NightTrace

Version 4.2 Release Notes (Linux)

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1.0. Introduction

NightTrace™ is part of the PowerWorks™ Linux Development Environment (PLDE) and is used for developing, debugging and analyzing multiprocess and multiprocessor real-time applications.

NightTrace is a graphical toolset for analyzing the dynamic behavior of multiprocess and multiprocessor applications. A NightTrace daemon on a target system running PowerMAX OS™ writes trace event records to user-specified files. These trace event records are generated by the execution of user application programs written in C, Fortran, or Ada. The generated trace files are input to the **`ntrace`** program on the host system running Linux®. The **`ntrace`** interactive trace-event analysis tool provides summary statistics as well as a graphical view about the run-time behavior of those application programs as well as the PowerMAX OS system on which they were run.

2.0. Documentation

Table 2-1 lists the NightTrace 4.2 documentation available from Concurrent.

Table 2-1. NightTrace Version 4.2 Documentation

Manual Name	Pub. Number
NightTrace Manual	0890398-070
NightTrace Version 4.2 Release Notes (Linux)	0898398-4.2

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 manuals listed above are available online by using the PowerWorks Linux Development Environment utility, **`nhelp`**.

Further, the manuals listed above are also available on Concurrent Computer Corporation's web site at www.ccur.com.

3.0. Prerequisites

Prerequisites for NightTrace Version 4.2 for both the host system and target system are as follows:

3.1. Host System

3.1.1. Software

- Red Hat® Linux*
- Required capabilities

NOTE

The following capabilities are normally installed as part of the standard installation of Red Hat Linux and the PowerWorks Linux Development Environment. During installation of the PLDE, the user will be notified if required capabilities do not exist on the Linux system.

- PowerWorks Linux Development Environment

Capabilities	RPMs providing these capabilities
plde-HyperHelp **plde-HyperHelp-scripts**	**plde-x11progs-6.4.2-000** **plde-HyperHelp-scripts-6.4.2-000**

- 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)**	*Red Hat 6.1:* **XFree86-libs-3.3.5-3** **bash-1.14.7-16** **egcs-c++-1.1.2-24** **glibc-2.1.2-11** **libstdc++-2.9.0-24** *Red Hat 6.2:* **XFree86-libs-3.3.6-20** **bash-1.14.7-22** **egcs-c++-1.1.2-30** **glibc-2.1.3-15** **libstdc++-2.9.0-30**

* This product has been extensively tested on Red Hat Linux 6.1 and 6.2. However, this product has not been tested with versions of Linux supplied by other vendors.

3.1.2. Hardware

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

3.2. Target System

3.2.1. Software

- PowerMAX OS 4.3 or later
- **`ntracelog`** 4.2.1 or later (see “Target Installation” on page 7 for more information)

3.2.2. 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

4.0. System Installation

Installation of the host portion of NightTrace is normally done as part of the general installation of the PowerWorks Linux Development Environment software suite. A single command installs (or uninstalls) all software components of the PLDE, as described in the *PowerWorks Linux Development Environment Release Notes* (0898000).

The following section describes how to install (or uninstall) NightTrace separately from the PLDE suite for those rare cases when this is necessary.

In addition, NightTrace requires that certain packages be installed on the PowerMAX OS target systems. See “Target Installation” on page 7 for more information.

4.1. Separate Host Installation

In rare cases, it may be necessary to install (or uninstall) NightTrace independent of the installation of the PowerWorks Linux Development Environment software suite. This may be done using the standard Linux product installation mechanism, **`rpm`** (see **`rpm(8)`**).

The rpm name associated with NightTrace 4.2 is:

```
plde-ntrace
```

and the file associated with this rpm is:

```
plde-ntrace-4.2-001.i386.rpm
```

which can be found in the **`linux-i386`** directory on the PowerWorks Linux Development Environment 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 PowerWorks Linux Development Environment 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/linux-i386
   ```

4. Install the rpm

   `rpm -i plde-ntrace-4.2-001.i386.rpm`

   By default, the product is installed in **`/usr/opt`**. To install in a different directory, add

   `--relocate /usr/opt=`*directory*

   to the **`rpm`** command where *directory* is the desired directory.

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 PowerWorks Linux Development Environment Installation CD from the CD-ROM drive)

   `umount /mnt/cdrom`

To uninstall the NightTrace rpm, use the following command:

`rpm -e plde-ntrace`

4.2. Target Installation

NightTrace requires that the following software package is installed on the PowerMAX OS target systems:

NightStar Tool	Package	Version
NightTrace	**ntracelog**	4.2.1 or later

This package is normally installed during the installation of the corresponding NightStar tool on the PowerMAX OS system. However, the package is also included on the PowerWorks Linux Development Environment Installation CD and may be installed by following the procedures below if the above package has not been installed on the target system, or if the version installed on the target system is earlier than that specified above.

NOTE

The version of the required software package installed on the PowerMAX OS target systems must be the same as or later than that 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 4.2

5.1. Changes in This Release

5.1.1. Dynamically-Built Default Kernel Display Pages

ntrace now builds all kernel display pages dynamically, determining the number of CPUs on the system from information in the converted KernelTrace trace event file.

The kernel pages no longer contain display objects for CPUs which do not exist on a system. For example, if a system has 3 CPUs, the default kernel page will not have an interrupt data graph, an exception state graph, or a system call state graph for a non-existent 4th CPU, as in previous releases.

Also, because **ntrace** builds kernel display pages dynamically, the pre-defined kernel page files that were located under the **/usr/lib/NightTrace** directory are no longer needed and have been removed from the **ntrace** package.

Other than small spacing changes on the left side of a kernel display page between the CPU boxes and the Running Process boxes, the new display pages should be virtually indistinguishable from the old predefined kernel pages.

NOTE

For those users who have previously customized default kernel pages and stored them in **/usr/lib/NightTrace**, you will need to either specify the saved configuration file as a command line argument to **ntrace** or open it via the Open Config File… entry from the global window File menu item.

5.1.1.1. Dynamically-Built RCIM Default Kernel Display Pages

When viewing KernelTrace trace event files that have been timestamped by the RCIM tick clock, **ntrace** determines the number of distinct nodes/hosts which have trace files and constructs a default display page accordingly. When you create a default kernel display page from trace event files that have been timestamped by the RCIM tick clock, **ntrace** pops up a dialog box that allows you to select the nodes you wish to display on that kernel page.

Version 4.2 eliminates the restriction of being able to display at most four nodes on a display page. Based upon the number of nodes you wish to display and how many CPUs each node has, **ntrace** figures out how much vertical real estate the grid needs. If the required vertical space does not exceed the maximum grid height, **ntrace** will allow the page to be created. Otherwise, **ntrace** will pop up a warning dialog window and will not allow the page to be created.

Because **ntrace** builds kernel display pages dynamically, the pre-defined kernel page template files that were located under the **/usr/lib/NightTrace** directory are no longer needed and have been removed from the **ntrace** package.

The only noticeable change to the RCIM kernel page is that the Node boxes have been moved on top of the CPU and Running Process boxes.

5.1.2. More Robust Handling of ntrace -listing

NightTrace 4.2 no longer aborts when

```
ntrace -listing
```

is invoked with either an invalid filename or no filename.

5.1.3. Save As... and Save Text As... Functionality

In NightTrace 4.2, the Save button, when pressed in:

- the Save As … dialog from the File menu on a display page, and
- the Save Text As … dialog from the File menu on the Summarize Form window

now correctly saves the requested information.

5.1.4. Correct Evaluation of Built-in Functions

In NightTrace 4.2, built-in functions referenced within the `default_item` of a format table are now evaluated in the context of the correct event.

5.2. Enhancements

5.2.1. Support of Power Hawk 710, 720, and 740

NightTrace 4.2 now supports gathering and analysis of trace data on the Power Hawk 710, 720, and 740 systems.

5.2.2. Additional Kernel Trace Points

The following kernel trace points have been added:

TR_PAGEFLT_ADDR	For a page fault, logs the address whose memory was read or written causing the fault, and logs the program counter of the instruction which performed the read or write to that memory.
TR_PROTFLT_ADDR	For a kernel protection fault, logs the address whose memory was read or written causing the fault, and logs the program counter of the instruction which performed the read or write to that memory.

NOTE

PowerMAX OS 5.0 contains the **ktrace** module with the capabilities to log the trace points listed above. Therefore, NightTrace will only be able to display these trace points from trace files generated on systems running PowerMAX OS 5.0 or later.

These trace points are not logged by default. They need to be activated using the **ktrace -enable** option.

These can be extremely useful. For example, if your real-time simulation is overrunning due to a page fault, you can enable the TR_PAGEFLT_ADDR trace point and find the instruction that caused the fault, and the address of the memory it read or wrote easily from NightTrace. This removes the guesswork involved in determining this information (e.g. searching the program to find out where some particular page got unlocked or was never locked, the stack got extended, etc.).

5.2.3. Verbose Report Prints Process Names

When creating a verbose report (using the **-verbose** option), **ktrace** will now attempt to print process names instead of process IDs.

5.2.4. Node Selection Dialog

When creating a default kernel display page from trace event files that have been timestamped by the RCIM tick clock, **`ntrace`** now pops up a dialog box to select the nodes that are to be displayed on that kernel page.

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.