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NetWare/6000 Setup Tips for AIX 3.2.5 and 4.1

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About this Document

This document contains setup tips for NetWare/6000 Release 3.2.0 Version 3.11a with AIX 3.2.5 and Release 3.2.0 Version 3.11b with AIX 4.1.

This document was written and tested with the above operating system. The provided explanations, techniques, and procedures have been reviewed for technical accuracy and applicability. Though the techniques and information contained in this item may work on other levels of the operating system, it has not necessarily been tested. Normal precautions should be taken in adopting these same techniques and procedures in your own environment.

This document describes the basis steps for configuring NetWare, including the following:

- Verification of the NetWare server code that is installed on the RISC System/6000 server.
- NetWare configuration for AIX/6000.
- Starting and stopping NetWare.
- Performance tuning and optional methods.
- NetWare Virtual Terminal (NVT) Configuration for AIX/6000 system.
- Personal Computer (PC) information.
- Problem determination.
- Using the command "nwfsck".
- Documentation.

Verification of NetWare Server Code

This sections describes verification of NetWare server code that is installed on the RISC System/6000.

To verify the installation of the NetWare software, execute

```
lslpp -ah netware.*
```

Sample output is shown below:

```
  Name
  --------------------
Fix Id  Release         Status    Action   Date      Time     User Name
------- --------------- --------- -------- --------- -------- ---------  ---
Path: /usr/lib/objrepos
netware.fs.obj
         03.02.0000.0000 COMPLETE  COMMIT   03/17/94  11:44:59 root
         03.02.0000.0000 COMPLETE  APPLY    01/25/94  17:41:14 root
 U419537 03.02.0000.0000 NONE
 U420960 03.02.0000.0000 COMPLETE  COMMIT   03/17/94  11:45:32 root
         03.02.0000.0000 COMPLETE  APPLY    03/17/94  10:32:07 root
 U491151 03.02.0000.0000 COMPLETE  COMMIT   03/17/94  11:45:48 root
         03.02.0000.0000 COMPLETE  APPLY    03/17/94  11:18:35 root

netware.server.obj
         03.02.0000.0000 COMPLETE  COMMIT   03/17/94  11:43:48 root
         03.02.0000.0000 COMPLETE  APPLY    01/25/94  17:41:13 root
 U419537 03.02.0000.0000 NONE
 U420958 03.02.0000.0000 NONE
 U421794 03.02.0000.0000 NONE
 U422006 03.02.0000.0000 NONE
 U422429 03.02.0000.0000 COMPLETE  COMMIT   03/17/94  11:45:23 root
         03.02.0000.0000 COMPLETE  APPLY    03/17/94  10:34:39 root
 U423375 03.02.0000.0000 NONE
 U491151 03.02.0000.0000 COMPLETE  COMMIT   03/17/94  11:45:32 root
         03.02.0000.0000 COMPLETE  APPLY    03/17/94  11:18:35 root

Path: /etc/objrepos
netware.fs.obj
         03.02.0000.0000 COMPLETE  COMMIT   03/17/94  11:45:25 root
         03.02.0000.0000 COMPLETE  APPLY    01/25/94  17:46:35 root

netware.server.obj
         03.02.0000.0000 COMPLETE  COMMIT   03/17/94  11:44:55 root
         03.02.0000.0000 COMPLETE  APPLY    01/25/94  17:46:35 root
 U419537 03.02.0000.0000 NONE
 U420958 03.02.0000.0000 NONE
 U421794 03.02.0000.0000 NONE
 U422006 03.02.0000.0000 NONE
 U422429 03.02.0000.0000 COMPLETE  COMMIT   03/17/94  11:45:26 root
         03.02.0000.0000 COMPLETE  APPLY    03/17/94  10:36:20 root
 U423375 03.02.0000.0000 NONE
```

Note: For version 4.1, the corresponding fileset would be netware.server for Netware Server Code v3.11b.

NetWare Configuration for AIX/6000

There are three files that need to be changed for configuration of NetWare for AIX/6000. These files are:

```
/etc/netware/NWConfig
/etc/netware/NPSConfig
/etc/rc.netware
```

These files can be edited manually, or you can use /usr/lpp/netware/bin/sconsole to configure NetWare for AIX/6000.

The file /etc/rc.netware starts NetWare. This file loads the STREAMS drivers needed to start NetWare. If TCP/IP is not configured on the system, then uncomment the lines associated with the interface. By default, these interfaces have a "0" at the end. Make sure that these numbers match the interface that will be used for NetWare. The number may be different if there are multiple token ring or Ethernet adapters in the system. Use the "netstat -i" command to see what interfaces are currently configured on the system.

Example from /etc/rc.netware:

```
# /usr/sbin/ifconfig en0 up
# /usr/sbin/ifconfig et0 up
# /usr/sbin/ifconfig tr0 up
```

The /etc/netware/NWConfig file contains the NetWare file server name and other tuning-related parameters. In most cases, only the "file_server_name" needs to be set in this file for NetWare to work. The default name is "PORTABLE", which should be changed to a name that will distinguish the RISC System/6000 from other possible NetWare servers on the network. It is also recommended to change the "console_flag" parameter from "inactive" to "active". This will allow messages to be echoed to the system console.

The /etc/netware/NPSConfig file contains the network-related configuration. This file determines what network adapter card(s) and network numbers are used. It also lists which daemons to activate when NetWare for AIX is started. By default, NetWare for AIX has SAP active and SPX and NVT inactive. If NVT is activated, then the "nvt_server_name" should also be set. The "nvt_server_name" does not have to be the server host name. SPX is needed for printing in a Novell NetWare network and should be active if printing is configured. The "internal_network" number is also set in this file. This number should be changed and should be a unique eight-digit number. The last eight digits of a system's hardware address makes a good unique "internal_network" number.

By default, NetWare for AIX/6000 is configured for the Ethernet Version 2 interface. There are sample configurations for the other possible interfaces (commented out) near the end of the /etc/netware/NPSConfig file.

Here is an example of the network configuration part of the /etc/netware/NPSConfig file:

```
lan_1_network = "e2e2e2e2"
lan_1_adapter = "/dev/dlpi/en"
lan_1_adapter_type = "ETHERNET_DLPI"
lan_1_ppa = 0
lan_1_if_name = "en"
lan_1_frame_type = "ETHERNET_II"
lan_1_module = "NULL"
```

Starting and Stopping NetWare for AIX/6000

Once all changes have been made to the configuration files, the command "/etc/rc.netware" will start NetWare on the RISC System/6000. Verify that the NetWare daemons are running with the command "ps -ef" and "grep" for the following six daemons:

NW Engine 0
Novell NetWare 3.11A (or Novell NetWare 3.11B for AIX 4.1)
NW Server Advertiser 0
./sapd
./npsd
./nvtd (only if nvt is configured)

To make changes to the configuration, always stop NetWare first. The command "/etc/netware.clean" can be used to stop NetWare. Verify that the NetWare daemons have stopped by running "ps -ef" and "grep" for the six daemons listed above. If nvt is not configured, the ./nvtd daemon will not be running.

NetWare for AIX/6000 can also be configured, started, and stopped using the sconsole utility on AIX. This is a better way to configure NetWare for AIX if you are not comfortable using the vi editor. You will need to log on as root on AIX in order to run the sconsole utility. It is located in the /usr/lpp/netware/bin directory.

Performance Tuning and Optional Methods

This section contains information that is relative to any user's configuration and should be interpreted and integrated into each user's situation. There is no guarantee for the actual performance your system will reach when configuring a NetWare server under these guidelines.

These guidelines have been used in other systems, and certain performance characteristics such as response time and speed were improved with these

changes. The default values in the /etc/netware/NWConfig file will work; however, some variables, such as number of users, application types, volume size and depth, or system demand place the NetWare server under various strains which may be relieved with a change to this file.

The optimum number of users per NCP engine (also called an NW engine) varies somewhat with system capacities and other site-specific factors. However, as a general rule, a ratio of 10 users per NCP engine should be maintained. Other ratios can be used but performance may suffer. Even having less than 10 users per engine may decrease performance because there will be more engines competing for system resources. The examples below can serve as a template which might apply to your system's configuration. The shared memory variables should be increased to avoid memory errors. The default value is 512*1024. A good value to use is 2048*1024. The file system cache blocks value should be increased to aid in cache performance. The default value is 28 and the maximum is 80. Forty to 60 is suggested depending on usage.

Edit the /etc/netware/NWConfig file and make the following changes that would best apply to your configuration:

Configuration #1 (10 users, 1 server, 1 network, normal usage on PCs (file editing)):

```
max_procs = 1
max_connections = 10
max_volumes = 64
shm_size = 2048*1024
fs_shm_size = 2048*1024
fs_num_cache_blocks = 40
```

Configuration #2 (10-20 users, 1 server, 1 network, normal usage on PCs (file editing)):

```
max_procs = 1  (possibly 2)
max_connections = 20
max_volumes = 64
shm_size = 2048*1024
fs_shm_size = 2048*1024
fs_num_cache_blocks = 40
```

Configuration #3 (40-50 users, 1 server, 1 or more networks, heavy usage (file editing, database usage, file transfers etc.)):

```
max_procs = 5
max_connections = 50
max_volumes = 64
shm_size = 4096*1024
fs_shm_size = 4096*1024
fs_num_cache_blocks = 60
```

Note: Changes to the /etc/netware/NWConfig file do not take effect until netware is stopped and restarted.

NetWare Virtual Terminal (NVT) Configuration for AIX/6000 System

NVT can be configured for AIX with sconsole or by editing the /etc/netware/NPSConfig file. The sconsole utility changes the NPSConfig file in a menu driven style.

The following changes to NVT parameters need to be made.

1. Change the NVT flag from INACTIVE to ACTIVE.
2. Change the NVT Server Name from "PORTABLE" to a preferred name that can be distinguished on the network. This can be the same as the "file_server_name" parameter in /etc/netware/NWConfig.
3. The NVT Spawn Number is the number of NVT sessions that can be available. Increase this number if more sessions are needed.
4. Stop and restart NetWare in order for the NVT to be active on the NetWare for AIX/6000 system.

Personal Computer (PC) Information.

A number of different NetWare configurations can exist between the RISC System/6000 server, PC workstations, and a Novell NetWare server. This section highlights one possible configuration and should provide sufficient information to address problems with different configurations.

The "C:autoexec.bat" file should have the following line to log in to the server:

```
login <servername>/supervisor
```

This should be the last line in this file and follow the "f:" drive specification. The "<servername>" is the same name used in the /etc/netware/NWConfig file for the NetWare server.

When the PC is booted, there should be messages regarding connections to the NetWare server as follows:

```
Attached to server...
You are attached to server <servername>
Good afternoon, supervisor.
```

The prompt should look like "F:\SYSTEM>".

If you run "logout" at the "F:\SYSTEM>" prompt, you will receive the message "SUPERVISOR logged out from server <servername> connection 1" and the system prompt will look like: "F:\LOGIN>".

If you do not get attached to the NetWare server, you should receive the message "Server <servername>....The specified server is unknown". The prompt will look like "F:\LOGIN>".

Once attached to the NetWare server, with the "F:\SYSTEM>" prompt, you should be able to run the DOS/OS2 executables found in this directory. Other utilities like slist and syscon can be found in the F:\PUBLIC> file system.

Problem Determination

Error messages on the PC.

- Errors:

  ```
  Server <servername>....The specified server is unknown. F:\LOGIN>
  ```
  or
  ```
  No remote login ports available
  ```

  Possible Solutions:

  – Check NetWare daemons on server (see section “Starting and Stopping NetWare for AIX/6000” for daemon list).
  – Server may need rebooting.
  – Verify hardware and network connectivity.
  – Verify configuration files (NWConfig, NPSConfig).

- Errors:

  ```
  Cannot execute F:<filename>
  ```
  or
  ```
  Access denied: F:<filename>
  ```
  or
  ```
  File locked: F:<filename>
  ```

  Possible solution:

  – Check file permissions and ownership.

  Note: On the RISC System/6000 server, run "ls -alF /opt/netware/sys/system". This will show ownership of all files and subdirectories as netware.netware. Any files copied or restored using ftp or mksysb will not have netware.netware ownership. For files or subdirectories not owned by netware.netware, run "chown netware.netware <filename>". This changes owner and group to netware. The permissions for various files and subdirectories in /opt/netware/sys/system range from 600, 644, 700, to 755. The user portion of the permissions field must be "rw" (6) or "rwx" (7).

Error messages on the RISC server:

- Error:

  ```
  NWError 0x1, NWDMain verify dirs, bad system value, invalid
       /system directory
  ```

  Possible solution:

  - Run "df". Check disk space in /opt. If 100% used, increase the size of /opt using smit or the "chfs" command. Before changing the size of a NetWare file system, stop NetWare.

- Error:

  ```
  cannot mount volume
  ```

  Possible solution:

  - Check the "volume" line in the /etc/netware/NWConfig file. This line must have the word "inodes" in the volume definition.

- Error:

  ```
  NWERROR:(0XFF) Setup memory creating shared memory...
  ```

  This error occurs when netware daemons are running and a second startup of netware occurs. You can avoid this error by verifying that the netware daemons are not running (see the daemon list in the section “Starting and Stopping NetWare for AIX/6000”) before starting netware. If you already have the error, see the following solution.

  Possible solution:

  - Run "ipcs -m" to get the IPC status from /dev/mem. The output will look like:

    ```
    T        ID     KEY        MODE       OWNER    GROUP
    Shared Memory:
    m      0 0x0d050236 --rw-------     root   system
    m 151553 0x58067000 --rw-rw-rw-     root   system
    m      2 0x0d06b15b --rw-rw-rw-     root   system
    m   8195 0xba5eba11 --rw-rw----     root   system
    m   8196 0xdead2bad --rw-------     root   system
    ```

    Find the Shared Memory IDs for the segments 0xba5eba11 and 0xdead2bad. Delete these memory segments with the command:

    ```
    ipcrm -m #
    ```

    where # is the ID number for these memory segments.

    For the above example, "ipcrm -m 8195" and "ipcrm -m 8196" would be run.

Using the NWFSCK Utility and the Command "nwfsck"

See /usr/lpp/netware/README for details on nwfsck.

The NWFSCK utility is a consistency-check and interactive-repair utility for the NetWare file system. Use nwfsck to repair inconsistencies in the NetWare Inodes file, generate the Inodes file if the file is missing, and print statistics on items in the Inodes file (number of files, forks, directories, blocks).

Before running the NWFSCK utility, make sure:

- NetWare is not running. Stop NetWare services before running nwfsck. See section “Starting and Stopping NetWare for AIX/6000.”
- Only run the utility on one volume at a time. The nwfsck must finish its check on the first volume before it is initialized to check a second volume.

The command "nwfsck" is located in /usr/lpp/netware/bin and the syntax is shown below.

```
nwfsck [options...] filename [volume_number (optional)] [mount_point (optional)]
```

The recommended flag options to use with this command are "-yacf". The meaning of these flags is:

```
-y  apply all corrections
-a  automatic mode; used for volume creation
-c  force checking of forks
-f  force synchronization with host file system
```

If you do not include an option, the utility runs in interactive mode. If any inconsistencies are found, you determine which inconsistencies are fixed.

Replace "filename" with the complete path and name of the inodes file on the host system. The system administrator specified this name in the NWConfig file when the volume was created. The default for path and file name is "/opt/netware/NWControl/sys/inodes". Other volumes will have different pathnames to the inodes file and the NWConfig file should be checked.

Replace volume_number with the number specified for the volume in the NWConfig file. If specified, the nwfsck utility verifies that the specified number matches the volume number in the header of the inodes file. This parameter is optional. If not specified, the number in the file system header is used.

Replace mount_point with the path on the host system that specifies the root of the NetWare volume on the host file system. The system administrator specified the path when the volume was created. Use the SCONSOLE utility to view the path. This parameter is optional. If specified, the nwfsck utility verifies that the path matches the path in the header of the inodes file. If not specified, the path in the file system header is used.

Documentation

The following publications are available and can be ordered through your marketing representative:

GG24-3686-00

Crafting NetWare for AIX.
Installing and Configuring NetWare for AIX/6000 from IBM v3.11.
(Red book)

SC23-2420-00

System Administration. v1.1.0

NetWare for AIX/6000 from IBM v3.11.

SC23-2421-00

Utilities Reference. v1.1.0

NetWare for AIX/6000 from IBM v3.11.

SC23-2422-00

NetWare Concepts. v1.1.0
NetWare for AIX/6000 from IBM v3.11.

SC23-2423-00

User Basics for DOS Workstations. v1.1.0

NetWare for AIX/6000 from IBM v3.11.

SC23-2424-00

Troubleshooting and System Messages. v1.1.0
NetWare for AIX/6000 from IBM v3.11.

SC23-2428-00

Print Server. v1.1.0 NetWare for AIX/6000 from IBM v3.11.

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