



NightStar LX Installation Guide

Version 4.1 SR5

Red Hat Enterprise Linux 4, 5

Fedora 8, 9, 10, 11

CentOS 5

SUSE Linux Enterprise 10, 11

openSUSE 10.2, 10.3, 11.0, 11.1

Ubuntu 7.10, 8.4, 8.10, 9.4

Debian 4, 5



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NightStar's integrated help system is based on Qt's Assistant from Trolltech.

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1.0. Introduction

NightStar LX Version 4.1 SR5 is a production release of the NightStar Tools running under Red Hat Enterprise Linux 4 and 5, Fedora 8, 9, 10 and 11, CentOS 5, SUSE Linux Enterprise 10 and 11, openSUSE 10.2, 10.3, 11.0 and 11.1, Ubuntu 7.10, 8.4, 8.10 and 9.4, and Debian 4 and 5.

NightStar LX consists of the NightProbe data monitor, NightTrace event analyzer, NightTune system and application tuner, and the NightView source-level debugger.

NightStar LX Version 4.1-SR5 is a service release which provides:

- support for additional operating system distributions;
- all the available bugfixes;
- all the tool enhancements since the last service release, as well as inclusion of new enhancements never before released in production.

The most notable recent enhancements include:

- NightView thread attributes - providing the ability to automatically identify threads by name and to allow the user to set per-thread attributes that are displayed in NightView.
- NightTune logging -- providing logging of system and process tuning activities as well as all system and process metrics that NightTune provides -- in XML and NightTrace data format. This includes using NightTune in batch mode to capture data.
- NightTrace Application Illumination improvements, including additional batch-mode summary for user functions and installation of function keywords for states, and function entry/exit profiles.
- Includes recent NightProbe improvements in array slice support, multi-dimensional array support, C++ enumeration support for recorded samples (during playback), floating point format preferences, and user-controlled format of playback data.
- Support of systems with more than 32 CPU cores.

NightStar LX no longer includes a kernel as part of its distribution. Legacy versions included an enhanced kernel applicable to Red Hat systems which provided performance advantages as well as NightTrace kernel tracing. Kernel tracing is no longer supported under NightStar LX unless you are already using the NightStar LX 3.2 enhanced kernel. Version 4.1 SR5 will still take advantage of that kernel if it is running. Other operating system distributions provide real-time kernels which benefit NightStar. See the “Kernel Dependencies” chapter of any of the NightStar User’s Guides for more information on recommended real-time kernels.

1.1. Organization

Chapter 2 describes the Linux distributions supported by NightStar LX.

Chapter 3 provides installation instructions for NightStar LX for the variety of distribution types supported.

Subsequent chapters describe NightStar LX licensing, an overview of NightStar LX 4.1 GUI features, and instructions for obtaining software support.

Follow the instructions under “Installing NightStar LX” on page 4 to install NightStar LX on your system and then proceed to “Obtaining License Keys” on page 29.

Then take a look at “NightStar LX GUI Features” on page 33 to learn about the new graphical interface of the NightStar LX tools.

2.0. Software Prerequisites

Prerequisites for NightStar LX Version 4.1 SR5 for both the host system and target system are as follows:

2.1. Host System

Any of the following distributions:

- Red Hat Enterprise 4 (with Update 4 or 5)
- Red Hat Enterprise 5
- Fedora 8, 9, 10, or 11
- CentOS 5
- SUSE Linux Enterprise Desktop/Server 10 or 11
- openSUSE 10.2, 10.3, 11.0, or 1.1
- Ubuntu 7.10 (or Kubuntu 7.10), 8.4, 8.10, and 9.4
- Debian 4 and 5

Any Intel Pentium Xeon or Intel EMT64 or AMD Opteron supported by the operating system distribution.

2.2. Target System

Any of the following distributions:

- Red Hat Enterprise 4 (with Update 4 or 5)
- Red Hat Enterprise 5
- RedHawk 2.3 or higher
- Fedora 8, 9, 10, or 11
- CentOS 5
- SUSE Linux Enterprise Desktop/Server 10 or 11
- openSUSE 10.2, 10.3, 11.0, or 1.1
- Ubuntu 7.10 (or Kubuntu 7.10), 8.4, 8.10, and 9.4
- Debian 4 and 5

Any Intel Pentium Xeon or Intel EMT64 or AMD Opteron system supported by the target operating system.

3.0. Installing NightStar LX

This section provides instructions for Installing NightStar LX, organized by the packaging mechanism used by the various supported Linux distributions.

- Debian/APT-based Instructions for Ubuntu and Debian Systems
- RPM/YUM-based Instructions for Red Hat, Fedora, CentOS and SUSE Systems

3.1. Instructions for Ubuntu and Debian Systems

NightStar LX installation is accomplished using the standard Debian packaging utilities:

- **synaptic**
- **apt-get**
- **apt-cdrom**
- **apt-key**

Other installation tools that are based on APT (such as **adept**) can be used as well, but they are not discussed in this document.

Select the following installation section that best suites your familiarity with Debian and Ubuntu installation procedures and utilities:

- Debian and Ubuntu Instructions for Experts
- Detailed Debian Installation Instructions using Synaptic
- Detailed Ubuntu Installation Instructions using Synaptic

3.1.1. Debian and Ubuntu Instructions for Experts

1. Add Concurrent's public GPG key to the APT database system.

Download the key file and install it via the following commands:

```
wget http://redhawk.ccur.com/debian/ccur-public-key
sudo apt-key add ccur-public-key
```

The key file is also included in the **debian** directory of the NightStar LX installation CD.

If you wish to verify the authenticity of the key, contact Concurrent Customer Support (as described in "Direct Software Support" on page 49) and request the key's fingerprint.

2. Add the repository to the APT database system.

If installing via the network, add the following line to the **/etc/apt/sources.list** file:


```
deb http://redhawk.ccur.com/debian nightstar lx
```

If installing via CD, run the following command, substituting the correct path for your CD device for `/media/cdrom`:

```
sudo apt-cdrom -d /media/cdrom add "NightStar LX"
```

3. Ensure that one of the following lines is present in `/etc/apt/sources.list` as well, depending on whether you have an Ubuntu or Debian distribution (ensuring that the line is not prefixed with a comment character):

```
deb http://archive.ubuntu.com/ubuntu/gutys main universe
deb http://ftp.debian.org/debian/ etch main
```

NightStar LX requires installation of the `compat-libstdc++` package, which will be accessible (if not already installed) if the appropriate line shown above is present in `/etc/apt/sources.list`.

NOTE

The distribution code names (e.g. `gutys`, `etch`, `lenny`, etc.) will vary, depending on your version of Ubuntu or Debian.

4. Refresh the APT database with details from these repositories:

```
sudo apt-get update
```

5. Install the core portion of NightStar LX via the following command:

```
sudo apt-get install ccur-nightstar-lx
```

6. Optionally install NightStar LX icons on your desktop:

Run the following command as your normal user, not `root`, otherwise the icons will only be installed on `root`'s desktop:

```
/usr/lib/NightStar/bin/install_icons
```

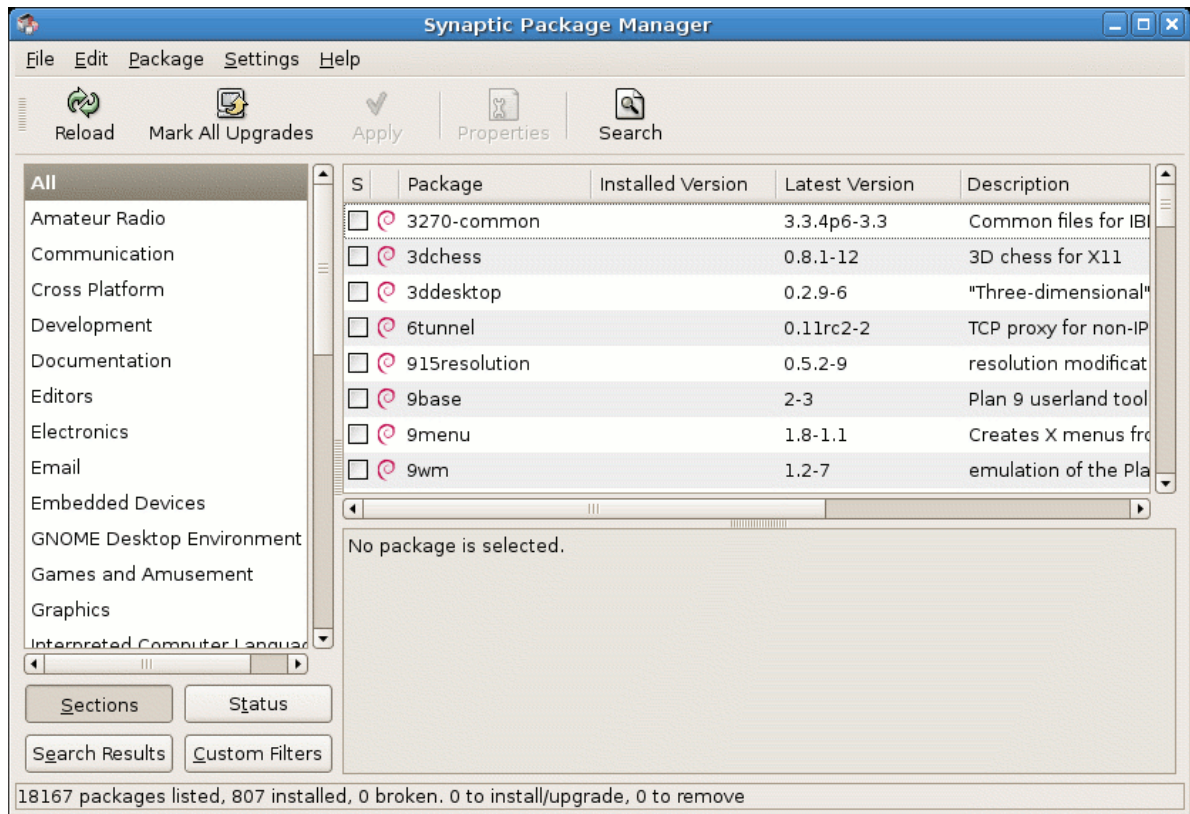
Installation of NightStar LX is now complete but you still need to activate a NightStar LX license. Skip ahead to "Obtaining License Keys" on page 29.

3.1.2. Detailed Debian Installation Instructions using Synaptic

The following instructions refer to **synaptic** version 0.57.8. Alternative versions may have a slightly different user interface, but the concepts are the same.

Begin the installation process by running **synaptic** as the `root` user:

`sudo synaptic`



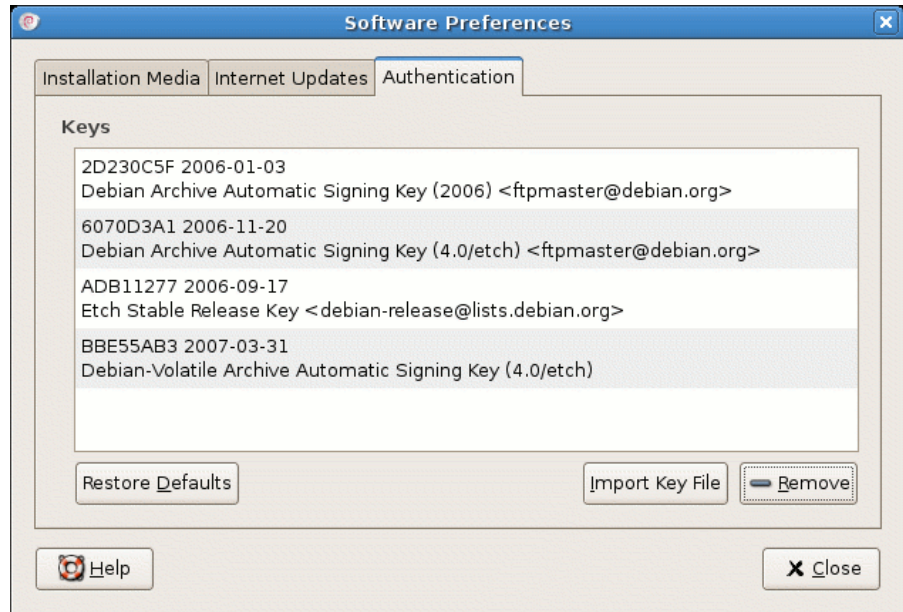
1. Add Concurrent's public GPG key to synaptic's authorization database
 - a. Download the key file via the following command:

```
wget http://redhawk.ccur.com/debian/ccur-public-key
```

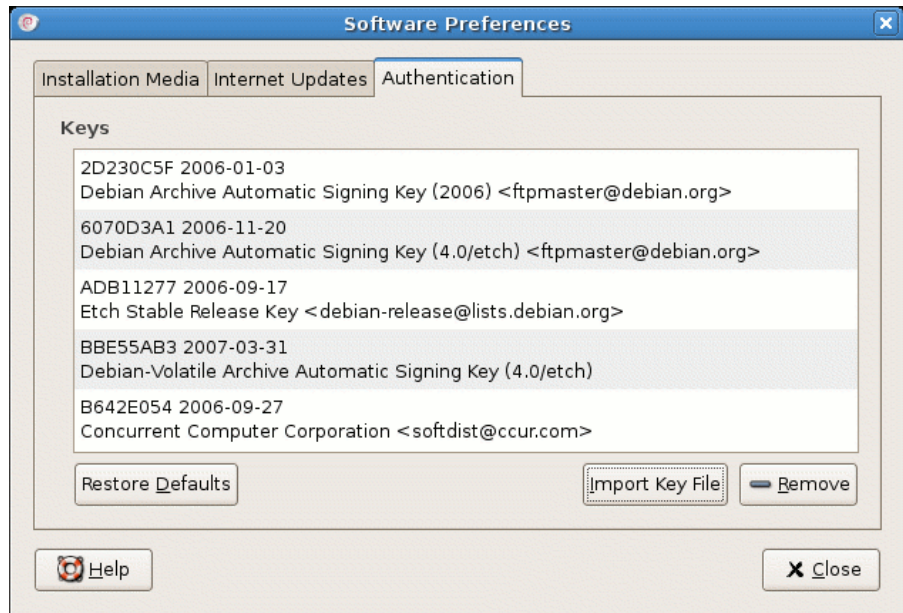
The key file is also included in the debian directory of the NightStar LX Installation CD.

If you wish to verify the authenticity of the key, contact Concurrent Customer Support (as described in "Direct Software Support" on page 49) and request the key's fingerprint

- b. Open the Software Sources dialog via the Settings -> Repositories option on the menu bar and click on the Authentication tab.

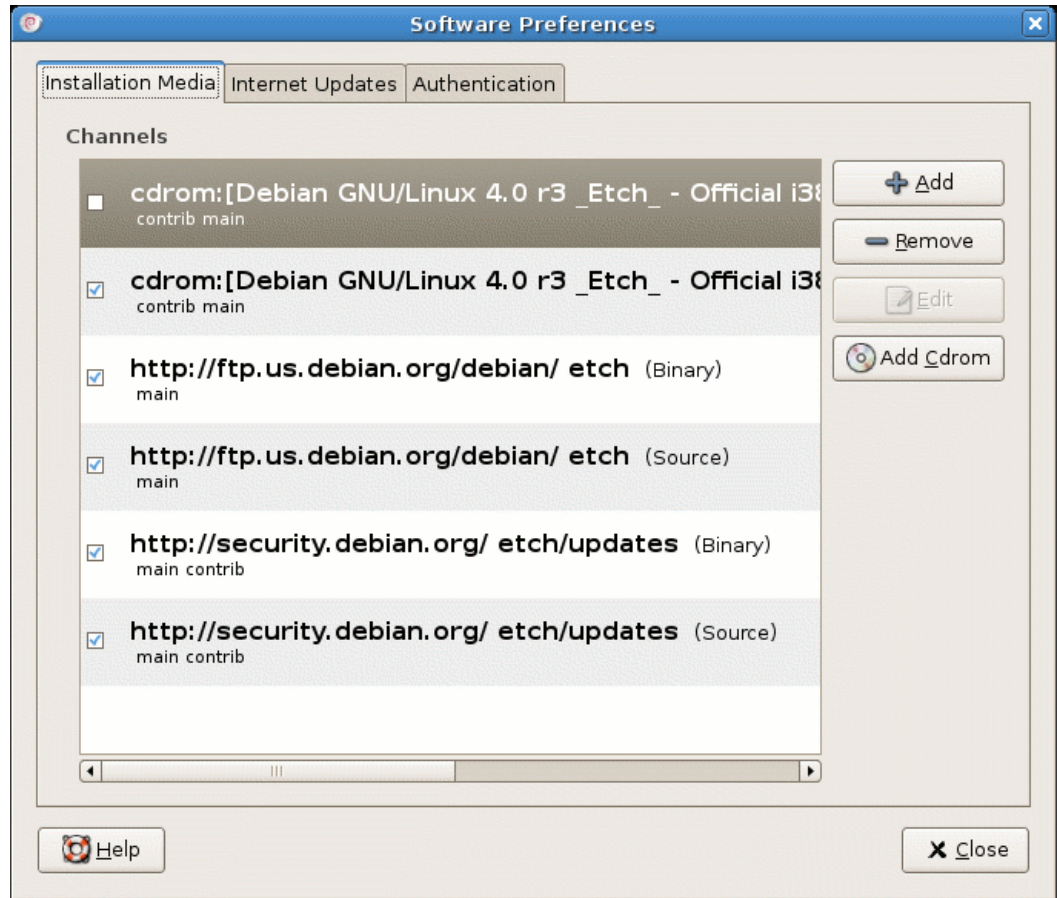


- c. Click the Import Key File button and select the key file from step a) and press the OK button.



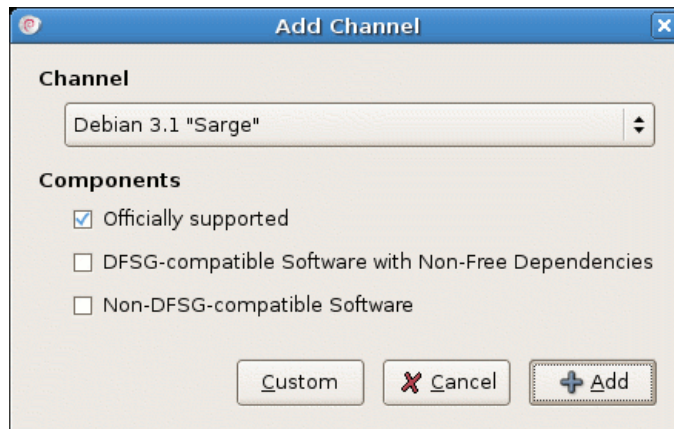
2. Add the appropriate repositories to the Software Preferences list

- a. Click on the Installation Media tab of the Software Preferences dialog which was opened in step 1.



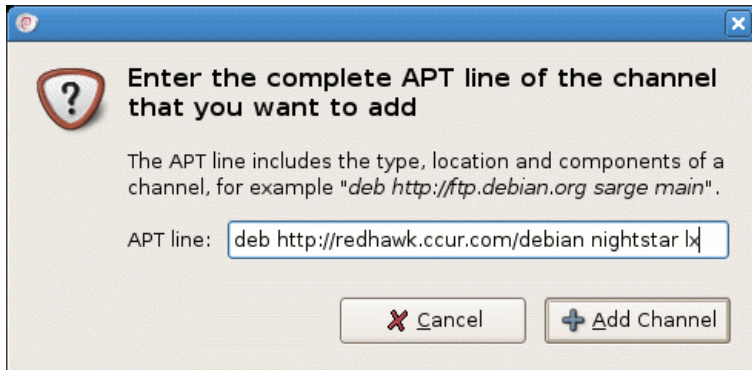
- b. Ensure that the standard repositories are checked on the Installation Media tab, specifically including the binary **main** repository, as shown above.
- c. If you are installing from CD, skip to Step 2f on page 10.

If you are installing from the network, press the Add button.



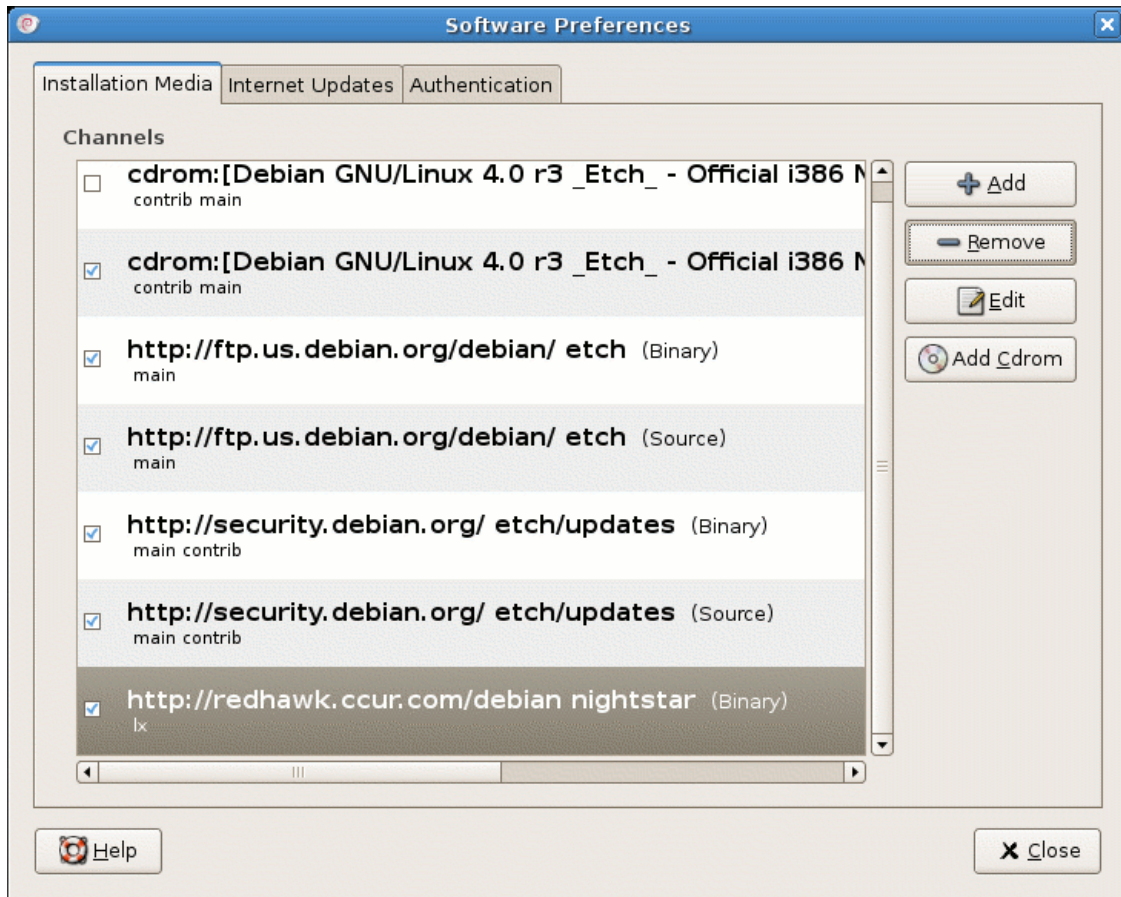
- d. Press the Custom button and enter the following in the APT line text field:


```
deb http://redhawk.ccur.com/debian nightstar lx
```



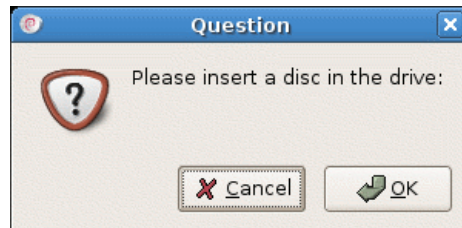
e. Press the Add Channel button to close the dialog.

The Installation Media tab should now include Concurrent's repository.



Now skip ahead to Step 3 on page 11.

f. If installing from CD, click the Add CD-ROM button



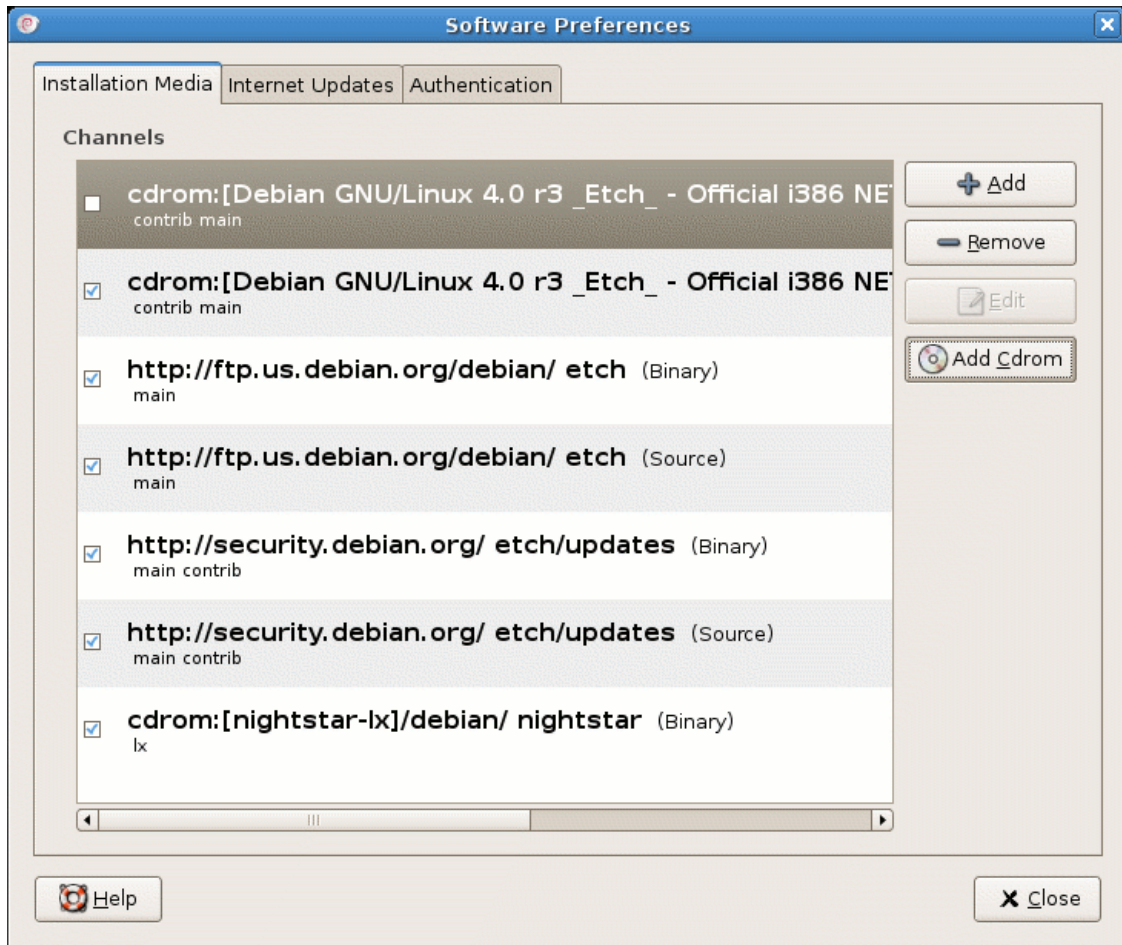
g. Insert the NightStar Installation CD and press OK.

h. When prompted for a name for the CD, enter NightStar LX and press the OK button.

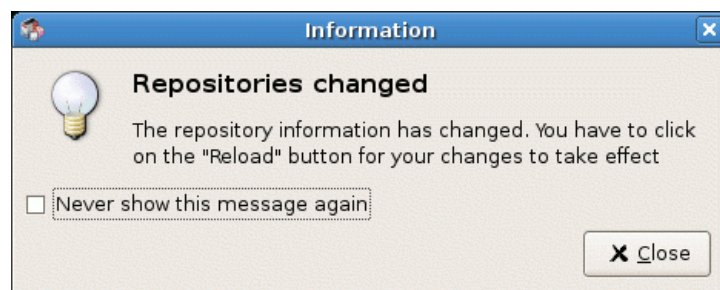


i. Press the Close button on the Scanning CD-ROM dialog if it persists in staying open.

The Installation Media tab should now include the NightStar LX CD entry, as shown below:

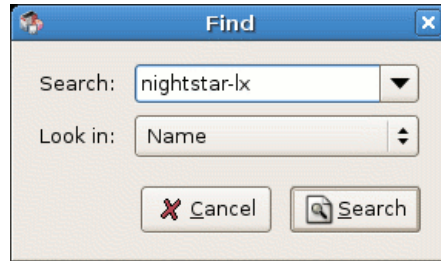


- j. Press the Close button to close the Software Preferences dialog.
3. After adding the repository as described in Step 2, a dialog may appear which warns you that the configuration has been changed and you must press the Reload button to load details associated with the new repository.



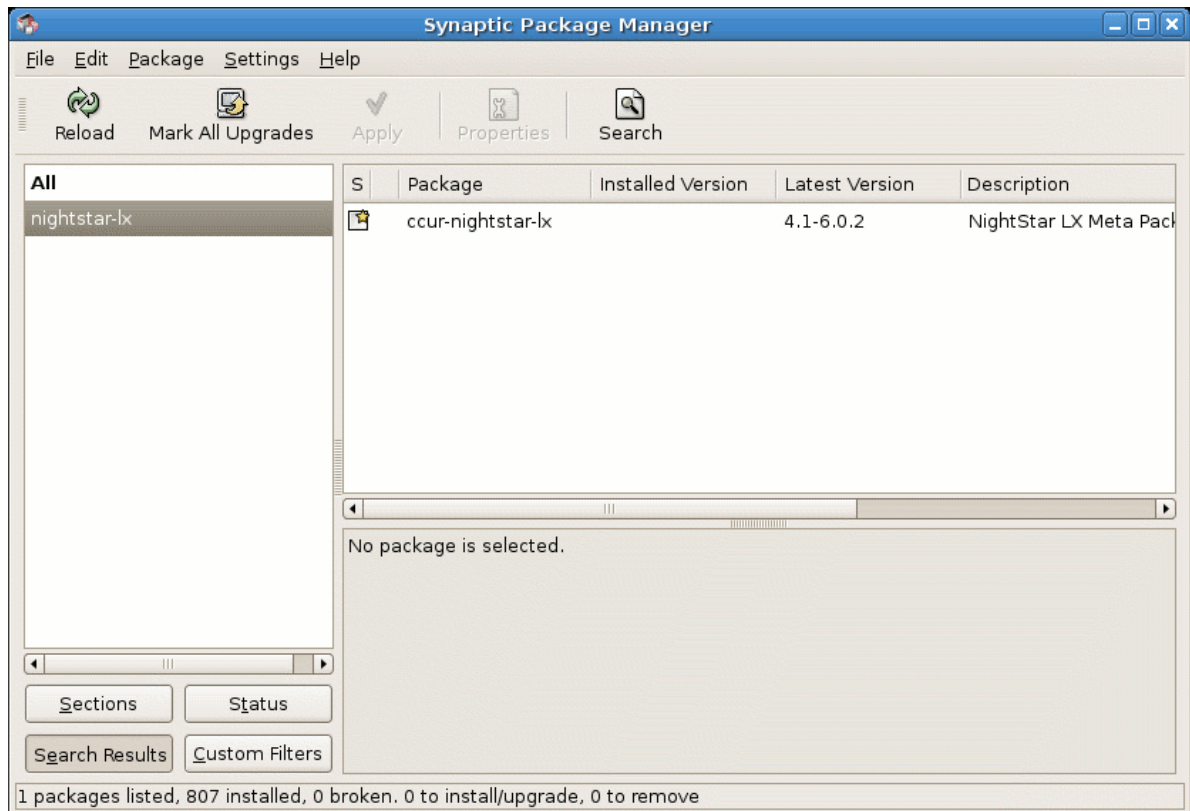
- a. If a dialog similar to the above appears, press its Close button.
- b. Press the Reload button on the main window (even if a dialog similar to that shown above did not appear).

4. Press the **Search** button on the main window
 - a. Enter **nightstar** into the **Search** text field and select **Name** from the **Look in** option list as shown below:



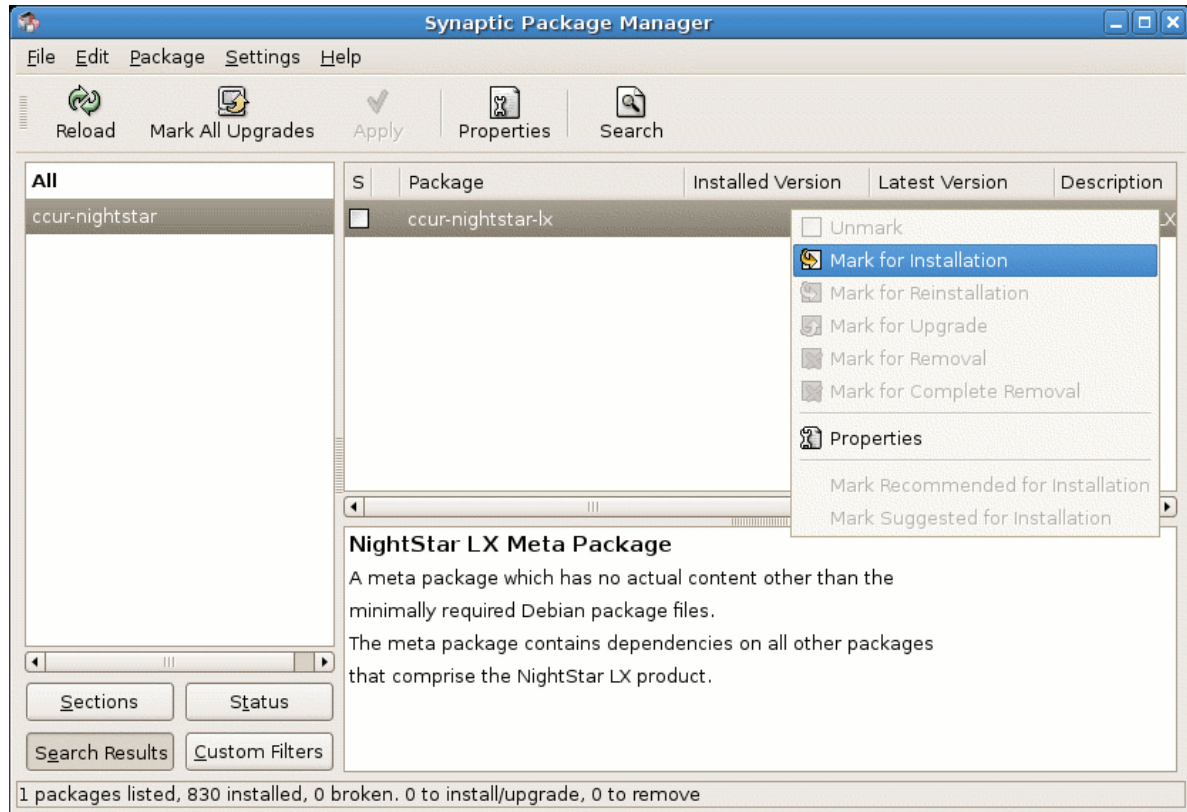
- b. Press the **Search** button in the dialog.

Synaptic should now show you a matching package as shown below:



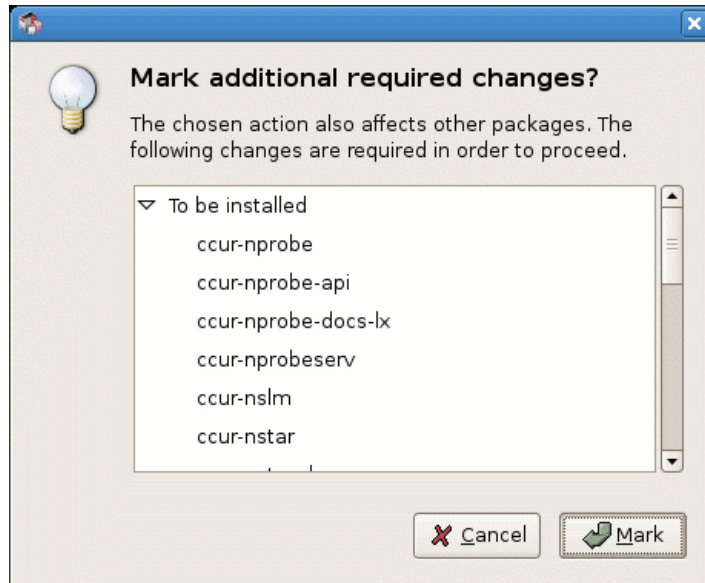
5. Select packages for installation
 - a. Select the **ccur-nightstar-lx** package by clicking on its row in the main window

- b. Right-click on the **ccur-nightstar-lx** selection to launch the context menu, then select Mark for Installation.

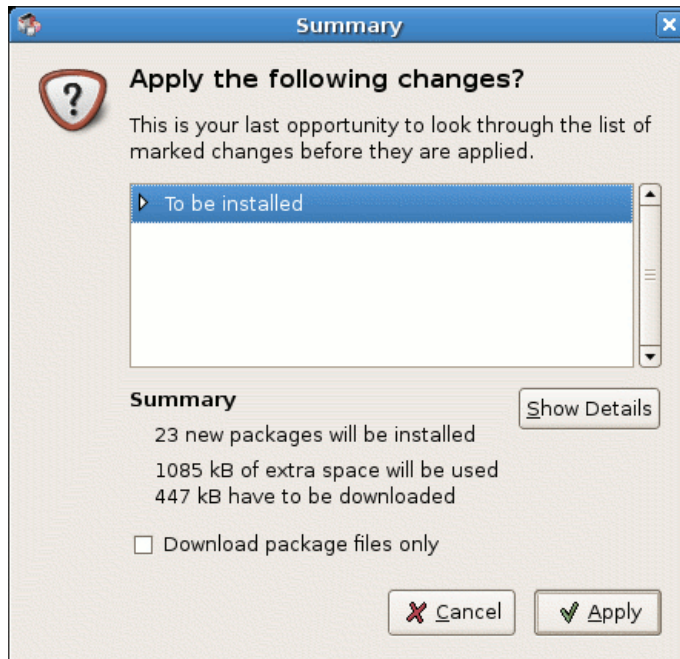


The **ccur-nightstar-lx** package is a meta package which contains no actual files, merely package dependencies which cause the core of the NightStar LX product to be installed.

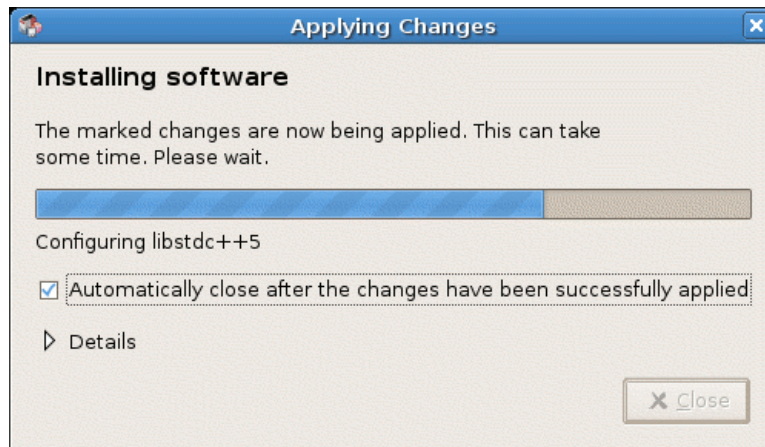
Synaptic will display a dialog indicating the additional packages which will be installed in order to satisfy those dependencies.



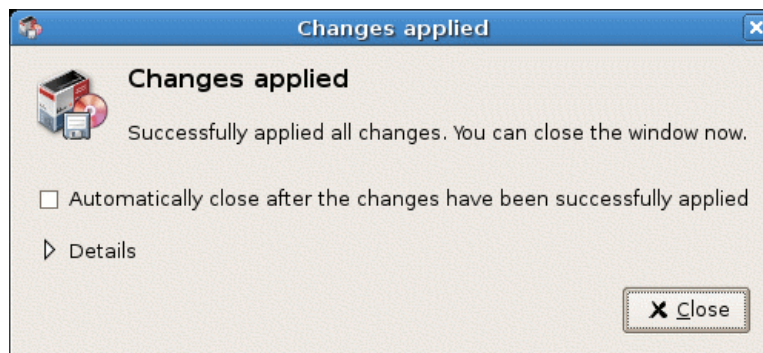
- c. Press the **Mark** button to approve installation of those packages and close the dialog.
6. Install the Packages
 - a. Press the **Apply** button in the main window.



- b. Press the Apply button in the dialog as shown above to start actual installation.



- c. After successful installation, you may see a dialog similar to the following.



Press the Close button if this dialog appears.

8. Exit **synaptic**.
9. Optionally install NightStar LX icons on your desktop:

Run the following command as your normal user, not *root*, otherwise the icons will only be installed on *root*'s desktop:

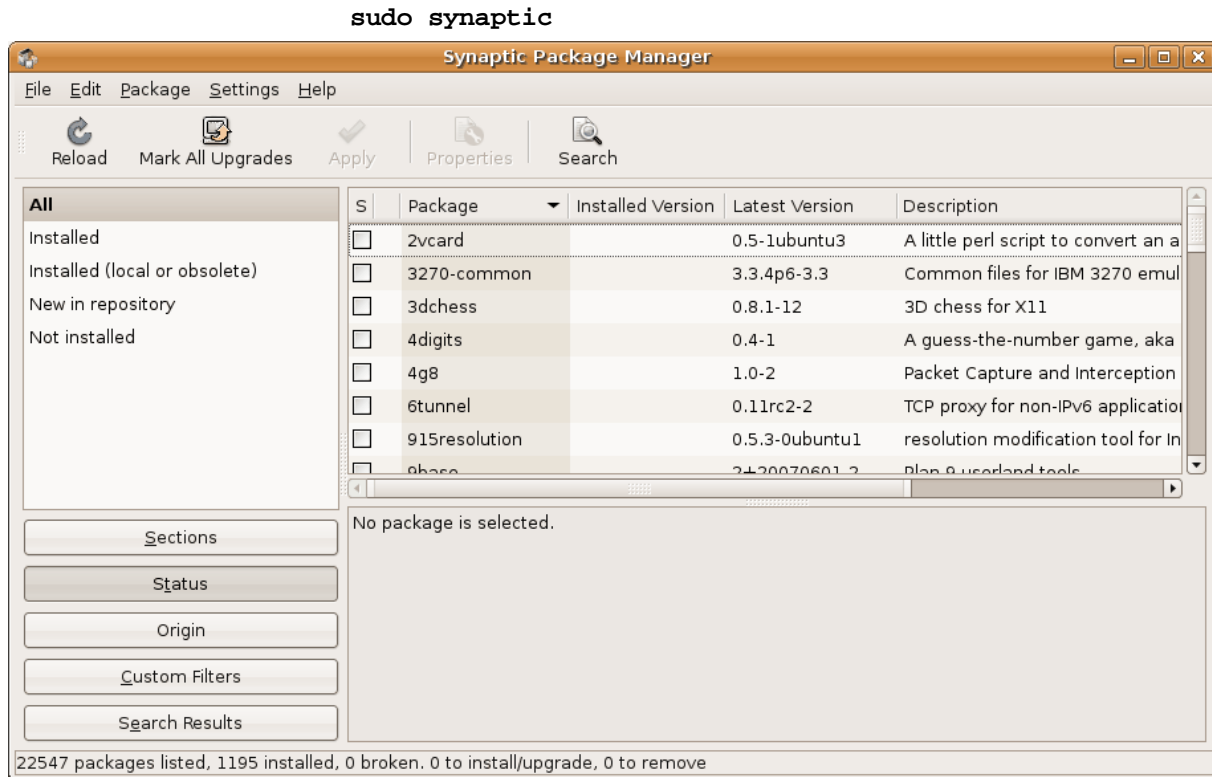
```
/usr/lib/NightStar/bin/install_icons
```

Installation of NightStar LX is now complete but you still need to activate a NightStar LX license. Skip ahead to “Obtaining License Keys” on page 29.

3.1.3. Detailed Ubuntu Installation Instructions using Synaptic

The following instructions refer to **synaptic** version 0.60ubuntu5. Previous versions may have a slightly different user interface, but the concepts are the same.

Begin the installation process by running **synaptic** as the *root* user:



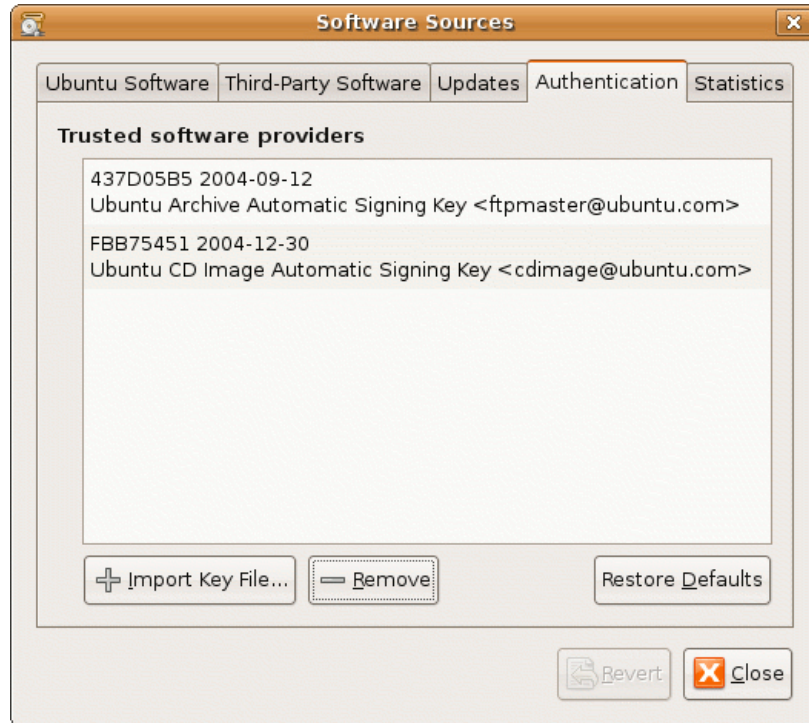
1. Add Concurrent’s public GPG key to synaptic’s authorization database
 - a. Download the key file via the following command:

```
wget http://redhawk.ccur.com/debian/ccur-public-key
```

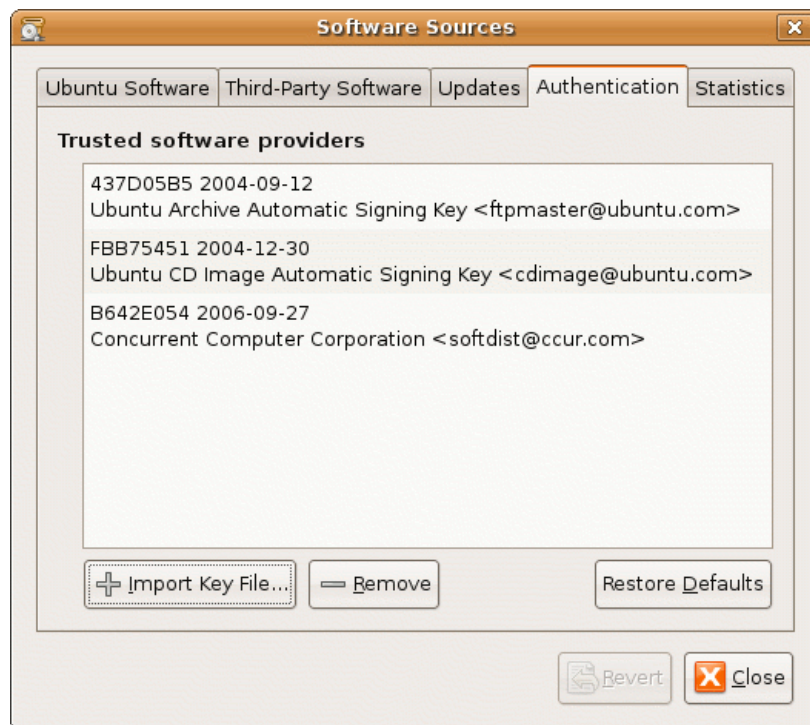
The key file is also included in the **debian** directory of the NightStar LX Installation CD.

If you wish to verify the authenticity of the key, contact Concurrent Customer Support (as described in “Direct Software Support” on page 49) and request the key’s fingerprint

- b. Open the Software Sources dialog via the Settings -> Repositories option on the menu bar and click on the Authentication tab.

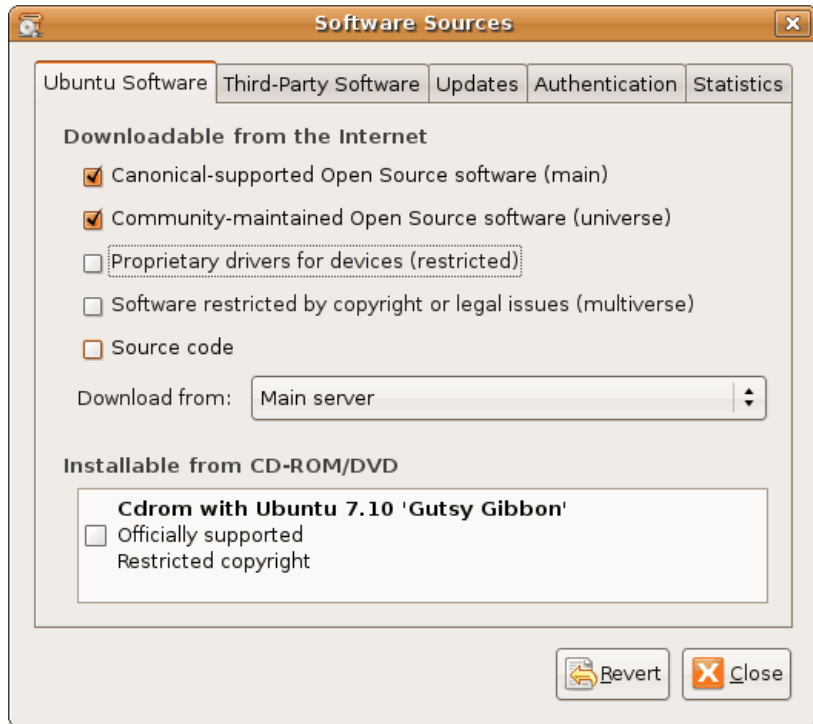


- c. Click the Import Key File button and select the key file from step a) and press the OK button.

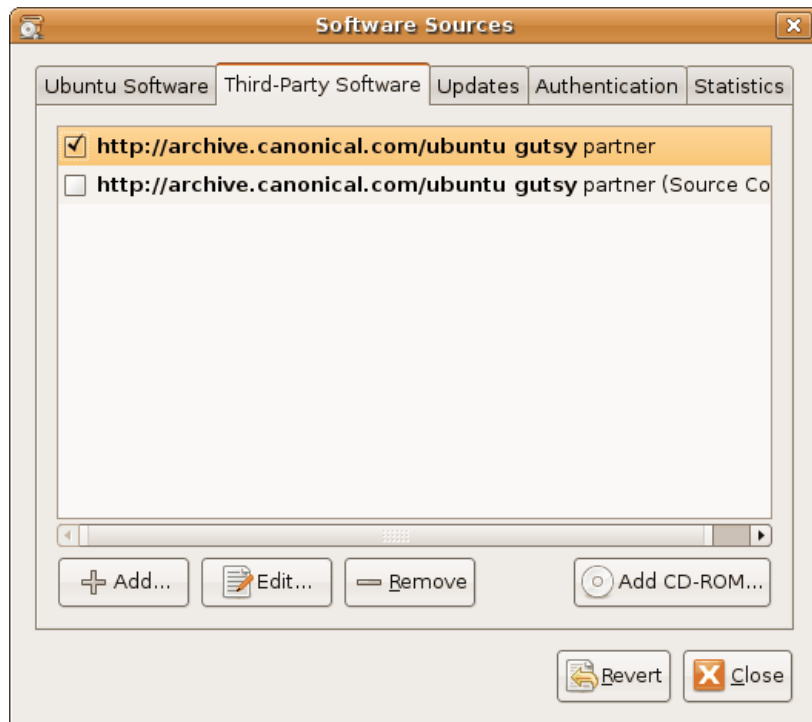


2. Add the appropriate repositories to the Software Sources list

- a. Click on the **Ubuntu Sources** tab of the **Software Sources** dialog that was opened in step 1.



- b. Ensure that the standard repositories are checked on the **Ubuntu Software** tab, including the **main** and **universe** repositories, as shown above.
- c. Click on the **Third-Party Software** tab.

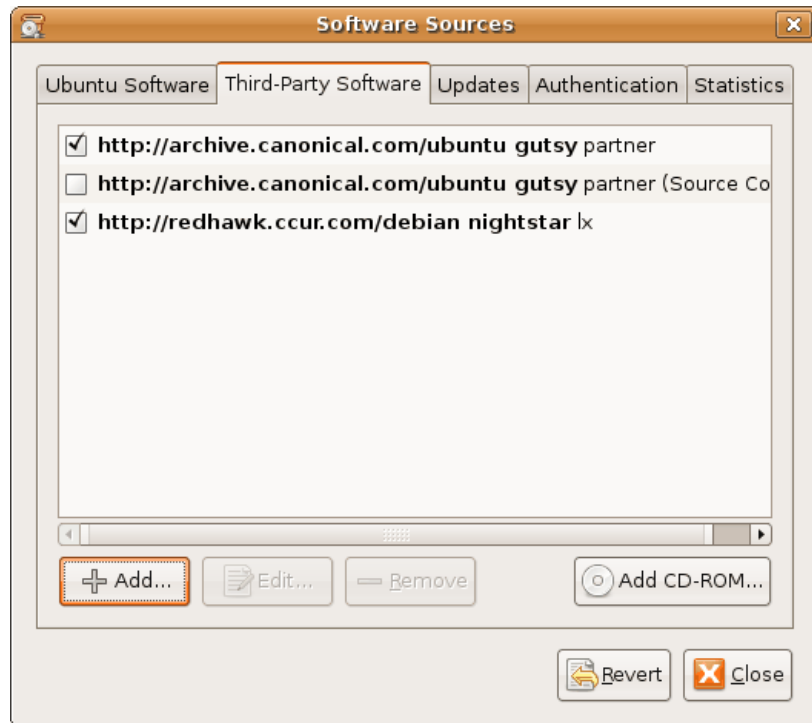


d. If you are installing from CD, skip to Step 2e on page 9.

If you are installing from the network, press the Add button and enter the following line into the dialog, then press Add Source.

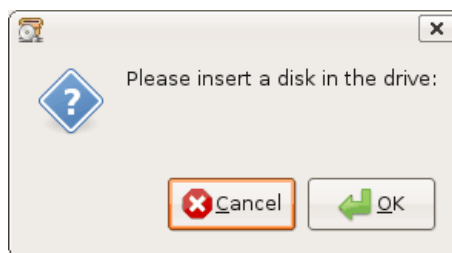
```
deb http://redhawk.ccur.com/debian nightstar lx
```

The Third Party Software tab should now include the **nightstar** repository as shown below:



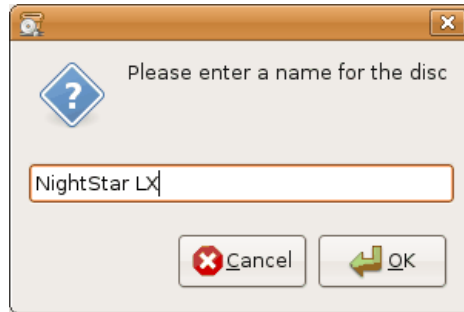
Now skip ahead to Step 3 on page 21.

e. If installing from CD, click the Add CD-ROM button



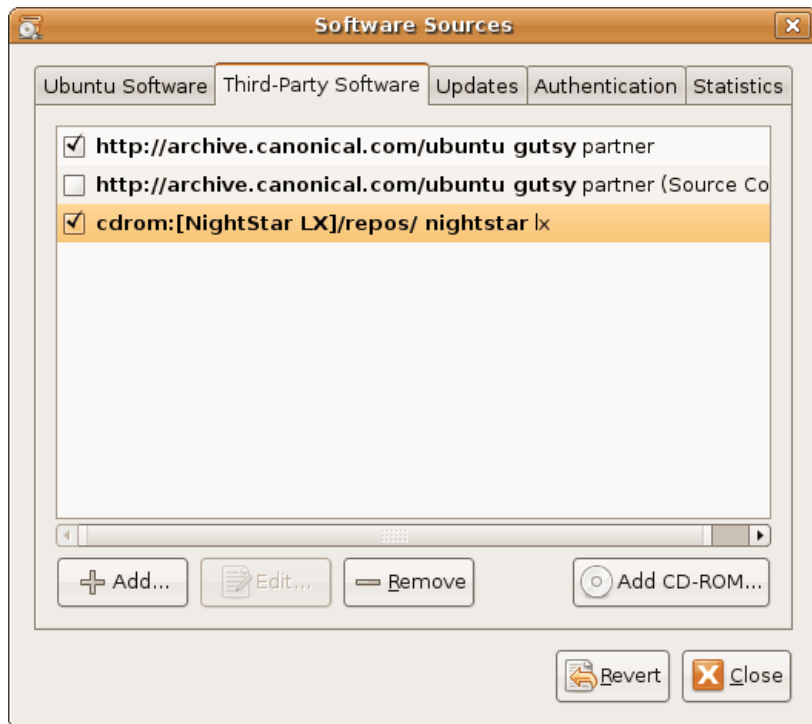
f. Insert the NightStar Installation CD and press OK.

- g. When prompted for a name for the CD, enter NightStar LX and press the OK button.



- h. Press the Close button on the Scanning CD-ROM dialog if it persists in staying open.

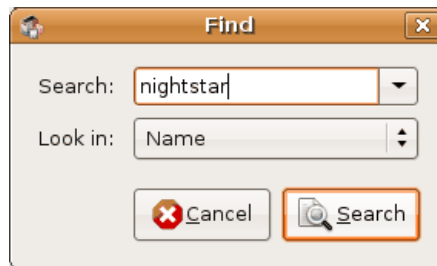
The Third-Party Software tab should now include the NightStar LX CD entry, as shown below:



3. After adding the repository as described in Step 2, a dialog may appear which warns you that the configuration has been changed and you must press the **Reload** button to load details associated with the new repository.

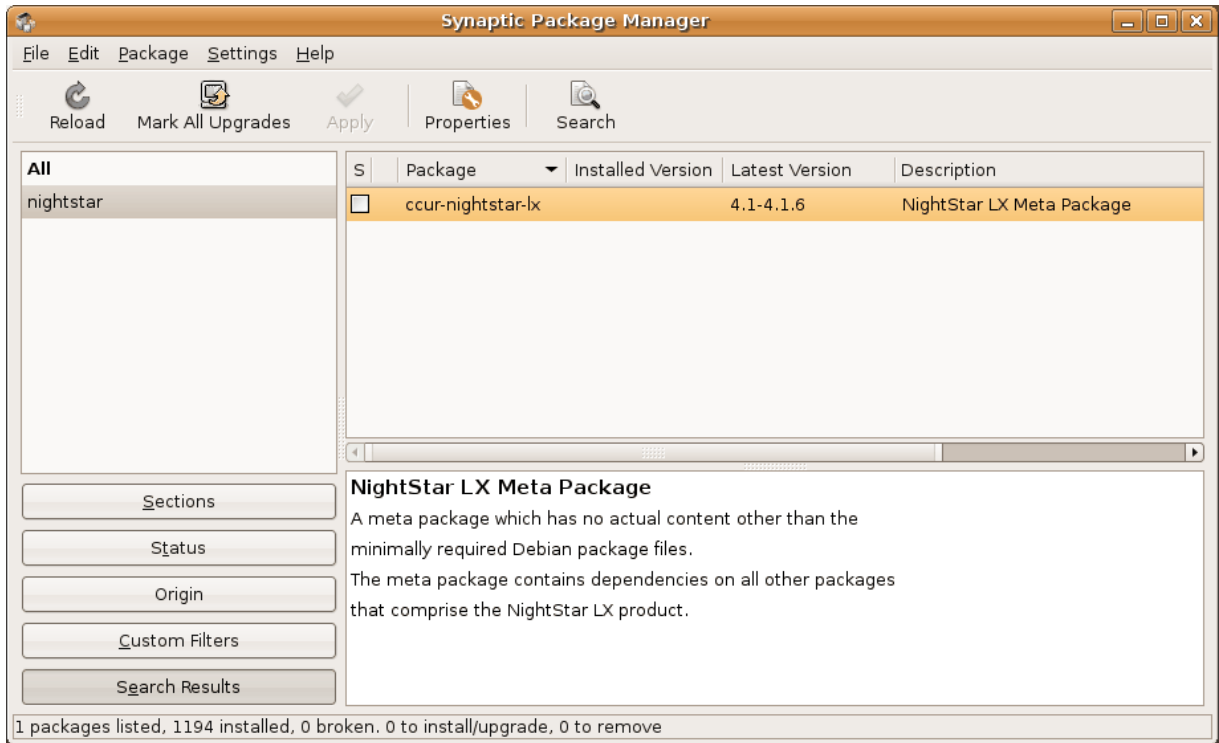


- a. If a dialog similar to the above appears, press its **Close** button.
 - b. Press the **Reload** button on the main window (even if a dialog similar to that shown above did not appear).
4. Press the **Search** button on the main window
 - a. Enter **nightstar** into the **Search** text field and select **Name** from the **Look in** option list as shown below:



b. Press the **Search** button in the dialog.

Synaptic should now show you a matching package as shown below:

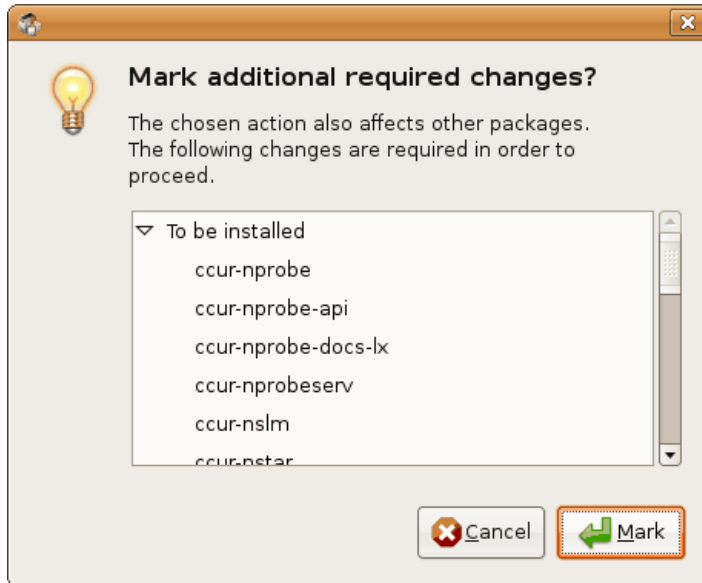


5. Select packages for installation

- a. Select the **ccur-nightstar-lx** package by clicking on its row in the main window
- b. Right-click on the **ccur-nightstar-lx** selection to launch the context menu, then select **Mark for Installation**.

The **ccur-nightstar-lx** package is a meta package which contains no actual files, merely package dependencies which cause the core portion of the NightStar LX product to be installed.

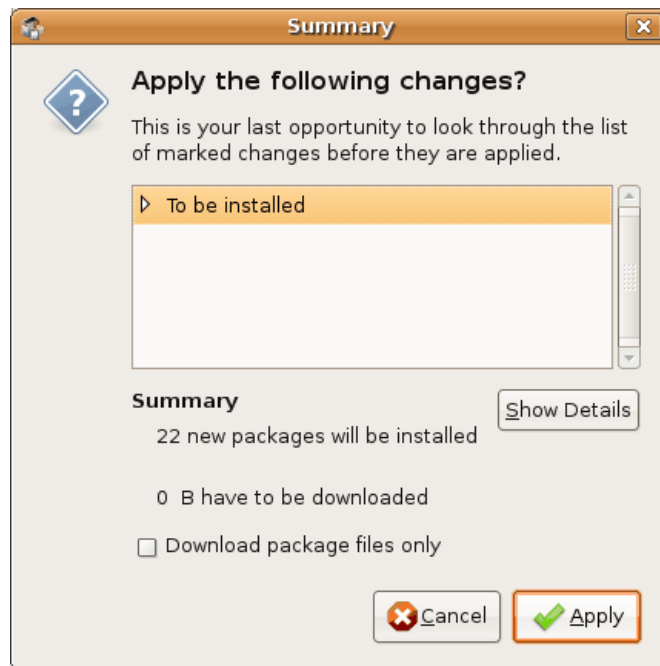
Synaptic will display a dialog indicating the additional packages which will be installed in order to satisfy those dependencies.



c. Press the **Mark** button to approve installation of those packages and close the dialog.

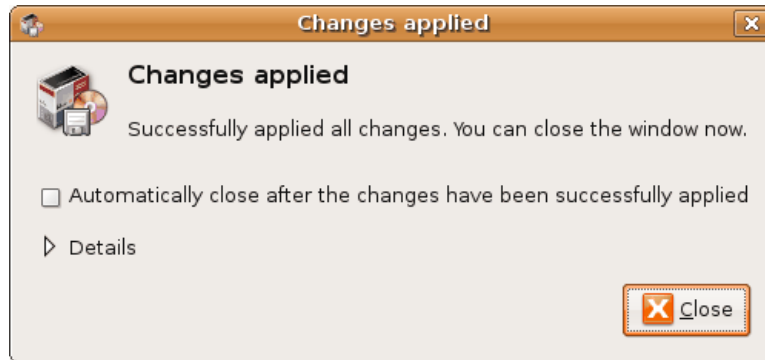
6. Install the Packages

a. Press the **Apply** button in the main window.



b. Press the **Apply** button in the dialog as shown above to start actual installation.

c. After successful installation, you may see a dialog similar to the following.



Press the **Close** button if this dialog appears.

7. Exit **synaptic**.
8. Optionally install NightStar LX desktop icons:

Run the following command as your normal user, not *root*, otherwise the icons will only be installed on *root*'s desktop:

```
/usr/lib/NightStar/bin/install_icons
```

Installation of NightStar LX is now complete but you still need to activate a NightStar LX license. Skip ahead to “Obtaining License Keys” on page 29.

3.2. Instructions for Red Hat, Fedora, CentOS and SUSE Systems

There are two methods of installing NightStar LX on Red Hat, Fedora, CentOS and SUSE systems.

- Network Installation
- CD Installation

3.2.1. Network Installation

The following steps describe how to install NightStar LX from Concurrent's Software Repository.

To complete the installation, you will need to supply an Order Number and an Email Address. If you purchased NightStar LX, provide the order number you received when you purchased it and use the email address you registered at that time. If you would like to evaluate the tools on a trial basis, first register at <http://www.ccur.com/NightStar> to obtain a trial Order Number. The order number is emailed to you as part of the registration step.

1. Download the installation bootstrap tar file that matches your operating system distribution and architecture. A list of these bootstrap tar files can be found at:

```
http://redhawk.ccur.com/nightstar-lx/index.html#kits
```

2. Extract the files from the tar file:

```
tar zxvf nstar-lx-*.tar.gz
```

3. Execute the installation script in the **nightstar-lx** directory:

```
cd nstar-lx-*; ./install-nstar
```

Installation via NUU (a YUM client)

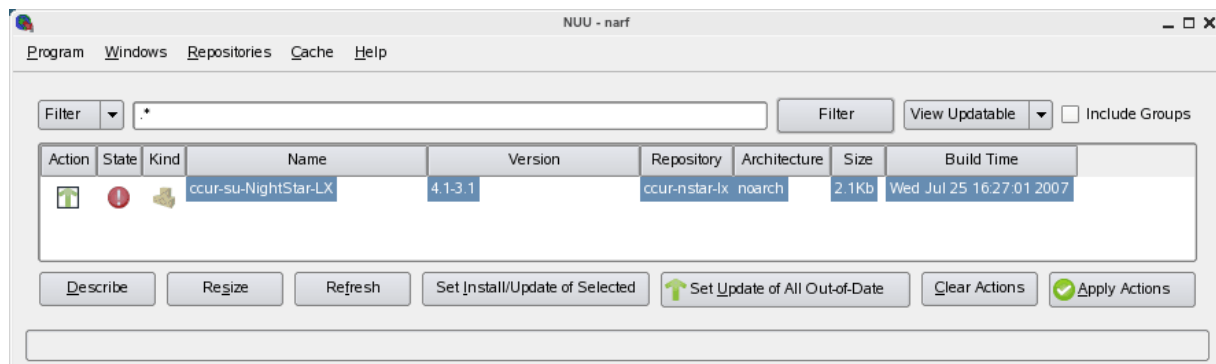
Most Red Hat and SUSE distributions support YUM repositories. For those systems, the network installation will be done via **nuu**, a graphical user interface client to the YUM system. **nuu** will be installed, and once launched, the following dialog will appear.



4. Supply your Email address and Order Number and press OK.
5. By default, **nuu** will display the installed packages which can be updated.

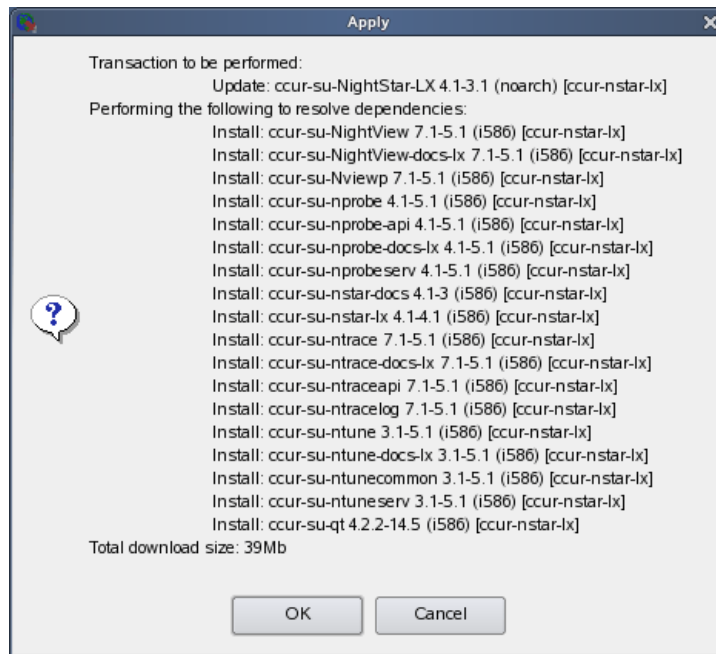
This should now include the NightStar LX meta package, which has dependencies on all the other packages which comprise the core of NightStar LX.

Click the ACTION box to the left of the row with the **ccur-NightStar-LX** package name (or **ccur-su-NightStar-LX** for SUSE-based systems).

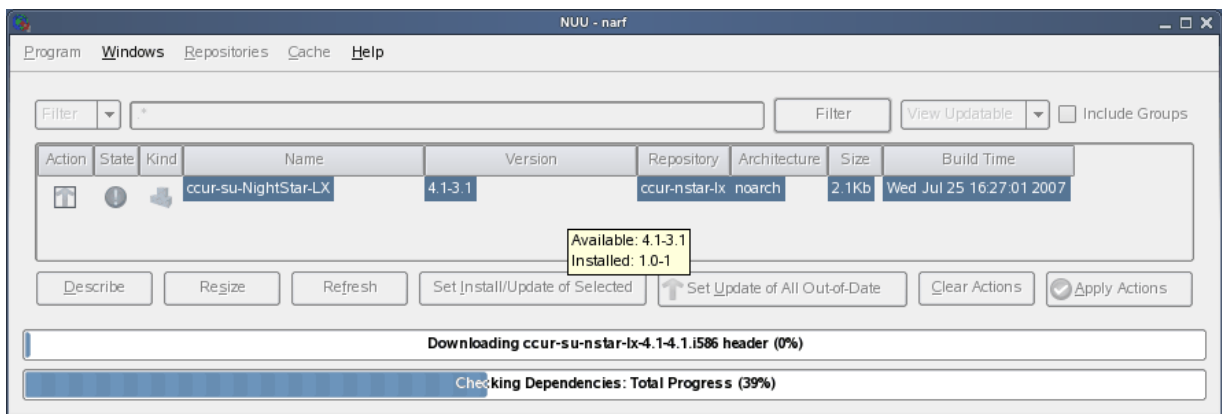


6. Press the Apply Actions button.

nuu will download header information to perform dependency analysis and resolution. A screen similar to the following will be presented indicating which packages will be installed:



Press the OK button to initiate download and installation of packages.



7. Exit **nuu** using the Program -> Quit menu option.

Installation of NightStar LX is now complete, but you must still obtain and install a license key by following the instructions listed under “Obtaining License Keys” on page 29.

SUSE Systems that Do Not Support YUM

Recent SUSE systems have dropped support for YUM; for these systems, the installation script will employ **zypper**, a native SUSE installation tool, to install from Concurrent’s network repository.

You will be prompted for the Email address and Order Number before **zypper** begins the installation.

Depending on the version of SUSE that you have, you should expect to encounter some issues during installation.

- Zypper may ask you if you should trust the public key file it finds in Concurrent's repository -- which is required to authenticate the signed repository. Answer "t" for trust or "a" for always trust. If you are uncomfortable doing this, contact Concurrent Customer Support as directed in "Direct Software Support" on page 49 to verify the authenticity of the key via its fingerprint.
- Zypper may issue a warning that some packages to be installed from Concurrent's repository are not supported by their vendor -- this is incorrect. Concurrent fully supports all RPMs in the Concurrent software repository for NightStar LX that begin with the prefix **ccur**. Ignore the warning and proceed.
- Zypper may not be able to authenticate the secure certificate it encounters at <https://redhawk.ccur.com> because older versions of SUSE do not recognize the certificate authority that granted Concurrent their SSL certificate. You can rectify this situation by installing the public key for the certificate authority, which you can obtain from newer SUSE systems or from Novell.

1. Download the following RPM file for SUSE 11.0 from Novell:

```
openssl-certs-0.9.8h-25.14
```

2. Extract the following file (using **rpm2cpio** or the like) from the RPM (or, if you have a newer SUSE system available, skip the download of the RPM and simply copy the file between systems):

```
/etc/ssl/certs/UTN_USERFirst_Hardware_Root_CA.pem
```

placing it in **/etc/ssl/certs** on your system.

3. Change to the following directory:

```
/etc/ssl/certs
```

4. Run the following command as the root user:

```
/usr/bin/c_rehash
```

3.0.1. CD Installation

To install NightStar LX using the *NightStar LX Installation CD*:

1. Insert the *NightStar LX Installation CD* in the CD-ROM drive.
2. If the CD does not auto-mount, mount the CD-ROM drive (assuming the standard mount entry for the CD-ROM device is **/media/cdrom** in **/etc/fstab**)

```
mount /media/cdrom
```

3. Double-click on the CD icon labeled NightStar LX on your desktop.

4. Double-click on the icon labeled Launch Install Script.

IMPORTATNT

Some operating system distributions mount the CD with the *noexec* mount option, which makes it impossible to run any installation scripts from the CD. In this situation, if you try to double-click on the Launch Install Script, the screen may flash or simply do nothing -- with no error message.

If this occurs, verify that the *noexec* option has been applied (you can use the mount command and look for the CD entry). To correct the problem, remount the CD by issuing the following command (as root), substituting the actual mount point used for **/media/cdrom** as shown here:

```
mount -o exec,remount /media/cdrom
```

NOTE

If you are not using a file browser to access the CD, change the current working directory to **/media/cdrom** and invoke the **./install-nstar** script.

The NightStar icons will be installed on root's desktop.

NOTE

Since you are running as root, these icons will only be installed on root's desktop. To install these on your normal user's desktop, run the following script when logged on as your normal user:

```
/usr/lib/NightStar/bin/install_icons
```

4.0. Obtaining License Keys

If you are upgrading from a version of NightStar LX prior to version 4.1, you must obtain new permanent license keys (NightStar LX Version 4.1 uses a different license feature code than in prior releases).

License Key

- If you have purchased NightStar LX or registered as a trial user, you can obtain your license key at the following URL:

<http://www.ccur.com/NightStarRTKeys>

You will need your permanent or trial Order Number, your Email Address, and your System Identification number which was displayed during product installation. You can obtain that number again by running the following command on the system where the license keys will be installed:

```
/usr/bin/nslm_admin --code
```

See “NightStar LX Licensing” on page 46 for more detailed information about the NightStar License Manager (NSLM).

5.0. Product Updates

After installation, you can keep your NightStar LX product up to date interactively by referencing Concurrent's software repositories which are updated as product updates become available.

5.1. NightStar Updates for Debian and Ubuntu Systems

Concurrent maintains a NightStar LX repository in APT format.

Product updates for NightStar LX can be installed using the standard Debian and Ubuntu tools (e.g. **synaptic**, **apt-get**, **update-manager**).

Ensure that `/etc/apt/sources.list` has the following repository entry to gain access to Concurrent NightStar LX updates:

```
deb http://redhawk.ccur.com/debian nightstar lx
```

5.2. NightStar Updates for Red Hat, Fedora, CentOS and SUSE Systems

You can keep your NightStar product up to date using NUU (Concurrent's Network Update and Installation Utility) or even install a **cron** job to update your system nightly.

To query Concurrent for updates and optionally install them interactively, invoke NUU:

```
/usr/bin/nuu
```

Once you have successfully entered your authentication information using NUU (your Order Number and your Concurrent-registered Email address), you can set up your system to automatically update.

To automatically update your system nightly with any available NightStar updates, add a line similar to the following to **root**'s cron table (`/usr/bin/crontab -e`):

```
1 0 * * * /usr/bin/yum -y --disablerepo=*  
--enablerepo=ccur-nstar-lx update
```

NOTE

On recent SUSE-based systems, support for YUM has been dropped by SUSE, therefore **nuu** is not available. You can use the native SUSE **zypper** tool to access Concurrent's network repositories to keep NightStar LX up to date. The following command is an example of adding the NightStar LX repository to the list of zypper-enabled repositories (replace *email*, *order*, and *arch* with the appropriate values in the URI shown below):

```
zypper ar -t rpm-md \  
  https://redhawk.ccur.com/buffet/Login=email/Password=order/path=NightStar/LX/SUSE/arch ccur-nstar-lx
```

NOTE

The value of *arch* in the URI above should be either *i386* or *x86_64*.

6.0. Documentation

The following table lists the NightStar LX Version 4.1 SR5 documentation available from Concurrent.

Table 6-1. NightStar LX Version 4.1 SR5 Documentation

Manual Name	Pub. Number
<i>NightStar LX Installation Guide (Version 4.1 SR2)</i>	0897008-4.1SR5
<i>NightStar LX Tutorial (Version 4.1)</i>	0897009-072
<i>NightProbe User's Guide (Version 4.1)</i>	0897465-106
<i>NightTrace User's Guide (Version 7.1)</i>	0897398-166
<i>NightTune User's Guide (Version 3.1)</i>	0897515-036
<i>NightView User's Guide (Version 7.1)</i>	0897395-336

Additionally, the manuals are available:

- in PDF format in the **documentation** directory of the *NightStar LX Installation CD*
- on the Concurrent Computer Corporation web site at <http://redhawk.ccur.com/docs>

and, after installation:

- using the NightStar integrated HTML online help from the **Help** menu of any NightStar tool
- in PDF format in the directory **/usr/share/doc/NightStar/pdf**
- in HTML format in the directory **/usr/share/doc/NightStar/html**

7.0. NightStar LX GUI Features

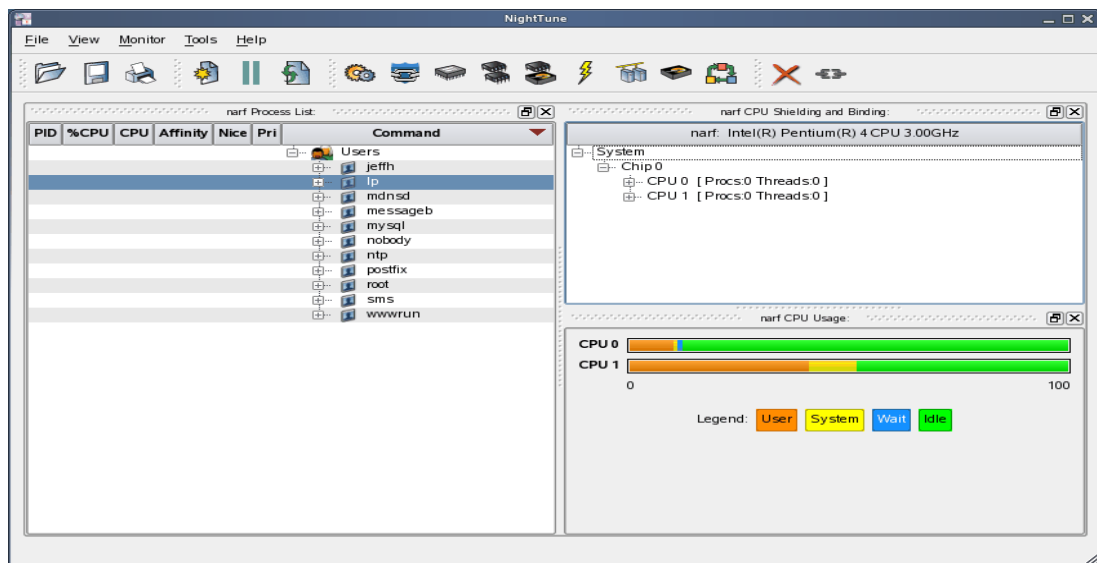
Some of the common features of the NightStar LX Tools graphical user interface include:

- movable and resizable panels
- tabbed pages
- context menus

7.1. Movable and Resizable Panels

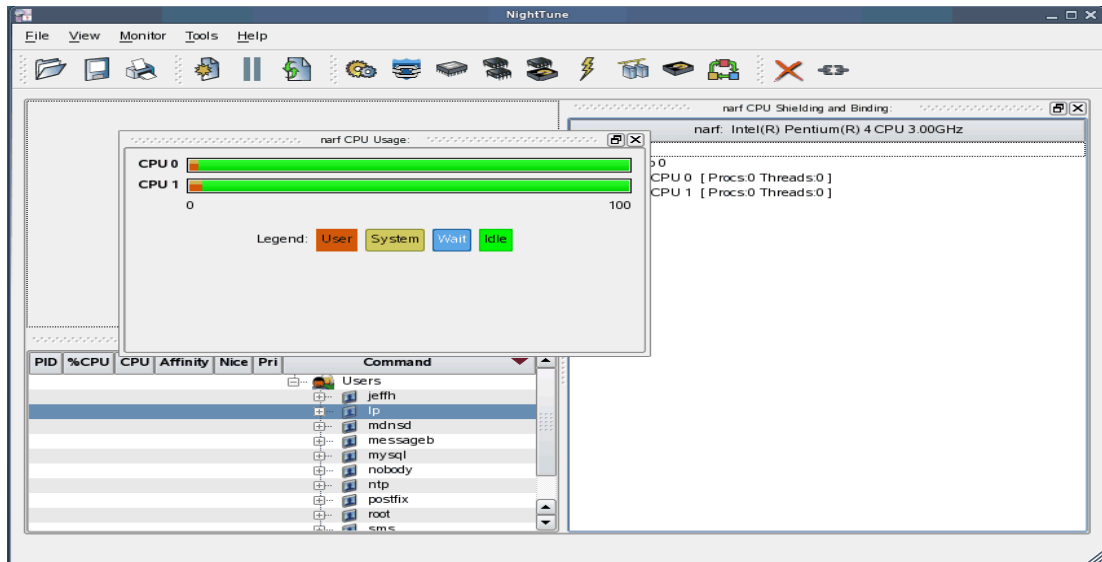
The NightStar LX Tools allow the user flexibility in configuring the graphical user interface to suit their needs through the use of resizable and movable panels.

For instance, consider the default configuration for NightTune. When NightTune is invoked, the graphical user interface looks similar to the following figure:

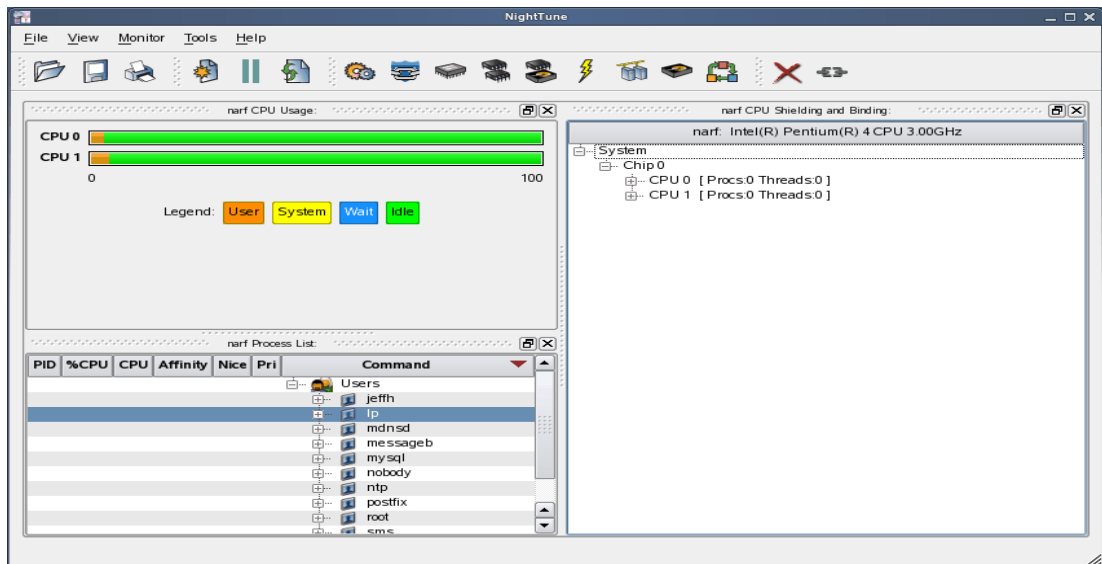


To move one of the panels in the current page, left-click on the title bar for the panel you wish to move and begin to drag the panel to the desired location. The application will respond by creating space on the page based on where you move the panel while resizing and moving the other panels accordingly.

For instance, to move the CPU Usage panel above the Process List panel, left-click on the title bar of the CPU Usage panel and begin to drag it up and to the left. NightTune will respond by creating space above the Process List panel as shown in the figure below:

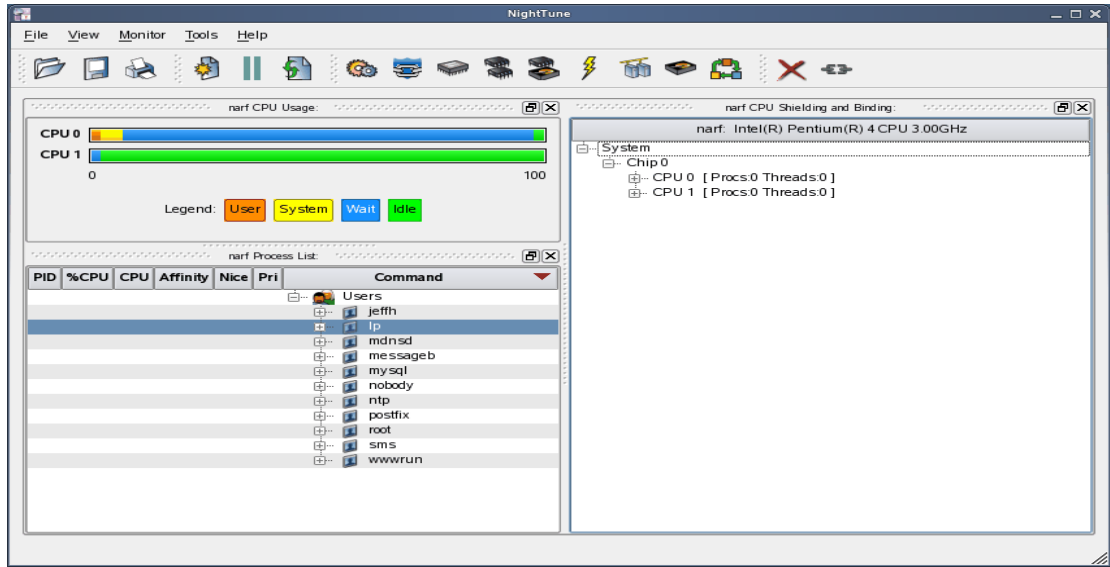


Release the mouse button when NightTune has opened a space where you desire and NightTune will place the panel in that location. The CPU Usage panel now resides in the upper left corner of the NightTune display:



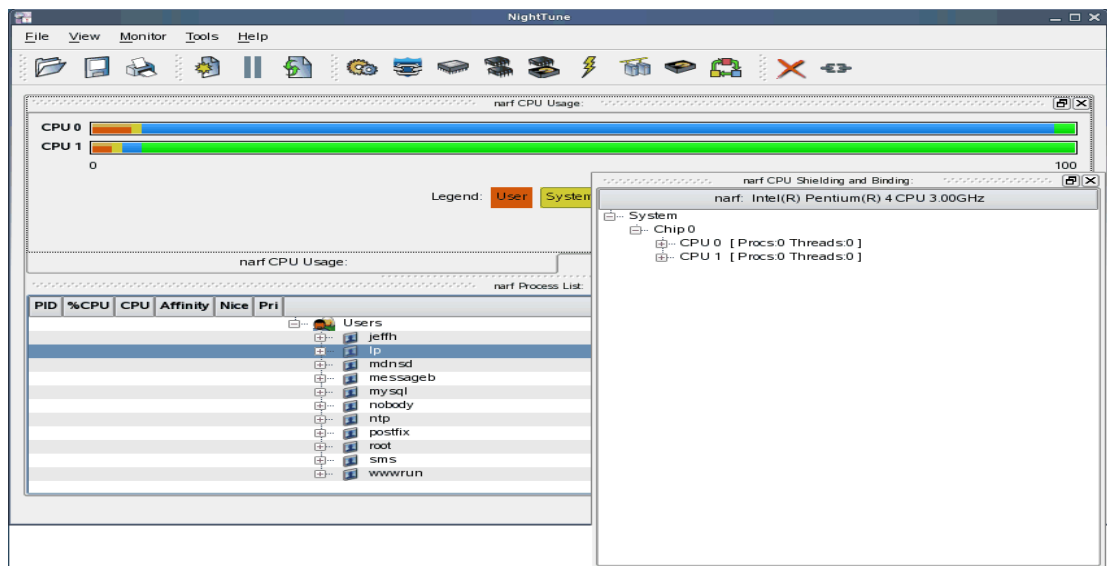
If an empty space does not appear where you desire it, try increasing the size of the main window, decreasing the size of the undocked panel, and moving an alternative edge of the undocked panel near where you want to place it.

Panels can be resized by left-clicking on the separator between the panels and dragging it to the desired size. For instance, to increase the height of the Process List panel (and thereby decrease the height of the CPU Usage panel), left-click on the separator between the two panels (the cursor will become a double-headed arrow) and drag the separator until the panels are the desired size.

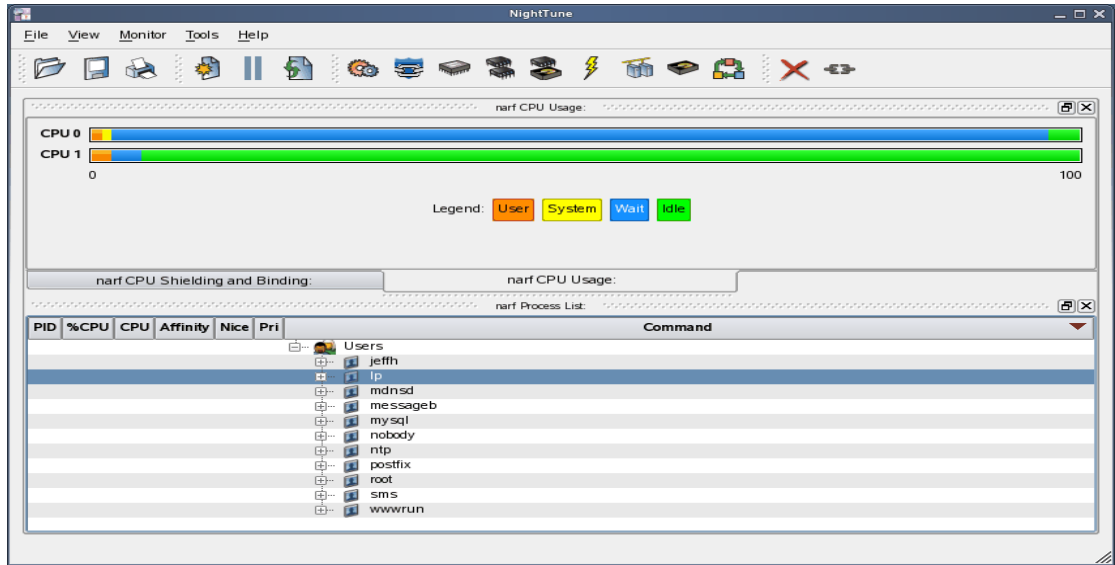


Another feature of the NightStar LX Tools graphical user interface is the use of tabbed panels. Tabbed panels allow you to maximize your GUI real estate by placing two or more panels in the same location. You can then switch between the panels using the tabs created.

In our example, we can configure NightTune so that the CPU Shielding and Binding panel and the CPU Usage panel share the same space. Left-click on the title bar of the CPU Shielding and Binding panel and drag it beneath the CPU Usage panel until you see a tab labeled “CPU Usage” created at the bottom of the CPU Usage panel as shown in the figure below:



Release the mouse button and NightTune places the CPU Shielding and Binding panel in the same location as the CPU Usage panel and creates two tabs underneath enabling you to switch back and forth between the two:

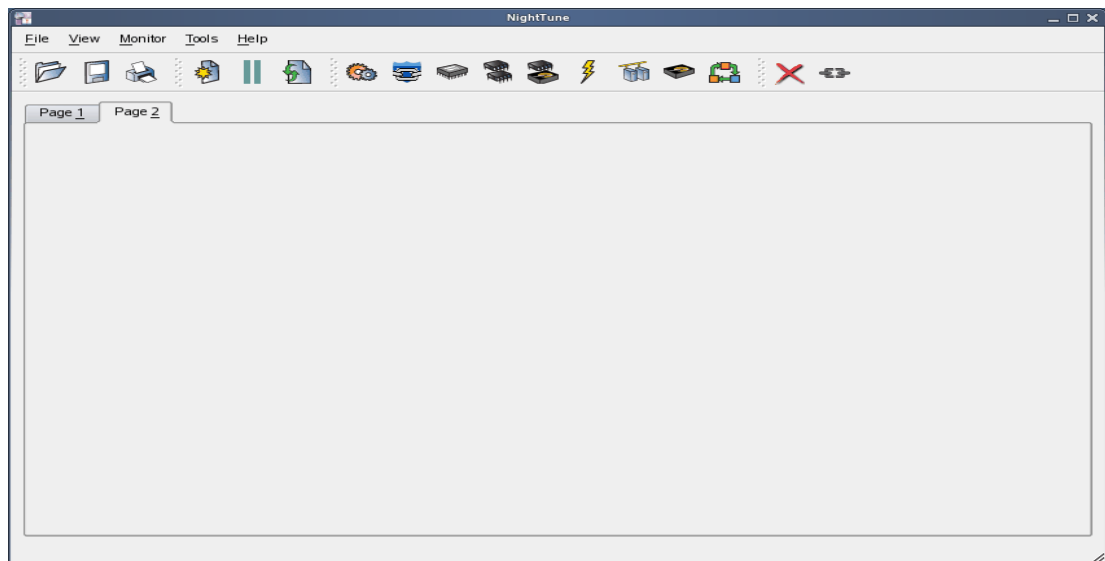


7.2. Tabbed Pages

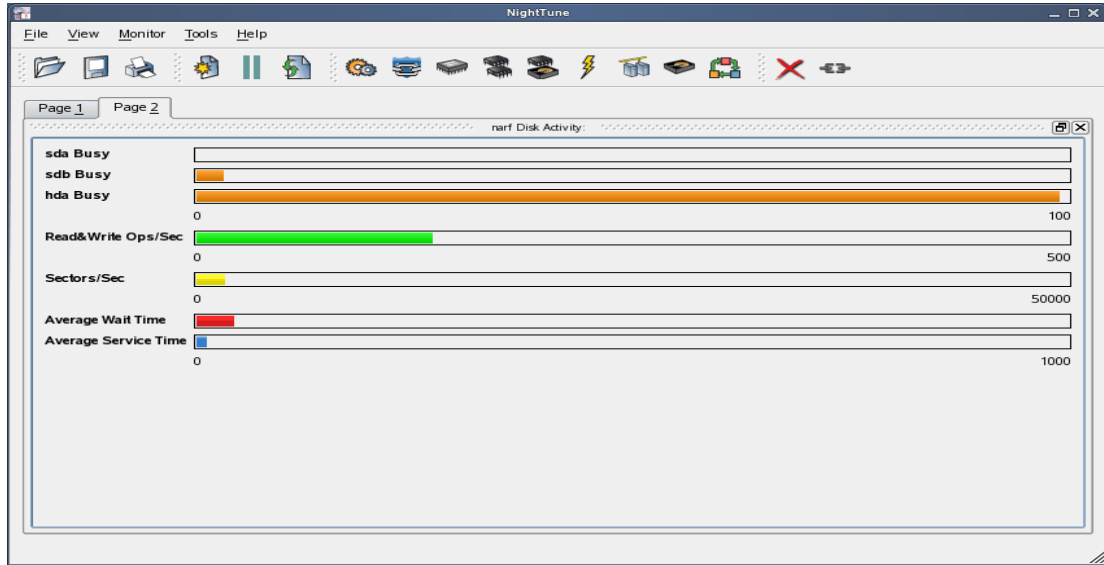
The NightStar LX Tools allow the user to maintain multiple views of data and the mechanisms that manipulate that data within each application through the use of tabbed pages. By default, only one page is displayed when the tool is invoked.

In our NightTune example from the previous section, we can create another page in which to display a different set of data. For instance, perhaps we would like to monitor disk activity, interrupt activity, and memory activity but do not want to clutter up our original page.

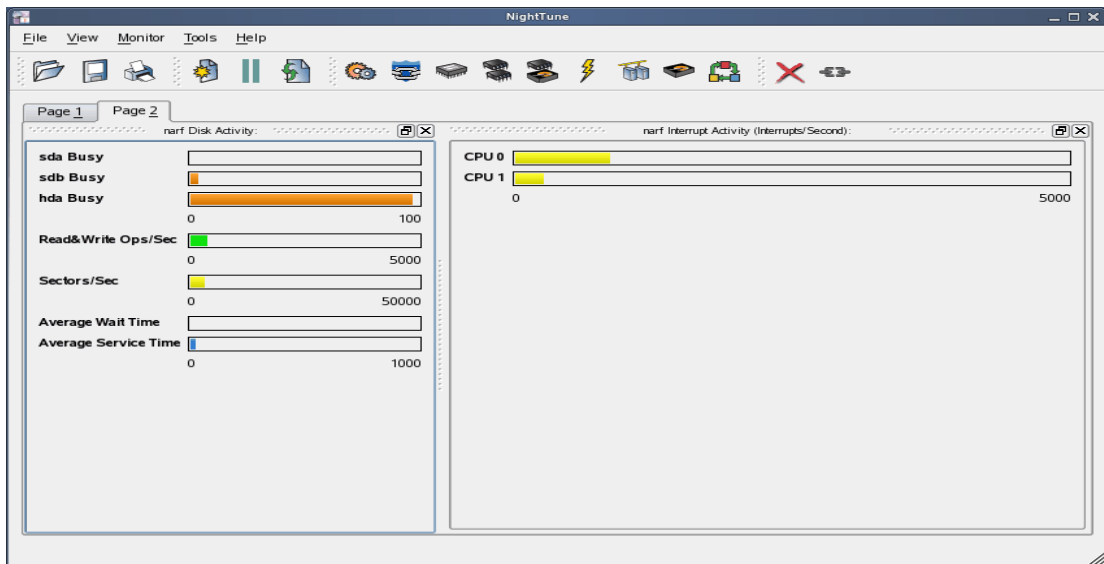
Select **Add Page** from the **View** menu. NightTune will create two tabbed pages; our original page is placed under the first tab and a new empty page will be presented under the second:



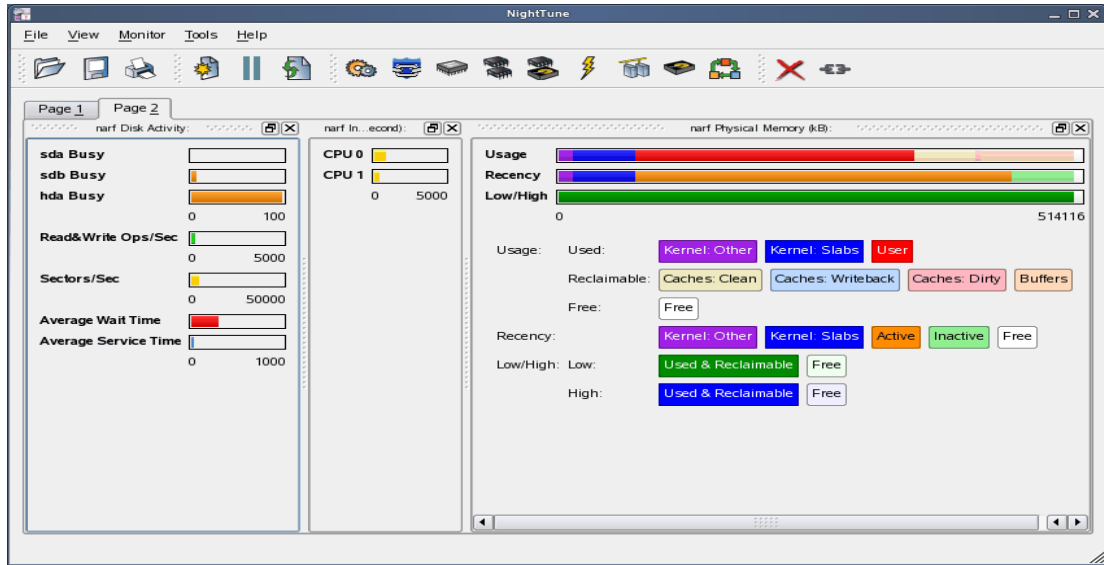
To add the desired NightTune panels, click on the Monitor menu item. You will be presented with a menu of panels to choose from. Select the Disk Activity menu item and then select Bar graph pane from the sub-menu. The Disk Activity panel displaying the information in bar graph format is added to our new page:



Select Bar graph pane from the Interrupt Activity sub-menu. The Interrupt Activity panel is added to the page:



Select Bar graph pane from the Memory: Physical sub-menu. The Physical Memory panel is added to the page:



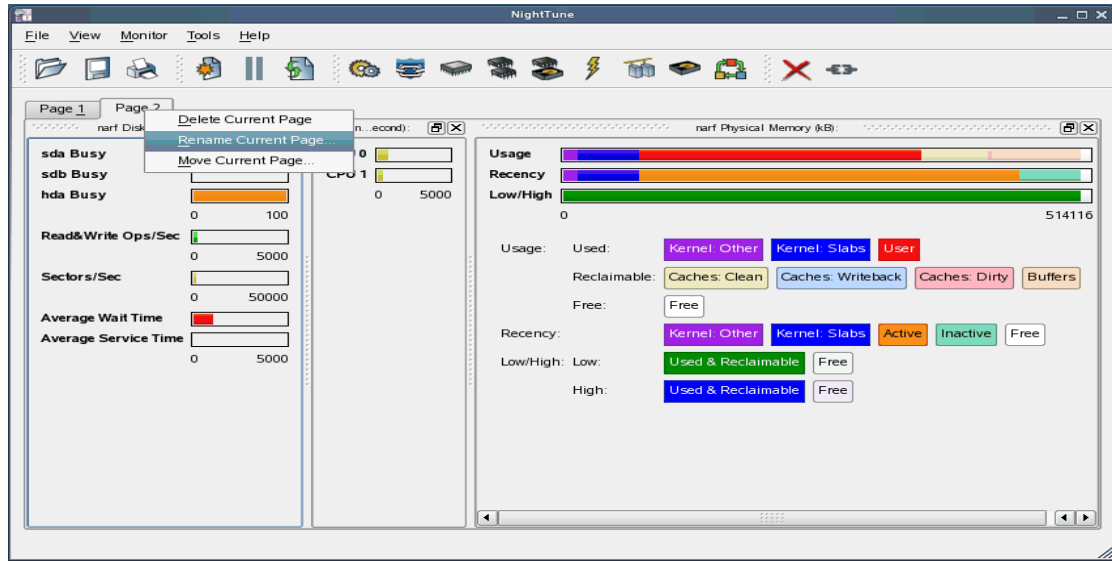
Our new page now contains the Disk Activity, Interrupt Activity, and Physical Memory panels all displaying their information in bar graph format. We can switch back to our first page by clicking on the tab labeled “Page 1” and return to our new page by clicking on the tab labeled “Page 2”.

7.3. Context Menus

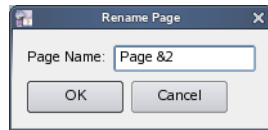
The NightStar LX Tools provide extensive use of context menus. Right-clicking in any of the NightStar LX Tools will provide the user with a menu containing items related to the location of the mouse in the tool.

We can demonstrate this feature using our NightTune example. For instance, perhaps we would like to give our new page that we created in “Tabbed Pages” on page 36 a more meaningful name.

Right-click on the tab labeled “Page 2”. We are presented with a context menu with the menu items Delete Current Page, Rename Current Page..., and Move Current Page...:



Select **Rename Current Page...** from the context menu. The **Rename Page** dialog is presented:

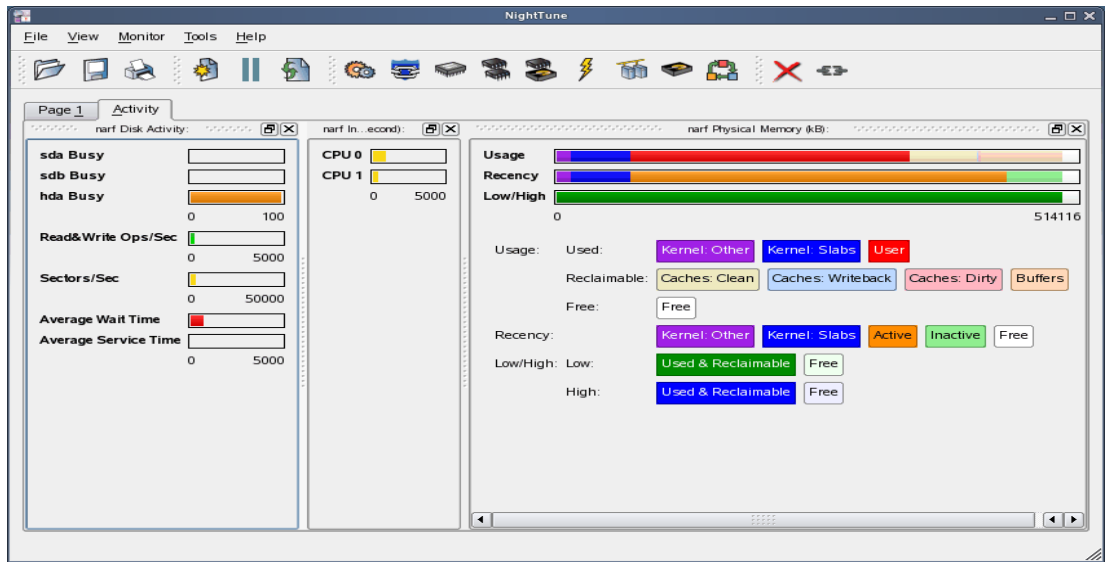


Change the Page Name to “&Activity”.

NOTE

An ampersand (&) before a particular character creates an accelerator for that page. The user can then switch to a particular page by holding down the Alt key and pressing the accelerator for that page. The accelerator is indicated on the tab by an underline.

Press Alt-1 to switch to our original page; press Alt-A to return to our Activity page:



8.0. Overview of NightStar LX

The following sections describe the basic features of each of the NightStar LX tools.

8.1. NightProbe

The features of the NightProbe data monitor include:

- Independent sampling and recording of program data
- Synchronous and asynchronous data capture
- Flexible data display features
- Sampling, recording and replay APIs
- Time stamping of acquired data

NightProbe is a tool for independently monitoring, modifying and recording data values from multiple application resources, including programs, shared memory segments, and memory mapped files. NightProbe can be used in a development environment for debugging, analysis, proto-typing and fault injection, or in a production environment to create a GUI control panel for program input and output.

Synchronized and Asynchronous Logging

NightProbe can perform synchronous logging of data via a simple API. Asynchronous logging can be performed via on-demand sampling or a cyclic clock rate.

NightProbe provides for logging data items using tracepoints for simultaneous analysis by the NightTrace event analyzer. Sampled data can be combined with additional user trace data to obtain a synchronized picture of application behavior. NightProbe can record data to disk files or provide data directly to the NightTrace tool.

Interactive Sampling and Modification

NightProbe provides a flexible spreadsheet display for on-demand or cyclic sampling of data at user-specified refresh rates. Direct modification of user data is accomplished by typing in new values for data items into the spreadsheet. NightProbe provides colorized notification of violations of user-defined data thresholds for individual data items. NightProbe allows sampled data to be timestamped and passed off to user applications written with the NightProbe API for subsequent analysis, recording or customized display.

NightProbe supports scalar and structured data types in C/C++ and Fortran that have statically-determined addresses and shapes. NightProbe scans the symbol table and debug information of user programs allowing the user to browse for data items or specifically enter the names of data items to be monitored. Any application that contains symbol table and debug information may be used with NightProbe. No application source code changes are required.

8.2. NightTrace

The features of the NightTrace event analyzer include:

- Synchronized graphical or text display of system application activity
- User-defined event logging in single or multi-threaded applications
- Data analysis API
- Application Illumination, featuring automated program instrumentation

NightTrace is a tool for displaying and analyzing the dynamic behavior of applications, the Linux operating system and the interaction between them. NightTrace can log events from multiple processes executing simultaneously on multiple CPUs or systems. NightTrace then creates a graphical time-based view of all logged events. NightTrace allows users to zoom, search, filter, summarize and analyze events. Tracing analysis can be performed live or post execution.

NightTrace was specifically designed to meet the most stringent requirements of time-critical applications. Using synchronized, fast-access hardware clocks and kernel-free primitives, NightTrace tracepoints are logged with minimal overhead. Tracepoints can be inserted into any user application. Tracepoints can be left in production-quality applications even when not collecting trace data.

NightTrace's Application Illumination feature allows you to automatically instrument a user application without making source changes. It allows you to selectively enable or disable tracing for all functions or specific sets of functions and describes the entry and exit of functions, their parameters, and return values.

Graphical and Interactive

NightTrace graphically displays requested events and states along a timeline graph or event log to clearly show the relative timing of events and provide an overall picture of application activity. NightTrace can locate specific events and zoom in on them with a fine degree of granularity for precise timing observation. The NightTrace graphical display is completely user-configurable for customized viewing. Configurations can be saved and later recalled, and multiple configurations can be viewed simultaneously.

NightTrace generates source code using an Analysis API that allows users to easily create custom applications that monitor or analyze application or system activity.

8.3. NightTune

The features of the NightTune system and application tuner include:

- Dynamic display of system and application performance
- Monitoring of CPU use, memory paging and network operation
- Interactive control of processes, priorities, policies and interrupts
- Dynamic CPU affinity control for processes, threads and interrupts

NightTune provides a graphical interface to system facilities for monitoring and tuning application and system performance. Users can monitor the priority, scheduling policy,

CPU assignment and CPU usage of user applications. NightTune also monitors system CPU usage, context switches, interrupts, memory paging and network activity.

NightTune can monitor processes individually or in groups determined by user or by CPU. NightTune also displays information about individual threads or tasks within a process. Multiple frames and windows are used to display information allowing users to customize their display.

Application Tuning

NightTune allows users to change the process attributes of an individual thread, task or process or a group of processes as a whole using pop-up dialogs and drag-and-drop actions. For example, dragging a process icon to a CPU icon binds the process to that processor. The user then instantly sees the results of the tuning effort both graphically and as text.

System Tuning

NightTune allows users to change the CPU assignment of interrupts using pop-ups or drag-and-drop actions. NightTune optionally provides a textual log of all application and system tuning actions taking during a NightTune session.

8.4. NightView

The features of the NightView source-level debugger include:

- Multi-system, multi-processor, multi-process, multi-thread debugging via single interface
- Hot patches including breakpoints, monitorpoints and watchpoints
- Application speed conditions
- Dynamic memory “heap” debugging
- Modification and display of variables during execution

NightView allows users to simultaneously debug multiple, time-critical processes. With NightView, a programmer can change program execution and modify or display data without stopping or interrupting the program. Eventpoint conditions, such as hit and ignore counts, are patched directly into an application and can execute at full application speed. NightView provides fine-grained control without adversely affecting application timing.

NightView monitorpoints can display expressions at user-selected locations without stopping a process, thus providing data displays that are synchronized with the application's algorithms. Watchpoints utilize hardware address trap features that cause an application to stop when user-specified variables or memory locations are selectively read or modified.

Language-sensitive Debugging

NightView supports the debugging of multiple applications written in any combination of C/C++ and Fortran. All variables and expressions in each program are referenced in the

appropriate language. NightView is also integrated with the NightTrace event analyzer. NightView can insert tracepoints at user-specified locations for concurrent or post execution analysis by NightTrace.

More Powerful Than The Gnu Debugger

NightView offers many features not available in the gnu debugger (**gdb**). Advantages of NightView include the ability for users to debug multiple processes from a single session and processes started from scripts. With NightView, patched-in code runs at full speed. While a process is executing, hot patching can modify variables or add eventpoints. Monitorpoints can display expressions and stack variables, and signals can be sent directly to the process, bypassing the debugger.

Dynamic Memory Debugging

NightView includes an interactive memory debugger that helps find and eliminate memory problems during the debug process without code recompilation. NightView watches for heap memory leaks, monitors the amount of memory an application uses, and tracks how it allocates and frees memory. With its memory debugger enabled, NightView lets users track heap allocations and deallocations in real-time, thus allowing for more efficient debugging than post-run analysis. Programmers can stop execution, check for problems, test patches and then continue debugging. NightView can detect double-frees, dangling pointers, heap area overruns, and other common user application bugs.

9.0. Getting Started

The NightStar Tutorial is highly recommended reading. It provides step-by-step instructions which introduce you to some of the major features of NightStar LX. After installation, you can access the tutorial from the **Help** menu of any NightStar tool, or by typing the following command: `/usr/bin/nhelp`.

After installation, NightStar's help system is integrated with each of the tools so that you can get context-sensitive help on diagnostic messages or on specific widgets, panels, dialogs or windows.

The help system presents each of the individual User Guides as well as this installation guide and the NightStar Tutorial.

10.0. NightStar LX Licensing

NightStar LX uses the NightStar License Manager (NSLM) to control access to the NightStar LX tools.

License installation requires a license key provided by Concurrent. The NightStar LX tools request a licence from a license server (see “License Server” on page 47).

Tools are licensed per system, per concurrent user. Concurrent usage of any or all NightStar LX tools by the same user from the same system automatically share a single license. The intent is to allow “*n*” developers to fully utilize all the tools at the same time while only requiring “*n*” licenses. When operating the tools in remote mode, where a tool is launched on a local system but is interacting with a remote system, licenses are required only from the host system.

You can obtain a license report which lists all licenses installed on the local system, current usage, and the expiration date for demo licenses (see “License Reports” on page 47).

10.1. License Keys

Licenses are granted to specific systems.

License installation requires a license key provided by Concurrent.

To obtain a license key, you must provide your system identification code. The System Identification code is generated by the `nslm_admin` utility:

```
nslm_admin --code
```

System identification codes are dependent on system network configurations. Replacing network devices may require you to obtain new license keys.

To obtain a license key, use the following URL and click on the appropriate link:

```
http://www.ccur.com/NightStarRTKeys
```

Provide the requested information, including the System Identification code. Your license key will be immediately emailed to you.

Install the license key using the following command:

```
nslm_admin --install=xxxx-xxxx-xxxx-xxxx-xxxx
```

where `xxxx-xxxx-xxxx-xxxx-xxxx` is the key included in the license acknowledgment email.

IMPORTANT

Both the System Identification code and the license key may contain both upper case “O” characters as well as zero (“0”) characters. Depending on the font in use, they may be almost indistinguishable. Copy and paste techniques are recommended to avoid problems.

If the required information is not readily available, or you have special circumstances, contact Concurrent support (see “Direct Software Support” on page 49 for more information).

10.2. License Server

The NSLM license server is automatically installed and configured to run when you install NightStar LX.

The **nslm** service is automatically activated for run levels 2, 3, 4, and 5. You can check on these settings by issuing the following command:

```
/sbin/chkconfig --list nslm
```

In rare instances, you may need to restart the license server via the following command:

```
/sbin/service nslm restart
```

See **nslm(1)** for more information.

10.3. License Reports

A license report can be obtained using the **nslm_admin** utility.

```
nslm_admin --list
```

lists all licenses installed on the local system, current usage, and expiration date (for demo licenses). Use of the **--verbose** option also lists individual clients to which licenses are currently granted.

See **nslm_admin(1)** for more options and information.

10.4. License Support

For additional aid with licensing issues, contact the Concurrent Software Support Center. See “Direct Software Support” on page 49 for details.

11.0. Architecture Interoperability

The NightStar LX tools were designed to be used in a self-hosted environment as well as remotely, separating the host processing from the time-critical target system.

The following table describes the interoperability of each tool between systems of different word-size architectures in the Intel x86 and AMD64 families.

NightStar Tool	Host	Target	Limitation
NightProbe	32-bit	64-bit	No limitations
	64-bit	32-bit	No limitations
NightTrace	32-bit	AMD64	Not supported
	64-bit	32-bit	Not supported
NightTune	32-bit	64-bit	No limitations
	64-bit	32-bit	No limitations
NightView	32-bit	64-bit	Cannot debug 32-bit applications on 64-bit systems
	64-bit	32-bit	Cannot execute 64-bit user applications on 32-bit systems

12.0. Direct Software Support

Software support is available from a central source. If you need assistance or information about your system, please contact the Concurrent Software Support Center at our toll free number 1-800-245-6453. For calls outside the continental United States, the number is 1-954-283-1822. The Software Support Center operates Monday through Friday from 8 a.m. to 5 p.m., Eastern Standard Time.

You may also submit a request for assistance at any time by using the Concurrent Computer Corporation web site at http://www.ccur.com/isd_support_contact.asp or by sending an email to support@ccur.com.

