NightProbe

Version 2.6 Release Notes (Linux)

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CONCURRENT
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1.0. Introduction

NightProbe™ provides a graphical user interface that permits real-time recording, viewing, and modification of program data within one or more executing programs. It can be used during development and operation of applications, including simulations, data acquisition, and system control.

The features and capabilities of NightProbe include:

- An X Window System™ and OSF/Motif™ graphical user interface provides data sampling control and a spreadsheet interface for data recording, monitoring, and modification.
- Several timing sources, including the system clock and the frequency-based scheduler, are provided for controlling the sampling rate. The user may explicitly start, suspend, and stop sampling using the graphical user interface.
- Any static memory location of any Ada, C, or Fortran process on any processor may be sampled by NightProbe. The symbol table browsing facilities support all scalar data types in those programming languages.
- Sampled data can be monitored interactively, written to a file or shared memory area in real time, logged via the NightTrace™ daemon, or streamed in real time to a user-specified application.
- NightProbe can be run on a different processor from the target program, which minimizes NightProbe's impact on the target program's performance.
- NightProbe allows data locations to be specified using logical addresses or the symbolic names that appear in the program source code. The data addresses and data types are then located by searching the symbol table in the executable program file. NightProbe can present lists of the static variables in programs, and the user may select the variables of interest using the graphical user interface.
- Configuration files can be created, edited, and saved to retain target selections and display layout, allowing for fast start-up.
- No modifications to source code or recompilations are required for use with NightProbe.

2.0. Documentation

Table 2-1 lists the NightProbe 2.6 documentation available from Concurrent.

Table 2-1. NightProbe Version 2.6 Documentation

Manual Name	Pub. Number
NightProbe User's Guide	0890480-050
NightProbe Version 2.6 Release Notes (Linux)	0898465-2.6

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 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

3.0. Prerequisites

Prerequisites for NightProbe Version 2.6 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. The user will be notified if required capabilities do not exist on the Linux system.

- NightStar™ Tools

Capabilities	RPMs providing these capabilities

`ccur-HyperHelp`
`ccur-HyperHelp-scripts`
`ccur-elanlm`
`ccur-ktalk`
	`ccur-HyperHelp-scripts-6.4.2-002`
	`ccur-elanlm-5.0-7`
	`ccur-x11progs-6.4.2-006`

3.1.2. Hardware

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

* This product has been extensively tested on RedHawk Linux 1.4 and Red Hat Linux 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.

3.2. Target Systems

3.2.1. RedHawk Systems

3.2.1.1. Software

- RedHawk Linux 1.3 or later
- Required RedHawk Linux RPMs (see “RedHawk Target Installation” on page 7 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 7 for more information)

3.2.2.2. Hardware

- Computer Systems:

  Power Hawk™ 620 and 640

  Power Hawk 710, 720 and 740

  Power Hawk 910 and 920

  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 NightProbe 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) NightProbe independently for those rare cases when this is necessary.

NOTE

NightProbe requires that certain packages are installed on the target systems. See "Target Installation" on page 7 for more information.

4.1. Separate Host Installation

At times, it may be necessary to install (or uninstall) NightProbe 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 names associated with NightProbe 2.6 are:

ccur-nprobe	the NightProbe GUI application - this application runs on the host system and communicates with the Night-Probe server on the target. The host and target systems may be the same.
ccur-nprobeserv	the NightProbe server - this application runs on the target system and performs real-time data recording services on the probed user application.
ccur-nprobe-api	the NightProbe Application Programming Interface (API) - these libraries and include file may be used to implement your own applications which consume data provided by the NightProbe application using the To File or To Program output methods.

and the files associated with these RPMs are:

ccur-nprobe-2.6-3.i386.rpm
ccur-nprobeserv-2.6-3.i386.rpm
ccur-nprobe-api-2.6-3.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 NightProbe 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 NightProbe RPM

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

4. Install the RPM

   ```
   rpm -ivh ccur-nprobe-2.6-3.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 NightProbe RPM, use the following command:

```
rpm -e ccur-nprobe
```

4.2. Target Installation

4.2.1. RedHawk Target Installation

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

NightStar Tool	RPM
NightProbe server	**ccur-nprobeserv-2.6-3.i386.rpm**
NightStar daemon	**ccur-nstar-1.2-005.i386.rpm**
Élan License Manager	**ccur-elanlm-5.0-7.i386.rpm**

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 5 for the procedure to install an individual RPM.

NOTE

For applications that link dynamically with **libnprobe.so** and execute on a RedHawk Linux target system other than the NightProbe host, the **ccur-nprobe-api** RPM must also be installed on the target system.

4.2.2. PowerMAX Target Installation

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

NightStar Tool	Package	Version
NightProbe	**nprobeserv**	2.6
NightStar daemon	**nstar**	1.2-005

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 -
```

NOTE

If the **nsimserver** package already exists on the PowerMAX OS system and its version is different from that specified in the table above, do NOT remove it, but instead supply the **-a check** arguments to the above **pkgadd** command. This will allow multiple versions of this package to coexist on the system. Use of the **-a check** arguments also causes the **pkgadd** command to become extra verbose.

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 NightProbe 2.6

5.1. Enhancements

5.1.1. NightProbe Application Programming Interface

The NightProbe Application Programming Interface provides a basic interface to the data recording output produced by NightProbe and consists of a number of functions and data structures.

This API can be used to read data recording output which has been saved to an external file via the To File output method in NightProbe. In addition, a program can use the API to process data recording output streamed directly from NightProbe using the To Program output method (see "Program Output Specification dialog" on page 11 for more information on configuring the program used by the To Program output method).

Applications using the NightProbe API should include the NightProbe header file **`/usr/include/nprobe.h`** with the following line:

```
#include <nprobe.h>
```

In addition, programs using this interface must link dynamically with **`libnprobe.so`** or else statically with **`libnprobe.a`**.

NOTE

If your application links dynamically with **`libnprobe.so`** and executes on a RedHawk Linux target system other than the NightProbe host, then the **`ccur-nprobe-api`** RPM must also be installed on the target system. See "RedHawk Target Installation" on page 7 for more information.

See the chapter titled "Using the NightProbe API" in the *NightProbe User's Guide* (0890465) for details.

5.1.2. NightTrace Specification dialog

The NightTrace Specification dialog is presented when you select the To NightTrace output method.

This output method allows the user to save data sampled by NightProbe in the form of NightTrace records that can be streamed to a NightTrace daemon for collection.

When this output method is selected, each sampled data value is logged as a trace event that can be viewed using NightTrace. NightProbe gives the user the option of starting a NightTrace session when it first connects to the target program. A NightTrace display page containing Data Graphs which display the values of the sampled variables as either vertical lines or bars of varying height is created for the user. The height of the line or bar reflects the value of the sampled data. The user can configure which variables are to be displayed as well as the style and color of the items on the Data Graphs.

NightTrace session files containing information such as display page configurations and daemon definitions are automatically generated by NightProbe and are saved in a directory specified by the user.

See the section “To NightTrace” in the chapter titled “Using the Data Recording Window” in the *NightProbe User’s Guide* (0890465) for details.

5.1.3. Program Output Specification dialog

The Program Output Specification dialog is presented when the user selects the To Program output method from the Output menu of the Data Recording window. This dialog allows the user to specify a program to process the data recording output streamed from NightProbe.

The user can select the desired scheduling policy and priority of the program as well as constrain the execution of the program to certain CPUs.

In addition, the Program Output Specification dialog allows the user to specify a frequency-based scheduler on which to schedule the program which processes the data recording output from NightProbe. Scheduling the program in cycles unused by the probed application allows for minimal interference with that application.

The user may also set NUMA flags for those programs running on PowerMAX OS systems.

See the section “To Program” in the chapter titled “Using the Data Recording Window” in the *NightProbe User’s Guide* (0890465) for details.

5.1.4. Frequency-Based Scheduler Selection dialog

The Frequency-Based Scheduler Selection dialog is opened when the user presses the Select… button for the Scheduler Key field on either the Frequency-Based Scheduler Configuration dialog or the Program Output Specification dialog (see “Program Output Specification dialog” on page 11). This dialog allows the user to select a frequency-based scheduler on the target system.

See the section “Frequency-Based Scheduler Selection” in the chapter titled “Using the Data Recording Window” in the *NightProbe User’s Guide* (0890465) for details.

5.1.5. Target System Selection dialog

The Target System Selection dialog has been enhanced so as to allow the user to specify the run-time attributes associated with data monitoring activities on the target.

The user can select the desired scheduling policy and priority of those processes associated with data monitoring and recording on the target system as well as constrain the execution of those processes to certain CPUs on the target system.

Also, on platforms belonging to the local/global/remote subclass of non-uniform memory access (NUMA) architectures, the user can influence the page placement decisions made by the kernel by specifying policies for the different parts of their address spaces.

See the chapter titled “Using the Target System Selection Window” in the *NightProbe User’s Guide* (0890465) for details.

5.2. Known Issues

The following items describe NightProbe issues which may be addressed in future patches and releases:

- NightProbe prints Ada95 fixed point types using their underlying integer representation, not as a fractional number.

- NightProbe prints Ada95 enumeration values as the underlying integer representation, not the textual image of the corresonding enumeration constant.

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.