NetWare Directory Services: Technical Tips

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Internetwork Packet Exchange, ODI, Open Data-Link Interface, LSL, Link Support Layer, MLID, Multiple Link-Interface Driver, MLI, Multiple Link Interface, MPI, Multiple Protocol Interface, MSM, Media Support Module, TSM, Topology Support Module, HSM, Hardware Support Module, RX-Net, NE1000, NE2000, NE/2, NE2-32, and NTR2000 are trademarks of Novell, Inc.

NetWare 4.01 Directory Services Technical Tips

Introduction

This paper contains hints you can use to improve your network performance and techniques to help you administer the NetWare Directory Services (NDS). Some of these techniques suggest correct methods of using the administrative utilities contained within NDS.

This paper is broken into the following sections:

Install, Uninstall, Upgrade, Update Issues
Time and TIMESYNC Synchronization Issues
Communication and Source Routing Issues
Utilities--DSRepair and DSTrace Options

Install, Uninstall, Upgrade, Update Issues

- When you install NetWare 4.x, create a DOS C: partition that is larger than or equal to the amount of RAM in the machine + 10 M bytes. This partition will then be large enough to allow the server to write core dumps to the C: drive instead of to floppies. If you use Novell DOS 7 on the C: partition, you can use the built-in compression option to shrink the partition.

- Remove Directory Services only as a last resort.

  If you must remove Directory Services: 1) use Partition Manager to remove all replicas from the server; 2) use the *Install* utility to remove Directory Services; 3) re-initialize the server volume. You will rarely need to remove Directory Services except for cases when you have decided to use the hardware elsewhere (for example).

- If you remove Directory Services, `DOWN` the server and cold boot it before you reinstall Directory Services. (A cold boot involves three steps: 1) Turn off the machine's power; 2) Wait 30 seconds; 3) Turn on the machine's power.)

- Always maintain at least 2 copies of all partition replicas. These partitions ensure data backup and enhance performance.

- Ensure that TTS always backs out incomplete transactions by setting the *Auto TTS Backout Flag* to ON (insert the following line into your AUTOEXEC.NCF file: `SET AUTO TTS BACKOUT FLAG = ON`).

- Verify that all servers are running DS.NLM build #296 or later. You can use one of the following procedures to determine the server's build number: 1) Issue the `MODULES` command at the server console. The section listing DS.NLM provides the build number; 2) Run the *DPING.EXE* utility (available on NetWire, Lib 14). The *DPING.EXE* utility reports only on servers it can see. Therefore, if your network has SAP restrictions, you might have to run this utility from various locations within the company.

- When you upgrade servers to build #296, download 401PT1.EXE from NetWire, Lib 1.

Time and TIMESYNC Synchronization Issues

- The server's DOS clock is frozen while NetWare 4.x is running. This means that the clock is inaccurate when you DOWN the server and exit to DOS. To correct the clock, you must reboot the machine before you execute any patches that update the SERVER.EXE file. If you do not reboot the machine, DOS stamps the wrong date and time on the SERVER.EXE file. This could cause version control difficulties.

- Use the TIMESYNC command instead of the TIME command to change the time on a NetWare 4.x server.

- Verify that all servers have time synchronization functioning properly. You can verify TIMESYNC on a server by typing TIME on the server console.

  If the server returns the message: TIME IS SYNCHRONIZED, you can proceed with the same command on the next server in the tree.

  If the server returns the message: TIME IS NOT SYNCHRONIZED, you must determine and resolve the cause of error as follows.

  A time synchronization error can be caused by one if the following:

  - A server has received an error while communicating with another time server.
  - The TIMESYNC configuration file tells TIMESYNC to communicate with a nonexistent server.
  - The server clock's time is out of synchronization with the network time. In this case, TIMESYNC will eventually synchronize the times.

  Verify which of these scenarios has occurred and fix the error by using the following procedures:

  1. Type TIME at the console, and check the response to see if the time is correct. If it is only minutes off, TIMESYNC will soon synchronize the time. However, if you can measure the time difference in terms of hours or days, use procedure 2.

  2. If the server's time is too incorrect to allow automatic synchronization: 1) DOWN the server; 2) type time to correct the time at the DOS prompt; 3) cold boot the machine; 4) watch the monitor to ensure that the hardware clock is maintaining the correct time.

     Caution: Do not correct the server's time either on the server monitor or while NetWare is operating.

  3. At the server console, type the command set TIMESYNC debug = 7. TIMESYNC then displays its messages on the server console. If the server is a secondary time server,

the displayed messages will show it contacting a primary server and calculating the time offset.

If the server is a primary or a reference server, the displayed messages will show the name of the server it is contacting along with a polling weight. The polling weight should be 1 for other contacted primary servers and 16 for reference servers. A polling weight of 0 indicates a communication failure.

Check to see that the other contacted server is communicating. If it is, check that the routers are not SAP restricting the TIMESYNC SAPs.

If the server is a primary or a reference server, it must vote successfully with at least one other primary server. Otherwise, if no vote is observed, the server is probably a single-reference server. Type `TIMESYNC TYPE` at the server console to determine which type of time server it is.

4. Other possible causes of time synchronization errors could be: a) the time zone is not set correctly; b) the daylight savings time parameter is not set to be effective; or c) the NetWare 3.x AUTOEXEC.NCF file has accidentally overwritten the NetWare 4.x AUTOEXEC.NCF during the migration process.

Communication & Source Routing Issues

- Avoid moving any NetWare 4.01 installed servers from one network segment to another.

- Ensure that all servers, routers, and bridges are turned on and functioning properly.

  Be aware that some of NetWare 3.x's basic premises are not valid in Directory Services. One essential concept that has changed is the view of each server as an isolated object that does not affect any other server. In NetWare 4.x, turning servers off can affect other servers' ability to access resources on the network.

  You should leave any server containing a replica running. However, you can temporarily down a server for routine maintenance. But, if you intend to leave it down for an extended period (such as days, weeks or months), use *Partition Manager* to remove all the partition replicas from the server.

  Leaving a server that contains partition replicas down for extended periods prevents partition operations, such as split and join. These operations must access all partition replicas. Directory Services will also continually attempt to synchronize partition replica information to a downed server.

- If Directory Services is having difficulty synchronizing a server, ensure that the server still exists.

  Sometimes servers are turned off and used for other purposes, which damages the Directory Services tree. If a server has been permanently removed, check to see if it contained the Master Replica of any partitions. If it did, use the *Assign New Master Replica* option in

DSREPAIR to designate an existing Read\Write replica as the Master replica; then use the *Ring Edit* option in *DSREPAIR* to edit the replica ring and delete the reference to the nonexistent server.

Caution: Use the *Assign New Master* option in *DSREPAIR* only when a Master Replica has been permanently removed.

Please call Technical Support for questions regarding the use of the *DSREPAIR Ring Edit* option.

- Do not change server names and IPX internal net addresses.

  If you must change either a server name or an IPX internal net address, remove the copies of all partition replicas from the server prior to making any changes, then copy the replicas back after making the changes. If, after changing the server name or the IPX internal net address, communication errors (error -625) occur and the servers do not synchronize within a reasonable amount of time, enter the command `SET DSTRACE=*L` at the console. If this does not correct the problem, call your technical support representative for help.

  Note: Synchronization sometimes requires a few hours to complete.

- If you are using token-ring source routing to communicate between any NetWare 4.01 servers, obtain and install the ROUTE.NLM dated 2/4/94 and the DS.NLM Build #296 as soon as possible.

  Source routing allows the network to use parallel paths between token-rings. Source routing uses an algorithm known as *Single routes broadcast, All Routes Return (SRB/ARR)* to discover parallel paths. This broadcast initiates a duplicate packet for each path to the destination server with the result that the server receives the same packet many times. Usually, the server just drops the duplicate packets. Currently, however, these duplicate broadcast packets prevent Directory Services from synchronizing.

  ROUTE.NLM sends source routing broadcast packets every time two servers attempt communication. However, the potential packet flooding could affect Directory Services because it talks server-to-server. If excessive packets are flooding your LAN/WAN because the broadcast bit is set to ON, obtain and load the ROUTE.NLM file dated 2/4/94 and the DS.NLM build #296.

  You can also prevent packet flooding by adding `RSP=NR` to the ROUTE.NLM load command. (Type `LOAD ROUTE RSP=NR` on the command line when you load ROUTE.NLM.) Be aware, however, that setting `RSP to NR` disables the ability to use parallel source-routing bridges.

DS Utilities - DSRepair and DSTrace Options

- If you must run *DSREPAIR* on any server, run it on all servers in the replica ring.

- Use the *Rebuild Replica* option in the *Partition Manager* utility only when you know your replicas are not synchronized. Reduce the number of partition replicas to 2 before you use this option.

- You can use the *DSTRACE* command line function to detect Directory Services communication and synchronization problems. To turn this option on, type `SET DSTRACE=ON` at the server console command line. Then press ALT-ESC until the DSTRACE screen appears on the monitor. You can then watch the processing messages. You should see the message `All Processed=Yes` for each replica on the server. Ensure that this message is displayed on the server console screen before you begin partition operations, such as Split and Join.

- Use the following two *DSTRACE* parameters to speed up synchronization after correcting communication errors.

  - `SET DSTRACE=*H` sets Directory Services to High Convergence which means "Synchronize Now." This saves waiting 5 minutes for synchronization to automatically take place.

  - `SET DSTRACE=*U` resets flags in Directory Services, clearing the transport failure communication errors. Directory Services will then retry communication at the next synchronization interval. This DSTRACE parameter option is only available for Directory Services build #296 or later.

- If auditing has been turned on, and the server is indicating high utilization, use the console command `SET DSTRACE= +AUDIT` to display audit replication information on the console screen.

  When audit information is replicated, a new line appears on the monitor which indicates the number of the replica being updated, the number of replicas in the ring, and the byte offset of the auditing file. Check that the number of replicas listed agrees with the number in the replica ring.

  Note: If the audit file becomes corrupt, Directory Services build #296 automatically corrects it. If the network still has Directory Services audit file synchronization problems, please call technical support. ■