

**HP-UX Workload Manager A.03.00
Release Notes
for HP-UX 11i v1 and HP-UX 11i v2**



Manufacturing Part Number: B8843-90027

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HP-UX Workload Manager and JFreeChart:

Starting with version A.02.01, HP-UX Workload Manager uses JFreeChart, an open source software package for displaying charts and graphs. JFreeChart is licensed under the GNU Lesser General Public License (LGPL). A copy of this license is available at /opt/wlm/lib/mongui/LGPL.txt and at the GNU web site, <http://www.gnu.org/licenses/lgpl.txt>.

The version of JFreeChart that Workload Manager uses is a modified version of JFreeChart 0.9.4. For information on the modifications, see /opt/wlm/lib/mongui/README. The latest version of JFreeChart is available at <http://www.object-refinery.com/jfreechart/> and <http://www.sourceforge.net>.

1 HP-UX Workload Manager Release Notes

This release notice contains the following information about HP-UX Workload Manager A.03.00:

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

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

Announcement

Announcement

HP-UX Workload Manager (WLM) A.03.00 supports HP-UX 11i v1 (B.11.11) on HP 9000 servers; also, it supports HP-UX 11i v2 (B.11.23) on HP 9000 servers and HP Integrity servers.

HP-UX WLM provides goal-based workload management. This management enables automatic resource allocation and application performance management through the use of prioritized service-level objectives (SLOs). It provides this functionality by automating features of HP Process Resource Manager (PRM), HP-UX Virtual Partitions, nPartitions, and processor sets.

HP-UX WLM offers the following features:

- Automatic allocation of CPU resources to your most critical applications (allocation of time slices on CPUs as well as whole CPUs when managing processor sets, virtual partitions, or nPartitions)
- User-configured allocation of real memory and disk bandwidth resources
- Shares-based and goal-based SLOs
- CPU shares-per-metric allocations, which allow you to give a workload, for example, 2% of the CPU for each process in the workload
- Multiple SLOs at different priorities, allowing you to have a “must meet” goal and optional stretch goals for each workload
- Passive mode for analyzing a configuration’s behavior
- Audit and billing data
- Ability to set minimum and maximum amounts of CPU available to a workload
- Time-based and metric-based activation of SLOs, including the ability to activate SLOs associated with a Serviceguard package on failover
- GUI for creating, modifying, and deploying WLM configurations locally and on remote systems
- Integration with HP Systems Insight Manager, allowing you to remotely control WLM running on numerous nodes from a single point of administration

What's in this version

WLM A.03.00 provides the following new or changed functionality.

- Simultaneous management of virtual partitions and nPartitions
WLM now allows you to manage SLOs across the virtual partitions and nPartitions in a single server at the same time.
For more information, see the `wlmpard(1M)` man page.
- Integration with Security Containment
The HP-UX feature Security Containment provides file and process isolation. WLM's integration with this feature allows you to create Secure Resource Partitions, which combine the isolation of Security Containment and the resource allocation controls of WLM.
For more information, see the `scomp` keyword in the `wlmconf(4)` man page.
- Secure communications
WLM's communications can now be secured. Use the new `wlmcert` command to manage security certificates, then use the `-s` option with `wlmd`, `wlmpard`, and `wlmcmd` as needed. You can start the daemons in secure mode at boot time by editing the file `/etc/rc.config.d/wlm`. You can also secure communications in `wlmgui` via the Preferences menu.
For more information, see the `wlmcert(1M)`, `wlmd(1M)`, `wlmpard(1M)`, and `wlmcmd(1M)` man pages and the `/etc/rc.config.d/wlm` file.
- A WLM configuration is now host-based unless it includes a `prm` structure
WLM now assumes a configuration is intended for migrating CPUs between virtual partitions or nPartitions unless the configuration includes a `prm` structure.
- New keywords for configurations without `prm` structures
The `wlmd` configuration file now supports the keywords `hmincpu`, `hmaxcpu`, and `hweight`.
Use these keywords when managing virtual partitions or nPartitions to specify minimum and maximum CPU shares for a host as well as a CPU weight for the host. (These keywords cannot be used in configuration files that include a `prm` structure.)
For more information, see the `wlmconf(4)` man page.
- The `vpar` and `npar_icod` structures in a `wlmpard` configuration are silently converted to `par` structures

What's in this version

- `wlmpard` is no longer required to be running in a partition on the managed complex
Previously, if WLM was managing the partitions in a complex, `wlmpard` had to be running in one of those partitions. Now, `wlmpard` simply has to be running on a supported platform with network connectivity to the managed partitions.
- Terminology change: The Instant Capacity on Demand (iCOD) product is now known as Instant Capacity, or iCAP. Given WLM's integration with this product, Instant Capacity is mentioned in a number of places in the WLM product and documentation.
- Configuration file for `wlmpard` now has a `utilitypri` keyword
The `utilitypri` keyword allows you to specify the lowest priority at which WLM is allowed to use Temporary Instant Capacity or Pay Per Use resources to meet service-level objectives for your workloads.
The `utilitypri` keyword allows WLM—when Temporary Instant Capacity is available—to adjust the CPU total to meet demand.
Using this keyword also ensures WLM maintains compliance with your license for Temporary Instant Capacity: When the license is exhausted, WLM will no longer attempt to use the temporary resources.
For more information, see the `wlmpardconf(4)` man page.
- Configuration file for `wlmpard` no longer supports the `partitions` or `weight` keywords
If you use either the `partitions` or `weight` keywords in your `wlmpard` configuration file, WLM issues warnings and ignores the keywords' values.
You can still assign weights to workload groups in the `wlmd` configuration file. You can also assign a weight on a host as a whole using the new `hweight` keyword in the `wlmd` configuration.
For more information, see the `wlmpardconf(4)` man page.
- The WLM GUI now has a Reconnect button that allows you to re-establish a connection—without re-entering all the data—to a system you activated a configuration on. After reconnecting, you can monitor your workloads.
- The recommended value for `wlm_interval` is 5 when using usage goals
Typically, you should set `wlm_interval` to 5 when your configuration includes a usage goal.
- `cntl_base_previous_req` now set to 1 by default
In previous releases, the default value for `cntl_base_previous_req` was 0. The default value is now 1.
For more information, see the `wlmconf(4)` man page.

- `wlminfo` changes
 - New option: `-q`
Quiets (suppresses) display of messages from `/var/opt/wlm/msglog` in the `wlminfo` output.
 - New option to group command: `-S`
Shows data for the reserved workload group `PRM_SYS` in the output.
 - New command: `proc`
Displays data about the most active processes.
 - Hostname field in output has been extended
In output of `wlminfo host` and `wlminfo par`, the `Hostname` field has been extended from 16 characters to 24.
 - Field size issues in output have been addressed
Values for the `Req` and `Shares` columns can no longer extend beyond their fields, disrupting data in surrounding fields.
 - `wlminfo group` produces output only when the configuration data includes workload groups
There is no output when the configuration data is only for hosts.
 - Several fields now show a '-'
In the `Group` field of `wlminfo slo` output and the `Workload Group` field of the `wlminfo group` output, you will see a '-' character if the configuration data is for a host (rather than a workload group).
 - New field in `wlminfo host` output
A field named `CPUs Used` has been added to display the CPU utilization for the host.
- `mincpu / maxcpu` are now optional in all cases
You are no longer required to specify `mincpu / maxcpu` statements when creating certain types of `slo` structures. For SLOs without a `mincpu`, `goal`, or `cpushares` statement, WLM requests 0 CPU shares for the associated workload group—unless a `gmincpu` or `hmincpu` value is being used.
- New tunable
The tunable `cntl_avg` allows you to control averaging in usage controllers. By default, averaging is used.
For more information, see the `wlmconf(4)` man page.

What's in this version

- New behavior when the sum of the `gmincpu` values exceed the total CPU
Previously, when this sum exceeded the total CPU, the values were scaled down proportionately so that the sum equals the total CPU. Now, those values are treated as CPU requests to be met before any other requests are considered. Any `weight` values assigned to the workload groups apply.
- Pay Per Use Toolkit being deprecated
The toolkit, including its `utilitydc` command, is being deprecated. Support for the command will be removed in a future release. In the meantime, it is still documented in the `utilitydc(1M)` man page.
Please begin upgrading to the simpler and more robust solution provided by `wlmpard` and the new keyword `utilitypri`. For information on the new solution and keyword, see the `wlmpard(1M)` and `wlmparconf(4)` man pages.
- Deprecated memory record syntax no longer supported
The following syntax was deprecated in WLM A.02.00:
`mem = group : ent [cap] [sup] [method] [, ...];`
As of this release, it is no longer supported.
If you would like information on how to duplicate the behavior provided, email wlmfeedback@rsn.hp.com.
- Deprecated syntax for PSET-based groups no longer supported
The `numcpus` and `cpus` portions of the following syntax were deprecated in WLM A.02.01:
`groups = group : PSET [{ [numcpus = integer] [cpus = ID1, ID2, ...] }];`
As of this release, those portions are no longer supported.
If you would like information on how to duplicate the behavior provided, email wlmfeedback@rsn.hp.com.
- Deprecated usage threshold tunables have been removed
The following tunables were deprecated in WLM A.02.00:
`— usage_goal_dflt_low`
`— usage_goal_dflt_high`
As of this release, these tunables are no longer supported.
- A `wlmd` configuration is rejected if `absolute_cpu_units` is set explicitly to 0 when PSETs or the `primary_host` keyword are present
- Multiple `prm` structures are no longer allowed

Known problems and workarounds

This section discusses problems and workarounds.

High CPU load may reduce CPU allocations of workload groups with few processes

Issue

The CPU scheduler that WLM uses schedules processes by:

- Distributing all the processes from each workload group in round-robin fashion starting from the same CPU every time
- 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 workload 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 workload groups may not be able to get their CPU allocations.

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 Table 1-3 on page 28. 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.

Known problems and workarounds**Capping issue**

- Issue** WLM maintains CPU allocations for workloads by capping their CPU access. Unfortunately, an algorithm in the CPU scheduler that WLM uses does not always preserve capping.
- You may see symptoms of this issue in `wlminfo` output. A portion of sample output is shown below:
- ```
wlminfo group
Workload Group PRMID CPU Shares CPU Util Mem Shares State
OTHERS 1 450.00 4.49 0.00 ON
g_nice 2 108.00 55.57 0.00 ON
g_nightly 3 0.00 0.00 0.00 OFF
g_team 4 6.00 0.00 0.00 ON
```
- For a given group, if its “CPU Util” value is ever significantly greater than its “CPU Shares” value, your system is affected by this issue. (“CPU Util” values slightly above “CPU Shares” are normal.)
- 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.
- On HP-UX 11i v2 (B.11.23), install the BUNDLE11i patch bundle. Any version of this bundle is acceptable.

**WLM uses only the assigned CPUs even with utilitypri set**

- Issue**
- In an Instant Capacity environment, with `utilitypri` set in your WLM global arbiter configuration, WLM ensures all your owned CPUs are active. However, if Instant Capacity is not in the environment, WLM uses only the CPUs that were assigned to virtual partitions when the WLM global arbiter (`wlmpard`) was started.
- Workaround**
- Be sure to assign all the owned CPUs using `vparmodify` before you start `wlmpard`. If `wlmpard` is already running, stop it (with the `-k` option) and assign all the owned CPUs using `vparmodify`.

## Temporary Instant Capacity expires while WLM is managing nPartitions

### Issue

WLM manages nPartitions using its wlm<sub>pard</sub> daemon. Assume wlm<sub>pard</sub> is started on a system that has Temporary Instant Capacity in use. If that temporary capacity expires, wlm<sub>pard</sub> will still be able to deactivate CPUs without any problems. However, wlm<sub>pard</sub> may attempt to activate CPUs based on the expired capacity. These attempts will fail because the temporary capacity no longer exists. wlm<sub>pard</sub> will not abort, but it may continue to attempt to activate unavailable CPUs, generating a message of the following form in /var/opt/wlm/msglog:

```
Error increasing CPU count on partition par_name (has x needs y).
```

You will also see the message:

```
Unable to set the local partition to z CPUs. Check the partition status.
```

where *x*, *y*, and *z* represent integer values.

### Workaround

Add a utility<sub>pri</sub> statement to your wlm<sub>pard</sub> configuration, say *configuration\_file*, and then load the new file:

```
/opt/wlm/bin/wlmpard -a configuration_file
```

The utility<sub>pri</sub> keyword allows WLM—when Temporary Instant Capacity is available—to adjust the CPU total to meet demand.

The keyword also ensures WLM maintains compliance with your license for Temporary Instant Capacity: When the license is exhausted, WLM will no longer attempt to use the temporary resources.

## **WLM uses Temporary Instant Capacity only when more than 15 days are available**

### Issue

WLM can optimize the use of Temporary Instant Capacity to meet the goals of your workloads, using the least amount of temporary capacity needed to meet the workloads' SLOs.

However, WLM does not use Temporary Instant Capacity when there are fewer than 15 days of temporary capacity available.

This 15-day threshold is not mentioned elsewhere in the WLM documentation.

### Workaround

Add Temporary Instant Capacity so that the balance is greater than 15 days.

When you purchase additional temporary capacity, be sure to stop `wlmpard` (using the `-k` option) before you add the capacity.

The WLM documentation will reflect this 15-day threshold in the next release.

## **Automatic activation of Instant Capacity processor without authorization**

### Issue

An Instant Capacity processor was automatically activated without customer authorization.

### Workaround

Please contact your HP representative.

If you have Instant Capacity or Pay Per Use (PPU) software installed, either:

- Do not use WLM's virtual partitions management, or
- Use vPars version A.03.01 or later

## Application hangs in FSS group

### Issue

On HP-UX 11i v2 (B.11.23), an application inside a workload group based on an FSS group may hang when running in a single-processor virtual partition, nPartition, or system.

### Workaround

Install patch PHKL\_33052.

## “wlmcmd -k failed,” “wlmcmd -k failed,” “wlmcmd -k failed” messages

### Issue

You may get one of the following messages when using -k with a WLM daemon:

```
wlmcmd -k failed: Resource temporarily unavailable
```

```
wlmcmd -k failed: Resource temporarily unavailable
```

```
wlmcmd -k failed: Resource temporarily unavailable
```

### Workaround

When you get one of these messages, the -k most likely did succeed—but not as quickly as expected. You can verify using the `ps` command and issue your shutdown command again if needed.

## Unable to get CPU allocation due to number of processes

### Issue

WLM provides a workload group its allocation on a system by granting the group its allocation on each CPU. If the group does not have at least one process for each CPU, WLM increases the allocations for the processes to compensate. For example, for a workload group with a single-threaded process, 10% of four CPUs is allocated as 40% of one CPU.

Assume this same group were allocated 50% of the four CPUs. WLM would allocate 100% of two CPUs to the workload group. However, because the group has only the one thread, it can use only one CPU, resulting in an allocation of 25%.

### Workaround

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

## Collectors abort when updated while running

### Issue

If you update (overwrite) a data collector executable (be it a binary or a script) while it is providing data to WLM, the collector may abort.

### Workaround

There are two workarounds to this issue:

- Update the data collector in place
  1. Stop WLM (`wlmd -k`)
  2. Update the data collector
  3. Re-start WLM (`wlmd -a configuration_file`)
- Replace the data collector
  1. Move the current data collector aside
  2. Install the new data collector in place of the collector you just moved aside
  3. Re-start WLM (`wlmd -a configuration_file`)



## GlancePlus/OpenView Performance Agent and processor sets

### Issue

On systems with multiple processor sets configured, GlancePlus may have incorrect data for the `PRM_SYS` group (ID 0). On these systems, GlancePlus will incorrectly include processes that are outside of the default processor set as belonging to the `PRM_SYS` group (ID 0).

As a result, WLM's `glance_prm` data collection script cannot be used to track application (APP or APP\_PRM) metrics for the `PRM_SYS` group or any PRM group defined based on a PSET.

Only GlancePlus is affected by this issue—WLM properly identifies workload groups (PRM groups and their PRM IDs).

### Workaround

For HP-UX 11i v1 (B.11.11), using GlancePlus C.03.55 or later and installing patch `PHKL_28052` addresses this issue.

For HP-UX 11i v2 (B.11.23), this issue is fixed in GlancePlus C.03.58.05.

## GlancePlus may not correctly identify processes' PRM groups

### Issue

On some systems, GlancePlus would not correctly identify processes' PRM groups. WLM uses these PRM groups as its workload groups. On these systems, GlancePlus would report all processes as belonging to the `PRM_SYS` group (ID 0). As a result, WLM's `glance_prm` data collection script could not be used to track application (APP) metrics for a PRM group of processes.

### Workaround

This issue is fixed in GlancePlus C.03.35.00. On HP-UX 11i v1, the best way to get this upgrade is to install GlancePlus when installing the 11i Enterprise or 11i Mission-critical Operating Environments.

## Known problems and workarounds

### Continuously increasing memory consumption by glance Adviser

#### Issue

GlancePlus's glance Adviser leaks memory when running continuously. Adviser is used by the WLM data collectors `glance_app`, `glance_gbl`, `glance_prm`, `glance_prm_byvg`, and `glance_tt`.

#### Workaround

This memory leak is fixed in GlancePlus C.03.35.00. On HP-UX 11i v1, the best way to get this upgrade is to install GlancePlus when installing the 11i Enterprise or 11i Mission-critical Operating Environments.

### WLM enables/disables SLOs at end of interval

#### Issue

WLM enables and disables time-based SLOs only at the end of an interval. This interval is 60 seconds by default and can be changed with the `wlm_interval` keyword in your configuration file.

SLOs are time-based when you set their `condition` or `exception` keyword values in the configuration file.

If your interval is too long, an SLO may not be enabled as indicated in the configuration. For example, assume the interval is 1800 seconds (30 minutes). Also assume that one SLO is supposed to have the entire system to itself for a short period of time, with WLM enabling that one SLO for 20 minutes while disabling all other SLOs for the same 20 minutes. If these 20 minutes begin at 3pm everyday, but the interval ends at 3:15pm, your configuration does not actually go into effect until 3:15pm. Moreover, it is not changed again until 3:45pm.

#### Workaround

Be aware of how your interval and time-based SLOs interact and adjust them accordingly.

## No metrics on startup or reconfiguration

### Issue

Metrics have no value on WLM startup or reconfiguration. WLM cannot work toward any SLOs without metrics.

### Workaround

Data collectors should report metrics as soon after startup or reconfiguration as possible.

## Reaching the system V semaphore limit

### Issue

If your system has many system V semaphores in use, WLM's use of semaphores may push the total number of semaphores over system limits—especially if the WLM configuration contains a large number of data collectors. The WLM daemon `wlmd` creates two semaphore sets: one containing a single semaphore; the other containing a semaphore for each data collector in the WLM configuration.

If this system limit is reached, `wlmd` prints the following error and exits before the first WLM interval begins:

```
Cannot allocate a system V semaphore set of size x: Increase
the system-imposed limits.
```

### Workaround

Use `/usr/sbin/sam` to increase the system limits.

On HP-UX 11i v1 and later, increase the following kernel parameters:

|                     |                                                     |
|---------------------|-----------------------------------------------------|
| <code>semms</code>  | Max number of overall semaphores                    |
| <code>semmsl</code> | Max number of semaphores allowed in a semaphore set |

**Known problems and workarounds**

**WLM configurations cannot be activated when there is less than 100 Mbytes of available memory**

Issue

When you have WLM controlling memory, it gives each workload group 1% of the memory when a configuration is activated and then adjusts the percentage for workload groups with active SLOs based on settings in the configuration.

However, WLM requires that the initial 1% of memory represent at least 1 Mbyte. On systems with less than 100 Mbytes of available memory, that 1% is less than 1 Mbyte. As a result, WLM cannot activate the configuration in this case.

Workaround

Increase the system's memory or decrease the minimum dynamic buffer cache using the kernel parameter `dbc_min_pct`.

**Secure Resource Partitions:  
Blocked port on a virtual network interface**

Issue

Using the 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*.

## Compatibility information and installation requirements

The following product is now available for HP 9000 servers running HP-UX 11i v1 (B.11.11) and for HP 9000 servers or HP Integrity servers running HP-UX 11i v2 (B.11.23):

- HP-UX WLM A.03.00 (B8843CA)  
Includes media, license, manual, and release notes.

Also available: *HP-UX Workload Manager User's Guide* (B8844-90008)

## Disk and memory requirements

This version of WLM requires:

- 16 Mbytes of disk space in /opt/wlm/
- disk space in /opt/prm/:  
8 Mbytes
- 5 Mbytes of memory (Also, your system must have at least 100 Mbytes of available memory for WLM to properly manage the workloads' memory usage.)

**Compatibility information and installation requirements****Compatibility with other software**

WLM A.03.00 was verified using the software listed in the following table. Compatibility with other versions of the software packages is unknown unless explicitly stated.

**Table 1-1 Verified software configurations**

| <b>Software package</b>                                      | <b>Version on HP-UX 11i v1</b>                                                                                                                       | <b>Version on HP-UX 11i v2 Update 2</b>                                      |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| PRM                                                          | C.03.00                                                                                                                                              | C.03.00                                                                      |
| Processor Sets                                               | A.01.00.00.06                                                                                                                                        | The PSET version included with HP-UX                                         |
| Serviceguard                                                 | A.11.14                                                                                                                                              | A.11.15                                                                      |
| Servicecontrol Manager;<br>HP Systems Insight Manager        | A.02.05,<br>B.03.00,<br>C.04.02                                                                                                                      | B.03.00,<br>C.04.02                                                          |
| Instant Capacity<br>(for use in<br>nPartition<br>management) | B.04.01,<br>B.05.00,<br>B.05.01,<br>B.06.00,<br>B.06.01,<br>B.06.02,<br>B.06.03,<br>B.06.50,<br>B.07.00 (can be used with<br>vPars A.03.x and later) | B.06.03,<br>B.06.50,<br>B.07.00 (can be used with vPars<br>A.03.x and later) |
| Virtual partitions                                           | A.02.03.02,<br>A.03.01,<br>A.03.02                                                                                                                   | A.04.01 (can be used with<br>Instant Capacity B.07.00 and<br>later)          |
| EMS                                                          | A.03.20.01                                                                                                                                           | A.04.00.01                                                                   |
| GlancePlus Pak                                               | C.03.55.00,<br>C.03.71.00                                                                                                                            | C.03.85.00                                                                   |
| WLM Toolkits                                                 | A.01.08                                                                                                                                              | A.01.08                                                                      |
| HP-UX Bastille                                               | B.02.00                                                                                                                                              | B.02.00                                                                      |

## Compatibility with long hostnames

WLM supports long hostnames. You must install the bundle NodeHostNameXpnd and configure the feature first though. For more information, see the section “Installation procedure” on page 25.

## Compatibility with X Windows

The WLM configuration wizard (/opt/wlm/bin/wlmcw) and the WLM monitoring GUI (invoked with wlminfo -i or wlmgui) were verified with the following X Windows variants:

- X Windows on HP-UX
- XFree86, Version 4.1.0-15 (Linux)
- Reflection X for Windows 2000

HP makes no claims with respect to other variants.

## Compatibility with GlancePlus

You can use GlancePlus to monitor PRM, which WLM uses. GlancePlus also provides metrics that you can use to drive SLOs.

WLM is compatible with any HP-UX 11i version of GlancePlus. On HP-UX 11i v1, be sure to install the 11i Enterprise Operating Environment or 11i Mission-critical Operating Environment to ensure you have a GlancePlus version that is fully compatible with WLM.

---

**NOTE** Do not use GlancePlus to change PRM allocations. WLM controls PRM.

---

## Compatibility of WLM’s virtual partition management and Instant Capacity / PPU

If you have Instant Capacity or Pay Per Use (PPU) software installed, use WLM’s virtual partitions management only if you have vPars version A.03.01 or later.

If you have a vPars version prior to A.03.01, using WLM’s virtual partition management may cause an Instant Capacity processor to be automatically enabled without customer authorization. If this situation occurs, please contact your HP representative.

With vPars version A.04.01 or later, use Instant Capacity v7 or later.

## Compatibility information and installation requirements

### **Compatibility of WLM's virtual partition management and certain CPU bindings**

Do not use cell-specific CPU bindings or user-assigned CPU bindings on virtual partitions you are going to manage with WLM.

### **Compatibility of WLM's partition management and PPUTK**

Do not use WLM's partition management (virtual partition or nPartition management) and the Pay Per Use Toolkit (PPUTK) tool `utilitydc` at the same time.

### **Compatibility of WLM's partition management and PSETs**

HP does not support WLM's simultaneous management of partitions (virtual partitions or nPartitions) and PSET-based workload groups. CPUs cannot be properly moved between these partitions when PSETs are active.

### **Compatibility of `utilitydc` and PSETs**

HP does not support the simultaneous use of the PPUTK command `utilitydc` and PSET-based workload groups.

### **Compatibility with PRM**

WLM and PRM 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.

WLM uses PRM for some types of resource management. You can bypass WLM and use PRM directly; however, if you do use PRM directly through its own configuration file, do not use any of the WLM interfaces.

When using WLM, you can use PRM's informational and monitoring commands such as `prmlist` and `prmmonitor`. You can also use the `prmrn` and `prmmove` commands, among others. If you use the `prmconfig` command, invoke it with no options or the `-u` (unlock) option—do not use the `-r` (reset) option.

### **Compatibility with gWLM**

WLM 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.



## Installation procedure

If you are installing WLM from the quarterly Application Release (AR) CD-ROM, use the procedure in this section to minimize system reboots.

To install your software, use the SD-UX `swinstall` command. For information on installing using a GUI, see “Using the swinstall Graphical User Interface (GUI)” on page 38.

---

**NOTE** If you are upgrading your version of WLM, after installation, you must explicitly restart HP-UX WLM with the `wlmd -a` or `wlmd -A` commands.

---

The following steps give an overview of the HP-UX WLM A.03.00 installation process:

- Step 1.** Verify that HP-UX is up-to-date
- Step 2.** (Optional) Configure long hostnames
- Step 3.** Determine what patches are needed
- Step 4.** (Optional) Create a software depot to minimize system reboots
- Step 5.** Disable PRM from starting automatically
- Step 6.** (Optional) Disable PRM's remote configuration daemon
- Step 7.** Install patches and install/upgrade WLM
- Step 8.** Check the file `/var/adm/sw/swagent.log`
- Step 9.** (Optional) Ensure you have the proper version of GlancePlus
- Step 10.** (Optional) Install files for integration with HP Systems Insight Manager
- Step 11.** (Optional) Merge new `/etc/rc.config.d/wlm` file with your modified file

These steps are discussed in detail below.

**Compatibility information and installation requirements**

**Step 1.** Verify that HP-UX is up-to-date

HP suggests that as part of your systems' ongoing maintenance and support, the systems be kept up-to-date through the HP-UX Support Plus program. This program delivers quarterly patch bundles via the web at [http://software.hp.com/SUPPORT\\_PLUS/](http://software.hp.com/SUPPORT_PLUS/) and as part of the quarterly AR media.

For HP-UX 11i v1 (B.11.11), the recommended bundles are described in the following table.

**Table 1-2 HP-UX 11i v1 (B.11.11) general support patches**

| <b>HP-UX 11i v1 patch</b> | <b>Description</b>                                                                                                                                                                |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GOLDQPK11i                | Defect-fix patches for HP-UX 11i v1 on HP 9000 workstations and servers<br><br>(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                                                                                                |

If you are using HP-UX 11i v1 (B.11.11) and are interested in using processor sets, you can download that software from the Enhancement Releases page on [software.hp.com](http://software.hp.com):

[http://software.hp.com/ER\\_products\\_list.html](http://software.hp.com/ER_products_list.html)

---

**NOTE** Install GOLDQPK11i before installing the processor sets software—unless you are using a depot to install them at the same time.

---

Processor sets are included with HP-UX 11i v2 (B.11.23).

**a.** Determine which patch bundles are already on the system

Run the `swlist` command, which will list the bundle if found:

```
/usr/sbin/swlist -l bundle patch_bundle
```

where `patch_bundle` is GOLDBASE11i, GOLDAPPS11i, or HWEnable11i

- b. Download any missing patch bundles from [http://software.hp.com/SUPPORT\\_PLUS/](http://software.hp.com/SUPPORT_PLUS/) to /tmp.

---

**NOTE** Do not install these patch bundles at this point.

---

Related support sites include:

- HP Software Depot (<http://software.hp.com>)  
See the “enhancement releases” link.
- HP IT Resource Center (<http://itrc.hp.com>)  
See the “maintenance/support” link.
- HP Technical Documentation (<http://docs.hp.com>)  
See the HP-UX 11i v1 topics “Installing and Updating” and “Patch Management”.

**Step 2.** (Optional) Configure long hostnames

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.

**Compatibility information and installation requirements**

**Step 3.** Determine what patches are needed

- a. Check the following data to determine what patches are suggested for WLM.

If you plan to use the WLM configuration wizard, the `wlmgui` command, or `wlminfo`'s interactive mode GUI (`-i`), all of which depend on Java, see the following website for patch information:

<http://www.hp.com/go/java>

On HP-UX 11i v1, apply patch PHCO\_29109 to address a pthread library issue.

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

For HP-UX 11i v1, the following patches are available.

**Table 1-3 HP-UX 11i v1 (B.11.11) patches for WLM**

| HP-UX 11i v1 patch                                                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PHKL_32619                                                             | Memory Resource Groups (MRG) patch                                                                                                                                                                                                                                                                                                                                                                                                            |
| PHKL_30034,<br>PHKL_30035,<br>PHKL_31993,<br>PHKL_31995,<br>PHKL_32061 | <p><b>NOTE:</b> Install all these patches at the same time.</p> <p>These patches:</p> <ul style="list-style-type: none"> <li>• Preserve allocations in cases where a workload group with a large allocation and just enough jobs to get that allocation could be outperformed by a smaller allocation group with more jobs</li> <li>• Improve performance of I/O-based applications when the Fair-Share Scheduler (FSS) is enabled</li> </ul> |

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.)                                                                |
| PHKL_33052             | Prevents performance degradation when using workload groups that are based on FSS groups in a single-processor virtual partition, nPartition, or system |

**b.** Determine which patches are already on the system

If a recent Quality Pack is installed, some of these patches may already be on your system. To determine if these patches are installed, use `swlist` as follows:

```
/usr/sbin/swlist [-l patch] patch
```

where *patch* is the patch's tag. For example, to check that patch PHKL\_32061 is installed, use the following command line:

```
/usr/sbin/swlist -l patch PHKL_32061
```

Similarly, if you downloaded patch bundles in Step 1, check the bundles for the patches:

```
/usr/sbin/swlist -d patch @ /tmp/bundle_name
```

If a given patch is not listed, check HP's IT Resource Center (<http://itrc.hp.com>) for a superseding patch, then use `swlist` to list the superseding patch.

**c.** Download any missing patches to `/tmp`.

If any of the required patches are missing (not installed or not in a bundle you downloaded), download the patches from HP's IT Resource Center:

Americas/Asia-Pacific

<http://itrc.hp.com/>

Europe

<http://europe.itrc.hp.com/>

---

**NOTE** Do not install these patches at this point.

---

## Compatibility information and installation requirements

### Step 4. (Optional) Create a software depot to minimize system reboots

Creating a depot is beneficial when you are completing two or more of the following tasks:

- Installing patch bundles (GOLDQPK11i or HWEnable11i)  
The patch bundles include kernel patches. Installation of a patch bundle requires a system reboot.
- Installing PHKL\_\* patches  
The PHKL\_\* patches are HP-UX kernel patches. Installation of these patches requires a system reboot.
- Installing/upgrading WLM  
The installation or upgrade of WLM requires a kernel rebuild and system reboot.

Completing two or more of the above tasks will cause multiple reboots unless you create a software depot. With a depot including all the patches, the patch bundles, and WLM, you can combine the installation steps into a single operation, thereby limiting the number of installation reboots that must occur.

If you do not mind multiple reboots or your system will not be subject to multiple reboots because its software is up-to-date, proceed to Step 5, “Disable PRM from starting automatically” on page 33.

In order to install these items with a single `swinstall(1M)` command, all of the related filesets must be collected into a single software depot distribution directory.

The following steps outline how to create a software depot. The steps use examples showing how to include the following items in your depot:

- Quality Pack GOLDQPK11i (also known as a patch bundle)
- Patch PHKL\_32619
- perl
- WLM

---

|             |                                                                                           |
|-------------|-------------------------------------------------------------------------------------------|
| <b>NOTE</b> | To satisfy SD-UX, it may be necessary to copy dependency filesets into this common depot. |
|-------------|-------------------------------------------------------------------------------------------|

---

- a. Ensure that adequate disk space is available. The size of each patch can be found in its README text.

- b. Create a directory for the depot:

```
mkdir /tmp/wlm_depot
```

- c. Place any patch bundles you downloaded in Step 1 (GOLDQPK11i or HWEnable11i) in /tmp/ if they are not already there.

For more information on these patch bundles, see Table 1-2.

- d. Check each of the patch bundles.

```
/usr/sbin/swlist -d @ bundle_path
```

For example, check GOLDQPK11i as follows:

```
swlist -d @ /tmp/GOLDQPK11i_11.11.depot
```

The output should include lines similar to the following lines:

```
GOLDAPPS11i B.11.11.0312.4 Gold Applications Patches for HP-UX
11i v1, December 2003
```

```
GOLDBASE11i B.11.11.0312.4 Gold Base Patches for HP-UX 11i v1,
December 2003
```

If your output is not similar, please download the file again.

- e. Add the patch bundles to the depot:

```
/usr/sbin/swcopy -s bundle_path bundle_name @ depot_path
```

where *bundle\_path* and *depot\_path* are fully specified path names, and *bundle\_name* is the patch bundle's tag. For example:

```
swcopy -s /tmp/GOLDQPK11i_11.11.depot GOLDAPPS11i @ /tmp/wlm_depot
```

```
swcopy -s /tmp/GOLDQPK11i_11.11.depot GOLDBASE11i @ /tmp/wlm_depot
```

This step automatically registers the wlm\_depot. Therefore, there is no need to register it using the swreg command.

- f. Verify the depot:

```
/usr/sbin/swverify -d * @ depot_path
```

where *depot\_path* is a fully specified pathname. For example:

```
swverify -d * @ /tmp/wlm_depot
```

## Compatibility information and installation requirements

- g.** Place any missing individual patches that you downloaded in Step 2 in `/tmp/`.

For HP-UX 11i v1 (B.11.11) patches, see Table 1-3.

For HP-UX 11i v2 (B.11.23) patches, see Table 1-4.

- h.** Add each patch file to the depot:

```
swcopy -s patch_file_path * @ depot_path
```

where `patch_file_path` and `depot_path` are fully specified path names. For example:

```
swcopy -s /tmp/PHKL_32619.depot * @ /tmp/wlm_depot
```

- i.** Verify the depot:

```
swverify -d * @ depot_path
```

where `depot_path` is a fully specified pathname. For example:

```
swverify -d * @ /tmp/wlm_depot
```

- j.** Ensure perl is available at `/opt/perl/bin/perl`

If you intend to use the:

- `wlmaudit` utility to display audit reports
- `wlmoradc` or `smooth` utilities from WLM's Oracle Database Toolkit (ODBTK)
- `expsmooth` utility from WLM's BEA WebLogic Server Toolkit (WebLogicTK)

and perl is not available at `/opt/perl/bin/perl`:

- If perl is not already installed, add it to your depot from the quarterly Application Release (AR) CD-ROM using the following `swcopy` line:

```
swcopy -s mount_path perl * @ /tmp/wlm_depot
```

where `mount_path` is the path to the quarterly AR CD-ROM.

- If perl is installed, but in a location other than `/opt/perl/bin/perl`, ensure there is a symbolic link from `/opt/perl/bin/perl` to your perl.

- k.** Locate and mount the WLM installation media. For assistance, consult `mount_cdfs(1M)`, or use SAM or the SD-UX Interactive User Interface for `swcopy`, which you can use to "find" the CD-ROM.



- l. Add WLM (product B8843CA) to the depot.

---

|             |                                                                                                                                                                                                                                                                                               |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>NOTE</b> | The WLM bundle B8843CA requires a <code>customer_id/codeword</code> pair to unlock it from the quarterly AR CD-ROM. Purchase of WLM entitles you to this codeword, which can be found on the Software Certificate you received from HP. The WLM codeword is needed to complete the next step. |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

---

Use a line similar to the following to add WLM to your depot.

```
/usr/sbin/swcopy -x customer_id=cust_id \
 -x codeword=codeword \
 -s mount_path \
 B8843CA @ depot_path
```

where `mount_path` is the path to the CD-ROM and `depot_path` is the same fully specified depot as in previous steps. For example:

```
swcopy -x customer_id=xyzCorp -x codeword=123456789101bcdf \
 -s /cdrom B8843CA @ /tmp/wlm_depot
```

- m. Verify the depot:

```
swverify -d * @ depot_path
```

where `depot_path` is a fully specified pathname. For example:

```
swverify -d * @ /tmp/wlm_depot
```

#### Step 5. Disable PRM from starting automatically

If you've previously installed WLM or PRM, ensure that PRM is disabled from starting automatically by setting the variable `PRM_CONFIG` to 0 in the file `/etc/rc.config.d/prm`:

```
PRM_CONFIG=0
```

#### Step 6. (Optional) Disable PRM's remote configuration daemon

The PRM remote configuration daemon is not useful with WLM. It need not be started. It is recommended that it be disabled.

If you've previously installed WLM or PRM, ensure that PRM's remote configuration daemon is disabled from starting automatically by setting the variable `PRM_RMTCONF` to 0 in the file `/etc/rc.config.d/prm`:

```
PRM_RMTCONF=0
```

## Compatibility information and installation requirements

### Step 7. Shut down WLM if it is currently running

Run the following command on every system or partition where you will install/upgrade WLM:

```
/opt/wlm/bin/wlmd -k
```

Also shut down any running instances of the WLM global arbiter:

```
/opt/wlm/bin/wlmpard -k
```

### Step 8. Install patches and install/upgrade WLM

---

**NOTE** The procedure below explains installation using the command-line version of `swinstall`. For information on using the `swinstall` GUI, see the section “Using the `swinstall` Graphical User Interface (GUI)” on page 38.

---

WLM is bundled as B8843CA, which contains the products Workload-Mgr, Proc-Resrc-Mgr, and PRM-Sw-Lib, and WLM-Monitor. If desired, you can use `swlist` to list the product’s filesets:

```
swlist -l fileset -s depot_path B8843CA
```

Installing WLM ensures that the following products are also installed:

- PRM C.03.00
- WLM Toolkits A.01.08 or later (T1302AA)

If the system already has the correct versions installed, they will not be modified.

The WLM product B8843CA replaces the WLM product B8843BA from WLM Version 1.0. If you install using `swinstall`’s `match_target` option, the new B8843CA product will match your installed B8843BA product.

Workload Manager is installed in `/opt/wlm/`. The man pages are also installed in `/opt/wlm/`.

- a. Plan for system downtime. This should include generation of a current system backup and notification to all users.
- b. Shut down MeasureWare if it is running:

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

c. Install WLM

There are two methods for installing WLM. You can:

- Install WLM from the depot you created in Step 6
- Install WLM directly from the CD-ROM

These options are discussed below.

**Installing WLM from a depot**

If you are installing WLM from your local depot, use `swinstall` as follows:

```
/usr/sbin/swinstall -x patch_match_target=true \
 -x autoreboot=true \
 -s depot_path \
 B8843CA [patch_bundles] [individual_patches]
```

where `depot_path` is the fully specified path of the depot just created. For example:

```
swinstall -x patch_match_target=true \
 -x autoreboot=true \
 -s /tmp/wlm_depot \
 B8843CA GOLDBASE11i PHKL_32619
```

SD-UX will attempt to build a new kernel and reboot the system.

---

**NOTE** The `autoreboot` option must be set to `true` to satisfy requirements of the HP PRM kernel-building fileset `PRM-Sw-Krn.PRM-KRN`. If this fileset is not already installed at the proper revision, SD-UX must reboot the system as part of installing that fileset. Setting this option to `true` instructs SD-UX to reboot once installation is complete. If this fileset is already installed at the proper revision, a reboot will not be necessary; however, SD-UX still requires that the `autoreboot` option be set to `true`.

The SD-UX Interactive User Interface differs from the command-line interface in that it can prompt for an OK to reboot. Consequently, the `autoreboot` option is not required if using the `swinstall` GUI.

---

### Installing from the CD-ROM

---

**NOTE** Installing without the benefit of a depot may cause unnecessary reboots. For information on reducing reboots, see Step 4 on creating a software depot.

---

If you are installing WLM from the CD-ROM:

- i. Install the general support patch bundles and software from Step 1  
If your system is missing any general HP-UX patch bundles or software mentioned in Step 1, install them now.  
Be sure to read the patch bundle documentation for any special installation instructions.
- ii. Install WLM

---

**NOTE** The WLM bundle B8843CA requires a customer\_id/codeword pair to unlock it from the AR CD-ROM. Purchase of WLM entitles you to this codeword, which can be found on the Software Certificate you received from HP. The WLM codeword is needed to complete the next step.

---

Use a line similar to the following to install WLM:

```
/usr/sbin/swinstall -x customer_id=cust_id \
 -x codeword=codeword \
 -x autoreboot=true \
 -s mount_path B8843CA
```

where *mount\_path* is the path to the CD-ROM. For example:

```
swinstall -x customer_id=xyzCorp \
 -x codeword=123456789101bcdf \
 -x autoreboot=true \
 -s /cdrom B8843CA
```

- iii. Install WLM-specific patches from Step 3  
If your system is missing patches from Step 3, install them now.  
Be sure to read the patch documentation for any special installation instructions.

- d. Restart MeasureWare if it was running before the WLM upgrade/installation:

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

**Step 9.** Check the file `/var/adm/sw/swagent.log`

Check the file `/var/adm/sw/swagent.log` for messages relating to additional tasks that may need attention following the `swinstall` of WLM bundle B8843CA.

**Step 10.** (Optional) Ensure you have the proper version of GlancePlus

If you plan to use WLM's data collectors that are based on Glance Adviser (such as `glance_app` or `glance_tt`), be sure to install and use GlancePlus C.03.35.00 or later to avoid a memory leak that occurs when Glance Adviser runs continuously. If you are using HP-UX 11i v1, install GlancePlus when installing the 11i Enterprise or 11i Mission-critical Operating Environments. If you are using processor sets, install GlancePlus C.03.58.05 or later.

**Step 11.** (Optional) Install files for integration with HP Systems Insight Manager

If you plan to use WLM with HP Systems Insight Manager (or Servicecontrol Manager), install the fileset `CMSConfig.WLMB-CMS-Tools` on the CMS. This fileset is available from the depot `/var/opt/mx/depot11` on the host where WLM has been installed.

If you are installing this fileset on a CMS that has WLM installed, the installation will fail if the fileset is not compatible with (does not have the same revision string as) the installed WLM.

**Step 12.** (Optional) Merge new `/etc/rc.config.d/wlm` file with your modified file

If you have made any modifications to your `/etc/rc.config.d/wlm` file by setting any of the variables ending in “`_ENABLE`” to 1, merge the file `/opt/wlm/newconfig/etc/rc.config.d/wlm` with your `/etc/rc.config.d/wlm` file.

## Compatibility information and installation requirements

As of WLM A.02.02, the `/opt/wlm/newconfig/etc/rc.config.d/wlm` file includes the variables `WLMCOMD` and `WLMCOMD_ENABLE`.

---

**NOTE** If this was the first time you installed WLM and you have not previously installed PRM, be sure to edit the file `/etc/rc.config.d/prm` to set the following variables as indicated:

```
PRM_CONFIG=0
```

```
PRM_RMTCONF=0
```

These settings prevent PRM and its remote configuration daemon from starting automatically at reboot. (The PRM remote configuration daemon is not useful with WLM and does not need to be started.)

---

### Using the `swinstall` Graphical User Interface (GUI)

Using the `swinstall` GUI can simplify installation. The steps below illustrate how to use the GUI to install patches and WLM from a depot (Step 8 above):

**Step 1.** Start the `swinstall` GUI:

```
/usr/sbin/swinstall -s depot_path
```

where `depot_path` is the path for the depot you created for the patches, patch bundles, and WLM.

**Step 2.** Select “Manage Patch Selection” under the Actions menu. (Do not select the menu item labeled “Match What Target Has”. That item is for loading products, not patches.)

**Step 3.** From the resulting submenu, select:

“Automatically select patches for software installed on the target”.

Because this is not the default selection, you may need to unmark the other option before proceeding.

The `swinstall` command will now scan the depot, and mark patches to be loaded.

**Step 4.** Return to the Actions menu and select any other individual patches, patch bundles, and WLM (B8843CA) for installation once the marking phase is complete.

**Step 5.** Choose “Install (analysis)...” from the Actions menu.

**Step 6.** Select OK to install the software after the analysis phase is completed.

Because these products contain kernel filesets, SD will prompt you that a reboot is necessary.

---

**NOTE** If this was the first time you installed WLM and you have not previously installed PRM, be sure to edit the file `/etc/rc.config.d/prm` to set the following variables as indicated:

```
PRM_CONFIG=0
PRM_RMTCONF=0
```

These settings prevent PRM and its remote configuration daemon from starting automatically at reboot. (The PRM remote configuration daemon is not useful with WLM and does not need to be started.)

---

---

## Patches and fixes in this version

WLM version A.03.00 includes the following fixes.

### Excessive logging of `wlmpard` messages

Previously, when WLM was configured to manage virtual partitions or `nPartitions`, all partitions had to be listed in the `wlmpard` configuration file. If on a particular partition `wlmd` was down or not running, a message similar to the one below was logged every `wlmpard` interval:

```
07/12/04 10:20:02 [W] (p23694) No data received from partition vpar1
```

The configuration file no longer lists partitions, so `wlmpard` no longer maintains a list of partitions from which it expects data.

This fix addresses CR# JAGaf30783.

## **Reprioritization**

Previously, when a workload group based on a PSET had an SLO with a priority between the priorities of two SLOs on a single FSS group, where the higher-priority SLO on the FSS group is a goal-based SLO, reprioritization can occur: The PSET-based group cannot acquire resources it needs from the low-priority SLO on the FSS group, effectively reprioritizing the low-priority SLO to a higher priority.

The `cntl_base_previous_req` tunable is now set to 1 by default, preventing the reprioritization issue.

This fix addresses CR# JAGaf34569.

## **wlmpard's ignoring some remote connections**

Previously, `wlmpard` had a list of the partitions that would be reporting in. If a connection from one of these partitions was not from the IP address `wlmpard` expected, the connection would be ignored.

With the removal of the `partitions` statement from the `wlmpard` configuration file, `wlmpard` no longer has a list of partitions from which to expect connections. As a result, `wlmpard` now accepts all connections—unless communications are secured, as explained in the `wlmcert(1M)` man page.

This fix addresses CR# JAGaf53206.

## **Increasing memory consumption with transient groups**

Previously, if your WLM configuration set `transient_groups = 1`, WLM would consume more and more memory.

The memory issues have been corrected.

This fix addresses CR# JAGaf56249.

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## **Software availability in native languages**

The man pages are available only in English. The release notes and user's guide are available in English and Japanese.



## Security

This section highlights security items you should be aware of.

### Data collectors

Data collectors invoked by WLM run as root and can pose a security threat. Hewlett-Packard makes no claims of any kind with regard to the security of data collectors not provided by Hewlett-Packard. Furthermore, Hewlett-Packard shall not be liable for any security breaches resulting from the use of said data collectors.

### wlmgui and wlmcomd

WLM and the WLM GUI allow you to set up secure communications as described in the `wlmcert(1M)` man page. If you choose not to use secure communications, here are several security tips:

- Do not use `wlmgui` over the Internet. Use `wlmgui` and `wlmcomd` only on trusted LANs where you trust all the users: All data exchanged between `wlmcomd` and `wlmgui`, including the user's password, is transmitted without encryption over the network.
- Restrict communications between `wlmcomd` and `wlmgui` to only authorized users to improve security.
- Rely—only to the extent that you trust your intranet—on the monitoring information from `wlmgui` to decide on a course of action.
- The WLM GUI sends data to `wlmcomd` over the network without verifying the recipient.
- Each connection to `wlmcomd` represents a separate process on the system. As such, each connection consumes resources, such as open file descriptors, a process ID, memory, and so forth. A large number of connections could result in denial of service. You can restrict connections by deploying `wlmcomd` on systems behind a firewall that blocks access to the port being used.

## What manuals are available

### Partitions

WLM manages virtual partitions and nPartitions through a global arbiter. WLM's global arbitration uses non-secured communications. A rogue user could manipulate the communications, resulting in one or more partitions being granted an incorrect number of CPUs. Use global arbitration only on trusted local area networks.

By default, `wlmpard` communicates to the partitions on a system through port 9691.

If the partitions use a firewall or if you are using the HP-UX Bastille product on the partitions, it is likely that communications on this port are being blocked. To use `wlmpard` in your environment, specifically allow port 9691 or another port to be open to incoming connections. If you use a port other than 9691, be sure to restart `wlmpard` to communicate on the new port.

If you use Bastille or the Install-Time-Security Levels to configure the IPFilter firewall, you may want to put the rules regarding which port to leave open in the file `/etc/opt/sec_mgmt/bastille/ipf.customrules` and run `bastille -b` to load the rules and make sure that Bastille does not remove them later during subsequent runs/lockdowns.

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## 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 WLM information can be found in:

- *HP-UX Workload Manager User's Guide* (B8844-90008)  
The release notes for each version of WLM can be found at <http://docs.hp.com>.  
The user's guide and release notes are available in `/opt/wlm/share/doc/`.

WLM Toolkits information can be found in:

- *HP-UX Workload Manager Toolkits User's Guide* (T1302-90028)  
The WLMTK documentation is available in `/opt/wlm/toolkits/doc/`.

PRM information can be found in:

- *HP Process Resource Manager User's Guide* (B8733-90013)

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

- *Managing Systems and Workgroups* (5187-2216)

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## WLM toolkits

Hewlett-Packard provides integration toolkits to simplify integrating Workload Manager with major third-party applications.

The toolkits are made available on the web as they are developed. Also, they are bundled with the subsequent Workload Manager release. To download toolkits, visit the Workload Manager web page:

<http://www.hp.com/go/wlm>

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## Providing feedback

- Email your feedback to the WLM and WLM Toolkit development teams at the following address:  
[wlmfeedback@rsn.hp.com](mailto:wlmfeedback@rsn.hp.com)
- For a forum with other WLM 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 Workload Manager web page:  
<http://www.hp.com/go/wlm/>

**Training**

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**Training**

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

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