NightTrace

Version 4.2 Release Notes

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1.0. Introduction

NightTrace™ is part of the NightStar™ tool set used for developing, debugging and analyzing multiprocess and multiprocessor real-time applications.

NightTrace is a graphical tool set for analyzing the dynamic behavior of multiprocess and multiprocessor applications. Trace applications can be written in C, Fortran, or Ada. The **`ntraceud`** daemon process writes the trace-event records generated by the execution of a user application program to user-specified files. The generated files are input to the **`ntrace`** program. The **`ntrace`** interactive trace-event analysis tool provides a graphical view and summary statistics about the run-time behavior of one or more application programs and possibly the system.

NightTrace also includes KernelTrace, a tool set for analyzing the dynamic behavior of the PowerMAX OS™ operating system. The **`ktrace`** program collects information out of the running kernel. In addition, **`ktrace`** can produce summaries and listings of kernel activity. The **`ntfilter`** tool can convert KernelTrace data files into NightTrace data format so that kernel and application activity can be analyzed simultaneously with **`ntrace`**.

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	0890398-4.2
NightTrace Pocket Reference	0890474-000

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 1-954-973-5354.

Additionally, the *NightTrace Manual* and *NightTrace 4.2 Release Notes* are available online by using the X Window System utility, **nhelp**.

Further, the *NightTrace Manual* and *NightTrace 4.2 Release Notes* are also available on Concurrent Computer Corporation's web site at www.ccur.com.

3.0. Prerequisites

Prerequisites for NightTrace Version 4.2 are as follows:

3.1. Software

- PowerMAX OS™ 4.3 or later
- X Window System (X11 Version 6.3 or later)[1]
- Élan License Manager™ 5.0.1 or later

3.2. 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
- An X Window System display device, such as an X™ terminal[1]

1. This is a prerequisite only for the NightTrace Event Analysis package (**`ntrace`**). It is not required by the NightTrace Event Logging package (**`ntracelog`**). See “System Installation” on page 4 for more information about these packages.

4.0. System Installation

The NightTrace product is installed as two standard PowerMAX OS software packages and utilizes the standard PowerMAX OS product installation mechanism, **pkgadd** (see **pkgadd(1)**).

The package names are **ntrace** and **ntracelog**. These names are case-sensitive.

ntrace	the NightTrace Event Analysis package. It consists of everything necessary to display trace event data.
ntracelog	the NightTrace Event Logging package. It consists of everything necessary to collect trace event data.

The **ntrace** and **ntracelog** packages can be installed together or separately because there are no package dependencies between them. The **ntracelog** package was designed for installation on minimally configured systems that do not have the X11 packages installed and which will be used for event logging but not event analysis.

NOTE

ktrace and **ntfilter** are part of the **trace** package. In order to perform kernel tracing, the **trace** package should be installed on the system. (**ktrace** is shipped with PowerMAX OS, and once installed, needs to be activated via the **config(1)** program.)

Please refer to the “Installing Add-on Software” chapter in the *System Administration Volume I* (0890429) manual and the *PowerMAX OS Release Notes* for instructions on software installation.

NightTrace may be installed in either the root directory or elsewhere. When you run **pkgadd(1M)** to install NightTrace, you are prompted to enter the name of the directory for installation. If you want to install in the root directory, just press the <return> key at the prompt. Otherwise, enter the name of the directory where you want NightTrace installed. If this directory does not exist, the installation procedures attempt to create it for you.

NightTrace requires the Élan License Manager. Follow the steps in the "Obtaining Licenses" section of the *Élan License Manager Release Notes* (0891055); the *feature alias* is NightTrace. If you are not already running the Élan License Manager, if you do not have a copy of the *Élan License Manager Release Notes*, or if you need a license key, contact Concurrent Software Distribution at 1-800-666-5405 (or 1-954-283-1836 outside the continental United States).

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 our toll free number (1-800-245-6453). Our customers outside the continental United States can contact us directly at 1-954-973-5354. 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.