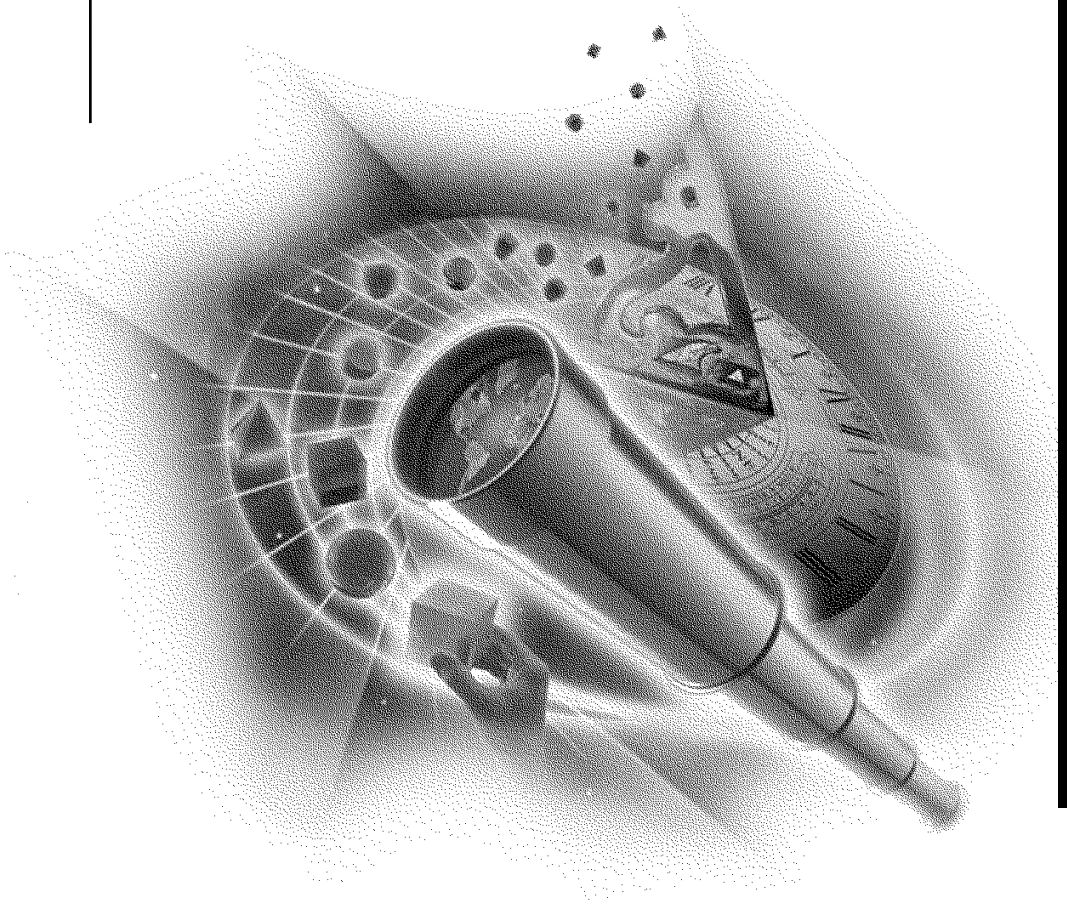
NDS® eDirectory™ 8.5

SCALABLE DIRECTORY SERVICES FOR E-BUSINESS

Quick Start



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NDS eDirectory 8.5 Quick Start
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Online Documentation: To access the online documentation for this and other Novell products, and to get updates, see www.novell.com/documentation.

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NDS eDirectory Overview

NDS® eDirectory™ is a highly scalable, high performing, secure directory service. It can store and manage millions of objects, such as users, applications, network devices, and data. NDS eDirectory natively supports the directory standard Lightweight Directory Access Protocol (LDAP) version 3 over Secure Socket Layer (SSL).

NDS eDirectory provides the basic foundation for the directory service, which provides replication and partitioning capabilities, along with other utilities. Additional packages that build upon this basic directory structure, such as DirXML and Account Management, are also available separately to increase functionality.

Supported Platforms

- ❑ NetWare®
- ❑ Windows* NT*
- ❑ Windows 2000
- ❑ Solaris*
- ❑ Linux*
- ❑ Tru64 UNIX*

More Information

For more information on NDS eDirectory, refer to the following sources:

- Product information (http://www.novell.com/products/nds)
- Product support (http://support.novell.com)
- Online forums (news://forums.novell.com)
- Product catalog (http://www.novell.com/catalog)
- Product documentation (http://www.novell.com/documentation)

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Installing or Upgrading NDS eDirectory on NetWare

Use the following instructions to install or upgrade NDS® eDirectory™ on a NetWare® server.

NDS eDirectory for NetWare can co-exist with the following NDS versions:

- NetWare 4.11 or 4.2 with NDS 6.09 or later
- NetWare 5 Support Pack 5 or later with Pre-NDS 8 7.46 or later
- NetWare 5 Support Pack 5 or later with NDS 8.35 or later
- NetWare 5.1 Support Pack 1
- Windows* NT* 4.0 Support Pack 4 or Windows 2000 with eDirectory 8.38 or later
- NDS eDirectory 8.5 on NetWare, Solaris, Linux, and Tru64 UNIX*

System Requirements

- ❑ If you are using RCONSOLE, a ConsoleOne™ administrator workstation with the following:
  - A 200 MHz or faster processor
  - A minimum of 64 MB RAM (128 MB recommended)
- ❑ The Novell® Client™ that shipped with NetWare 5 or later.
- ❑ The Novell Cryptography Support Modules (Novell International Cryptographic Infrastructure [NICI] 1.5.1 or later), available from the product CD or from the Novell Cryptography Web site (http://www.novell.com/products/cryptography).
- ❑ Administrative rights to the NDS tree so that you can modify the schema.

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Hardware Requirements

Hardware requirements depend on the specific implementation of NDS.

For example, a base installation of NDS eDirectory with the standard schema requires about 74 MB of disk space for every 50,000 users. However, if you add a new set of attributes or completely fill in every existing attribute, the object size grows. These additions affect the disk space, processor, and memory needed.

Two factors increase performance: more cache memory and faster processors.

For best results, cache as much of the DIB Set as the hardware allows.

NDS scales well on a single processor. However, NDS eDirectory 8.5 takes advantage of multiple processors. Adding processors improves performance in some areas, for example, logins and having multiple threads active on multiple processors. NDS itself is not processor-intensive, but it is I/O-intensive.

The following table illustrates typical system requirements for NDS eDirectory for NetWare:

Objects	Processor	Memory	Hard Disk
100,000	Pentium* III 450-700 MHz (single)	384 MB	144 MB
1 million	Pentium III 450-700 MHz (dual)	2 GB	1.5 GB
10 million	Pentium III 450-700 MHz (2 to 4)	2 GB +	15 GB

Requirements for processors might be greater than the table indicates, depending upon additional services available on the computer as well as the number of authentications, reads, and writes that the computer is handling. Processes such as encryption and indexing can be processor-intensive.

Of course, faster processors improve performance. Additional memory also improves performance because NDS can then cache more of the directory into memory.

Forcing the Backlink Process to Run

Because the internal NDS identifiers change when upgrading to NDS eDirectory, the backlink process has to update backlinked objects for them to be consistent.

Backlinks keep track of external references to objects on other servers. For each external reference on a server, the backlink process ensures that the real object exists in the correct location and verifies all backlink attributes on the master of the replica. The backlink process occurs two hours after the database is open and then every 780 minutes (13 hours). The interval is configurable from 2 minutes to 10,080 minutes (7 days).

After migrating to NDS, we recommend that you force the backlink to run by issuing a SET DSTRACE=*B command from the server console. Running the backlink process is especially important on servers that do not contain a replica.

Installing NDS eDirectory on NetWare

If your NDS tree does not have a Novell Certificate Server™, the NDS installation program does the following:

- Creates a Security container object for the entire NDS tree

  This object is created at the top of the NDS tree and must remain there.

- Creates an Organizational Certificate Authority (CA) object

- Places the Organizational CA object in the Security container

Only one Organizational CA object can exist in an NDS tree. Because you must not move this object from one server to another, ensure that the first NDS server is the one that you intend to permanently host the Organizational CA object.

PREREQUISITES

If you are installing NDS eDirectory for NetWare into an NDS tree that has NetWare and NT servers, each NetWare server must be running NetWare 5.0 with Support Pack 4 or later. Each NetWare 5.1 server must be running NetWare 5.1 Support Pack 1 or later.

UPDATING THE NDS SCHEMA

When upgrading a NetWare 5.*x* server to NDS eDirectory, you must update the NDS schema by running DSREPAIR on the server that has the master replica of the Tree partition.

NOTE: The [Root] object, used in earlier versions of NDS, has been renamed to Tree in NDS eDirectory 8.5.

IMPORTANT: If the master replica of the Tree partition resides on an NT server, follow the instructions in “Updating the NDS Schema” on page 19.

If one or both of the following conditions exist, you must run DSREPAIR.NLM before installing the first NDS eDirectory server in your tree:

- Anywhere in your tree, a NetWare 5 server is running NDS 8 or NDS 8 NetWare Update.
- Your first installation of NDS eDirectory is on a NetWare 5 server that does not hold a writable replica of the Tree partition.

To update the NDS schema:

1. Copy the appropriate DSREPAIR.NLM file from the product CD (or downloaded and expanded file) to the SYS:\SYSTEM directory of the server that contains the master replica of the Tree partition.

For This Version of NetWare	With This Version of NDS	Copy
4.11	6.09 or later	\PATCHES\DSREPAIR \NW4X\DSREPAIR.NLM
5.0 or later	NDS 7.46 or later	\PATCHES\DSREPAIR \NW5X\DSREPAIR.NLM
5.0 or later	8.11 or 8.17	Not supported
5.0 or later	8.35 or later	\PATCHES\DSREPAIR \NWNDS8\DSREPAIR.NLM

2. At the server console of the master replica of the Tree partition, load DSREPAIR.NLM > select Advanced Options Menu > Global Schema Operations.
3. Enter the administrator's name (for example, .Admin.VMP) and password.
4. Select Post NetWare 5 Schema Update > Yes.

   DSREPAIR updates the schema and posts the results to the DSREPAIR.LOG file.

   Ignore errors associated with adding object classes. DSREPAIR.NLM is simply applying the Post NetWare 5 Schema Update changes to each object.
5. Using the table in Step 1 as a reference, copy the appropriate patch version of DSREPAIR.NLM to each NetWare server in the NDS tree.

   This step ensures that the schema needed for NDS eDirectory is properly maintained when DSREPAIR.NLM is run in the future.

If you use an earlier version of DSREPAIR.NLM and select Rebuild Operational Schema, schema enhancements made by the Post NetWare 5 Schema Update will be lost. To resolve lost schema enhancements, run DSREPAIR.NLM according to the following table.

If You Are Running DSREPAIR from Here	Do This
A server that holds a writable replica of the Tree partition	Reapply the Post NetWare 5 Schema Update to your NDS tree.
From any other server	Click Advanced Options > Global Schema Operations > Request Schema from Tree.

This action resynchronizes the schema from the root of the tree.

6 Close DSREPAIR.NLM before installing NDS eDirectory on the server.

If DSREPAIR.NLM is loaded, the server might not restart.

INSTALLING THE SUPPORT PACK

Before Installing NDS eDirectory on This Server	Install This Support Pack
NetWare 5	NetWare 5 Support Pack 4
NetWare 5.1	NetWare 5.1 Support Pack 1 or later

1 (Conditional) Download the latest support pack to the NetWare 5.x server, for example, download to SYS:\.

If you purchased a support pack CD from Support Connection, skip this step.

2 (Conditional) Expand the support pack.

For NW51SP1.EXE, the support pack might take several minutes to verify an ARJ-SECURITY envelope. After verification, the support pack creates an NW5SPX directory and places subdirectories and files there.

If you purchased a CD from Support Connection, skip this step. The support pack is already expanded.

3 At the server console, start NWCONFIG.NLM.

4 Select Product Options > Install a Product Not Listed.

5 Press F3 (F4 if you're using RCONSOLE) > specify the path to the expanded support pack files, such as SYS:\NW5SP4.

6 Select options.

Follow the online instructions to install the support pack.

During installation, the support pack might prompt you concerning extending the schema. Although you have already extended the schema for NDS eDirectory, you most likely need to extend the schema for other functionality, such as Novell Licensing Services.

7 Take the server down, then restart it.

If you checked the Reboot Server option in Step 6, the server automatically restarts.

INSTALLING NDS EDIRECTORY

1 (Conditional) If you are upgrading NDS, do the following:

1a In the AUTOEXEC.NCF file, comment out the lines that load virus scanners, database applications such as Sybase* or Oracle*, backup applications, and other programs that rely on files being continually open and volumes being mounted.

During the NDS eDirectory 8.5 installation, the software must dismount volumes so that trustree assignments can be migrated.

Be aware that virus scanners and other programs might be embedded inside other products, for example, ZENworks™, ManageWise™, and BorderManager™.

1b Restart the server and verify that the programs and applications referred to in Step 1a are not running.

2 (Conditional) If you have an IP-only environment, load IPXSPX.NLM.

NWCONFIG.NLM looks in Btrieve* for the product list. Btrieve subsequently requires IPX™. Loading IPXSPX.NLM allows Btrieve to load. When you reboot the server, IPXSPX.NLM does not reload, so you have an IP-only environment again.

3 At the server console, load NWCONFIG.NLM.

4 Select Product Options > Install a Product Not Listed.

5 Press F3 (F4 if you're using RCONSOLE) > enter the path to the NDS files under the NW directory, for example, SYS:\NW.

Follow the prompts concerning license agreements, the readme file, and tips.

After the files are copied, the server automatically restarts and begins to install components for ConsoleOne and Novell Certificate Server.

6 Enter the administrator's login name (for example, Admin.VMP).

So that the installation program can access the Security container and create a Server Certificate object, log in to the existing Security container object as a user with Supervisor rights.

IMPORTANT: This window might close before you enter this information. If it does, toggle (Alt+Esc) to the window and enter the information. Otherwise, the installation will not be complete.

7 Follow the online instructions concerning the Certificate Server, LDAP, languages, components, and products to install.

8 When the installation is completed, restore the lines that you commented out in Step 1a on page 14 > restart the server by clicking Yes.

Repeat this procedure for each NetWare 5.*x* server you want to upgrade to NDS eDirectory 8.5 for NetWare.

You can download an evaluation license from the NDS eDirectory Web page (http://www.novell.com/products/nds/licenses/eval_85.html).

LOST TRUSTEE ASSIGNMENTS ON NFS GATEWAY VOLUMES

The NDS installation process does not upgrade trustee assignments on NFS Gateway volumes. If you are hosting NFS Gateway volumes on a server upgraded to NDS, those trustee assignments are mapped to non-existent trustees.

To delete the inaccurate trustee assignments, complete the following steps:

1 On the server, load UNICON > authenticate to NDS.

2 Select Start/Stop Services > NFS Gateway Server > Del.

3 From a workstation, log in to the server > delete the SYS:\NFSGW\SFS*xxxx*.DAT file.

4 At the server, load UNICON again > authenticate to NDS.

5 Select Start/Stop Services > NFS Gateway Server.

You will need to manually create new trustee assignments for NDS objects to any NFS Gateway volumes.

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Installing or Upgrading NDS eDirectory on Windows NT/2000

Use the following instructions to install or upgrade NDS® eDirectory™ on a Windows* NT* or Windows 2000 server.

System Requirements

- ❑ A Windows NT server 4.0 with Service Pack 4 or later (or Windows 2000 Server) and an assigned IP address.
- ❑ A Pentium* 200 with a minimum of 64 MB RAM (128 MB recommended) and a monitor color palette set to a number higher than 16.
- ❑ (Optional) One or more workstations running one of the following:
  - Novell® Client™ for Windows 95/98 3.0 or later
  - Novell Client for Windows NT 4.5 or later
  - NT client
- ❑ Administrative rights to the NT/2000 server and to all portions of the NDS tree that contain domain-enabled User objects. For an installation into an existing tree, you need administrative rights to the Tree object so that you can extend the schema and create objects.

  NOTE: The [Root] object, used in earlier versions of NDS, has been renamed to Tree in NDS eDirectory 8.5.

Hardware Requirements

Hardware requirements depend on the specific implementation of NDS.

For example, a base installation of NDS eDirectory with the standard schema requires about 74 MB of disk space for every 50,000 users. However, if you add a new set of attributes or completely fill in every existing attribute, the object size grows. These additions affect the disk space, processor, and memory needed.

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Two factors increase performance: more cache memory and faster processors.

For best results, cache as much of the DIB Set as the hardware allows.

NDS scales well on a single processor. However, NDS 8.5 takes advantage of multiple processors. Adding processors improves performance in some areas, for example, logins and having multiple threads active on multiple processors. NDS itself is not processor-intensive, but it is I/O-intensive.

The following table illustrates typical system requirements for NDS eDirectory for Windows NT and Windows 2000:

Objects	Processor	Memory	Hard Disk
10,000	Pentium* III 450-700 MHz (single)	384 MB	144 MB
1 million	Pentium III 450-700 MHz (dual)	2 GB	1.5 GB
10 million	Pentium III 450-700 MHz (2 to 4)	2 GB +	15 GB

Requirements for processors might be greater than the table indicates, depending upon additional services available on the computer as well as the number of authentications, reads, and writes that the computer is handling. Processes such as encryption and indexing can be processor-intensive.

Forcing the Backlink Process to Run

Because the internal NDS identifiers change when upgrading to NDS eDirectory, the backlink process has to update backlinked objects for them to be consistent.

Backlinks keep track of external references to objects on other servers. For each external reference on a server, the backlink process ensures that the real object exists in the correct location and verifies all backlink attributes on the master of the replica. The backlink process occurs two hours after the database is open and then every 780 minutes (13 hours). The interval is configurable from 2 minutes to 10,080 minutes (7 days).

After migrating to NDS, we recommend that you force the backlink to run by issuing a SET DSTRACE=*B command from the server console. Running the backlink process is especially important on servers that do not contain a replica.

Installing NDS eDirectory on Windows NT/2000

NDS eDirectory 8.5 for NT upgrades NT servers running NT Service Pack 4 with NDS 8.35 or later.

If no NDS tree exists, you can install NDS eDirectory 8.5. The installation program creates an NDS tree.

If your NDS tree does not have a Novell Certificate Server, the NDS installation program does the following:

- Creates a Security container object for the entire NDS tree

  This object is created at the top of the NDS tree and must remain there.

- Creates an Organizational Certificate Authority (CA) object

- Places the Organizational CA object in the Security container

Only one Organizational CA object can exist in an NDS tree. Because you must not move this object from one server to another, ensure that the first NDS server is the one that you intend to permanently host the Organizational CA object.

PREREQUISITES

- ❑ Because NTFS provides a safer transaction process than a FAT file system provides, you can only install NDS on an NTFS partition. Therefore, if you only have FAT file systems, do one of the following:

  - Create a new partition and format it as NTFS.

    Use Disk Administrator. Refer to *Windows NT Server User Guide* for more information.

  - Convert an existing FAT file system to NTFS, using the CONVERT command.

  If your server only has a FAT file system and you forget or overlook this process, the installation program prompts you to provide an NTFS partition.

- ❑ If you are installing NDS eDirectory for NT into an NDS tree that has NetWare and NT servers, each NetWare server must be running one of the following:

  - NetWare 4.2 with NDS 6.09 or later

  - NetWare 5.0 with Support Pack 5 or later

  - NetWare 5.1

  Each NT server must be running eDirectory 8.0 or later.

UPDATING THE NDS SCHEMA

IMPORTANT: If the master replica of the Tree partition resides on a NetWare server, follow the instructions in “Updating the NDS Schema” on page 11.

To upgrade an existing tree, run DSREPAIR on the server that contains the master replica of the Tree partition.

The NDS eDirectory installation program checks the existing schema's version. If the schema has not been upgraded, the installation program instructs you to run DSREPAIR, then discontinues.

1. Copy PATCHES\DSREPAIR\ NTNDS8\DSREPAIR. DLL from the product CD to the directory where you installed NDS, for example, G:\NOVELL\NDS.

   This file is version 8.35.

2. Start NDSCONSOLE by running NDSCONS.EXE.

   This file is in the directory where you installed NDS.

3. Select DSREPAIR from the NDS Service list.

4. Enter **`-ins`** in the Startup Parameters field > click Start.

   After the schema has been updated, the status field next to the DSREPAIR module in NDSCONSOLE will be blank.

5. To see the results of the schema update, select DSREPAIR in NDSCONSOLE.

6. Click Start > File > Open Log File > Open.

   The last entry of the log file will contain the results of the schema update.

INSTALLING NDS EDIRECTORY

1. At the NT/2000 server, log in as Administrator or as a user with administrative privileges.

2. Run SETUP.EXE from the NT directory on the product CD.

3. Select which components to install.

   You can install the components separately or together.

   - Install Novell Directory Services

     This option installs NDS in an NT-only or mixed NetWare/NT server environment.

     Follow the online instructions in the Installation Wizard.

- SLP Directory Agent

  This option installs SLP Directory Agent, which allows you to control the collection and dissemination of network service information through advanced features.

  Follow the online instructions in the Installation Wizard. Select the type of setup you want to install:

  Directory: Use NDS to manage, configure, and store Directory Agents, scopes, and services.

  Local: The Directory Agent and its associated scopes and services are stored and configured through the local machine.

- Install ConsoleOne

  This option installs ConsoleOne™ 1.2d. ConsoleOne can perform all the tasks previously performed in NetWare Administrator and NDS Manager™.

  Follow the online instructions in the Installation Wizard.

The installation program checks for the following components. If a component is missing or is an incorrect version, the installation program automatically launches an installation for the component.

- Microsoft* NT Client
- Novell Client

  For more information on the Novell Client for Windows NT, see the Novell Client for Windows online documentation (http://www.novell.com/documentation/lg/client/docui/index.html).

- Novell Licensing

  You can download an evaluation license from the NDS eDirectory Web page (http://www.novell.com/products/nds/licenses/eval_85.html).

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Installing NDS eDirectory on Solaris

Use the following instructions to install NDS® eDirectory™ on Solaris*.

System Requirements

- ❑ Solaris 2.6, Solaris 7, or Solaris 8 with the following required patches:

Version	Required Patch
Solaris 2.6	105591-07
Solaris 7 (32-bit)	106327-06
Solaris 7 (64-bit)	106300-07
Solaris 8	None required

  All recommended Solaris OS patches can be downloaded from the Sunsolve Online Web page (http://sunsolve.sun.com/).

- ❑ A minimum of 64 MB RAM (128 MB recommended)
- ❑ 56 MB of disk space to install NDS Server. Additional disk space requirements will depend on the number of objects you will have in NDS.
- ❑ ConsoleOne™ requirements:
  - ConsoleOne 1.2d
  - 32 MB disk space

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Hardware Requirements

Hardware requirements depend on the specific implementation of NDS.

For example, a base installation of NDS eDirectory with the standard schema requires about 74 MB of disk space for every 50,000 users. However, if you add a new set of attributes or completely fill in every existing attribute, the object size grows. These additions affect the disk space, processor, and memory needed.

Two factors increase performance: more cache memory and faster processors.

For best results, cache as much of the DIB Set as the hardware allows.

NDS scales well on a single processor. However, NDS 8.5 takes advantage of multiple processors. Adding processors improves performance in some areas, for example, logins and having multiple threads active on multiple processors. NDS itself is not processor-intensive, but it is I/O-intensive.

The following table illustrates typical system requirements for NDS eDirectory for Solaris.

Objects	Processor	Memory	Hard Disk
100,000	Sun* Enterprise 4500	384 MB	144 MB
1 million	Sun Enterprise 5500	2 GB	1.5 GB
10 million	Sun Enterprise 6500 with multiple processors	2 GB +	15 GB

Requirements for processors might be greater than the table indicates, depending upon additional services available on the computer as well as the number of authentications, reads, and writes that the computer is handling. Processes such as encryption and indexing can be processor-intensive.

Forcing the Backlink Process to Run

Because the internal NDS identifiers change when upgrading to NDS eDirectory, the backlink process has to update backlinked objects for them to be consistent.

Backlinks keep track of external references to objects on other servers. For each external reference on a server, the backlink process ensures that the real object exists in the correct location and verifies all backlink attributes on the master of the replica. The backlink process occurs two hours after the database is open and then every 780 minutes (13 hours). The interval is configurable from 2 minutes to 10,080 minutes (7 days).

After migrating to NDS, we recommend that you force the backlink to run by issuing a SET DSTRACE=*B command from the ndstrace command prompt. Running the backlink process is especially important on servers that do not contain a replica.

Prerequisites

NDS Server must be installed on all servers that you want to place a NDS replica on.

- Meet the “System Requirements” on page 23.
- Enable the Solaris host you are installing the product on for multicast routing. Enter the following command to check whether the host is enabled for multicast routing:

  `/usr/bin/netstat -nr`

  The following entry should be present in the routing table:

  `224.0.0.0` *`host_IP_address`*

  If the entry is not present, log in as root, and enter the following command to enable multicast routing:

  `route add -net "240.0.0.0" netmask "224.0.0.0" dev -interface`

- If you have more than one server in the tree, the time on all the network servers should be synchronized. Use Network Time Protocol (NTP) to synchronize time. If you want to synchronize time on Solaris with NetWare servers, use TIMESYNC.NLM 5.09 or later.
- If you are installing a secondary server, all the replicas in the partition that you install the product on should be in the On state.
- For the first NDS installation on Solaris systems, the administrator needs the Write rights to the Tree partition to update the schema.

  NOTE: The [Root] object, used in earlier versions of NDS, has been renamed to Tree in NDS eDirectory 8.5.
- For secure NDS eDirectory operations, you will need the NICI Foundation Key file (*filename*.nfk, for example, 01234567.nfk), which is available in the license diskette that ships with NDS eDirectory. Copy the .nfk file to the /var directory on the Solaris system. If you do not use the NICI Foundation Key, you will not be able to create Certificate Authority and Key Material objects.

Installing NDS eDirectory on Solaris

Use the nds-install utility to install NDS components on Solaris systems. This utility is located in the Setup directory on the CD for the Solaris platform. The utility adds the required packages based on what components you choose to install. After adding the required packages, the installed NDS component will be configured based on inputs provided in the ndscfg.inp file.

IMPORTANT: The NDS configuration input file (ndscfg.inp) opens in the default editor vi, unless a different value is specified for the *editor* environment variable. If you do not want to use vi to edit the configuration input file, you can specify the name of the preferred editor as the value for the *editor* environment variable.

To install NDS components on Solaris systems:

1. Log in as root on the host.
2. Enter the following command:

   ```
   nds-install
   ```

3. When prompted, accept the license agreement.

   The installation program displays a list of NDS eDirectory components that you can install.

4. Specify the option for the component you want to install.

   Based on the component you choose to install, the installation program proceeds to add the packages in to the Solaris system.

5. If you are prompted, enter the complete path to the NICI Foundation Key file.

   You will be prompted to enter the complete path to the NICI Foundation Key only if the installation program cannot locate the file in the default location (/var, the mounted license diskette, or the current directory).

   If the path you entered is not valid, you will be prompted to enter the correct path. if you continue with the installation without specifying the correct path, nds-install will not configure NDS Server.

   You can use the ndsconfig utility to configure NDS Server after installation. However, to do so, you need to ensure that the .nfk file has been copied to the /var directory.

6 The installation program loads the NDS configuration input file (ndscfg.inp), which you can use to specify values for the following configuration parameters:

- Admin Name and Context

  Specifies the name (with the full context) of the user with administration rights to the Tree object.

- Tree Name

  Specifies a name for the NDS tree.

- Create NDS Tree

  Specify Yes to install NDS in a new tree.

- Server Context

  Specifies the context in which the NDS Server object should reside.

- IP Address

  To add NDS Server to an existing tree, specify the IP address of the server holding the master replica of the Tree object. This is useful if you are installing across a WAN. This is an optional parameter.

- DB Files Dir

  Specifies the directory path to a location in which NDS database files are to be stored. This is an optional parameter.

7 Save the ndscfg.inp file > close the editor.

8 Enter the password of the user with administration rights, when prompted.

Upon successful installation, the replica is created and initialized with the basic schema. Objects for the replica server, LDAP, and security are also created.

IMPORTANT: Before you begin to use NDS eDirectory, you must ensure that SLP has been installed properly in order for the NDS tree to be advertised correctly. To determine if the NDS tree is advertised, type the following:

```
/usr/bin/slpinfo -s "ndap.novell//(svcname-ws==*tree_name.)/"
```

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Installing NDS eDirectory on Linux

Use the following instructions to install NDS® eDirectory™ on Linux*.

System Requirements

- Linux 2.2 and glibc 2.1.3.
- A minimum of 64 MB RAM (128 MB recommended)
- 56 MB of disk space to install NDS Server. Additional disk space requirements will depend on the number of objects you will have in NDS.
- ConsoleOne™ requirements:
  - ConsoleOne1.2d
  - A minimum of 64 MB RAM (128 MB recommended)
  - 200 MHz processor (a faster processor is recommended)
  - 32 MB disk space

Hardware Requirements

Hardware requirements depend on the specific implementation of NDS.

For example, a base installation of NDS eDirectory with the standard schema requires about 74 MB of disk space for every 50,000 users. However, if you add a new set of attributes or completely fill in every existing attribute, the object size grows. These additions affect the disk space, processor, and memory needed.

Two factors increase performance: more cache memory and faster processors.

For best results, cache as much of the DIB Set as the hardware allows.

NDS scales well on a single processor. However, NDS 8.5 takes advantage of multiple

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processors. Adding processors improves performance in some areas, for example, logins and having multiple threads active on multiple processors. NDS itself is not processor-intensive, but it is I/O-intensive.

The following table illustrates typical system requirements for NDS eDirectory for Linux:

Objects	Processor	Memory	Hard Disk
100,000	Pentium* III 450-700 MHz (single)	384 MB	144 MB
1 million	Pentium III 450-700 MHz (dual)	2 GB	1.5 GB
10 million	Pentium III 450-700 MHz (2 to 4)	2 GB +	15 GB

Requirements for processors might be greater than the table indicates, depending upon additional services available on the computer as well as the number of authentications, reads, and writes that the computer is handling. Processes such as encryption and indexing can be processor-intensive.

Forcing the Backlink Process to Run

Because the internal NDS identifiers change when upgrading to NDS eDirectory, the backlink process has to update backlinked objects for them to be consistent.

Backlinks keep track of external references to objects on other servers. For each external reference on a server, the backlink process ensures that the real object exists in the correct location and verifies all backlink attributes on the master of the replica. The backlink process occurs two hours after the database is open and then every 780 minutes (13 hours). The interval is configurable from 2 minutes to 10,080 minutes (7 days).

After migrating to NDS, we recommend that you force the backlink to run by issuing a SET DSTRACE=*B command from the ndstrace command prompt. Running the backlink process is especially important on servers that do not contain a replica.

Prerequisites

NDS Server must be installed on all servers that you want to place a NDS replica on.

- ❑ Meet the “System Requirements” on page 29.

- Enable the Linux host you are installing the product on for multicast routing. Enter the following command to check whether the host is enabled for multicast routing:

  /bin/netstat -nr

  The following entry should be present in the routing table:

  224.0.0.0 *host_IP_address*

  If the entry is not present, log in as root, and enter the following command to enable multicast routing:

  route add -net "240.0.0.0" netmask "224.0.0.0" dev -interface

- If you have more than one server in the tree, the time on all the network servers should be synchronized. Use Network Time Protocol (NTP) to synchronize time. If you want to synchronize time on Linux systems with NetWare servers, use TIMESYNC.NLM 5.09 or later.

- If you are installing a secondary server, all the replicas in the partition that you install the product on should be in the On state.

- For the first NDS installation on Linux systems, the administrator needs the Write rights to the Tree partition to update the schema.

  NOTE: The [Root] object, used in earlier versions of NDS, has been renamed to Tree in NDS eDirectory 8.5.

- For secure NDS eDirectory operations, you will need the NICI Foundation Key file (*filename*.nfk, for example, 01234567.nfk), which is available in the license diskette that ships with NDS eDirectory. Copy the .nfk file to the /var directory on the Linux system. If you do not use the NICI Foundation Key, you will not be able to create Certificate Authority and Key Material objects.

Installing NDS eDirectory on Linux

Use the nds-install utility to install NDS components on Linux systems. This utility is located in the Setup directory on the CD for the Linux platform. The utility adds the required packages based on what components you choose to install. After adding the required packages, the installed NDS component will be configured based on inputs provided in the ndscfg.inp file.

IMPORTANT: The NDS configuration input file (ndscfg.inp) opens in the default editor vi, unless a different value is specified for the *editor* environment variable. If you do not want to use vi to edit the configuration input file, you can specify the name of the preferred editor as the value for the *editor* environment variable.

To install NDS components on Linux systems:

1. Log in as root on the host.
2. Enter the following command:

   ```
   nds-install
   ```

3. When prompted, accept the license agreement.

   The installation program displays a list of NDS eDirectory components that you can install.

4. Specify the option for the component you want to install.

   Based on the component you choose to install, the installation program proceeds to add the RPMs in to the Linux system.

5. If you are prompted, enter the complete path to the NICI Foundation Key file.

   You will be prompted to enter the complete path to the NICI Foundation Key only if the installation program cannot locate the file in the default location (/var, the mounted license diskette, or the current directory).

   If the path you entered is not valid, you will be prompted to enter the correct path. if you continue with the installation without specifying the correct path, nds-install will not configure NDS Server.

   You can use the ndsconfig utility to configure NDS Server after installation. However, to do so, you need to ensure that the .nfk file has been copied to the /var directory.

6. The installation program loads the NDS configuration input file (ndscfg.inp), which you can use to specify values for the following configuration parameters:

   - Admin Name and Context

     Specifies the name (with the full context) of the user with administration rights to the Tree object.

   - Tree Name

     Specifies a name for the NDS tree.

   - Create NDS Tree

     Specify Yes to install NDS in a new tree.

   - Server Context

     Specifies the context in which the NDS Server object should reside.

- IP Address

  To add NDS Server to an existing tree, specify the IP address of the server holding the master replica of the Tree object. This is useful if you are installing across a WAN. This is an optional parameter.

- DB Files Dir

  Specify the directory path to a location in which NDS database files are to be stored. This is an optional parameter.

7. Save the ndscfg.inp file > close the editor.

8. Enter the password of the user with administration rights, when prompted.

   Upon successful installation, the replica is created and initialized with the basic schema. Objects for the replica server, LDAP, and security are also created.

IMPORTANT: Before you begin to use NDS eDirectory, you must ensure that SLP has been installed properly in order for the NDS tree to be advertised correctly. To determine if the NDS tree is advertised, type the following:

```
/usr/bin/slpinfo -s "ndap.novell//(svcname-ws==*tree_name.)/"
```

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Installing NDS eDirectory on Tru64 UNIX

Use the following instructions to install NDS® eDirectory™ on Tru64 UNIX*.

System Requirements

- Compaq* Tru64 UNIX 4.0F (formerly DIGITAL UNIX) or Tru64 UNIX 5.0.
- A minimum of 64 MB RAM (124 MB recommended)
- 56 MB of disk space to install NDS Server. Additional disk space requirements will depend on the number of objects you will have in NDS.
- ConsoleOne™ requirements:
  - ConsoleOne 1.2d
  - 32 MB disk space

Hardware Requirements

Hardware requirements depend on the specific implementation of NDS.

For example, a base installation of NDS eDirectory with the standard schema requires about 74 MB of disk space for every 50,000 users. However, if you add a new set of attributes or completely fill in every existing attribute, the object size grows. These additions affect the disk space, processor, and memory needed.

Two factors increase performance: more cache memory and faster processors.

For best results, cache as much of the DIB Set as the hardware allows.

NDS scales well on a single processor. However, NDS 8.5 takes advantage of multiple processors. Adding processors improves performance in some areas, for example, logins and having multiple threads active on multiple processors. NDS itself is not processor-intensive, but it is I/O-intensive.

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The following table illustrates typical system requirements for NDS eDirectory for Tru64:

Objects	Processor	Memory	Hard Disk
100,000	Alpha 64-bit processor	384 MB	144 MB
1 million	Alpha 64-bit processor	2 GB	1.5 GB
10 million	Alpha 64-bit processor	2 GB +	15 GB

Requirements for processors might be greater than the table indicates, depending upon additional services available on the computer as well as the number of authentications, reads, and writes that the computer is handling. Processes such as encryption and indexing can be processor-intensive.

Forcing the Backlink Process to Run

Because the internal NDS identifiers change when upgrading to NDS eDirectory, the backlink process has to update backlinked objects for them to be consistent.

Backlinks keep track of external references to objects on other servers. For each external reference on a server, the backlink process ensures that the real object exists in the correct location and verifies all backlink attributes on the master of the replica. The backlink process occurs two hours after the database is open and then every 780 minutes (13 hours). The interval is configurable from 2 minutes to 10,080 minutes (7 days).

After migrating to NDS, we recommend that you force the backlink to run by issuing a SET DSTRACE=*B command from the ndstrace command prompt. Running the backlink process is especially important on servers that do not contain a replica.

Prerequisites

NDS Server must be installed on all servers that you want to place a NDS replica on.

- Meet the platform specific “System Requirements” on page 35.
- Enable the Tru64 host you are installing the product on for multicast routing. Enter the following command to check whether the host is enabled for multicast routing:

  ```
  /usr/sbin/netstat -nr
  ```

  The following entry should be present in the routing table:

  ```
  224/8 host_IP_address
  ```

If the entry is not present, log in as root, and enter the following command to enable multicast routing:

```
route add [-net] "224.0.0.0" -netmask "240.0.0.0" hostname -dev tu0
```

- If you have more than one server in the tree, the time on all the network servers should be synchronized. Use Network Time Protocol (NTP) to synchronize time. If you want to synchronize time on Tru64 systems with NetWare servers, use TIMESYNC.NLM 5.09 or later.
- If you are installing a secondary server, all the replicas in the partition that you install the product on should be in the On state.
- For the first NDS installation on Tru64 systems, the administrator needs the Write rights to the Tree partition to update the schema.

  NOTE: The [Root] object, used in earlier versions of NDS, has been renamed to Tree in NDS eDirectory 8.5.
- For secure NDS eDirectory operations, you will need the NICI Foundation Key file (*filename*.nfk, for example, 01234567.nfk), which is available in the license diskette that ships with NDS eDirectory. Copy the .nfk file to the /var directory on the Tru64 system. If you do not use the NICI Foundation Key, you will not be able to create Certificate Authority and Key Material objects.

Installing NDS eDirectory on Tru64 UNIX

Use the nds-install utility to install NDS components on Tru64 systems. This utility is located in the Setup directory on the CD for the Tru64 platform. The utility adds the required packages based on what components you choose to install. After adding the required packages, the installed NDS component will be configured based on inputs provided in the ndscfg.inp file.

IMPORTANT: The NDS configuration input file (ndscfg.inp) opens in the default editor vi, unless a different value is specified for the *editor* environment variable. If you do not want to use vi to edit the configuration input file, you can specify the name of the preferred editor as the value for the *editor* environment variable.

To install NDS components on Tru64 UNIX systems:

1. Log in as root on the host.
2. Enter the following command:

   ```
   nds-install
   ```

3 When prompted, accept the license agreement.

The installation program displays a list of NDS eDirectory components that you can install.

4 Specify the option for the component you want to install.

Based on the component you choose to install, the installation program proceeds to add the packages in to the Tru64 system.

5 If you are prompted, enter the complete path to the NICI Foundation Key file.

You will be prompted to enter the complete path to the NICI Foundation Key only if the installation program cannot locate the file in the default location (/var, the mounted license diskette, or the current directory).

If the path you entered is not valid, you will be prompted to enter the correct path. if you continue with the installation without specifying the correct path, nds-install will not configure NDS Server.

You can use the ndsconfig utility to configure NDS Server after installation. However, to do so, you need to ensure that the .nfk file has been copied to the /var directory.

6 The installation program loads the NDS configuration input file (ndscfg.inp), which you can use to specify values for the following configuration parameters:

- Admin Name and Context

  Specifies the name (with the full context) of the user with administration rights to the Tree object.

- Tree Name

  Specifies a name for the NDS tree.

- Create NDS Tree

  Specify Yes to install NDS in a new tree.

- Server Context

  Specifies the context in which the NDS Server object should reside.

- IP Address

  To add NDS Server to an existing tree, specify the IP address of the server holding the master replica of the Tree object. This is useful if you are installing across a WAN. This is an optional parameter.

- DB Files Dir

  Specifies the directory path to a location in which NDS database files are to be stored. This is an optional parameter.

7. Save the ndscfg.inp file > close the editor.

8. Enter the password of the user with administration rights, when prompted.

   Upon successful installation, the replica is created and initialized with the basic schema. Objects for the replica server, LDAP, and security are also created.

IMPORTANT: Before you begin to use NDS eDirectory, you must ensure that SLP has been installed properly in order for the NDS tree to be advertised correctly. To determine if the NDS tree is advertised, type the following:

```
/usr/bin/slpinfo -s "ndap.novell//(svcname-ws==*tree_name.)/"
```