Translation

When data is transferred between a NetWare server and z/OS, two file properties may need to change:

1. File name

NetWare files have eight character file names and a three character extension name. z/OS data, on the other hand, is represented by a data set name. Obviously, some scheme must be used to rename files when they are transferred from one system to the other.

2. Text representation

On NetWare, text files use an ASCII character set. Each line of the file is followed by a carriage return character X'0D' and a line feed character X'0A'. Sometimes the last line of a file is followed by an end-of-file character X'1A'. Some files also contain ASCII tab characters. On z/OS, the EBCDIC character set is used instead of ASCII. Each line of the file is stored as a separate record, and there is an EBCDIC tab character. z/OS LANRES either preserves the tab or expands it by replacing the tab with space characters.

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The commands that transfer data (EWXDS GET and EWXDS PUT) have options that let you specify the sources and the targets completely. If you omit some portion of the target, however, a default renaming scheme is used.

Changing Translation Defaults

You can change the default renaming scheme in any of the following ways. This list also implies the search order:

1. Create and allocate a fully qualified data set to the EWXTRANS DDname containing translation defaults. This makes EWXDS GET and EWXDS PUT commands use the renaming scheme defined in this data set as the translation defaults. A sample translation defaults data set can be found in *qual.SEWXSAMP* as member EWXTRANS.
2. Create a data set containing translation defaults, but instead of allocating the data set to EWXTRANS, specify its name as the value for the Translation_Defaults option in the *qual.SEWXOPTS(EWXCOMM)* data set. This makes EWXDS GET and EWXDS PUT commands use the renaming scheme defined in this data set as the translation defaults. A sample translation defaults data set can be found in *qual.SEWXSAMP* as member EWXTRANS. For details about host configuration options, see “Setting Host Configuration Options” on page 124.
3. Don't use a translation defaults data set; leave the Translation_Defaults host configuration option initial value as NONE, and don't allocate any data set to EWXTRANS. The EWXDS GET and EWXDS PUT commands process as described in the reference portion of this manual (as they did in earlier z/OS LANRES releases).

Note: The EWXTRANS DDname allocation, being the first translation default searched for, helps those users who want to override the translation defaults the administrator may have set in the host configuration options data set. For a list of data set allocations, see Table 8 on page 131.

To set up a translation defaults data set, specify the following:

TYPE QUALIFIER Field

Specify the third-level qualifier of the z/OS data set name here or the string BLANK. If the TSO prefix is part of the data set name, it is counted as the first-level qualifier. For example, the type qualifier for the following data set is three.

prefix.two.three.four.five

If there is no third-level qualifier, nothing is used and there is no check made.

If this is set to the string BLANK, the PC EXT field must be left blank.

PC EXT Field

Specify the PC file extension, or you can leave this blank. If this field is blank, then the TYPE QUALIFIER field must be specified as the string BLANK.

TRANSLATION OPTION Field

Determine how the data should be translated.

Specify ASCII and the data is translated from EBCDIC to ASCII when copying a data set from z/OS to the NetWare server. Data is translated from ASCII to EBCDIC when copying a file from the NetWare server to z/OS.

Specify ASCII TAB and it is the same as specifying ASCII with the addition of expanding tabs. This only works with EWXDS GET. For example, ASCII TAB here is the same as specifying the EWXDS GET command with the ASCII NOTAB options.

Specify BINARY and no data is translated. This is useful when you have files that contain binary data, such as bit maps.

Syntax

Comments are identified by an *, ;, or / in column one and are ignored. Blank lines are ignored. The maximum size of a line is 80 characters. If duplicate entries exist, only the first entry is used.

Example of Data Translation Using the EWXDS GET Command

For example, let's assume the following is set in our translation defaults data set:

```
*
*
*--Type Qualifier----<PC Ext>-----<Translation Options>-----
*
  DATASET          PC          ASCII
```

When the following command is entered from the LANRES READ prompt:

```
EWXDS GET SYS:\NETWARE\ISA.PC *.*
```

The NetWare file ISA.PC in ASCII format is copied from the NetWare server to create an z/OS data set named ISA.DATASET in EBCDIC format.

Automating Distribution

One way to automate distribution is to group EWXDS commands together in REXX programs. Consider creating REXX programs that issue several EWXDS commands to perform a single distribution task. One of the features of distribution is the ability to create new procedures for the system administrator.

z/OS LANRES provides a sample REXX program named DISTSAMP that can be found in the *qual.SEWXSAMP* data set. This program gets a file from a NetWare server, then distributes the file to multiple NetWare servers. For example, the DISTSAMP program starts a distribution connection, issues EWXDS GET and EWXDS PUT commands, then ends the connection. If you want to use the DISTSAMP program, you will need to tailor it to meet the needs of your environment. For information about running sample programs, see "Running z/OS LANRES Samples" on page 138.

To further automate, you can use the EWXEXEC command to run the REXX programs in batch.

Automatically Archiving or Backing Up NetWare Files

You can use EWXDS commands to archive or backup different NetWare files to:

- An z/OS data set
- Another NetWare volume, if the volume is mounted
- Another backup media

To automate the task, you can use the sample REXX programs that z/OS LANRES provides named EWXARV and EWXBAK. Both programs can be found in the *qual.SEWXSAMP* data set. Of course, you will need to tailor them to meet the

Distribution

needs of your environment and files. To tailor the messages, you can either put the message text in the procedure itself or create your own message repository.

The EWXARV program archives all files in a NetWare server directory to the same data set prefix. The EWXBAK program backs up all files on a NetWare volume to another mounted NetWare volume. Note that z/OS LANRES distribution cannot back up NetWare files with the execute-only attribute.

For information about running z/OS LANRES samples, see “Running z/OS LANRES Samples” on page 138.

Compressing Data

Using z/OS LANRES distribution to store individual workstation files in compressed format in an z/OS data set can help free valuable space on the workstation and host. The EWXDS GET command used with the COMPRESS option gets the workstation file and stores it on the host in compressed format. You don't need to do anything special to decompress data when it is placed back on the NetWare server. Just use the EWXDS PUT command with the BINARY option.

Sometimes the best choice is not to use data compression because it uses more CPU. Certain types of data (such as minimal repetition) can require more space to store data in compressed format than to store it in its original format. If this is detected, z/OS LANRES makes this decision for you and the data is saved in its original format. You are notified through a message if data compression was not performed.

Chapter 11. Host-to-LAN Print

This chapter describes how to set up and use the host-to-LAN print function as a JES local printer or as a VTAM printer. Depending on how you want to set up host-to-LAN print, go to:

- “About Host-to-LAN Print (JES)”
- “About Host-to-LAN Print (VTAM)” on page 190

About Host-to-LAN Print (JES)

This section describes how to set up host-to-LAN print to act as a JES local printer. But first, we will explain how this works.

z/OS has a functional subsystem interface (FSI) that allows communication between JES and a functional subsystem (FSS)/ functional subsystem application (FSA). This FSS/FSA can be a program that lets the z/OS environment support sophisticated printer devices, such as the 3800-3. However, FSS has an added capability; it can drive a simple device or a process, that, in reality, is not a printer. In our case, it is the host-to-LAN print server. Consequently, this host-to-LAN print server looks like a JES local printer to z/OS applications. If z/OS applications can use that JES local printer, they can print data on a NetWare printer.

The FSS/FSA can drive more than one JES local printer at a time. Each printer is driven by a task (TCB) in the FSS (ASID) address space. Multiple printers can be active in a single FSS. The following figures show JES local printing and JES FSS printing.

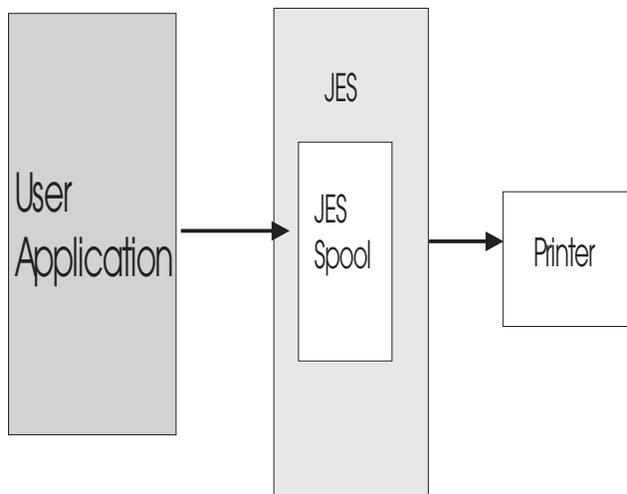


Figure 17. JES Local Printing

Host-to-LAN Print (JES)

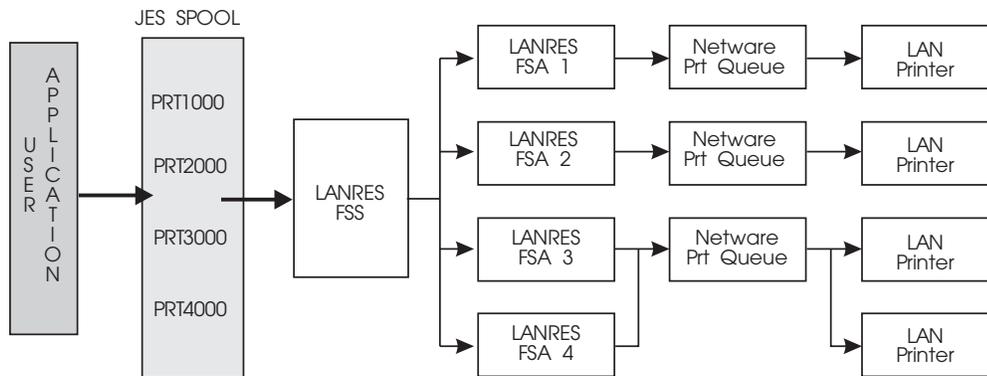


Figure 18. JES Functional Subsystem Printing Dataflow Using LANRES

Setting Up Host-to-LAN Print (JES)

The first time you set up host-to-LAN print, there are several tasks you must perform on z/OS and several on the NetWare file server. The following steps summarize these tasks for you. Each task is described in detail in this section.

1. Create a NetWare print queue server and print queue.
One NetWare print queue will correspond to one JES local printer (with its associated z/OS LANRESFSS host-to-LAN print server). Print data sent to the JES local printer will be routed to the associated NetWare print queue on the specific NetWare server.
2. Create host-to-LAN print definitions in a data set that will be used by the z/OS LANRES FSS.
Each z/OS LANRES FSS has a definitions data set. Each definition defines values for printer initialization and configuration.
Many printers can be active in the FSS at the same time. This data set gets allocated to the EWXHLCFG DDname in a JCL procedure. If a data set is not allocated to the EWXHLCFG DDname, host-to-LAN print will look for a data set with the name *prefix*.EWXHLPRT.PROCS.
3. Define FSS initialization statements and include them in your JES initialization stream.
Both JES2 and JES3 have FSS initialization statements that you use to install the z/OS LANRES FSS.
4. Define a JCL procedure that will start the z/OS LANRES FSS host-to-LAN print server.
JES uses this JCL to create a started task that acts as the FSS/FSA.
5. Associate a user ID with the host-to-LAN print started task.
The started task must have a user ID (such as a RACF user ID) associated with it so that the started task can access z/OS resources.
6. Authorize the EWXCONN QUERY PRINT command.
If you will be using the EWXCONN QUERY PRINT command, add EWXHLQRY to the TSO authorized program and command tables.
7. Create a LANRES object on the NetWare server where the NetWare print queue and print queue server were created.
 - a. Bindery
The LANRES object (NetWare supervisor privilege) must exist on each NetWare server with a print queue that will be used by z/OS LANRES host-to-LAN print.

b. NDS

Create a user object named LANRES using NETADMIN or NWADMIN. The user named LANRES needs supervisor privileges and must be a user of the queues that it will access.

8. Ensure that z/OS LANRES communications are active between the NetWare server and z/OS.

The EWXCOMM communications driver must be loaded on the NetWare server. See “Starting z/OS LANRES Communications on a NetWare Server” on page 99 for details.

9. Load the host-to-LAN print.nlm on the NetWare server.

The host-to-LAN print.nlm is a program loaded on the NetWare server that will receive data from the z/OS LANRES FSS and place that data on a NetWare server’s print queue.

10. Start the z/OS LANRES FSS.

The z/OS LANRES FSS can be made available by using the \$ADD command (JES2) or the next cold-start (JES3). To start the FSS, use the JES start printer command to start one of the z/OS LANRES connections.

11. Start the JES printer.

The z/OS operator can use JES printer commands to start (and stop) z/OS LANRES printing.

After setting up this host-to-LAN print serving, little intervention is needed. z/OS users can then send data to a LAN printer using the TSO PRINTDS command or the SYSOUT DDname (for JCL). The z/OS LANRESEWXCONN PRINT command can also be used.

There can be many host-to-LAN print servers running at the same time. Each z/OS LANRESprint server sends print data to one NetWare print queue.

Creating a NetWare Print Queue Server and Print Queue

To create a print server, you can use the NetWare PCONSOLE utility or the z/OS LANRESadministration EWXADMIN ADDPRTS command. (See “Chapter 8. Administration” on page 139 for information about using the z/OS LANRESadministration function.) You can use any of the z/OS LANRESinterfaces.

We will use the EWXADMIN ADDPRTS command. Assuming an z/OS LANRES administration connection is established and the z/OS LANRES EWXEXEC command was issued, we will create a print server from the LANRES READY prompt:

```
EWXADMIN ADDPRTS PSERV1
```

Where PSERV1 is our NetWare print queue server name.

The print server is created with the following properties. You can change these properties with the NetWare PCONSOLE utility.

Property	Initial Value
PASSWORD	Null
PS_USERS	EVERYONE
PS_OPERATORS	SUPERVISOR

Host-to-LAN Print (JES)

ACCOUNT_BALANCE

Null

Note: A “Null” for account balance means that there is no charge for using this print server.

The user SUPERVISOR is assigned as a print server operator, and the group EVERYONE is assigned as a print server user. If you are using NetWare Version 4.01, the EVERYONE group may not exist. In this case, the print server is still created, but no users are assigned to it. (No one can use the print server.) You will need to use the NetWare PCONSOLE utility to add print server users.

Next we will create a NetWare print queue. You can use the NetWare PCONSOLE utility or the z/OS LANRES administration command EWXADMIN ADDPRTQ.

Assuming an administration connection is established and the EWXEXEC command was issued, we will use the EWXADMIN ADDPRTQ command to create a print queue named HOSTPRT and assign the print server PSERV1 to it:

```
LANRES READY
EWXADMIN ADDPRTQ HOSTPRT (PRINTQS PSERV1
```

If the print server specified is incorrect or hasn't yet been created, a warning message displays. The print queue, however, is still created, and the name of the print server is not assigned to it.

Print queues created by the EWXADMIN ADDPRTQ command have the following properties. You can change these properties by using the NetWare PCONSOLE utility.

Property

Initial Value

Q_DIRECTORY

SYS:\SYSTEM

Q_SERVERS

The name of the print server you specified

Q_OPERATORS

SUPERVISOR

Q_USERS

EVERYONE

The user SUPERVISOR is assigned as a print queue operator, and the group EVERYONE is assigned as a print queue user. If you are using NetWare Version 4.01, the EVERYONE group may not exist. In this case, the print queue is still created, but no users are assigned to it. (No one can use the print queue.) You will need to use the NetWare PCONSOLE utility to add print queue users.

Creating a Host-to-LAN Print Definitions Data Set for JES

The z/OS LANRES host-to-LAN print function needs information such as the JES printer name, NetWare print queue, NetWare server name, and so on. This information is obtained by defining the values in a host-to-LAN print definitions data set.

The EWXHLPJE command looks for this information in the data set you have allocated to the EWXHLCFG DDname. (See Table 8 on page 131 for a list of data set allocations.) If you don't have a data set allocated, EWXHLPJE looks for a data set named *prefix.EWXHLPRT.PROCS*.

z/OS LANRES provides a sample of a host-to-LAN print definitions data set in the *qual*.SEWXPRT data set as member EWXHLPRT. Remember that *qual* is the high-level qualifier name used when z/OS LANRES was installed.

The print definitions data set is optional, but if there are no definitions, then no printers can be started. Here, the operator will have to dynamically add the printer definitions using the z/OS MODIFY operator command. See “Changing Printer Definitions without Stopping z/OS LANRES” on page 205 for details.

Specifying Definitions

Specify the following values in the host-to-LAN print definitions data set. The values are not case sensitive.

PRINTER NAME Field

Specify the name of your JES printer.

HOST ID Field

Specify NONE, or any nonblank character string here. This field is used for host-to-LAN print (VTAM) only.

NETWARE FILE SERVER Field

- Bindery
Specify the name of the NetWare server where the print queue was created.
- NDS
This field must be NDSERVER.

NETWARE PRINT QUEUE Field

- Bindery
Specify the name of the NetWare print queue where the print data is sent. When we created our print queue, we named ours HOSTPRT.
- NDS
Specify the fully qualified Context of the queue.

TRANSLATE DATA Field

Determine whether the print data is to be translated from EBCDIC to ASCII. Specify ASCII to translate the data from EBCDIC to ASCII. Specify BINARY to leave as EBCDIC data. If BINARY is specified, no internal exits are called.

NOTIFY WHEN PRINTED Field

Determine whether a message should be sent to the print job owner when the NetWare printer has printed the data. Specify NOTIFY to send the message. Specify NONOTIFY and no message is sent.

If you want to change the response time of receiving this message, use the QUERYTIME option.

USER EXIT NAME Field

Specify the name of a load module, REXX exec, or internal exit that you want to use to transform the print data, if any.

z/OS LANRES provides these exits that you can use:

- EWXHLINE
 - Allows a PROFILE, as well as an FCB and BANNER to be specified
 - Translates z/OS print data from EBCDIC to ASCII

Host-to-LAN Print (JES)

- Transforms ANSI or machine carriage control characters to ASCII control characters
- Is only valid for JES printers and results in an error if you specify EWXHLTRN for a VTAM printer
- Does not require a parameter list
- Is an INTERNAL exit
- EWXHLTRN
 - Transforms Advanced Function Printer Data Stream (AFPDS) to PostScript** (PS) or Hewlett-Packard** (HP**) Print Control Language (PCL**)
 - Requires that you set up the printer definition and outclasses it uses as a page printer.
 - Converts EBCDIC to ASCII
 - Is an INTERNAL exit
 - Needs a profile to run. For details, see “Defining a Profile for the EWXHLTRN Exit” on page 210.
 - Looks for fonts in the data set allocated to the EWXFONT DDname. For a list of all z/OS LANRES allocations, see Table 8 on page 131. If no data set is allocated, then EWXHLTRN looks for the *qual.SEWXFONT* data set. Remember that *qual* is the high-level qualifier name used when z/OS LANRES was installed.
 - Looks for the data sets needed for the transformation in the data set allocated to the EWXHLTR DDname. If no data set is allocated, then EWXHLTRN looks for the *qual.SEWXHLTR* data set. Remember that *qual* is the high-level qualifier name used when z/OS LANRES was installed.

Consider the following when using the EWXHLTRN user exit:

- Only text is supported.
 - The following AFPDS objects are translated:
 - Document
 - Presentation page
 - Presentation Text Data
 - Form definitions inside the data stream.
 - The following AFPDS objects *are not* supported:
 - Im1 image data
 - Overlay resources
 - Page segment resources
 - IO image (IOCA) commands
 - Graphic data (GOCA) commands
 - Bar code (BCOCA*) commands
 - Form definitions needed to read from a file
- Ensure that the AFP* and the z/OS LANRES translate tables are compatible. If they are not compatible, characters may not be properly transformed. (See “Changing the Default Translate Table” on page 125 for more information about translate tables.)
 - All text data is assumed to have characters that are in the current z/OS LANRES translation table for converting EBCDIC to ASCII.
- AFPDS that is transformed into PostScript is limited to Helvetica**, Times Roman**, and Courier style fonts.
- DBCS characters received in AFP data streams are not supported.

USER EXIT TYPE Field

Determine the type of the user exit. Specify PGM to define a load module exit. Specify EXEC to define a REXX exec exit. Specify INTERNAL to define one of the IBM supplied exits (EWXHLIN or EWXHLTRN).

USER EXIT PARAMETERS Field

Specify any parameters you want to pass to the user exit. Always begin the parameter string with a (. If you are using the EWXHLTRN user exit, specify the non-qualified data set name (profile) here if DD EPTRPRO is defined in the PROC or specify a fully qualified name.

- **EWXHLIN**

You may specify up to four optional parameters (FCB, BANNER, PROFILE, and NOFF) using the following format:

```
<keyword>=VALUE
where <keyword>= is FCB=, BANNER=, PROFILE=, or NOFF
```

Note: If an error is made in specifying the parameter, the parameter is ignored and no error message is issued. These parameters are described in the following:

Parameter**Description**

FCB= Specifies the 4-character prefix of an FCB name. JES passes the 4-character suffix to the host-to-LAN print function as part of the SWB. This suffix is not sufficient to resolve the FCB name. If FCB=PREFIX is specified, the 4-character suffix is appended to the prefix to create a FCB name. For example, if FCB=BFC2 was specified as a parameter and JES passed STD2 as the FCB name in the SWB, the host-to-LAN print function would look for the FCB named FCB2STD2.

BANNER=

Specifies the name of a REXX exec to change the NetWare Banner description shown by PCONSOLE. The name specified must be the name of a REXX exec that is a member of a data set allocated to the DDNAME SYSEXEC. The banner description is passed to the REXX exec via the REXX stack. The exit is expected to pull the banner description data from the stack and push the banner description back onto the stack before returning. The banner description can be up to 40 characters in length. A banner description longer than 40 characters is an error and is ignored.

PROFILE=

Specifies the name of a member of a data set allocated to the DDNAME EWXHLPRF, or the name of a member of the data set named <prefix>.EWXHLPRF.PROFS. The member has the same format as the profile data set that is specified for the EWXHLPRF INTERNAL exit. However, the only profile entries that are recognized are the SETUP 1 and SETUP 4 entries. They are used to pass a string of printer control characters to set up or reset the printer.

NOFF Replaces the leading form feed of the dataset to be printed with a suppressed form feed. This prevents a blank page from being printed between the banner and the start of data.

- **EWXHLTRN**

Host-to-LAN Print (JES)

Specifies the name of the print profile data set.

Syntax

When you create an entry in this data set, use this format:

```
mvsprintername none netwarefileservname netwareprintqueue name ASCII/BINARY  
NONOTIFY/NOTIFY userexitname PGM/EXEC/INTERNAL ( parm1 parm2
```

Comment lines are identified by a /* in the first two columns of a line and are ignored. The maximum size of a logical line is 255 characters. Specify a value for all the fields, except, of course, if you are not using user exit parameters.

Create a print definition entry for each z/OS LANRES FSS host-to-LAN print server and every NetWare queue that is to be used by the host-to-LAN print function.

Defining JES FSS Initialization Statements

The system programmer may be needed to complete the following.

Both JES2 and JES3 have FSS-related initialization statements that are used to define the FSS requirements and install the FSS.

JES2 FSS Initialization Statements

Define the following JES2 FSS-related initialization statements:

Statement

Description

FSS Defines the characteristics of the z/OS LANRES FSS host-to-LAN print server to JES2.

PRTnnnn

Defines each z/OS LANRES FSS host-to-LAN print server as a JES2 printer device.

For example, we defined one z/OS LANRES FSS host-to-LAN print server as a JES2 printer device; then we defined its characteristics:

```
FSS(HLFSS) PROC=HLPPROC,HASPFSSM=HASPFSSM,AUTOSTOP=YES
```

```
PRT1000 FSS=HLFSS,MODE=FSS,CKPTPAGE=100,PAGECKPT,START=NO,CLASS=printclass(s)  
PRT2000 FSS=HLFSS,MODE=FSS,CKPTPAGE=100,PAGECKPT,START=YES,CLASS=printclass(s)  
PRT3000 FSS=HLFSS,MODE=FSS,CKPTPAGE=100,PAGECKPT,START=NO,CLASS=printclass(s)  
PRT4000 FSS=HLFSS,MODE=FSS,CKPTPAGE=100,PAGECKPT,START=NO,CLASS=printclass(s)
```

This example means we are going to create a JCL procedure (next step) named HLPPROC. For more information about these statements and their parameters, see the *JES2 Initialization and Tuning Reference*.

JES3 FSS Initialization Statements

The system programmer may be needed to complete the following.

Define the following JES3 FSS-related initialization statements:

Statement

Description

DEVICE

Defines each z/OS LANRES FSS as a JES3 printer device.

SETNAME

Specifies all user-assigned and device type names associated with the *MDS-managed devices*. MDS-managed devices are those devices that JES3 allocates instead of z/OS.

FSSDEF

Defines the characteristics of the z/OS LANRES FSS host-to-LAN print server to JES3.

For example, we defined one z/OS LANRES FSS host-to-LAN print server as a JES3 printer device; then we defined its characteristics:

```
FSSDEF,TYPE=WTR,FSSNAME=HLFSS,PNAME=HLPPROC,SYSTEM=(SY1)

DEVICE,DTYPE=PRT3820,JNAME=PRT1000,MODE=FSS,FSSNAME=HLFSS,JUNIT=(,SY1,D1,ON)
DEVICE,DTYPE=PRT3820,JNAME=PRT2000,MODE=FSS,FSSNAME=HLFSS,JUNIT=(,SY1,D1,ON)
DEVICE,DTYPE=PRT3820,JNAME=P3T3000,MODE=FSS,FSSNAME=HLFSS,JUNIT=(,SY1,D1,ON)
DEVICE,DTYPE=PRT3820,JNAME=PRT4000,MODE=FSS,FSSNAME=HLFSS,JUNIT=(,SY1,D1,ON)
```

This example means we are going to create a JCL procedure (next step) named HLPPROC.

For more information about these statements and their parameters, see the *JES3 Initialization and Tuning Reference*.

Defining a JCL Procedure Used for Starting the z/OS LANRES FSS

Define a JCL procedure that contains z/OS LANRES and FSS required statements. This should reside in SYS1.PROCLIB or an extension.z/OS LANRES provides a sample JCL procedure named EWXHLP found in *qual.SEWXSAMP*.

An example follows:

```
//HLPPROC PROC
//STEP01 EXEC PGM=EWXHLPJE,PARM='(TCP/IP ENTERPRISE PWIN UP PWOUT DOWN',
// REGION=4096K
//STEPLIB DD DISP=SHR,DSN=QUAL.SEWXLMOD
//EWXHLCFG DD DISP=SHR,DSN=QUAL.EWXHLCFG
//EWXMSGSGS DD DISP=SHR,DSN=QUAL.SEWXMSGSGS
```

This example means:

- HLPPROC was defined in our previous FSS statements.
- EWXHLPJE is the program that emulates a JES2 local printer and starts a host-to-LAN connection.
- EWXHLPJ3 is the program that emulates a JES3 local printer and starts a host-to-LAN connection.
- TCP/IP indicates the TCP/IP communications method which connects z/OS LANRES on z/OS to z/OS LANRES on the NetWare server.
- ENTERPRISE is the NetWare server's TCP/IP host name.
- UP and DOWN are our host-to-LAN print component passwords. (We're not using a password data set.)
- QUAL.SEWXLMOD is the required step library.
- QUAL.EWXHLCFG is the data set where we defined our host-to-LAN print definitions. This is optional, but if there are no definitions, then no printers can be started. Here, the operator will have to dynamically add the printer definitions with the MODIFY operator command. See "Changing Printer Definitions without Stopping z/OS LANRES" on page 205 for details.
- QUAL.SEWXMSGSGS is our z/OS LANRES message repository.

For a list of all z/OS LANRES allocations, see Table 8 on page 131.

Host-to-LAN Print (JES)

Defining the FSS Started Task in the Started Procedures Table

The system programmer may be needed to complete the following.

The started procedures table ICHRIN03 must be updated to assign an identity (such as a RACF user ID) to each host-to-LAN print started task. A sample table is in SYS1.SAMPLIB.

If you are using RACF, see the *RACF System Programming Library* for information about defining a started task to RACF.

APF Authorize the z/OS LANRES Library

The system programmer may be needed to complete the following.

APF-authorize the *qual*.SEWXLMOD dataset. However, do not put *qual*.SEWXLMOD in LPA since some of the modules are not reentrant. Remember that *qual* is the high-level qualifier name used when z/OS LANRES was installed. See the *z/OS Installation and Tuning Reference* for information on making libraries APF-authorized.

Creating the LANRES Object

- Bindery

The LANRES object is required on each NetWare server that processes z/OS LANRESdistribution or host-to-LAN print requests. This includes local servers which are directly connected to z/OS through z/OS LANRES and remote servers which are not connected to z/OS and not running z/OS LANRES. The LOAD EWXLOBJ command must be executed on all NetWare servers that will process host-to-LAN print requests. Create the LANRES object by following the instructions in “Creating the LANRES Object” on page 171.

- NDS

A user object named LANRES must be created and given supervisory rights.

Assign the LANRES Object as a PRINTQ User

- Bindery

The LANRES object must be added as a user for all PRINTQs to be accessed. The LOAD EWXLOBJ command must be executed using the PRINTQ option as follows:

```
LOAD EWXLOBJ PRINTQ QUEUENAME
```

- NDS

The object named LANRES must be made a user of all the queues that it will access.

Loading the Host-to-LAN Print NLM

The host-to-LAN print NLM on NetWare receives print data and requests from z/OS. If the print NLM is not loaded, NetWare attached printers are not available to z/OS users and applications.

Before loading the print NLM, ensure that the z/OS LANRES communication driver (EWXCOMM) is already loaded. If you don't know whether it is loaded, use the NetWare MODULES command to list the loaded modules. See the *NetWare Utilities Reference* manual for more about the MODULES utility. If you need to load the

z/OS LANRES communication driver, see “Starting z/OS LANRES Communications on a NetWare Server” on page 99 for details.

To load the z/OS LANRES host-to-LAN print NLM, enter the LOAD EWXHLPRT command on the NetWare server console. A simple form of the command is shown in the following example:

```
load sys:\ewxn1m\ewxh1prt
```

The EWXHLPRT NLM is located in the EWXNLM directory of the SYS volume. If you have moved the NLM to a different directory, substitute the correct volume and path on the above command. The EWXHLPRT NLM remains loaded until you enter a command to unload it.

You can specify IN and OUT component passwords for the EWXHLPRT NLM by using the PWIN and PWOUT options, as follows:

```
load sys:\ewxn1m\ewxh1prt pwin=h1down pwout=h1up
```

- Bindery

You can also specify the password for the LANRES object:

```
load sys:\ewxn1m\ewxh1prt lobj_password=lanresobjpass
```

If you set the passwords in the z/OS LANRES initialization file (EWXCOMM.INI) as recommended in “Specifying Server Component Passwords” on page 103 and “Specifying the LANRES Object Password” on page 104, you don’t need to specify them here.

Each copy of EWXHLPRT uses the same passwords.

- NDS

You can specify the Context of the LANRES object, LOBJ_Context=Fully Qualified Name.

If you set the Context of the LANRES object in the EWXCOMM.INI file, you do not have to specify it here.

Remember that the total number of connections allowed to the NetWare server is governed by the SESSIONS option in the EWXCOMM.INI file. See “z/OS LANRES Sessions” on page 101 for more information.

You can automate the loading of EWXHLPRT on the NetWare server. To learn how, see “Automatically Loading z/OS LANRES NLMs on a NetWare Server” on page 107.

After the EWXHLPRT NLM is loaded, you will need to load the print server on the NetWare server using the NetWarePSERVER print utility and NLM. See the *Novell Print Server* book for details about PSERVER.

Defining the z/OS LANRES FSS

After updating your JES initialization statements, the z/OS LANRES print FSS will be defined to JES the next time JES is cold started.

Starting the JES Printer

Activating the JES printer will start z/OS LANRES printing.

The z/OS operator can use the JES printer stop command to stop z/OS LANRES printing.

Host-to-LAN Print (JES)

The End of Setup

If you have been reading through the chapter and have been setting up z/OS LANRES host-to-LAN print serving for JES, your set-up is complete. Both the NetWare NLMs and the z/OS print server should be up and running. The JES printers should be available to z/OS applications.

Now you can go to “Printing an z/OS Data Set on a NetWare Printer” on page 203.

About Host-to-LAN Print (VTAM)

This section describes how to set up host-to-LAN print to act as a VTAM attached printer, but first we will explain how this works.

The z/OS host-to-LAN print server, in reality, is an z/OS address space which emulates one or more VTAM LU1 (SCS) printers. Each printer is driven by a task in the address space. JES RJE and VTAM printing dataflow using LANRES is shown in the following figures:

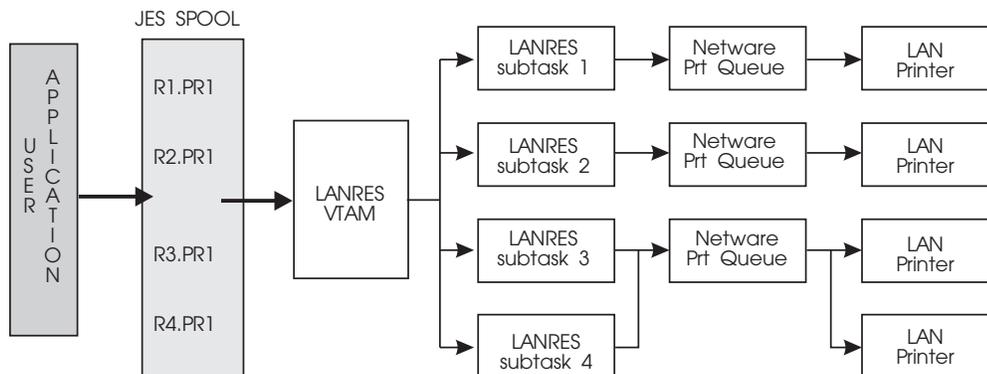


Figure 19. JES RJE Printing Dataflow Using LANRES

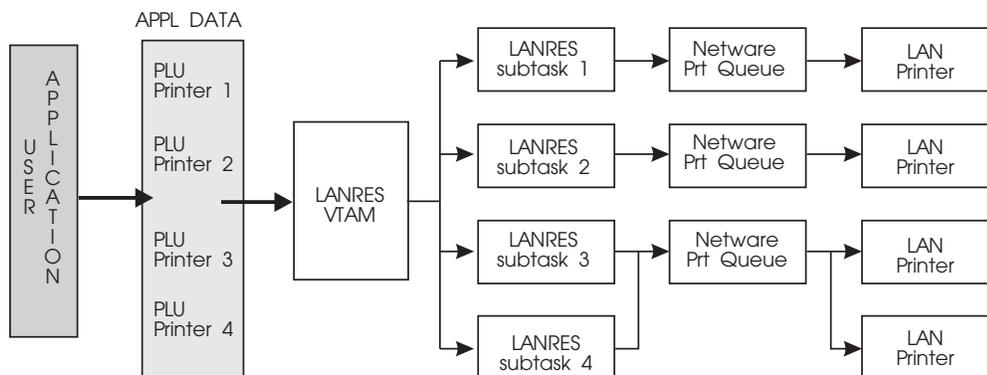


Figure 20. VTAM Printing Dataflow Using LANRES

Setting Up Host-to-LAN Print (VTAM)

The first time you set up host-to-LAN print (VTAM), there are several tasks you must perform on z/OS and several on the NetWare file server. The following steps summarize these tasks for you. Each task is described in detail in this section.

1. Create a NetWare print queue server and print queue.

One NetWare print queue will correspond to one VTAM printer. Print data sent to the VTAM printer will be routed to the associated NetWare print queue on the specific NetWare server.

2. Create host-to-LAN print definitions in a data set that will be used by the z/OS LANRES host-to-LAN print server.

Each host-to-LAN print server has a definitions data set. Each definition defines values for printer initialization and configuration. This data set gets allocated to the EWXHLCFG DDname in a JCL procedure. For a list of all z/OS LANRES allocations, see Table 8 on page 131.

3. Define VTAM initialization statements and include them in your VTAM initialization stream.

Each host-to-LAN print server (address space) must be defined as a secondary application to ACF/VTAM*.

4. Add LOGMODE table entries to VTAM.

If you decide to use z/OS LANRES host-to-LAN print as a JES RJE printer, you must add the JES0256 and JES4096 LOGMODE table entries to VTAM. These entries are in the EWXMTEWX member of the samples data set. Host-to-LAN print will not function correctly as an RJE printer without these table entries.

5. Define a JCL procedure that will start the z/OS LANRES VTAM host-to-LAN print server.

6. Define the EWXCONN QUERY PRINT command to TSO.

If you will be using the EWXCONN QUERY PRINT command, you must add EWXHLQRY to the TSO authorized program and command tables.

7. Load a LANRES object on the NetWare server where the NetWare print queue and print queue server were created.

- a. Bindery

The LANRES object (NetWare supervisor privilege) must exist on each NetWare server with a print queue that will be used by z/OS LANRES host-to-LAN print.

- b. NDS

Create a user named LANRES using NETADMIN or NWADMIN. The user named LANRES needs supervisor privileges and must be made a user of the queues that it will access.

8. Ensure that z/OS LANRES communications are active between the NetWare server and z/OS.

The EWXCOMM communications driver must be loaded on the NetWare server. If you need to load the z/OS LANRES communication driver, see “Starting z/OS LANRES Communications on a NetWare Server” on page 99 for details.

9. Load the host-to-LAN print NLM on the NetWare server.

The host-to-LAN print NLM is a program loaded on the NetWare server that will receive data from the host-to-LAN print server address space and place that data on a NetWare server’s print queue.

10. Start the z/OS LANRES VTAM host-to-LAN print address space.

Host-to-LAN Print (VTAM)

Use the z/OSSTART command or the TSO SUBMIT command to start the VTAM host-to-LAN print address space.

11. Start the VTAM printer.

Start the VTAM printer using the z/OS MODIFY command.

After setting up this host-to-LAN print serving, little intervention is needed. z/OS users can then send data to a LAN printer using the TSO PRINTDS command or the SYSOUT DDname (for JCL). The z/OS LANRES EWXCONN PRINT command can also be used.

There can be many host-to-LAN print servers running at the same time. Each z/OS LANRESprint server sends print data to one NetWare print queue.

Creating a NetWare Print Queue Server and Print Queue

To create a print server, you can use the NetWare PCONSOLE utility or the z/OS LANRESadministration EWXADMIN ADDPRTS command. (See “Chapter 8. Administration” on page 139 for information about using the z/OS LANRESadministration function.) You can use any of the z/OS LANRESinterfaces.

We will use the EWXADMIN ADDPRTS command. Assuming an z/OS LANRES administration connection is established and the z/OS LANRES EWXEXEC command was issued, we will create a print server from the LANRES READY prompt:

```
EWXADMIN ADDPRTS PSERV1
```

Where PSERV1 is our NetWare print queue server name.

The print server is created with the following properties. You can change these properties with the NetWare PCONSOLE utility.

Property	Initial Value
PASSWORD	Null
PS_USERS	EVERYONE
PS_OPERATORS	SUPERVISOR
ACCOUNT_BALANCE	Null

Note: A “Null” for account balance means that there is no charge for using this print server.

The user SUPERVISOR is assigned as a print server operator, and the group EVERYONE is assigned as a print server user. If you are using NetWare Version 4.01, the EVERYONE group may not exist. In this case, the print server is still created, but no users are assigned to it. (No one can use the print server.) You will need to use the NetWare PCONSOLE utility to add print server users.

Next we will create a NetWare print queue. You can use the NetWare PCONSOLE utility or the z/OS LANRES administration command EWXADMIN ADDPRTQ.

Assuming an administration connection is established and the EWXEXEC command was issued, we will use the EWXADMIN ADDPRTQ command to create a print queue named HOSTPRT and assign the print server PSERV1 to it:

```
LANRES READY
EWXADMIN ADDPRTQ HOSTPRT (PRINTQS PSERV1
```

If the print server specified is incorrect or hasn't yet been created, a warning message is displayed. The print queue, however, is still created, and the name of the print server is not assigned to it.

Print queues created by the EWXADMIN ADDPRTQ command have the following properties. You can change these properties by using the NetWare PCONSOLE utility.

Property

Initial Value

Q_DIRECTORY

SYS:\SYSTEM

Q_SERVERS

The name of the print server you specified.

Q_OPERATORS

SUPERVISOR

Q_USERS

EVERYONE

The user SUPERVISOR is assigned as a print queue operator, and the group EVERYONE is assigned as a print queue user. If you are using NetWare Version 4.01, the EVERYONE group may not exist. In this case, the print queue is still created, but no users are assigned to it. (No one can use the print queue.) You'll need to use the NetWare PCONSOLE utility to add print queue users.

Creating a Host-to-LAN Print Definitions Data Set for VTAM

The z/OS LANRES host-to-LAN print function needs information such as the VTAM printer name and ID, NetWare print queue, NetWare server name, and so on. This information is obtained by defining the values in a host-to-LAN print definitions data set.

The EWXHLPVT command looks for this information in the data set you have allocated to the EWXHLCFG DDname. For a list of all z/OS LANRES allocations, see Table 8 on page 131. If you don't have a data set allocated, EWXHLPVT looks for a data set named *prefix*.EWXHLPRT.PROCS.

z/OS LANRES provides a sample of a host-to-LAN print definitions data set in the *qual*.SEWXPRT data set as member EWXHLPRT.

The printer definitions data set is optional, but if there are no definitions, then no printers can be started. Here, the operator will have to dynamically add the printer definitions with the z/OS MODIFY operator command. See "Changing Printer Definitions without Stopping z/OS LANRES" on page 205 for details.

Specifying Definitions

Specify the following values in the host-to-LAN print definitions data set. You can specify values in any type case.

PRINTER NAME Field

Specify the name of your VTAM printer. The name of the VTAM printer is the same as the Secondary Logical Unit (SLU) name; example RMT1.

Host-to-LAN Print (VTAM)

HOST ID Field

Specify the name of the VTAM application that will be acting as the Primary Logical Unit in the LU-LU session between the printer and the application. z/OS LANRES host-to-LAN print acts as the Secondary Logical Unit in this session. This field is used for host-to-LAN print (VTAM) only; example JESLGN2.

NETWARE FILE SERVER Field

- Bindery
Specify the name of the NetWare server where the print queue was created.
- NDS
This field must be NDSEVER.

NETWARE PRINT QUEUE Field

- Bindery
Specify the name of the NetWare print queue where the print data is sent. When we created our print queue, we named ours HOSTPRT.
- NDS
Specify the fully qualified Context of the queue.

TRANSLATE DATA Field

Determine whether the print data is to be translated from EBCDIC to ASCII. Specify ASCII to translate the data from EBCDIC to ASCII. Specify BINARY to leave as EBCDIC data. If BINARY is specified, no internal exits are called.

NOTIFY WHEN PRINTED Field

Specify NONOTIFY here. This field is used only for JES host-to-LAN print.

USER EXIT NAME Field

Specify the name of a load module, REXX exec, or internal exit that you want to use to transform the print data, if any.

Most likely, you will use the EWXHSCS exit with a VTAM attached printer.

- EWXHSCS
 - Converts SNA Character Stream (SCS) data to ASCII
 - Allows a PROFILE, as well as an FCB and BANNER to be specified
 - Is only valid for VTAM printers and results in an error if you specify EWXHSCS for a JES printer
 - Does not require a parameter list
 - Is an INTERNAL exit

USER EXIT TYPE Field

Determine the type of the user exit. Specify PGM to define a load module exit. Specify EXEC to define a REXX exec exit. Specify INTERNAL to define an IBM supplied exit (EWXHSCS).

USER EXIT PARAMETERS Field

Specify any parameters you want to pass to the user exit. Always begin the parameter string with a (. If you are using the EWXHLTRN user exit, specify the non-qualified data set name (profile) here if DD EPTRPRO is defined in the PROC, or specify a fully qualified name. If you are using EWXHSCS user exit, then DD EWXHLPRF must be defined.

- EWXHSCS
You may specify up to four optional parameters (FCB, BANNER, PROFILE, and NOFF) using the following format:

<keyword>=VALUE
 where <keyword>= is FCB=, BANNER=, PROFILE=, or NOFF

Note: If an error is made in specifying the parameter, the parameter is ignored and no error message is issued. These parameters are described in the following:

Parameter

Description

FCB= Specifies the 4-character prefix of an FCB name. JES passes the 4-character suffix to the host-to-LAN print function as part of the SWB. This suffix is not sufficient to resolve the FCB name. If FCB=PREFIX is specified, the 4-character suffix is appended to the prefix to create a FCB name. For example, if FCB=BFC2 was specified as a parameter and JES passed STD2 as the FCB name in the SWB, the host-to-LAN print function would look for the FCB named FCB2STD2.

BANNER=

Specifies the name of a REXX exec to change the NetWare Banner description shown by PCONSOLE. The name specified must be the name of a REXX exec that is a member of a data set allocated to the DDNAME SYSEXEC. The banner description is passed to the REXX exec via the REXX stack. The exit is expected to pull the banner description data from the stack and push the banner description back onto the stack before returning. The banner description can be up to 40 characters in length. A banner description longer than 40 characters is an error and is ignored.

PROFILE=

Specifies the name of a member of a data set allocated to the DDNAME EWXHLPRF, or the name of a member of the data set named <prefix>.EWXHLPRT.PROFS. The member has the same format as the profile data set that is specified for the EWXHLPRF INTERNAL exit. However, the only profile entries that are recognized are the SETUP 1 and SETUP 4 entries. They are used to pass a string of printer control characters to set up or reset the printer.

NOFF Replaces the leading form feed of the dataset to be printed with a suppressed form feed. This prevents a blank page from being printed between the banner and the start of data.

- **EWXHLTRN**

Specifies the name of the print profile data set.

Syntax

When you create an entry in this data set, use this format:

```
mvsprintername hostid netwarefileservname netwareprintqueue name ASCII/BINARY
NONOTIFY userexitname PGM/EXEC/INTERNAL ( parm1 parm2
```

Comment lines are identified by a /* in the first two columns of a line and are ignored. Blank lines are ignored. The maximum size of a logical line is 255 characters. Specify a value for all the fields, except, of course, if you are not using user exits or user exit parameters.

Host-to-LAN Print (VTAM)

Create a print definition entry for each z/OS LANRES host-to-LAN print server address space and every NetWare queue that is to be used by the host-to-LAN print function.

Defining JES RJE Initialization Statements for VTAM

Both JES2 and JES3 have VTAM related initialization statements that are used to define the RJE printer connection using VTAM. The following statements should be included in the appropriate JES initialization dataset:

```
LOGON(2) APPLID=JESLGN2
LINE(3) UNIT=SNA
RMT(1) DEVTYP=LU1,LINE=3,LUNAME=RMT1,SETUP=PDIR
R(1).PR(1) CLASS=V
DESTID(LANPRT1) DEST=R1      (This is an optional printer name)
```

Note: The above statements are for the JES2 environment.

Defining VTAM Initialization Statements

Each z/OS LANRES address space must be defined as a secondary application to ACF/VTAM. Define the following VTAM-related initialization statement:

Statement	Description
-----------	-------------

RMT*nnnn*

Defines each printer to the z/OS LANRES address space (host-to-LAN print server) that will operate as a VTAM printer device.

For example, we defined one z/OS LANRES VTAM host-to-LAN print server as a VTAM printer device:

```
RMT1 APPL EAS=1,AUTH=ACQ,VPACING=0,DLOGMOD=JES4096
```

ADD MODETAB=EWXMTEWX if setup does not use system default dataset. We could have created more host-to-LAN print servers; for example:

```
RMT2 APPL EAS=1,AUTH=ACQ,VPACING=0,DLOGMOD=JES0256
RMT3 APPL EAS=1,AUTH=ACQ,VPACING=0,DLOGMOD=SCS
```

For more information about these statements and their parameters, see the *VTAM Resource Definition Reference*.

Adding a LOGMODE Entry to VTAM

Add a logon mode table entry in the VTAM LOGMODE table data set to use z/OS LANRES host-to-LAN print as a JES RJE printer.

The LOGMODE table entry must be either the JES0256 or JES4096 entry which can be found in the EWXMTEWX member of the *qual.SEWXSAMP* samples data set. The following shows the contents of the EWXMTEWX member:

```

*****
* LOGON MODE TABLE ENTRY FOR A JES RJE PRINTER
*****
EWXMTEWX MODETAB
*
  MODEENT LOGMODE=JES0256,
    FMPROF=X'03',
    TSPROF=X'03',
    PRIPROT=X'A1',
    SECPROT=X'A1',
    COMPROT=X'7080',
    RUSIZES=X'8585',
    PSERVIC=X'01102000B100C00000010000'
*

```

```

*****
* LOGON MODE TABLE ENTRY FOR A JES RJE PRINTER(continued)
*****
  MODEENT LOGMODE=JES4096,
    FMPROF=X'03',
    TSPROF=X'03',
    PRIPROT=X'A1',
    SECPROT=X'A1',
    COMPROT=X'7080',
    RUSIZES=X'8989',
    PSERVIC=X'01102000B100C00000010000'
*
  MODEEND
  END

```

Use the SCS table entry in the VTAM default LOGMODE table if you are using z/OS LANRES host-to-LAN print as a VTAM attached printer.

For more details about adding logon mode table entries, see the *VTAM Resource Definition Reference*.

Setting up CICS for LANRES Printing

The following is a sample setup of CICS with LANRES as the VTAM attached printer.

Host-to-LAN Print (VTAM)

```

*****
* CICS definition table
*****
Terminal Definition:

OVERTYPE TO MODIFY
CEDA Alter Terminal( RMT2 )
Terminal      : RMT2
Group        : USERTERM
Description   ==>
AUTINSTModel ==> No                No | Yes | Only
AUTINSTName  ==>
TERMINAL IDENTIFIERS
Typeterm     ==> SCSPRINT
NETname      ==> RMT2
CONSOLE      ==> No                No | 0-127 | 129-250
CONSName     ==>
REMOTESYSTEM ==>
REMOTENAME   ==>
REMOTESYSNet ==>
Modename     ==>
ASSOCIATED PRINTERS
PRINTER      ==>
+ PRINTERCopy ==> No                No | Yes
ALTPRINTER   ==>
ALTPRINTCopy ==> No                No | Yes
PIPELINE PROPERTIES
POOL         ==>
TASKLIMIT    ==> No                No | 1-32767
OPERATOR DEFAULTS
OPERID       :
+ OPERPriority : 000                0-255
OPERRS1      : 0
OPERSecurity : 1
PRESET SECURITY
USERID       ==>
NATLANG      ==>
TERMINAL USAGES
TRANSACTION  ==>
TERMPRIORITY ==> 000                0-255
+ Inservice  ==> Yes                Yes | No
SESSION SECURITY
Securityname ==>
ATTACHSEC    ==> Local              Local | Identify | Verify | Persis
| Mixidpe
BINDPASSWORD :                      PASSWORD NOT SPECIFIED
BINDSecurity ==> No                No | Yes
USEDFLTUSER  ==> No                No | Yes

```

```

*****
* CICS definition table (continued)
*****
TypeTerm Definition:

CEDA View TYPeterm( SCSPRINT )
  TYPeterm      : SCSPRINT
  Group        : USERTERM
  DESCRIPTION   :
RESOURCE TYPE
  DEVICE       : SCSPRINT
  TERmmodel    :
  SESSiontype  :
  LDclst       :
  SHippable    : No                No | Yes
MAPPING PROPERTIES
  PAGEsize     : 024 , 080         0-999
  ALTPage      : 000 , 000         0-999
  ALTSuffix    :
  FMhparm     : No                No | Yes
  OBOperid    : No                No | Yes
PAGING PROPERTIES
+  AUTOPage    : Yes              No | Yes
DEVICE PROPERTIES
  DEFscreen    : 000 , 000         0-999
  ALTScreen    :                   0-999
  APLKybd     : No                No | Yes
  APLText     : No                No | Yes
  AUDiblealarm : No                No | Yes
  COLor       : No                No | Yes
+  COPy       : No                No | Yes
  DUAlcasekybd : No                No | Yes
  EXTendedds  : Yes               No | Yes
  HILight     : No                No | Yes
  Katakana    : No                No | Yes
  LIghtpen    : No                No | Yes
  Msrcontrol  : No                No | Yes
  OBFormat    : No                No | Yes
  PARTitions  : No                No | Yes
+  PRIntadapter : No              No | Yes
  PROgsymbols : No                No | Yes
  VALidation  : No                No | Yes
  FORmfeed    : No                No | Yes
  HORizform   : No                No | Yes
  VERTicalform : No              No | Yes
  TEXTKybd    : No                No | Yes
  TEXTPrint   : No                No | Yes
+  Query      : No                No | Cold | All
  OUTline     : No                No | Yes
  SOsi        : No                No | Yes
  BAcKtrans   : No                No | Yes
  CGcsgid     : 00000 , 00000     0-65535

```

Host-to-LAN Print (VTAM)

```
*****
* CICS definition table (continued)
*****
SESSION PROPERTIES
  AScii      : No                No | 7 | 8
  SENdsize   : 04096             0-30720
  RECEivesize : 04096             0-30720
+ BRacket    : Yes                Yes | No
  LOGMode    :
DIAGNOSTIC DISPLAY
  ERRLastline : No                No | Yes
  ERRIntensify : No               No | Yes
  ERRColor    : NO                NO | Blue | Red | Pink | Green
                                     | Turquoise | Yellow | NEutral
  ERRHilight  : No                No | Blink | Reverse | Underline
+ OPERATIONAL PROPERTIES
  AUTOConnect : No                No | Yes | All
  ATi         : Yes                No | Yes
  TTi         : Yes                Yes | No
  CReatesess  : Yes                No | Yes
  RELreq      : Yes                No | Yes
  DIScreq    : Yes                Yes | No
  Nepclass    : 000                0-255
  Signoff     : Yes                Yes | No | Logoff
+ Xrfsignoff  : Noforce            Noforce | Force
MESSAGE RECEIVING PROPERTIES
  ROutedmsgs  : All                All | None | Specific
  LOGOnmsg    : No                No | Yes
APPLICATION FEATURES
  BUildchain  : No                No | Yes
  USerarealen : 000                0-255
  Ioarealen   : 00512 , 00000      0-32767
+ UCtran      : No                No | Yes | Tranid
RECOVERY
  RECOVOption : Sysdefault          Sysdefault | Clearconv | Releases
                                     | Uncondrel | None
  RECOVNotify : None                None | Message | Transaction
```

Defining a JCL Procedure for z/OS LANRES Address Space

Define a JCL procedure that contains the required statements for starting the z/OS LANRES address space. A sample JCL procedure named EWXHLPV is provided in *qual.SEWXSAMP*.

An example follows:

```
//HLPPROCV   PROC
//STEP01    EXEC PGM=EWXHLPVT,PARM='(CHANNEL 49C PWIN UP PWOUT DOWN',
//          REGION=4096K
//STEPLIB   DD  DISP=SHR,DSN=QUAL.SEWXLMOB
//EWXHLCFG  DD  DISP=SHR,DSN=QUAL.EWXHLCFG
//EWXMSGSGS DD  DISP=SHR,DSN=QUAL.SEWXMSGSGS
```

This example means:

- HLPPROCV defines our z/OS address space.
- EWXHLPVT is the program that emulates a VTAM printer and starts a host-to-LAN connection using the program.
- CHANNEL indicates the channel communications method which connects z/OS LANRES on z/OS to z/OS LANRES on the NetWare server. The host-to-LAN print server will use channels 49C and 49D. (Only the even channel needs to be specified.)
- DOWN and UP are our host-to-LAN print component passwords. (We are not using a password data set.)
- QUAL.SEWXLMOB is the required step library.

- QUAL.EWXHLCFG is the data set where we defined our host-to-LAN print definitions. This is optional, but if there are no definitions, then no printers can be started. Here, the operator will have to dynamically add the printer definitions with the z/OS MODIFY operator command. See “Changing Printer Definitions without Stopping z/OS LANRES” on page 205 for details.
- QUAL.SEWXMSGs is our z/OS LANRES message repository.

For a list of all z/OS LANRES allocations, see Table 8 on page 131.

Starting the z/OS LANRES Address Space

Use the z/OSSTART command or the TSO SUBMIT command (specifying the name of the JCL procedure you defined above) to start the VTAM host-to-LAN print address space.

Creating the LANRES Object

- Bindery

The LANRES object is required on each NetWare server that processes z/OS LANRESdistribution or host-to-LAN print requests. This includes local servers which are directly connected to z/OS through z/OS LANRES and remote servers which are not connected to z/OS and not running z/OS LANRES. The LOAD EWXLOBJ command must be executed on all NetWare servers that will process host-to-LAN print requests. Create the LANRES object by following the instructions in “Creating the LANRES Object” on page 171.

- NDS

A user object named LANRES must be created and given supervisory rights.

Assign the LANRES Object as a PRINTQ User

- Bindery

The LANRES object must be added as a user for all PRINTQs to be accessed. The LOAD EWXLOBJ command must be executed using the PRINTQ option as follows:

```
LOAD EWXLOBJ PRINTQ QUEUENAME
```

- NDS

The object named LANRES must be made a user of all the queues that it will access.

Loading the Host-to-LAN Print NLM

The host-to-LAN print NLM on NetWare receives print data and requests from z/OS. If the print NLM is not loaded, NetWare attached printers are not available to z/OS users and applications.

Before loading the print NLM, ensure that the z/OS LANRES communication driver (EWXCOMM) is already loaded. If you don't know whether it is loaded, use the NetWare MODULES command to list the loaded modules. See the *NetWare Utilities Reference* manual for more about the MODULES utility. If you need to load the z/OS LANRES communication driver see “Starting z/OS LANRES Communications on a NetWare Server” on page 99.

To load the z/OS LANRES host-to-LAN print NLM, enter the LOAD EWXHLPRT command on the NetWare server console. A simple form of the command is shown in the following example:

```
load sys:\ewxn1m\ewxh1prt
```

Host-to-LAN Print (VTAM)

The EWXHLPRT NLM is located in the EWXNLM directory of the SYS volume. If you have moved the NLM to a different directory, substitute the correct volume and path on the above command. The EWXHLPRT NLM remains loaded until you enter a command to unload it.

You can specify IN and OUT component passwords for the EWXHLPRT NLM by using the PWIN and PWOUT options, as follows:

```
load sys:\ewxn1m\ewxh1prt pwin=h1down pwout=h1up
```

- Bindery

You can also specify the password for the LANRES object:

```
load sys:\ewxn1m\ewxh1prt lobj_password=lanresobjpass
```

If you set the passwords in the z/OS LANRES initialization file (EWXCOMM.INI) as recommended in “Specifying Server Component Passwords” on page 103 and “Specifying the LANRES Object Password” on page 104, you don’t need to specify them here.

Each copy of EWXHLPRT uses the same passwords.

- NDS

You can specify the Context of the LANRES object, LOBJ_Context=Fully Qualified Name.

If you set the Context of the LANRES object in the EWXCOMM.INI file, you do not have to specify it here.

Remember that the total number of connections allowed to the NetWare server is governed by the SESSIONS option in the EWXCOMM.INI file. See “z/OS LANRES Sessions” on page 101 for more information.

You can automate the loading of EWXHLPRT on the NetWare server. To learn how, see “Automatically Loading z/OS LANRES NLMs on a NetWare Server” on page 107.

After the EWXHLPRT NLM is loaded, you will need to load the print server on the NetWare server using the NetWare PSERVER print utility and NLM. See the *Novell Print Server* book for details about PSERVER.

Starting the Host-to-LAN Print JES RJE Printer

Start the JES RJE printer using the z/OS MODIFY START subcommand. To continue with our example, if we wanted to start host-to-LAN print as a started procedure (task), we would specify:

```
VARY NET,ACT,ID=(VTAMLST MEMBER NAME)
$s LOGON(2)
$s LINE(3)
$s RMT(1)
$s R1.PR1
S PROCNAME
F PROCNAME, S PRINTERNAME
```

Where PROCNAME is the name of the JCL procedure for the started task and PRINTERNAME is the name of the printer to start.

Starting the Host-to-LAN Print VTAM Printer

Start the VTAM printer using the z/OS MODIFY START subcommand. To continue with our example, if we wanted to start host-to-LAN print as a started procedure (task), we would specify:

```
S PROCNAME
F PROCNAME, S PRINTERNAME
```

Where PROCNAME is the name of the JCL procedure for the started task and PRINTERNAME is the name of the printer to start.

You can also start host-to-LAN print as a batch job. An example of starting z/OS LANRES as a batch job can be found in the *qual.SEWXSAMP* samples data set as member EWXHLPV. For details about the MODIFY command, see “Changing Printer Definitions without Stopping z/OS LANRES” on page 205.

The End of Setup

If you have been reading through the chapter and have been setting up z/OS LANRES host-to-LAN print serving for VTAM, your setup is complete. Both the NetWare modules and the z/OS print server should be up and running. The VTAM printers should be available to z/OS applications.

The remaining sections in this chapter describe additional print serving tasks.

Printing an z/OS Data Set on a NetWare Printer

When host-to-LAN print is running, you can print any physical sequential data set or single member of a data set on a NetWare printer using the TSO PRINTDS command or the SYSOUT DDname (for JCL). The EWXCONN PRINT command can also be used.

For example, assume we entered the following command from the LANRES READY prompt:

```
EWXCONN PRINT MYDSN(MYMEMBER) (VIA RMT1 AT SYSTEM COPIES 4
```

We would be printing the z/OS partitioned data set member MYMEMBER on the printer PRINT01 on the z/OS system SYSTEM, which was set up to route the print job to a NetWare print queue. Four copies are printed. If you don't specify the number of copies to print, one copy is printed.

In addition, you don't have to specify the printer and system values. You can set up defaults as described in “Setting Up Default Printers for EWXCONN PRINT and QUERY Commands” on page 204.

Determining the Status of Print Jobs

At some point you may want to know the status of print jobs waiting to print on the NetWare printer. Here, use the EWXCONN QUERY PRINT command to obtain information about print jobs. You will need to ensure EWXHLQRY is added to the TSO authorized program and command tables before you can use the EWXCONN QUERY PRINT command.

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For example, if you want to list the print jobs that are waiting to print, if any, on the NetWare printer associated with the host printer PRINT01 running in started task HLPPROCV on system SYSTEM, specify the following command from the LANRES READY prompt:

```
EWXCONN QUERY PRINT (VIA PRINT01 AT HLPPROCV.SYSTEM
```

You don't have to specify the printer, procedure, and system values. You can set up defaults as described in the next section.

Setting Up Default Printers for EWXCONN PRINT and QUERY Commands

You don't have to enter printer, procedure, and system names each time you specify the EWXCONN PRINT and EWXCONN QUERY PRINT commands. You can set up a default print data set as described below:

If you don't specify a printer, whatever address space name (procedure) and printer system is defined on the first line in the default print data set is used. So, set up your most commonly used printer (and its procedure and system) on the first line.

If you don't want to use the default printer, you can specify just a printer name. The address space name and system name are obtained from the data set for you. Here, host-to-LAN print searches the default print data set for the first line that has the same printer name as the one you specified. The system name (and address space name) defined on that line is used. So, use the rest of the lines in the data set to set up other commonly used printers with their procedures and systems.

You can copy and edit a sample default print data set that z/OS LANRES provides to set up your printer defaults. The sample is in the *qual.EWXXSAMP* samples data set as member EWXDSPRT. If you decide to use a default print data set, remember to allocate it to the EWXDSPRT DDname. For a list of all z/OS LANRES allocations, see Table 8 on page 131. If you do not allocate a data set to the EWXDSPRT DDname, the EWXCONN PRINT and EWXCONN QUERY PRINT commands look for a data set named *prefix.EWXDSPRT.SERVERS*.

If you decide to use printing from the z/OS LANRES panels and you would like to use a default print data set, you will need to allocate it to the EWXDSEV DDname. If you do not allocate a data set to the EWXDSEV DDname, you will need to hardcode the printer and system names when using the print panel.

Specifying Defaults

Use the following information to help you specify values in the default print data set. These values are used as defaults for the z/OS LANRES EWXCONN PRINT and EWXCONN QUERY PRINT commands as previously described.

Specify the following values in the default print data set. The values are not case sensitive.

PRINTER NAME Field

Specify the name of the VTAM or JES printer that you want to send your printer output to.

PROCEDURE.SYSTEM Field

Specify the name of the started task or address space that is emulating the printer you specified in the PRINTER NAME field. Then, specify the z/OSsystem ID that the procedure or started task is running on. Separate the procedure name and system name with a period. For example:

```
proc.sys
```

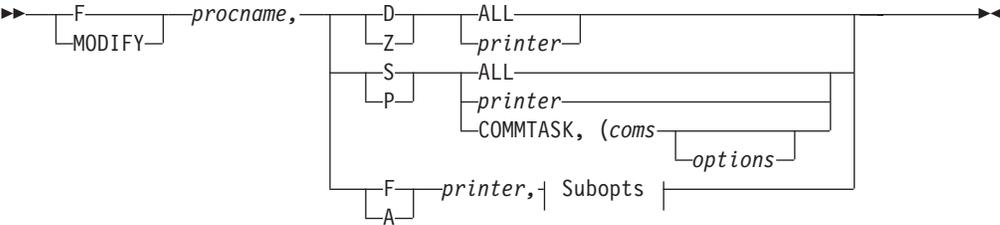
Where *proc* is your started task or address space and *sys* is the z/OS system ID that the procedure or started task is running on.

Syntax

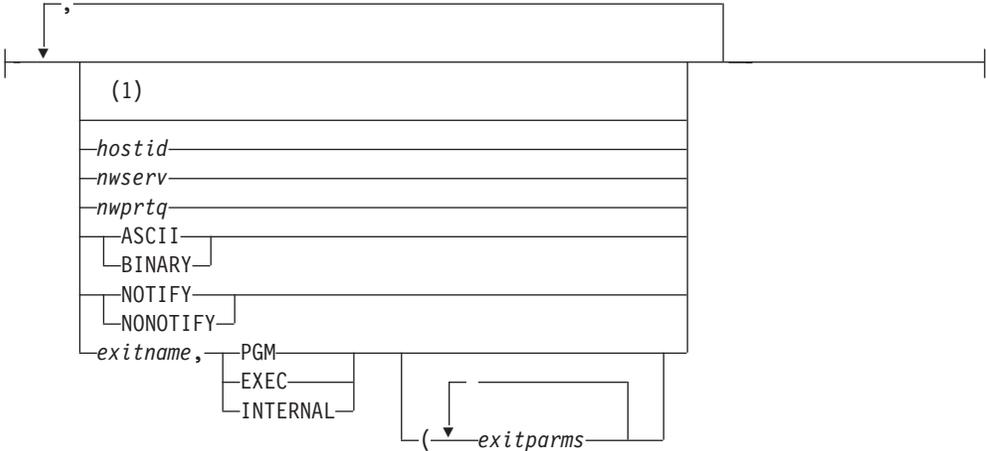
Comments are identified by /* characters found in the first two columns of a line. Comments and blank lines are ignored. A line can contain up to 255 characters. If duplicate entries are found, only the first entry is used.

Changing Printer Definitions without Stopping z/OS LANRES

You may want to add or change printer definitions while host-to-LAN print is running using the z/OS MODIFY command. Also, you will need to use the start and stop subcommands that MODIFY provides to start and stop the host-to-LAN VTAM print servers. Use the following MODIFY command syntax:



Subopts:



Notes:

- 1 You cannot specify the same option more than once. Options must be specified in the order listed. If you want to use one option but not another, specify a comma as a place holder for the option that you are not using. If

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you specify more than one option, separate them with a comma. The total width of the Subopts field is subject to system limitations.
If you are going to use the z/OS MODIFY command, the following can help you understand each of the MODIFY parameters:

procname

Specify the name of your JCL procedure that you're using to start host-to-LAN print.

- D** This is the DISPLAY subcommand that displays the status of the printer you specify.
- Z** This is the DELETE subcommand that dynamically deletes a printer definition for the printer you specify. If you try to delete a printer definition that doesn't exist or if the specified printer is currently active, an error message displays.

printer

Specify the name of the printer.

ALL

Displays the status of all the printers or deletes all of the printers.

- S** This is the START subcommand that starts a VTAM printer subtask.
- P** This is the STOP subcommand that stops a VTAM printer subtask.

ALL

Starts or stops all of the printers.

printer

Specify the name of the printer.

COMMTASK

Specifies the communications method and the target NetWare server.

coms

Specifies the communications method and the target NetWare server, which can be:

Nickname

This means you want to obtain the connection information (protocol and target values) from the user or system configuration data sets.

nickname

Specify the nickname that matches the nickname value you have set up in your user or system configuration data set. The protocol and target values defined on this line are used. This value cannot be ADMIN, DISK, DIST, HLPRT, or LHPRT.

APPC

Specifies the Advanced Program-to-Program Communications protocol communication method (SNA LU 6.2 or NetWare for SAA channel driver).

CHANNEL

Specifies the MMC or ESCON adapter card communication method.

TCPIP

Specifies the Transmission Control Protocol/Internet Protocol communication method.

If the protocol specified is TCPIP and you do not have z/OS Open Edition, the C/370 Version 2 runtime library must be available to

your address space before entering the MODIFY command. In addition, the TCP/IP client common code (containing the TCPIP.HOSTS.SITEINFO, TCPIP.HOSTS.ADDRINFO, and TCPIP.ETC.SERVICES data sets) must be inserted into the z/OS search order before entering the MODIFY command.

target

Specify either the APPC symbolic destination name, APPC fully-qualified partner LU name, the TCP/IP internet address or host name of the NetWare server, or the channel. This value can be from 1 to 63 characters. This value corresponds with the communication method you specify. It uniquely identifies the connection to the NetWare server.

For example, if APPC is specified, this target value is either the APPC fully-qualified partner LU name or the symbolic destination name (symdestname) that identifies the NetWare server. The symbolic destination name you specify must have already been set by your system programmer as the side information name of an SAA Common Programming Interface for Communications (CPI-C) side information on the z/OS system.

If CHANNEL is specified, this target value is any of the *even* subchannels defined for z/OS LANRES use. This is the complete z/OS defined subchannel address: an even three or four character hexadecimal number. For example, 624 or 10A.

If TCPIP is specified, this target value is the TCP/IP internet address or host name of the target NetWare server. The host name you specify must have already been set by your system programmer. For example, a NetWare server that was set up by your system programmer has a host name of SERVER2. Therefore, that means you can use SERVER2 as the target value.

If you are unsure about what to specify, see the person who set up the communications at your installation.

- * This means you want to obtain the target value from the user or system configuration data sets.

options

Specify any of the following options:

PWIn

Specifies the host component password which is needed for NetWare to successfully connect to z/OS. If PWIN is specified, PWOUT must be specified.

pwIn

Specify a component password using an alphanumeric (a to z, A to Z, and 0 to 9) string from 1 to 8 characters. The component password is not case sensitive.

PWOut

Specifies the host component password which is needed for z/OS to successfully connect to NetWare. If PWOUT is specified, PWIN must be specified.

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pwout

Specify a component password using an alphanumeric (a to z, A to Z, and 0 to 9) string from 1 and 8 characters. The component password is not case sensitive.

PWFile

Specifies that a data set contains the host component passwords needed for a successful z/OS and NetWare connection. If PWFILE is specified, PWIN and PWOUT cannot be specified.

name

Specifies the DDname or the name of the data set containing the host component passwords. To specify a DDname, prefix the eight character or less DD name with DD: without any blanks. For example: PWFILE DD:PW. If the DD: prefix is not used, the specified name will be treated like a dataset name.

NOLOG

z/OS LANRES messages are not logged.

LOG

Starts logging z/OS LANRES messages in the data set allocated to the EWXMLOG DDname. For a list of all z/OS LANRES allocations, see Table 8 on page 131. If there is no data set allocated, then the messages are logged in the *prefix*.EWXHLPVT.LOG data set. The following log size values are only remembered if the connection is made.

lines

Specify the size of the log data set using a value from 1 to 1000000. The old log data set is replaced each time EWXHLPVT is issued.

Nolimit

Specifies there are no size limits for the log data set. The z/OS LANRES messages are appended to the existing log data set.

RETRY

Specifies the number of seconds that must pass to retry a connection that was either lost, initially unsuccessful, or a retry attempt that was unsuccessful. The actual connection this retries is that between the z/OS LANRES print server running on z/OS and the EWXHLPRT.NLM running on the NetWare server.

sec

Specify the number of seconds using a value from 10 to 3600. The default is 600 seconds.

DEBUG

Specifies whether debug trace information is enabled. This option should *only* be specified upon request from your IBM service representative.

Note: DEBUG can severely impact performance.

0 Specifies debug tracing is disabled. This is the default.

level

Only specify upon request from your IBM service representative. Your representative will provide you with this value.

F This is the MODIFY subcommand that dynamically changes the

characteristics of the printer you specify. You can redefine any value that is currently set in the printer definitions data set. If the printer is currently active, an error message displays.

- A** This is the ADD subcommand that dynamically adds a printer definition for the printer you specify. This is not a START command. If a printer definition already exists for the printer you specify, an error message displays and the definition is not added.

printer

Specify the name of the printer.

hostid

The VTAM application name for the application that will be sending data to the printer(s).

nwserv

- Bindery

Specify the name of the NetWare server where the print queue was created.

- NDS

Specify NDSERVER as the name of the NetWare server where the print queue was created.

nwprtq

- Bindery

Specify the name of the NetWare print queue where the print data is sent to.

- NDS

Specify the fully qualified name of the NetWare print queue where the print data is sent (Example: *queuename.ou=xx.o=yy*).

ASCII

This means the data is translated from EBCDIC to ASCII.

BINARY

Specify BINARY to leave as EBCDIC data. If BINARY is specified, no internal exits are called.

NOTIFY

This means a message is sent to the print job owner when the NetWare printer has printed the data.

NONOTIFY

This means no message is sent.

exitname

Specify the name of the load module or REXX exec that transforms the data.

PGM

This means the exit is a load module.

EXEC

This means the exit is a REXX exec.

INTERNAL

This means the exit is an IBM supplied exit (for example, EWXHLTRN).

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exitparms

Specify any parameter or parameters that need to be passed to the user exit. Always begin the parameter string with a (. If more than one parameter is specified, separate them using at least one blank.

If you are using the EWXHLTRN exit, specify the data set name (profile) here.

Defining a Profile for the EWXHLTRN Exit

The z/OS LANRES host-to-LAN print function provides an internal user exit named EWXHLTRN. EWXHLTRN transforms Advanced Function Printer Data Stream (AFPDS) to PostScript (PS) or Hewlett-Packard Print Control Language (PCL). Also, the EBCDIC to ASCII conversion is performed. (Internal user exits cannot be modified.)

A mapping of AFP fonts to PS and HP fonts, as well as many HP bitmap fonts, are provided by z/OS LANRES. To see these mappings, look in the *qual*.SEWXSAMP samples data set in member EWXFONT.S. Remember that *qual* is the high-level qualifier name used when z/OS LANRES was installed.

Create a profile for each NetWare print queue that you want to use with the EWXHLTRN user exit. The EWXHLTRN exit requires this profile which is passed as any non-qualified data set name. The profile is specified as a parameter in the USER EXIT PARAMETERS field of the print definitions data set or with the z/OS MODIFY command, whichever is appropriate. Remember to begin the data set name with a left parenthesis if it is specified as a user exit parameter.

The profile can have many entries; ones that define the paper size, duplexing, scaling, and so on. However, a MODE entry is required in every profile defined.

Generally, host printers tend to have a larger printable page as compared to LAN printers. You may want to consider this when defining your entries.

Let's read on for details about these entries.

Specifying Profile Entries

The following entries are defined in the profile. If an entry (a keyword and its value) is defined more than once, only the first valid entry is used, except for FONT, AFPFONT, and SCALFONT. For these entries, the last valid entry is used. Entries are not case sensitive.

MODE Entry

The mode entry is the only required entry and must be one of the following:

- **MODE HP**
Data is transformed for the HP LaserJet** II or compatible (PCL 4) printer. If the document to be processed is in an orientation other than Portrait, unpredictable results occur in HP mode.
- **MODE HP3**
Data is transformed for the HP LaserJet III or compatible (PCL 5) printer.
- **MODE HP4**
Data is transformed for the HP LaserJet 4 or compatible (PCL 5) printer.
- **MODE PS**

Data is transformed for any PostScript printer.

PAPER Entry

PAPER lets you specify the size of the paper that the data will be printed on. This entry assures proper paper alignment, such as when rotation of paper is necessary. The paper entry can be one of the following:

- PAPER LETTER

This is what is used if this entry is not found in a profile. This means US size paper, which is 8 1/2 x 11 inches.

- PAPER A4

This means European A4 size paper, which is 210 x 297 mm or 8.27 x 11.70 inches.

- PAPER B5

This means Metric B5 size paper, which is 182 x 257 mm or 7.17 x 10.12 inches. This is not supported for PCL. The default of PAPER LETTER is used.

- PAPER EXEC

This means executive size paper, which is 7 1/4 x 10 1/2 inches.

- PAPER LEGAL

This means legal size paper, which is 8 1/2 x 14 inches.

DUPLEX Entry

DUPLEX determines whether the printing is to be done in duplex. Of course, duplexing can only be done on printers capable of duplexing. The duplex entry can be one of the following:

- DUPLEX DEFAULT

This is what is used if this entry is not found in a profile. This means the transform tells the printer nothing about duplexing.

- DUPLEX ON

This means the printer is to duplex when printing.

- DUPLEX OFF

This means the printer does not duplex when printing.

SCALE Entry

SCALE determines the vertical and horizontal scaling factors that are applied to line positions. This can be helpful when you want to print a document that is bigger than the size of the paper. For example, if you have print data that has been formatted for European size paper (A4) and you need to print it on US letter size paper (letter is shorter than A4), use the scale entry SCALE 94 100. This shortens the vertical page for printing by 6%.

The scale entry can be:

- SCALE 100 100

This is what is used if this entry is not found in a profile. This means the vertical and horizontal scaling is 100 percent.

- SCALE *ver hor*

Specify the vertical scale factor for *ver*, which can be from 50 to 200 percent. Specify 100 for *hor* to use the default.

Specify the horizontal scale factor for *hor*, which can be from 50 to 200 percent. Specify 100 for *ver* to use the default.

Both *ver* and *hor* must be specified and correct, otherwise, the defaults of 100 and 100 are used.

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FONT Entry

FONT means there is a Hewlett-Packard (HP) bitmap font that you want to override or add for HP, HP3, or HP4 modes. This can be helpful when you want to map HP bitmap font files to a specific class, font size in points, and font attribute. A font entry must exist for each HP bitmap font installed at your site. The last valid entry is used.

The font entry is:

- FONT *ccccssa dsname(member)*
Specify one of the following classes for *cccc*:

Class	Font
avan	Avant Grade
bask	Baskerville
book	Bookman
broa	Broadway
casl	Caslon
cent	Century Schoolbook**
chan	Chancery
clar	Clarendon
cloi	Cloiser
coop	Cooper
coro	Coronet
cour	Courier
elit	Elite
essa	Essay
futn	Futura** Narrow
futu	Futura
gall	Galliard
gara	Garamond
garn	Garamond Narrow
gill	Gill Sans
goud	Goudy
heln	Helvetica Narrow
helo	Helvetica Outline
helv	Helvetica
helx	Helvetica Extra Narrow
kori	Korinna
lgot	Letter Gothic
line	Line Printer

news	News Gothic
olde	Old English (Windsor)
opti	Optima**
orat	Orator
pala	Palatino**
pica	Pica
pres	Presentor
pret	Prestige
rock	Rockwell
scri	Script
seri	Serif
souv	Souvenir
time	Times Roman
univ	Univers**
unvr	University

Specify the font size using a digit value from 01 to 99 for *ss*. Note when the value is less than 10, a leading zero must be specified.

Specify the font attribute using one of the following single characters for *a*:

Attr.	Font
I	Italics or oblique
B	Bold
N	Base font attribute
X	Bold and italics (or oblique)

Specify the data set name and member that contains the HP bitmap fonts for *dsname(member)*. If the font data set is not already on the host, you must get the font file from the workstation to an z/OS data set in binary format. If a z/OS LANRES distribution connection is established, you could use the EWXDS GET command to do this.

AFPFONT Entry

AFPFONT allows AFP host fonts to be mapped to a font identifier. You can override AFP font mappings that z/OS LANRES sets. The last valid entry is used.

The *afpfont* entry is:

- AFPFONT *afpfontname ccccssa*

Specify an AFP font name using up to 8 bytes. AFP font names usually begin with the string C0. In general, DCF uses the 3800 form of the name in which the second character indicates direction. Therefore, upright fonts usually begin with the string C0. The AFP font list is usually found in the SYS1.FONTLIB data set.

Specify the *cccssa* value the same way as explained in “FONT Entry” on page 212.

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You cannot change the mapping of an AFP font to a printer resident font.

Note: Any added AFP fonts are treated as mono spaced fonts, meaning that each character uses the same amount of space.

SCALFONT Entry

SCALFONT lets you override or add an HP scalable font for HP3 and HP4 modes only. This can be helpful when you want to map HP scalable fonts to a specific class or font attribute. A SCALFONT entry must exist for each HP scalable font installed at your site. The last valid entry is used.

The scalfont entry is:

- SCALFONT *cccca dsname(member) symset*
Specify the *cccc* value the same way as explained in “FONT Entry” on page 212.
Specify the font attribute using one of the following single attributes for *a*:

Attr.	Font
I	Italics or oblique
B	Bold
N	Base font attribute
X	Bold and italics (or oblique)

Specify the data set name and member that contains the HP scalable fonts for *dsname(member)*. If the font data set is not already on the host, you must get the font file from the workstation to an z/OSdata set in binary format. If a z/OS LANRES distribution connection is established, you could use the EWXDS GET command to do this.

Specify the symbol set from the font that the HP printer should use for *symset*. The default is Roman-8, which is specified as 8U.

SETUP Entry

SETUP lets you specify printer specific controls to be added to the data stream. This should be done with caution because it may cause the data not to print.

The setup entry is:

- SETUP *number string*
Specify one of the following numbers for *number* to indicate where you want to place the insert characters:

Number	Location
1	At the start of the data stream (before the reset)
2	During document set up
3	At the beginning of each page
4	At the end of the data stream (after the reset)

Specify the string that you want to send to the printer for *string*. This can be flat text or escape sequences. An escape sequence consists of a backslash followed

by either two hex digits or a special character from the list below, which can be useful when sending a universal exit language to an HP3 or HP4 printer at the beginning of the transform.

Character

	Description
\	Insert a backslash (0x5c)
(Insert an escape (0x1b)
n	Insert a line feed (0x0a)
r	Insert a carriage return (0x0d)

Syntax

When you create an entry in this data set, specify one entry per line. For example:
keyword value1 value2

If an entry (a keyword and its value) is defined more than once, only the first valid entry is used, except for FONT, AFPFONT, and SCALFONT. For these entries, the last valid entry is used. Entries are not case sensitive. To enter comments, specify a blank, tab, or an asterisk (*) in the first column. Blank lines are ignored.

Example of an EWXHLTRN Profile

The following is an example of an EWXHLTRN user exit profile which can be found in the *qual.SEWXSAMP* samples data set as member EWXHP3. Other sample members include EWXPS, EWXHP, and EWXHP4.

To call this profile, we would either specify its non-qualified data set name with the z/OS MODIFY command, or as a user exit parameter in our print definitions data set.

```
*****
* z/OS LANRES                                     *
*                                                                 *
* COPYRIGHT -                                     *
* 5695-123 (C) COPYRIGHT IBM CORP. - 1994       *
* LICENSED MATERIALS - PROPERTY OF IBM         *
* SEE COPYRIGHT INSTRUCTIONS, G120-2083        *
* ALL RIGHTS RESERVED.                          *
*                                                                 *
* Sample Queue Profile for a HP LaserJet III printer *
*****

* This Profile is for an HP LaserJet III printer
* Mode is the only required entry.
mode HP3

* The font we want to use in Times Roman, with a size 10 font, in
* italics. Our HP bitmap font can be found in the A.B.C data set
* as member FONT.
font time10i A.B.C(FONT)

* We are using European A4 size paper.
paper a4

* We want to use the duplexing feature of our HP LaserJet III printer.
duplex on

* We want to insert a Top Margin Command to set the top margin to be
* at the top of the logical page during document setup.
setup 2 \(&10E
```

Stopping a Print Server on z/OS

To stop the z/OS LANRES print server on z/OS, use the z/OS STOP command. Any user having operator authority can enter the following command:

```
/P taskorjob
```

Or, enter the following command from the operator console:

```
P taskorjob
```

Where *taskorjob* is the name of the started task or batch job that is running.

Unloading the Host-to-LAN Print NLM

To unload a host-to-LAN print NLM on the NetWare server, use the NetWare UNLOAD utility:

```
unload ewxhlpert
```

All copies of EWXHLPRT are unloaded. The host-to-LAN print servers on z/OS wait for the connection to be reestablished. Old print jobs are not lost. When the connection is reestablished, the servers on z/OS resume sending jobs to NetWare.

Chapter 12. LAN-to-Host Print

This chapter describes how to use the LAN-to-host print function of z/OS LANRES. The z/OS LANRES LAN-to-host print function gives NetWare clients access to host printers. NetWare clients can use print utilities such as NetWare's NPRINT or CAPTURE commands to send output to printers attached to the z/OS system.

Setting Up LAN-to-Host Print

When you set up LAN-to-host print, there are several tasks you must perform on z/OS and several on the NetWare file server. The following steps summarize the tasks for setting up LAN-to-host print. Each task is described in detail in this chapter.

1. Create a NetWare print queue server and print queue.
To print data on z/OS, NetWare users send data to a regular NetWare print queue. You must create the print queue and the print server. The print server is assigned to the print queue. However, the regular NetWare print server programs (PSERVER) are not used to monitor the print queue. Instead, a z/OS LANRES LAN-to-host print NLM monitors the print queue and sends the data to z/OS. The z/OS LANRES print NLM acts as the NetWare print server.
2. Update the LAN-to-host print procedures data set on z/OS.
Each z/OS LAN-to-host print server job uses an z/OS printer data set for print procedures. The print procedures data set identifies an installation-wide exit that processes the data before it is printed on z/OS. An installation-wide exit is associated with each NetWare print queue.
3. Ensure that z/OS LANRES communications are active between the NetWare server and z/OS.
The EWXCOMM communications driver must be loaded on the NetWare server.
4. Load the LAN-to-host print NLM on the NetWare server.
The LAN-to-host print NLM on the NetWare server monitors the NetWare print queue and sends print jobs to the print server on z/OS.
5. Start the LAN-to-host print serving program on z/OS.
At this point, the NetWare side of LAN-to-host print is running, so you need to start the z/OS side. To start the LAN-to-host print server on z/OS, submit a batch job that runs the EWXLHSRV command. EWXLHSRV reads the print procedures data set.

After setting up print serving, little intervention is required. NetWare users can print files on z/OS by directing their print output to a NetWare queue that is being monitored by z/OS LANRES. NetWare users don't need to use any z/OS LANRES commands.

The part of z/OS LANRES that monitors the NetWare print queue is the LAN-to-host print NLM, named EWXLHPRT. EWXLHPRT is an NLM that runs on a NetWare server. EWXLHPRT operates as the print server for the queue. (The queue is not monitored by the usual NetWare print server.) Like a NetWare print server, EWXLHPRT can monitor several print queues. The EWXLHPRT NLM sends the print files to an z/OS LANRES print server on z/OS.

The z/OS LANRES print server on z/OS is started by the EWXLHSRV command. It is the print server that receives the output from the EWXLHPRT NLM. The print server then calls an exit routine to process the file for printing. The exit routine may,

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for example, convert ASCII data to EBCDIC. The user exit then sends the file to an z/OS print queue for regular z/OS print processing. After calling the user exit, the print server sends a reply to the EWXLHPRT NLM.

When starting the print server on z/OS, you specify the name of a communications target. The communications target is a NetWare server that must have the z/OS LANREScommunications NLM EWXCOMM loaded. It must also have the EWXLHPRT NLM loaded.

There can be several z/OS LANRES LAN-to-host print servers running on z/OS at the same time. Each communicates with a different copy of the EWXLHPRT NLM. Each EWXLHPRT NLM operates as a different NetWare print server. The EWXLHPRT NLM knows the name of the NetWare print server from data sent to it by z/OS. You specify the name of the NetWare print server when entering the EWXLHSRV command. EWXLHSRV then operates as the identified print server, monitoring all queues assigned to that print server.

LAN-to-host print serving allows ASCII readable print data to be converted to z/OS print data through installation-wide exits. The LAN-to-host print procedures data set associates an installation-wide exit with a NetWare print queue. The installation-wide exit is called from the LAN-to-host print server and converts the LAN print data.

Creating a NetWare Print Queue Server and Print Queue

To create a print server, you can use the NetWare PCONSOLE utility or the z/OS LANRESadministration EWXADMIN ADDPRTS command if creating a Bindery queue. (See “Chapter 8. Administration” on page 139 for information about using the z/OS LANRES administration function.) You can use any of the z/OS LANRES interfaces.

- Bindery

We will use the EWXADMIN ADDPRTS command. Assuming an z/OS LANRESadministration connection is established and the z/OS LANRES EWXEXEC command was issued, we will create a print server from the LANRES READY prompt:

```
EWXADMIN ADDPRTS PSERV1
```

Where PSERV1 is our NetWare print queue server name.

The print server is created with the following properties. You can change these properties with the NetWare PCONSOLE utility.

Property	Initial Value
PASSWORD	Null
PS_USERS	EVERYONE
PS_OPERATORS	SUPERVISOR
ACCOUNT_BALANCE	Null

Note: A “Null” for account balance means that there is no charge for using this print server.

The user SUPERVISOR is assigned as a print server operator, and the group EVERYONE is assigned as a print server user. If you are using NetWare Version 4.01, the EVERYONE group may not exist. In this case, the print server is still created, but no users are assigned to it. (No one can use the print server.) You will need to use the NetWare PCONSOLE utility to add print server users.

- NDS
USE PCONSOLE to create the Print server.

Next, we will create a NetWare print queue. You can use the NetWare PCONSOLE utility or the z/OS LANRES administration command EWXADMIN ADDPRTQ.

- Bindery
Assuming an administration connection is established and the EWXEXEC command was issued, we will use the EWXADMIN ADDPRTQ command to create a print queue named LINEPRT and assign the print server PSERV1 to it:

```
LANRES READY  
EWXADMIN ADDPRTQ LINEPRT (PRINTQS PSERV1
```

If the print server specified is incorrect or hasn't yet been created, a warning message displays. The print queue, however, is still created, and the name of the print server is not assigned to it.

Print queues created by the EWXADMIN ADDPRTQ command have the following properties. You can change these properties by using the NetWare PCONSOLE utility.

Property

Initial Value

Q_DIRECTORY

SYS:\SYSTEM

Q_SERVERS

The name of the print server you specified.

Q_OPERATORS

SUPERVISOR

Q_USERS

EVERYONE

The user SUPERVISOR is assigned as a print queue operator, and the group EVERYONE is assigned as a print queue user. If you are using NetWare Version 4.01, the EVERYONE group may not exist. In this case, the print queue is still created, but no users are assigned to it. (No one can use the print queue.) You will need to use the NetWare PCONSOLE utility to add print queue users.

- NDS
Use PCONSOLE to create the Print queue and have it serviced by the Print server created above.

Creating a LAN-to-Host Print Procedures Data Set

The LAN-to-host print server on z/OS reads *print procedure* data sets. A print procedure data set is required. It identifies the following for each NetWare queue used by the LAN-to-host print function:

- The name of the NetWare print queue to which the print procedure information applies
- The name of the user exit to be used to prepare the NetWare output for printing on z/OS
- The type of exit

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- Any options to pass to the exit

The EWXLHSRV command looks for this information in the data set you have allocated to the EWXLHCFG DDname. (See Table 8 on page 131 for a list of z/OS LANRESdata set allocations.) If you don't have a data set allocated, EWXLHSRV looks for a data set named *prefix.EWXLHPRT.PROCS*.

z/OS LANRES provides a sample of the LAN-to-host print procedures data set in the *qual.SEWXPRT* data set as member EWXLHPRT.

Specifying Definitions

Specify the following values in the LAN-to-host print procedures data set. The values are not case sensitive.

NETWARE PRINT Q Field

- Bindery
 - Specify the name of the NetWare print queue where print data is sent. When we created our print queue, we named ours LINEPRT.
- NDS
 - Specify the fully qualified name of the NetWare Print queue where print data is sent.

EXIT NAME Field

Specify the name of the REXX exec, command, executable module, or internal exit that you want to use to transform the print data.

The following sample installation-wide exits are supplied with z/OS LANRES LAN-to-host print serving. If you are using the file tailoring exits under ISPF, you must use a REXX exec (the z/OS LANRES EWXLHPRT command) to set up the proper environment for the file tailoring services. For details about the EWXLHPRT command, see *z/OS LANRES Configuration Files and Commands*.

- EWXLINE
 - Is a REXX exec
 - Prints a file on a line printer using file tailoring services
 - Requires TSO and ISPF
 - Converts data to EBCDIC, and ANSI control characters are added
 - Supports form feed, carriage return, line feed, and tabs
- EWXAFP
 - Is a REXX exec
 - Prints an AFP file using file tailoring services. The AFP file is created using the Windows AFP driver at the client.
 - Requires TSO and ISPF
- EWXSENDF
 - Is a REXX exec
 - Sends a file to a given user ID. The file can be in binary format or translated to EBCDIC.
 - Requires TSO
- EWXLHLNP
 - Is an INTERNAL exit
 - Prints a file on a line printer
 - Does not require TSO or ISPF
 - Converts data to EBCDIC and ANSI control characters are added
 - Supports form feed, carriage return, line feed, and tabs
 - Does not require TSO or ISPF

- EWXLHJOB
 - Is an INTERNAL exit
 - Submits a job (the JOBNAME option description follows) to process printer data.

If the job does not begin with a JOB card statement, the JOB card is read from the member EWXLHJOB.

These jobs are members of the data set allocated to the EWXLHJCL DDname. If the DDname is not allocated, it looks in the *prefix.EWXLHPRT.JCL* data set.

- Translates the data according to your specification (TRANSLATE option description follows)
- Does not require TSO or ISPF

EXIT TYPE Field

Specify the type of the exit here. Exit types can be:

- OLDEXEC—OLDEXEC is the default type if you don't specify anything here. Use OLDEXEC for a REXX exec from an earlier z/OS LANRES release.
- EXEC—Use EXEC for a REXX exec from this z/OS LANRES release. For example, the EWXLINE user exit provided with this release is an EXEC type.
- PGM—Use PGM for an executable module user exit.
- TSO—Use TSO for a TSO command.
- INTERNAL—Use INTERNAL for an internal exit. You cannot create or change an internal exit.

EXIT DATA Field

Specify exit options here. These options depend on the name of the exit you have specified in the EXIT NAME field.

If the exit is:	The type is:	The options that can be specified are:
EWXLINE	EXEC	(SKELETON CLASS PRINTER NODE)
EWXAFP	EXEC	(SKELETON CLASS PRINTER NODE)
EWXSENDF	EXEC	
EWXLHLNP	INTERNAL	(CLASS DESTINATION)
EWXLHJOB	INTERNAL	(JOBNAME TRANSLATE OVERRIDES)

Note:

- Always begin the option string with a (.
- The options must be specified in the order listed.
- You cannot specify an option lower in order without specifying all the options higher in order. For example, for the EWXLINE exit, you cannot specify a CLASS without specifying a SKELETON.

Where:

- SKELETON is the name of the ISPF file tailoring skeleton. Sample skeletons can be found in the *qual.SEWXSLIB* data set as members EWXLINE and EWXAFP.
- CLASS is A to Z for the output class.
- PRINTER is the name of the z/OS printer.
- NODE is the system of the z/OS printer.
- DESTINATION is any valid JCL DEST= parameter.
- JOBNAME is the member name of the job to submit. Sample jobs can be found in the *qual.SEWXSAMP* data set as members EWXLHJOB, EWXLHLNE, EWXLHPST, and EWXLHPCL.

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- TRANSLATE is the translation type, which can be:
 - LINE—Data is converted to EBCDIC, and ANSI control characters are added. Form feed, carriage return, line feed, and tabs are supported.
 - SEND—Data is converted to EBCDIC. Processing for control characters is not supported.
 - NONE—Data is not translated.
 - HPPCL—Converts Hewlett-Packard (HP) Print Control Language (PCL) text print streams to Advanced Function Printer (AFP) print streams. The default device type is 3820. Using the OVERRIDES option (explained following), you can specify 38PP. The following are examples of what may happen when using the HPPCL translate type:
 - Only text is supported. Any graphics instructions in the file to be printed, including PCL Print Model, HP/GL-2 graphics, and raster graphics, are ignored.
 - Some word processors use graphics commands to draw the characters for some fonts. This text does not appear in the data sent to z/OS LANRES and does not appear in the output document.
 - Some word processors use overstrike to implement boldface. In this case, underscoring combined with boldface may not produce desirable results.
 - Translation from ASCII to EBCDIC is done using the current z/OS LANRES code page. If characters other than those in the ASCII printable character set are used, the results are unpredictable.
 - Many times, graphics commands are used for underscoring. This underscore is ignored and does not appear in the output document. Text may be printed in Portrait or Landscape format. No support is provided for reverse Portrait or reverse Landscape format, or for rotation of text within the page.
 - If raster graphics commands are used to download font images to the printer, the corresponding font descriptor part of the font heading may not be completely filled in by the Hewlett-Packard printer driver on the workstation. For example, font characteristics such as italics, bold, even typeface type may not be specified. z/OS LANRES selects a font based on the information available in the font header and uses defaults where necessary.
 - Except for common font typefaces, z/OS LANRES cannot translate to AFP fonts. z/OS LANRES uses a font based on whether the font requested is monospace or proportional, and also the font size. This is consistent with the HP *hierarchy* of font selection, but, in some cases, may not give the results expected. Also, on the AFP side, z/OS LANRES is limited to a subset of fonts shipped with PSF*. If a proportional font is specified, Times New Roman Latin1 is used. Otherwise, Courier Latin1 is used.
 - Workstation printer drivers for various HP printers use different HP printer instructions to print the same file. Therefore, the results of printing the data on an AFP printer through z/OS LANRES may differ, depending on which HP printer driver was used to do the formatting.
- OVERRIDES are any values that you want to override in your JCL. For example, `DEST=GDLVM7.ALLENMJ,DEVTYPE=38PP,CLASS=A`.

Syntax

When you create an entry in this data set, use a single line of blank-delimited values. Lines can contain up to 254 characters.

Comments are identified by a `/*` in the first two columns of a line and are ignored. Specify a value for each field, except, of course, if you are not using exits or user exit options.

Create a print procedure entry for each NetWare print queue that is to be serviced by the LAN-to-host print function.

Example

For example, if we needed to set up the following:

- We have a NetWare print queue named LINEPRT.
- We have a line printer we will access using file tailoring services, so we will use the EWXLINE supplied exit.
- We don't have an earlier release of the z/OS LANRESEWXLINE exit, so the type will be EXEC.
- We want to use the ISPF file tailoring skeleton named EWXLINE.
- We want to use a job class of A.
- We want to print data on the z/OS printer named MVSPRTR.
- The printer MVSPRTR is on the z/OS system named MVSSYS.

The entry we would create in our print procedures data set would look like this:

- Bindery format

```
/* LAN-to-host print procedures data set */
LINEPRT      EWXLINE  EXEC    (EWXLINE A MVSPRTR MVSSYS
:
:
```

- NDS format

```
/* LAN-to-host print procedures data set */
:cn=LINPRT.ou=xx.o=yy      EWXLINE  EXEC    (EWXLINE A MVSPRTR MVSSYS
:
:
```

Loading the LAN-to-Host Print NLM on the NetWare Server

The LAN-to-host print NLM on NetWare retrieves print data from the NetWare print queue and sends it to the print server on z/OS. If the print NLM is not loaded, z/OS printers are not available to NetWare users and applications.

Before loading the print NLM, ensure that the z/OS LANRES communication driver (EWXCOMM) is already loaded. If you don't know whether it is loaded, use the NetWare MODULES command to list the loaded modules. See the *NetWare Utilities Reference* manual for more about the MODULES utility. If you need to load the z/OS LANRES communication driver, see "Starting z/OS LANRES Communications on a NetWare Server" on page 99.

To load the z/OS LANRES LAN-to-host print NLM, enter the LOAD EWXLHPRT command on the NetWare server console. A simple form of the command is shown in the following example:

```
load sys:\ewxn\lm\ewxlhpert
```

The EWXLHPRT NLM is located in the EWXNLM directory of the SYS volume. If you have moved the NLM to a different directory, substitute the correct volume and path on the above command. The EWXLHPRT NLM remains loaded until you enter a command to unload it.

LAN-to-Host Print

You can specify IN and OUT component passwords for the EWXLHPRT NLM by using the PWIN and PWOUT options, as follows:

```
load sys:\ewxnlm\ewxlhprt pwin=1hdown pwout=1hup
```

If you set the passwords in the z/OS LANRES initialization file (EWXCOMM.INI) as recommended in “Specifying Server Component Passwords” on page 103, you don’t need to specify them here.

The EWXLHPRT NLM communicates with only one z/OS print server. If you want to use multiple print servers on z/OS, load multiple copies of the EWXLHPRT NLM by repeatedly entering the LOAD EWXLHPRT command. Each copy of EWXLHPRT will use the same passwords.

Remember that the total number of connections allowed to the NetWare server is governed by the SESSIONS option in the EWXCOMM.INI file. See “z/OS LANRES Sessions” on page 101 for more information.

You can automate the loading of EWXLHPRT on the NetWare server. To learn how, see “Automatically Loading z/OS LANRES NLMs on a NetWare Server” on page 107.

Starting the LAN-to-Host Print Server on z/OS

The print server on z/OS receives data from the LAN-to-host print NLM on the NetWare server, calls the user exit to process the data, and submits a print job to z/OS.

To start the LAN-to-host print server for non-TSO exits, submit a job to run the EWXLHSRV command. The following is an example of the JCL we used to start the LAN-to-host print server.

This sample is in the *qual.SEWXSAMP* samples data set as member EWXLHJCL. You won’t be able to use this sample unless you tailor it to meet the needs of your environment.

```

//jobname JOB
//*
//* JCL TO START LAN-TO-HOST PRINT FOR NON TSO EXITS
//*
//* USING CONFIGURATION DATASET TO MAKE CONNECTION
//*
//* Netware Directory Services support.
//*
//* The server name must be .NDSERVER and EWXLHPS DD must be added.
//* The dataset assigned to this DD should contain the fully qualified
//* NDS name of the print server. A sample of this Dataset is in
//* prefix.sewxprt(ewxlhps)
//*
//* LHPRT EXEC PGM=EWXLHSRV,PARM='QS .NDSERVER',
//* TIME=1440,REGION=4096K
//*
//* Netware Bindery support.
//*
//LHPRT EXEC PGM=EWXLHSRV,PARM='QS PSERV1',
// TIME=1440,REGION=4096K
//*
//STEPLIB DD DISP=SHR,DSN=EWX.SEWXLMOD
//SYSEXEC DD DISP=SHR,DSN=EWX.SEWXEXEC
//* LANRES OPTIONS
//EWXLHCFG DD DISP=SHR,DSN=prefix.EWXLHPRT.PROCS
//*TO USE COMPONENT PASSWORDS, UNCOMMENT NEXT LINE
//*EWXLHPPW DD DISP=SHR,DSN=prefix.PASSWORD
//*TO USE Netware Directory Services UNCOMMENT NEXT LINE
//*EWXLHPS DD DISP=SHR,DSN=prefix.SEWXPRTEWXLHPS)
//EWXCONFG DD DISP=SHR,DSN=prefix.LINKUSER
//* Select one of the languages
//EWXMSGSD DSN=EWX.SEWXMSGSD,DISP=SHR <--- AMENG
//*EWXMSGSD DSN=EWX.SEWXMSGJ,DISP=SHR <--- KANJI

//EWXPRINT DD SYSOUT=*
//* IN CASE TSO EXIT IS CALLED
//SYSTSPRT DD SYSOUT=*,DCB=(LRECL=133,RECFM=FBA)
//*

```

To start the LAN-to-host print server with TSO/ISPF exits, submit a job to run the z/OS LANRES EWXLHPRT command. The z/OS LANRES EWXLHPRT command is specified the same way the z/OS LANRES EWXLHSRV command is specified. This command must be used to start the LAN-to-host print server with TSO/ISPF exits. The following is an example of the JCL we used to start the LAN-to-host print server.

This sample is in the *qual*.SEWXSAMP samples data set as member EWXLHTSO. You won't be able to use this sample unless you tailor it to meet the needs of your environment.

LAN-to-Host Print

```
//jobname JOB
//*
//* JCL TO START LAN-TO-HOST PRINT WITH TSO/ISPF EXITS
//*
//* USING CONFIGURATION DATASET TO MAKE CONNECTION
//*
//* To use KANJI, uncomment the KANJI statements and comment out the
//* AMENG statements. Only one language can be active.
//*
//LHPRTB PROC
//LHPRT1 EXEC PGM=IKJEFT01,TIME=1440,REGION=4096K
//STEPLIB DD DISP=SHR,DSN=EWX.SEWXLMOB
//SYSEXEC DD DISP=SHR,DSN=EWX.SEWXEXEC
//ISPLLIB DD DSN=SYS1.ISPLLIB,DISP=SHR
//ISPMLIB DD DSN=EWX.SEWXMLIB,DISP=SHR <--- AMENG
//*ISPMLIB DD DSN=EWX.SEWXMLBJ,DISP=SHR <--- KANJI
// DD DSN=SYS1.ISPMLIB,DISP=SHR
//ISPTLIB DD DSN=SYS1.ISPTLIB,DISP=SHR
//ISPPROF DD DISP=SHR,DSN=prefix.ISPF.ISPPROF
//ISPPLIB DD DSN=EWX.SEWXPLIB,DISP=SHR <--- AMENG
//*ISPPLIB DD DSN=EWX.SEWXPLBJ,DISP=SHR <--- KANJI
//ISPPLIB DD DSN=EWX.SEWXSLIB,DISP=SHR
//* LANRES OPTIONS
//EWXLHCFG DD DISP=SHR,DSN=prefix.EWXLHPRT.PROCS
//TO USE Netware Directory Services UNCOMMENT NEXT LINE
//EWXLHPS DD DISP=SHR,DSN=prefix.SEWXPRP(EWXLHPS)
//* To use Component PASSWORDs, uncomment next line
//EWXLHPPW DD DISP=SHR,DSN=EWX.PASSWORD <--- PASSWORD
//EWXCONFG DD DISP=SHR,DSN=EWX.LINKUSER
//EWXPRINT DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*,DCB=(LRECL=133,RECFM=FBA)
//SYSTSIN DD DUMMY
// PEND
//LANRES EXEC LHPRTB,REGION=4096K
//*
// * Netware Bindery support.
// *
//SYSTSIN DD *
// ISPSTART CMD(EWXLHPRT QS PSEVR1)
// *
// * Netware Directory Services support.
// *
// * The server name must be .NDSERVER and EWXLHPS DD must be added.
// * The dataset assigned to this DD should contain the fully qualified
// * NDS name of the print server. A sample of this Dataset is in
// * prefix.sewxprt(ewxlhps)
// *
// * SYSTSIN DD *
// * ISPSTART CMD(EWXLHPRT QS .NDSERVER)
```

Stopping a LAN-to-Host Print Server on z/OS

To stop the z/OS LANRES print server on z/OS, use the MVS STOP command. Any user having operator authority can enter the following command:

```
/P taskorjob
```

Or, enter the following command from the operator console:

```
P taskorjob
```

Where *taskorjob* is the name of the started task or batch job that is running.

Unloading the LAN-to-Host Print NLM on the NetWare Server

To unload the LAN-to-host print NLMs on the NetWare server, use the NetWare UNLOAD utility:

```
unload ewxlhprt
```

The print server on z/OS detects this and cancels any in-progress print job that hasn't yet been sent to the z/OS printer. The print server then restarts and waits for the EWXLHPRT NLM to be loaded on the NetWare server again.

Printing NetWare Files on z/OS

You can use the IBM-supplied user exits to print files from the client workstation to z/OS. To do this, set up the print server and print queues as outlined above and then use NetWare NPRINT or CAPTURE commands to send the print job to the queue.

NPRINT Command

The format of the NPRINT command for the EWXLINE, EWXLHLP, and EWXLHJOB exits is:

```
NPRINT filename
  with optional parameters of:
  /Queue=queue      The NetWare queue name.
  /Server=fileserver The NetWare fileserver owning the queue.
  /Copies=n         Number of copies to print.
  /Tab=n           The tab stop. The default is 8.
```

The format of the NPRINT command for the EWXSEND exit is:

```
NPRINT filename
  with optional parameters of:
  /Queue=queue      The NetWare queue name.
  /Server=fileserver The NetWare fileserver owning the queue.
  /Copies=n         Number of copies to print.
  /NAME=userid     User ID to send file to.
  /Banner=system   Host system to send file to.
  /Form=BINARY     Don't translate file before sending.
```

Note: When using /Form=BINARY, a form named BINARY must be created with the NetWare PRINTDEF command. Avoid setting the form number to the default form number (0) because all data will not be translated. See the *Novell NetWare Print Server* manual for details of the PRINTDEF command.

CAPTURE Command

The format of the CAPTURE command is:

```
CAPTURE
  with optional parameters of:
  /Queue=queue      The NetWare queue name.
  /Local=n         LPT port to capture.
```

Glossary

This section explains or defines selected terms, acronyms, and abbreviations that may appear in this book. You may also want to refer to Novell NetWare documentation that applies to the NetWare version you are running.

A

access. A NetWare trustee right, indicating that a user may change trustee rights. To read; the ability to use or read.

access control. The techniques and facilities used to ensure that a computer system and the operating system, application programs, and data stored therein can be accessed only by authorized users in authorized ways.

Advanced Communications Function for Virtual Telecommunications Access Method (ACF/VTAM). An IBM licensed program that controls communications and flow of data in an SNA network. It provides single-domain, multiple-domain, and interconnected network capability.

Advanced Program-to-Program Communications (APPC). The interprogram communications service within SNA LU 6.2.

Advanced Program-to-Program Communications/Personal Computers (APPC/PC). A protocol that lets systems or devices such as IBM personal computers be attached to the IBM Token Ring Network so that they may communicate and process the same programs.

B

bindery. In NetWare, a database that contains definitions for entities such as users, groups, and workgroups. The bindery allows the network supervisor to design an organized and secure operating environment, based on the individual requirements of each of these entities. The bindery is comprised of three components: objects, properties, and property data sets.

bindery context. The position in the Directory tree structure where bindery emulation is performed. Bindery context is set during server initialization in AUTOEXEC.NCF. To enable the full capability of bindery emulation, bindery context should be set to the same Directory path as the NetWare Version 4.01 server.

bindery emulation. A method to allow NetWare Version 4.01 servers which use NetWare Directory Services to co-exist with NetWare Version 3.11 servers which use Bindery Services. The bindery emulator,

which runs on the Version 4.01 server, enables clients on requesters prior to Version 4.01 to see Version 4.01 servers and some Directory Services objects. Most, but not all, bindery functions can be duplicated through bindery emulation. Bindery emulation is optional and can be disabled by not specifying a bindery context in the Directory for the bindery emulator.

buffer. An area of storage temporarily reserved for performing input or output into which data is read, or from which data is written.

byte. A unit of storage consisting of eight adjacent binary digits that are operated on as a unit and constitute the smallest addressable unit in the system.

C

cache. A high-speed buffer storage that contains frequently accessed instructions and data; it reduces access time.

channel-to-channel (CTC) device. A hardware device that connects two channels on the same computing system or on different systems.

client. A DOS, OS/2, Macintosh, or UNIX workstation that accesses resources on a Novell server.

Common Programming Interface (CPI) Communications. A set of program-to-program communication routines that let applications written in REXX and high-level languages access APPC functions. These routines are part of the IBM Systems Application Architecture.

communications server. A workstation or virtual machine that provides APPC/VM services between systems within a CS or TSAF collection, and allows for communications between an APPC/VM environment and a SNA-defined network. TSAF and AVS are communication servers. Also known as an intermediate communications server.

component passwords. Four passwords; two on the NetWare server and two corresponding passwords on MVS that authorize a connection between z/OS LANRES on the NetWare server and z/OS LANRES on MVS for each z/OS LANRES function.

configuration data set. A data set that a command can use to obtain predefined values or settings.

connect. To establish a communication path between two programs or objects.

context. In NetWare terminology, this is the portion of the complete object name that specifies the container in

which the object resides. It can be specified in the typeless format. The maximum length for the context is 191 characters.

conversation. A connection between two transaction programs over an LU-LU session that lets them communicate with each other while processing some transaction. The programs establish a conversation, send and receive data in the conversation, and then terminate the conversation.

conversation partner. One of the two programs involved in a conversation.

create. A NetWare trustee right allowing the creation of NetWare files and subdirectories.

D

data link. The equipment and rules (protocols) used for sending and receiving data. Synonymous with communications link.

DBCS. Double-byte character set.

direct access storage device (DASD). A storage device in which the access time is effectively independent of the location of the data.

disk image. A replica of a NetWare disk.

disk operating system (DOS). An operating system for computer systems that use disks and diskettes for auxiliary storage of programs and data.

domain. A set of transaction programs and servers that allocate shared resources within a single logical system.

double-byte character set (DBCS). A set of characters in which each character is represented by 2 bytes. Languages such as Japanese, Chinese, and Korean, which contain more symbols than can be represented by 256 code points, require double-byte character sets. Because each character requires 2 bytes, the typing, display, and printing of DBCS characters requires hardware and programs that support DBCS.

dump. To write the contents of part or all of main storage, part or all of a data space, to auxiliary storage or a printer.

duplexing. Duplicating data from one hard disk's NetWare partition to another hard disk's NetWare partition. Each hard disk uses a different disk channel path. If one hard disk or disk channel path fails, the other hard disk can continue to operate. This guards against failures in a single hard disk or a single disk channel path. Duplicating data from a locally-attached hard disk to an z/OS LANRES host disk is considered duplexing. Compare with *mirroring*.

E

Enterprise Systems Connection (ESCON). A set of IBM products and services that provides a dynamically connected environment within an enterprise.

erase. A NetWare trustee right indicating that a user may erase files and subdirectories.

ESCON channel. A channel having an Enterprise Systems Connection channel-to-control-unit I/O interface that uses optical cables as a transmission medium. Contrast with parallel channel.

F

file allocation table (FAT). Refers to a table kept by the operating system that enables it to locate files stored on disk. This scheme was designed to work with small capacity disks.

fully qualified LU name. A name that identifies each LU in a SNA network. It consists of a network ID followed by a network LU name.

H

help panel. An online display that tells you how to use a command or another aspect of a product. See *task panel*.

host system. A data processing system that prepares programs and the operating environments for use by another computer or controller.

I

input/output (I/O). Pertaining to a device whose parts can do an input process and an output process at the same time. Pertaining to a functional unit or channel involved in an input process, output process, or both, concurrently or not, and to the data involved in such a process.

interface. A shared boundary between two or more entities. An interface might be a hardware or software component that links two devices or programs together.

intermediate communications server. A program that handles communication requests to a resource manager program on behalf of a user program.

Internetwork Packet eXchange (IPX).** A Novell communication protocol that creates, maintains, and terminates connections between network devices. IPX addresses and routes outgoing data packets across a network, reads the assigned addresses of returning data, and directs the data to the proper area within a workstation's operating system.

interrupt. A suspension of a process, such as execution of a computer program, caused by an external event and done in such a way that the process can be resumed.

J

job. A unit of work within a network. It consists of all data beginning with a job header control record and ending with a job trailer control record.

K

keyword. A name or symbol that identifies a parameter. A part of a command operand that consists of a specific character string (such as FEATURE=).

L

LANRES object. An object in the NetWare directory/bindery that acts as a user ID that provides Supervisor Equivalent rights. The host-to-LAN print and distribution functions use the LANRES object. For example, the host-to-LAN print function logs in to the file server from which it intends to print as the LANRES object. The distribution function uses the LANRES object in certain cleanup situations, again as a NetWare user ID.

local. Two entities (for example, a user and a server) are said to be local to each other if they belong to the same node within a SNA system. Contrast with *remote*.

local area network (LAN). A data network located on the user's premises in which serial transmission is used for direct data communication among data stations.

local server. A NetWare server running z/OS LANRES code and connected to the host by one of the z/OS LANRES communications methods. z/OS LANRES works on both local servers and remote servers.

log data. Information that a communications program can send to its partner to help diagnose errors.

logical unit (LU). An entity addressable within a SNA-defined network, similar to a node within a VM network. LUs are categorized by the types of communication they support. A VM system, CS collection, or TSAF collection in a SNA network is viewed as one or more LUs. An MVS system may contain one or more LUs.

logical unit name (LU name). A symbolic name given to a particular LU in a SNA-defined network.

login. The procedure by which a user begins a NetWare session.

login script. Files similar to configurable batch files and processed as part of the NetWare login procedure. There are two types of login script files; system and user.

login security. One of four NetWare security levels that controls access to information stored on the network volumes. This security level indicates who can access the network by logging into the network server.

logon. The procedure by which a user begins a host session.

LU type 6.2. A set of protocols and services defined by IBM's SNA for communication between application programs.

M

message repository. A source file that contains message text for an IBM product or a user application. The message text in a repository file can be translated and used to support national languages.

migration. Installing a new version or release of a program when an earlier version or release is already in place.

mirroring. Duplicating data from one hard disk's NetWare partition to another hard disk's NetWare partition. Both hard disks use the same disk channel path and usually the same disk controller on the server. If one hard disk fails, the other hard disk can continue to operate. This does not guard against error on the disk channel path. Compare with *duplexing*. z/OS LANRES uses duplexing, not mirroring.

mode name. A symbolic name given to a set of characteristics that describe a particular LU 6.2 session.

MVS. Multiple Virtual Storage.

N

NetWare Directory Services (NDS). A global, distributed, and replicated database for NetWare Version 4.x. The database maintains information for every object, or resource, on the network. Unlike Bindery Services, where a server only keeps a database about objects on that particular server, Directory Services keeps a global database for all servers.

NetWare Loadable Module (NLM). A program you can load and unload from NetWare server memory while the server is running. NLMs link disk drivers, LAN drivers, name spaces, and other file server management and enhancement utilities to the operating system.

network. Any set of two or more computers, work stations, or printers linked in such a way as to let data be transmitted between them.

network job entry (NJE). A facility for transmitting jobs, SYSOUT data sets, operator commands and operator messages, and job accounting information from one computing system to another. NJE is supported by JES2, JES3, RSCS, VSE/POWER, and BDT.

networking. In a multiple-domain network, communication among domains.

node. A single processor or a group of processors in a teleprocessing network. A computer, workstation, or printer, when it is participating in a network.

node identifier (node ID). The name by which a node is known to all other nodes in a network.

P

page. The portion of a panel that is shown on a display surface at one time. To move back and forth among the pages of a multiple-page panel.

panel. A formatted display of information that appears on a terminal screen. See also *help panel* and *task panel*. In computer graphics, a display image that defines the locations and characteristics of display fields on a display surface.

parallel channel. A channel having a System/360* and System/370 channel-to-control-unit I/O interface that uses bus-and-tag cables as a transmission medium. Contrast with *ESCON* channel.

parameter. A variable that is given a constant value for a specified application and that may denote the application.

password. In computer security, a string of characters known to the computer system and a user who must specify it to gain full or limited access to a system and to the data stored within it.

patch. A circumvented service change applied directly to object code in a text deck in a nucleus.

path. A connection between two application programs that are on the same or different systems. Paths have names assigned to them.

PF key. Programmed function key.

print queue. A subdirectory on a file server where print jobs are stored until the print server can send the job to a printer.

print queue operator. A NetWare user type assignment allowing control of a print queue. For

example, a print queue operator can edit any user's print job, delete print jobs, change the queue status, and so on.

print server. When the printer is ready for the job, a print server moves the job from a print queue to a printer. Print servers let you increase the number of printers on the network and physically locate printers where you want them.

print server operator. A NetWare user type assignment allowing control of the print server. For example, a print server operator can attach the print server to other file servers, issue print commands, change print forms, change queue priority, and so on.

problem determination. The process of identifying the source of a problem; for example, a program component, a machine failure, telecommunication facilities, user or contractor-installed programs or equipment, an environmental problem such as a power loss, or a user error.

product. Any separately installable software program, whether supplied by IBM or otherwise, distinct from others and recognizable by a unique identification code. The product identification code is unique to a given product but does not identify the release level of that product.

program update tape (PUT). A tape containing a customized collection of service tapes (preventive service) to match the products listed in a customer's ISMD (IBM Software Manufacturing and Delivery) profile. Each PUT contains cumulative service for the customer's products back to earlier release levels of the product still supported. The tape is distributed to authorized customers of the products at scheduled intervals or on request.

programmed function (PF) key. On a terminal, a key that can do various functions selected by the user or determined by an application program.

prompt. A displayed message that describes required input or gives operational information.

protocol. In SNA, the meanings of, and the sequencing rules for, requests and responses used for managing the network, transferring data, and synchronizing the states of network components. A set of rules for communication that are mutually understood and followed by two communicating stations or processes. The protocol specifies actions that can be taken by a station when it receives a transmission or detects an error condition.

R

random access memory (RAM). A memory device into which data is entered and from which data is retrieved in a nonsequential manner.

remote. Two entities (for example, a user and a server) are said to be remote to each other if they belong to different systems within a collection or to different nodes within a SNA network. Contrast with *local*.

remote server. A server that is not running z/OS LANRES code and is therefore not directly connected to MVS using z/OS LANRES. Although it is not directly connected, it is *indirectly* connected by being on the same LAN as a local server (which is directly connected to MVS using z/OS LANRES). z/OS LANRES works with both local and remote servers.

requester. The name given to a workstation or virtual machine containing a user program that requests a resource. Contrast with *server*.

resource. A program, a data file, a specific set of files, a device, or any other entity or a set of entities that the user can uniquely identify for application program processing in a system.

resource ID. A one-to-eight character name that identifies a resource.

resource manager. An application running in a server workstation or virtual machine that directly controls one or more resources. There are three categories of resource managers: global, local, and private.

Restructured Extended Executor (REXX) language.

A general-purpose, high-level programming language, particularly suitable for EXEC procedures, XEDIT macros, or programs for personal computing. Procedures, XEDIT macros, and programs written in this language can be interpreted by the REXX interpreter.

return code. A code used by a program, routine, or subroutine that influences the execution of succeeding instructions.

route. A connection to another system by a logical link and one or more intermediate systems.

router. An enhanced connectivity program that interprets requests for services and directs them to the applicable server.

S

security equivalence. Establishes a NetWare user's security relationship to another user or group.

server. A computer that shares its resources with other computers in the network. In a local area network, a data station that provides services to other data stations. In TCP/IP, a system in a network that handles the requests of a system at another site (may be part of the same network) called a client. The general name for

a software product that provides a service for and fills the requests of a client. Contrast with *requester*.

session. For SNA, the term for a connection between two LUs. The LUs involved allocate conversations across sessions. For z/OS LANRES, the term for a connection between the NetWare server and MVS.

SNA. Systems Network Architecture.

SNA network. The part of a user-application network that conforms to the formats and protocols of Systems Network Architecture. It enables reliable transfer of data among end users and provides protocols for controlling the resources of various network configurations. The SNA network consists of network addressable units (NAUs), boundary function components, and the path control network.

subsystem. A secondary or subordinate system, usually capable of operating independent of, or asynchronously with, a controlling system.

supervisor. A NetWare user type assignment that gives the user all rights everywhere in the NetWare system. No one can permanently restrict the supervisor from any action or area. There is only one supervisor on the file server and it cannot be deleted or renamed.

supervisor equivalent. A NetWare user type assignment that gives the user the same rights as the supervisor has. Any user can be a supervisor equivalent, who, among other things, can change the supervisor's password and perform backups.

supervisory. A NetWare trustee right, indicating that a user has access to a directory, its subdirectories, and its files.

swap. To change the contents of two or more directories or files simply by swapping file names or directory names among them.

syntax. The rules for the construction of a command or program.

Systems Network Architecture (SNA). The description of the logical structure, formats, protocols, and operational sequences for transmitting information units through and controlling the configuration and operation of networks.

T

task panel. Online display from which you communicate with the program in order to accomplish the program's function, either by selecting an option provided on the panel or by entering an explicit command. See *help panel*.

TCP/IP. Transmission Control Protocol/Internet Protocol.

telecommunication line. Any physical medium such as a wire or microwave beam, that transmits data.

token-ring network (TRN). A network that uses a ring topology in which tokens are passed in the circuit from node to node. A node ready to send can capture the token and insert data for transmission.

Transmission Control Protocol/Internet Protocol (TCP/IP). The Internet standard transport level protocol that provides reliable, full duplex stream service. This widely used protocol allows dissimilar nodes in a heterogeneous environment to communicate with each other.

trustee assignments. NetWare rights granted to a specific user or group that let that user or group use a file or directory in certain ways; for example, read-only, write-only, or browse-only.

trustee rights. Privileges assigned to a NetWare user or group controlling which directories and files they can access and what they can do to the directory or files. Rights that may be granted include: read, filescan, write, create, erase, modify, and access control.

U

user. Anyone who requires the services of a computing system.

userobject. This is the complete name of the user ID object including the common name and the NDS context. It must start with a period. It can be specified in the typeless format. The maximum length for this is 255 characters.

user account manager. A NetWare user type assignment that is similar to a workgroup manager when it comes to editing user profiles, except a user account manager cannot create any new users or groups. User account managers can edit the user profiles of only those users or groups assigned to them. Similar to workgroup managers, a user account manager must have trustee rights allowing them to grant rights to users they manage.

user group. A named collection of users with certain trustee rights associated with the name and with the users.

user ID. User identification.

user login script. Lets the user tailor the NetWare login procedure. For example, it may contain mappings to specific drives and define certain environmental variables.

user program. A transaction program that requests a service from a resource manager program. User programs reside in requester workstations or virtual machines.

user type. One of several classifications of NetWare users. Each user type is an assignment, meaning that the user is created first, then assigned to one of these types: supervisor, supervisor equivalent, workgroup manager, user account manager, console operator, print server operator, print queue operator, or network user.

V

Virtual Telecommunications Access Method (VTAM). An IBM licensed program that controls communication and the flow of data in a computer network. It provides single-domain, multiple-domain, and multiple-network capability. VTAM runs under MVS and other operating systems.

volobject. This is the complete name of the volume object including the common name and the NDS context. It must start with a period. It can be specified in the typeless format. The maximum length for this is 255 characters.

VSAM. Virtual Storage Access Method. An IBM product that allows for the efficient storage and retrieval of program data to DASD.

W

workgroup manager. A NetWare user type assignment that gives the user the authority to:

- Create new users and groups
- Delegate responsibility to another user without having to make certain that the user is a supervisor equivalent
- Delete users and groups the workgroup manager has created and edit their security profiles.

workstation. An I/O device from which jobs can be submitted to a host system for processing, or to which output can be returned, or both.

wrapping. A technique that prevents an output file from growing beyond its authorized limit. When the file reaches that limit, n , the $n+1$ record replaces the first record in the file, the $n+2$ record replaces the second record, and so on.

write. A NetWare trustee right, indicating that a user can write to and open a file.

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This book is intended to help you set up and use z/OS LANRES.

This book primarily documents information that is NOT intended to be used as a Programming Interface of z/OS.

This book also documents intended Programming Interfaces that allow the customer to write programs to obtain the services of z/OS. This information is identified where it occurs, either by an introductory statement to a chapter or section or by the following marking:

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- OS/2
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- Personal System/2
- Print Service Facility
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- PS/2
- RACF
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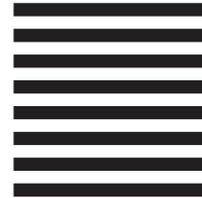
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