

**HP PRM Version C.03.03.01
Release Notes for
HP-UX 11i v1, HP-UX 11i v2, and
HP-UX 11i v3**

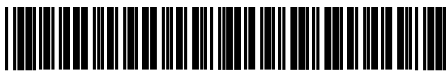


i n v e n t

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1 PRM Release Notes

This release notice contains the following information about HP Process Resource Manager Version C.03.03.01:

- Announcement
- What's new in this version
- Compatibility information and installation requirements
- Known problems and workarounds
- Patches and fixes in this version
- Software availability in native languages
- Security
- What manuals are available
- Providing feedback
- Training

NOTE Visit <http://www.hp.com/go/prm> for information on PRM's support policy and patch policy. These policies indicate the time periods for which this version of PRM is supported and patched.

Announcement

HP Process Resource Manager (PRM) Version C.03.03.01 supports the:

- HP-UX 11i v1 (B.11.11) operating system on HP 9000 servers
- HP-UX 11i v 2 (B.11.23) operating system running on either HP 9000 servers or HP Integrity servers
- HP-UX 11i v3 (B.11.31) operating system running on either HP 9000 servers or HP Integrity servers

HP PRM provides an efficient and flexible way to manage resource allocation at times of peak system load. It gives the system administrator the ability to group users or processes together and guarantee each group minimum amounts of the total CPU, real memory, and disk bandwidth resources available.

HP PRM Version C.03.03.01 offers the following features:

- In-kernel memory management of both private and shared memory
- A web-based interfaces in both HP System Management Homepage and HP Systems Insight Manager for performing various PRM tasks
- Flexible allocation of CPU, memory, and disk bandwidth resources
- Guaranteed minimum and maximum amounts of CPU and memory resources for groups of users and applications
- Improved system response time for critical users and applications
- Multiple PRM configuration files to meet cyclical demands on system resources
- Ability to monitor CPU, memory, and disk bandwidth resource use, including the ability to track user and application resource requirements
- Ability to change the configuration without disabling PRM
- During times of nonpeak resource use, allocation of excess resources to processes that need them

What's new in this version

PRM Version C.03.03.01 includes the following new features or changes:

- HP Systems Insight Manager interface

A new graphical interface to PRM is available through HP Systems Insight Manager (SIM). SIM is available from the Applications DVD and the Operating Environment DVD. It is also available from <http://www.hp.com/go/softwaredepot>. With SIM and the bundle PRMSIMTools C.03.03 or later installed, you can access the new PRM interface in SIM through the links Optimize -> Process Resource Manager -> Configure PRM Groups. For more information on using the new interface, see the PRM online help.

Along with this interface, there is now a utility called `prminitconfig`. This utility configures/unconfigures the PRM interface in SIM. Run it after SIM is installed, as described in the section "Installation procedure for PRMSIMTools" on page 10.

- Change in capping terminology

The CAP field in group records and memory records is now referred to as the MAX field. The change is intended to reduce confusion between the configuration-wide CPU capping enabled through `prmconfig -M CPUCAPON` and the per-group CPU upper bounds formerly set using the CAP field. (Memory records were updated to be consistent with group records.)

- Increase in allowed length of application name

PRM's interface in System Management Homepage allowed the name of an application to be 40 characters. The allowed length is now 256 characters.

- `xprm` interface has been removed

With the implementation of the new graphical interface mentioned above as well as the interface in HP System Management Homepage, the `xprm` interface has been removed.

Compatibility information and installation requirements

The following HP PRM products are now available for HP 9000 servers running HP-UX 11i v1 (B.11.11). They are also available for HP 9000 servers or HP Integrity servers running HP-UX 11i v2 (B.11.23) from September 2004 or later or HP-UX 11i v3 (B.11.31):

- HP PRM Version C.03.03.01 (B3835DA)
- HP PRMSIMTools Version C.03.03.01 (PRMSIMTools)

Disk and memory requirements

PRM system requirements are given in the following table, based on the PRM bundle.

Table 1-1 Disk and memory requirements

	B3835DA	PRMSIMTools
Disk space	9 Mbytes	55 Mbytes
Memory	HP-UX 11i v3: 3 Gbytes HP-UX 11i v2 / HP-UX 11i v1: 1.1 Mbytes (40 Mbytes if using the SMH GUI or SIM GUI)	40 Mbytes

NOTE If PRM is unable to start or run properly due to CPU or memory resources not being available, it cannot manage your system's resources.

Software requirements

PRM C.03.03.01 was verified using the software listed in the following table. Compatibility with other versions of the software packages is unknown unless explicitly stated. The following software is required only if you plan to make use of PRM features that require the software.

Table 1-2 Verified software configurations

Software package	Version for HP-UX 11i v1	Version for HP-UX 11i v2	Version for HP-UX 11i v3
Processor Sets	A.01.00.00.07	The version included with HP-UX	The version included with HP-UX
HP Systems Insight Manager	—	C.05.00.02.00.08, C.05.01.00.01.04	—
HP System Management Homepage	A.2.2.0.4, A.2.2.4, A.2.2.5	A.2.2.4.1	A.2.2.5.1
Java*	1.4.2	1.4.2	1.4.2
GlancePlus Pak	C.03.71.00, C.03.86.00	C.03.85.00, C.04.50.00	C.04.55.00
HP-UX Bastille	B.02.01.02	B.02.01.02	B.3.0.20
WBEM	A.02.00.10, A.02.00.11, A.02.05.01	A.02.05.04	A.02.05.02, A.02.05.02.01

* Java is needed only if you are going to use the SMH GUI or SIM GUI.

Installation procedures

The sections below explain how to install the full PRM product, B3835DA, and the PRM interface in HP Systems Insight Manager, PRMSIMTools.

Compatibility information and installation requirements**Installation procedure for B3835DA**

Install the full PRM product, B3835DA, on systems where you want PRM to control resource allocations.

To install the software:

NOTE If the PRM-Sw-Krn.PRM-KRN fileset is not installed or it is installed but its revision is older than the current revision (C.01.04), the current revision will be installed, causing a reboot.

Step 1. Shut down any versions of PRM, WLM, and GlancePlus that are already installed.

Having these products running can prevent the proper update of files that are in use. Be sure to shut down WLM (`wlmd -k`), its configuration wizard, `wlmgui`, PRM (`prmconfig -r`), `xprm`, and GlancePlus—if any of them are running.

Step 2. Evaluate whether to upgrade any WLM version that is installed, as explained in “Upgrading or installing PRM before upgrading WLM from C.03.00 or earlier can cause WLM to fail swverify checks” on page 24.

Step 3. Shut down MeasureWare if it is running:

```
# /sbin/init.d/mwa stop
```

Step 4. Shut down HP Integrity Virtual Machines if it is running:

```
# /sbin/init.d/hpvm stop
```

PRM cannot run on a host used as a VM Host. However, you can use PRM inside virtual machines.

Step 5. Start the SD-UX `swinstall` command. It will invoke a user interface to lead you through the installation.

Step 6. Load product B3835DA and install patches from the section “Required patches” on page 11.

- Step 7.** Ensure the NodeHostNameXpnd bundle is installed if you want to use long hostnames on HP-UX 11i v2. Configure long hostnames as described below.

Set the kernel tunable to allow long hostnames:

```
# kctune expanded_node_host_names=1
```

Set the node and hostname, with the changes being persistent across boots:

```
# /sbin/set_parms hostname
```

where `hostname` is the literal string `hostname`—not the desired hostname. You will be prompted for the hostname.

For configuration information, read the paper “Node and Host Name Sizes on HP-UX,” available in `/usr/share/doc/NodeHostNameSize.pdf` on systems with the NodeHostNameXpnd bundle installed.

- Step 8.** Configure PRM GUI and restart HP System Management Homepage (SMH)

NOTE This step assumes SMH is already installed. If not, install SMH before completing this step. (As of May 2005, SMH is available from the Applications DVD and the Operating Environment DVD. It is also available from <http://www.hp.com/go/softwaredepot>.)

If you are going to use PRM’s interface available through SMH, perform the following steps:

- a.** Configure the PRM interface by running:

```
# /opt/prm/bin/prmsmhconfig -c
```

- b.** Restart SMH

Log in to HP System Management Homepage by pointing your web browser to:

```
http://SMH_host:2301
```

where `SMH_host` has SMH and PRM C.03.02 or later installed.

By using port 2301, SMH is restarted.

You can now access the PRM interface in SMH through the following links:

Tools -> Resource Management -> Manage PRM Groups

Compatibility information and installation requirements

Step 9. Restart WLM if it was running before the PRM upgrade/installation:

```
# /opt/wlm/bin/wlmd -A
```

Step 10. Restart MeasureWare if it was running before the PRM upgrade/installation:

```
# /sbin/init.d/mwa start
```

PRM is installed in /opt/prm/. PRM manpages are also installed in /opt/prm/.

NOTE If you have made any modifications to your /etc/rc.config.d/prm file and the corresponding file being shipped with the PRM being installed has changed, the file /var/adm/sw/swagent.log will note a conflict. If there is a conflict, merge the file /usr/newconfig/etc/rc.config.d/prm with your /etc/rc.config.d/prm file. Changes in the file shipped with PRM are due to the introduction of new variables or changes in the default values for existing variables.

Starting with PRM C.02.01, the /usr/newconfig/etc/rc.config.d/prm file includes several new variables: PRM_CONFIG_FILE, PRM_INT_APPL, PRM_INT_MEM, PRM_LOG_APPL, and PRM_LOG_MEM.

Installation procedure for PRMSIMTools

Install the bundle PRMSIMTools on systems that already have HP Systems Insight Manager (SIM) installed and from which you want to control or monitor PRM. If you want to control resources on the local system, install the full PRM product, B3835DA, as explained in the section “Installation procedure for B3835DA” on page 8.

To install your software:

Step 1. Start the SD-UX `swinstall` command. It will invoke a user interface to lead you through the installation.

Step 2. Load product PRMSIMTools.

Step 3. Configure the PRM GUI for HP Systems Insight Manager (SIM)

NOTE This step assumes SIM is already installed. If not, install SIM before completing this step. (SIM is available from the Applications DVD and the Operating Environment DVD. It is also available from <http://www.hp.com/go/softwaredepot>.)

If HP VSE Management Software A.03.00.00 or later is not installed

If you do not have HP Virtual Server Environment Management Software A.03.00.00 or later installed, run the following command to configure the PRM GUI:

```
# /opt/prm/bin/prminitconfig -a
```

If HP VSE Management Software A.03.00.00 or later is installed

If you installed HP Virtual Server Environment Management Software A.03.00.00 or later and ran `vseinitconfig -a`, it ran `prminitconfig -a` for you.

When you log in to HP Systems Insight Manager by pointing your web browser to:

`http://SIM_host:280`

where `SIM_host` has SIM and now PRMSIMTools installed, you can now access the PRM interface through the following links:

Optimize -> Process Resource Manager -> Manage PRM Groups

Required patches

The patches needed to use PRM Version C.03.03.01 are discussed below.

For the latest information on patches, visit the “patches” page available from <http://www.hp.com/go/prm/>.

The patches below—or their successors—may be available in patch bundles. Obtain patches and patch bundles from <http://itrc.hp.com> or from the quarterly HP-UX software update release CDs.

Compatibility information and installation requirements**HP-UX 11i v3 (B.11.31) patches**

For HP-UX 11i v3 (B.11.31), install the following patch.

Table 1-3 HP-UX 11i v3 (B.11.31) patch for WLM

HP-UX 11i v3 patch	Description
PHKL_36160	Memory Resource Groups (MRG) patch

HP-UX 11i v2 (B.11.23) patches

For HP-UX 11i v2 (B.11.23), install the following patches.

Table 1-4 HP-UX 11i v2 (B.11.23) patch for WLM

HP-UX 11i v2 patch*	Description
BUNDLE11i patch bundle	Bundle of patches (Installing this bundle updates your system to HP-UX 11i v2 Update 2.) Any version of this bundle is acceptable.
PHKL_32518	This patch allows you to create more than 64 PRM groups—assuming you have already installed BUNDLE11i.
PHKL_33052	This patch improves application performance in single-processor environments that use FSS groups with CPU capping enabled.
PHKL_36134	Memory Resource Groups (MRG) patch
PHKL_33604, PHKL_33605	NOTE: Install these patches at the same time. These patches help ensure each job within a FSS-based PRM group gets a more equal share of the group's entitlement than it would under HP-UX semantics.
PHCO_34599	Addresses a libc defect relating to ps, cron, login, and other such commands

* These patches may have been superseded. You can use the patches listed here or their superseding patches.

HP-UX 11i v1 (B.11.11) patches

Several patches are needed to use PRM Version C.03.03.01 with HP-UX 11i v1. In addition, HP-UX 11i v1 supports processor sets, although that support is provided by a software download.

For HP-UX 11i v1, the recommended general support patch bundles are described in the following table.

Table 1-5 HP-UX 11i v1 (B.11.11) general support patch bundles

HP-UX 11i v1 patch	Description
GOLDQPK11i	Defect-fix patches for HP-UX 11i v1 on HP 9000 workstations and servers (When placed in your local depot, this bundle appears with the names GOLDBASE11i and GOLDAPPS11i.)
HWEnable11i	Required hardware enablement patches for all HP-UX 11i v1 workstations and servers

This table lists patches specific to using PRM.

Table 1-6 HP-UX 11i v1 (B.11.11) patches for PRM

HP-UX 11i v1 patch*	Description
PHKL_33372, PHKL_36133	Memory Resource Groups (MRG) patches
PHKL_30034, PHKL_30035, PHKL_31993, PHKL_31995, PHKL_32061	<p>NOTE: Install all these patches at the same time.</p> <p>These patches:</p> <ul style="list-style-type: none"> • Preserve entitlements in cases where a PRM group with a large entitlement and just enough jobs to get that entitlement could be outperformed by a smaller entitlement group with more jobs • Improve performance of I/O-based applications when the Fair-Share Scheduler (FSS) is enabled • Address VERITAS Volume Manager (VxVM) errors that arise when PRM attempts disk bandwidth control

Compatibility information and installation requirements**Table 1-6 HP-UX 11i v1 (B.11.11) patches for PRM (Continued)**

HP-UX 11i v1 patch*	Description
PHCO_34275	Addresses a libc defect relating to ps, cron, login, and other such commands

* These patches may have been superseded. You can use the patches listed here or their superseding patches.

The next table describes additional software available for use with PRM.

Table 1-7 HP-UX 11i v1 (B.11.11) additional software

Software	Description
Processor sets	<p>The HP-UX Processor Sets bundle is required to use the PSET functionality for PRM C.03.03.01 on HP-UX 11i v1.</p> <p>To download this bundle, visit www.hp.com/go/prm. You will need to install the Software Pack and Quality Pack.</p>

Compatibility with HP Integrity Virtual Machines

HP Integrity Virtual Machines (Integrity VM) is a robust soft partitioning and virtualization technology that provides operating systems isolation, shared CPU (with sub-CPU granularity), shared I/O, and automatic, dynamic resource allocation. It is available for HP-UX 11i v2 running on HP Integrity servers.

Given a system with Integrity VM installed, you can run PRM inside any of the virtual machines; however, you cannot run PRM on the VM Host as the `vm_fssagt` already controls FSS groups on behalf of Integrity VM.

NOTE Do not specify disk bandwidth records for configurations used inside virtual machines.

Compatibility with processor sets (PSETs)

PRM allows you to define PRM groups based on PSETs.

NOTE	<p>When you have PRM groups based on PSETs, disable PRM to perform any of the following operations:</p> <ul style="list-style-type: none">• Modify the PSETs manually using the <code>psrset</code> command• Adjust core (CPU) counts in virtual partitions using the <code>vparmodify</code> command• Adjust Instant Capacity (iCAP), Temporary Instant Capacity (TiCAP), or Pay Per Use resources using the <code>icapmodify</code> or <code>ppuconfig</code> commands• Perform online cell operations, using <code>parolrad</code> or any other interface, while PRM is managing the system (For more information, see the WARNINGS section in the <code>prmconfig(1)</code> manpage.)
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Compatibility with WLM

You can have distinct PRM and WLM configurations in use at the same time. For example, the WLM configuration could be managing only the migration of CPU resources across virtual partitions or nPartitions. For more information, see the WLM Release Notes.

When upgrading WLM, be careful of the order of upgrades, as explained in “Upgrading or installing PRM before upgrading WLM from C.03.00 or earlier can cause WLM to fail swverify checks” on page 24.

Compatibility with gWLM

PRM and HP Global Workload Manager (gWLM) should not be used to manage the same system at the same time. Using these products to control resources at the same time may cause inconsistent behavior and undesirable performance.

Compatibility with long hostnames

PRM supports long hostnames. You must install the bundle `NodeHostNameXpnd` and configure the feature first though. For more information, see the section “Installation procedure for B3835DA” on page 8.

Compatibility with online cell operations

If you want to perform online cell operations, and:

- Your PRM configuration contains memory records
Stop memory management (`prmconfig -d MEM`), then after the online cell operation has completed, restart memory management (`prmconfig -e MEM`).
- Your PRM configuration uses PSETs
Reset PRM (`prmconfig -r`), then after the online cell operation has completed, restart PRM management (`prmconfig -ie [-f file]`).

For more information on online cell operations, see `parolrad(1M)`.

Compatibility with Trusted Systems

PRM is supported on Trusted Systems.

Known problems and workarounds

This section discusses problems and workarounds for HP PRM Version C.03.03.01.

Degraded performance when starting via RC scripts

Issue When an initial configuration requesting memory management is loaded (after installing or resetting PRM), PRM initializes memory resource groups (MRGs) giving all usable memory to `PRM_SYS` initially. Any free memory is then distributed to other PRM groups. This distribution of memory for use by your PRM groups can be affected by:

- Heavy paging or swapping
- A single application using over half the lockable memory on the system

Such conditions may exist if memory-intensive applications start immediately after PRM is configured—as may be the case with applications starting automatically at reboot.

Workaround You can possibly avoid these issues by:

- Starting these applications in their designated PRM groups with the `prmrn` command
- Using the `PRM_SLEEP` variable in your `/etc/rc.config.d/prm` file so that the application manager and memory manager can place processes in their configured groups before the heavy demand begins.

Application hangs in FSS group with capping enabled

Issue

On HP-UX 11i v2 (B.11.23), an application inside an FSS group may hang when running in a single-processor virtual partition, nPartition, or system if CPU capping is enabled.

Workaround

Install patch PHKL_33052.

Inconsistent inheritance

Issue

If a process placed in a PRM group via `prmrn`, `prmmove`, or a record spawns child processes, those child processes remain in the same PRM group as the parent. However, if the child process matches a Unix group record, the process is moved to the corresponding PRM group.

Workaround

Consider using user records instead of Unix group records to maintain inheritance.

No PSET PRM group data from GlancePlus

Issue

GlancePlus has not been enhanced to recognize processor sets. If you have defined PRM groups based on processor sets in your PRM configuration, GlancePlus returns no information for these PRM groups.

Workaround

For configurations with processor sets defined, use the `prmmonitor` command instead of GlancePlus.

Colons in alternate names

Issue

You get a message similar to:

```
Cannot parse configuration record at line 3 -- contains too many fields.  
Remove some fields or remove record. (PRM-2249) PRM is not configured.
```

This may be due to using colons (:) in extended regular expressions. Starting with PRM C.03.02, you can use extended regular expressions in the alternate names field of application records. However, you cannot use colons (:) in these extended regular expressions, as they are used as field separators by PRM.

Workaround

Remove colons from these extended regular expressions.

Spaces when using the SMH interface

Issue

When using PRM's interface in SMH, spaces may be collapsed to a single space or removed. For example, consecutive spaces in alternate names that use extended regular expressions are reduced to single spaces. Spaces at the ends of configuration file names are removed, preventing the files from appearing in the SMH listing of files. Spaces used in names of users or volume groups may also be affected.

Workaround

On HP-UX 11i v1 (B.11.11) and HP-UX 11i v3 (B.11.31), be sure to use WBEM Services A.02.05 or later.

For HP-UX 11i v2 (B.11.23), WBEM Services A.02.05 is scheduled for a June 2007 release. Until then, remove trailing spaces in filenames for configuration files you want to use in SMH. For alternate names, use “[]*” to handle zero or more spaces; use “[]+” to handle one or more spaces. Be careful of spaces used elsewhere.

Alternate names have limit on length

Issue

Due to a kernel limitation:

- On HP-UX 11i v1 (B.11.11), the PRM application manager cannot identify alternate names that are greater than 64 characters in length, or scripts where the combination of the alternate name and command name is greater than 64 characters.
- On HP-UX 11i v2 (B.11.23), the PRM application manager cannot identify alternate names that are greater than 128 characters in length, or scripts where the combination of the alternate name and command name is greater than 128 characters.

Workaround

Be sure these names do not exceed 64 characters on HP-UX 11i v1 or 128 characters on HP-UX 11i v2.

High CPU load may reduce CPU entitlements of PRM groups with few processes

Issue

NOTE	With Hyper-Threading disabled, each core is seen as a CPU. With Hyper-Threading enabled, each core can be seen as multiple, logical CPUs.
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The CPU scheduler that PRM uses schedules processes by:

- Distributing all the processes from each PRM group in round-robin fashion starting from the same CPU every time (with the CPUs being cores or logical CPUs depending on whether Hyper-Threading is enabled)
- Once all the processes are distributed, CPUs with spare cycles inherit processes from CPUs that are completely busy

Because the round-robin distribution always starts with the same CPU, that CPU—and other CPUs at the start of the distribution—can quickly become loaded with processes. For example, assume there are many groups with just one or two processes. Also assume a single PRM group has enough processes to distribute at least one process per CPU and that each of those processes consumes all of its CPU's cycles.

As a result, there are no CPUs with spare cycles to inherit processes. With all those processes crowded on the first CPUs in the round-robin distribution, the processes' associated PRM groups may not be able to get their CPU entitlements.

Workaround

On HP-UX 11i v1 (B.11.11), install patches PHKL_30034, PHKL_30035, PHKL_31993, PHKL_31995, and PHKL_32061. Install all these patches at the same time. For patch descriptions, see “HP-UX 11i v1 (B.11.11) patches” on page 13. These patches address CR# JAGae14311.

On HP-UX 11i v2 (B.11.23), install the BUNDLE11i patch bundle. Any version of this bundle is acceptable.

Unable to achieve CPU entitlement due to number of processes

Issue

PRM provides a PRM group its entitlement on an SMP system with Hyper-Threading disabled by granting the group its entitlement on each core. If the group does not have at least one process for each core, PRM compensates by proportionally increasing the PRM group's entitlements on cores where it does have processes. For example, for a PRM group with a single-threaded process, a 10% entitlement of four cores results in a 40% entitlement on one core.

Assume this same PRM group were allocated 50% of the four cores. PRM would give the group an entitlement of 100% on two cores. However, because the group has only the one thread, it can use only one core, resulting in a 25% entitlement.

Workaround

There is no workaround. However, be aware of how your applications run so that you do not give them resource entitlements they cannot use.

Secure Resource Partitions: Blocked port on a virtual network interface

Issue

Using the optional HP-UX feature Security Containment, you can set up a virtual network interface for each secure compartment. A process in one secure compartment can bind to a socket on a virtual network interface associated with a different secure compartment. Although this process will not be able to accept connections or use the socket to send or receive data, it does prevent other processes from binding to that socket.

Workaround

Be sure your applications that access the network bind only to sockets on the virtual network interface created for their respective secure compartments.

For more information, see the Security Containment release notes and the *HP-UX 11i Security Containment Administrator's Guide*.

Network Node Manager and PRM's SNMP structures

Issue

When you install the OpenView products after installing PRM, the OpenView networking products, including Network Node Manager, do not recognize PRM's SNMP structures.

Workaround

Run the following command:

```
# /opt/OV/bin/xmlloadmib -load /opt/prm/prm.my -replace
```

This command is automatically run when you install PRM and when you boot the system.

pr mavail not showing VxVM disk groups

Issue

On HP-UX 11i v1 (B.11.11) and HP-UX 11i v2 (B.11.23), if you are logged in as a nonroot user, invoking the `pr mavail` command does not display information for VxVM disk groups.

Workaround

This issue is due to a permissions problem. Change permissions as shown below:

```
# chmod 755 /dev/vx
```

If you are interested in the status of this issue, contact your HP support representative regarding CR# JAGae90306 (for HP-UX 11i v1) or CR# JAGae73866 (for HP-UX 11i v2).

libprmxext “not removed” on PRM upgrade

Issue

When upgrading your version of PRM, you may see the following message in `/var/adm/sw/swagent.log`:

```
File "/opt/prm/lib/hpux32/libprmxext.so.2" could not be removed. It was renamed and added to the cleanup file "/var/adm/sw/cleanupfile".
```

This message is generated by `swinstall` when the `libprmxext` file is busy, most likely because HP-UX Workload Manager (WLM), GlancePlus, or MeasureWare were running when a PRM upgrade started.

Workaround

If you do see this message:

1. Use the `fuser` command to determine what processes are using `libprmxext`:

```
# fuser /opt/prm/lib/libprmxext.sl  
# fuser /opt/prm/lib/hpux32/libprmxext.so
```
2. Stop any processes that are using `libprmxext`. (The “Installation procedure for PRMSIMTools” given later indicates how to stop WLM and MeasureWare.)

If you are unable to stop the processes, skip the following steps and reboot.

3. Stop `prmagt`:

```
# /opt/prm/bin/prmagt -stop
```
4. Reset PRM:

```
# prmconfig -r
```

Upgrading or installing PRM before upgrading WLM from C.03.00 or earlier can cause WLM to fail swverify checks

Issue

If you install or upgrade to the latest version of PRM (C.03.03) on a system with WLM A.03.00 or earlier, WLM will fail swverify checks.

Workaround

To ensure that WLM works properly on a system with PRM C.03.03 or later, upgrade WLM to A.03.02 or later. When upgrading from WLM A.03.00 or earlier, upgrade WLM prior to upgrading PRM.

Patches and fixes in this version

The following fixes are in PRM Version C.03.03.01.

Nonroot access for MRG information

Previously, PRM only allowed root to access memory resource group (MRG) information using `prmmmonitor`. With the correct patches installed, all users have access to this MRG information. (For information on the MRG patches, see the section “Required patches” on page 11.)

Processes running in MRGs may get only one megabyte of RAM

Previously, when PRM managed memory, it could under certain circumstances compute incorrect page counts for the MRGs. As a result, PRM would have allocated just one megabyte of RAM to one or more groups, adversely affecting performance for processes running in those groups. This calculation has been fixed.

Software availability in native languages

The HP PRM C.03.03.01 manpages, release notes, and user's guide are available in English and Japanese.

Security

HP provides the HP-UX Bastille product, available from <http://www.hp.com/go/softwaredepot> at no charge, for enhancing system security.

What manuals are available

Several related manuals are available. These manuals can be accessed at <http://docs.hp.com>. They are also available for order.

Specific PRM information can be found in:

- *HP Process Resource Manager User's Guide* (B8733-90021)

Information about HP-UX system administration and Logical Volume Manager can be found in:

- *HP-UX System Administrator's Guide* (HP-UX 11i v3) (5991-6440)
- *Managing Systems and Workgroups: A Guide for HP-UX System Administration* (HP-UX 11i v1 and HP-UX 11i v2) (B2355-90950)

Providing feedback

- Email your feedback to the PRM development team at the following address:
prmfeedback@rsn.hp.com
- For a forum with other PRM users, visit the IT Resource Center's forum for HP-UX Workload/Resource Management:
<http://forums.itrc.hp.com/cm/>
- For the latest patch information, white papers, and documentation, visit the Process Resource Manager web page:
<http://www.hp.com/go/prm/>

Training

HP offers a course in HP-UX resource management using PRM. For information, including a course outline, visit:

<http://www.hp.com/education/courses/u5447s.html>