

Novell NetWare® 6

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NOVELL LICENSING SERVICES
ADMINISTRATION GUIDE



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Overview

Novell® Licensing Services (NLS) that ships with NetWare® 6 supports the User Access License (UAL) model. User objects gain access to network services by connecting to the network instead of to servers. These User objects receive a permanent license unit that allows them to access network services at any time and from any workstation attached to the network.

For information on NLS concepts and how NLS works, see [“Understanding Novell Licensing Services” on page 9](#).

For information on the User Access Model, see [User Access Licensing for NetWare](#).

When you install or upgrade to NetWare, the server installation software automatically installs NLS, but not the license certificates. You must install the license certificates either during the installation or at a later time.

For information on installing or upgrading NLS, see [“Installing Novell Licensing Services” on page 21](#).

License certificates enable users to access network resources, including NetWare servers. Typically, the server installation program installs license certificates for NetWare and other selected NLS-enabled products. You can use iManage, Novell’s browser-based management tool, to install additional license certificates and to manage license units for NLS-enabled products. You can also create metered certificates and then use ZENworks™ to manage applications that are not NLS-enabled.

To set up and configure iManage to install and maintain licensing, see [iManage 1.0 and iMonitor 1.5 for Novell eDirectory 8.6](#) for more information.

For information on troubleshooting, see [“Troubleshooting Novell Licensing Services” on page 31](#).

This documentation does not cover information about policy managers and license certificates for specific products. Refer to product-specific documentation for that information.

Documentation Conventions

In this documentation, a greater-than symbol (>) is used to separate actions within a step and items in a cross-reference path.

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1

Understanding Novell Licensing Services

Since NLS is integrated with eDirectory™, you need to be familiar with the basics of eDirectory, especially eDirectory objects, partitions, and replicas of partitions.

- ♦ “Key NLS Terms” on page 9
- ♦ “How NLS Works” on page 17

Key NLS Terms

Understanding the following terms will help you maintain licensing and license units on your network.

- ♦ **Novell Licensing Services (NLS)**—Software components and technology that provide a balance between your company’s need to manage and access license units and a software manufacturer’s need for enforcement of licensing requirements.

NLS consists of the following components:

- ♦ License Service Providers (LSPs)
- ♦ NLS clients
- ♦ eDirectory objects (License Service Provider objects, License Certificate objects, and License Container objects)
- ♦ **License Service Provider (LSP)**—Licensing software that you install and run on NetWare® servers. This software is contained in the NLSLSP.NLM program running on a NetWare 4.11 or later server.

An license service provider provides the actual licensing service. It handles requests from NLS clients and maintains the license certificates, which are stored within eDirectory.

When you install NetWare and licensing certificates, NLS

- ◆ Installs the license service provider software on the server
- ◆ Creates an License Service Provider object (`NLS_LSP_servername`) in the eDirectory tree

You can also use NetWare Deployment Manager to accomplish these two tasks.

IMPORTANT: You must have an license service provider running on a server with a writable replica of each partition. This requirement applies to partitions that contain—or will contain—License Certificate objects. If a partition does not—or will not—contain a license certificate, that partition does not require a server running an license service provider.

The replica can be a master or read/write replica. You can run license service providers on other servers without replicas as long as they can communicate with the license service provider that has a writable replica. The server with the writable replica can make changes to the eDirectory database on the other server's behalf.

- ◆ **NLS_LSP_servername**—An object in eDirectory.

This object's existence in the tree is one indication that NLS is configured to run on a server and that a server is a license service provider.

Both the NetWare server installation software and NetWare Deployment Manager install the license service provider software on the server and create a corresponding License Service Provider object (`NLS_LSP_servername`) in the eDirectory tree.

License service provider objects are created in the same context as the server running the license service provider software (`NLSLSP.NLM`). The License Service Provider object stores configuration information about an license service provider running on the server: a transaction database name, information about how to search for a license certificate (whether to search to the partition root or to the root of the tree), notifications concerning unlicensed access and service problems, and other associated data.

NLS adds an attribute on the NCP Server object. This attribute points to the license service provider so that NLS has a link between the NCP™ Server object and the license service provider.

- ♦ **NLS client**—Software that requests licensing services from license service providers.

An NLS client runs on client workstations and on NetWare servers. (The client can run on either a workstation or a server or on both the workstation and the server.) This software supports 32-bit Windows* and NetWare Loadable Module™ (NLM™) platforms. When you install NLS on a server, all of the files that enable an application to use NLS are copied to the SYS:\PUBLIC and SYS:\SYSTEM directories on the server.

Other than the client software, no additional files need to be installed on client workstations. Applications written to use NLS load client libraries that communicate with NLS components running on a NetWare server.

If a 32-bit Windows NLS client has an existing connection to a NetWare server running an license service provider, the client communicates directly with the license service provider. If the client does not already have a connection to a server running an license service provider, the client searches from the server's context upward in the eDirectory tree for an license service provider.

An NLM client does not search. It simply examines the current connection.

See [“Examples of NLS Clients” on page 16](#) for more information.

- ♦ **License unit**—A component of a license certificate.

When you purchase a product, you purchase one or more license units for it. For example, a 100 Additive User License for Novell BorderManager™ Firewall Services 3 contains 100 license units, allowing 100 users to access BorderManager services.

NLS supports digital license units that are available from installed License Certificate objects. NLS also supports metered license certificates that are managed through ZENworks™ functionality.

License certificates are installed from files. Typical filename extensions are

- ♦ .NLF (for NetWare, BorderManager, and other Novell products)
- ♦ .CLS (for NetWare for Small Business)
- ♦ .KEY (activation keys)

IMPORTANT: A license unit or a license certificate is not the license itself.

Licenses are specified in your license agreement. Although NLS helps you stay in compliance with the license agreement, you are bound by the terms and conditions of your software agreement.

- ♦ **License Certificate object**—An object in eDirectory; represents a license certificate.

License certificates correspond to the printed license statement that is typically included in the packaging for software products. The icon for a License Certificate object looks like a single sheet of paper representing a license certificate. When you view the object in iManage, the object typically displays the serial number or certificate name, as shown below:

 SN:44445007

Certificates can be secure or unsecure:

- ♦ A *license certificate* is a digital license that is secured by secrets. For additional security, NetWare license certificates are digitally signed. They cannot be modified. License certificates usually come from a software vendor.
- ♦ A *metered certificate* does not have secrets; it is an unsecure license certificate. ZENworks functions as the NLS client and requests license units on behalf of applications. Metered certificates are usually created by network administrators.

NLS creates a License Certificate object when you install license certificates for NLS-enabled applications or when you create metered certificates.

When you install or create a license certificate, you choose the context (location in an eDirectory tree) for this object.

License certificates contain policies and are managed by a policy manager.

- ♦ **Activation Key**—A sequence of numbers and letters; allows you to complete the installation of a license certificate for a product you purchased.

All license certificates require an activation key. Software vendors usually include the activation key in a .KEY file along with the certificate. This combination enables the Activation Key to be installed automatically during installation. However, if the installation program can't locate an Activation Key, a prompt allows you to enter it.

- ♦ **Envelope**—An .NLF file that contains one or more license certificates; a convenient way of packaging multiple license certificates to be distributed as a single file.

Because multiple license certificates can exist in an envelope, envelopes allow you to install several license certificates at the same time. Envelopes can contain an embedded activation key for license certificates.

A sample envelope file is 4234171D.NLF.

- ♦ **License Container object**—An object in eDirectory; contains one or more License Certificate objects.

A License Container object is a special container object in eDirectory. (Other container objects include [Root] or Tree, Country, Organization, and Organizational Unit.)

License Container objects are named using publisher, product, and version. For example, Corel* WordPerfect* version 9 could appear as follows in a tree:

 Corel+WordPerfect+900

When you install a license certificate or create a metered certificate, NLS creates a License Container object *and* a License Certificate object. (If a license container already exists, NLS places the additional license certificate in that existing container.)

 Novell+NetWare User+500
 SN:77632921

Using iManage, you can view License Container objects as they appear in the eDirectory tree.

- ♦ **Licensing model**—The way a vendor allows its customers to use its licensed products.

NLS can support many models of licensing. For example:

- ♦ Nonconcurrent connections in BorderManager
- ♦ Server Connection Licensing (SCL) in NetWare 4 and NetWare 5
- ♦ User Access Licensing (UAL) for Novell Cluster Services™ and NetWare 6

For information about the licensing model for the product that you use, refer to the product-specific documentation.

- ♦ **Policy**—An electronic representation of a term or condition in your license agreement. Policies are contained in license certificates. For example, a certificate for a company could include the following tags for policies:

- ♦ Each license unit is consumable.
- ♦ Each license unit allows nodal reuse. (A user can use it multiple times from different workstations.)
- ♦ The certificate does not require an license service provider assignment.
- ♦ Duplicate certificates can be installed (an important tag for Master License Agreement accounts).
- ♦ The certificate is an evaluation license certificate.
- ♦ The certificate has a soft stop. (The policy allows users to use the service even though a license unit is not available. However, a network administrator receives notification that the company is out of compliance.)
- ♦ The certificate uses secrets.
- ♦ The certificate is digitally signed.

A policy is tied to a license certificate and a policy manager, not to the licensing service. A policy can be flexible, simply by changing (or replacing) a license certificate.

- ♦ **Policy Manager (Gatekeeper)**—Code that makes decisions based on requests from a licensing service.

A policy manager

- ♦ Is part of the application
- ♦ Makes the application NLS-enabled
- ♦ Requests licenses from NLS
- ♦ Receives responses from NLS regarding availability of license units
- ♦ Decides whether to grant access to certain program functionality
- ♦ Informs the license service provider when a license unit is no longer being used
- ♦ Contains mechanisms (policy) for handling errors concerning failed requests for license units

Each NLS-enabled product has its own policy manager. The policy manager for NetWare differs from the policy manager for BorderManager. Both of these policy managers differ from the policy manager for a third-party software manufacturer's application.

Because each application or service supports a different policy, you might have many policy managers running on a network.

- ♦ **Notification**—A message that informs you about the licensing service or a problem concerning your compliance with the terms and conditions licensing agreement.

System Alert notifications inform a designated person that one of the following has occurred:

- ♦ An eDirectory communication error related to the licensing service
- ♦ An eDirectory schema error related to the licensing service
- ♦ A transaction logging error

Out of Compliance notifications inform a designated person that your company is out of compliance with the terms and conditions of your licensing agreement.

By default, the designated person is whoever installs the license certificate. You can modify (change, delete, add) objects that receive notifications. Multiple network users or groups can receive notifications.

Notifications are sent through the NetWare Broadcast utility and (optionally) SNMP.

- ♦ **Unlicensed access**—An allowance beyond the number of license units purchased.

Software manufacturers can allow unlicensed access (a grace condition) on their license certificates. This functionality allows users to continue using the product while you purchase and install more license certificates.

NOTE: Unlicensed access does not grant licenses. The terms and conditions of your license agreement specify how the product is to be used.

To see how a product handles unlicensed access, refer to the product-specific documentation.

- ♦ **Stop**—A policy in a License Certificate object.
 - ♦ A *hard stop* policy informs users that they are out of compliance with the terms and conditions of the license agreement. A hard stop prevents users from accessing a license unit. The hard stop could result from all available license units already being in use.

NOTE: NLS is a service. The terms and conditions of your license agreement determine how the product is to be used.

- ♦ A *soft stop* policy informs users that they are out of compliance but allows them to continue using license units under certain conditions.
- ♦ A *no stop* policy ignores situations in which no license units are available. NLS keeps track of the overage by logging the noncompliance, but does not inform or warn the user.

Examples of NLS Clients

Example 1: NLS Client Software on a Client Workstation

At your Windows 2000 workstation you want to use OptionsPlus, an NLS-enabled application. After you click the icon for OptionsPlus, that application loads on your client workstation.

OptionsPlus then requests a license unit. The NLS component (a .DLL file linked to OptionsPlus software) locates a license service provider (an NLS component running on a server). That license service provider searches eDirectory for a License Certificate object that has license units available.

The license service provider responds to the NLS client in OptionsPlus and allows you to use the application.

Example 2: NLS Client Software on a Server

When starting a server, NetWare loads and runs eDirectory and license service provider, two necessary components of the NLS system.

Before completing its bootup, NetWare's policy manager uses NLS client software (an NLM library for NLS) to request a server base license from the license service provider.

The license service provider then queries eDirectory for a license certificate. If a license unit is available, the license service provider then grants the request for the policy manager, and the NetWare server is allowed to run.

NLS itself does not enforce licensing. Instead, it checks out a license unit or returns the appropriate error condition to the application. The policy manager part of the application then determines whether the user can use the application or how the error condition is reported.

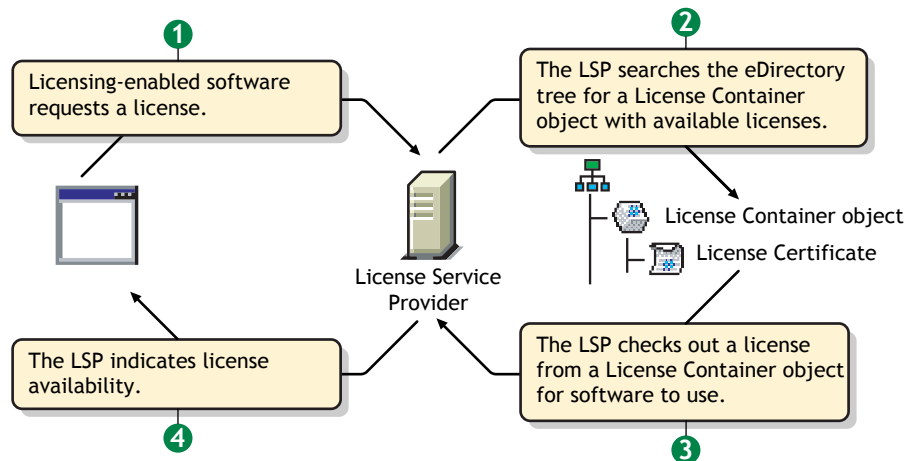
Example 3: Metering

A client workstation requests an application that is not NLS-enabled. ZENworks, integrated with NLS, requests a license unit on behalf of the application.

Depending on the response from NLS, Application Launcher in ZENworks chooses whether or not to load the application. Therefore, Application Launcher can be configured to request license units for applications that are not NLS-aware.

How NLS Works

The following figure illustrates how NLS Works.



The following list describes how License Service Providers (license service providers) handle requests from NLS clients by interacting with the eDirectory database.

1. An application issues a request to the NLS client.
In NetWare, for example, the server requests a license unit on behalf of the user that is connecting to the server. The server issues this request to the NLS client.
2. The NLS client library packages the request from the application and submits it to an license service provider.

In NetWare, for example, the NLS client communicates with the license service provider on that server.

3. The license service provider examines the request and determines whether it can fill the request. It does this by checking the eDirectory context of the requesting client for the specific information or license unit being requested.

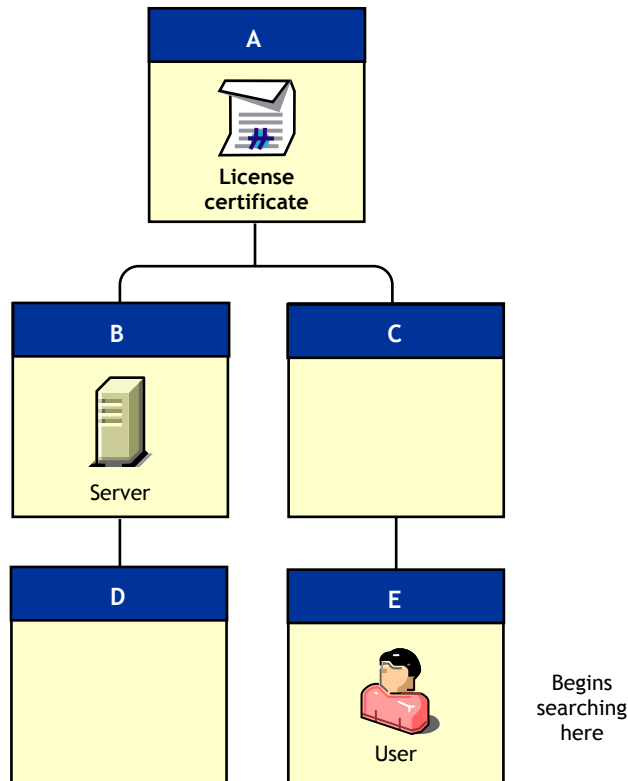
In NetWare, for example, the license service provider searches the user's context for a NetWare license unit.

4. If the requested resource is available, the license service provider fills the request. If the license service provider cannot fill the request, it searches for a resource. Where an license service provider starts its search for a resource depends on what the requesting application has specified.

The license service provider can check the next-higher context in eDirectory for the requested resources. The license service provider continues to search until it reaches the [Root] or Tree of the partition or the top of the tree, depending on how the license service provider is configured.

In NetWare, for example, the license service provider starts in the user's context and searches up the eDirectory tree for a user license.

The following figure illustrates how an license service provider searches for a license certificate in the User Access Licensing model.



In this example, the user accesses the network from context .E.C.A. To search for a license unit, the license service provider begins its search in the user's context—.E.C.A. The license service provider searches up the tree to context A and finds an available license unit.

5. The license service provider returns status to the client library.

In NetWare, for example, if the license service provider finds a NetWare license unit, it returns a successful status to the library. Otherwise, it returns an error code.

6. The library returns status to the application.

In NetWare, for example, the library returns licensing status to the server.

7. The application determines action based upon the status of license units.

In NetWare, for example, the server determines an action. If the status is successful, the server allows a connection to the server. Otherwise, the server allows a grace connection if one is available, or denies service if a grace connection isn't available.

2

Installing Novell Licensing Services

This chapter discusses

- ♦ “Guidelines for Installing NLS” on page 21
- ♦ “Installing NLS” on page 22
- ♦ “Verifying That NLS Is Installed” on page 22

Guidelines for Installing NLS

- ❑ Prepare the network.

If you are upgrading a server, the server should have a read/write replica of the partition where the NetWare® 6 server will be installed.

- ❑ Provide fault tolerance.

Two servers running NLS in a partition provide fault tolerance. If one server goes down, the other provides required licensing services.

We recommend that the master replica be on one of these servers.

- ❑ Upgrade existing NLS.

Before installing NetWare 6, ensure that your servers have the following Support Packs installed.

NetWare Version	Support Pack
NetWare 4	NetWare 4 Support Pack 6a or later
NetWare 5.0	NetWare 5.0 Support Pack 4 or later
NetWare 5.1	NetWare 5.1 Support Pack 2 or later

NOTE: If you are running NetWare for Small Business or NetWare for Growing Business, you should install the corresponding Support Pack before upgrading to NetWare 6.

- ❑ Know where to install NLS.

For more information, see [Guidelines for Installing License Certificates](#) in the *User Access Licensing for NetWare Guide*.

Installing NLS

When you install or upgrade to NetWare 6, NLS is automatically installed. For a NetWare 6 server in a new eDirectory tree, no other action concerning the licensing service is required.

For fault tolerance, you should have NetWare 6 (or NLS) running on a second server in same partition as the other server.

NLS-enabled applications can use the licensing service. See the product-specific documentation for information about implementing the licensing services for that product.

Verifying That NLS Is Installed

- 1** At the server console GUI, click Novell > Install, and then look for an NLS entry.
- 2** Do one of the following:
 - ♦ If NLSLSP.NLM is running on the server, enter the following at the server console:
modules nls*
 - ♦ If NLS_LSP_servername is a leaf object in eDirectory, view this object in iManage.

3

Using Novell Licensing Services

You can manage NLS functionality in iManage, the Novell® browser-based management tool, to complete the following tasks:

- ♦ “Managing License Certificates” on page 23
- ♦ “Deleting a License Certificate” on page 25
- ♦ “Moving a License Certificate” on page 25
- ♦ “Modifying or Deleting Server Assignments” on page 26
- ♦ “Viewing Information about License Certificates and Containers” on page 26

You can still use NetWare Administrator to administer NLS.

You can also use SNMP to view information about your network and licensing. See “Using SNMP” on page 27.

Managing License Certificates

You can install license units contained within a single license certificate or an envelope.

About Single Certificates

When a certificate for an NLS-aware application is installed, NLS adds a License Container object to the tree and a License Certificate object to that container object. You select the context or location in the eDirectory™ tree for that License Container object.

You install license certificates by accessing envelope files (.NLF).

If you purchase and install additional license certificates, they will also be added to the eDirectory tree as objects in the appropriate License Container object.

About Envelopes

An envelope is an .NLF file containing one or more license certificates. (The envelope might have just one certificate because it also contains other information associated with the product—for example, information for NIS-enabled installations.)

Envelopes let you install more than one license certificate at a time into License Container objects. For example, if you have purchased three products in a suite, you can use an envelope to simultaneously install license certificates for all three products.

When adding license certificates to the eDirectory tree, you should know where in the tree you want to install the license certificate. This location or context will determine who can use the license units associated with that license certificate. For more information on placing licenses, see [Guidelines for Installing License Certificates](#) in *User Access Licensing for NetWare*.

Installing License Certificates

- 1** In iManage, click License Management > Install License.
- 2** Navigate to and select a license file, and then click Next.

The file might be on a diskette in drive A: or on a CD-ROM.

A sample path and filename for a license certificate is A:\LICENSE\43D211.NLS. A sample path and filename for an envelope is A:\LICENSE\43D23E.NLF.

The file, usually linked to an activation file (key), automatically retrieves the password (if one is available).

- 3** Select the licenses to install, and then click Next.

Each license includes the user licenses and a server license. Each server must have a server license associated with it.

If the licenses are to be installed in different contexts, you should install the licenses one at a time.

If you choose to install a server license and one is already assigned to the server, the server license install will fail.

4 Fill in the following fields:

Location: Browse to or enter the context where you want the licenses installed. User licenses should be installed at or above the user's context. You might want to install the licenses high in the tree so that they will be available to more users. Server licenses should be installed at or above the server's context.

Server Assignment: If you are installing a server base license, the Server Assignment field displays. Browse to or enter the fully distinguished name of the Server object you want the license assigned to.

Enter an Activation Key: This field displays only if you are required to provide an activation key to unlock a license. You can either enter the key as text or select an activation key file to be read from a disk.

The results of installing the licenses appears.

5 To install another license or to reinstall a license that failed, click Continue; otherwise, click Done.

Deleting a License Certificate

- 1** In iManage, click License Management > Delete License.
- 2** Navigate to and select a license to delete, and then click Next.
- 3** Confirm that this is the license to delete and click OK.

Moving a License Certificate

- 1** In iManage, click License Management > Move a License.
- 2** Navigate to and select a license to move, and then click Next.
- 3** Navigate to and select the context where you want to move the license to, and then click Next.

A results screen displays showing the result of the moving the certificate.

- 4** Click OK.

Assigning Licenses to a Server

Each server needs a server license. You need to install a server license only if you did not install licenses during the installation process or if the server license was deleted. To install a server license certificate, follow the steps in [“Installing License Certificates” on page 24](#).

Modifying or Deleting Server Assignments

- 1** In iManage, click License Management > Manage License Properties.
- 2** Navigate to and select a license file, and then click Next.
- 3** Do one of the following:
 - ♦ Enter the fully distinguished name of the Server object you want the license assigned to.
 - ♦ Delete a server assignment by removing the server information from the field.
- 4** Click Done.

Viewing Information about License Certificates and Containers

When you install a license certificate or create a metered certificate, a License Certificate object is added to the eDirectory database. NLS also adds a License Container object, if one doesn't already exist, and places the License Certificate object in that container.

Using iManage, you can view information about licenses and their usage for the License Certificate container or license.

- 1** In iManage, click License Management > Manage License Properties.
- 2** Navigate to and select a license file, and then click Next.
- 3** Select a tab to display the information you want to view.

Using SNMP

You can use SNMP to find out about licensing service events on your network.

About SNMP and NLS

SNMP is a management interface and high-level protocol. General-purpose protocols such as IPX™, TCP/IP, and UDP can host SNMP. NLS takes events and errors, wraps them in one of these protocols, and sends them to a management utility or console.

For example, suppose you instruct SNMP to raise an event whenever a license unit is conveyed to a User object. Every time a license unit is conveyed, SNMP sends a packet to a management console. The console registers that event. As network administrator, you can view these packets at the management console.

With SNMP, you can send out a wide variety of different events. NLS provides a list of events and errors that the licensing service can send out notifications on. As network administrator, you choose the events that you are interested in. You can turn off all events, turn them all on, or turn on selected events.

For example, NLS sends broadcast messages. Using SNMP, you can send an SNMP message with the same content to a management console.

In short, SNMP enables you to be aware of what's happening on the network.

Why You Need a Management Console

An SNMP management product—for example, OpenView* or ManageWise®—resides on the network and registers itself as the management console. An SNMP agent (SNMP.NLM) runs on a NetWare server. The SNMP pieces on each server send the SNMP datagrams to the console. You use the console to track what's happening on the network.

You can place the management console anywhere on the network. This console reads the SNMP packets and displays their contents to you, as the network administrator. Typically these consoles are run on client computers for convenience, but that functionality can be implemented on any computer on the network.

Three Configuration Files for SNMP

NLS uses three configuration files for SNMP. The configuration files allow the various systems which provide SNMP information to tailor that information to your needs as you manage the network. All three files are installed into SYS:\ETC.

SNMP.CFG lets you add descriptive strings that might be included in SNMP packets. These packets provide you with specific information, such as server name, computer hardware description, location, and whom to contact in case of an issue.

NLSTRAP.CFG lets you specify which NLS events and errors you want to track. NLSTRAP.CFG has a list of all possible events that NLS could ever send out. The file contains two lines for each event. The first line is a description. The second line enables or disables notification for that event. If the line begins with a pound sign (#), no message is sent.

By default, all lines (events) are commented out. To see an event, you edit NLSTRAP.CFG. The file contains a description at the top about the format and what to do with each value. You just turn on what you want to see.

If NLSTRAP.NLM detects an event that is enabled in the NLSTRAP.CFG file, NLSTRAP.NLM calls routines provided by SNMP.NLM to place the SNMP packet on the network.

TRAPTARG.CFG lets you specify all targets (or receivers) that are to receive SNMP trap messages generated by the SNMP agent (SNMP.NLM). It pairs targets with a protocol for SNMP packet addressing. For example, a server named PUFFIN in the IPX section of TRAPTARG.CFG instructs NLS to send SNMP messages to server PUFFIN using IPX.

Implementing SNMP

- 1** Edit NLSTRAP.CFG to set events that you want to monitor.
Specify parameters by using a parameter keyword followed by the desired parameter value. Then unload and reload NLSTRAP.NLM. (The changes won't take effect until you reload NLSTRAP.NLM.)
- 2** Edit SNMP.CFG.
- 3** Edit TRAPTARG.CFG to specify all targets that are to receive SNMP trap messages.
- 4** Run the management console.

5 Load SNMP.NLM on a server.

SNMP.NLM (the SNMP agent) provides the APIs and framework to allow SNMP to work on NetWare. SNMP.NLM traps events, generates SNMP messages about the trapped events, and sends the messages to the management console.

6 At the management console, view the SNMP messages.

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Troubleshooting Novell Licensing Services

This chapter contains tips, information about system messages and error codes, and a list of Technical Information Documents.

- ♦ “Tips” on page 31
- ♦ “Error Codes and System Messages” on page 33
- ♦ “TIDs” on page 34

Tips

Unable to get a server base license

Problem: The server console displays “Unable to get a Server Base license.”

Action: Delete and reinstall the license certificate. If you use iManage, you must manually make a server assignment during the installation of the licenses certificate. (If you are an MLA account, do not make a server assignment.)

No access to license units

If License Service Provider objects are not well placed in the eDirectory™ tree. Some NLS clients might not have access to licensing services

Place license certificates as close as practical to the actual users but high enough in the eDirectory tree so that everyone who needs to access them can do so.

Consider the following guidelines:

- ◆ Place server license certificates so that NLS servers do not have to traverse slow WAN links to access license units.
- ◆ Place user certificates so that NLS does not have to traverse WAN links when users are authenticating to the tree.
- ◆ Place at least one License Service Provider object in a container near the root of the tree. Also, consider loading license service provider software on servers that many or most users log in to in the eDirectory tree. These two actions distribute requests for license units.
- ◆ Identify license certificates that many users throughout the eDirectory tree will use. Place these license certificates in a context near the root of the eDirectory tree.
- ◆ Identify license certificates that a small group will use. Place these license certificates in the same eDirectory context as those users' objects.
- ◆ Identify license certificates that larger groups will use. Place these certificates in the eDirectory context that represents the root-most context for the group.

The system erroneously reports duplicate licenses

Problem: The system reports that duplicate licenses are installed in the eDirectory tree.

Possible cause: In a using earlier versions of NLS, you installed a license certificate, deleted it, and then reinstalled it elsewhere in the eDirectory tree. When the earlier NLS dredge process walks the eDirectory tree and looks for certificates, the dredge encounters the deleted certificate and considers it a duplicate.

Solution: If that license certificate was the only certificate in the License Container object, delete the License Container object where the certificate was installed and deleted. (Don't delete the License Container object if it contains other license certificates.)

Solution: Deploy the current version of NLS by installing the NetWare 4 Support Pack 6a and NetWare 5 Support Pack 4 on your servers.

Error Codes and System Messages

Many messages for Novell® Licensing Services are self-documenting; information that you need appears on-screen with the message. Additional information about error codes are provided below. Other error codes are provided in **NLSLSP Messages** in *System Messages*.

Error Code C0001002 Displays

Possible Problem	Possible Solutions
You removed and reinstalled eDirectory™.	See TID 2941280.
The Server object and [Public] don't have enough rights.	Make sure that the Server object (NLS_LSP_server) has the Browse right to the License Certificate objects. Make sure that the Server object has the Read property right to "All Properties." Make sure that [Public] has the Browse right to the License Container object where the license certificates are stored. See TID 2943750.
You deleted the server base license (a License Certificate object).	Reinstall the license certificates. See TID 2943405.
You removed the read/write replica from the NLS server. (The NLS server is running NLSLSP.NLM. It's the server that shows up in NetWare Administrator as NLS_LSP_server.)	See TID 2949634.
Two NetWare 5 servers contain a replica of the [Root] or tree partition.	See TID 2950971.

Error Code C0001005 Displays

Possible Problem	Possible Solution
The license certificate requires a server assignment but doesn't have one.	Assign a server. See “Modifying or Deleting Server Assignments” on page 26.

TIDs

The following TIDs might help you resolve some issues relating to NLS on your network. The TIDs are available at www.support.novell.com/servlet/knowledgebase.

TID	Description
2943405	What to do when the server is unable to obtain a valid server base license
2944797	Installing MLA certificates
2925689	Renaming a server
2943157	Moving a server to a different NDS context
2949634	Responding to a C0001002 message