

The **Essential** Guide

to an NDS-to-
Active Directory
Migration

By David Chernicoff

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With the release of Windows Server 2003 and a new generation of Active Directory, many enterprise IT departments have decided the time has come to move from their current networking environment to Active Directory. Included in this group is a fairly significant contingent with extensive directory experience—that is, Novell NetWare, Novell Directory Services (NDS), and eDirectory users. Well aware of Novell, Microsoft has designed tools specifically to help move NDS/eDirectory users to Active Directory. You'll find the tools—Microsoft Directory Synchronization Services (MSDSS) and File Migration Utility (FMU)—in Microsoft Windows Services for NetWare 5.x.

Using Microsoft's Tools

MSDSS is designed for use in environments where NDS/eDirectory is deployed and where plans are underway to deploy Windows Server 2003. The tool offers two-way synchronization between the directory services, so migrating in one step or allowing long-term coexistence between NDS/eDirectory and Active Directory isn't necessary. In addition, MSDSS's single interface offers migration, synchronization, and management options for ongoing integration of NDS and Active Directory.

FMU, which is integrated with MSDSS, is designed to move data in bulk from NDS to Active Directory networks while maintaining the appropriate security permissions. The data can be copied in one-to-many and

many-to-many modes, which makes possible copying from multiple sources to a single destination, from multiple sources to multiple destinations, or from a single source to multiple destinations. This functionality lets administrators move appropriate data from the old network to the correct locations on the new network without needing to make multiple individual copies, each of which requires manual intervention. FMU's most important feature is that users don't lose access to their files during the migration process.

MSDSS and FMU are functional tools, but they are basic tools that solve only a small part of the overall problem set that an NDS/eDirectory-to-Active Directory migration presents. Complex environments that are typical of medium to large NDS/eDirectory environments require a flexible, project-based solution. A solid, fully functional third-party tool that helps administrators plan, test, and manage the migration process can ensure a successful migration.

Planning the Migration

As Table 1 shows, significant differences exist between NDS/eDirectory and Active Directory. Overcoming these differences isn't impossible but requires careful premigration planning. Without detailed information about the existing structure of both the NDS/eDirectory and Active Directory networks (or only the NDS/eDirectory network if you are creating a new Active Directory environment), the process of migration will be haphazard and fraught with problems.

The first step in the planning process is to conduct a detailed assessment of the NDS/eDirectory environment. Necessary to this step is a tool that can generate reports about your existing hardware and software. Some of the report types you'll need include:

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Table 1: Important Differences Between NDS and Active Directory

Key Feature	Novell Directory Services/eDirectory	Active Directory
Computer Account	Only servers authenticate.	Server and client computers running Windows NT or later OS must have a computer account in the Active Directory domain.
File ACLs	NDS/eDirectory-only file permissions are stored in the directory. Permissions are flexible and very granular.	Active Directory doesn't store file permissions. In Windows Server 2003, file permissions are handled by the file system. The permissions are less granular than NDS/eDirectory permissions.
File Sharing	Sharing occurs according to NDS volume.	Sharing occurs according to the NT file share.
Group Account	Only one group-type account	Local, Global, Universal, and Domain Local Groups
Login Scripting	Login scripts can be provided for individual users and for each OU that the user is a member of.	One logon script through the user attribute.
Object Naming	NDS/eDirectory adheres to strict X.500 naming conventions, which require that an object must be unique only within its container object. The same object name can be used throughout the directory as long as it isn't repeated within a container.	Object name must be unique to the domain; therefore, an object name can be used only once.
Security	Security Principles within NDS/eDirectory can be by organization role, OU, Group, or User.	As defined in Group Accounts, security can be applied to any existing group as well as applied universally, to designated users, or to computers (i.e., anything with an account in Active Directory).
Security Equivalence	In NDS/eDirectory, any object can be made equivalent to any other object, so that the equivalent object acquires the original object's security attributes.	This functionality isn't available in Active Directory.
User Account	NDS/eDirectory User accounts can have almost twice the number of account attributes as Active Directory User accounts.	Contains 24 attributes that map well to crucial NDS/eDirectory attributes.

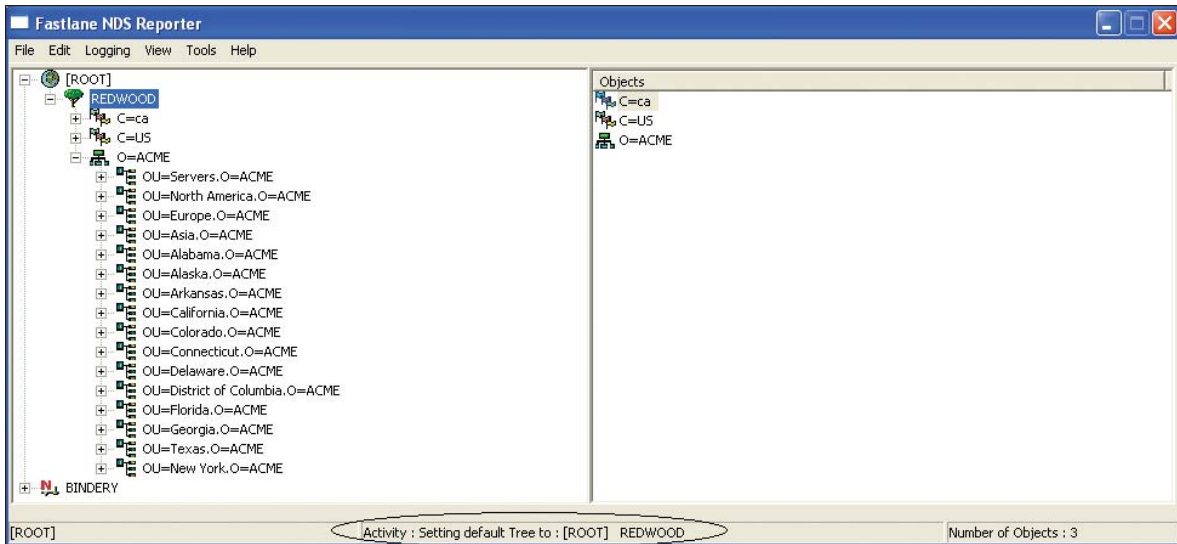


Figure 1: The NDS tree

- Hierarchical report about all of the container objects in the NDS/eDirectory environment from a top-down perspective. This report offers an overview of the structure and contents of the NDS tree from the root down, as Figure 1 shows.
- Reports about the current security model, including trustees and permissions on the data volumes. Figure 2 shows one tool's reporting capability.
- Report about NDS-dependent software. If applications (such as ZENworks) are in use, you'll need to replace these dependent applications. Although such replacement might occur toward the end of your migration, you need to plan for it.
- Report that identifies duplicate names in the NDS tree, as Figure 3 shows. You must identify these names before migrating because they must be unique in Active Directory. If the names are user accounts, you'll need to remember to create home directo-

ries for any account names that must be changed.

- Reports that identify inactive accounts, servers, and objects, such as the one Figure 4 shows. If your NDS environment contains objects that don't need to be migrated, accounts that are no longer in use, or objects that won't be necessary in Active Directory, you must identify them so that they aren't migrated.

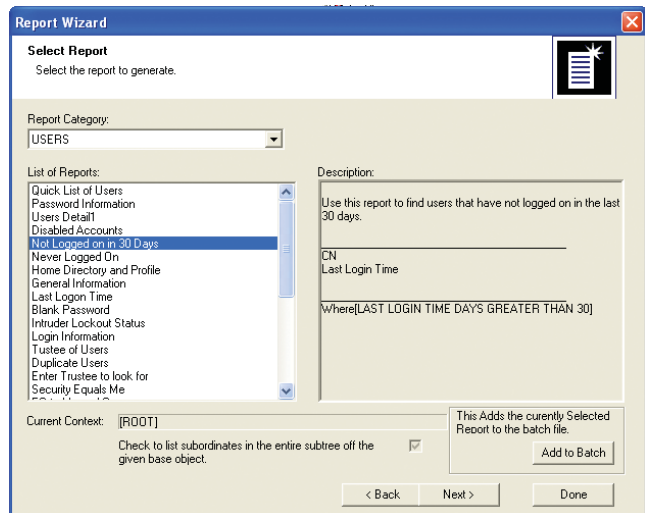


Figure 2: Sample reporting categories

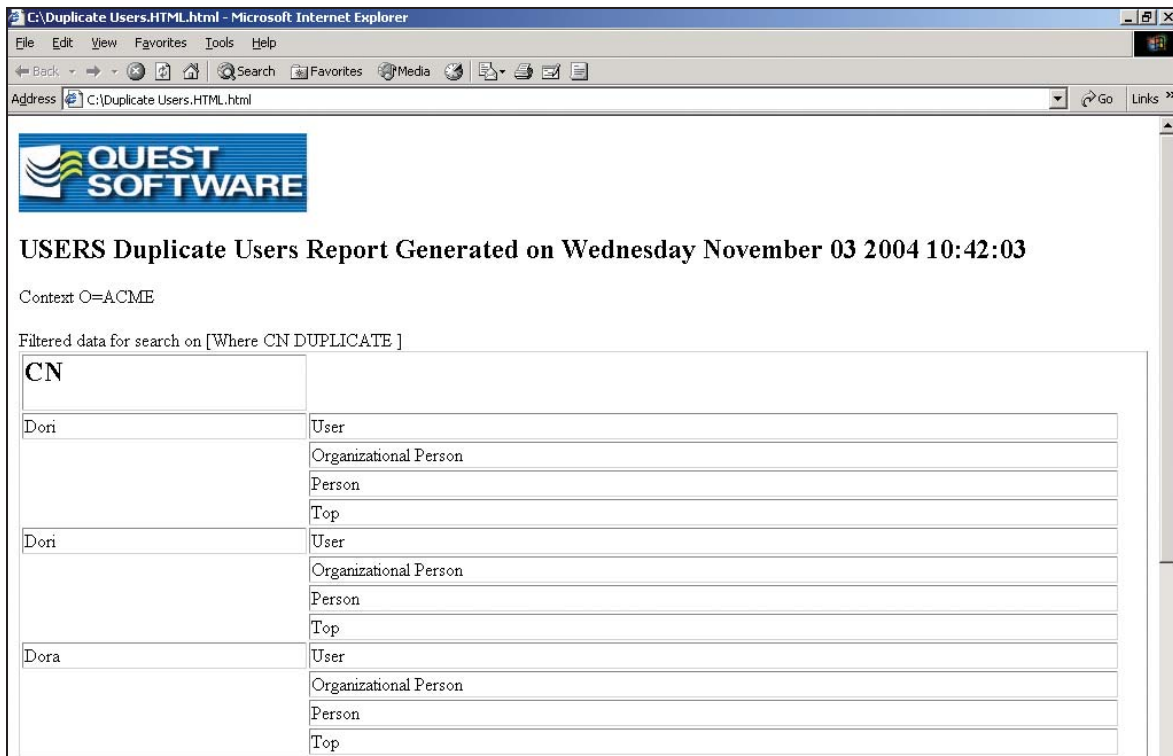


Figure 3: Identifying duplicate users

Determine the Active Directory Environment

The next step in the planning process is to make several decisions about the final Active Directory environment. The specific concerns you'll need to consider include but aren't limited to the following:

- What will the final Active Directory structure look like: the current NDS/eDirectory structure, the current or a redesigned Active Directory structure? Make sure that you can accomplish your goal within the parameters of the working environment.
- How will you handle passwords? Because passwords can't be migrated, you need to decide how to handle the creation of new passwords and how to synchronize passwords between

NDS/eDirectory and Active Directory while the two environments coexist.

- How will you handle schema extensions? Are the extensions necessary after the migration? If so, how will attributes be added to Active Directory? Can you discard any extensions?

Network Housecleaning

You have the opportunity now to clean up your networking environment. Any network that's been in existence for more than a few months will have acquired artifacts that are no longer necessary. This detritus often consists of such elements as leftovers from uninstalled applications (i.e., schema changes, directory structures, account permissions), unused groups that are empty or no longer serve a purpose, and a variety of network mappings that won't be necessary in the new

	A	B	C	D	E
1	Not Logged on in 30 Days Report Generated on 08/10/2004				
2	Context [ROOT]				
3	Fully qualified distinguished name	CN	Last Login Time		
4	CN=jhoffa.OU=Florida.O=ACME	jhoffa			
5	CN=hblanpied.OU=Texas.O=ACME	hblanpied			
6	CN=Mfullerton.OU=Texas.O=ACME	Mfullerton			
7	CN=pkimrey.OU=Texas.O=ACME	pkimrey			
8	CN=jcohen.OU=Texas.O=ACME	jcohen			
9	CN=cgarrigan.OU=New York.O=ACME	cgarrigan			
10	CN=tfillman.OU=New York.O=ACME	tfillman			
11	CN=gsandoz.OU=New York.O=ACME	gsandoz			
12	CN=nyadmin.OU=New York.O=ACME	nyadmin			
13	CN=Rudy.OU=Sales.OU=North America.O=ACME	Rudy			
14	CN=Sandy.OU=Sales.OU=North America.O=ACME	Sandy			
15	CN=Peter.OU=HR.OU=North America.O=ACME	Peter			
16	CN=Mike.OU=HR.OU=North America.O=ACME	Mike			

Figure 4: Identifying inactive user accounts

environment. You can make all of these items go away when you migrate to the new directory structure; make sure that you don't automatically drag along this useless information because you haven't properly evaluated all of the data in the NDS/eDirectory directory. The migration is your chance to get an added benefit of starting with a fresh directory structure; there is no need to bring along the clutter from the old directory.

Map the Migration

Finally, completely outline the migration process. Create lists of the actions you need to take and the order in which you must take them. Remember to include a map of NDS/eDirectory objects and their appropriate Active Directory locations, and plan the migration of the home directories for user accounts.

It's crucial to remember that you need to maintain both NDS/eDirectory and Active Directory during the migration process. You need to formulate a plan to manage both directories and to ensure that all necessary

synchronizations are kept current. Manage synchronization changes carefully. These changes aren't automatic; rather, administrators must identify which objects to synchronize, then manually initiate the synchronization process. Without exercising due care, you can synchronize a change that overwrites another change in the directory to which you're migrating. Figure 5 shows a migration tool that displays the status of NDS/eDirectory objects during a migration to Active Directory.

Make sure to make a full backup prior to migrating. Even the best-laid plans fail occasionally, so be prepared to restore your environments to their premigration state, should that be necessary.

Considerations for Migrations in Progress

After you begin the migration, you'll make decisions according to your migration plan. The first concern you'll deal with is the new directory structure. In your migration plan,

NDS-to-Active Directory Migration Checklist

Create a planning team

Involve

- IT staff _____
- Business unit management _____
- Corporate management _____
- User representatives _____

Define your goals

- _____
- _____
- _____

Understand your directories

Generate NDS/eDirectory reports

- User accounts _____
- Duplicate usernames _____
- Home directories _____
- Login scripts _____
- Passwords _____
- Group accounts _____
- Duplicate group names _____
- Tree structure reports _____
 - OUs _____
- Security principles _____
- Data _____
 - Security permissions _____
 - Ownership _____
- Schema extensions _____
 - Application-specific _____

Generate Active Directory Reports

- User accounts _____
- Groups _____
- Login scripts _____
- Passwords _____
- Tree structure reports _____
- Data _____
 - ACLs _____
 - Ownership _____

NDS-to-Active Directory Migration Checklist - continued

- Schema extensions _____
 - Application-specific* _____
- Reconcile the two directories _____
- Map NDS/eDirectory structure to Active Directory structure _____
- Determine Active Directory group memberships for NDS/eDirectory users _____
- Redesign Active Directory hierarchy to meet current needs of both migrated NDS/eDirectory users and existing Active Directory users _____
- Chart necessary changes _____
- Determine data migration needs _____
- Make sure critical file information is migrated along with actual data _____

Determine necessary changes to user desktops

- Drive mappings _____
- Location changes for network resources _____
- Printers _____
- Client software changes _____
 - Installation or removal of client software* _____

Test plans

- Develop a migration test plan _____
- Determine what third-party tools will be necessary to a successful migration _____
- Test migration process on a small scale _____
- Determine migration time frame _____
 - Will maintaining two directories simultaneously be necessary? _____
 - Can the migration be completed without affecting users? _____

Double-check prior to actual migration

- Does the migration plan include disaster contingencies? _____
- Plan for success as well as failure _____
- Replacement applications (if required) for users in place? _____
- Contingency planning complete? _____
- Evaluate high-probability "what-if" scenarios _____

NDS Object Name	AD Object Name	Migration Status	MigrationAction
O=ACME/OU=Alabama/OU=Autauga County/CN=A	cn=AccotDisabled,ou=Autauga County,ou=Alabama,ou=Corp,dc=Domain03,dc=lo	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Autauga County/CN=A	cn=Andie,ou=Autauga County,ou=Alabama,ou=Corp,dc=Domain03,dc=local	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Autauga County/CN=A	cn=Andrea,ou=Autauga County,ou=Alabama,ou=Corp,dc=Domain03,dc=local	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Autauga County/CN=A	cn=Andrew,ou=Autauga County,ou=Alabama,ou=Corp,dc=Domain03,dc=local	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Autauga County/CN=A	cn=Andy,ou=Autauga County,ou=Alabama,ou=Corp,dc=Domain03,dc=local	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Autauga County/CN=A	cn=Angela,ou=Autauga County,ou=Alabama,ou=Corp,dc=Domain03,dc=local	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Autauga County/CN=A	cn=Angie,ou=Autauga County,ou=Alabama,ou=Corp,dc=Domain03,dc=local	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Autauga County/CN=E	cn=AL_Empty group,ou=Autauga County,ou=Alabama,ou=Corp,dc=Domain03,dc	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Autauga County/CN=s	cn=AL_sales,ou=Autauga County,ou=Alabama,ou=Corp,dc=Domain03,dc=local	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Baldwin County	ou=Baldwin,dc=Domain03,dc=local	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Baldwin County (CPEG)	cn=\$Baldwin,ou=Alabama,ou=Corp,dc=Domain03,dc	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Baldwin County/CN=D	cn=Done,ou=Alabama,ou=Corp,dc=Domain03,dc=local	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Baldwin County/CN=D	cn=Dorra,ou=Alabama,ou=Corp,dc=Domain03,dc=local	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Baldwin County/CN=D	cn=Doris,ou=Alabama,ou=Corp,dc=Domain03,dc=local	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Baldwin County/CN=D	cn=Doris,ou=Alabama,ou=Corp,dc=Domain03,dc=local	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Baldwin County/CN=S	cn=AL_Sales,ou=Alabama,ou=Corp,dc=Domain03,dc=	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Barbour County	ou=Barbour,dc=Domain03,dc=local	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Barbour County (CPEG)	cn=\$Barbour,ou=Alabama,ou=Corp,dc=Domain03,dc	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Barbour County/CN=Bi	cn=AL_Bi,ou=Alabama,ou=Corp,dc=Domain03,dc=	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Barbour County/CN=Ci	cn=Craig,ou=Alabama,ou=Corp,dc=Domain03,dc=local	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Barbour County/CN=Ci	cn=Croton,ou=Barbour County,ou=Alabama,ou=Corp,dc=Domain03,dc=local	Not Migrated	Migrate object
O=ACME/OU=Alabama/OU=Barbour County/CN=Ci	cn=Cruise,ou=Barbour County,ou=Alabama,ou=Corp,dc=Domain03,dc=local	Not Migrated	Migrate object

Figure 5: Object status during a migration

you decided either to retain the NDS/eDirectory structure or move to a newly designed or existing Active Directory structure. Your migration tool should let you make these structural changes on the fly, as Figure 6 shows—flattening the existing NDS/eDirectory structure, matching the existing NDS/eDirectory structure, migrating into the planned Active Directory structure, or implementing any combination of changes that suits the needs of the final architecture. Regardless of how well you plan, you might encounter problems that require you to make minor changes to your planned directory architecture. For example, NDS/eDirectory behaves fairly consistently no matter how many layers deep your tree structure is; Active Directory prefers a flatter, shallower environment with only a few levels of depth for optimal performance. Remember to keep conditions and factors like this in mind when you plan your migration.

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Directory Structure

When the new directory structure is in place, you'll need to populate it. Although plenty of objects will vie for your attention, user accounts are the best place to start. Here is where your plans for handling inactive accounts, duplicate usernames, and passwords will be tested first. And, as Table 1 shows, login script support is different in NDS/eDirectory and Active Directory, so you'll need to make necessary accommodations.

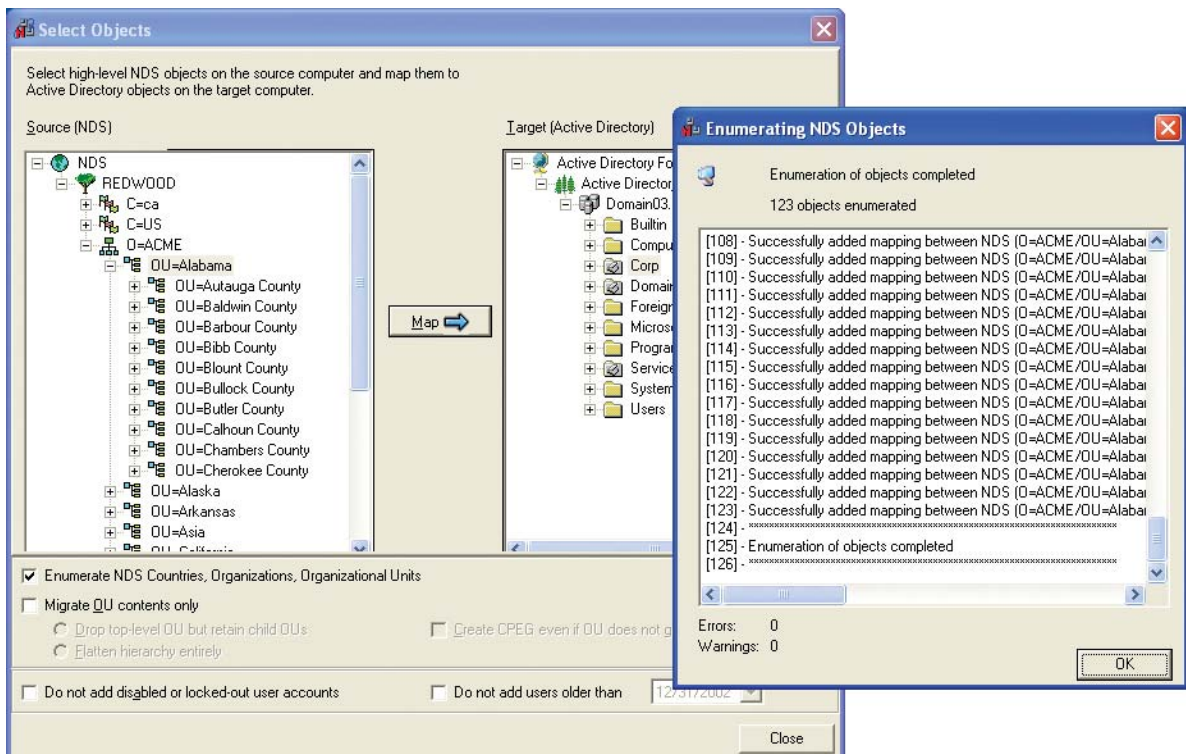


Figure 6: Making structural changes to a directory during a migration

Your migration plan will have determined how to accommodate any new naming conventions that you plan to implement or to match with existing Active Directory usage. Also, you will have created a map to guide you in assigning security permissions appropriately to newly created groups of migrated NDS/eDirectory users or in providing the necessary permissions and access rights to new Active Directory users. Your choices will be to retain each user's current rights, to map existing NDS/eDirectory rights to the equivalent Active Directory rights, or to change previous rights to match new Active Directory requirements.

Maintaining users' group membership information during the migration process is crucial. Unless you are working with such a small network that you can accomplish the migration in one shot, you will need to maintain the two directory infrastructures side by side and

keep rights and permissions synchronized until the migration is complete.

Security Concerns

Pay careful attention to the migration of your security model. You might have Security Principles in NDS/eDirectory that don't translate well into Active Directory. Evaluate the impact that creating equivalence to those security principles will have if you make a direct translation into Active Directory. You will likely find that doing so gives affected users or groups a far broader range of permissions than you would prefer in Active Directory. You might find that you need to create new group models and a more granular application of file permissions to create the security environment you want. NDS/eDirectory has only a single group type, whereas Active Directory, in Windows Server 2003, has seven (four of which are global). Make careful decisions about what types of groups are applicable and

If you'd like more information about migration from Novell NDS/eDirectory to Active Directory, visit <http://www.quest.com> to learn more and explore how Quest NDS Migrator can simplify and automate your migration.

make use of NDS/eDirectory's single security group type to provide your network with the security model you need.

Migrating Data

Although migrating data seems straightforward, the process has its own pitfalls. You must maintain file contents and file attributes throughout the data migration process. For example, make sure that users retain ownership of their files; if you aren't careful, you can mistakenly change the ownership of user files that you're migrating to the account that you are using for the migration. File attribute information, such as last date accessed and last date created, are necessary to certain secondary applications, such as backup programs. The goal is to migrate data files while retaining the same user access permissions that were in place before the migration.

Client Concerns

Don't forget that you must update all client workstations involved in the migration. Workstations must be configured to log on to the Active Directory domain and not the Novell network. (You can accomplish this change simply by removing the Novell client.) You also must make certain that OLE automa-

tion links function (i.e., the links in Office documents and applications), that persistent network, printer, and driver mappings function, and that post-logon scripting has the expected and desired results. A significant part of your premigration planning mindset is to keep the migration's impact on your users absolutely minimal. Concerns that attract the notice of your users will generate help desk calls that are out of proportion to the actual problem. Magnify that user dissatisfaction by tens or hundreds of users and you'll find yourself without sufficient time or personnel to deal with all of the problems that proper planning would have prevented.

Application Transitioning

I've focused solely on migrating from NDS/eDirectory to Active Directory. If your migration plans include moving to Exchange Server from Groupwise, retaining support for Groupwise, or supporting Windows 2000 Server along with Windows Server 2003, you'll need to make specific contingency plans to allow these transitions to take place. Each of these applications has its own concerns, as does supporting Active Directory on Windows 2000 Server and Windows Server 2003.

Sweat the Details

The only way to have a successful migration is to plan the process to the smallest practical detail and select the right tools. Before you begin a migration, be sure you'll be able to effectively plan, test, manage, and execute the process. ■

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