Novell
Client™ for Linux

1.2

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ADMINISTRATION GUIDE

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Contents

About This Guide

This guide describes how to configure the Novell® Client™ for Linux software.

Audience

This guide is intended for network administrators.

Feedback

We want to hear your comments and suggestions about this manual and the other documentation included with this product. Please use the User Comments feature at the bottom of each page of the online documentation, or go to www.novell.com/documentation/feedback.html and enter your comments there.

Documentation Updates

For the latest version of this documentation, see the Novell Client online documentation (http://www.novell.com/documentation/linux_client/index.html) Web site.

Additional Documentation

For information on installing the Novell Client for Linux, see the "Novell Client for Linux 1.2 Installation Quick Start"

For information on the Novell Client tray application, see the *Novell Client for Linux 1.2 User Guide*.

For information on login scripts, see the *Novell Login Scripts Guide*.

Documentation Conventions

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

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What's New

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The following are new features added to the Novell® Client™ for Linux 1.2:

- The ability to edit login scripts from an option on the tray application menu.

  User authentication and access control are enforced (that is, users must be logged in to edit their personal login scripts). eDirectory™ access control is enforced as well, which is useful when administrators do not want their users to be able to edit their personal login scripts. An administrator can also configure the Novell Client for Linux to disallow the *Edit Login Script* option so it is not displayed on the on the tray application menu.

  For more information, see "Editing Your Login Script" in the *Novell Client for Linux User Guide*.

- An integrated login feature that allows login profiles to be stored for use by subsequent network login operations.

  This functionality makes use of CASA (Common Authentication Services Adapter) for persistent storage of credentials for a given realm. The overall concept is that if the Novell Client for Linux 1.2 or later and CASA 1.6 or later are installed on the workstation, users can have their eDirectory connections, login scripts, and startup drive mappings run when they initially log in to the workstation. This authentication does not replace the workstation login; it currently just augments it with eDirectory functionality.

  Users must run the normal *Novell Login* from the tray application menu and save their Novell Login settings. After saving the Novell Login settings, the next time the same user logs in to the workstation, eDirectory authentication is automatic and the user's login script runs at startup.

  For more information, see Section 4.1, "Setting Up Integrated Login," on page 25.

Understanding the Novell Client for Linux

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The Novell® Client™ for Linux* software allows users of Linux workstations to access and use all of the services available on servers running Novell eDirectory™. The Novell Client brings the full power, ease of use, manageability, and security of eDirectory to Linux workstations. The Novell Client for Linux fully supports NetWare®, OES, and eDirectory services and utilities on a Linux workstation, including security, file, and print services through Novell iPrint.

This section contains the following information:

- Section 2.1, "Understanding How the Novell Client for Linux Differs from the Novell Client for Windows 2000/XP," on page 11
- Section 2.2, "Understanding the Novell Client for Linux Virtual File System," on page 12

2.1 Understanding How the Novell Client for Linux Differs from the Novell Client for Windows 2000/XP

Using the Novell Client for Linux differs in a few ways from using the Novell Client for Windows*. For users and network administrators who are familiar with the Novell Client for Windows, knowing these differences can help the transition to Linux run more smoothly.

Installation and Upgrades

- The Novell Client for Linux can be installed and upgraded using either YaST or an installation script. For more information, see the "Novell Client for Linux 1.2 Installation Quick Start"
- There is no Automatic Client Upgrade available on Linux.
- The Client Configuration Wizard lets you set up a configuration file that can be used to preconfigure workstations during installation. For more information, see Section 3.2, "Using Configuration Files to Preconfigure the Novell Client," on page 22.

Logging In

- When a user logs in to a local workstation and then opens a remote SSH session and logs in as the same user, the network resources that user has rights to are available to the user.
- The Novell Client for Linux can use the NMAS™ login method to authenticate. However, the NMAS login is not integrated in to the Novell Client for Linux login screen, so the default login sequence cannot be set in the Novell Client Login screen.
- The Novell Client for Linux uses OpenSLP, whereas the Novell Client for Windows uses Novell's implementation of SLP. The network administrator *must* set up OpenSLP before users can look up trees, contexts, and servers using the Browse buttons in the Novell Client Login window. If OpenSLP is not set up, the user must enter a username, tree, and context to connect to the network. See Chapter 4, "Managing Login," on page 25 for more information.

Because Linux uses OpenSLP, the implementation is different and the user's experience is different. For more information, see Section 4.4, "Using OpenSLP to Simplify Login," on page 29.

- The Novell Client for Linux does not use the Dynamic Local User or Location Profiles that are available in Windows.

User Interface

Both a graphical user interface and command line utilities are available to complete client actions such as mapping drives, setting trustee rights, and copying files.

Login Scripts

Novell has ported the vast majority of login script functionality to the Linux platform. This means that the login scripts you create in your network can be used for both Windows users and Linux users with very little difference in functionality.

Some differences do exist, however. For example, mapped drives are implemented by creating symbolic links and search drives are not available on Linux. Other small differences are created by the inherent difference between Windows and Linux. All the differences and issues are listed in the *Novell Login Scripts Guide*.

2.2 Understanding the Novell Client for Linux Virtual File System

The Novell Client for Linux differs from previous Novell Clients to enable it to work on the Linux platform. In Windows, the Novell Client loads a single binary that works on multiple operating system platforms without modifications. The Novell Client for Linux has a Virtual File System that consists of a kernel module (`novfs.ko`) that runs as part of the Linux kernel and a daemon (`novfsd`) that runs in the user space. Both components must be running on the workstation for the client to connect to the network.

The daemon can run on any of the supported Linux platforms without modification. The kernel module, however, is dependent on the kernel version and must be compiled to match the kernel on the workstation. When the Novell Client is installed, it compiles the kernel module during the installation process. If this process fails, the kernel module cannot load. It attempts to recompile when the workstation is restarted.

2.2.1 Understanding When the Virtual File System Kernel Module Needs to Be Compiled

The following is a list of the instances when you must compile the Novell Client Virtual File System Kernel Module (`novfs.ko`):

- You installed the Novell Client and received an error message. This generally occurs because all the required packages are not installed on a workstation. You must install these packages, compile the Novell Client Virtual File System Kernel Module (`novfs.ko`), and restart the workstation. See "System Requirements" in the *Novell Client for Linux Installation Quick Start* for more information.

- You have previously compiled the Novell Client Virtual File System Kernel Module (`novfs.ko`) and then made changes to the kernel.

- You have a custom kernel of any of the supported versions.
- Kernel updates are automatically pushed to the workstation via Red Carpet®.

In all of these instances, you must recompile the Novell Client Virtual File System Kernel Module (`novfs.ko`) to ensure that it is compatible with the Linux kernel version on your workstation. However, when later shipping versions of SLED are provided by Novell, the Novell Client Virtual File System Kernel Module (`novfs.ko`) is installed and you do not need to recompile it because the module is included in the kernel.

For more information, see Appendix A, "Compiling the Novell Client Virtual File System Kernel Module," on page 43.

NOTE: If you patch the kernel for any reason, you must make sure that you have the required packages that correspond to the kernel patch. For a list of the required packages, see "System Requirements" in the *Novell Client for Linux Installation Quick Start*. The Novell Client for Linux then recompiles when the workstation is restarted. Without the corresponding packages, the recompile fails.

Under certain conditions, your version of `novfs.ko` could be rolled back when you install a new kernel module. For example, if you download and install a patched version of `novfs.ko`, and then later install an SLED 10 update to your kernel, the Novell Client Virtual File System Kernel Module patch might be overwritten. You should then reinstall the `novfs.ko` patch and recompile the kernel in order to ensure that the kernel module and the kernel are compiled.

Configuring the Novell Client for Linux

<div style="text-align: right; font-size: 3em;">3</div>

This section explains two ways that you can configure the Novell® Client™ for Linux settings on a workstation. Both methods let you configure the file browser, protocol, login, tray application, and SLP configuration settings available to Novell Client users.

- Using the Novell Client Configuration Wizard (page 15)
- Using Configuration Files to Preconfigure the Novell Client (page 22)

3.1 Using the Novell Client Configuration Wizard

The Novell Client for Linux includes a Novell Client Configuration Wizard to simplify the process of configuring your Novell Client.

1 Launch the Novell Client Configuration Wizard using either of the following methods:

- In the Novell Client tray application, click *System Settings*.
- In YaST, click *Network Services > Novell Client*.

2 Select the Client Configuration Wizard pages that contain the settings you want to configure.
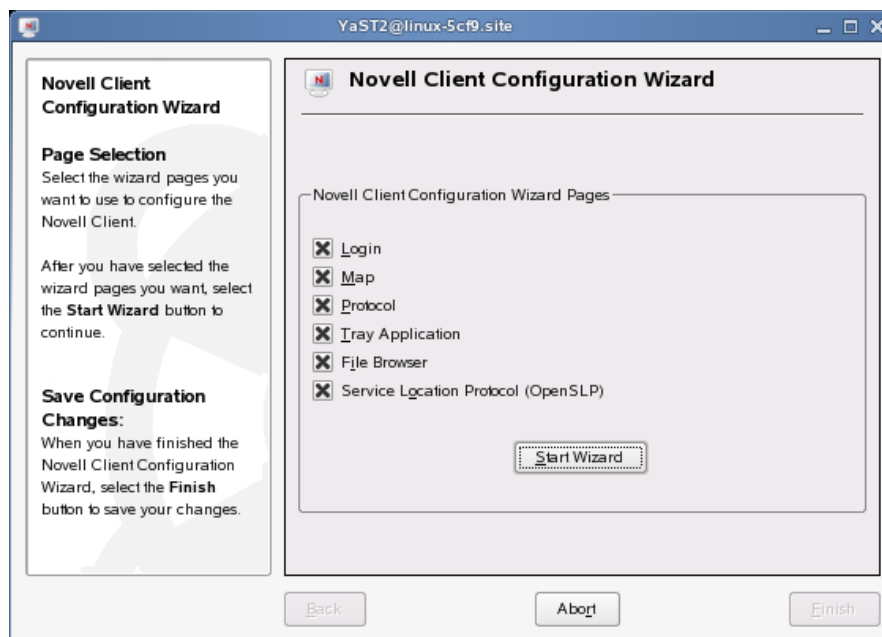
You can configure the following settings:

- Login
- Map
- Protocol
- Tray Application

- File Browser
- Service Location Protocol (OpenSLP)

3 Click *Start Wizard*.

4 Follow the instructions in the left panel to configure Novell Client settings.

5 Click *Finish*.

6 Restart the workstation to ensure that the settings take effect.

7 If you made changes to the Protocol Settings page or the Service Location Protocol (OpenSLP) Settings page, reboot the machine for those changes to take effect.

Any changes you make to the Novell Client settings are written to a set of configuration (`.conf`) files in the `/etc/opt/novell/ncl` directory. These files are then used by the Novell Client.

IMPORTANT: When the Novell Client software is uninstalled, these settings are not saved.

3.1.1 Configuring Login Settings

Use the Login Settings page in the Novell Client Configuration Wizard to configure the settings available to users in the Novell Login dialog box.

Figure 3-1 *Login Settings Page*
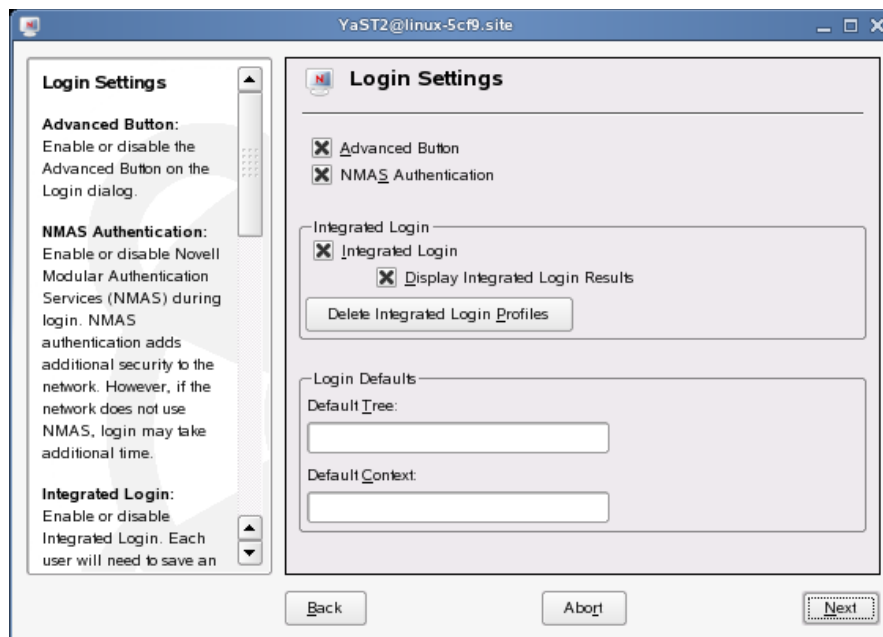
This page contains the following options:

- **Advanced Button:** Enables or disables the *Advanced* button in the Login dialog box. This option is selected by default.
- **NMAS Authentication:** Enables or disables Novell Modular Authentication Services (NMAS™) during login. NMAS authentication can add additional security to the network, but if the network does not use NMAS, login might take additional time, so you can disable NMAS authentication by disabling this setting. This option is selected by default.

- **Integrated Login:** Enables the integrated login feature for the entire system. This is set by the administrator and cannot be overridden by the user.
- **Display Integrated Login Results:** When this option is disabled, all login scripts are run silently and the script results window is not displayed, but login scripts are still processed.
- **Delete Integrated Login Profiles:** Removes the existing login profiles for all users on this workstation.
- **Default Tree:** Specify the default tree that Login attempts to log in to. This setting is overridden by the Login Dialog Tree history.
- **Default Context:** Specify the default context that Login attempts to log in to. This setting is overridden by the Login Dialog Context history.

For more information on using the Novell Login dialog box, see "Logging In to the Network" in the *Novell Client for Linux User Guide*.

3.1.2 Configuring Map Settings

Use the Map Settings page in the Novell Client Configuration Wizard to specify the directory on the local workstation where symbolic links to network resources are created and to select the first letter to use when creating these links.

Figure 3-2   *Map Settings Page*
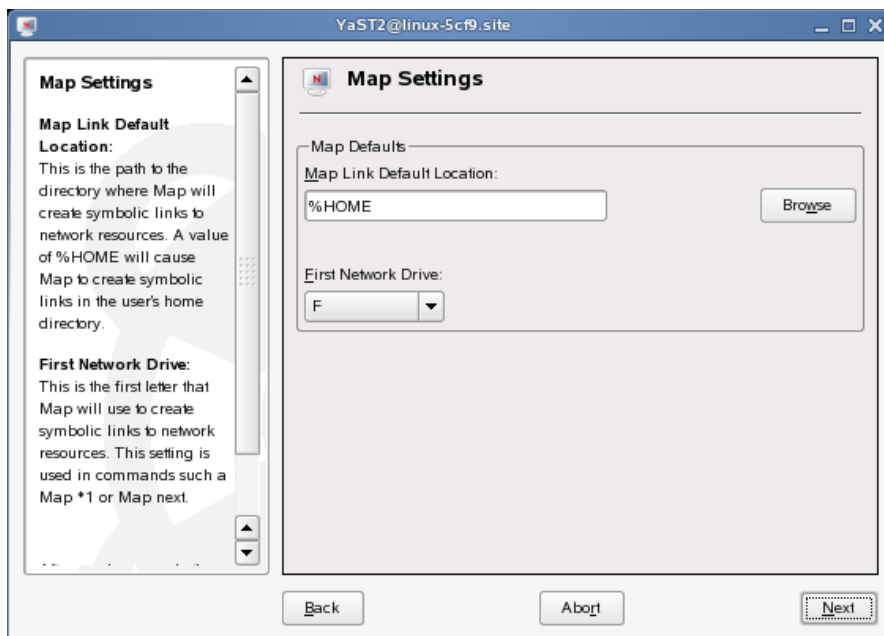
This page contains the following options:

- **Map Link Default Location:** Specify the path to the directory where Map creates symbolic links to network resources. A value of %HOME (the default) causes Map to create symbolic links in the user's home directory.
- **First Network Drive:** Select the first letter for Map to use when creating symbolic links to network resources. This setting is used in commands such a `Map *1` or `Map next`.

3.1.3 Configuring Protocol Settings

Use the Protocol Settings page in the Novell Client Configuration Wizard to determine the level of enhanced security support, select the providers to perform name resolution, and enable the Client to obtain configuration information from your DHCP server.

Figure 3-3 *Protocol Settings Page*
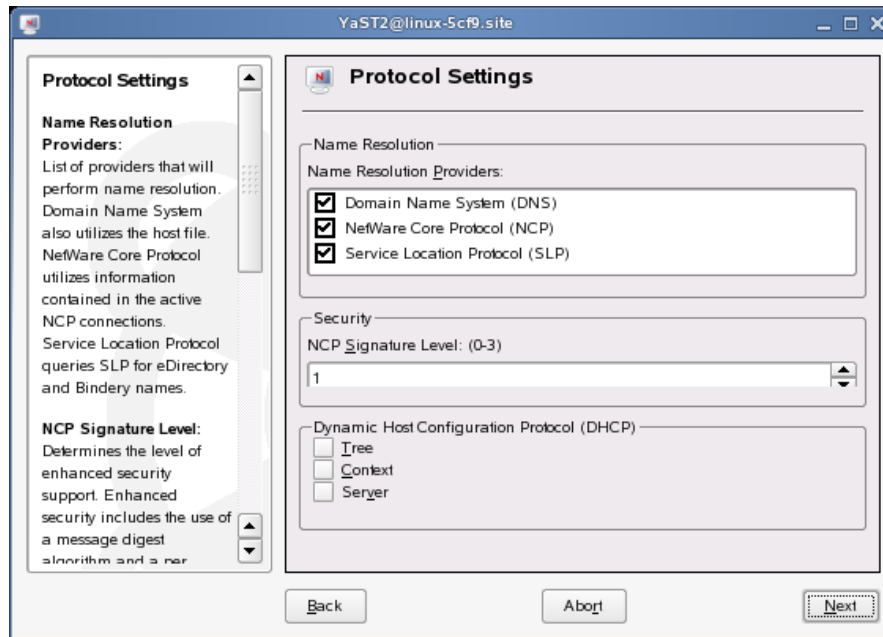
This page contains the following options:

- **Name Resolution Providers:** Select the providers to perform name resolution. Domain Name System also uses the `/etc/hosts` file. NetWare® Core Protocol™ uses information contained in the active NCP™ connections. Service Location Protocol queries SLP for eDirectory™ and Bindery names.

- **NCP Signature Level:** Specify the level of enhanced security support. Enhanced security includes the use of a message digest algorithm and a per connection/per request session state. The values are as follows:

  0=Disabled1=Enabled but not preferred2=Preferred3=Required

  Changing the value of this setting to 2 or 3 increases security but decreases performance.

- **Dynamic Host Configuration Protocol (DHCP):** If a DHCP server is set up on your network, the DHCP server can inform the Novell Client of network-specific configuration information. This information is made available when a user click the Tree, Context, or Server buttons on the eDirectory tab of the Novell Login dialog box.

If you make changes to the Protocol Settings page, you must reboot the workstation for those changes to take effect.

3.1.4 Configuring Tray Application Settings

Use the Tray Application Settings page in the Novell Client Configuration Wizard to automatically launch the Novell Client Tray Application when the desktop starts and to determine which options are available to users on the Tray Application menu.

Figure 3-4 *Tray Application Settings Page*
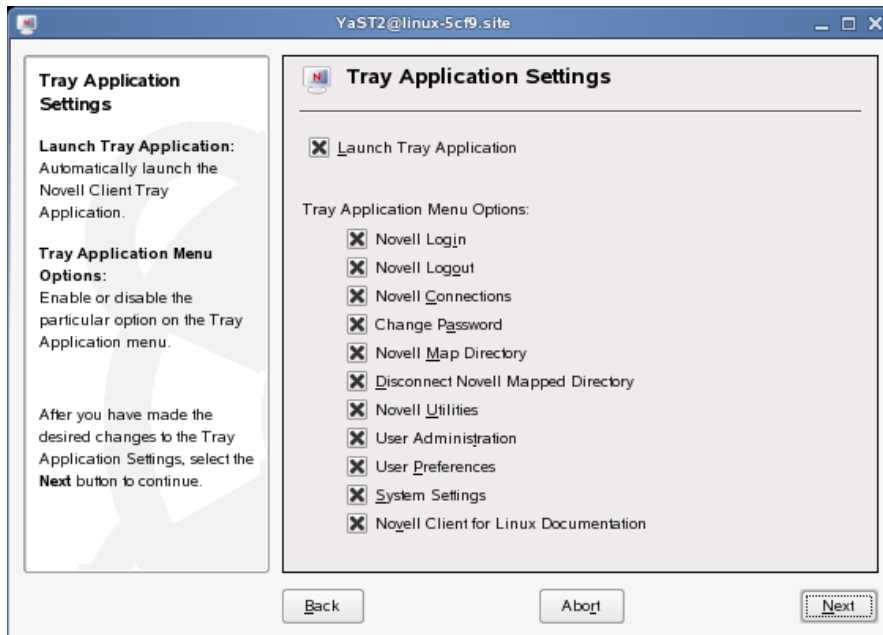
This page contains the following options:

- **Launch Tray Application:** Select this option to automatically launch the Novell Client Tray Application.
- **Tray Application Menu Options:** Enables or disables the options available to users on the Tray Application menu.

For more information, see "Using the Novell Client Tray Application" in the *Novell Client.for Linux User Guide*.

3.1.5 Configuring File Browser Settings

Use the File Browser Settings page in the Novell Client Configuration Wizard to specify which Novell Client options are available to users when they right-click Novell file system directories or

files in a file manager, and which tabs are available on the Novell File, Folder, and Volume Properties pages.

Figure 3-5 *File Browser Settings Page*
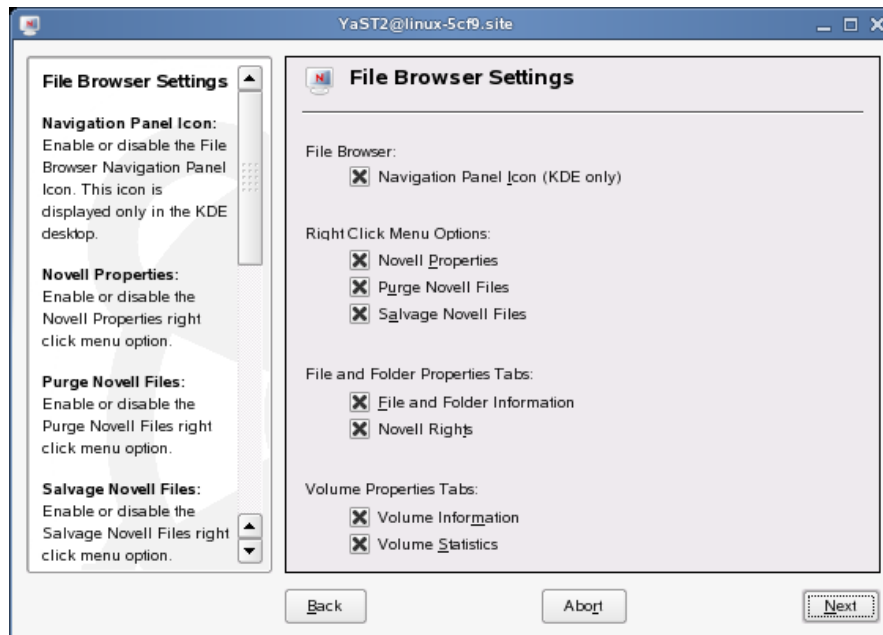
This page contains the following options:

- **Navigation Panel Icon (KDE only):** Enables or disables the *File Browser Navigation Panel* icon. This icon is displayed only in KDE.

- **Novell Properties:** Enables or disables the *Novell Properties* menu option when users right-click a Novell file system directory or file in a file manager.

- **Purge Novell Files:** Enables or disables the *Purge Novell Files* menu option when users right-click a Novell file system directory or file in a file manager.

- **Salvage Novell Files:** Enables or disables the *Salvage Novell Files* menu option when users right-click a Novell file system directory or file in a file manager.

- **File and Folder Information:** Enables or disables the *File Information* and *Folder Information* tabs on the File and Folder Properties pages (available when users right-click a Novell file system directory or file in a file manager and then click *Novell Properties*).

- **Novell Rights:** Enables or disables the *Novell Rights* tab on the File and Folder Properties pages (available when users right-click a Novell file system directory or file in a file manager and then click *Novell Properties*).

- **Volume Information:** Enables or disables the *Volume Information* tab on the Volume Properties page (available when users right-click a Novell file system volume in a file manager and then click *Novell Properties*).

- **Volume Statistics:** Enables or disables the *Volume Statistics* tab on the Volume Properties page (available when users right-click a Novell file system volume in a file manager and then click *Novell Properties*).

3.1.6 Configuring OpenSLP Settings

Use the Service Location Protocol (OpenSLP) Settings page in the Novell Client Configuration Wizard to specify where and how the Client requests network services.

In an IP-only network, the Novell Client needs a way to resolve the eDirectory tree, context and server names to an actual IP address of an eDirectory server that can provide authentication. On a simple LAN, the client can send an IP broadcast to discover this information, but on a multisite WAN, the SLP scope and Directory Agents must be listed.

Figure 3-6   *Service Location Protocol (OpenSLP) Settings Page*
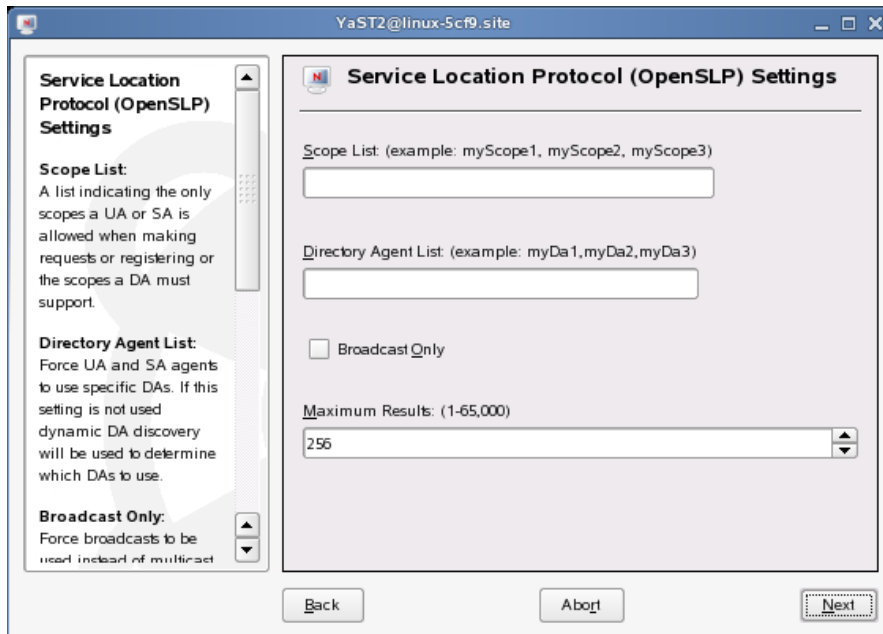
This page contains the following options:

- **Scope List:** Specify the scopes that a user agent (UA) or service agent (SA) is allowed when making requests or registering, or the scopes that a directory agent (DA) must support.

- **Directory Agent List:** Specify the specific DAs that UA and SA agents must use. If this setting is not used, dynamic DA discovery is used to determine which DAs to use.

- **Broadcast Only:** Select this option to use broadcasting instead of multicasting. This setting is not usually necessary because OpenSLP automatically uses broadcasting if multicasting is unavailable.

  SLP is designed to use IP multicasting; however, if any SLP Agent does not implement IP multicasting, then all Agents must use broadcasting to reach that Agent. If a DA does not support multicasting, we recommend using the Directory Agent List to configure that Directory Agent rather than using this option.

  If the network does not contain a DA, IP servers must use their own SAs to specify the services that are available. If the SA does not support multicasting and if there are any services advertised by that SA that are needed by the UA on this machine, then use the Broadcast Only option.

  Broadcasting has the disadvantage of being limited to the local LAN segment.

- **Maximum Results:** Specify a 32-bit integer giving the maximum number of results to accumulate and return for a synchronous request before the time-out, or the maximum number of results to return through a callback if the request results are reported asynchronously.

If you make changes to the Service Location Protocol (OpenSLP) Settings page, you must reboot the workstation for those changes to take effect.

For more information, see Section 4.4, "Using OpenSLP to Simplify Login," on page 29, SLP Fundamentals (http://www.novell.com/documentation/edir873/qsedir873/data/aksciti.html), and the OpenSLP (http://www.openslp.com) Web site.

3.2 Using Configuration Files to Preconfigure the Novell Client

The Novell Client for Linux allows you to apply preconfigured client settings contained in one or more configuration (`.conf`) files. This option works similar to the unattend file that can be used to configure the Novell Client for Windows (see Creating the Configuring File (http://www.novell.com/documentation/noclienu/noclienu/data/bu01sei.html#hn62kppa) in the *Novell Client for Windows Installation and Administration Guide* for more information).

Preconfiguring the Novell Client for Linux requires the `novell-client-conf.spec` file and the `make_novell-client-conf_rpm` Bash script located in the `/add-on/novell-client-conf` subdirectory in the directory where you unarchived the Client download file.

1 Create the preconfigured settings using the Novell Client Configuration Wizard.

See Section 3.1, "Using the Novell Client Configuration Wizard," on page 15.

2 Copy the appropriate `.conf` files to the `/add-on/novell-client-conf` directory.

Depending on the settings you preconfigured, copy one or more of the following files:

Conf File Path and Name	Configuration Settings
`/etc/opt/novell/ncl/file_browser.conf`	File browser settings
`/etc/opt/novell/ncl/login.conf`	Login settings
`/etc/novell/ncl/map.conf`	Map settings
`/etc/opt/novell/ncl/protocol.conf`	Protocol settings
`/etc/opt/novell/ncl/tray_app.conf`	Novell Client Tray Application settings
`/etc/slp.conf`	SLP configuration settings

3 Run the `make_novell-client-conf_rpm` script to create a `novell-client-conf-version_number.platform.rpm` file (for example, `novell-client-conf-1.0.0-0.i586.rpm`) using all of the `.conf` files contained in the `/add-on/novell-client-conf` directory.

3a Make sure you are the root user.

3b Enter the following in a terminal:

```
bash make_novell-client-conf_rpm
```

4 Install the preconfigured settings contained in `novell-client-conf-`*`version_number.platform`*`.rpm` using one of the following methods:

- **Install manually in a terminal:** Enter `rpm -i novell-client-conf-`*`version_number.platform`*`.rpm` in a terminal.

- **Install using the ncl_install script:** When you launch the `ncl_install` script (located in `/opt/novell/ncl/bin` or in the directory where you unarchived the Client download file), it looks for `novell-client-conf-`*`version_number.platform`*`.rpm` in the `/add-on/novell-client-conf` directory and adds it to the list of RPMs it installs as part of the Client.

- **Install with the Novell Client using YaST:** Add the location of the newly created `novell-client-conf-`*`version_number.platform`*`.rpm` to the list of installation sources in YaST (add a local directory in the *Installation Source* option and point it to the directory containing `novell-client-conf-`*`version_number.platform`*`.rpm`). When the YaST install runs, `novell-client-conf-`*`version_number.platform`*`.rpm` is added as one of the RPMs in the Novell Client selection.

  The Novell Client configuration settings on a workstation can be updated at any time using the YaST method.

The `.conf` files contained in the RPM are copied to the `/etc/opt/novell/ncl` directory, overwriting the files of the same name that already exist there. The installation then copies the `slp.conf` file to the `/etc` directory, overwriting that file as well.

TIP: Backup copies of the existing files are made in the same directory so that you can revert to the old files if you need to.

Managing Login

4

You can customize the client login environment with the following tasks to suit your network and have greater control over what users can access during login:

For more information, see "Logging In to the Network" and "Logging Out of a Network Location (Server or Tree)" in the *Novell Client for Linux User Guide*.

4.1 Setting Up Integrated Login

The Novell® Client™ for Linux 1.2 provides a single, synchronized login to the SUSE® Linux desktop and the NetWare® network. Users enter their name and password only once to access all the resources they are authorized to use.

IMPORTANT: The integrated login feature is not available if you log in as the root user, and the integrated login feature does not work if a workstation is set up to *not* ask for a password in the display manager greeter.

For integrated login to work, the Novell Common Authentication Services Adapter (CASA) must be installed and enabled. CASA is a common authentication and security package that provides a set of libraries for application and service developers to enable single sign-on to an enterprise network.

4.1.1 Installing and Enabling CASA

CASA is installed by default with SLED 10, but it is not enabled. CASA is not installed or enabled by default with SUSE Linux 10.1.

Installing CASA

1 Launch the YaST Control Center.

   SLED 10 GNOME: Click *Computer > More Applications > YaST Control Center*.

   SUSE Linux 10.1 GNOME: Click *Desktop > YaST*.

   KDE: Click the menu button > *System > YaST (Control Center)*.

2 If you are not logged in as root, type the root password, then click *Continue*.

3 Click *Software* in the left column, then click *Software Management* in the right column.

4 Click *Search* in the *Filter* drop-down list.

5 Type `casa` in the Search field, then click *Search*.

6 Select the `casa` packages for installation.

7 Click *Accept* to install all of the selected packages.

YaST displays the progress of the package installation.

8 (Conditional) If a message informs you that other package selections have been made to resolve dependencies, click *Continue*.

9 (Conditional) If a message prompts you to insert a SUSE Linux CD, put the CD in the CD drive, then click *OK*.

10 After all the packages have been installed, click *Close* to close the YaST Control Center.

Enabling CASA

1 Launch the YaST Control Center.

SLED 10 GNOME: Click *Computer > More Applications > YaST Control Center*.

SUSE Linux 10.1 GNOME: Click *Desktop > YaST*.

KDE: Click the menu button > *System > YaST (Control Center)*.

2 Click *Security and Users* in the left column, then click *CASA* in the right column.

3 Click *Configure CASA*, then click *OK*.

4 Click *Finish* to close the CASA Configuration Wizard.

4.1.2 Configuring Integrated Login

1 Use one of the following methods to open the Novell Login dialog box:
- Click > *Novell Login*.
- **SLED 10 GNOME:** Click *Computer > More Applications > Novell Login*.
- **SUSE Linux 10.1 GNOME:** Click *Applications > Applications > Novell Login*.
- **KDE:** Click the menu button > *Applications > Novell Login*.

2 Enter your username and password, then click *Advanced*.

3 Specify the tree, context, and server information for the server you want to connect to.

4 Click the *Startup* tab, then select *Run Novell Client Login at Session Startup*.
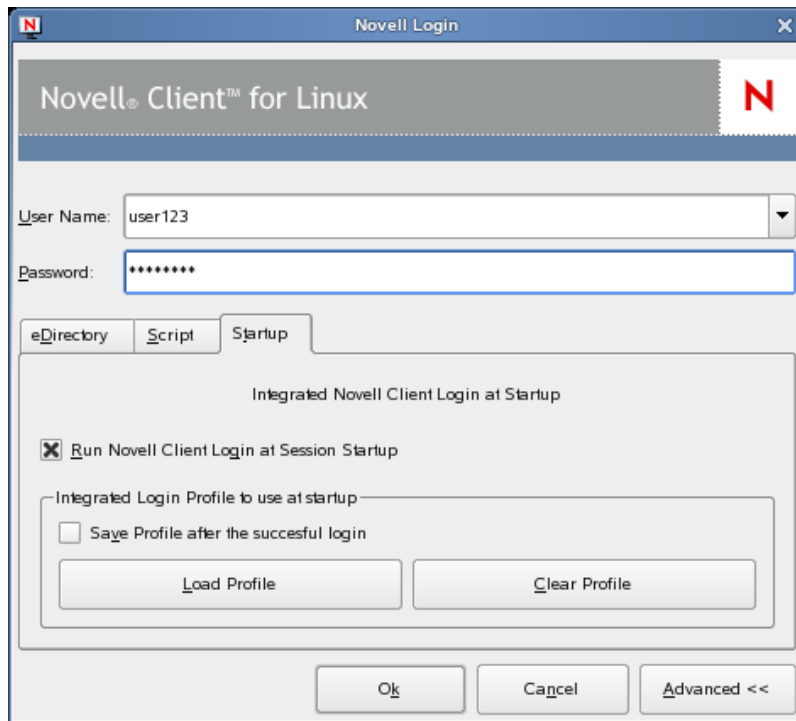
5 Select *Save Profile after the successful login* to save the Novell Login dialog settings to be used for all subsequent session logins.

You must have the *User Name* and *Password* fields and the *Tree* and *Context* fields on the eDirectory tab filled out for this to be saved.

IMPORTANT: An integrated login does not happen at the next session startup without a saved profile.

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6 (Optional) Click *Load Profile* to populate all fields in the dialog based on the saved settings.

7 (Optional) Click *Clear Profile* to remove the profile settings.

8 Click *OK* to log in to the server specified in Step 3.

4.1.3 Managing System Wide Integrated Login Settings

1 Launch the Novell Client Configuration Wizard using either of the following methods:
- Click ![N] > *System Settings*.
- In YaST, click *Network Services > Novell Client*.

2 Select *Login*, then click *Start Wizard*.

3 On the Login Settings page, select or deselect *Integrated Login*.

This enables or disables the integrated login feature for the entire system. This is set by the administrator and cannot be overridden by the user.

4 Select *Display Integrated Login Results* to display the Integrated Login Script Results window when the user desktop is launched.

If this option is disabled, all login scripts are run silently and the Integrated Login Script Results window is not displayed, but login scripts are still processed.

5 Select *Delete Integrated Login Profiles* if you want remove the existing login profiles for all users on this workstation.

6 Click *Finish*.

4.2 Setting Up Login Scripts

When a user successfully logs in to the network, one or more login scripts are executed that automatically set up the workstation environment. Login scripts are similar to batch files and are executed by Novell Login. You can use login scripts to map drives to Novell file system volumes and directories, display messages, set environment variables, and execute programs or menus.

Login scripts were originally created for use with the Novell Client for Windows. However, the Novell Client for Linux can take advantage of the majority of the functionality available in Windows. This means that the login scripts you created for Windows workstations can also be used with Linux workstations without modification, so you need to administer only one set of login scripts.

Because login scripts are very flexible and dynamic, offer a high degree of customization, and are cross-platform, you should customize the scripts to optimize workstation login to your network. For more information on setting up login scripts, see the *Novell Login Scripts Guide*.

4.3 Setting Up Login Restrictions

Login restrictions are limitations on user accounts that control access to the network. These restrictions can be set by an administrator in Novell iManager for each user's eDirectory™ User object and include the following:

- Requiring a password

  You can specify its minimum length, whether it must be changed and how often, whether it must be unique, and whether the user can change it.

- Setting the number of logins with an expired password and the number of incorrect login attempts allowed

  When a user violates login restrictions by entering an incorrect password or exceeding the number of logins with an expired password, the account is disabled and no one can log in using that username. This prevents unauthorized users from logging in.

- Setting account limits such as an account balance or expiration date

- Limiting disk space for each user by specifying the maximum blocks available for each user on a volume

- Specifying the number of simultaneous connections a user can have

- Specifying (by node address) which workstations users can log in on

- Restricting the times when users can log in (you can assign all users the same hours or you can restrict users individually)

For specific information on setting these restrictions, see the online help located in Novell iManager.

4.4 Using OpenSLP to Simplify Login

The service location protocol (SLP) was developed so that networking applications such as the Novell Client for Linux could discover the existence, location, and configuration of networked services in enterprise networks. Without SLP, users must supply the hostname or network address of the service that they want to access.

Because SLP makes the existence, location, and configuration of certain services known to all clients in the local network, the Novell Client for Linux can use the information distributed to simplify login. For the Novell Client, having SLP set up allows users to see the trees, contexts, and servers available to them when they use the Novell Client for Linux Login screen. When they click the *Browse* button, a list of available trees, contexts, or servers appears and they can select the appropriate ones. For example, instead of remembering an IP address or DNS name for a server, users can select the server's name from a list of available servers.

SLP must be activated and set up on your Novell servers in order for the Novell Client to take advantage of it. For more information, see *"SLP Services in the Network" in the SUSE LINUX Enterprise Server 9 Administration Guide* (http://www.novell.com/documentation/oes/index.html?page=/documentation/oes/sles_admin/data/sec-net-slp.html#sec-net-slp).

SLP is not set up by default on Linux workstations. The Novell Client for Linux includes a Novell Client Configuration Wizard to simplify the process of configuring your SLP and other Novell Client configuration options. The Novell Client Configuration Wizard provides only basic SLP configuration because this is all that is required by the client. However, if other applications on your workstation require more advanced settings, you can modify the /etc/slp.conf file to set advanced settings.

For more information on advanced SLP configuration, see the OpenSLP Web site (http://www.openslp.org). In addition, the /usr/share/doc/packages/openslp directory contains documentation on SLP, including a README.SuSE file containing the SUSE® LINUX details, several RFCs, and two introductory HTML documents (*An Introduction to SLP* and *OpenSLP User's Guide*). RFC 2609 details the syntax of the service URLs used and RFC 2610 details DHCP via SLP.

4.4.1 Setting Up SLP

1 Launch the Novell Client Configuration Wizard using either of the following methods:

   - Click > *System Settings*.

   - In YaST, click *Network Services > Novell Client*.

2 Select *Service Location Protocol (OpenSLP)*, then click *Start Wizard*.

3 Specify the following SLP information for your network:

   - **Scope List:** Specify the scopes that a user agent (UA) or service agent (SA) is allowed when making requests or registering, or the scopes that a directory agent (DA) must support.

   - **Directory Agent List:** Specify the specific DAs that UA and SA agents must use. If this setting is not used, dynamic DA discovery is used to determine which DAs to use.

   - **Broadcast Only:** Select this option to use broadcasting instead of multicasting. This setting is not usually necessary because OpenSLP automatically uses broadcasting if multicasting is unavailable.

SLP is designed to use IP multicasting; however, if any SLP Agent does not implement IP multicasting, then all Agents must use broadcasting to reach that Agent. If a DA does not support multicasting, we recommend using the Directory Agent List to configure that Directory Agent rather than using this option.

If the network does not contain a DA, IP servers must use their own SAs to specify the services that are available. If the SA does not support multicasting and if there are any services advertised by that SA that are needed by the UA on this machine, then use the *Broadcast Only* option.

Broadcasting has the disadvantage of being limited to the local LAN segment.

- **Maximum Results:** Specify a 32-bit integer giving the maximum number of results to accumulate and return for a synchronous request before the time-out, or the maximum number of results to return through a callback if the request results are reported asynchronously.

4 Complete the Novell Client Configuration Wizard.

5 Restart the workstation.

4.4.2 Troubleshooting SLP Configuration

If users cannot see a list of available trees, contexts, and servers when they use the Novell Client for Linux Login screen, use `slptool`, located in `/usr/bin`, to troubleshoot your SLP configuration.

After you start `slpd` (located in `/usr/sbin`), you should be able to issue a query for SLP service agents using the following command:

```
slptool findsrvs service:service-agent
```

This should display a list of the hosts that are running `slpd`, which indicates that OpenSLP is successfully installed and working. If you do not get a list, OpenSLP is not installed correctly or is not working. See Section 4.4.1, "Setting Up SLP," on page 29 for more information.

Managing File Security

5

Novell® Open Enterprise Server (OES) and NetWare® networks restrict access to network files and folders based on user accounts. For example, a user connected to the network using the Administrator account can delete or rename a file that other users can only open and edit.

The Novell file system keeps track of the rights that users have to files and directories on the network. When users try to access any file on the network, Novell File Services (NFS) either grants access or prohibits certain things that users can do with the file.

It is important to note that Linux file rights do not correlate with NFS file rights. When you copy a file from a Linux workstation to a Novell server, the only right that is preserved is the Read-Only attribute. This also occurs if you copy files from one server to another using any method other than NCOPY at the command terminal.

For more information on the specific rights on NetWare and OES servers, see "File Services" (http://www.novell.com/documentation/oes/implgde/data/filesvcs.html) in the *Novell OES Planning and Implementation Guide*.

For additional information on file system attributes, see the *File Systems Management Guide for OES* (http://www.novell.com/documentation/oes/stor_filesys/data/hn0r5fzo.html).

Rights are granted and revoked by creating trustee assignments. For more information, see Section 5.2, "Changing Trustee Rights," on page 33.

This section explains the following:

- Checking File or Folder Rights (page 31)
- Changing Trustee Rights (page 33)
- Combining Multiple Trustees (page 34)

5.1 Checking File or Folder Rights

1 In a file manager, right-click a Novell file system directory or file.

2 Do one of the following:

- **GNOME:** Click *Novell Properties*.
- **KDE:** Click *Actions > Novell Properties*.

3 Click the *Novell Rights* tab.
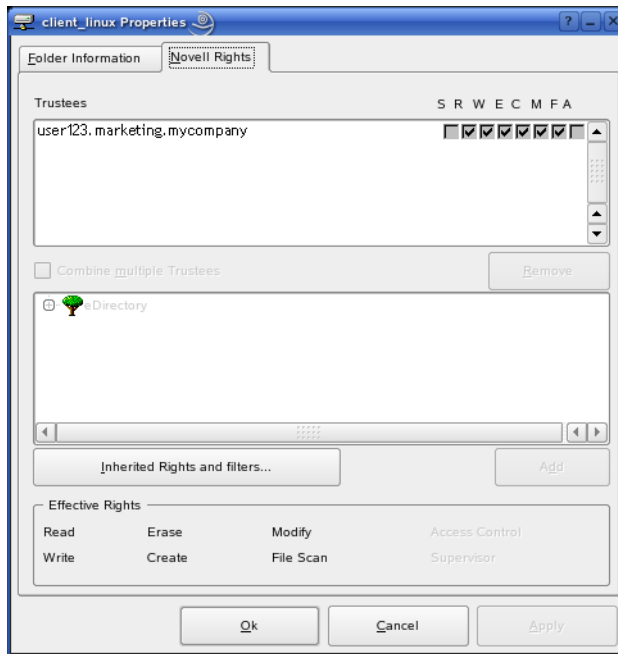
4 View the information.

The *Trustees* list shows the users or groups that have been granted rights to work with this file or folder. The trustees rights to the folder also apply to all the files and subfolders it contains unless the rights are explicitly redefined at the file or subfolder level.

The rights that each trustee has are shown by check marks under the letters. If you are viewing the properties of multiple files, the trustees and rights shown are the combined trustees and rights for all the files.

Effective Rights displays your rights for this file or folder. Users can receive rights in a number of ways, such as explicit trustee assignments, inheritance, and security equivalence (see eDirectory Rights Concepts (http://www.novell.com/documentation/edir873/edir873/data/fbachifb.html) in the *Novell eDirectory 8.7.3 Administration Guide* for more information). Rights can also be limited by Inherited Rights Filters and changed or revoked by lower trustee assignments. The net result of all these actions—the rights a user can employ—are called *effective rights*.

5 To view a list of rights and filters inherited by this file or directory, click *Inherited Rights and filters*.

All rights assignments on directories are inheritable. You can block such inheritance on individual subordinate items so that the rights aren't effective on those items, no matter who the trustee is. One exception is that the Supervisor right can' be blocked.

6 Click *OK*.

5.2 Changing Trustee Rights

The assignment of rights involves a trustee and a target object. The trustee represents the user or set of users that are receiving the authority. The target represents those network resources the users have authority over. You must have the Access Control right to change trustee assignments.

1 In a file manager, right-click a Novell file system directory or file.

2 Do one of the following:

- **GNOME:** Click *Novell Properties*.
- **KDE:** Click *Actions > Novell Properties*.

3 Click the *Novell Rights* tabbed page.

4 In the *Trustees* list, select the trustee whose rights you want to change.

5 Select or deselect the rights you want to assign for this trustee.

For each trustee in the list, there is a set of eight check boxes, one for each right that can be assigned. If a check box is selected, the trustee has that right. The following rights can be set for each trustee:

- **Read:** For a directory, grants the right to open files in the directory and read the contents or run the programs. For a file, grants the right to open and read the file.
- **Write:** For a directory, grants the right to open and change the contents of files in the directory. For a file, grants the right to open and write to the file.
- **Erase:** Grants the right to delete the directory or file.
- **Create:** For a directory, grants the right to create new files and directories in the directory. For a file, grants the right to create a file and to salvage a file after it has been deleted.
- **Modify:** Grants the right to change the attributes or name of the directory or file, but does not grant the right to change its contents (changing the contents requires the Write right).
- **File Scan:** Grants the right to view directory and file names in the file system structure, including the directory structure from that file to the root directory.
- **Access Control:** Grants the right to add and remove trustees for directories and files and modify their trustee assignments and Inherited Rights Filters.
- **Supervisor:** Grants all rights to the directory or file and any subordinate items. The Supervisor right can' be blocked by an Inherited Rights Filter. Users with this right can grant or deny other users rights to the directory or file.

6 Click *OK*.

Trustee assignments override inherited rights. To change an Inherited Rights Filter, click *Inherited Rights and filter*s.

5.3 Adding a Trustee

When you add a trustee to a Novell file system directory or file, you grant a user (the trustee) rights to that directory or file. You must have the Access Control right to add a trustee.

1 In a file manager, right-click the Novell file or directory that you want to add a trustee to.

2 Do one of the following:

- **GNOME:** Click *Novell Properties*.

- **KDE:** Click *Actions > Novell Properties*.

3 Click the *Novell Rights* tab.

4 In the tree diagram, locate the eDirectory™ user object that you want to add as a trustee, then click *Add*.

5 Set the rights for this user by selecting the boxes under the letters on the right of the *Trustees* list.

The following rights can be set for each trustee:

- **Read:** For a directory, grants the right to open files in the directory and read the contents or run the programs. For a file, grants the right to open and read the file.

- **Write:** For a directory, grants the right to open and change the contents of files in the directory. For a file, grants the right to open and write to the file.

- **Erase:** Grants the right to delete the directory or file.

- **Create:** For a directory, grants the right to create new files and directories in the directory. For a file, grants the right to create a file and to salvage a file after it has been deleted.

- **Modify:** Grants the right to change the attributes or name of the directory or file, but does not grant the right to change its contents (changing the contents requires the Write right).

- **File Scan:** Grants the right to view directory and file names in the file system structure, including the directory structure from that file to the root directory.

- **Access Control:** Grants the right to add and remove trustees for directories and files and modify their trustee assignments and Inherited Rights Filters.

- **Supervisor:** Grants all rights to the directory or file and any subordinate items. The Supervisor right can't be blocked by an Inherited Rights Filter. Users with this right can grant or deny other users rights to the directory or file.

6 Click *OK*.

5.4 Removing a Trustee

When you remove a trustee of a Novell file system directory or file, you delete a user's rights to that directory or file. You must have the Access Control right to remove a trustee.

1 In a file manager, right-click the Novell file or directory whose trustee you want to remove.

2 Do one of the following:

- **GNOME:** Click *Novell Properties*.

- **KDE:** Click *Actions > Novell Properties*.

3 Click the *Novell Rights* tab.

4 In the *Trustees* list, select the trustee you want to remove.

5 Click *Remove*, then click *OK*.

5.5 Combining Multiple Trustees

As an administrator, you might need to apply the same trustee assignments to a group of selected files. You can combine trustee assignments by selecting the *Combine multiple Trustees* option on the Novell Rights page.

For example, Kim is a trustee of FILEA and FILEB. Kim has Read, File Scan, and Access Control rights for FILEA and Read and File Scan rights for FILEB. Nancy has Read and File Scan rights for FILEA.

If you give a new user named Michael the Read, Write, and File Scan rights for both FILEA and FILEB and, at the same time, you want to give similar trustee rights for Kim and Nancy, you would select Combine Multiple Trustees. The following would then be true:

- Kim has Read and File Scan rights to both FILEA and FILEB. Her Access Control right is lost because the combined rights are based on the rights given to Michael.

- Nancy has Read and File Scan rights to both FILEA and FILEB. She has gained Read and File Scan rights to FILEB because the combined rights are based on the rights given to Michael.

- Michael has Read, Write, and File Scan rights to both FILEA and FILEB.

To combine multiple trustees:

1 In a file manager, select all the Novell files or directories that you want to combine rights for.

2 Right-click the files or directories, then select one of the following:

- **GNOME:** Click *Novell Properties*.

- **KDE:** Click *Actions > Novell Properties*.

3 Click the *Novell Rights* tab.

4 Click *Combine multiple Trustees*, then click *OK*.

Security Considerations

6

This section contains the following topics:.

6.1 Security Features

The following table contains a summary of the Novell® Client™ for Linux security features:

Table 6-1 *Novell Client for Linux Security Features*

Feature	Yes/No	Details
Users are authenticated	Yes	GUI and command line login utilities support authentication of NCP™ and LDAP connections via user authentication into eDirectory™. NCP protocol authentication is supported via RSA and LDAP authentication is supported via SSL and Simple Bind protocol.
Servers, devices, and/or services are authenticated	Yes	Connections to servers are authenticated via user-supplied credentials. No device authentication is supported directly by the Client.
Access to information is controlled	Yes	The product's Virtual File System (VFS) component (located in Linux Kernel space) is the gatekeeper for enforcement of access controls to Novell file systems.
Roles are used to control access	No	No explicit use of roles is included in this product. eDirectory alias objects can be created, but this is not considered true role-based access and is not specifically supported or administered through this product.
Logging and/or security auditing is done	No	Security logging and auditing features are not supplied by nor supported by this product.
Data on the wire is encrypted by default	No	No wire encryption is supplied by this product.
Data stored is encrypted	No	This product does not provide long-term storage of data.

Feature	Yes/No	Details
Passwords, keys, and any other authentication materials are stored encrypted	Yes	Passwords and other authentication materials in temporary storage are encrypted to prevent in-memory scanners.
Security is on by default	Yes	There are no configuration options to enable or disable with the exception of packet signing. Packet signing is enabled by default.
FIPS 140-2 compliant	No	This product currently uses the ATB (authentication toolbox) instead of Novell's NICI product. Therefore, this product is not FIPS 140-2 compliant because ATB itself is not FIPS-compliant.

6.2 Known Security Threats

The following section provides a list of known security threats for the Novell Client for Linux, an indication of how difficult it would be to exploit the threat, and what the consequences would be for a customer.

Table 6-2 *Known Security Threats*

Description	Consequence	Likelihood	Difficulty
Repetitive password cracking attempts	Intruder detection lockout	Low	Hard
"Stale" passwords	Password expiration, grace login enforcement	High	Hard
Attempted access out-of-hours or from unauthorized locations	Date/Time and Location restrictions at login	Medium	Easy
Port scanners	Unsuccessful pass of Nessus scans; possible port hijacking	Medium	Possible
Man-in-the-middle attacks	NCP request sequencing, packet signing	Low	Hard
Wire frame examination and manipulation	Same protections as with other Novell products utilizing NCP and RSA-based authentication	Low	Hard
Memory scanning for sensitive data	All buffers containing sensitive data (passwords) are short-term in nature and are zeroed and/or freed immediately after use.	Low	Hard

6.3 Security Characteristics

6.3.1 Identification and Authentication

This product uses X-Tier to authenticate users via user identity information stored in eDirectory and resource authorization and access control provided by eDirectory. The product takes a user name and password supplied directly by the user and transfers that information to X-Tier for use within its supported authentication mechanisms (via X-Tier's plug-in authentication module architecture). If configured to do so, this product will authenticate (using PAM NAM (LUM)) to eDirectory through SSL and LDAP Simple Bind Protocol.

This product does not itself authenticate to another product, system or service. No portion of this product authenticates to another.

6.3.2 Authorization and Access Control

This product allows the protections supplied by eDirectory for access control to be fully realized for those resources that are contained within eDirectory. Access to resources is protected based on user identity (as stored within eDirectory). The VFS, Daemon, and X-Tier work together to compare ACLs for a given file system path or object retrieved from eDirectory to the identity and session scope established for the identity that owns a given connection.

The VFS acts as a proxy to the local file system (via redirection of its local mount point) to make such decisions for network-based file system paths or objects.

6.3.3 Roles

This product does not define or manage roles. It simply makes use of roles that have already been defined elsewhere and treats role access privileges in the same way as any user identity.

Because the product has a VFS module running in the kernel, it does not require root access for users to create mount points (as do NCPFS and other similar open source offerings to date). The product does not require use of SETUID for any of its operations.

6.3.4 Security Auditing

No security auditing is performed by this product.

6.4 New and Modified Files

The following sections describe the files that are added or modified during the installation of the Novell Client for Linux.

6.4.1 Configuration Files

Table 6-3 *New and Modified Configuration Files*

File	New	Modified	Description
`$HOME/.novell/ncl/StartupLogin.conf`	X		Local user autologin configuration file. All fields in the Novell Login dialog box (except the password) are stored in this file.
`$HOME/.novell/ncl/MapDrives.conf`			This user configuration file specifies the drive mapping to run at startup. Integrated login is not required, but credentials must be saved or the login dialog box is displayed to get the password at desktop startup.
`/etc/opt/novell/ncl/login.conf`			Optional global configuration file that overrides defaults. This file is modified only by the root user, normally with YaST using the Novell Client Configuration Wizard for the login page (click the Novell Tray icon, select *System Settings*, and start the Login Wizard).

6.4.2 PAM Login Files

Table 6-4 *New and Modified PAM Login Files*

File	New	Modified	Description
`/lib/security/pam_ncl_autologin.so`	X		This file queries CASA credentials, verifies if autologin is allowed, verifies the user with credentials, then authenticates.
`/etc/pam.d/xdm`		X	PAM configuration file for the X Display Manager login.
`/etc/pam.d/gdm`		X	PAM configuration file for the GNOME Display Manager login.
`/etc/pam.d/kdm`		X	PAM configuration file for the KDE Display Manager login.
`/etc/pam.d/sshd`		X	PAM configuration file for SSH login.

A "required" authentication module is added for each of the above GUI logins. The added text is `auth    required    pam_ncl_autologin.so`, which is be added after the `pam_micasa.so` module (if it exists).

Authentication is not added for the two console login authentication files, `/etc/pam.d/login` and `/etc/pam.d/sshd`. This modification is done at install time and is removed at uninstall time.

IMPORTANT: For the root user, no tree authentication is performed, no automatic login scripts are run, and no drives are mapped. Therefore, the `pam_ncl_autologin.so` module always returns SUCCESSFUL, having done nothing for the root user.

6.4.3 User Profile Startup Files

Table 6-5 *New and Modified User Profile Startup Files*

File	New	Modified	Description
`/etc/profile.d/novell-ncl-autologin.sh`	X		This script determines if the desktop is GNOME or KDE, then installs (or removes) the session startup file (`$HOME/.kde/Autostart/ncl_autologin.desktop` or `$HOME/.gnome2/session-manual`) for that Display Manager.
`/opt/novell/ncl/bin/ncl_autologin.desktop`			This file is copied to `$HOME/.kde/Autostart` and runs `ncl_autologin`.

6.4.4 KDE and GNOME Desktop Startup Files

Table 6-6 *New or Modified Desktop Startup Files*

File	New	Modified	Description
`$HOME/.kde/Autostart/ncl_autologin.desktop`	X		KDE startup for `ncl_autologin`.
`$HOME/.gnome2/session-manual`		X	GNOME startup for `ncl_autologin`.
`/opt/novell/ncl/bin/ncl_autologin`	X		Validates and run `nwlogin` or `gnwlogin`.
`/opt/novell/ncl/bin/nwlogin`			This existing file silently authenticates and processes scripts.
`/opt/novell/ncl/bin/gnwlogin`		X	GUI for authentication, processing scripts, and saving settings. This file adds a new tab (called *Startup*) to the Novell Login dialog box which allows users to save their current login settings for use during the next system startup to automatically log in the user.
			When the user clicks *Clear Profile* on the Startup tab, the `$HOME/.novell/ncl/StartupLogin.conf` file is deleted.
			When the user clicks *Save Current Profile*, the settings are used to authenticate the user (but not run login scripts). If authentication is successful (CASA stores those credentials), the current settings are written to `StartupLogin.conf`.

6.4.5 Installation Files

Table 6-7 *New Installation Files*

File	New	Modified	Description
/opt/novell/ncl/bin/ delete_login_profiles	X		Run from YaST to purge all profiles.
/opt/novell/ncl/bin/ login_cfg_pam	X		Inserts pam_ncl_autologin into PAM file.
/opt/novell/ncl/bin/ login_ucfg_pam	X		Removes pam_ncl_autologin from PAM file.

6.5 Other Security Considerations

- If root is compromised, all network access could also be compromised. For example, if a malicious entity gets root access, it might be able to steal user credentials and authenticate to the network with those credentials.

Compiling the Novell Client Virtual File System Kernel Module

A

If you have updated the kernel on your workstation, you must compile the Novell® Client™ Virtual File System Kernel Module so that it works with the updated kernel. Compiling the Novell Client Virtual File System Module kernel requires the following steps:

1. Ensure that the right packages are installed on your workstation so that the kernel module can be compiled.

   See Section A.1, "Installing the Required Packages," on page 43.

2. (Conditional) Install the Novell Client software so that the kernel module pieces are on the workstation.

   See the "Novell Client for Linux 1.2 Installation Quick Start."

   NOTE: If you installed the Novell Client for Linux and the installation failed, you do not need to repeat this step.

3. Compile the Novell Client Virtual File System Kernel Module.

   See Section A.2, "Compiling the Novell Client Virtual File System Kernel Module," on page 44.

4. Restart the workstation.

A.1 Installing the Required Packages

If you want to use the precompiled Novell Client for Linux Virtual File System provided with the distribution, make sure the following packages are installed on your workstation before you install the Novell Client for Linux:

- novfs-kmp-default
- novfs-kmp-smp or novfs-kmp-bigsmp (depending on your kernel)

If you want to compile the Novell Client for Linux Virtual File System from sources provided with the Novell Client for Linux 1.2, make sure the following packages are installed on your workstation before you install the Novell Client for Linux:

- gcc
- kernel-source
- make

To install the required packages:

1 Launch the YaST Control Center.

   SLED 10 GNOME: Click *Computer > More Applications > System > YaST*.

   SUSE Linux 10.1 GNOME: Click *Desktop > YaST*.

KDE: Click the menu button > *System* > *YaST*.

2 If you are not logged in as root, type the root password, then click *Continue*.

3 Click *Software* in the left column, then click *Software Management* in the right column.

4 Click *Search* in the *Filter* drop-down list.

5 Type the name of the package you want to install in the *Search* field, then click *Search*.

6 Select the package for installation.

7 Repeat Step 5 and Step 6 for each package that you want to install.

8 Click *Accept* to install all of the selected packages.

   YaST displays the progress of the package installation.

9 (Conditional) If a message informs you that other package selections have been made to resolve dependencies, click *Continue*.

10 (Conditional) If a message prompts you to insert a SUSE® Linux CD, put the CD in the CD drive, then click *OK*.

11 After all the packages have been installed, click *Close* to close the YaST Control Center.

A.2 Compiling the Novell Client Virtual File System Kernel Module

Depending on whether or not you have a standard kernel that has been updated or a custom kernel that needs to have the Novell Client Virtual File System Kernel Module added, the steps for compiling the module differ.

- Section A.2.1, "Compiling the Novell Client Virtual File System Kernel Module After a Kernel Update," on page 44
- Section A.2.2, "Compiling the Novell Client Virtual File System Kernel Module on Workstations Running a Custom Kernel," on page 45

A.2.1 Compiling the Novell Client Virtual File System Kernel Module After a Kernel Update

If you have updated the kernel on the workstation, you must compile the Novell Client Virtual File System Kernel Module so that it works with the updated kernel.

1 In a terminal, log in as root.

2 Enter the following command:

```
cd /opt/novell/ncl/src/novfs
```

3 Enter the following command:

```
./mk_novfs
```

   The Novell Client Virtual File System Kernel Module is updated to match your updated kernel.

A.2.2 Compiling the Novell Client Virtual File System Kernel Module on Workstations Running a Custom Kernel

If you have a custom kernel on the workstation, you must compile the Novell Client Virtual File System kernel module so that it works with the custom kernel.

1 In a terminal, log in as root.

2 Unpack the `/proc/config.gz` file and copy the resulting config to the new name `/usr/src/linux/.config`.

3 In the `/usr/src/linux` directory, enter the following command:

```
make
```

> **TIP:** You might also need to enter `make -C /usr/src/linux-obj/i386/$i SUBDIRS=$PWD clean`. The easiest way to do this is to copy the `mk_novfs` script and change the BUILD_TYPE to "clean."

4 In the `/opt/novell/ncl/src/novfs` directory, enter the following command:

```
./m
```

The Novell Client Virtual File System Module is updated to match your custom kernel.

The Novell Client for Linux Commands

B

The Novell® Client™ for Linux provides a set of command line utilities that let you start and stop the Novel Client daemon, install and uninstall the Novell Client for Linux, load the Novell Client for Linux tray application, list active connections for the currently logged-in user, copy files and directories to and from Novell file systems, display or modify the attributes of files and directories on Novell file systems, log a user in to or out of a Novell file server or eDirectory™ tree, map a local file system to a remote file system on a Novell file server, and display or modify a user's trustee assignments or inherited rights filter for volumes, directories, or files.

The utilities are located in the `/opt/novell/ncl/bin` directory, and include the following:

- Section B.1, "Shell Commands," on page 47
- Section B.2, "GUI Utilities," on page 48

B.1 Shell Commands

Table B-1   *The Novell Client for Linux Shell Commands*

Utility	Description	Syntax
ncl_tray	Loads the Novell Client for Linux tray application and allows customization of the tray interface.	`ncl_tray basic_options Qt_options KDE_options`
nwconnections	Lists active connections for the currently logged-in user.	`nwconnections [--] [-v] [-h]`
nwcopy	Copies files and directories to and from Novell file systems.	`nwcopy flags -p source_path -t target_path`
nwflag	Displays or modifies the attributes of files and directories on Novell file systems.	`nwflag {-a|-n} {-w|-e eDir object|+|- attr modifier} [-s] [-d|-f] [--] [-v] [-h] URI1 {URI2} {URI3} ...`
nwlogin	Logs a user in to a Novell file server or an eDirectory tree.	`nwlogin [-u string] [-p string] [-t string] [-c string] [-s string] [-r] [-L path] [-P path] [-2 string] [-3 string] [-4 string] [-5 string] [--] [-v] [-h]`
nwlogout	Logs the user out of a Novell or eDirectory tree.	`nwlogout {-s string|-t string} [-f] [--] [-v] [-h]`

Utility	Description	Syntax
`map`	Creates a mapping (mount) from a local file system to a remote file system on a Novell file server.	`map -d drive -s server -v volume -f filespec` or `map options	parameters drive:=path	local_path:=remote_path`
`nwrights`	Displays or modifies a user's trustee assignments or inherited rights filter for volumes, directories, or files.	`nwrights flags -r +|-rights_list -o user_or_group_object -p network_path`

B.2 GUI Utilities

Table B-2 *The Novell Client for Linux GUI Utilities*

Utility	Description
`gnwconnections`	Displays the Novell Connections dialog box, which lets you see what servers and trees you are logged in to, refresh connections, set a specific tree as your primary connection, or log out of a tree or server. For more information on using this dialog box, see "Viewing Your Network Connections" in the *Novell Client for Linux User Guide*.
`gnwlogin`	Displays the Novell Login dialog box. For more information on using this dialog box, see "Logging In to the Network" in the *Novell Client for Linux User Guide*.
`gnwservers`	Displays a dialog box showing the servers you are logged in to
`gnwtrees`	Displays a dialog box showing the eDirectory trees you are logged in to.

B.3 Using the Novell Client for Linux Man Pages

Each of the utilities has a man page associated with it that contains information on the utility, such as a definition, usage, and samples. There is a known bug related to the manpath environment variable on both SUSE® Linux Enterprise Desktop and SUSE Linux. The `ncl_man` utility has been provided for convenience until the manpath bug is resolved. You should use the `ncl_man` command (instead of the traditional `man` command) to view NCL-related man pages. To do this, enter the following in a terminal the first time you want to view a Novell Client for Linux man page:

`/opt/novell/ncl/bin/ncl_man`

This modifies the manpath to allow the Novell Client man pages to be displayed.You can then access the man page for a specific Novell Client for Linux utility by entering the following:

`ncl_man utility_name`

For example:

`ncl_man ncl_tray`

In the man pages, use the PgUp and PgDn keys to move up and down. Use the Home and End keys to move between the beginning and the end of a document. To exit a man page, press q. You can learn more about the man command by entering `man man` in a terminal window.

You can also enter *utility_name* `--help` in a terminal window to access a help page for the utility.

Documentation Updates

C

This section contains information on documentation content changes made in this guide since the initial release of the Novell® Client™ for Linux. The information will help you keep current on updates to the documentation.

The documentation was updated on the following dates:

C.1 July 26, 2006

- Removed Novell Linux Desktop 9 and SUSE® Linux 10.0 as supported platforms.
- Added SUSE Linux Enterprise Desktop 10 and SUSE Linux 10.1 as supported platforms.
- Added Section 4.1, "Setting Up Integrated Login," on page 25.

C.2 December 23, 2005

- Page design reformatted to comply with revised Novell documentation standards.