



*The Telnet Server for Windows*

SLnet

## User's Manual

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# Table of Contents

Table of Contents.....	v
Preface - About This Manual.....	1
Assumptions of this documentation .....	1
Typographical conventions of this manual.....	1
SLnet and Windows Security .....	2
SLclient32.....	3
Secure Logon Capabilities .....	3
Unsecure Logon.....	3
Definitions .....	4
SLnet and Terminal Server .....	5
SLnet Defined.....	6
SLnet Features.....	7
SLnet Requirements.....	8
Installing SLnet.....	10
Welcome.....	10
License Agreement.....	11
Check for New Version .....	12
Contact Information.....	13
Enable Product .....	14
Evaluate Product.....	15
Permanently Enable Product .....	16
Configure SLnet.....	17
Select Components.....	18
Destination Directory.....	19
Ready to Install .....	21
Installation Complete .....	22
Configuring SLnet.....	23
Service Options .....	24
Console Options.....	27
User Access Control.....	32
Configuring User Accounts .....	34
Additional Options.....	35
Creating Windows User Accounts .....	37
Include/Exclude .....	39
Service Controls.....	41
Alternative Ways to Start and Stop SLnet.....	42
Registering SLnet.....	43
About.....	45
Logging onto SLnet .....	46
Exiting an SLnet Session .....	48
SLnet Terminal Emulation .....	49
SLnet Logging .....	51
Windows Event Viewer .....	51
SLnet Error Codes.....	52

SLnet Frequently Asked Questions.....	54
SLnet Tips & Troubleshooting.....	57
About SeattleLab.....	63
Index.....	65

# Preface - About This Manual

We are very interested in improving SLnet documentation and welcome all criticisms and suggestions for improvement.

This email address should only be used for issues relating to documentation, not for general technical questions. (Tech support email should be addressed to [slsupport@bvrpusa.com](mailto:slsupport@bvrpusa.com).)

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## ***Assumptions of this documentation***

This documentation assumes that you have some familiarity with the basic Windows user interface: that you know, for example, how to select an item in a list box, what a program group is, and how to double-click. We have tried not to assume further knowledge—for example, knowledge of the Telnet protocol.

To use much of the material in this documentation, you must have administrative privileges on your Windows NT/2000 system; you must either have logged on under the user name of Administrator or be a member of the Administrators user group. It is assumed that if you have these privileges you also have a basic acquaintance with the essentials of Windows NT/2000 administration. Windows NT administration fundamentals are covered in the Windows NT Resource Guide.

## ***Typographical conventions of this manual***

*Italic* type is used for items and text that may appear on your computer screen.

For example: To stop the service click *Stop*. To restart the service, click *Start*.

Text you will be instructed to enter will appear in the *Courier* font.

For example: Type: *Install*.

Important notices will be displayed entirely in **bold** text.

For example: **Note: Changes made in the Service tab will not take effect unless you click *Apply* or stop and restart the SLnet service.**

## SLnet and Windows Security

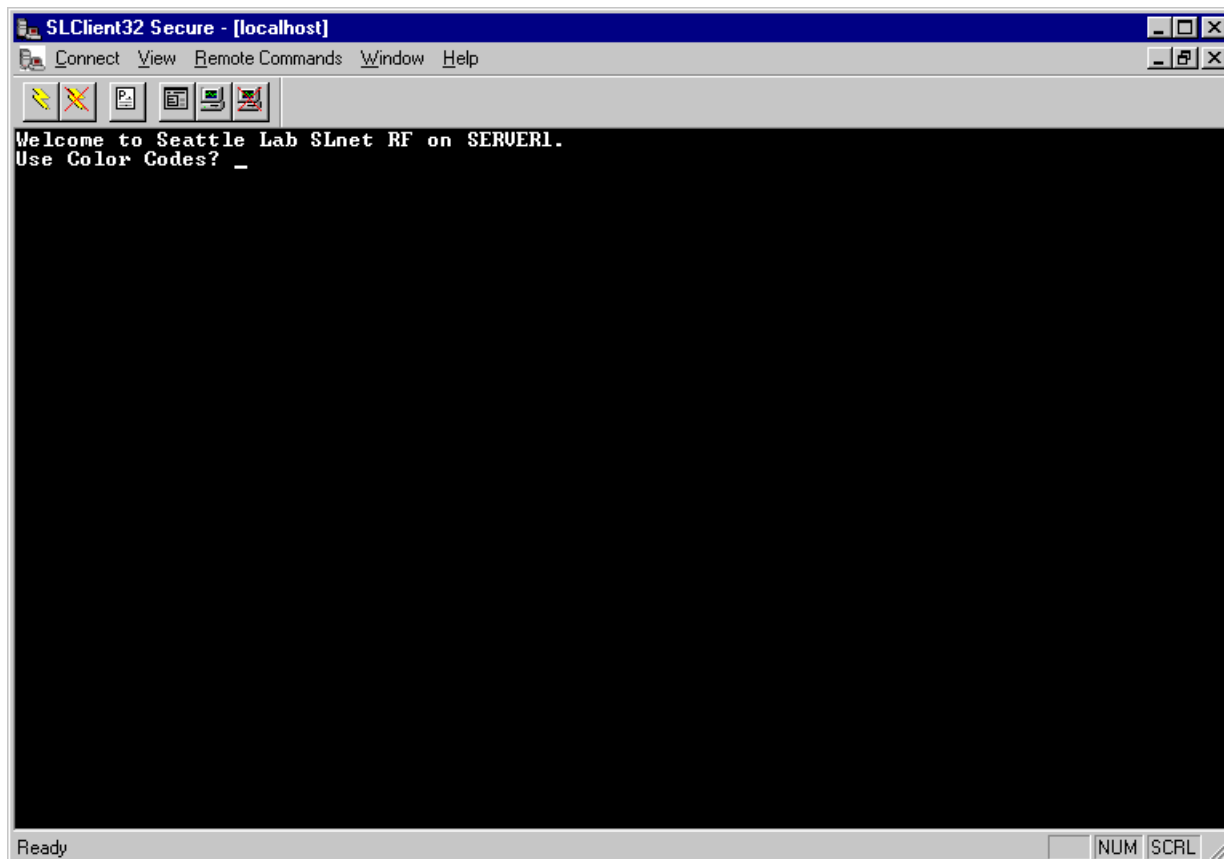
SLnet abides by all Windows security features. It does not alter nor change any security settings or privilege levels set by normal Windows mechanisms.

When a Telnet user logs into your system via SLnet, he or she must be a valid user that you or another administrator created using the Windows User Manager or Active Directory Manager. SLnet sets that user's process to run in the security context appropriate to that user. The user then has exactly the same privileges he or she would have on your machine if they sat down in front of it and logged in on the console by pressing the *CTRL ALT DELETE* keys.

Windows allows you to grant or withhold privileges on a user-by-user basis to every object on the system. Using Windows Explorer, for example, you may choose which individual users can have access to any given file you create. SLnet abides by these exact same access restrictions. It does not and cannot alter any privileges set by Windows.

## SLclient32

SLclient is a fully featured, secure 32-bit Telnet client for Windows. It is available from the Start menu by clicking *Start > Programs > SL Products > SLnet > SLclient*.



*SLclient*

### **Secure Logon Capabilities**

SLclient32 provides secure logon for SLnet users. When a user enters his or her user ID and password, SLclient32 encrypts them and sends them to SLnet where they are decrypted. This allows complete security when sending IDs and passwords over the Internet. While anyone with the right equipment can still intercept logon information when sent over the Internet, they will not be able to read it because the information is encrypted.

In a standard dialup Internet connection using Point-to-Point Protocol (PPP), the data is encrypted with a Point-to-Point Tunneling Protocol (PPTP) wrapper. This encryption is a 40-bit international or standard process. Together SLnet and SLclient32 use a stronger encryption when sending logon data; the encryption is used only for authentication, however, not general data security.

**Note: SLclient32 only works with SLnet. It will not work with any other product.**

### **Unsecure Logon**

Please note that users with the 16-bit SLclient installed on 3.1/9x machines (Windows 3.1, Windows 95 or Windows 98 operating systems) should beware that their IDs and passwords are not encrypted.

The only security risk you open to your system by installing SLnet is that when Telnet users who are **not** using **SLclient32** send passwords over their TCP/IP connection to your system, a nefarious party with a TCP/IP protocol analyzer could watch these passwords go by and use the passwords to gain unauthorized access to your system.

In most installations this is an unlikely scenario. For example, if all your users log on from your Local Area Network (LAN), evildoers would have to come onto your premises and physically attach a protocol analyzer to your Ethernet cabling in order to undermine your security.

If, however, you allow Internet connections to your network, you should be aware that malicious individuals at Internet sites between your users and you could steal your passwords and break into your system. This is the same security risk all Internet access allows, and system administrators in this position would be advised to consult the many excellent books on Internet firewalls in order to secure their sites against unauthorized access.

### ***Definitions***

**Encryption** is the process of converting a message into a ciphertext (encrypted message) using a key. The message appears jumbled to anyone not able to decrypt it. The intended recipient then uses the same encryption key to decrypt the message and read it.

**Decryption** is the process of decoding an encrypted message using the encryption key.

# SLnet and Terminal Server

SLnet has a companion product named Terminal Server that extends all the functionality of SLnet to asynchronous terminals. When you add Terminal Server to any Windows system on your network, terminals and other serial devices attached to that system can use SLnet to run character-based applications on your Windows system.

By combining SLnet and Terminal Server, your users can run DOS, OS/2, POSIX, and Win32 console applications from dumb terminals. From their terminals, they can have complete control of the Windows command shell, just as if they were sitting at the console of the machine.

A demonstration version of Terminal Server is available from SeattleLab's website, located at [www.seattlelab.com](http://www.seattlelab.com).

# | SLnet Defined

SLnet is a Telnet service for Windows.

Telnet is the standard for character-based network communications. It is a part of TCP/IP, the networking protocol of the Internet. Computer users on local area networks (LANs) and on the Internet use Telnet to connect to a remote host and execute programs on the host.

Microsoft Windows networking supports TCP/IP, and has a built-in Telnet client, but does not have a built-in Telnet service. This means that from Windows, you can Telnet *out* to run a program on other systems. But from those other systems, you cannot Telnet *in* to Windows to run programs there.

SLnet provides this functionality. When SLnet is installed on your system, you can Telnet from remote systems and run programs on your Windows system.

There are many reasons why users want to Telnet into a Windows system. Among the most popular are:

## **To remotely administer a Windows system**

To take care of a Windows system—for example, to start and stop services—you must be at the console of that system. SLnet provides the remote user the same power as the user at a console, so a system administrator whose office is several floors from the server does not have to physically go to the server to restart a service. Indeed, over a RAS connection or over the Internet, an administrator or a developer can support a Windows system that may be physically located thousands of miles away.

## **To support legacy applications**

With the phenomenal popularity of Windows, developers are moving applications from other platforms to run on Windows. These older platforms almost always use Telnet to provide their interface to users. They need SLnet to make Windows work more like the legacy platforms.

## **To run multiple users on a single Windows system**

Windows is a multi-tasking operating system, completely capable of handling multiple users running different jobs at the same time. But there is no way for multiple users to log onto an NT system. Only one user can be using the system console at a time. SLnet allows multiple users to be logged on at once. One possible use of this functionality is for multiple users to run DOS applications. With SLnet, Windows is the ultimate multi-user DOS system.

## **To run jobs where they run most efficiently**

As Wide-Area Networks and business uses of the Internet become more popular, many users are discovering that the client/server model is not the most efficient architecture for every situation. If a remote client needs to run an application that uses large amounts of data, it may be very inefficient to drag all that data over a slow link such as a telephone wire or the Internet. It can be orders of magnitude faster to run the job on the server where the data resides than to run it on the client where access to the data is slow. SLnet allows remote users to run their jobs on the server rather than on the client when it makes sense to do so.

# | SLnet Features

## **Access to Windows's Common Command Shell**

Users who Telnet into SLnet can have full access to Windows Common Command Shell. This command shell is the equivalent of the DOS command prompt, with many additional features. Users can also run OS/2 or POSIX applications from the command shell. (SLnet is completely configurable by the administrator, who can choose to disable access to the Command Shell on a user-by-user basis.)

## **Direct Access to Custom Applications**

SLnet offers you the power to define default custom applications for users as soon as they log in.

## **Security**

Users run in their own appropriate security context, with all their own permissions in place, just as if they had logged in from the main console. This completely preserves all Windows C2 security features.

## **Secure Logon**

SLclient32 encrypts user IDs and passwords for secure logon over the Internet.

## **Terminal emulation**

SLnet provides ANSI terminal sequences (compatible with the VT-100 and VT-220) for cursor positioning and formatted screen handling.

## **Logging**

SLnet leaves a record in the Windows event log every time a user connects or disconnects, along with a record of what process the user executed and the resulting code from that process.

## **Integration with SeattleLab Terminal Server for Terminal Support**

By connecting SLnet to SeattleLab's Terminal Server, you can extend the complete Windows functionality to asynchronous terminals and other serial devices. On a system with both SLnet and Terminal Server installed, a user from a terminal connected to the Windows box can run DOS commands or any character-based application.

## **Remote Administration of SLnet Telnet Server**

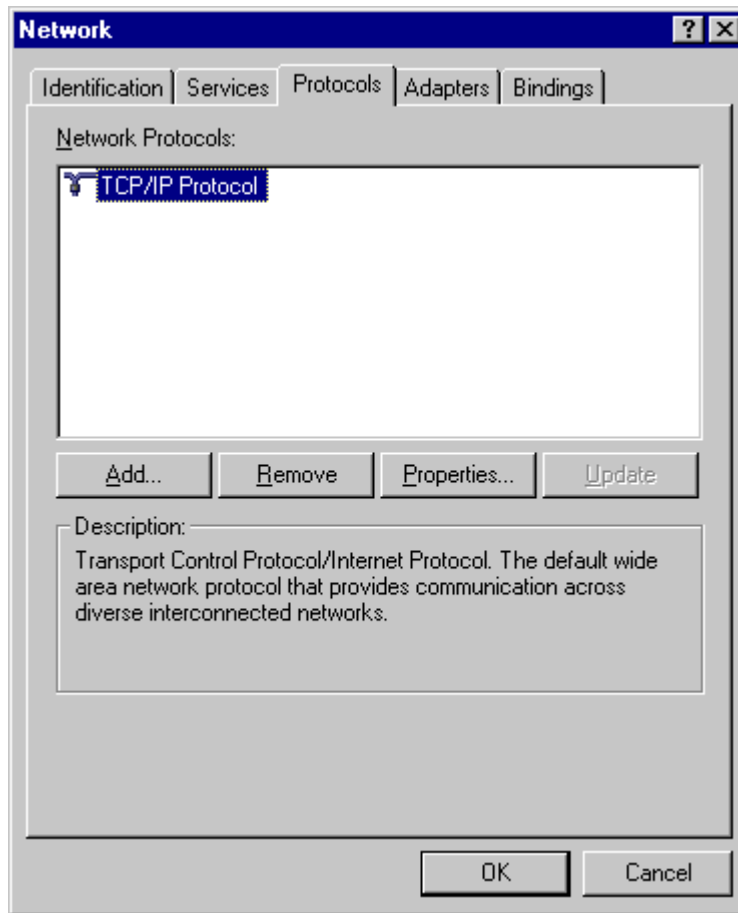
SLnet can be remotely administered by using the Run command.

# SLnet Requirements

SLnet requires Windows NT 4.0/2000/2003. If you need to support Windows NT 3.51 or DEC Alpha CPU, please call SeattleLab.

**Note: If you are using Service Pack 4 of NT 3.51, you must disable the Create Private Desktop option for SLnet to function. See the section on "Service Options" for details.**

The TCP/IP protocol must be installed on your system for SLnet to function properly. This protocol is included with the Windows operating system but is not always installed on all systems. You can check if TCP/IP is installed on your system by choosing *Network* from the *Control Panel* and then selecting the *Protocols* tab as illustrated below. If TCP/IP is installed on your system it should show up in the list of Installed Network Software.



**Network Settings Dialog in the Windows Control Panel**

The SLnet service uses only a minimal amount of system resources, requiring two megabytes of system RAM per user logon and one megabyte of disk space in your root system directory (the directory where Windows is installed on your system).

Each individual SLnet user will require an additional megabyte of system memory. The additional memory requirements of specific user applications, which may consume any amount of memory, should also be taken into account when tabulating system requirements.

SLnet is a CPU-intensive service. Monitoring virtual consoles to export changes across the Telnet interface consumes more and more system resources as you add more and more users.

The two crucial variables, then, in determining the total number of SLnet users your Windows system can support will be based upon a combination of your system CPU speed and memory limitations.

# Installing SLnet

Before installing SLnet, you must first log on as a member of the Administrator's user group.

To start the SLnet installation process:

If you have purchased the CD-ROM, place the disk in the CD-ROM drive, click the *Start* button, then *Run*, select the drive that contains the media, and execute the file `SETUP.EXE`.

If you downloaded the SLnet self-extracting file from SeattleLab's website, choose the *Run* command from either the task bar or Program Manager, choose the directory in which the self-extracting file was saved, and execute the file.

## Welcome

Setup will display a welcome screen identifying itself as the SLnet Installation and asking you to click *Next* to continue.



**SLnet Installer Welcome Screen**

The License Agreement screen will appear next.

## License Agreement



### **SLnet License Agreement Screen**

After reading the complete SLnet License Agreement, click **Yes** to continue the installation process.

## Check for New Version

If you are connected to the Internet, the SLnet installation wizard will ask you whether you want to check with SeattleLab to ensure that you are installing the most current version of SLnet. (It is best to ensure that you are installing the most current version.)

**Note: If you are not connected to the Internet, make sure that you leave the box unchecked. Otherwise, the installation process will trigger your dialup connection. If you have no way of connecting to the Internet, the installation will freeze, and you will have to quit installation and start over.**

If the check box is greyed, it may indicate that the TCP/IP settings for DNS are incorrect.



**Check for New Version Screen**

If you are not installing the current version of SLnet, the installation wizard will ask you whether you would like to launch your web browser to the SLnet upgrade page.

Click *Next* to continue.

## Contact Information

Unless you are downloading from SeattleLab's website and have already provided contact information, the installation wizard will ask you for it now. This information is not released to anybody outside of SeattleLab; it is used to inform you of updates to SLnet.

The image shows a screenshot of a Windows-style dialog box titled "SLnet Installation". The dialog box has a blue title bar with a close button (X) in the top right corner. On the left side, there is a vertical black bar with a white starry background and a circular logo in the center. The logo features the letters "SL" in red and white, with "SEATTLE" above and "LAB" below in blue. To the right of the logo, the text "Contact Information" is displayed in a large, bold, italicized font. Below this, a smaller line of text reads: "Please enter the following contact information. This information will be kept strictly confidential by Seattle Lab." There are three text input fields: "Name:" with the placeholder text "Your Full Name", "Email:" with the placeholder text "Email Address", and "Phone:" with the placeholder text "Phone Number including the country code". At the bottom right of the dialog box, there are two buttons: "Next >" and "Cancel".

**Contact Information Screen**

After filling in the text boxes, click *Next* to continue.

## ***Enable Product***

The wizard will next ask you whether you prefer to register SLnet or evaluate the product. If you already have your serial number and authorization code, click the *Register* button. Then click the *Enable* button.

Alternatively, you may register later from the Registration tab of the SLnet Configuration Control Panel. (See the section on Registering SLnet later in this documentation for details.)



***Enable SLnet Screen***

If you wish to visit Seattle Lab's online store at this time, check that option. The installation wizard will launch your web browser and direct it to the store. Should you choose to pay for the product at this time, you can pay on-line and the serial number and authorization code will be emailed to you within two business days.

## ***Evaluate Product***

If you wish to evaluate the product, check the *Evaluate* button and the following screen will appear.

Free technical assistance is available during your 14-day evaluation period.



***Evaluate Product Screen***

## Permanently Enable Product

Registration requires you to enter two values. The first is your *Serial Number*. You receive your serial number from SeattleLab when you purchase SLnet. In most cases, it is the same as your invoice number. You should record your serial number in a safe place because you will need it to receive technical support. The serial number consists of numerical digits.

The second number required is your *Authorization Code*. (In the past, this was referred to as your *Registration Key*.) This code is provided to you by SeattleLab when you pay for your copy of SLnet. The authorization code is tied to your serial number and will not work with any other copy of SLnet. The authorization code is a string of up to eight hexadecimal digits. Hexadecimal digits include the ten decimal digits and the letters A-F. If your code includes these letters, you may enter them in either upper or lower case. You should record your authorization code with your serial number. You should not need it again unless you need to completely reinstall SLnet.



**Permanently Enable Product Screen**

Click *Register* to continue installation.

See Registering SLnet for information on how to register the product after it has already been installed.

## Configure SLnet

Whether you have chosen to register the product or evaluate it, the installation wizard will now provide a configuration screen that it has automatically filled in.

It is best not to change any of the information within the dialog boxes.

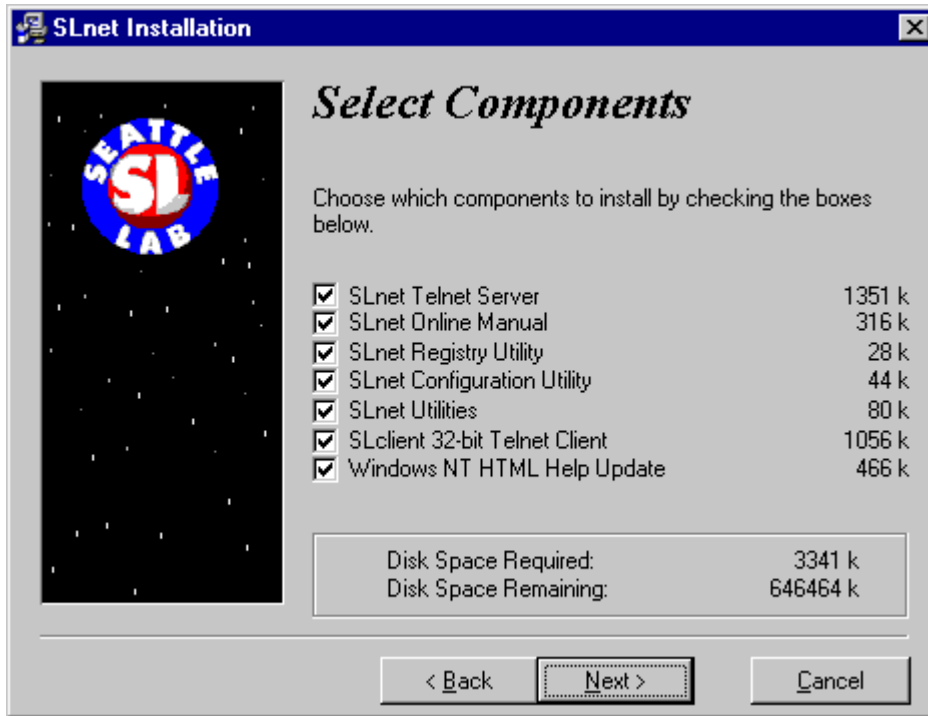


**Configure SLnet Screen**

Click *Next* to continue to the Select Components screen.

## Select Components

The Select Components screen will allow you to choose which of the SLnet components you wish to install. By default, all components are installed. Click *Next* to continue.

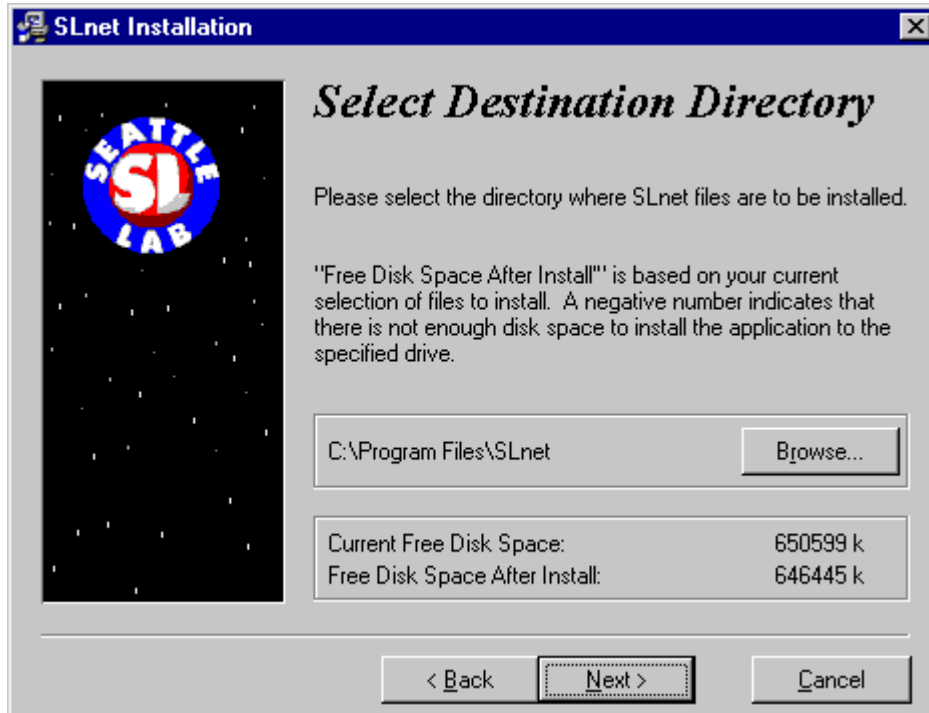


**Select Components Screen**

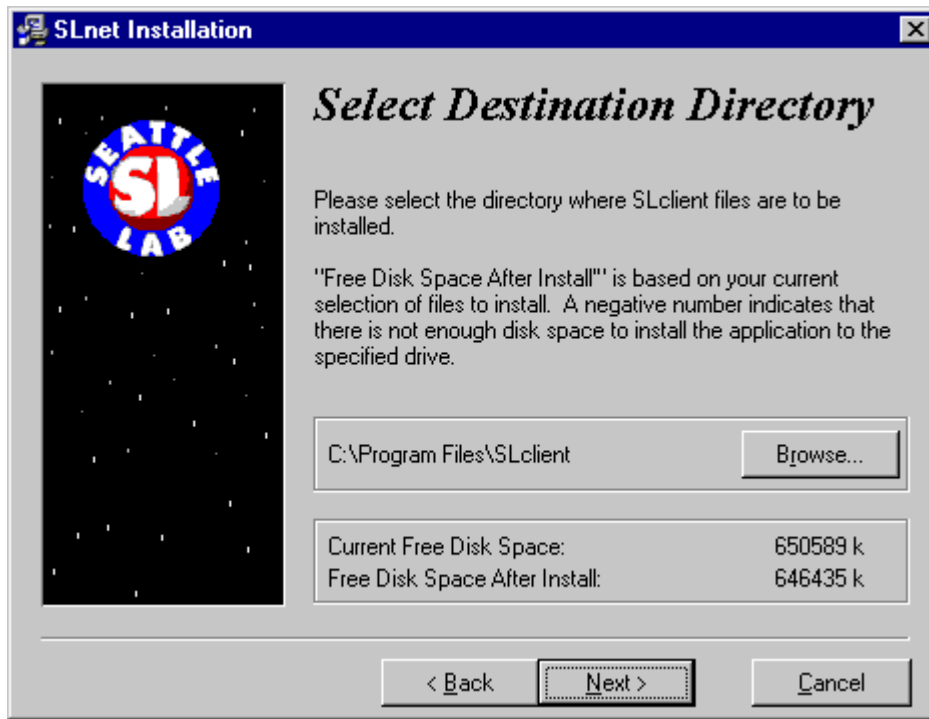
## Destination Directory

If a previous installation has **not** been detected, the Select Destination Directory dialog box will open, asking you to select the directory where you want the **SLnet** files to be installed. To install the application to the default location, click *Next*.

Alternatively, you may click *Browse* to select a different destination directory. After highlighting the alternative destination directory, click *Next*.



A second Select Destination Directory dialog box will open next, asking you to select the directory where you want the **SLclient32** files to be installed. Click *Next* to install the application to the default location.

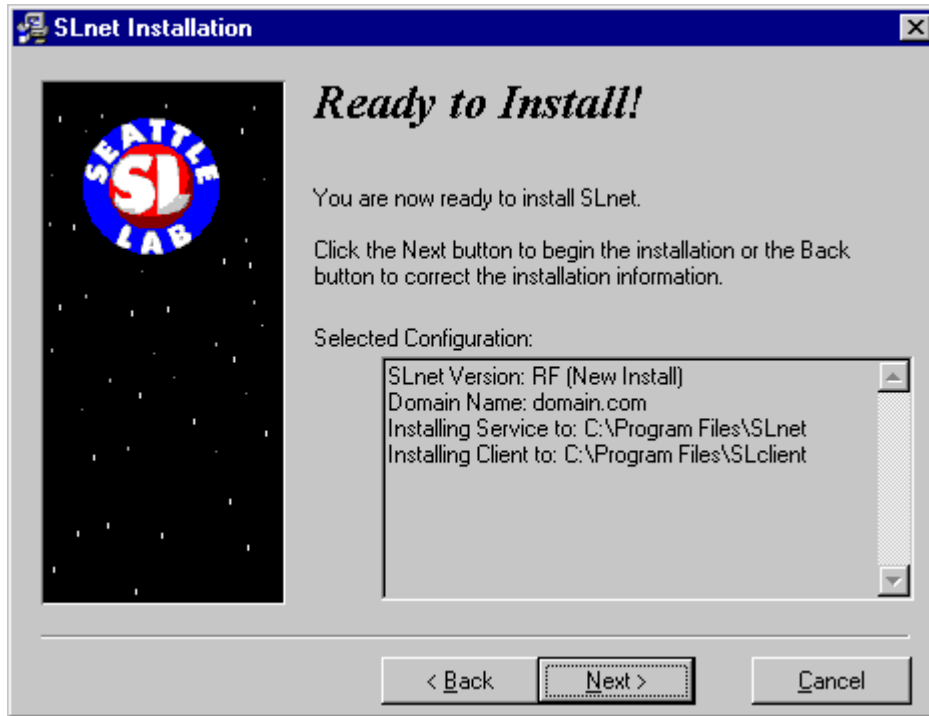


***SLclient Destination Directory***

Alternatively, you may click *Browse* to select a different destination directory. Click *Next* after highlighting the alternative destination directory.

## Ready to Install

The Ready to Install screen provides information about the selected configuration. If you wish to change any of the information, click the *Back* button.



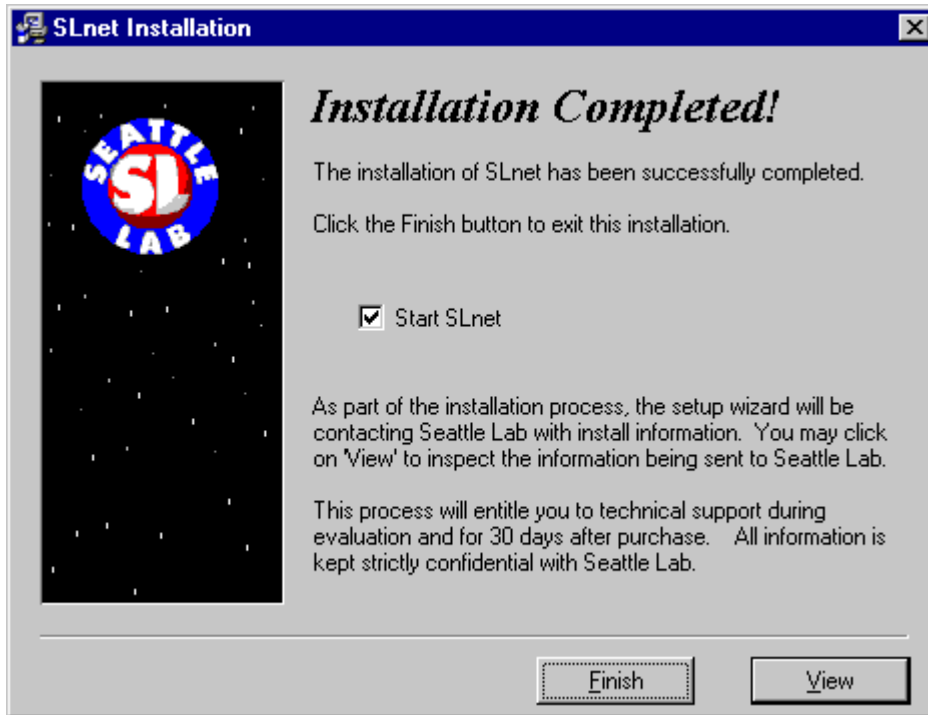
### Ready to Install Screen

To complete installation, click the *Next* button. A progress indicator (not illustrated) will appear.

If the installer detects that the SeattleLab Telnet Service is already running, it will ask you if you would like to stop the service and perform an upgrade. You must stop the service to perform the upgrade. Click *Yes* to continue.

## ***Installation Complete***

The following screen will appear upon completion of installation. To view the information being provided to Seattle Lab, click the *View* button. You have the option of starting SLnet at this time by checking the *Start SLnet* check box. Click the *Finish* button.



***Installation Completed Screen***

# Configuring SLnet

All SLnet configuration and maintenance is performed centrally from the SLnet Configuration Control Panel. This control panel may be accessed either directly from within the system control panel or from within the SLnet program group. Simply double-click the *SLnet Configuration* icon to open the application.

**Note: In order for you to configure SLnet, you must be logged on with Administrator privileges.**

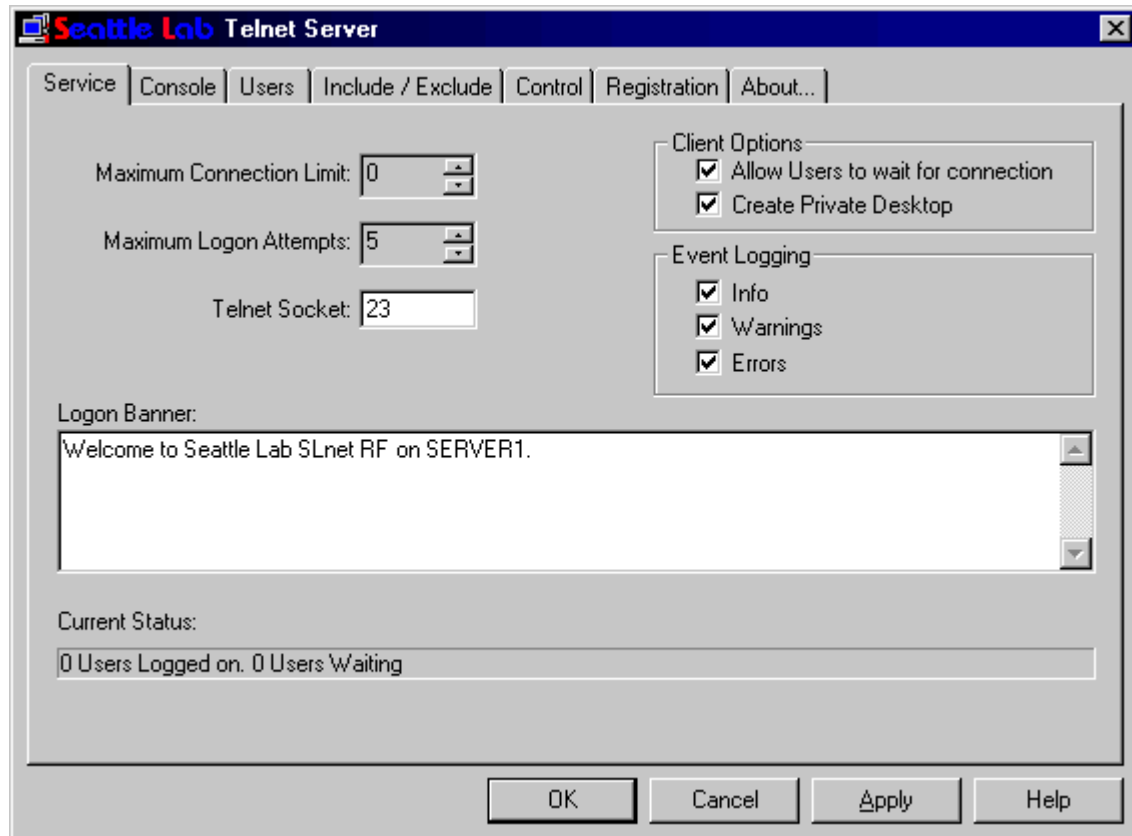
The SLnet Configuration Control Panel offers complete control of SLnet operation through seven different dialog tabs: Service, Console, Users, Include/Exclude, Control, Registration, and About. The following is a brief description of the function of each tab. In-depth documentation of the proper operation of each tab will follow later in this manual.

- The **Service** tab allows you to control service access parameters.
- The **Console** tab is used to optimize console application performance.
- The **Users** tab allows you to specify valid user accounts.
- The **Include/Exclude** tab allows you to specify ranges of IP addresses that may and may not use SLnet to connect to your system.
- The **Control** tab allows you to start, stop or pause the SLnet service.
- The **Registration** tab is used for registering or relicensing SLnet.
- Finally, the **About** tab provides information about SLnet and contacting SeattleLab.

**Note: Changes made in the Service tab will not take effect unless you click *Apply* or stop and restart the SLnet service.**

# Service Options

From the Service tab of the SLnet Configuration Control Panel, you can set parameters that govern the operation of the SLnet service.



**Service Tab**

## Maximum Connections

The Maximum Connection Limit field allows you to configure how many SLnet connections are allowed at any one time. The default setting for this field is 0 (zero); this permits as many machines to connect as you are licensed for. This also allows **unlimited** maximum connections. Should you wish to change the number of machines allowed to log on, simply change the value in this field.

## Allow Users to Wait for Connection

Unless the Allow Users to Wait for Connection check box is checked, all additional users over the limit prescribed in the *Maximum Connection Limit* field who attempt to log on will see the message: "There are currently too many Telnet sessions. Please try again later." They will then be returned to the Telnet prompt.

If the *Allow Users to wait for connection* check box **is** checked, however, users will not be immediately returned to the Telnet prompt. Instead, they will be asked whether they would like to wait until a Telnet session becomes available. This option is enabled by default.

## Create Private Desktop

In its normal operation, SLnet creates a private desktop for each individual user that logs on. A private desktop is essentially an invisible MS-DOS console that does not appear in the main system window nor the task list. For a user logged onto the main Windows system console, the work of SLnet users is virtually unnoticeable.

For the SLnet user, work appears to take place on an MS-DOS console. Because Windows is a multi-tasking operating system, it can theoretically support an infinite number of these connections.

If the Create Private Desktop function is disabled, a command window will open on the desktop of the computer running SLnet each time a user logs onto SLnet.

The Create Private Desktop function is enabled by default.

### Maximum Logon Attempts

The Maximum Logon Attempts field allows you to set the number of times the system will allow you to enter incorrect user IDs or passwords before returning you to the Telnet prompt. The default is 5. If you leave this setting at 5, a user has five chances to enter a correct user ID and password before being returned to the Telnet prompt. It should be reiterated that SLnet will never take precedence over Windows own security. Therefore, if you have activated NT's account lockout policy and wish to avoid locking out forgetful SLnet users from your system, ensure that the value for SLnet's *Maximum Logon Attempts* is never set higher than the NT value.

### Telnet Socket

The Telnet Socket field allows you to set the TCP/IP socket on your machine that the SLnet service monitors for Telnet client connections. The default is socket 23. This is the Telnet socket. Telnet services and clients use socket 23 by default. You should only need to modify this socket if you already have another Telnet service using socket 23. If you have Telnet clients that are capable of being configured to use alternate sockets, you could configure some clients to use socket 23 to reach the other Telnet server and some clients to use an alternate socket to reach SLnet.

Note that some sockets are reserved for other services. Internet RFC 1060 lists the assigned sockets. Excerpts from this RFC are included on your Windows system in the following file:

```
%systemroot%\system32\drivers\etc\services
```

Here *%systemroot%* indicates the directory in which Windows is installed.

It is important, however, to emphasize that this is only a general guide to finding free sockets, and only experimentation will prove that an alternate socket you choose is not in use by another service on your network.

**Note: Changes you make to the Telnet Socket in the Service Options do not take effect until you restart the SLnet service.**

### Event Logging

SLnet uses the Windows Application Log in the Event Viewer to keep a record of everything it does by entering messages as events occur. By default, SLnet logs three types of events: Info, Warnings and Errors. Info messages (such as which user logged on) are the least serious and Errors (such as your demo copy of SLnet has expired) are the most serious. Uncheck any type of event that you do not want entered in the Application Log. (See the section on SLnet Logging in this documentation for more information.)

**Note: While the Event Viewer is used to display these messages, the database it is stored in is the Windows Event Log.**

### Logon Banner

The Logon Banner is displayed when users first connect to SLnet. The banner shown is an example that displays a brief welcome message and the software version followed by the machine name. The default banner is created during the install process, but can be easily altered once installation is completed. The multi-line banner can be as many as 2,048 characters long.

**Current Status**

At the very bottom of this tab, SLnet's current status will appear listing both the number of current users logged on and the number of users waiting for a session to open.

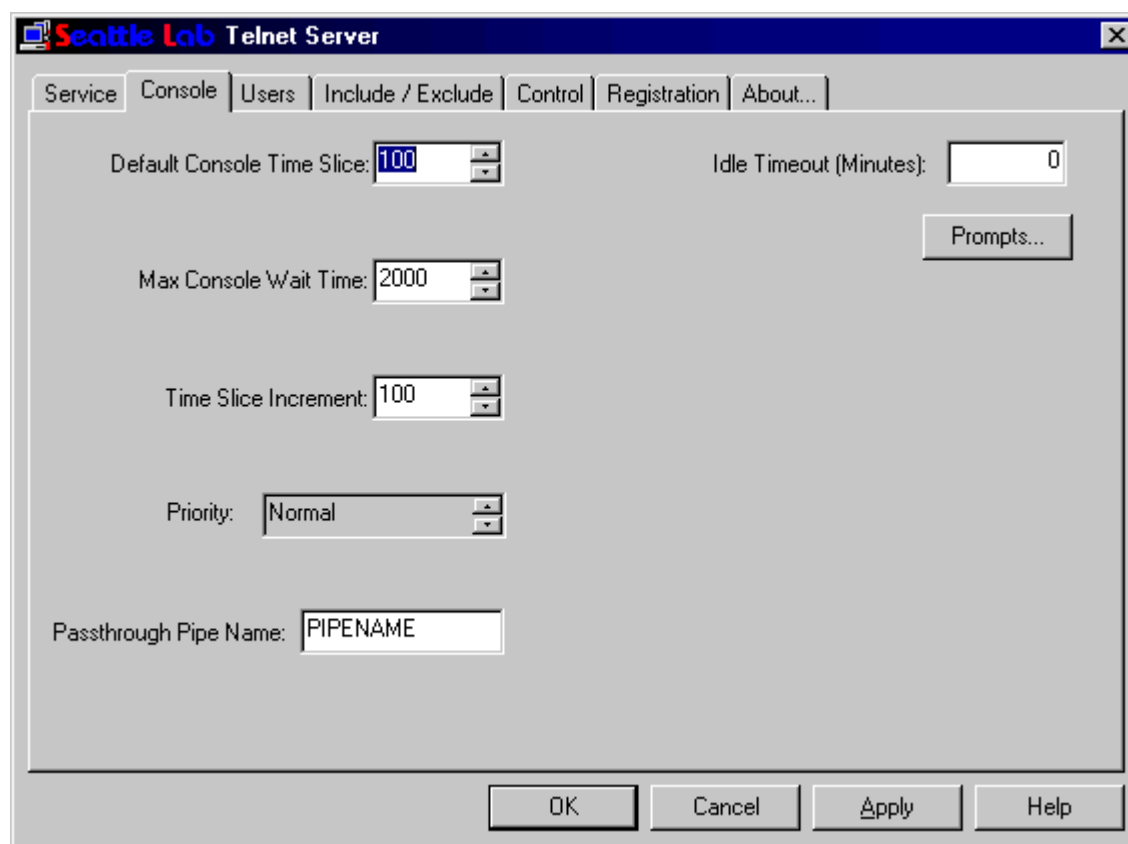
# Console Options

The Console tab of the SLnet Configuration Control Panel allows you to set internal parameters used in the virtual consoles created by the SLnet service. For most use, you should not need to adjust these parameters. Doing so will change performance, latency, and throughput of SLnet and your Windows system as a whole.

When an SLnet user is running a task on a virtual console on the Windows system, the SLnet service monitors the screen buffer of that console for changes, so that those changes may be sent over Telnet to update the screen of the client.

If SLnet monitors these changes too infrequently, the user will experience sluggish and choppy performance. If SLnet monitors those changes too frequently, it will consume too much of the system's resources and reduce the performance of the SLnet user's task and all other tasks running on the system.

The algorithm used by SLnet to attempt to optimize these conflicting constraints is to begin polling relatively frequently, and to poll progressively less frequently when no screen activity is detected. The parameters used by this algorithm are those exposed in the *Console* tab of the SLnet Configuration Control Panel.



**Console Options Tab**

## Console Time Slice, Wait Time and Increment

SLnet begins by polling at the *Default Console Time Slice*. If no screen activity is observed, it increases the polling period by the value set in the *Time Slice Increment* field until it reaches *Max Console Wait Time*. Whenever screen activity is observed, SLnet returns the polling period to the *Default Console Time Slice*. All times are in milliseconds. The defaults are those pictured above.

SLnet begins by polling every 750 milliseconds. If no activity is observed, it increases the time slice by 750 milliseconds each time slice until it reaches a maximum of 30 seconds. As soon as activity is observed, it returns the time slice to 750.

These parameters should provide acceptable responsiveness to SLnet users as well as an acceptable load on the system as a whole. If you wish to experiment, SLnet may be made more responsive by decreasing the Default Console Time Slice, the Max Console Wait Time, and the Time Slice Increment. (Decreasing the Max Console Wait Time gives you the lowest benefit at the highest cost, since it controls how many resources SLnet is consuming when the user is not doing anything.)

You can decrease the amount of system resources SLnet consumes by increasing the Default Console Time Slice, the Max Console Wait Time, and the Time Slice Increment. Note that if you excessively increase the Max Console Wait Time, users may be led to believe that their process is hung.

SLnet will disregard values outside a range that allows it to function. The range is set as follows:

Parameter	Minimum Value	Maximum Value
Default console time slice	500	1,000
Max console wait time	500	60,000
Time slice increment	250	1,000

### Priority

The Priority option allows system administrators to customize response time for users connected to the SLnet service. In most cases, the default setting of "Normal" is sufficient.

You should be very cautious about changing the priority of your processes. It is possible to severely impact the performance of other processes—including the Windows desktop—if the settings are not properly set.

### Pipe Name

The Passthrough Pipe Name field allows you to customize the environment variable name of the main pipe used by SLnet. The default name for this field is *pipename*.

SLnet works with unmodified off-the-shelf character applications by reading the console output buffer at periodic intervals, noting any changes made in the buffer, translating those changes into a character stream, and directing that character stream to the Telnet socket. The character stream contains ANSI escape sequences for cursor control to correctly format the screen. This design allows SLnet to support the widest possible range of third-party products, without requiring customers to make any modification to their software.

For customers who have the ability to modify their software, however, or who are writing new software, SLnet provides a more direct output connection.

This connection takes the form of a Named Pipe. There are two advantages to using direct output to the named pipe:

1. It is more efficient, allowing given hardware to support more processes in addition to allowing for each process to complete more quickly.
2. It allows support for non-ANSI terminal emulations.

The SLnet Named Pipe can be handled in the following way:

When SLnet creates a process, it places the name of the pipe it creates for that process in a variable in the process's environment. The Pipe Name field defines the name of this environment variable. To read this environment variable from C code, a program could call the `getenv` function. The name received from the environment can then be used in a call to the API `CreateFile` (which in Win32 is used to open files and other devices as well as to create them).

If your application shells out to run other applications that do not know about the Named Pipe, you should close the pipe, and SLnet will return to screen-scraping mode. When your application regains control, it can then re-open the pipe. The Win32 API `CloseHandle` is used to close the pipe:

Characters may be directed to the named pipe by calling the Win32 API function `WriteFile`.

The following C code sample demonstrates how to open the SLnet Named Pipe directly.

```
#include <fcntl.h>    /* Needed only for _O_WRONLY definition */
#include <io.h>
#include <stdlib.h>
#include <stdio.h>
#include <string.h>

void main (void)
{
    char PipeName[256];
    char *EnvPipeName;
    char Temp[256];
    int PipeHandle;
    int BytesRead;

    EnvPipeName = getenv ("PIPENAME");

    /*
    ** the pipename on NT is \\.\pipe\<>pipename> where <pipename> is the value stored
    **in the PIPENAME environment variable set by SLnet
    */

    if (EnvPipeName){
        sprintf (PipeName, "\\.\pipe\\PIPE\\%s", EnvPipeName);
        PipeHandle = open (PipeName, _O_WRONLY);
        if (PipeHandle == -1) {
            printf ("Error: Unable to open the named pipe %s.\n", PipeName);
            exit (-1);
        }

        sprintf (Temp, "This program now controls the output to the terminal\n Type
'exit' to end.\n");

        write (PipeHandle, Temp, strlen (Temp));

        while ((BytesRead = read (0, Temp, 256)) { /* File handle 0 is standard in or
the keyboard */
            if (BytesRead == -1) /* an error occurred */
                break;

            if (strnicmp (Temp, "exit", 4) == 0) /* The user chose to exit */
```

```

        break;
        write (PipeHandle, Temp, BytesRead);
    }
    close (PipeHandle);
} else {
    printf ("SLnet is not running\n");
}
exit (0);
}

```

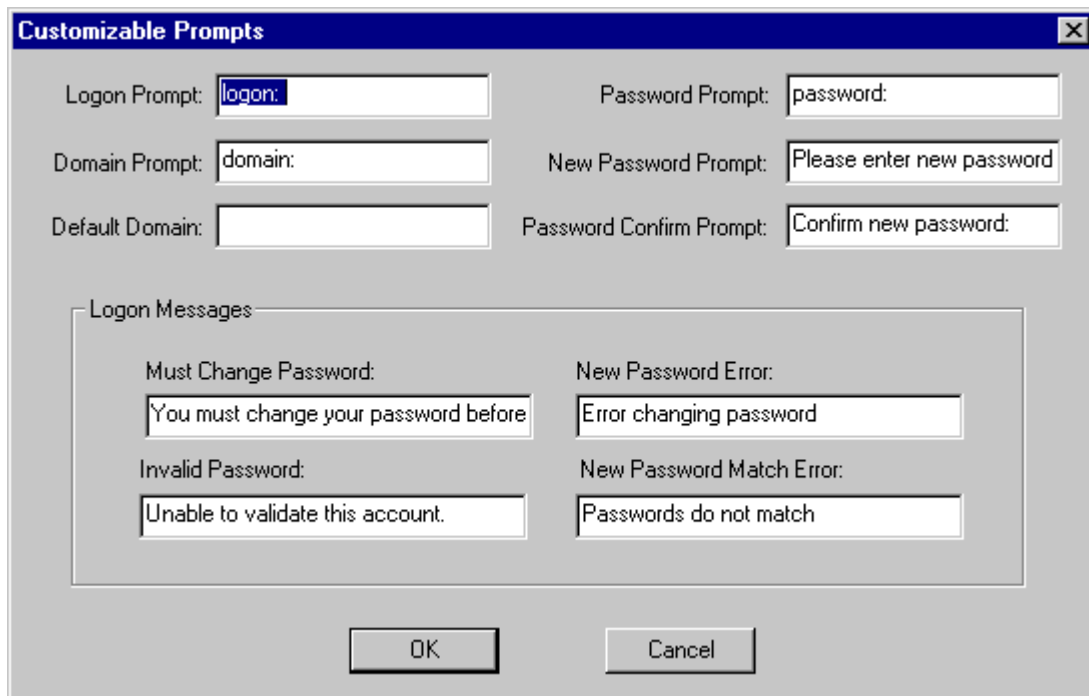
**Idle Timeout (Minutes)**

This option is disabled by default. You may set *Idle Timeout* for as many minutes as you choose, however. If there is no activity from a client in the amount of time entered, SLnet will close the process.

Example: Suppose you cannot back up your system if there are processes running. If your users have a habit of not logging off at the end of the day, you can set this option in order to end the processes so that you can backup your system.

**Customizable Prompts**

To customize the prompts the user sees when connecting to SLnet, click on the *Prompts* button within the *Console* tab to bring up the Customizable Prompts screen illustrated below.



**Customizable Prompts Screen within the Console Tab**

**Logon Prompt**

To change the Logon Prompt that users see when they log on, simply enter the text you wish the users to see in the dialog box. For example, if your users are more accustomed to Unix systems, you can change the logon prompt to "Login" in this dialog box.

**Domain Prompt and Default Domain**

The Domain Prompt text box asks the user for the domain they wish to access. The user must answer the question if you have more than one domain. If you enter the domain name in the *Default Domain* box, users will not see a domain prompt of any kind, and SLnet will access the default domain automatically.

However, if your users need to access more than one domain, use the existing prompt or enter a new prompt in the text box. In this case, make sure the Default Domain box remains empty.

**Note: Enter your domain name, not your Internet domain name.**

**Password Prompt**

Enter the prompt you wish the user to see when prompted for a password in this text box. For example, if users are assigned a password that coincides with their employee number, you may change the prompt to read, "Please enter employee number."

**New Password Prompt**

You may change the prompt text that requests a new password from the user in this text box.

**Password Confirm Prompt**

You may leave the default text here or, for example, change it to "Please reenter new password."

**Logon Messages**

*Must Change Password* informs the user that the Windows server requires them to change their password immediately.

*Invalid Password* informs the user that SLnet is unable to validate their password.

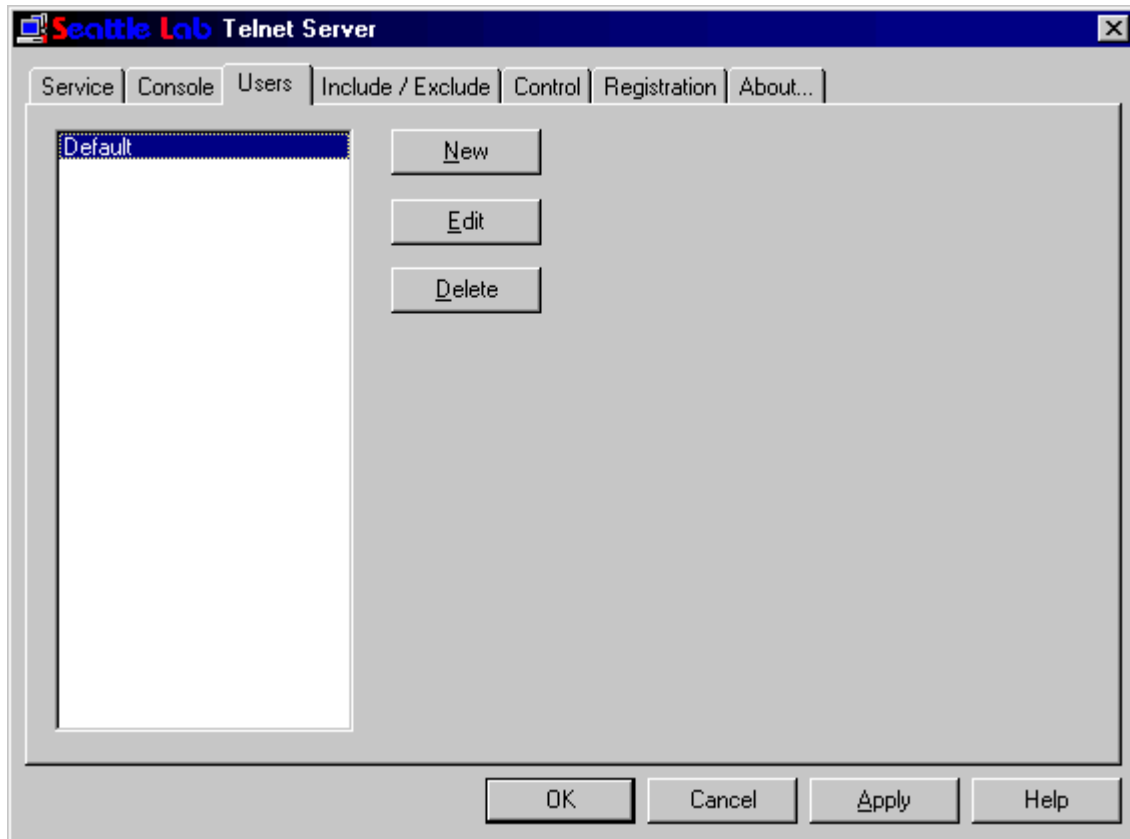
*New Password Error* informs the user that there was an error in changing their password.

*New Password Match Error* informs the user that their new password was not entered correctly the second time.

Click *OK* when you are satisfied with any changes you have made on this screen. Click *Cancel* to reset the screen to its former state.

# User Access Control

The Users tab of the SLnet Configuration Control Panel allows you to decide which users should be allowed to connect to your Windows system via Telnet.



## **Users Tab**

All valid SLnet users are based upon existing Windows user accounts. For more information on creating new user accounts, please see [Creating Windows User Accounts](#) in this documentation.

The only further requirement to be a valid SLnet user is that you have rights to log on locally. Essentially, if a user can log onto the local system console, they can use SLnet.

When SLnet is first installed, the users list that appears in the Users tab will default to a configuration named "Default." This is the configuration that will be used for any user who logs onto SLnet but does not have a custom profile.

If the "Default" configuration is ever removed, only individual users who have been specifically added to the SLnet user list will be allowed to log on via SLnet.

Most system administrators will find the "Default" setting adequate. All the users the administrator has validated will now be given SLnet access. You may, however, wish to grant access to SLnet on a user-by-user basis. To do so is a simple two-step process:

First, if you wish only those specifically defined in the SLnet user list to have access rights, begin by removing the default setting by highlighting *Default* in the user list and clicking *Delete*. (At this point, because no other individual users exist in the SLnet user list, no users will be allowed to access your system using SLnet.)

Second, to add new users for later individual modification, click *New* to open the Add New User window. From this window, enter the name of any previously created system user. Each user name entered from this window will be added to the User list. Only the users that appear in this user list will be able to access your system using SLnet.



***Add New User Dialog***

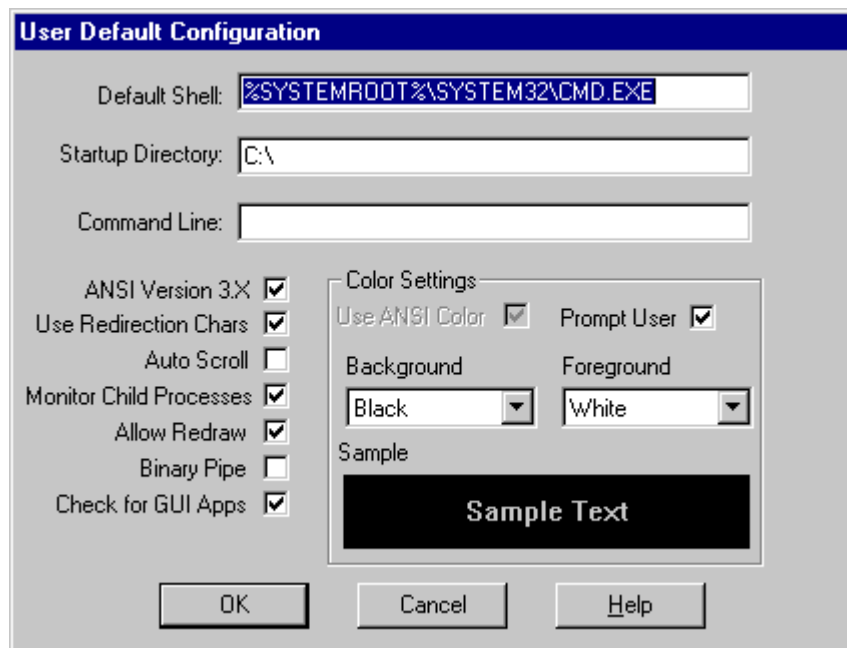
For example, if you wish to allow only Derek and Larry to access your system via Telnet, highlight the *Default* user and click *Delete*. Then click *New*. When the system presents the Add New User dialog box, type `Derek` in the text field and click *OK*. After repeating this process once more for Larry, the revised user list will be complete. Only Larry and Derek will have power to access the system through SLnet.

**Note:** In the above example, both Larry and Derek have had user accounts previously created that Windows recognizes. User accounts on your system or in your domain, therefore, must have been created using the Windows NT User Manager or Active Directory Manager. (See *Creating Windows User Accounts* in this documentation) Nothing in SLnet bypasses Windows security. To be granted access to your system using SLnet, a user must have first been granted access to your system by the normal Windows mechanisms.

## Configuring User Accounts

SLnet allows you to define system access on a user-by-user basis. It also allows you to automatically customize the start for each user. You may, for example, decide that all users are presented with the Windows Common Command Shell or, alternatively, you may specify the shell on a user-by-user basis. You may choose to allow Larry access to the command shell but deposit Derek directly into the main menu of your application.

To edit a user's settings, simply highlight the user's name in the User list box of the User tab, then click *Edit*. This will produce the User Configuration screen for that particular user.



**SLnet User Configuration Screen**

The *Default Shell* field should be left as configured upon installation of SLnet. This default path allows access to the system command shell, which is the same command prompt you see from your console when you click the MS-DOS icon in the Main program group. Opening the command shell allows console applications to run properly as well as giving access to the prompt in the command shell if desired.

If you would prefer that users be taken directly to your own custom application, you can specify the directory and application in the appropriate text boxes.

The *Startup Directory* field is the path to the directory that the user will first appear in immediately after logging on. For a custom application (or any application other than the command shell), enter the full path for the directory that holds the application you wish to run.

The *Command Line* text box is used to enter the application that you wish to invoke. The application must reside in the directory specified in the Startup Directory text box. Enter the filename in the text box preceded by a switch command (*/c* or */k*).

**Note: You must include either the */c* or */k* switch in the *Command Line* text box for the application to run properly.**

For example, if you were executing the batch file `test.bat`, which resided in the `test_2` directory in the `test` directory in the root of `C`, you would enter `c:\test\test_2` in the *Startup Directory* text box and `/c test.bat`

in the *Command Line* text box. Please see the cmd.exe help file for additional information about invoking applications from the command shell.

The complete paths for both the *Default Shell* and *Startup Directory* fields must be entered in the format of either the Universal Naming Convention (UNC) or drive letters. That is:

c:\myapp.exe	is okay, and
\\servername\sharename\myapp.exe	is okay, but
\myapp.exe	is insufficient.

**Note: In both cases the paths entered must be local. Any drive letters entered must be for non-network drives and any UNC domains must be for local share points without security.**

In the *Command Line* text box you can include any other parameters that would normally be included on the command line. For example, in the above case if DIR were entered in the *Command Line* field, users would automatically receive a directory of \users\default each time they logged on.

## Additional Options

In the bottom left corner of the User Configuration window will appear seven additional user options. Each option may be enabled or disabled by simply clicking the adjacent check box. The default installation settings for these options are adequate for the most common use. There should rarely be any need to alter these options from their defaults and doing so may risk SLnet system integrity.

### ANSI Version 3.x

This option is used for terminal emulators supporting ANSI version 3 or better. When enabled in terminal emulators that support version 3 this option will increase the speed of screen refreshes. If you are unsure whether your terminal emulator supports this option, activate it and if the screen colors aren't displayed properly, disable it. This option will be disabled by default.

### Use Redirection Chars

This option determines whether non-printable characters (characters less than 32 decimal) are mapped to printable characters. The 32 non-printable characters will be converted to printable characters based upon the following table. When a non-printable character is encountered, the printable equivalent will be substituted in its place. If this option is disabled, all non-printable characters will be represented with spaces. This option will default to enabled.

Decimal	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Non-Printable Character	☺	☻	☼	☽	☾	☿	♁	♂	♀	♁	♂	♀	♁	♂	♀
RNT Equivalent	@	*	n	*	*	\$	*	o	*	o	o	o	!		*

Decimal	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Non-Printable Character	▶	◀	↑	⇄	↓	§	■	↑	↑	↓	→	←	L	↔	▲	▼
RNT Equivalent	>	<		#	#	\$	-		^	v	>	<	-	%	^	v

### Auto Scroll

If the Auto Scroll option is enabled, when a character is output to the last position on the screen (the 80<sup>th</sup> column of the 25<sup>th</sup> row), the screen scrolls up. Most Telnet clients support auto scrolling. If the Telnet client is set to perform scrolling, the Auto Scroll option should be disabled in SLnet to prevent incorrect screen formatting. This option will default to disabled.

### **Monitor Child Processes**

When this option is enabled any child processes that are spawned by the user's primary application will also be monitored by SLnet. With this option, SLnet can insure that all user processes are properly stopped before exiting. It should be noted that some applications will not run if this option is enabled. If an application functions directly from the NT system console but will not function with SLnet, disable this option. This option will default to enabled.

### **Allow Redraw**

This option, when enabled, will clear the screen if you switch from screen scraping mode to using a custom name pipe. This option will default to enabled.

### **Binary Pipe**

If this option is enabled, all translation of characters in the input stream is disabled. This would be appropriate, for example, for users writing custom communications software such as a file transfer protocol. This option will default to disabled.

### **Check for GUI Apps**

SLnet will function with all character-based applications. This includes, but is not limited to, MS-DOS, POSIX, and Win32 character based applications. SLnet will not support any Windows applications with graphic user interfaces. Normally, if a character based Telnet user inadvertently launches a Windows application, they will have no way to control it since interaction requires a window. If this option is enabled, SLnet will notify users before opening any Windows-based applications. User may then click the *Y* key to terminate the application or *N* to continue. This option requires that the *Monitor Child Processes* option also be enabled. This option will default to enabled.

### **Color Settings Box**

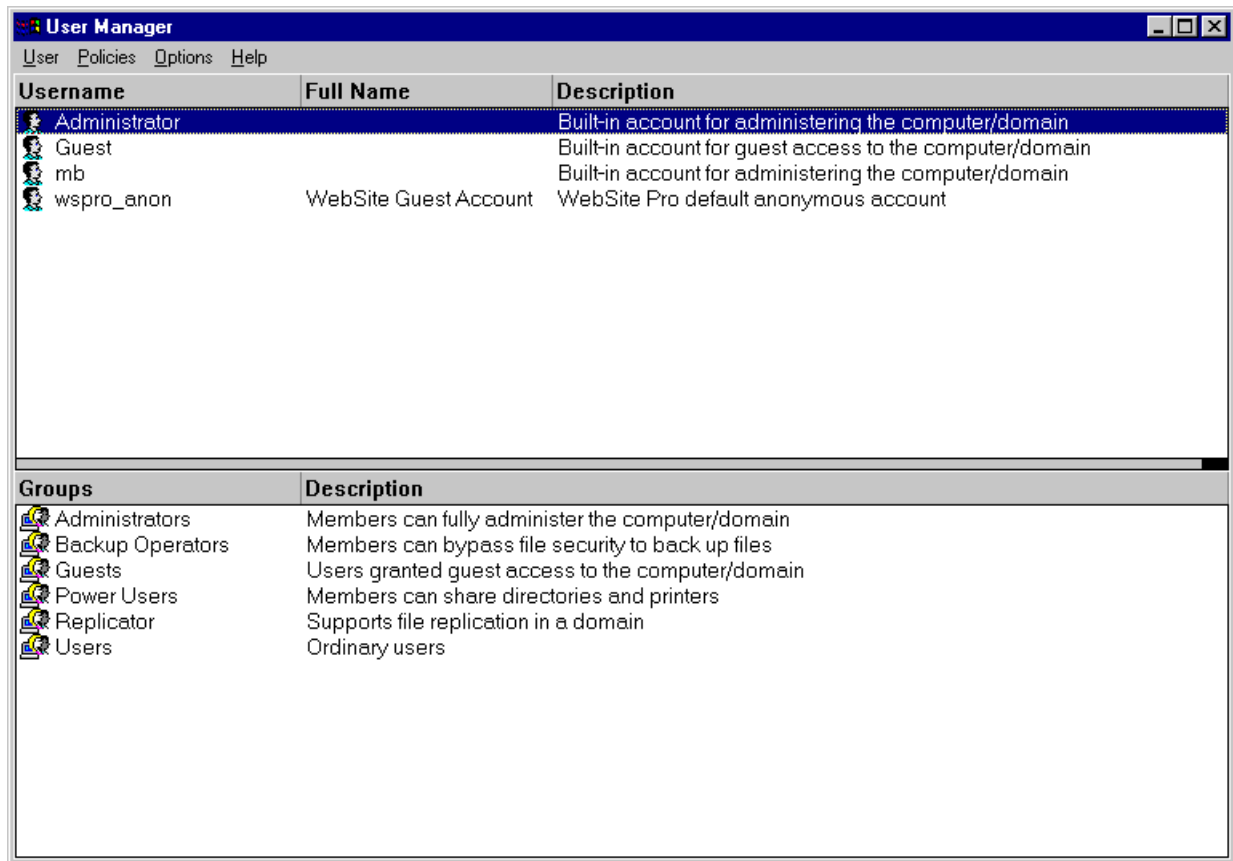
The display settings for a specific user's terminal may also be controlled through the options found in the Color Settings Box of the Edit Configuration screen. Here, an administrator can control background and foreground colors for each user, as well as ANSI color usage.

To alter either the foreground or background colors for a user's display click the appropriate drop-down menu and select the desired color scheme. A sample of how the text will display appears immediately below. Use the two check boxes at the top of the Color Settings box to control default ANSI color usage. These options may be changed manually by the user after logging on.

**Note: Changes made in the User Configuration window do not take effect until the next time the user logs on.**

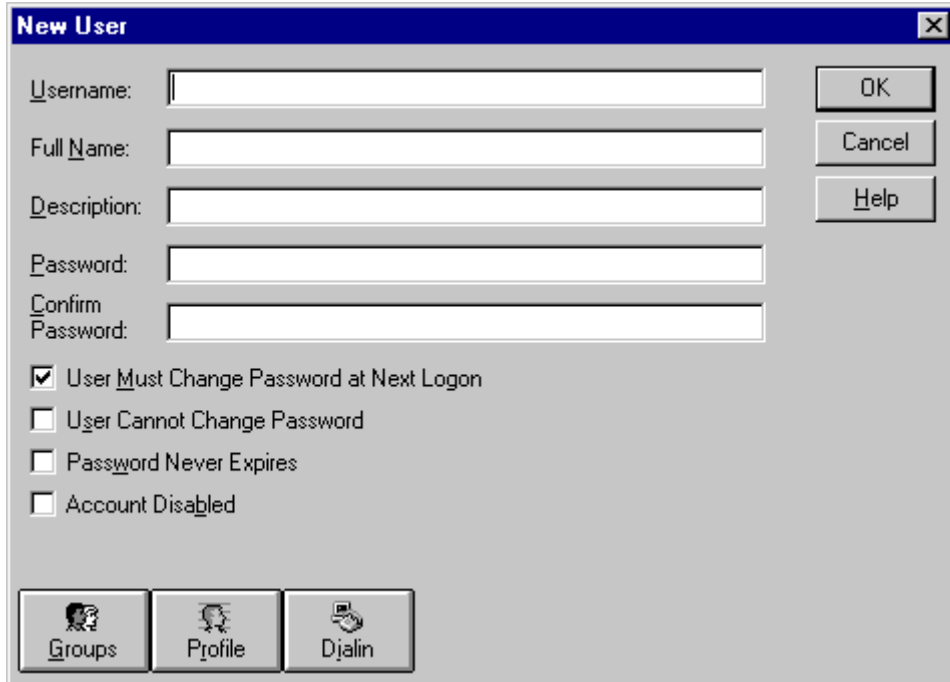
# Creating Windows User Accounts

To create a new user account for Windows — and therefore SLnet—or to alter the rights of an existing user account, simply open the *User Manager* found in the Administrative Tools program group. You must be a member of the Administrators user group to create or alter user accounts.



## *NT User Manager*

To create a new user account, choose the *New User* option from the *User* drop-down menu. In the New User dialog box, enter the appropriate information for the new user account.



**Windows NT New User Dialog**

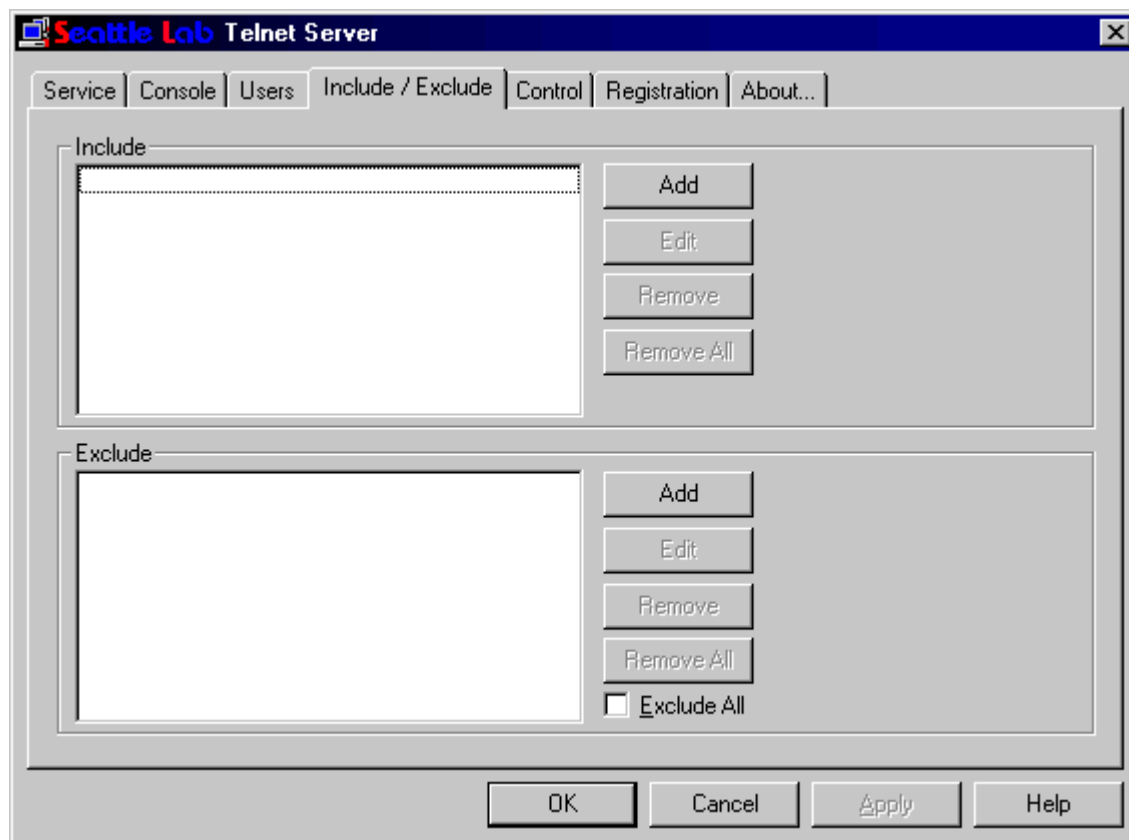
By default, all new users will automatically be members of the *Users* group that is granted access to the local console. To change the current group membership for a new user account, click *Groups* to open the Groups settings dialog.

To alter the current rights for an existing user, simply double-click the desired account found in the *User Name* portion of the *User Manager* window. This will open the *User* dialog for that specific account.

To modify the rights for a user group, choose the *User Rights* options from the *Policies* drop-down menu. From this dialog you may mix and match various system rights, such as *Log On Locally*, with any user group.

# Include/Exclude

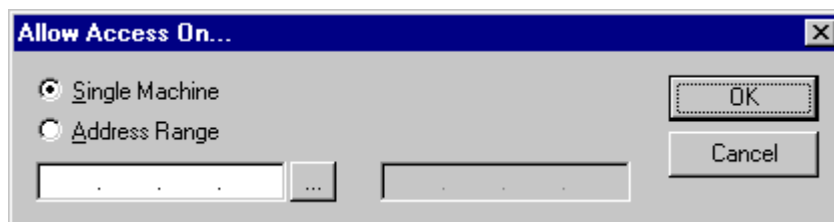
The Include/Exclude tab of the SLnet Configuration Control Panel allows you to specify ranges of IP addresses that may and may not use SLnet to connect to your system.



**Include/Exclude Tab**

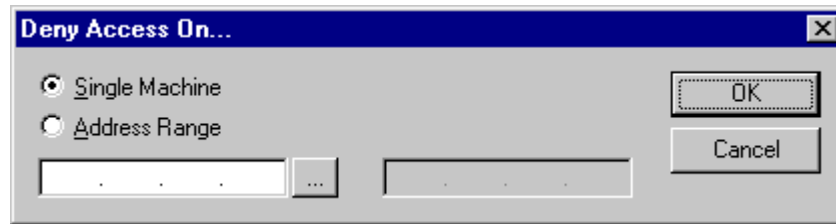
An IP (Internet Protocol) address specifies individual systems on the TCP/IP network. Using this tab, you can specify individual systems or ranges of systems for which SLnet access should be allowed or disallowed.

For example, if you wish to only allow SLnet access from a single system, perhaps that of the system administrator, check the *Exclude All* box in the exclusion section, and, using the *Add* button in the inclusion section, type <the IP address> of the single system for which SLnet access should be allowed.



**Allow Access Dialog**

If, to give another example, you wish to allow SLnet access from any system in the world other than that of a malicious hacker who has been vexing your organization, you would use the *Add* button in the exclusion section to type in <the IP address> of the system for which SLnet access should be disallowed.

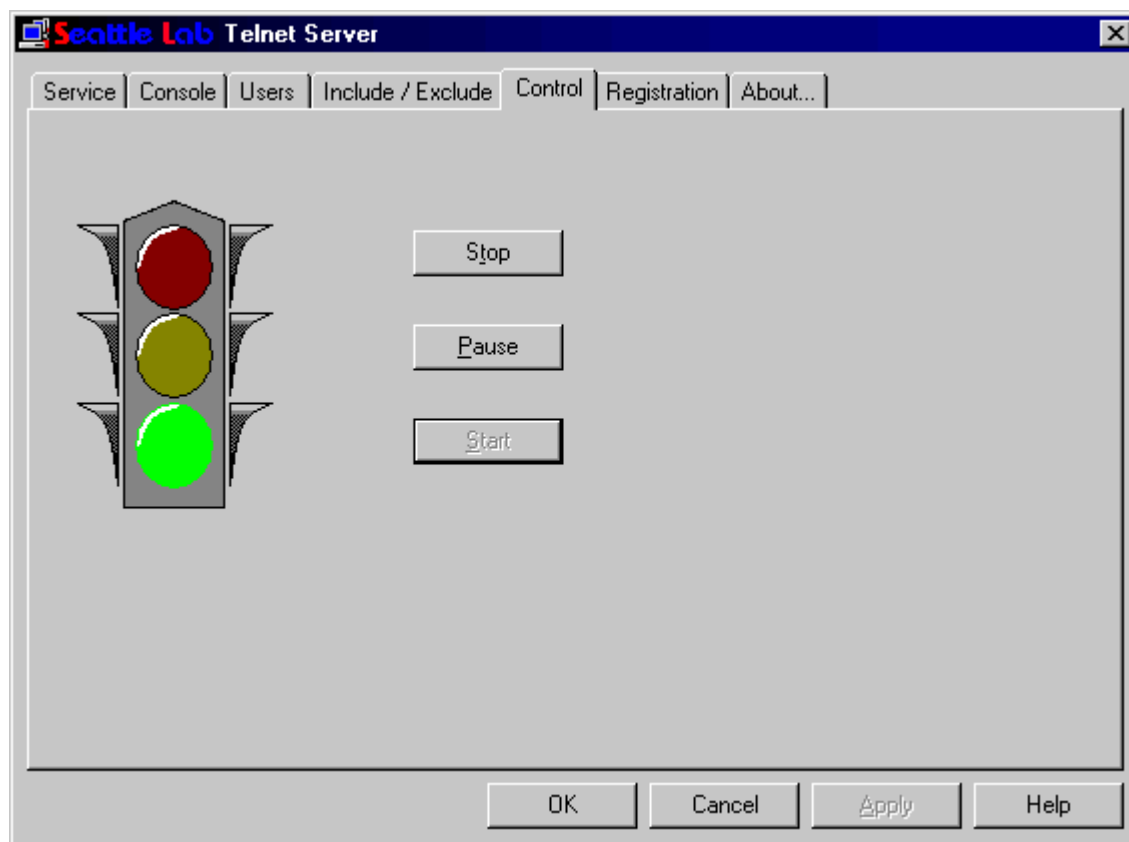


*Deny Access Dialog*

**Note:** You can specify either single systems or address ranges. If you specify an address range for exclusion, you may also specify a single address or a subrange within the excluded range for inclusion.

# Service Controls

The Control tab of the SLnet Configuration Control Panel allows you to start, stop and pause the SLnet service.



**Service Controls Tab**

You can stop the SLnet service by clicking *Stop*. If you stop the SLnet service, the service is completely inactivated. It is removed from memory and is no longer listening on the Telnet socket. Telnet users who attempt to connect to your Windows system will receive a connection refusal message.

**Note: You should not stop the SLnet service while SLnet users are connected to your system.**

You can temporarily pause the SLnet service by clicking *Pause*. A yellow light (middle) indicates that the service has been paused. When paused, all current users will be allowed to continue normally but no new users will be allowed to log in.

You can start the SLnet service by clicking *Start*.

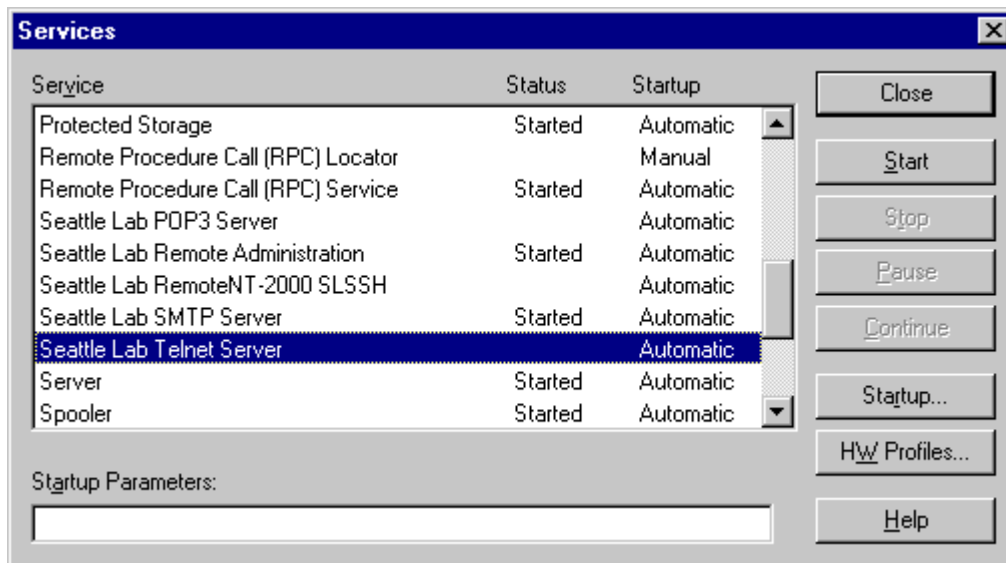
By looking at the Service tab of the SLnet Configuration Control Panel, you can tell whether the service is running. If the service is running, the *Start* button will be grayed out and the green (top) light will be on. If the service is not running, the *Stop* button will be grayed out, and the red light (bottom) will be on.

## Alternative Ways to Start and Stop SLnet

The SLnet service can also be controlled from the Services applet in the system control panel. In the *Services* scroll box, choose *SeattleLab Telnet Server*. You may then start, stop or pause the service.

To set the SLnet service to start whenever the system is started, do the following: (SLnet setup sets the service to do this by default.)

- Select *SeattleLab Telnet Server* from the services scroll box.
- Click *Startup*.
- In the Services startup dialog, select *Automatic*.
- Click *OK*.
- Click *Close* to exit the Services applet.



**Control Panel Services Applet**

You may, of course, reverse this procedure to set SLnet to be started manually, or to completely disable the service so that it may not be started at all.

Finally, SLnet can also be started or stopped directly from the Windows Common Command Shell. To start SLnet from the Common Command Shell, type `net start slnet`. To stop the service, type `net stop slnet`.

This means that if you have the appropriate privileges, you can potentially stop the SLnet service remotely from a SLnet client. If you do so, of course, there is no way to start the SLnet service using a Telnet client.

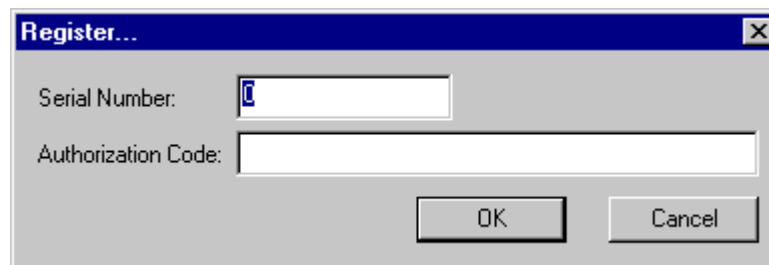
# Registering SLnet

SLnet must be registered or it will cease to function two weeks after installation. If you did not register your copy of SLnet during the initial installation process, you may register it later from the Registration tab of the SLnet Configuration Control Panel, illustrated below.



**Registration Tab**

Click the *Register* button. The following dialog screen will appear.



**Registration Dialog**

Enter the Serial Number and Authorization Code and click *OK*. The number of users it is licensed for will now be displayed in the Registration Tab under the dialog box.

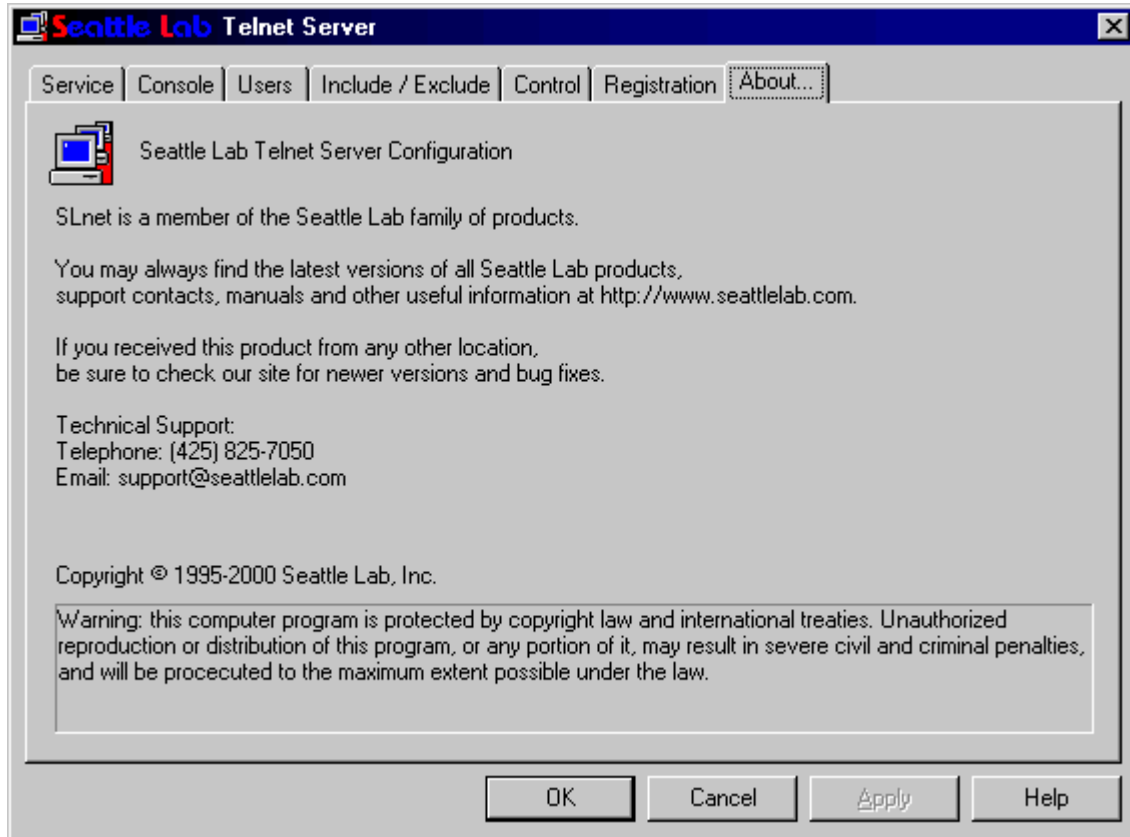
**Note:** Please keep a hard copy of the Authorization Code in a safe place. Should you ever need to reinstall SLnet, you will need to reenter it. Once your Authorization code is entered, it will not be displayed again.

## User's Guide

If you are using a demonstration copy of SLnet and wish to license it for permanent use, or if you wish to relicense your copy of SLnet for a greater number of users, contact SeattleLab and pay the appropriate fee to receive a new authorization code.

# About

The About tab of the SLnet Configuration Control Panel contains information about SLnet and contacting Seattle Lab for technical support. This page also contains important copyright information.



## ***About Tab***

To determine which version of SLnet you are running, click on the SLnet icon located in the upper left-hand corner of the screen.

# Logging onto SLnet

A Telnet client can be any of a variety of devices: a process on a UNIX machine, a Macintosh running MacTCP, a network terminal, a dumb terminal attached to SeattleLab Terminal Server (see the section on SLnet and Terminal Server elsewhere in this documentation), a Windows terminal emulator, etc. For purposes of illustration, however, assume it is the built-in Telnet applet (in the Accessories program group) on another machine. Most terminal emulators that support Telnet behave very much like the Windows Telnet application.

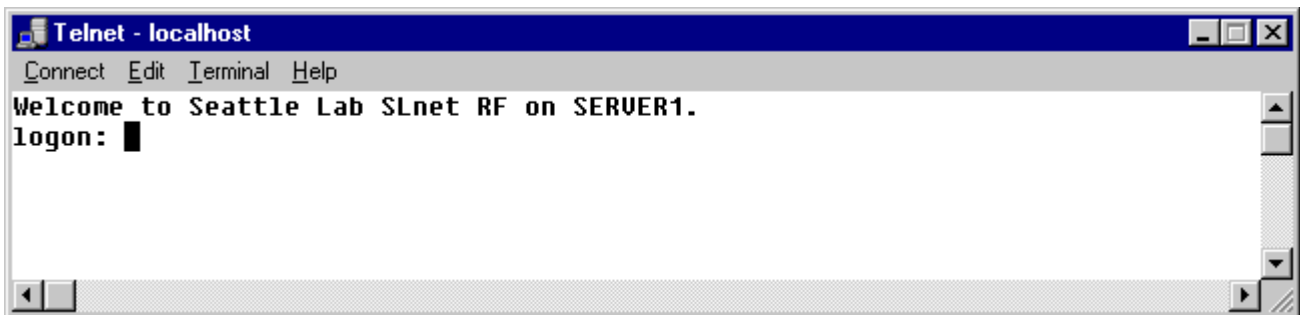
When you initially launch the Telnet client, it is not connected to anything. You need to initiate a Telnet connection. From some Telnet clients, you do so by typing commands at a Telnet command prompt. For many, the connect command is either `connect` or `open`:

```
connect hostname      or
open  hostname       or
telnet hostname
```

Here hostname is the name your machine goes by on the TCP/IP network. This name may be resolved by a Windows Internet Name Service, or it may be resolved by looking in a Hosts file, or you may use a raw IP address.

From the Windows Telnet client, you connect by choosing the *Remote System* option from the *Connect* menu and typing the hostname in the text box if it does not appear in the list offered.

When you connect to a Windows system running SLnet, you will see the following prompt:



### **Sample SLnet Telnet Session**

The greeting line specifies the host name of the system to which you have attached. In the example, it is the system named SERVER1.

The SLnet service will negotiate with the Telnet client to determine the terminal emulation type, if possible.

**Note: The current version of SLnet supports only the ANSI/VT 100 terminal type.**

SLnet will then pause at the logon prompt until you enter your user name. You must be a valid Windows user on the individual system or on the domain, and you must have been granted permission to use SLnet in the Include/Exclude tab of the SLnet Configuration Control Panel.

SLnet defaults to the domain name that the host machine is logged onto. If you wish to log onto another domain, enter the domain before your user name, separated by a back slash (\). For example, if a user named Amy wanted to log onto the default domain, she would respond to the logon prompt this way:

```
logon: AMY
```

If she wanted to log onto the Engineering domain, she would respond this way:

```
logon: ENGINEERING\AMY
```

If you are logging on as a user who is not a member of the default domain, you may alternatively use the same logon format, simply replacing the domain name with the machine name. For example, if Amy were not a member of the default domain, she would respond to the login prompt this way, where Test is the name of the server:

```
logon: TEST\AMY
```

SLnet then asks you for your password. (Nothing shows on your screen as you type the password in.)

If you have successfully logged on, you will be taken to the shell specified in the Configuration Screen for your user. (The default is the Windows Common Command Shell.)

If your user name or password is not valid, SLnet will display the following message:

```
Unable to validate this account
```

It will then re-display the logon prompt. If you fail to logon correctly in the number of tries granted you by the system administrator in the Service tab of the SLnet Configuration Control Panel, your SLnet connection will be broken.

## Exiting an SLnet Session

Once your SLnet connection is established, your Telnet client remains connected to SLnet until one of the following happens:

- You type `exit` at the command prompt.
- You disconnect the Telnet session.

You can do this, for example, by choosing *Disconnect* from the *Connect* menu in the Windows Telnet applet, or by exiting the application altogether.

**Note: Ending the session in this way may leave child processes running.**

- The process you are running on the Windows system terminates. (This could be an intentional termination, such as choosing *Quit* from a menu, or it could be an abnormal ending, such as having a program cause an exception.)
- Your network link is broken.

Although SLnet takes great care in an attempt to clean up after disconnections and abnormal exits, **it is best to exit cleanly whenever possible**. Educate your users to exit cleanly, too. With some Telnet clients, this means using the file exit commands rather than clicking on the "X" in the upper right-hand corner of the user interface.

# SLnet Terminal Emulation

ANSI terminal emulators lack all the keys on a PC keyboard, yet software written to be run on PCs makes extensive use of these keys. To allow terminal emulator users to simulate the pressing of keys they do not have, SLnet provides mapping sequences. These sequences begin with `CTRL-A` (A for *Attention*). You first press `CTRL-A`, then another key, to simulate the pressing of a single PC keyboard key.

The keys that need to be simulated fall into three basic groups: Cursor keys (Home, Pg Up, etc.); ALT-Keys (keystrokes entered while the ALT key is held down); and PC function keys.

The following chart summarizes the CTRL-A sequences used to simulate these keys. Where ellipses are used, they indicate that the pattern set by the preceding simulation is followed. For example, to simulate Function Key 2, you would use the same sequence as for Function Key 1, only replacing the 1 with a 2. The sequence must be completed in less than a second, or no key will be simulated, and the sequence that you typed will be sent to the application verbatim.

The Special Keys allow you to control processes you have generated from SLnet. It is possible from SLnet to invoke a process of which you lose control. For example, suppose that from a terminal emulator via SLnet you type `Notepad` at the command line. SLnet will invoke the Notepad applet, which is a Windows program. From your terminal emulator, you have no way of getting input to a Windows program. The Special Keys allow you to terminate this process.

`CTRL-A p` will show a process list of processes you have created. `CTRL-A k` will allow you to exit from the last process on the list. (It will prompt you before doing so.)

<b>Sequence</b>	<b>Simulates</b>
<b>Cursor Keys</b>	
<code>CTRL-A i</code>	Insert
<code>CTRL-A d</code>	Delete
<code>CTRL-A h</code>	Home
<code>CTRL-A e</code>	End
<code>CTRL-A u</code>	PgUp
<code>CTRL-A n</code>	PgDn
<code>CTRL-A t</code>	Back-tab
<b>ALT Keys</b>	
<code>CTRL-A A</code>	ALT-A
...	...
<code>CTRL-A Z</code>	ALT-Z
<b>Function Keys</b>	
<code>CTRL-A 1</code>	F1
...	...
<code>CTRL-A 9</code>	F9
<code>CTRL-A 0</code>	F10
<code>CTRL-A - (minus)</code>	F11
<code>CTRL-A = (equal)</code>	F12
<b>Sticky Keys (Active until second key pressed)</b>	
<code>CTRL-A a</code>	ALT
<code>CTRL-A c</code>	CTRL
<b>Sticky Keys (Active until CTRL-A is repeated)</b>	
<code>CTRL-A s</code>	SHIFT

<i>Sequence (cont.)</i>	<i>Simulates (cont.)</i>
<b>Special Keys</b>	
CTRL-A p	List Processes
CTRL-A k	Close application
CTRL-R	Refresh Screen
CTRL-A SPACE	Refresh Screen
CTRL-A l	Forced exit of application

***SLnet Terminal Emulation Keys Chart***




**Note:** The special keys affect only processes you have created. You cannot use them to list or kill another user's processes.

# SLnet Logging

SLnet keeps a record of its activities by entering messages in the Windows Event Log as events occur. To view these messages, access the Event Viewer, click *Start > Programs > Administrative Tools (Common) > Event Viewer*.

The Event Viewer provides three event logs: System, Security and Application. To view event logs for SLnet, go to the *Log* menu on the tool bar and select *Application*.

## Windows Event Viewer

The key columns in the *Event Viewer* are the *Source* column, which shows the application to which the entry relates, and the *Event* column, which shows the ID number for the event. A  symbol displayed in the Event Viewer indicates a log entry for what Windows considers a “critical error.” A blue  symbol displayed in the Event Viewer represents an “information” log entry. A yellow  symbol represents a “warning” log entry.

SLnet writes a record in the Application Log for the events described in the Error Code Table. These events are described in the section on SLnet Error Codes. To determine which event took place, look up the number from the *Event Viewer*’s Event column in the following Error Code Table’s Event column.

**Note: The [%1] and [%2] tags in the following examples are values that are filled in by SLnet at the time the event is generated.**

### Message Examples

3. If the socket SLnet is trying to use is already in use by another program the user will get an Error message. The number *1000* will appear in the Event column, and the Error message will be: “The [%1] service could not be started.”
4. If a user who does not have permission to use SLnet attempts to log on, the number *2000* will appear in the Event column, and the Warning message will be: “User [%1] attempted to log on with no profile. There was no default.”
5. When a user logs onto SLnet, the number *2002* will appear in the Event column, and the Information message for that event is: “Accepting connection from IP: [%1]. Connection Number [%2].”
6. When the Telnet service is successfully started, the number *3000* will appear in the Event column, and the Success message for that event is: “[%1] has been successfully started.”

**Note: If the user is connecting via a proxy server, the IP address will always be the address of the proxy server rather than the client machine on the other side of the proxy server.**

You may select which types of events you wish recorded in the Event Log by going to the SLnet Configuration Control Panel *Service* tab. In the Event Logging box, uncheck the boxes for the types of events that should not be recorded. The default setting is to record all three types of events.

## SLnet Error Codes

In the Error Code Table, the Event column contains the event's ID number, the Type column specifies the type of error and its level of importance (Error, Information, or Warning). The Error Message column contains descriptions of the errors.

**Note: The [%1] and [%2] tags in the Error Message column are values that are filled in by SLnet at the time the event is generated. Generally speaking, [%1] tags represent applications and [%2] tags represent machine IP addresses, although that is not *always* the case.**

The following table explains error codes generated by SLnet. While many of these error codes are self-explanatory, some are not. Most of these error codes pertain to the authentication security between SLnet and Windows NT/2000.

Event	Type	Error Message
1000	ERROR	The %1 service could not be started.
1001	ERROR	Unable to find socket library.
1002	ERROR	Unable to allocate memory for Socket Info Structure.
1003	ERROR	An error occurred while attempting to allocate memory.
1004	ERROR	%1 has not been installed correctly. Please re-install.
1005	ERROR	%1 %2 (generic)
1006	ERROR	%1
1007	ERROR	The user's process returned %1.
1008	ERROR	Assert in file %1.
1009	ERROR	Invalid registration data. The service is shutting down.
1010	ERROR	The demo version of %1 has expired.
10000	ERROR	The Socket error is undefined.
10004	ERROR	The Socket has been interrupted.
10024	ERROR	No more file descriptors are available.
10036	ERROR	A blocking Windows Sockets operation is in progress.
10041	ERROR	The specified protocol is the wrong type for this socket.
10043	ERROR	The specified protocol is not supported.
10044	ERROR	The specified socket type is not supported in this address family.
10047	ERROR	The specified address family is not supported.
10050	ERROR	The Windows Sockets implementation has detected that the network subsystem has failed.
10052	ERROR	The network has been reset.
10053	ERROR	The connection was aborted.
10054	ERROR	The connection was reset.
10055	ERROR	No buffer space is available. The socket cannot be created.
10060	ERROR	A timeout has occurred.
10093	ERROR	A successful WSASStartup must occur before using this API.
2000	WARNING	User %1 attempted to logon with no logon profile. There was no default.
2000	INFORMATION	The terminal type is: %1.
2001	ERROR	A connection from address %1 was rejected because it is not in the accepted address range.
2002	INFORMATION	Accepting connection from IP: %1. Connection Number %2.
2003	INFORMATION	IP %1 Disconnected.

2004	INFORMATION	The demonstration period will expire on %1.
2005	INFORMATION	%1 user version initialized.
3000	SUCCESS	%1 has been successfully started.
3001	SUCCESS	%1 has been successfully stopped.

# SLnet Frequently Asked Questions

## What is SLnet?

SLnet is a Telnet Server for Microsoft Windows. SLnet will run on Windows NT version 4.0 and Windows 2000/2003.

## What applications can SLnet run?

SLnet can run character-mode applications: DOS text applications, Win32 console applications, OS/2 character-based applications, and POSIX applications.

## What applications can SLnet not run?

SLnet cannot run Windows based (gui) applications. Any applications that use a GUI will not run in SLnet.

Some Win32 applications create a second console window that is invisible to SLnet and therefore SLnet will not be able to display their output. At this time, the only applications that do this are GNU UNIX ported utilities such as vi.

## How much memory does SLnet require?

SLnet requires one megabyte of system memory for the Service and less than one megabyte of memory for each logged-on user, plus whatever memory requirements the applications being run require.

The formula for determining how much memory is required is:

$$\text{NT memory requirements} + 1\text{MB SLnet} + (1\text{MB} \times \text{Number of users})$$

So for SLnet running on NT 4.0 Workstation to support two users:

$$16\text{MB (NT)} + 1\text{MB (SLnet)} + 2 \times (1\text{MB}) = 19\text{MB}$$

## What processor is required for SLnet?

SLnet does not require any additional processing power than Windows NT/2000. However, the faster or more processors and RAM available, the better performance you'll get. The table below can be used as a guide for what to expect when using SLnet with various processors.

PENTIUM 133	Acceptable
PENTIUM 166	Good
PENTIUM 200	Good

As a general rule, the more CPU and RAM that the machine has the more robust SLnet will be.

## What terminal types does SLnet support?

SLnet supports VT100, VT220, and ANSI terminal types.

## How many user licenses do I need?

There are two kinds of licenses that you can purchase for SLnet. A single license for each user (the number of users is decided by you) or a single license that allows an unlimited number of users. In either case, there is only one machine (Telnet server) on which SLnet is installed, that the users can access concurrently from their workstation.

### What is the maximum number of concurrent connections I can make to my server?

As a general rule, the more CPU and RAM that you have on your system the more connections you can make. The following is a table that shows the approximate maximum number of connections that Seattle Lab has tested. The Operating System, CPU, and RAM for each test are listed for reference.

SLnet RF maximum number of tested connections to a single server		
Operating System	CPU/RAM	Connections
Windows 2000/2003	K6 2-233Mhz, 256 Megas RAM	58 (default installation) 198 with MS reg tweak (3072)*
Windows NT	P Pro 200Mhz, 128 Megas RAM	51 (default installation) 206 with MS reg tweak (3072)*

\* The Microsoft registry tweak involves changing a registry value. Open the registry editor by clicking *Start > Run* and then typing `regedit` then clicking *OK*, or by using RegShell shipped with SLnet. Expand *HKEY\_LOCAL\_MACHINE > SYSTEM > CurrentControlSet > Control > Session Manager > SubSystems*.

In the right frame you will see the list of string and DWORD values in the subsystem key. Highlight the *Windows* string value and then right-click on the string name. In the popup menu, select *Modify*. The Edit String dialog box will open.

The entire string value should look something like this (all one line).

```
%SystemRoot%\system32\csrss.exe ObjectDirectory=\Windows SharedSection=1024,3072
Windows=On SubSystemType=Windows ServerDll=basesrv,1 ServerDll=winsrv:UserServerDl-
lInitialization,3 ServerDll=winsrv:ConServerDllInitialization,2 ProfileControl=Off
MaxRequestThreads=16
```

Scroll through the string until you see "SharedSection=1024,3072."

Change the first number (1024) to 3072 and add , 3072 after the 3072 that is there by default. The string should now look like this "SharedSection=3072,3072,3072." Click *OK* to accept the changes.

The full documentation of this registry change is available in the Microsoft Knowledge Base at <http://support.microsoft.com/support/kb/articles/Q142/6/76.asp>.

**Note: You must restart your system in order for this change to the registry to take effect.**

† The SLnet registry tweak involves adding three registry values. Open the registry editor by clicking *Start > Run* and then typing `regedit` and then clicking *OK*, or by using RegShell, shipped with SLnet. Expand *HKEY\_LOCAL\_MACHINE > SOFTWARE > SeattleLab > SLnet > InheritedUserSettings*.

You will need to add (or modify) three registry values in this key. The three values in question are:

```
Use Process Monitor
Use Process Snapshots
Use Watch for Windows
```

If these registry values are not present in the folder, right-click in the white space of the right frame and select *New > DWORD Value* from the popup menu. A new value will be created in the list. Change the name of the "New Value #1" to one of the missing value names (above). Repeat this process until all three values are present.

You need to disable all three values by highlighting the value name (Use Process Monitor, Use Process Snapshots, or Use Watch for Windows) and then right clicking on it. Select *Modify* from the popup menu. The Edit DWORD Value dialog box will open

In the *Value data* text box enter 0 and then click *OK* to accept the changes.

**Note: You must stop and restart SLnet before these changes will take effect.**

**Note: Although disabling some of the processes running within SLnet will free up some CPU allowing for more connections. These changes limit some of the functionality of SLnet's extended feature set, however, they do not affect the normal Telnet functionality.**

# SLnet Tips & Troubleshooting

## How do I add users to SLnet?

SLnet uses the Windows user database, so adding users to SLnet is as easy as adding a new user via the User Manager.

## What if I can't log on to SLnet?

Make sure you have Log on Locally rights. This means you must be able to log on with the user name and password at the machine you are sitting in front of.

If the user is a local user and not a member of the domain, you will need to specify the local machine name in the logon line.

Be sure to include a back slash ( \ ) between the machine name and your user name.

## How can I stop a program that keeps running after I log off?

SLnet normally cleans up after your user processes, exiting all processes when you log off. If you wish to disable this feature, you may disable the Monitor Child Processes option located in the Users tab of the SLnet Configuration screen. This option is set on a per user basis.

**Note: If you disable this feature, you will need to manage process clean-up yourself, or your system may become littered with leftover processes.**

## How can I use mapped drives from SLnet?

It is important to understand that if you map a drive, the same mapping applies to ALL users. For example, if one user has drive F mapped there is no need to map it for another. If you do attempt to map it again, your attempt will fail. In a multi-user environment, the best practice is for the system administrator to set up the drive mappings globally so that individual users or individual applications do not have to.

## How can I print from SLnet?

Windows NT/2000 maps printer ports globally, meaning that LPT1 points to the same printer whether you are logged in on the desktop or through SLnet. If you change the printer that LPT1 is mapped to locally on that machine, you change it for all users who are currently logged on. Therefore, Seattle Lab recommends that the system administrator designate specific printers to specific ports. Do not allow users the ability to change these values.

## How do I map Windows drives in Telnet?

Although Windows is user specific, the drive letters are global. If a user is logged onto the server's desktop locally and has drives mapped to the network, anyone who logs on via Telnet should see those mapped drives—as long as the security share permissions are set up for the user who is logging on via Telnet. If there is no user who has logged onto the desktop locally, and a user logging on via Telnet maps a drive in their Telnet session, any users logging on via Telnet will see that mapped drive as long as the first user is still connected. When the first user disconnects, that drive mapping will not be available until a current user re-maps the drive. You can also use a \*.bat file to map the drive as each user logs on. SLnet's Default User Account is used when a specific user account is not already set up. In the properties for the default user at the Command Line field you can type the following path: /k c:\testpath.bat.

The following is an example of a \*.bat file:

```
@echo off
net use r: \\machinename\d$
:done
```

### How do I create terminal or console beeps in SLnet?

Applications written on UNIX are by design able to run from any terminal, whether remote or local. Windows and MS-DOS applications can only be driven by a remote terminal by emulating the CRT and keyboard over the remote connection.

Because of the design of Windows, any console beeps are sent to the server via a device driver which SLnet and RemoteNT cannot intercept.

Using the C code below, it is possible to create custom applications that support terminal beeps.

```
#include <fcntl.h> /* Needed only for _O_WRONLY definition */
#include <io.h>
#include <stdlib.h>
#include <stdio.h>
#include <string.h>
void main (void)
{
char PipeName[256];
char *EnvPipeName;
char Temp[256];
int PipeHandle;
int BytesRead;
EnvPipeName = getenv ("PIPENAME");
/*
** the pipename on NT is \\.\pipe\
```

### How can I setup an automatic logon for all users connecting to SLnet?

Open the Registry Editor by clicking *Start > Run* and then typing `regedit` and then clicking *OK*, or by using RegShell, shipped with SLnet. Expand *HKEY\_LOCAL\_MACHINE > SOFTWARE > SeattleLab > SLnet*.

The string values for all of the SLnet registry keys will appear in the right frame.

You need to modify (or add) the following values to the Registry Editor in the SLnet key:

```
AutoLogon
DefaultUserName
DefaultPassword
```

If the registry values are present in the SLnet key (they are by default) you will need to modify the values.

Highlight the DWORD Value labeled *AutoLogon* and then right-click on the string name. Select *Modify* from the popup menu. The Edit DWORD Value dialog box will open.

In the *Value data* text box enter `1` and then click *OK* to accept the changes.

Highlight the String Value labeled *DefaultUserName* and then right-click on the string name. Select *Modify* from the popup menu. The Edit String dialog box will open.

In the *Value data* text box enter `<the default user name>` and then click *OK* to accept the changes.

Highlight the String Value labeled *DefaultPassword* and then right-click on the string name. Select *Modify* from the popup menu. The Edit String dialog box will open.

In the *Value data* text box enter `<the default password>` and then click *OK* to accept the changes.

If any of the registry values are missing they will need to be added. Right-click in an empty area of the right frame and select *New > DWORD Value* or *String Value* depending on the value type (see above) from the popup menu. Enter the appropriate value name and settings as described above ensuring that all three of the registry values are present in the SLnet key.

**Note: You must stop and restart SLnet before these changes will take effect.**

### What do I do if I want to be prompted for terminal type when I log in?

Open the Registry Editor by clicking *Start > Run* and then typing `regedit` and then clicking *OK*, or by using RegShell, shipped with SLnet. Expand *HKEY\_LOCAL\_MACHINE > SOFTWARE > SeattleLab > SLnet*.

The String Values for all of the SLnet registry keys will appear in the right frame.

Highlight the DWORD Value labeled *Negotiate Terminal Type* and then right-click on the string name. Select *Modify* from the popup menu. The Edit DWORD Value dialog box will open.

Change the *Base* to `Decimal` and then enter `817` in the *Value data* text box. Click *OK* to accept the changes.

**Note: You must stop and restart SLnet before these changes will take effect.**

### How do I set the console window size manually?

If you are having difficulties with your Telnet client and would like to manually set the size of the console window (especially useful for very large or small console viewing areas) you must add some registry settings referring to negotiate about window size (NAWS).

Open the registry editor by clicking *Start > Run* and then typing `regedit` and then clicking *OK*, or by using RegShell, shipped with SLnet. Expand *HKEY\_LOCAL\_MACHINE > SOFTWARE > SeattleLab > SLnet > InheritedUserSettings*.

You will need to add (or modify) two registry values in this key. The two values in question are:

```
Ignore NAWS For rendering
Ignore NAWS For sub processes
```

If these registry values are not present in the key, right-click in the white space of the right frame and select *New > DWORD Value* from the popup menu. A new value will be created in the key. Change the name of the "New Value #1" to one of the missing value names (above). Repeat this process until both values are present.

You need to ensure that both Values are set to 1 by right clicking on the value and selecting *Modify* then changing the *Value Data* to 1 (if necessary).

By ignoring the NAWS information for rendering you force the server to look into the registry for the console window size information for the client. The Server does not rely on the NAWS information and sends the console window size to the client monitor based on the registry settings in *Terminal Cols* and *Terminal Lines*. (The Terminal Columns and Terminal Lines keys are usually kept in individual user's registry folders.) If Terminal Cols and Terminal Lines are both set to 0 the server will look in the terminal database to find the number of terminal lines and columns based on the Terminal Type information that was passed.

By ignoring NAWS for sub processes you are forcing the Server to send the default window size that has been set in the command shell.

**Note: You must stop and restart SLnet before these changes will take effect.**

### How do I invoke my own application instead of being sent to the command prompt when I log in?

SLnet allows you to invoke an application when you log on or at start up if you have autologon enabled. The User Configuration lets you run virtually any console application from the command shell at logon. There are only a few quick steps needed to be made to accomplish this.

From the *User* tab of the SLnet control panel, select the desired user from the list and click the *Edit* button. The User Configuration dialog box will open.

Once in the User Configuration dialog box you can add a command line command that will invoke your application. The directions for doing so follow:

1. Do not make changes to the *Default Shell* text box should be configured to open the command shell and should be left as is.
2. The *Startup Directory* text box should be filled with the path to the directory that contains the console application that you would like to invoke.
3. The *Command Line* text box is used to enter the application that you wish to invoke. The application must reside in the directory specified in the *Startup Directory* text box. Enter the filename in the text box preceded by a switch command (`/c` or `/k`).

**Note: You must include either the `/c` or `/k` switch in the *Command Line* text box for the application to run properly.**

For example, if you were executing the batch file `test.bat`, which resided in the `test_2` directory in the `test` directory in the root of `C`, you would enter `C:\test\test_2` in the *Startup Directory* text box and `/c test.bat`

in the *Command Line* text box. Please see the cmd.exe help file for additional information about invoking applications from the command shell.



# About SeattleLab

SeattleLab develops, sells and supports the world's most robust Web-based server software for Windows. The company is headquartered in Irvine, CA.

Since 1992, Seattle Lab has developed exclusively for Windows. The company was one of the earliest Windows developers, and has remained at the forefront of development ever since. SeattleLab technology sets industry standards for performance, reliability, ease-of-use and value.

SeattleLab is available to create custom utilities or OEM versions of our software to embed in your products.

SeattleLab's other products for Windows NT/2000 include:

**SLmail**—This industrial-strength Internet and intranet email server for Windows 95, 98, 2000, and NT was the first Internet email server for Windows, and it's still the leader. No email server is more powerful, and none is easier to use.

**IT Commander**—This remote administrative tool for Windows NT/2000 is based on the extremely efficient Telnet protocol. It offers more reliability than any other remote administration package; Command Post gets through when nothing else will.

**SL Fax**—With powerful communications capabilities, SL Fax Server is a complete solution for workgroups and small/medium businesses. All the tools—fax, email, file transfers—that allow companies to manage internal and external communications are integrated into SL Fax Server. A true unified messaging solution, SL Fax Server is cost and time-effective, allowing users to send and receive fax and email files from one inbox.

**SLnet RF**—This Telnet server for Windows turns any Windows system into a multi-user host. SLnet supports DOS applications and UNIX interaction and is even optimized for RF wireless devices.

**Emurl**—This Web-based email host for Windows NT extends all the functionality of email over the World-Wide Web. When you install Emurl on your Web server, your users can access their email from anywhere using just a Web browser.

**SeattleLab Terminal Server**—This software-based terminal server extends all the functionality of IT Commander to asynchronous terminals. When you add SeattleLab Terminal Server to any Windows system on your network, terminals and other serial devices attached to that system can use IT Commander or SLnet to run character-based applications on your Windows system.

The current version of all Seattle Lab products and information about them are always available on our website, located at [www.seattlelab.com](http://www.seattlelab.com).

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# Index

- A
- Administrators user group .....1, 10
  - ANSI
    - Color Usage .....36
    - Terminal type .....46
    - version 3 support .....35
  - Arrow keys .....49
  - asynchronous .....5
- B
- Banner .....25, 46
- C
- ciphertext .....4
  - Colors .....36
  - Command line .....35
  - Common Command Shell .....7
  - Configuration screen .....23
  - Connect command .....46
  - Console Beep .....58
  - Control keys .....49
  - Control Panel .....42
  - CPU .....9
  - Cursor keys .....49
  - custom application .....34
  - Custom utilities .....63
- D
- Decryption .....4
  - Directory .....8, 34
  - Disk space .....8
  - Domain .....46
  - Drive letters .....35
- E
- Emulator .....46, 49
    - Key mapping .....49
    - Terminal type .....46
  - Emurl .....63
  - Encryption .....4
  - encryption .....3
  - Event Log .....51
  - Exiting .....48
- F
- Function keys .....49
- G
- Greeting .....25, 46
- H
- Hosts file .....46
- I
- Installation .....10
  - Internet .....4
  - IP address .....46
- K
- Key mapping .....49
- L
- legacy applications .....6
  - License Agreement .....11
  - Logging .....51
  - Logon .....46
    - banner .....46
  - Logon Attempts .....25
- M
- Maximum Connections .....24
- N
- Nonprintable characters .....35
- O
- OEM versions .....63
  - Options
    - Color .....36
    - Priority .....28
    - User .....34
- P
- Password .....4, 25, 47
  - Pipes
    - binary .....36
  - Polling .....27
  - Preface .....1
  - Print .....57
  - Priority .....28
  - Privileges .....1, 2

Processes

- Killing .....49
- List .....49
- monitoring child .....36

R

- Redirection chars .....35
- Registration .....43

S

- Seattle Lab .....63
- Security .....2, 33
- Security risk .....4
- serial devices .....5
- Serial Number .....16
- Serial number .....43
- Service
  - Automatic startup .....42
  - Disabling .....42
  - Stopping and Starting .....41
- Shell .....47
  - Common Command .....34
- SLclient32 .....3
- slice .....28
- SLmail .....63
- Sockets .....25
- Special keys .....49
- Support .....63

T

- TCP/IP protocol .....8
- Technical Support .....63
- Telnet
  - Clients .....46
  - Connecting to a host .....46
  - Ending a Telnet session .....48
  - Negotiation .....46
  - Prompt .....24
  - RFC 1060 .....25
  - Socket .....25
  - Windows NT Telnet applet .....46
- Terminal Beep .....58
- Terminal emulation .....7
- Terminal emulator .....49
- Terminal Server .....5
- Terminals .....5, 46
- Time slice .....28

- Tuning .....28

U

- Universal Naming Convention (UNC) .35
- Unsecure Logon .....3
- User utilities .....10
- Users
  - Access control .....32
  - Adding new .....33
  - Configuring accounts .....34
  - Domain .....46
  - Increasing User Limit .....44
  - Limit .....24
  - Logon .....46
  - Privileges .....2
  - Security .....2, 33

W

- Wide-Area Networks .....6
- Working directory .....34