Pay Per Use (PPU) User's Guide for versions B.06.x

Fifth Edition

Manufacturing Part Number: T2351-90031
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United States

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Publication History

The manual publication date and part number indicate its current edition. The publication date will change when a new edition is released. The manual part number will change when extensive changes are made.

To ensure that you receive the new editions, you should subscribe to the appropriate product support service. Contact your HP sales representative for details.

- First Edition: June 2003, 5187-2706,
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- Third Edition: September 2003, T2351-90011,
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- Fifth Edition: March 2004, T2351-90031,
  (PPU version B.06.04 on HP-UX 11i v2)
  Available on web, print, and March 2004 HP-UX 11i v2 Instant Information CD

IMPORTANT

New information may have been developed after the time of this printing. For the most current information, visit the following HP documentation web site (search for “PPU user’s guide”):

`docs.hp.com`

Conventions in this Guide

This guide uses these typographic conventions:

Boldface	Words defined for the first time appear in **boldface**.
`Computer`	`Computer font` indicates system commands, file names, and literal items — which may be displayed by the computer. For example: `file not found`
`User input`	Bold, computer text indicates literal items that you type. For example, to change to your HP-UX account's home directory, enter: **`cd`**
Italics	Manual titles, variable in commands and emphasized words appear in *italics*. For example, you would substitute an actual directory name for *`directory_name`* in this command: **`cd`** ***`directory_name`***
`[ ]` and **`|`**	Brackets **`[]`** enclose optional items in command syntax. The vertical bar **`|`** separates syntax items in a list of choices. For example, you can enter any of these three items in this syntax: **`ls [-a | -i | -x]`**
Enter	Text in **this bold, sans-serif font** denotes keyboard keys and on-screen menu items. A notation like **Ctrl-Q** indicates that you should hold the **Ctrl** key down and press **Q**.

Contents

Contents

1 About this guide

This chapter covers the following topics:

For more in-depth information, see the manpage *ppu* (5).

Introduction

Welcome

Welcome to the *Pay Per Use (PPU) User's Guide for versions B.06.x.* HP's pay per use (PPU) B.06.x software product provides you cost savings by charging for only the percent utilization of the processors in your HP enterprise server. As your computing demands vary, you are charged according to the processor usage. The PPU software product is a part of the HP On Demand Solutions (ODS) program.

NOTE PPU versions B.06.00, B.06.01, B.06.02, B.06.03, and B.06.04 are encompassed in references to "versions B.06.x" in this document.

This user's guide provides you with the most recent information on using the PPU versions B.06.x software.

How to Use this Guide

- *Chapter 1, About this Guide* provides an introduction to the guide, an overview of the PPU system, and locating PPU documentation.
- *Chapter 2, Understanding PPU Requirements* describes PPU: program, software, and system move requirements.
- *Chapter 3, Installing and Configuring PPU Software* contains a *Getting Started* section to help you verify your PPU system is correctly installed and configured, and corrective actions to take if it is not. This chapter also has instructions on how to install, configure, un-install, or re-install the PPU software.
- *Chapter 4, Using the PPU Software* explains the PPU web portal, PPU usage reports, utilization capping, and what to do when creating a new partition.
- *Chapter 5, Troubleshooting* gives you a step by step procedure to resolve problems with the PPU software.
- *Chapter 6, Frequently Asked Questions* contains questions and answers to common PPU software topics.

- *Appendix A, Open Source and Licenses* lists the open source components used by the PPU software — and the CURL MITX and OpenSSL licenses.
- *Appendix B, Special Considerations* describes export issues with the PPU software, inactivating partitions, and validating PPU utilization information with PPU web portal reports.
- *Appendix C, Glossary* explains PPU systems and software terms.
- *Appendix D, Manpages* contains the actual manpages for `ppu`, `ppud`, and `ppuconfig`.

We welcome any feedback that helps us improve the quality of our documentation. To provide feedback, go to the following HP web site: **docs.fc.hp.com/assistance/feedback.html**

HP On Demand Solutions Program

PPU

In previous versions of PPU (versions B.04.x — HP product `T1322AA`) a customer's usage charges were calculated based on the number of active processors in the system.

PPU versions B.06.x (HP product `T2351AA`) offers an alternative pricing model in which you are charged for the percent utilization of the active processors.

The billing amounts vary as your processor usage needs increase or decrease. This is different than the traditional financing approaches that are based on fixed payment amounts for a specified period.

The PPU product `T2351AA` is available for specified HP enterprise servers on HP-UX 11i v1 and 11i v2.

NOTE

Customers who are on the Percent CPU Utilization metric should use the most recent version of the PPU B.06.x software (HP product `T2351AA`).

iCOD

iCOD is a purchase model in which you license components with codewords.

iCOD is available for specified HP enterprise servers on HP-UX 11i v1 and 11i v2.

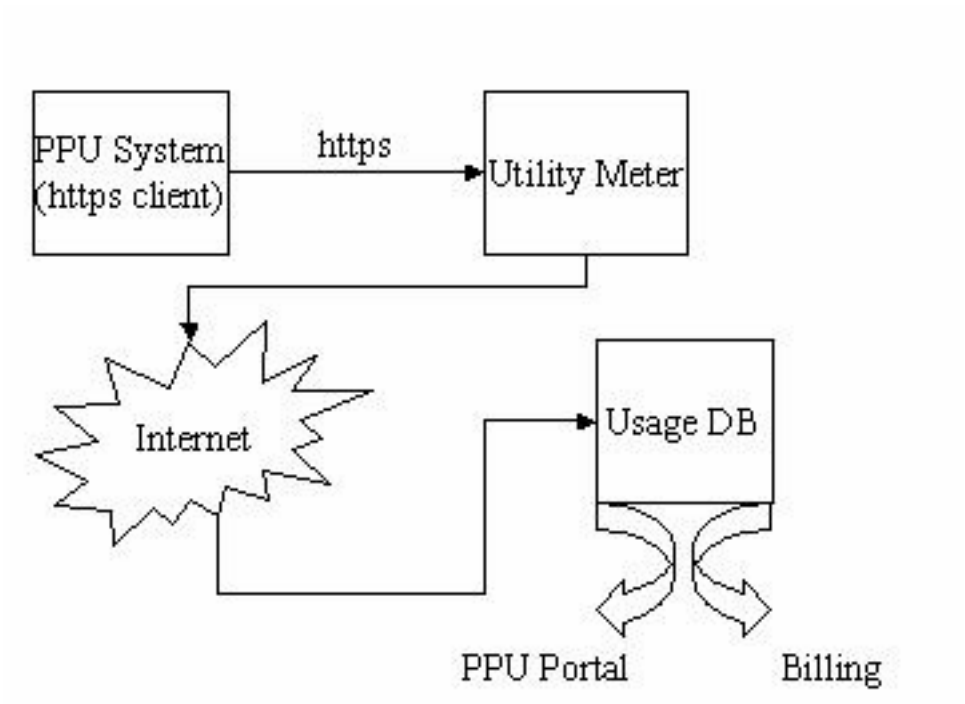
Overview

System Overview

PPU versions B.06.x consists of the following components:

1. PPU system (`https` client)
2. Utility meter
3. Usage database

Figure 1-1 PPU System Components



https Client

The `https` client, which runs on the PPU system as a daemon, reports the following information to the utility meter:

- System-identification information
- Hardware-partition information
- Virtual-partition information
- Per-processor utilization information for the operating system instance

You interact with the `https` client only when entering configuration information. The `https` client does not require a web server or additional web components for its operation.

IMPORTANT

If the `https` connection to the utility meter is broken, the PPU system may be assumed to have 100% processor utilization.

Utility Meter

To track the actual processor usage, the utility meter receives reports from the `https` client. The utility meter consists of hardware (generally an IA-32 system) connected to your network and pre-loaded with HP software. The utility meter is installed and configured by your HP service representative. One utility meter is required per 100 PPU systems or partitions.

Usage Database

The usage database receives information from the utility meter. The information is then aggregated and posted to the PPU web portal for your viewing. See “PPU Web Portal” on page 36 for details on the PPU web portal.

NOTE

If usage data for any partition in the PPU system is not received for any given day, an e-mail notification is sent to your PPU system contact’s e-mail address. This e-mail address is configured in the utility meter’s initial set-up.

Most Recent PPU Version and Supported Platforms

Table 1-1 Most Recent PPU Version and Supported Platforms

Software and Version	Operating System Version	Supported Hardware Platforms	Notes
PPU B.06.04 (T2351AA)	HP-UX 11i v2	hp Integrity servers: Superdome, rx8620, and rx7620	Available on: • **http://software.hp.com** • March 2004 HP-UX 11i v2 Operating Environments media • March 2004 HP-UX 11i v2 Applications Software media
PPU B.06.03 (T2351AA)	HP-UX 11i v1	hp 9000 servers: Superdome, rp8400, and rp7410	Available on: • **http://software.hp.com** • December 2003 HP-UX 11i v1 Operating Environments media • December 2003 HP-UX 11i v1 Applications Software media

PPU Supported Hardware Platforms

Currently, the PPU versions B.06.x software is supported on the following HP servers:

- HP-UX 11i v2
  1. hp Integrity Superdome
  2. hp Integrity rx8620
  3. hp Integrity rx7620
- HP-UX 11i v1
  1. hp 9000 Superdome
  2. hp 9000 rp8400
  3. hp 9000 rp7410

PPU Information

PPU User's Guide History

This is the fifth edition of the *Pay Per Use (PPU) User's Guide for versions B.06.x.*

Locating the PPU User's Guide for versions B.06.x

You can find the *Pay Per Use (PPU) User's Guide for versions B.06.x* in the following locations:

- For the most recent version of the user's guide, visit the following HP documentation web site (search for "PPU User's Guide"):

  docs.hp.com

- Printed — order HP part number "T2351-90031"
- March 2004 HP-UX 11i v2 Instant Information CD (HP-UX 11i v2)
- In the PPU B.06.x software product, located in:
  `/usr/share/doc/PayPerUseUserGuide.pdf`
  Note, this is an early version of this document. For more current information see the document at **docs.hp.com**.

Manpages

See Appendix D, "PPU Manpages," on page 69 for details of the following manpages:

- *ppu* (5): an overview of the PPU software
- *ppud* (1M): daemon that provides system configuration and CPU usage information to the utility meter
- *ppuconfig* (1M): set the configuration values of a PPU system

2 Understanding PPU Requirements

This chapter covers the following topics:

For more in-depth information, see the manpage *ppu* (5).

PPU Program Requirements

You must comply with the following HP On Demand Solutions program conditions to participate in the PPU program:

- Maintain the HP PPU software — a non-intrusive and low overhead software module that resides on the PPU system — on every partition, including virtual partitions
- Maintain the (HP required) hardware and software operation of the PPU utility meter
- Maintain the `https` connection from the PPU system/partition to the utility meter (this is required on every partition, including virtual partitions)
- Migrate to later PPU software versions as they become available

For the specific details on your individual PPU program requirements, refer to your On Demand Solutions contract from HP or your authorized channel partner. Participants of the On Demand Solutions program who do not meet these requirements may be in breach of contract. This results in unnecessary expense for both the PPU program participant and HP.

PPU Software Requirements

PPU systems are required to run the PPU software on every partition which reports information to the utility meter (located on your network). If your PPU system does not send usage reports, via the `https` client, your system's processors may be assumed to be 100% utilized.

Your PPU system is shipped with the correct version of HP-UX and the PPU software bundle. In the event your system's operating system is re-installed with Ignite-UX, ensure that the correct version of HP-UX is used and the PPU software is installed. See "Getting Started" on page 24 for details.

IMPORTANT This document lists the patches required to install and run PPU versions B.06.x known at the time of publication. To find the most current patches, see "How To Find The Latest Patches" on page 26 for detailed instructions.

HP-UX 11i v2 Requirements

For PPU Versions B.06.x on HP-UX 11i v2

The following software is required for PPU versions B.06.x on HP-UX 11i v2:

- ❏ HP-UX 11i v2
- ❏ PPU software bundle `T2351AA` (version B.06.x) located on the following HP web site (search for "T2351AA"): **`software.hp.com`**
- ❏ Kernel driver `diag2`
- ❏ `nPar` bundle
- ❏ WBEM `B8465BA` bundle

HP-UX 11i v1 Requirements

For PPU Versions B.06.x on HP-UX 11i v1

The following software is required for PPU versions B.06.x on HP-UX 11i v1:

- ❏ HP-UX 11i v1
- ❏ PPU software bundle `T2351AA` (version B.06.x) located on the following HP web site (search for "T2351AA"): **`software.hp.com`**
- ❏ Kernel driver `diag2`

IMPORTANT

For Superdome systems, the Utility subsystem firmware must be 6.40 or greater. PPU is not supported on versions prior to 6.40. The Utility firmware revision is displayed in two places by the Management Processor (MP). To determine your version, check the main menu when you first log into the MP, or type **`CM`** at the main menu to display the command menu, then **`HE`** for help.

Required Patches for PPU on HP-UX 11i v1

The following patch (or superseded patch) is required for PPU B.06.x on HP-UX 11i v1:

- `PHKL_25218: S700_800 11.11 PDC Call retry, PDC_SCSI_PARMS, iCOD hang fix`

NOTE

At the time of publication, there are no required patches for PPU B.06.x on HP-UX 11i v2

PPU System Move Requirements

If you are planning to move your PPU system from its current street address, refer to your Master Lease Agreement for details.

3 Installing and Configuring PPU Software

This chapter covers the following topics:

Getting Started

Factory Integrated Systems

You do not need to install the PPU B.06.x software if your processors and software were ordered with your HP enterprise server in (or after) January 2003. The PPU software was already installed by HP prior to delivery. However, initially you need to configure the PPU software to communicate with the utility meter.

NOTE

The PPU B.06.x software must be installed and configured on every partition in your system, including virtual partitions.

There are three steps you can perform to verify your PPU system has the PPU B.06.x software installed and configured for communication with the utility meter:

Step 1. Verify the PPU software is installed by executing the following command:

```
/usr/sbin/swlist | grep T2351AA
```

You should see output similar to:

```
T2351AA          B.06.04       HP-UX Pay Per Use (PPU)
```

If you do not receive the correct result for **Step 1** (above) see "Installing PPU Software" on page 26 for PPU software installation details.

Step 2. Verify the PPU software is configured to use the utility meter and the `https` connection is functional by executing the following command:

```
/usr/sbin/ppuconfig -t
```

You should see output similar to:

```
Round trip communication with the utility meter succeeded.
```

If you do not receive the correct result for **Step 2** (above) see "Configuring PPU Software" on page 29 for PPU software configuration details.

Step 3. Verify the ppud daemon is running on the system/partition by executing the following command:

```
/usr/bin/ps -e | grep ppud
```

You should see the ppud daemon listed as an active process on the system/partition.

If you do not receive the correct result for **Step 3** (above) see "Manually Starting the ppud Daemon" on page 32 for details.

IMPORTANT You need to configure the PPU software so your PPU system/partition communicates with the utility meter. PPU systems do not have the PPU software configured at the HP factory. See "Configuring PPU Software" on page 29 for details on configuring the utility meter settings.

If **Step 1**, **Step 2** and **Step 3** (above) provide the correct results, your PPU system is compliant and no action is necessary for PPU software installation or configuration.

Installing PPU Software

If you currently have PPU software installed that is prior to version B.05.00 (for example, version B.04.01), contact your HP sales representative to find out how to update to PPU B.06.x software.

How To Find The Latest Patches

This document lists the patches required to install and run PPU B.06.x software known at the time of publication. To find the most current patches, go to the HP Software Depot at **`software.hp.com`** and perform the following steps:

Step 1. Click on the **Search** link (left hand side), enter the PPU software product `T2351AA`, then click on the **Search** button

Step 2. Click on the **pay per use software (% utilization)** link that appears as a result of your search

Step 3. Click on the **installation** link, near the bottom of the page

The required patches for PPU B.06.x are listed. You can then retrieve the necessary patches from the HP web site: **ITresourcecenter.hp.com**

For HP-UX 11i v1 or 11i v2 - Installing from the OE Media

Follow this procedure to install PPU B.06.x software on your HP-UX 11i v1 or 11i v2 system:

Step 1. Log in as `root`.

Step 2. Determine the CD/DVD drive device file by entering the following command:
`ioscan -fnC disk`

Step 3. Insert the appropriate OE CD/DVD into the drive.

Step 4. Mount the drive to the desired directory. The following example uses the `/dev/dsk/c1t2d0` device file (from **Step 2**, above) and the `/cdrom` directory. To mount the drive, enter a similar command as:

Mount Example:
```
mount -r /dev/dsk/c1t2d0 /cdrom
```

Step 5. Install the PPU B.06.x bundle `T2351AA` from the OE CD/DVD:
```
swinstall -s /cdrom T2351AA
```

Step 6. Continue with "Configuring PPU Software" on page 29.

For HP-UX 11i v1 or 11i v2 - Installing from the AR Media

Follow this procedure to install the PPU B.06.x software on your HP-UX 11i v1 or 11i v2 system:

Step 1. Log in as `root`.

Step 2. Determine the CD/DVD drive device file by entering the following command:
```
ioscan -fnC disk
```

Step 3. Insert the Applications Software CD/DVD into the drive.

Step 4. Mount the CD/DVD drive to the desired directory. The following example uses the `/dev/dsk/c1t2d0` device file (from **Step 2**, above) and the `/cdrom` directory. To mount the drive, enter a similar command as:

Mount Example:
```
mount -r /dev/dsk/c1t2d0 /cdrom
```

Step 5. Install the PPU B.06.x bundle `T2351AA` from the CD/DVD:
```
swinstall -s /cdrom T2351AA
```

Step 6. Continue with "Configuring PPU Software" on page 29.

For HP-UX 11i v1 or 11i v2 - Installing from the HP Software Depot

Step 1. Do a search for the PPU product `T2351AA` at HP's Software Depot web site: **software.hp.com**

Step 2. Click on the **pay per use software (% utilization)** link that appears as a result of your search

Step 3. Read the "overview" page, then click on the **installation** link (near the bottom).

Step 4. Read the "installation" page, then click on the **Receive for Free** button.

Step 5. Fill in the registration information, click on the **HP-UX 11.11** or **HP-UX 11.23** operating system link, and then click on the **Next** button.

Step 6. Click on the appropriate link, under the "download software" table title, and download the depot file to the following directory: `/var/tmp`

Note that you can name the download anything but by default it is (substitute "11.11" for HP-UX 11i v1 systems):
`/var/tmp/T2351AA_B.06.04_HP-UX_B.11.23_32+64.depot`

Step 7. On the PPU system log in as `root`.

Step 8. Install the appropriate PPU bundle:

```
swinstall -s \
/var/tmp/T2351AA_B.06.04_HP-UX_B.11.23_32+64.depot '*'
```

The interactive `swinstall` can also be used to install the depot file by setting the target to `/var/tmp/`*<package_name>*. The PPU B.06.x software is low overhead and non-intrusive. The file-system size is increased by approximately 5MB and a reboot is not required.

Step 9. Continue with "Configuring PPU Software" on page 29.

Configuring PPU Software

After you have successfully installed the PPU B.06.x software, using the `swinstall` command, you need to configure the PPU `https` client connection to the utility meter. The utility meter must be configured on every partition, including virtual partitions.

NOTE The following configuration procedure assumes your utility meter has been installed on the PPU system's network by your HP service representative. If the utility meter is not installed, contact your HP service representative.

There can be up to four steps to configure your PPU system, depending on whether or not your network uses a proxy server, and if you desire to specify a name other than your system's hostname as the system identifier.

At a minimum, the name of the utility meter must be set. The four steps to configure the PPU software are:

Step 1. Configure the hostname of the utility meter (required)

Step 2. Configure the hostname of the proxy server (if necessary)

Step 3. Configure the proxy server's username and password (if required by the proxy server)

Step 4. Configure the system identifier (if desired)

Configuring the Utility Meter (required)

To set the hostname of the utility meter, execute the following command:

`/usr/sbin/ppuconfig -m` *`meter`*

Where *`meter`* is the fully qualified hostname or IP address of the utility meter.

Configuring the Proxy Server (if necessary)

Most networks do not require a proxy server to connect to devices within their intranet. However, if your network configuration requires the use of a proxy server for `https` connections between the PPU system and the utility meter, set the hostname of the proxy server with the following command:

`/usr/sbin/ppuconfig -p` *`proxy`*`[:`*`port`*`]`

Where *`proxy`* is the fully qualified hostname or IP address of the proxy server and *`port`* is the (optional) port number.

Configuring the Proxy Server's Username and Password (if required by the proxy server)

If you are using a proxy server you may need to set the `username` and a `password` for the `username`. To set the `username` and `password` (if required) for the proxy server, execute the following command, which starts an interactive session to make the settings:

`/usr/sbin/ppuconfig -u`

Configuring the System Identifier (if desired)

The `system identifier` of a PPU system is the identifier you specify in order to track your system. The default `system identifier` is the hostname of your PPU system. If you desire to protect the hostname of your PPU system, and do not want to use it as the `system identifier`, you have the flexibility to change the `system identifier` to any value you choose. Examples of a `system identifier` are: an asset number, a HP support tag, or a description of a physical location.

To set the `system identifier` of the PPU system, execute the following command:

`/usr/sbin/ppuconfig -s` *`system_id`*

Where *`system_id`* is an identifier for your PPU system.

NOTE You can set the utility meter, proxy server, username/password, and system identifier (or any combination) with the single command:
/usr/sbin/ppuconfig -m *meter* -p *proxy*[:*port*] -u -s *system_id*

Viewing the System Settings

You can view the utility meter, proxy server, proxy-server username, proxy-server password (not displayed), and system identifier settings with the `ppuconfig` command (with no options).

Example 3-1 Viewing system settings using the ppuconfig command

/usr/sbin/ppuconfig

```
Utility Meter IP/Hostname:      meter1.corp.com
Proxy Server:                   Not Set
Proxy Username:                 Not Set
Proxy Password:                 Not Set
System Identifier               superdome1.corp.com
```

See the "ppuconfig (1M) Manpage" on page 73 for details of the ppuconfig command.

Verifying the https Connection

After you have specified the utility meter and (if desired) system identifier settings, execute the following command to verify the utility meter configuration:
/usr/sbin/ppuconfig -t

You should see output similar to:
`Round trip communication with the utility meter succeeded`

If you do not receive the above message, correct the utility meter configuration — according to the error message received.

If you receive the correct message, your PPU system/partition is properly configured and no further configuration action is necessary.

Manually Starting the ppud Daemon

The ppud daemon is started automatically when you specify the utility meter using the `/usr/sbin/ppuconfig -m` *meter* command. It is also automatically started at system boot if a utility meter is configured. However, the ppud daemon's process may have inadvertently been killed on the system/partition. If the ppud daemon is not running on your PPU system/partition, you need to start it manually.

NOTE

The ppud daemon must be running on each PPU system/partition, including virtual partitions. If the ppud daemon is not running on your system/partition, utilization information is not sent to HP and 100% utilization may be assumed.

To verify the ppud daemon is running, execute the following command:

```
/usr/bin/ps -e | grep ppud
```

You should see the ppud daemon listed as an active process on the system/partition. If it is running, and the utility meter is properly configured, utilization information is sent to HP and your PPU system/partition is correctly configured.

If the ppud daemon is not listed as an active process, you can manually start the ppud daemon with the following command:

```
/sbin/init.d/ppu start
```

Re-installing PPU Software

If you re-install HP-UX on a PPU system (for example, installing HP-UX by either cold-installing or installing from a "golden image"), you need to perform the following steps to restore your PPU configuration:

Step 1. Manually save your PPU configuration file by backing up the following file: `/etc/ppu/ppu_config`

Step 2. Install the PPU software (see "Installing PPU Software" on page 26 for details)

Step 3. Restore your PPU configuration file (from **Step 1**): `/etc/ppu/ppu_config`

Step 4. Start the `ppud` daemon (see "Manually Starting the ppud Daemon" on page 32 for details)

NOTE An alternative method is to: install the PPU software and configure the utility meter, thus starting the `ppud` daemon.

Un-installing PPU Software

You should not un-install the PPU software from your PPU system.

WARNING **If you un-install the PPU software, you may be charged for 100% utilization of the processors in your PPU system.**

If you need to un-install the PPU software, execute the following command:

```
/usr/sbin/swremove -x enforce_scripts=false T2351AA
```

NOTE Executing the above `swremove` command produces error and warning messages; however, if the Execution Phase succeeds, the PPU software was successfully removed.

You can verify the PPU software was successfully un-installed by executing the following command:

```
/usr/sbin/swlist | grep T2351AA
```

You should not see a listing of the PPU software `T2351AA` in the output of the above command.

4 Using the PPU Software

This chapter covers the following topics:

PPU Web Portal

PPU customers have access to detailed usage information via a web portal. The PPU web portal contains the following information:

- Computed-average usage on a daily basis
- Computed-average usage for a specified period of time
- Client reports (usage reports that are sent to HP)

The PPU web portal can be accessed from the HP web site:

www.hp.com/go/payperuse

Initial access to the PPU web portal requires registration using your system identification information. After your password-protected account is set up, you can access usage information for your PPU servers.

NOTE Usage data is posted to the PPU web portal two days in arrears. For example, usage data for today is available at the portal two days from today.

PPU Usage Report

The most recent PPU usage report is retained on your PPU system/partition. You can access the usage report at: `/var/ppu/PPUReport.xml`

If you open a PPU usage report with a browser that understands XML, it makes the usage report easier to read. The following PPU usage report example displays the self-describing information contained in a PPU usage report.

Example 4-1 PPU 6.x Usage Report

```
  <?xml version="1.0" ?>
  <!DOCTYPE PPUReport (View Source for full doctype...)>
-<PPUReport>
  -<ReportData>
    <ReportType>Asset</ReportType>
    <ReportVersion>1.0</ReportVersion>
   </ReportData>
  -<System>
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```

```
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      </HardPartitionEntry>
    </HardPartition>
  </System>
  <Checksum />
</PPUReport>
```

Understanding Utilization Capping

You are billed by HP according to the usage of the active processors in your PPU system. For example, on a 32 processor Superdome system, you are billed the same amount whether you utilize all 32 processors at 50% utilization, or if you utilize 16 processors at 100% utilization.

There are three methods to cap the usage of processors on your PPU system:

1. Workload Manager (WLM) — WLM in combination with PPU is a solid answer for customers asking for a utility answer to their computing resource needs. WLM can address both fixed resource capping (that is, placing an upper bound on utilization) as well as dynamic resource allocation to address service level objectives. See the most current *HP-UX Workload Manager User's Guide* for details.
2. Partition Manager (Parmgr) — With Parmgr, you can assign/activate or unassign/deactivate cells in order to control the number of active processors. See the most current guide *HP System Partitions: Administration for nPartitions* for details.
3. Deconfigure — You can use the `CPU` command, in the HP-UX boot console handler (BCH) to control the number of available processors in your PPU system/partition. Basically, the procedure is:

   A) Reboot your PPU system and stop the boot process at BCH
   B) At BCH, deconfigure the desired processors per configuration rules
   C) Boot the PPU system

New Partition Creation

You must install and configure the PPU software on any newly created partition, including virtual partitions. See “Installing PPU Software” on page 26 for installation details. See “Configuring PPU Software” on page 29 for configuration details.

IMPORTANT A partition that doesn’t have the PPU `https` client installed and configured (reporting to the utility meter) could be assumed to have its processors 100% utilized.

5 Troubleshooting

This chapter covers the following topics:

Troubleshooting the PPU Software

In the event the PPU software is not functioning, perform the following step:

Step 1. **`/usr/sbin/swverify T2351AA`**

The above step verifies:

- The PPU software is installed
- The PPU system's utility meter is installed and configured
- The `https` connection from the PPU system to the utility meter is functional

Alternatively, you can troubleshoot your PPU system by performing the following individual steps:

1. Verify that the PPU software is installed on your PPU system by executing the following command:
   `/usr/sbin/swlist | grep T2351AA`

   You should see the following (similar) output:
   ```
   T2351AA       B.06.04       HP-UX Pay Per Use (PPU)
   ```

   If you do not receive the correct output, see "Installing PPU Software" on page 26 for details of installing the PPU software.
2. Verify that the PPU system's utility meter is installed, configured, and its https connection is functional by executing the following command:
   `/usr/sbin/ppuconfig -t`

   You should see the following output:
   ```
   Round trip communication with the utility meter
   succeeded.
   ```

   If you do not receive the correct output, see "Configuring PPU Software" on page 29 for details of configuring the utility meter.

3. Ensure the ppud daemon is running by executing the following command:
   /usr/bin/ps -e | grep ppud

   You should see a ppud process running. If you do not, then start the ppud process by executing the following command:
   /sbin/init.d/ppu start
4. Check the syslog for ppud errors by viewing the file:
   /var/adm/syslog/syslog.log
5. Verify that the executable and configuration files have not been deleted and the permissions are set correctly:

Table 5-1 PPU Executable and Configuration Files

File	Permissions
/usr/lbin/ppud	500
/usr/sbin/libppu.sl	500
/etc/ppu/ppu_config	500
/usr/lib/ppu/libcrypto.sl	500
/usr/lib/ppu/libcurl.sl	500
/usr/lib/ppu/libssl.sl	500

6. If any of the files in **Step 5** (above) are missing or corrupted then re-install the PPU software. Refer to “Installing PPU Software” on page 26 for details.
7. Ensure that the kernel driver diag2 is built into the kernel.
8. For HP-UX 11i v1 systems, verify that the required 11i v1 kernel patches are installed. See “Required Patches for PPU on HP-UX 11i v1” on page 20 for details.

6 Frequently Asked Questions

This chapter covers frequently asked questions on the following topics:

Pay Per Use Program

What is pay per use?

Pay per use (PPU) is a pricing model in which you are charged for actual processor usage. You acquire a specific hardware platform and number of processors, and are charged for the actual usage, based on one of the following HP contractual agreements:

- Processor percent utilization ("percent utilization" — HP product `T2351AA`)
- Number of active processors ("active CPU" — HP product `T1322AA`)

What is the benefit of pay per use, as opposed to traditional processor usage financing?

With pay per use, your billing is based on actual processor usage. The billing amounts vary as your processor usage needs increase or decrease. This is different than the traditional financing approaches that are based on fixed-payment amounts for the coverage period.

Is pay per use the same as leasing?

No. A lease is a fixed monthly payment. Pay per use charges vary on actual processor usage. With pay per use, there is a fixed charge and a variable charge on your monthly statement. The fixed charge is similar to a standard lease, and the variable charge is based on actual processor usage.

What HP enterprise servers is pay per use B.06.x currently available on?

Pay per use version B.06.x is currently available for the following HP servers:

- HP-UX 11i v2 — hp Integrity servers: Superdome, rx8620, and rx7620
- HP-UX 11i v1 — hp 9000 servers: Superdome, rp8400, and rp7410

Pay Per Use Software

What software product is required for PPU systems?

There are two HP pay per use (PPU) software products:

- T2351AA (versions B.05.00 and B.06.x): is the newest PPU offering and billing is based on the percent utilization of processors
- T1322AA (versions B.04.x): is a previous PPU offering and is based on the actual number of active processors

You can verify PPU is installed by executing:
/usr/sbin/swlist | grep T2351AA

The result should be similar to:
```
T2351AA     B.06.04     HP-UX Pay Per Use (PPU)
```

What patches are required for running PPU B.06.x software on a HP enterprise server that is running HP-UX 11i v1?

At the initial release of the PPU B.06.x software, the following patch is required:

- PHKL_25218 PDC Call retry, PDC_SCSI_PARMS, iCOD hang fix

How can I get the PPU B.06.x software bundle for HP-UX 11i v1 or HP-UX 11i v2?

The PPU B.06.x software bundle T2351AA is installed at the factory for new systems. The T2351AA bundle is available from the following:

- HP web site (search for "T2351AA"): **software.hp.com**
- March 2004 HP-UX 11i v2 OE media (HP-UX 11i v2)
- March 2004 HP-UX 11i v2 Applications media (HP-UX 11i v2)
- December 2003 HP-UX 11i v1 OE media (HP-UX 11i v1)
- December 2003 HP-UX 11i v1 Applications media (HP-UX 11i v1)

See "Installing PPU Software" on page 26 for details of installing the PPU B.06.x software bundle T2351AA.

We received an e-mail message indicating a HP-UX partition did not report system configuration data. What is the problem and how do I correct it?

Make sure that the PPU software is installed and the `https` connection is properly configured to the utility meter for the partition. All partitions, including virtual partitions, must have the PPU software installed and the `https` connection configured to connect to the utility meter. See "Troubleshooting the PPU Software" on page 46 for details on ensuring your PPU system is compliant and functional.

How many usage reports are retained on the PPU system?

The PPU system retains the latest usage report. For a complete history of your usage reports you can access the PPU web portal. See "PPU Web Portal" on page 36 for details.

You can view the latest PPU usage report for your system by invoking a web browser (or text editor) and opening the file:
`/var/ppu/PPUReport.xml`

When is information sent by the PPU software?

A system report is sent from the PPU software to the utility meter when the following occurs:

- System startup
- Approximately every 30 minutes, when the system is running
- System shutdown

What is the difference between PPU versions B.05.00 and B.06.x?

The main difference between these two PPU versions (HP product `T2351AA`) is that with versions B.06.x, the `ppud` daemon is started automatically when specifying the utility meter using the command: `/usr/sbin/ppuconfig -m` *`meter`*. With PPU version B.05.00, the `ppud` daemon needed to be started manually (with the command: `/sbin/init.d/ppu start`).

A Open Source and Licenses

This appendix lists the Open Source components used by the PPU software and the applicable licenses for the components.

This appendix includes:

Open Source Components

There is no charge for using HP's PPU software.

The PPU software uses the following Open Source components:

- `libCURL`
- `openSSL` (including `libcrypto`)

CURL MITX License

The PPU software is released under the following license.

```
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*/
```

B Special Considerations

This appendix describes special considerations for PPU systems.

This appendix includes:

Export Issues

The PPU software uses Secure Socket Layer (SSL) to encrypt data transmitted between:

- The PPU system and the utility meter
- The utility meter and HP

Because SSL uses 128 bit encryption, the PPU software cannot be exported to certain countries, as outlined by the Bureau of Industry and Security, in the U.S. Department of Commerce.

The distribution channels for acquiring the PPU software comply with these export limitations.

For more information about commercial encryption export controls, please visit the web site: **http://www.bxa.doc.gov/Encryption**.

Inactive Partitions in PPU Systems

Baseline usage for the PPU program is included in the minimum monthly payment. Baseline usage is assumed to be 25%. That is, 25% processor utilization is included in the minimum monthly payment. Inactive partitions in PPU systems are covered under baseline usage.

NOTE An inactive PPU partition is reported as “IDLE”, in the measurement “Method” column, on the PPU web portal report.

An inactive partition is a partition with all of the cells in the partition inactive. An inactive cell is a cell that is either powered off, or in a state prior to BCH, defined as “waiting on SINC_BIB”.

The easiest way for you to configure a partition to “waiting on SINC_BIB” is to do one of the following:

- **`reboot -R -H`**
- **`shutdown -R -H`**

If you have already shutdown your system without these options, you can still place it into an inactive state by doing one of the following:

- Via the GSP interface, enter the `RR` command to put the system in a “waiting on SINC_BIB” state (or)
- Via the GSP interface, enter the `PE` command to power down all the cells in the partition

HP receives a usage report from your PPU system indicating any inactive partitions.

NOTE At least one partition in the complex must always be active so that usage and inactive partition information can be reported to HP.

Cell boards assigned to active partitions must have at least one active processor. If your system/partition does not have any near term need to have at least one processors active on the system, then you can either:

1. Inactivate partitions (or)
2. Un-assign cell boards from partitions. When you un-assign cell boards from partitions there are zero active processors on that cell board. Un-assigned cell boards are covered under the baseline usage.

Failed Partitions

When a partition fails, and you no longer want to report any usage for that partition, you can do one of the following:

- Reset the failed partition, by entering the `RS` command via the GSP interface (or)
- Power down all of the cells in the failed partition, by using the `PE` command via the GSP interface

If one of the above is done, the other partitions in the complex report the failed partition as inactive.

Verifying PPU Utilization Information

Your PPU system/partition's processor utilization information is available from the HP PPU web portal. See "PPU Web Portal" on page 36 for details of the PPU web portal.

If you are interested in verifying PPU utilization information against the PPU web portal information, you can use the `sar` command to compare processor utilization numbers. The `sar` command is a HP-UX system activity reporter that samples and accumulates processor utilization. See the manpage *sar* (1M) for details on the `sar` command.

An overview of the processor utilization verification process is:

- Create processor utilization numbers for your PPU system/partition with the `sar` command
- Go to the PPU web portal and capture processor utilization numbers for the same PPU system/partition and duration of time
- Verify the `sar` utilization numbers against the PPU web portal utilization numbers

To perform the utilization verification process, perform the following steps:

NOTE Because the PPU web-portal's utilization reports contain 30 minutes of information, beginning on the hour or on the half-hour, it is recommended to time the execution of **Step 1** (below) immediately upon the start of a hour, or half past the hour. Another option is to create a shell script that contains the command in **Step 1** and schedule a `cron` job so it starts exactly on the hour or half hour.

Step 1. In a terminal window on the PPU system, execute the following command:

```
/usr/bin/nice --10 /usr/sbin/sar -o /tmp/sarOut 300 12
```

Where "300" represents the (averaged) interval duration of the utilization sample, in seconds, and "12" represents the number of

samples taken. In this example, there are 12 utilization samples taken every 5 minutes; therefore, one hour of utilization data is collected. Because the PPU web portal also reports in 5 minute increments, it is recommended to use a 5 minute interval duration with the `sar` command. You can vary the amount of `sar` information with its last argument.

Step 2. After **Step 1** has completed, execute the following command:
`/usr/sbin/sar -uM /tmp/sarOut > /tmp/sarOut.report`

The above command takes the binary output from the `sar` command in **Step 1**, convert it into a readable (text) format, and capture the text report in the file `/tmp/sarOut.report`.

Step 3. Go to the PPU web portal and locate the processor utilization report(s) for the PPU system/partition and the same duration of time used in **Step 1**. The PPU web portal is located at: **http://www.hp.com/go/payperuse**

Step 4. Validate the processor utilization numbers from the PPU web portal report(s) and the processor utilization numbers from the `sar` command, which is located in the file `/tmp/sarOut.report`.

There are a few differences between the PPU web portal report and the information from the `sar` command. Specifically:

- The `sar` command reports the processor as the system/partition's SPU number and the PPU web portal report uses the CPU ID.
- For the same 5 minute interval, the `sar` command's timestamp is for the end of the interval and the PPU web portal report's timestamp is for the beginning of the interval. For example, you would compare the `sar` utilization numbers for 12:05pm to the PPU web portal report utilization numbers for 12:00pm.
- To verify processor percent utilization numbers, you need to sum the two `sar` report columns "%usr" and "%sys", and compare them against the PPU web portal report's percent utilization.
- The `sar` command rounds processor percent utilization up to the nearest integer; therefore, the numbers can vary by one percent.

C Glossary

PPU Terminology

The following terms are commonly used in conjunction with PPU:

configured processors

Processors that have been configured at the boot interface and are now available for activation.

deconfigured processors

Processors that have not yet been configured at the boot console interface (BCH). The iCOD software cannot activate a processor that is deconfigured.

hard partition

A physical partitioning of a computer that divides the computer into groups of cell boards where each group operates independently of the other groups. A hard partition can run a single instance of HP-UX or be further divided into virtual partitions.

iCOD

The HP On Demand Solutions product that has a pricing model based on purchasing processors. With iCOD (instant Capacity On Demand) you initially purchase a specified number of activated processors and pay a *right to access* fee for a specified number of deactivated processors. Whenever you activate an additional processor you are charged an *enablement* fee.

inactive cell

On a hardware-partitionable system, a cell that is either powered off, or in a state prior to BCH, defined as “waiting on SINC_BIB”.

inactive partition

A partition where all of the cells in the partition are inactive.

pay per use

The HP On Demand Solutions product that has a pricing model in which you are charged for actual processor usage. You acquire a specific hardware platform, and number of processors, and are charged for the actual usage, based on the percent utilization of the processors.

portal

A HP web site that gives customers an interface to view their PPU system/partition utilization information. See “PPU Web Portal” on page 36 for details.

usage database

The HP repository that contains PPU system/partition utilization information. You can access this information through the PPU web portal.

utility meter

The software and hardware device that receives PPU system/partition utilization information from the PPU software. The utility meter is initially installed and configured by a HP service representative.

virtual partition

A software partitioning of a computer or hard partition where each virtual partition contains an instance of an operating system. Though a hard partition can contain multiple virtual partitions, the inverse is not true (that is, a virtual partition cannot span hard partition boundaries).

D PPU Manpages

This appendix contains the manpages for PPU.

The manpages are:

- “ppu (5) Manpage” on page 70 — An overview of the PPU software
- “ppud (1M) Manpage” on page 71 — Data provider giving system configuration and CPU usage information
- “ppuconfig (1M) Manpage” on page 73 — Set the configuration values of a pay-per-use system

NOTE The information contained in the following manpages is current at the time of publication for this manual.

ppu (5) Manpage

ppu (5)

NAME

ppu – Pay Per Use software for HP-UX

DESCRIPTION

Pay Per Use (PPU) is a program under which customers pay only for computing capacity that they use.

The PPU Software provides services for metering resource utilization on supported HP systems. The PPU software communicates with a utility meter to report utilization data. The utility meter in turn transmits the utilization data to HP for proper billing.

PPU systems must be configured to use a utility meter. Utility meter configuration is accomplished using the `ppuconfig` command (see *ppuconfig*(1M)).

The data that is sent to HP is aggregated and then sent to billing as well as posted on the utility portal for viewing at **http://www.hp.com/go/payperuse**.

For more information see the Pay Per Use user's guide located at `/usr/share/doc/PayPerUseUserGuide.pdf`.

SEE ALSO

ppud (1M), *ppuconfig* (1M)

ppud (1M) Manpage

ppud (1M)

NAME

ppud – Pay Per Use daemon

SYNOPSIS

Path: `/usr/lbin`

`ppud`

DESCRIPTION

`ppud` is a daemon that provides system configuration and CPU usage information to a utility meter system for billing purposes. This daemon runs on Pay Per Use systems and meters CPU utilization and system configuration information. The `ppud` daemon sends this information to a utility meter as an XML file transmitted via HTTPS

When a report is sent to a utility meter, it is also written to the file `/var/ppu/PPUReport.xml`. This report is best viewed using a web browser that understands XML.

The `ppud` daemon is automatically started when a system boots if a utility meter has been specified via the `ppuconfig` command (see *ppuconfig*(1M)). The `ppud` daemon is also automatically started when the meter configuration is changed via the `ppuconfig` command.

The `ppud` daemon reports errors via `syslog`.

To un-configure Pay Per Use, kill the daemon (`ppud`) if it is running and remove the configuration file (`/etc/ppu/ppu_config`). Warning, if this is a Pay Per Use system and the daemon is not running, usage may be assumed to be 100%.

AUTHORS

`ppud` was developed by HP

SEE ALSO

ppuconfig (1M), *ppu* (5)

ppuconfig (1M) Manpage

ppuconfig (1M)

NAME

ppuconfig – configure Pay Per Use daemon

SYNOPSIS

Path: `/usr/sbin`

```
ppuconfig [-m meter] [-p proxy[:port]] [-s system_id|-h] [-u]

ppuconfig -t
```

DESCRIPTION

`ppuconfig` is a tool for configuring communication between the Pay Per Use daemon `ppud` (see *ppud*(1M)) and a utility meter. A utility meter must be specified for a Pay Per Use system before the `ppud` daemon will collect and send utilization data to HP. In the absence of this data, HP may assume 100% utilization and bill for the system accordingly.

If `ppuconfig` is invoked without any options the current settings will be displayed.

If this is the first time you are supplying utility meter configuration information, after specifying the utility meter with the `ppuconfig` command, it is recommended to execute **`ppuconfig -t`** to perform a round trip communication test. If the test is successful, verify the `ppud` daemon is running using the `ps` command.

When `ppuconfig` is used to modify the configuration information related to the utility meter, it is not necessary to restart a running `ppud` daemon. When configuration information is modified it is recommended that **`ppuconfig -t`** is executed to verify the new configuration.

Options

`ppuconfig` recognizes the following command-line options and arguments:

`-m` *`meter`* Specifies the utility meter that the Pay Per Use system should use for reporting. The meter can be specified as a fully qualified hostname or IP address. A non-blank value is required.

`-p` *`proxy`*`[:`*`port`*`]` Specifies the proxy server that should be used by this system for HTTPS transmission if a proxy server is required. Optionally, a port number can be appended to the proxy server specification. Proxy configuration can be cleared by specifying an empty string (“”) as the proxy server value.

`-s` *`system_id`* Specifies the system identifier that the Pay Per Use system should use when reporting. This can be any value that helps you to identify this system (for example, a tracking number, asset number, physical location, etc). Until a system identifier is specified, the hostname will be used by default.

`-h` Specifies that the hostname should be used as the system identifier for the Pay Per Use system, when reporting usage information.

`-u` Starts an interactive session to allow setting a username and password for the proxy server, if required by the proxy server. These values can be cleared by pressing **Enter** when prompted for a username.

`-t` Perform communication test between Pay Per Use software and the configured utility meter.

RETURN VALUES

`ppuconfig` exits with one of these values:

`0` Success.

`>0` Failure; error message sent to `STDERR`

AUTHORS

`ppuconfig` was developed by HP

FILES

`/etc/ppu/ppu_config` File containing utility meter configuration data. If this file is removed, the `ppud` daemon will not be started at system boot and utilization data will not be transmitted to HP.

SEE ALSO

ppud (1M), *ppu* (5)

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