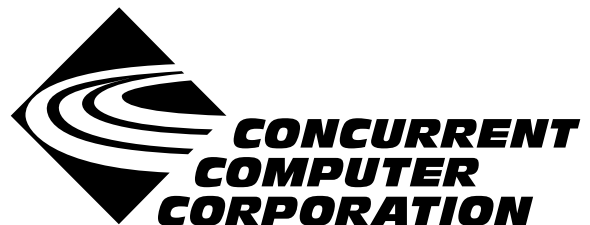


# NightTrace

## Version 5.2 Release Notes (Linux)

May 2003

0898398-5.2



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## 1.0. Introduction

NightTrace™ is used for debugging and analyzing multiprocess and multiprocess real-time applications and their interaction with the operating system.

The NightTrace toolset consists of an interactive debugging and performance analysis tool, trace data collection daemons, and an Application Programming Interface (API) allowing user applications to log data values:

NightTrace API	libraries and include files for use in user applications that log trace events to shared memory
<b>ntrace</b>	a graphical tool that controls daemon sessions and displays user and kernel trace events in trace event file(s)
<b>ntraceud</b>	a daemon program that copies user applications' trace events from shared memory to trace event file(s)
<b>ntracekd</b>	a daemon program that copies operating system trace events from kernel memory to trace event files.

NightTrace is flexible. As a user, you control:

- selection of user tracing of your application and/or kernel tracing
- selection of timestamp source
- trace-point placement within your application
- the source language of the trace application
- the number of processes and CPUs you gather data on
- the amounts and types of information you display
- trace event searches and summaries

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## 2.0. Documentation

Table 2-1 lists the NightTrace 5.2 documentation available from Concurrent.

**Table 2-1. NightTrace Version 5.2 Documentation**

Manual Name	Pub. Number
<i>NightTrace Manual</i>	0890398-100
<i>NightTrace Version 5.2 Release Notes (Linux)</i>	0898398-5.2

Copies of the Concurrent documentation can be ordered by contacting the Concurrent Software Support Center. The toll-free number for calls within the continental United States is 1-800-245-6453. For calls outside the continental United States, the number is 1-954-283-1822 or 1-305-931-2408.

Additionally, the documentation listed above is available:

- online using the **nhelp** utility
- in PDF format in the **documentation** directory of the installation CD
- on the Concurrent Computer Corporation web site at [www.ccur.com](http://www.ccur.com)

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## 3.0. Prerequisites

Prerequisites for NightTrace Version 5.2 for both the host system and target systems are as follows:

### 3.1. Host System

#### 3.1.1. Software

- RedHawk™ Linux *or* Red Hat® Linux \*
- Required capabilities \*\*

#### NOTE

The following capabilities are normally installed by the installation script on the CD containing the NightStar tools or by the standard installation of the Red Hat or RedHawk Linux operating system. The user will be notified if required capabilities do not exist on the Linux system.

- NightStar™ Tools

Capabilities	RPMs providing these capabilities
<code>ccur-HyperHelp</code> <code>ccur-HyperHelp-scripts</code> <code>ccur-elanlm</code>	<code>ccur-HyperHelp-scripts-6.4.2-002</code> <code>ccur-elanlm-5.0-7</code> <code>ccur-x11progs-6.4.2-006</code>

\* This product has been extensively tested on RedHawk Linux 1.2 and 1.3 and Red Hat Linux 7.3 and 8.0. However, this product has not been tested with versions of Linux supplied by other vendors.

\*\* The “Capabilities” listed may be found in those versions of the RPMs listed under “RPMs providing these capabilities” or in later versions.

- RedHawk Linux *or* Red Hat Linux

Capabilities	RPMs providing these capabilities
/bin/sh ld-linux.so.2 libX11.so.6 libXext.so.6 libc.so.6 libm.so.6 libnsl.so.1 libresolv.so.2 libstdc++-libc6.1-1.so.2 libc.so.6(GLIBC_2.0) libc.so.6(GLIBC_2.1) libm.so.6(GLIBC_2.0) libm.so.6(GLIBC_2.1)	<i>RedHawk 1.3:</i> bash-2.05b-5 compat-libstdc++-7.3-2.96.110 glibc-2.2.93-5 glibc-debug-2.2.93-5 XFree86-libs-4.2.0-72  <i>Red Hat 8.0:</i> bash-2.05a-13 compat-glibc-6.2-2.1.3.2 compat-libstdc++-6.2-2.9.0.16 glibc-2.2.5-39 glibc-debug-2.2.5-39 XFree86-libs-4.2.0-8

### 3.1.2. Hardware

- an Intel®-based PC - 300Mhz or higher (recommended minimum configuration)
- 64MB physical memory (recommended minimum configuration)



## 3.2. Target Systems

### 3.2.1. RedHawk Systems

#### 3.2.1.1. Software

- RedHawk Linux 1.2 or later
- Required RedHawk Linux RPMs (see “RedHawk Target Installation” on page 8 for more information)

#### 3.2.1.2. Hardware

- any iHawk Series 860 system

### 3.2.2. PowerMAX Systems

#### 3.2.2.1. Software

- PowerMAX OS 4.3 or later
- Required PowerMAX OS packages (see “PowerMAX Target Installation” on page 8 for more information)

#### 3.2.2.2. Hardware

- Computer Systems:
  - Power Hawk™ 620 and 640
  - Power Hawk 710, 720 and 740
  - PowerStack™ II and III
  - Night Hawk® Series 6000
  - TurboHawk™
  - PowerMAXION™
- Board-Level Products:
  - Motorola® MVME2604
  - Motorola MVME4604

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## 4.0. System Installation

Installation of the host portion of NightTrace is normally done as part of the general installation of either the RedHawk NightStar Tools or the PowerWorks Linux Development Environment. A single command installs (or uninstalls) all required software components. See the *RedHawk NightStar Tools Release Notes* (0898008) or *PowerWorks Linux Development Environment Release Notes* (0898000) for more information.

The following section describes how to install (or uninstall) NightTrace independently for those rare cases when this is necessary.

### NOTE

NightTrace requires that certain packages are installed on the target systems. See “Target Installation” on page 8 for more information.

## 4.1. Separate Host Installation

At times, it may be necessary to install (or uninstall) NightTrace independent of the installation of the software suite in which it is normally distributed. This may be done using the standard Linux product installation mechanism, **rpm** (see **rpm(8)**).

The RPM name associated with NightTrace 5.2 is:

**ccur-ntrace**

and the file associated with this rpm is:

**ccur-ntrace-5.2-000.i386.rpm**

which can be found in the **RPM** directory on the installation CD.

### NOTE

The user must be root in order to use the **rpm** product installation mechanism on the Linux system.

To install the NightTrace RPM, issue the following commands on your Linux system:

1. Insert the installation CD in the CD-ROM drive
2. Mount the CD-ROM drive (assuming the standard mount entry for the CD-ROM device exists in **/etc/fstab**)

```
mount /mnt/cdrom
```

3. Change the current working directory to the directory containing the NightTrace rpm

```
cd /mnt/cdrom/RPM
```

4. Install the rpm

```
rpm -Uvh ccur-ntrace-5.2-000.i386.rpm
```

By default, the product is installed in **/usr/opt**.

5. Change the current working directory outside the **/mnt/cdrom** hierarchy

```
cd /
```

6. Unmount the CD-ROM drive (otherwise, you will be unable to remove the installation CD from the CD-ROM drive)

```
umount /mnt/cdrom
```

To uninstall the NightTrace RPM, use the following command:

```
rpm -e ccur-ntrace
```

## 4.2. Target Installation

### 4.2.1. RedHawk Target Installation

When targeting a RedHawk Linux system, NightTrace requires that the following RPMs are installed on that target system:

NightStar Tool	RPM
NightTrace server	<code>ccur-ntracelog-5.2-000.i386.rpm</code>
NightStar daemon	<code>ccur-nstar-1.2-005.i386.rpm</code>
Élan License Manager	<code>ccur-elanlm-5.0-7.i386.rpm</code>

These RPMs may be installed on the target system by installing the RedHawk NightStar Tools on that system. However, the individual RPMs can be found in the **RPM** subdirectory on the installation CD and may be installed separately. See “Separate Host Installation” on page 6 for the procedure to install an individual RPM.

### 4.2.2. PowerMAX Target Installation

When targeting a PowerMAX system, NightTrace requires that the following software packages are installed on that target system:

NightStar Tool	Package	Version
NightTrace	<code>ntracelog</code>	5.2 or later
NightStar daemon	<code>nstar</code>	1.2

These packages are normally installed during the installation of the corresponding NightStar tool on the PowerMAX OS system. However, the packages are also included on the PowerWorks Linux Development Environment Installation CD and may be installed by following the procedures below if the packages listed above have not been installed on the target system, or if the versions installed on the target system are not the same as those specified above.

#### NOTE

The versions of the required software packages installed on the PowerMAX OS target systems must be the same as those listed above. If this is not the case, follow the procedures below.

If your PowerMAX OS system has a CD-ROM device:

```
mkdir /mnt/tmp
mount -F cdfs /dev/dev_name /mnt/tmp
cd /mnt/tmp/powermax-ppc604
```

If your PowerMAX OS system does not have a CD-ROM device:

On the Linux system, insert the PowerWorks Linux Development Environment Installation CD in the CD-ROM drive, mount the CD-ROM drive, and use NFS to export it to the PowerMAX OS system:

```
mount /mnt/cdrom
exportfs powermax_os_system:/mnt/cdrom
```

On the PowerMAX OS system, mount the CD-ROM as an NFS filesystem:

```
mkdir /tmp/cdrom
mount -F nfs linux_system:/mnt/cdrom /tmp/cdrom
cd /tmp/cdrom/powermax-ppc604
```

On the PowerMAX OS system, install the target portions of the NightStar tools via the following commands:

```
cp ./nightstar.Z /tmp/nightstar.Z
zcat /tmp/nightstar.Z | pkgadd -d -
```

If your PowerMAX OS system has a CD-ROM device:

```
cd /
umount /mnt/tmp
```

If your PowerMAX OS system does not have a CD-ROM device:

On the PowerMAX OS system, unmount the NFS filesystem:

```
cd /
umount /tmp/cdrom
```

On the Linux system, unexport the NFS filesystem, and then unmount the CD-ROM:

```
cd /
exportfs -u powermax_os_system:/mnt/cdrom
umount /mnt/cdrom
```

---

---

## 5.0. Overview of NightTrace 5.2

### 5.1. Changes in This Release

#### 5.1.1. Qualified state and event information saved in session file

Information regarding qualified states and events are no longer saved in page configuration files.

NightTrace 5.2 separates this information out of the page configuration files from previous versions of NightTrace and saves it as part of the session when those page configuration files are loaded.

NightTrace 5.2 backs up the original page configuration files before these modifications are made.

#### 5.1.2. Renamed app-defaults file

The app-defaults file associated with NightTrace has been renamed from:

**Ntsess**

to

**Ntrace**

If a user has a modified version of **Ntsess** from a previous version of NightTrace that they would like to use with NightTrace 5.2, they should rename it to **Ntrace** and change all occurrences of **Ntsess** to **Ntrace** in the file.

#### 5.1.3. Command-line options

NightTrace 5.2 contains changes to the command-line options to **ntrace**. See the **ntrace(1)** man page for complete information.

This release of NightTrace incorporates the GNU style of options, as shown in the following example:

```
-l
--long_name
--long_name=value
```

For backward compatibility, however, NightTrace 5.2 maps the following options without complaint.

---

<b>-help</b>	<b>--help</b>
<b>-filestats</b>	<b>--stats</b>
<b>-nohardclock</b>	<b>--notimer</b>
<b>-process</b>	<b>--process</b>
<b>-listing</b>	<b>--listing</b>
<b>-start</b>	<b>--start=</b>
<b>-end</b>	<b>--end=</b>
<b>-flat</b>	<b>--flat</b>

---

In addition, a new `--summary=criteria` option has been added which provides a textual summarization of specified trace events using the supplied *criteria*. See the `ntrace(1)` man page for a complete listing of valid criteria values.

Also, the `--hide-main-window` option has been added so that users can start NightTrace with the main window hidden. When this option is used, only display pages are shown. This option can be abbreviated as `-hm`.

#### 5.1.4. Auto-loading of previous session

NightTrace no longer automatically loads the last session when it is invoked. In NightTrace 5.2, this behavior only occurs if the `--use-session` (or `-u`) option is provided to the `ntrace` command.

#### 5.1.5. Multiple selection

Multiple selection is now done with the right mouse button (click and drag), not the left.

### 5.2. Enhancements

#### 5.2.1. `--wait` option to `ntracekd`

Normal operation of `ntracekd` requires two invocations; one to start the daemon and one to stop the running daemon.

The `--wait=delay` option merges these activities into a single command. With the `--wait` option, the daemon is started while the command waits for the specified number of seconds, then the daemon is stopped and the command returns.

#### 5.2.2. Enhanced summary and search dialogs

The search and summary dialogs have been significantly reworked to provide faster configuration for searching and summarization of common items (e.g. events, qualified states, system calls, interrupts, exceptions, etc) while retaining all of the power of user-customization.

In addition, graphical display of state summaries is optionally provided.

Search and summary configurations are retained in the session file for possible use in subsequent NightTrace sessions.

#### 5.2.3. Batch summarization

The `--summary` option now provides several built-in summary criteria that provide textual summaries of kernel data or user data. Additionally, users can specify their own (predefined) summary criteria for batch-mode processing.

For example,

```
ntracekd --wait=5 data
ntrace --summary=k data
```

provides a summary of the five seconds of kernel activities that `ntracekd` captures.

#### 5.2.4. Enhanced qualified state, qualified event and macro dialogs

The dialogs for defining qualified states, qualified events, and macros were redesigned for ease of use.

#### 5.2.5. Streaming Improvements

The following enhancements have been made with respect to streaming:

- streaming no longer uses temporary files to buffer data
- the user can now specify limits on the amount of memory used to collect streaming data
- streamed data segments can now be saved directly from within the NightTrace Main Window

#### 5.2.6. Initialization Performance

When data segments are saved with the NightTrace Main Window **Save Data Segments...** button, the resultant file format offers significant performance improvements for subsequent invocations of NightTrace with that data set.

#### 5.2.7. Accelerator keys

Accelerator keys have been added for ease and convenience on the NightTrace Main Window as well as the Display Pages.

<b>Main Window</b>	
ctrl-d	new daemon dialog
ctrl-l	launch daemon (previously start)
ctrl-h	halt daemon (previously stop)
ctrl-p	pause daemon
ctrl-r	resume daemon
ctrl-w	close the NightTrace Main Window

<b>Display Pages</b>	
up-arrow	zoom out
down-arrow	zoom in
left-arrow	scroll left
right-arrow	scroll right
ctrl-f	open search dialog
>	search forward with last criteria
<	search backward with last criteria



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**Display Pages**

---

ctrl-z	open summary dialog
ctrl-m	display NightTrace Main Window
ctrl-w	close current display page

---

**NOTE**

It is not necessary to press the Shift key to use the > or < accelerator.

## 5.3. Common Problems and Limitations

### 5.3.1. Privileges and Capabilities

A common problem when using the NightTrace API is that the `trace_begin()` (or `trace_start()`) call may fail if the lacks sufficient privileges to lock pages or utilize appropriate spin lock protection in which case no events are logged.

The application should be sure to check the return codes from `trace_begin()` (or `trace_start()`) and `trace_open_thread()` to ensure that subsequent `trace_event()` calls will actually log data.

### 5.3.2. Multithreaded programs and the NightTrace API

There are currently some limitations for using the NightTrace API with multithreaded programs due to a RedHawk operating system limitation.

The default mechanism for protection of critical sections between the user application and the NightTrace user daemon is rescheduling variables (see `resched_cnt1(2)`).

Once a rescheduling variable is created (which is done by default by the NightTrace API `trace_start()` and `trace_begin()` calls) the process will be unable to create new threads.

To work around this limitation, use the `trace_begin()` API call and specify a configuration record which sets the `ntc_use_resched` field to zero.

However, by clearing this field, it is possible for NightTrace API calls to spin forever if they are made by multiple threads on the same CPU.

Ensure that only one thread makes NightTrace API calls or that multiple threads make them from different CPUs.

This limitation will be removed in a future release of RedHawk and NightTrace.

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## 6.0. 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 1-800-245-6453. Our customers outside the continental United States can contact us directly at 1-954-283-1822 or 1-305-931-2408. The Software Support Center operates Monday through Friday from 8 a.m. to 7 p.m., Eastern Standard time.

Calling the Software Support Center gives you immediate access to a broad range of skilled personnel and guarantees you a prompt response from the person most qualified to assist you. If you have a question requiring on-site assistance or consultation, the Software Support Center staff will arrange for a field analyst to return your call and schedule a visit.





