

# **HP Pay per use (PPU) User's Guide for versions 8.x**

**Second Edition**



**Manufacturing Part Number: 5991-5554**

**September 2006**

United States

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## About This Guide

The *HP Pay per use (PPU) User's Guide for versions 8.x* provides you with the most recent information for using the Pay per use (PPU) version 8 software. This document describes PPU version B.11.23.08.00.01 on HP-UX 11i v2 systems, B.11.11.08.00.01 on HP-UX 11i v1 systems, PPU version 8.0 on OpenVMS 8.3 Integrity servers, and PPU version 7.1 on Windows systems.

The latest version of this document can be found online at:  
**<http://docs.hp.com>**.

This chapter covers the following topics:

- “Intended Audience” on page 7
- “New and Changed Information in This Edition” on page 8
- “Publishing History” on page 8
- “Document Organization” on page 9
- “Typographic Conventions” on page 11
- “PPU Documentation” on page 12
- “HP Encourages Your Comments” on page 13

## Intended Audience

All personnel with system administrator access (that is, with `root` login privileges on HP-UX systems, or Administrator or Admin equivalent on Windows systems and System Managers or Administrators on OpenVMS systems) to a PPU system should read and understand the contents of this document and the implications of managing a PPU system.

Administrators are expected to have knowledge of HP-UX, OpenVMS Integrity, or Microsoft Windows Server 2003 operating system concepts, commands, and configuration.

This document is not a tutorial.

## New and Changed Information in This Edition

This second edition of the *HP Pay per use (PPU) User's Guide for versions 8.x* has the following changes:

- Support for OpenVMS systems
- Updated man pages and error messages
- Support for Windows Server 2003, version 4.5

## Publishing History

The document printing date and part number indicate the document's current edition. The printing date will change when a new edition is printed. Minor changes may be made at reprint without changing the printing date. The document part number will change when extensive changes are made.

Document updates may be issued between editions to correct errors or document product changes. To ensure that you receive the updated or new editions, you should subscribe to the appropriate product support service. Contact your HP sales representative for details.

**Table 1**

**Publishing History Details**

| <b>Document Manufacturing Part Number</b> | <b>Operating Systems Supported</b>   | <b>Supported Product Versions</b>             | <b>Publication Date</b> |
|---|--|---|-------------------------|
| 5991-5361<br>First edition                | HP-UX 11i v1<br><br>HP-UX 11i v2<br><br>Microsoft Windows Server 2003, version 4.5 and higher (64-bit, Enterprise and Datacenter Editions) | B.11.11.08.00<br><br>B.11.23.08.00<br><br>7.1 | June 2006               |



**Table 1**

**Publishing History Details (Continued)**

| <b>Document Manufacturing Part Number</b> | <b>Operating Systems Supported</b>   | <b>Supported Product Versions</b> | <b>Publication Date</b> |
|---|--|-----------------------------------|-------------------------|
| 5991-5554<br>Second edition               | HP-UX 11i v1   | B.11.11.08.00.01                  | September 2006          |
|   | HP-UX 11i v2   | B.11.23.08.00.01                  |                         |
|   | hp OpenVMS I64 V8.3  | 8.0                               |                         |
|   | Microsoft Windows Server 2003, Installer Media 4.5 and higher (64-bit, Enterprise and Datacenter Editions) | 7.1                               |                         |

Note that for commonality across all platforms supported by PPU, generic references to version numbers are of the form “8.x” in this document. But because the operating system version is also incorporated in the depot version number on newer releases of HP-UX, specific references to version numbers may sometimes be more precise; for example, B.11.23.08.01 for an HP-UX depot.

## **Document Organization**

This user’s guide is not designed to be read from front to back in its entirety. For a general understanding of PPU versions 8.x, you should read this information:

1. This chapter — **About This Guide** (entirely)
2. Chapter 1 — **Pay per use Overview** (entirely)
3. Chapter 2 — **Understanding PPU Requirements** (entirely)
4. Chapter 3 — **Installing and Configuring PPU Software** (**Getting Started** section)

After reading this information, you can utilize the table of contents and index for specific topics of interest.

Here is a summary of the chapters and appendixes in this guide:

- **About This Guide** — Use this chapter for information on this document's intended audience, changes for this edition of the guide, publishing history, document organization, typographic conventions, available PPU documentation, and how to provide feedback.
- **Chapter 1, PPU Overview** — Use this chapter for an overview of the PPU program, an overview of a PPU system, the most recent PPU version and supported platforms, and changes for this version of the software.
- **Chapter 2, Understanding PPU Requirements** — Use this chapter to understand PPU: program, software, and system move requirements.
- **Chapter 3, Installing and Configuring PPU Software** — Use the **Getting Started** section to help you verify whether 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, uninstall, or reinstall the PPU software.
- **Chapter 4, Using the PPU Software** — Use this chapter for an explanation of the PPU web portal, PPU usage reports, utilization capping, and what to do when creating a new partition in a PPU system.
- **Chapter 5, Troubleshooting** — Use this chapter for a step-by-step procedure to resolve problems with the PPU software.
- **Chapter 6, Frequently Asked Questions** — Use this chapter for answers to questions on common PPU software topics.
- **Appendix A, Special Considerations** — Use this appendix for procedures on how to inactivate partitions, validate PPU percent-utilization information with PPU web-portal reports, information on PPU security, and OpenVMS command mapping.
- **Appendix B, Manpages** — Use this appendix for reading the actual HP-UX manpages: `ppu`, `ppud`, and `ppuconfig`. This section applies to HP-UX systems only.

- **Appendix C, PPU Services and Command References** — Use this appendix for more information about Windows PPU services and commands. This section applies to Windows systems only.
- **Appendix D, Glossary** — Use this appendix for definitions of PPU system and software terms.

## Typographic Conventions

This document uses the following conventions.

|                   |  |
|-------------------|--|
| <i>audit</i> (5)  | An HP-UX manpage. In this example, <i>audit</i> is the name and 5 is the section in the <i>HP-UX Reference</i> . On the web and on the Instant Information media, it may be a hot link to the manpage itself. From the HP-UX command line, you can enter “man audit” or “man 5 audit” to view the manpage. See <i>man</i> (1). |
| <i>Book Title</i> | The title of a book. On the web and on the Instant Information media, it may be a hot link to the book itself.   |
| <b>KeyCap</b>     | The name of a keyboard key. Note that <b>Return</b> and <b>Enter</b> both refer to the same key.   |
| <i>Emphasis</i>   | Text that is emphasized.   |
| <b>Bold</b>       | Text that is strongly emphasized.  |
| <b>Bold</b>       | The defined use of an important word or phrase.  |
| ComputerOut       | Text displayed by the computer.  |
| <b>UserInput</b>  | Commands and other text that you type.   |
| Command           | A command name or qualified command phrase.  |
| <i>Variable</i>   | The name of a variable that you may replace in a command or function or information in a display that represents several possible values.  |
| [ ]               | The contents are optional in formats and command descriptions. If the contents are a list separated by  , you must choose one of the items.  |
| { }               | The contents are required in formats and command descriptions. If the contents are a list separated by  , you must choose one of the items.  |

- ... The preceding element may be repeated an arbitrary number of times.
- | Separates items in a list of choices.

## **PPU Documentation**

### **PPU User's Guide History**

This is the second edition of the *HP Pay per use (PPU) User's Guide for versions 8.x*.

### **Locating the PPU User's Guide**

You can find the *HP Pay per use (PPU) User's Guide for versions 8.x* in the following locations:

- For the most up-to-date version of the User's Guide and for localized language-specific versions, go to the following HP documentation web site (search for "PPU User's Guide"):

<http://docs.hp.com>

- September 2006 HP-UX 11i v1 Instant Information media
- September 2006 HP-UX 11i v2 Instant Information media
- In the PPU 8.x software product on HP-UX, located in:  
`/usr/share/doc/PayPerUseUserGuide.pdf`
- The version 7.x User's Guide is also on the Smart Setup media associated with HP Integrity Servers for Microsoft Windows Server 2003 64-bit version, Installer Media 4.5 or higher (located at:  
`\contents\doc\en_us\PayPerUseUserGuide.pdf`)
- On the OpenVMS Version 8.3 Documentation CD
- For OpenVMS related information, visit the following web site:  
<http://h71000.www7.hp.com/openvms/integrity/products.html>

New information may have been developed after the time of this edition. For the most current information, visit the following HP documentation web site:

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

For Windows-related information, especially release notes, visit the following web site:

<http://www.hp.com/support/itaniumservers/>

## Manpages

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**NOTE**

The information contained in this section applies only to HP-UX systems. It does not apply to Integrity servers running OpenVMS 8.3 or Microsoft Windows Server 2003.

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The PPU software product contains the most up-to-date manpages. For details of the following PPU manpages, at the time of this document's publication, see Appendix B, "PPU Manpages (HP-UX only)," on page 97:

- *ppu* (5): An overview of the PPU software
- *ppud* (1M): The daemon that provides system configuration and core usage information to the utility meter
- *ppuconfig* (1M): For setting the configuration values of a PPU system

## HP Encourages Your Comments

HP welcomes any feedback that helps us improve the quality of our documentation. To provide feedback, go to the following HP web site:  
<http://docs.hp.com/assistance/feedback.html>

Please include document title, manufacturing part number, and any comment, error found, or suggestion for improvement you have concerning this document. Also, please include what we did right so we can incorporate it into other documents.



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# 1 Pay per use Overview

The HP Pay per use for HP 9000 and HP Integrity servers (PPU) software product provides you cost savings by enabling your HP server to be on one of the following HP contractual lease agreements:

- Core Percent Utilization (*percent core*)
- Number of Active Cores (*active core*)

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**NOTE**

Currently, the “Core Percent Utilization” pricing model is the only one provided on Integrity servers running Windows Server 2003.

---

As your computing demands vary, you are charged according to core usage. The PPU software product is a part of the HP Utility Pricing Solutions (formerly On Demand Solutions) program.

This user’s guide provides you with the most recent information on using the PPU versions 8.x software.

This chapter covers the following topics:

- “Pay per use Program” on page 16
- “PPU Overview” on page 17
- “Most Recent PPU Versions and Supported Platforms” on page 20

---

**NOTE**

For simplicity and commonality, this book uses the HP-UX commands in all examples. Refer to Appendix A for details on OpenVMS command equivalents.

---

## Pay per use Program

In previous versions of PPU on HP-UX (HP product T1322AA) a customer's usage charges were calculated based on the number of active cores in the system. Starting with version B.05.00 (HP product T2351AA), PPU offers an alternative pricing model in which you are charged for the percent utilization of the active cores.

Starting with the release of PPU version B.07.00 (HP product T2351AA), both pricing models are supported for HP enterprise servers running HP-UX. Your contract with HP determines which pricing model you are on. The release of the product on Windows Integrity servers added PPU support for HP Integrity servers running Windows Server 2003 (but only with the "core percent utilization" pricing model).

The billing amounts vary as your core usage increases or decreases. This is different than traditional financing approaches that are based on fixed-payment amounts for a specified period.

PPU can be run on an HP Integrity Virtual Machines environment (HPVM). In this case, the usage information for billing purposes is still the overall usage for the VM Host. However, you can examine the usage report at the portal to see a detailed breakdown of the usage for each virtual machine (also called a "guest").

The release of PPU versions 8.x on OpenVMS 8.3 (HP product BA485AA) introduces both number of active cores and core percent utilization to OpenVMS Integrity servers. PPU versions 8.x are currently available for specified HP enterprise servers running HP-UX 11i v1 and 11i v2, and OpenVMS I64 V8.3. PPU version 7.1 is available for HP Integrity servers running Windows Server 2003 (Enterprise and Datacenter editions). See "Most Recent PPU Versions and Supported Platforms" on page 20 for details.



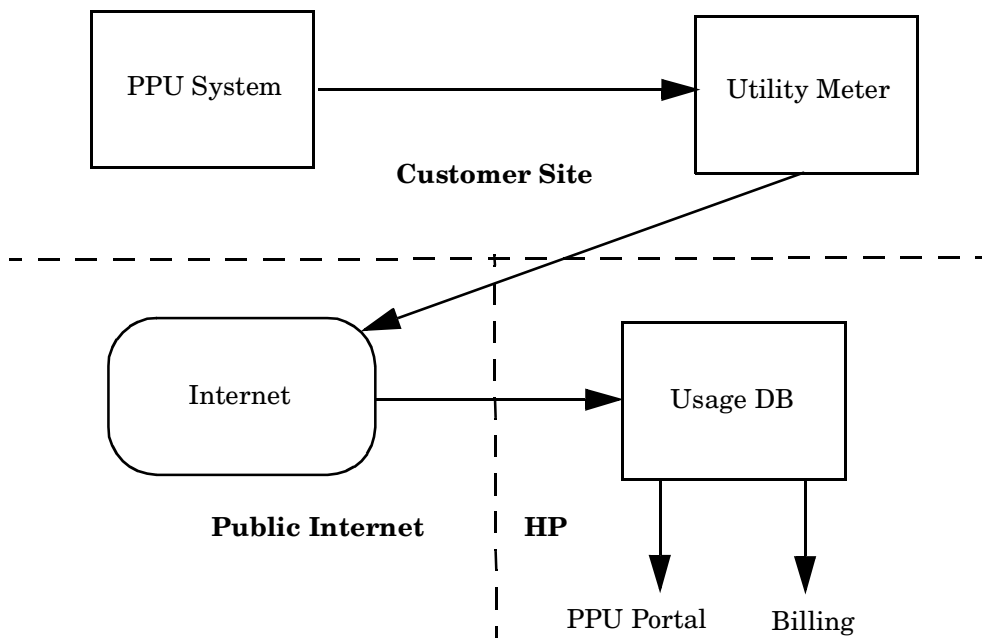
---

## PPU Overview

PPU consists of the following components:

- PPU system (hardware and software)
- Utility meter (hardware and software)
- Usage database

**Figure 1-1 PPU Components**



**PPU Software** The software which runs on the PPU system consists mainly of a “PPU Agent”. The PPU Agent reports the following information to the utility meter:

- System-identification information
- Hardware-partition information
- Virtual-partition information (HP-UX only)
- HPVM Integrity Virtual Machines guest information (HP-UX only)
- Per-core-utilization information for the operating system instance

---

**NOTE** The PPU Agent is the software component that provides information to the utility meter. On HP-UX systems, this component is implemented as a daemon (“ppud” daemon), on OpenVMS as a process (PPU\_SERVER), and on Windows systems, this component is implemented as a service (“PPU Service”).

---

You interact with the PPU Agent when you need to do any of the following: view PPU system settings, specify a utility meter, specify a system identifier, set a cap limiting the number of active cores (HP-UX and OpenVMS only), or test the connection to the utility meter.

---

**IMPORTANT** If the connection to HP is broken, and no usage information is sent to HP, HP may assume 100 percent core utilization.

---

**Utility Meter** To track the actual core usage, the utility meter receives reports from the PPU Agent. The utility meter is a dedicated appliance (generally an IA-32 system running Linux) connected to your network and preloaded with HP software. The utility meter is installed and configured by your HP service representative. One utility meter can support up to 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 56 for details on the PPU web portal.

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**NOTE**

If usage data for any partition in the complex 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 setup.

---

## Most Recent PPU Versions and Supported Platforms

**Table 1-1** Most Recent PPU Versions and Supported Platforms

| Software and Version                 | Operating System Version | Supported Hardware Platforms   | Where to Find  |
|--------------------------------------|--------------------------|--|--|
| PPU<br>B.11.23.08.00.01<br>(T2351AA) | HP-UX 11i v2             | hp Integrity servers:<br><ul style="list-style-type: none"> <li>• Superdome</li> <li>• rx8640</li> <li>• rx8620</li> <li>• rx7640</li> <li>• rx7620</li> </ul> hp 9000 servers:<br><ul style="list-style-type: none"> <li>• Superdome</li> <li>• rp8420</li> <li>• rp8400</li> <li>• rp7420</li> <li>• rp7410</li> </ul> | Available on:<br><ul style="list-style-type: none"> <li>• <a href="http://www.hp.com/go/softwaredepot">http://www.hp.com/go/softwaredepot</a></li> <li>• September 2006 HP-UX 11i v2 Operating Environment media</li> <li>• September 2006 HP-UX 11i v2 Applications Software media</li> </ul> |
| PPU<br>B.11.11.08.00.01<br>(T2351AA) | HP-UX 11i v1             | hp 9000 servers:<br><ul style="list-style-type: none"> <li>• Superdome</li> <li>• rp8420</li> <li>• rp8400</li> <li>• rp7420</li> <li>• rp7410</li> </ul>  | Available on:<br><ul style="list-style-type: none"> <li>• <a href="http://www.hp.com/go/softwaredepot">http://www.hp.com/go/softwaredepot</a></li> <li>• September 2006 HP-UX 11i v1 Applications Software media</li> </ul>  |

## Most Recent PPU Versions and Supported Platforms

Table 1-1 Most Recent PPU Versions and Supported Platforms (Continued)

| Software and Version   | Operating System Version  | Supported Hardware Platforms  | Where to Find   |
|--|---|---|---|
| PPU 8.0 (BA485AA)  | hp OpenVMS I64 V8.3   | hp Integrity servers: <ul style="list-style-type: none"> <li>• Superdome</li> <li>• rx8640</li> <li>• rx8620</li> <li>• rx7640</li> <li>• rx7620</li> </ul> | Available on: <ul style="list-style-type: none"> <li>• OpenVMS 8.3 Operating System media</li> </ul>  |
| PPU 7.1 (T2765AA)<br><br>*Percent Utilization pricing model only | Windows Server 2003 (Enterprise and Datacenter 64-bit Editions) | hp Integrity servers: <ul style="list-style-type: none"> <li>• Superdome</li> <li>• rx8620</li> <li>• rx7620</li> </ul>                                     | Available on: <ul style="list-style-type: none"> <li>• Smart Setup media associated with HP Integrity Servers for Microsoft Windows Server 2003 64-bit version, Installer Media 4.5 and above</li> <li>• <a href="http://www.hp.com/support/itaniumservers/">http://www.hp.com/support/itaniumservers/</a></li> </ul> |

Note that the only operating systems permitted to run inside a PPU system are HP-UX, OpenVMS, and Windows Server 2003. If the PPU system is using the “number of active cores” pricing model, only HP-UX and/or OpenVMS are allowed.

Pay per use Overview

**Most Recent PPU Versions and Supported Platforms**

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## 2

# Understanding PPU Requirements

This chapter covers the following topics:

- “PPU Program Requirements” on page 24
- “PPU Software Requirements” on page 25
- “PPU System Move Requirements” on page 30

## PPU Program Requirements

You must comply with the following HP Utility Pricing Solutions program conditions to participate in the PPU program:

- Maintain the PPU software on every partition in the complex, including virtual partitions on HP-UX systems (PPU software is a non-intrusive and low-overhead software module)
- In an HPVM environment, PPU is installed and configured only on the host, not on the guest Virtual Machines
- Maintain the HP-required hardware and software operation of the PPU utility meter
- Maintain the PPU software connection from each partition to the utility meter (this is required on every partition in the complex, including virtual partitions on HP-UX systems)
- Migrate to later PPU software versions when they become available

For specific details on your individual PPU program requirements, refer to your Utility Pricing Solutions contract from HP or your authorized channel partner.

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### IMPORTANT

Participants of the Utility Pricing Solutions program who do not meet these requirements may be in breach of contract. This can result in unnecessary expense for both the PPU program participant and HP.

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## PPU Software Requirements

PPU systems are required to run the PPU software on every partition in the complex. These partitions report information to the utility meter (located on your network). If the PPU software on your PPU system does not send usage reports, your system's core utilization may be assumed to be at 100 percent. In an HPVM environment, PPU is installed and configured only on the host, not on the guest Virtual Machines.

### Required Version of Utility Meter Software

---

**IMPORTANT**

The PPU 8.x software is inoperable if the Utility Meter software is not version 7.3 (or higher).

---

### HP-UX 11i v1 Requirements

**For PPU Versions  
8.x on  
HP-UX 11i v1**

The following software is required for PPU 8.x on HP-UX 11i v1:

- HP-UX 11i v1 June 2006 update, or later
- PPU software bundle T2351AA (version B.11.11.08.00.01) located on the following HP web site (search for "T2351AA"):  
<http://www.hp.com/go/softwaredepot>
- WBEM software bundle B8465BA (version A.01.05 or higher)
- NParProvider bundle (version B.12.01.06.01 or higher, available from the OE)
- The kernel configuration must include the diag2 module
- Network access to utility meter software version 7.3 (or higher)

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**NOTE**

On hp 9000 Superdome servers, 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

## PPU Software Requirements

Processor (MP). To determine your version, look at the main menu when you first log in to the MP, or type **CM** at the main menu to display the command menu, then **HE** for help.

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### NOTE

On hp 9000 servers rp8400 and rp7410, PDHC firmware version 2.03 or greater is required.

---

Your PPU system is shipped with the correct version of HP-UX and the PPU software bundle. If your system's operating system is reinstalled with Ignite-UX, ensure that the correct version of HP-UX is used and the PPU software is reinstalled. See "Getting Started" on page 32 for details.

### Required Patches for PPU on HP-UX 11i v1

Because the PPU software can activate and deactivate cores, the following patches are required for PPU 8.x systems running HP-UX 11i v1:

- PHKL\_22987: S700\_800 11.11 pstat() patch
- PHKL\_23154: S700\_800 11.11 dflush() patch
- PHKL\_25218: S700\_800 11.11 PDC Call retry, PDC\_SCSI\_PARAMS, iCOD hang fix
- PHKL\_26232: S700\_800 11.11 Psets Enablement patch, FSS iCOD patch
- PHCO\_24396: S700\_800 11.11 /etc/default/tz patch
- PHCO\_24477: S700\_800 11.11 sar(1M) patch
- PHCO\_29832: S700\_800 11.11 reboot(1M) patch
- PHCO\_29833: S700\_800 11.11 killall(1M) patch

---

### IMPORTANT

For the most up-to-date required patches, refer to the PPU Installation page on the HP web site <http://www.hp.com/go/softwaredepot> (search for "T2351AA").

## HP-UX 11i v2 Requirements

### For PPU Versions 8.x on HP-UX 11i v2

The following software is required for PPU 8.x on HP-UX 11i v2:

- ❑ HP-UX 11i v2 June 2006 update, or later
- ❑ PPU software bundle T2351AA (version B.11.23.08.00.01) located on the following HP web site (search for “T2351AA”):  
<http://www.hp.com/go/softwaredepot>
- ❑ WBEM software bundle B8465BA (version A.01.05 or higher, or version A.02.00 or higher for PA-RISC systems)
- ❑ NParProvider bundle (version B.23.01.06.01 or higher, available from the OE)
- ❑ The kernel configuration must include the `diag2` module
- ❑ Network access to utility meter software version 7.3 (or higher)
- ❑ If you have a virtual partitioned environment, the Virtual Partitions software (bundle T1335BC) must be version A.04.01 or greater

---

### NOTE

Updated firmware may be required by the NPar software, or by VPar software if you are using virtual partitions. Please check the product-specific documentation for additional requirements.

---

Your PPU system is shipped with the correct version of HP-UX and the PPU software bundle. If your system’s operating system is reinstalled with Ignite-UX, ensure that the correct version of HP-UX is used and the PPU software is reinstalled. See “Getting Started” on page 32 for details.

### Required Patches for HP-UX 11i v2

No patches are known for HP-UX 11i v2 systems at the time of publication of this document.

### Upgrading PPU Software (HP-UX)

You can easily upgrade the PPU software from versions 5.x, 6.x and 7.x to version 8.x. If you are running PPU version 4.x, the upgrade to version 8.x requires a utility meter. If you want to upgrade from PPU version 4.x

to version 8.x, you can utilize an existing utility meter, or order a utility meter from HP. Contact your HP sales representative if you have questions about upgrading PPU software.

### OpenVMS 8.3 Requirements

- For PPU Versions 8.x on OpenVMS 8.3** The following software is required for PPU versions 8.x on OpenVMS 8.3:
- hp OpenVMS Industry Standard 64 Operating System V8.3, or later
  - PPU software bundle BA485AA (versions 8.x) — installed from the OpenVMS I64 8.3 OE DVD
  - WBEMCIM bundle (version A2.0-A051013F or higher) — optionally installed with OpenVMS 8.3
  - Network access to utility meter software version 7.3 (or higher)

### Windows Server 2003 Requirements

- For PPU Versions 7.1 on Windows Server 2003** The following software is required for PPU 7.1 on Windows Server 2003:
- Windows Server 2003, 64-bit (either Enterprise or Datacenter edition)
  - WMI nPar Provider, 64-bit, version 2.0 or higher
  - WMI Mapper for Windows Server 2003 64-bit Edition, version 2.0 or higher
  - Baseboard Management Controller Driver (required by WMI nPar Provider), version 7.2.3790.3 or higher
  - Windows PPU installer cp006445.exe
  - Network access to a utility meter (version 7.3 or higher)

---

**IMPORTANT**

Windows PPU is only supported with the latest firmware, available on the Smart Setup media associated with HP Integrity Servers for Microsoft Windows Server 2003 64-bit version, Installer Media 4.5 or higher.

---

PPU is supported on Windows Server 2003 64-bit version, when hyperthreading is disabled. When hyperthreading is enabled and active, PPU does not report the correct usage information.

PPU is not supported on Windows Server 2003 64-bit version if it is running as an HPVM virtual machine (VM guest). PPU is supported on Windows Server 2003 64-bit version if it is running as an HPVM host. However, PPU does not report additional core usage information for the HPVM virtual machine (VM guest).

Your PPU system is shipped with the correct version of Windows Server 2003 and the PPU software. If your system's operating system is reinstalled, ensure that the correct version of Windows, the PPU software, and other required components are used. See "Getting Started" on page 32 for details.

### **OS Updates for Windows Server 2003**

No OS updates are known to be required at the time of publication of this document. The latest version of this document can be found online at: **<http://docs.hp.com>**. Future updates, including firmware, drivers and documentation can be found at **<http://www.hp.com/support/itaniumservers>**.

## **Firmware Requirements**

With the release of the PPU versions 8.x software, the following firmware versions are required for the specified HP PPU hardware platforms:

- HP 9000 Superdome: the Utility subsystem firmware must be version 6.40 or greater.
- HP 9000 rp8400 and rp7410: the PDHC firmware must be version 2.03 or greater.
- HP Integrity Superdome, rx8620, and rx7620: for Windows servers, the firmware must be the latest supported for the Smart Setup media associated with HP Integrity Servers for Microsoft Windows Server 2003 64-bit version, Installer Media 4.5 or higher.

---

## **PPU System Move Requirements**

If you are planning to physically 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” on page 32
- “Installing PPU Software” on page 38
- “Configuring PPU Software” on page 45
- “Reinstalling or Updating PPU Software” on page 53
- “Uninstalling PPU Software” on page 53

## Getting Started

### Factory Integrated Systems (HP-UX only)

You do not need to install the PPU 8.x software on your PPU HP-UX system if it was ordered in (or after) January 2004. 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 8.x software must be installed and configured on every partition in the complex, including virtual partitions on HP-UX systems.

The PPU software bundle T2351AA is a selectable product when installing the HP-UX operating environment (OE). With Windows, it is in the SmartComponent, **hp CPU PayPerUse Agent for Windows Server 2003 64-bit Edition**. (If extracted, the installer file is `CPUPayPerUseAgent64.msi`.) In an HPVM environment, PPU is installed and configured only on the VM Host, not on the guest virtual machines.

The PPU software (BA485AA) is an optional installation product accessible from the OpenVMS I64 8.3 OE DVD.

### Verifying PPU Functionality on HP-UX Systems

Perform the following steps to verify your partition has the PPU 8.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.11.23.08.00.01.05          HP Pay per use (PPU)
```

If you do not receive the correct result for **Step 1**, see “Installing PPU Software” on page 38 for PPU software installation details.



- Step 2.** Configure the PPU software to communicate with the utility meter, and test its proper function, by executing the following command:

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

Where *meter* is the hostname or IP address of a valid utility meter.

You should see output similar to:

```
The utility meter IP/hostname is set to 'meter.corp.com'.  
Pay per use daemon (ppud) started.
```

The `ppuconfig -m` command/option also starts the `ppud` daemon if it is not running. If you do not receive the correct result for **Step 2**, see “Configuring PPU Software” on page 45 for PPU software configuration details.

---

**IMPORTANT**

You need to configure the PPU software so your 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 45 for details on configuring the utility meter settings.

---

- Step 3.** Verify that communication can be established between the Pay per use software and the configured utility meter by executing the command:

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

You should see output similar to:

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

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

## Verifying PPU Installation and Functionality on Windows Systems

Perform the following steps on each of your Windows partitions to verify they have the PPU software installed and configured for communications with the utility meter. Note that the PPU software is *not* factory-installed on Windows systems, and therefore this verification

generally cannot be completed until you have first followed the steps outlined in the sections “Installing on Windows Server 2003 Systems” on page 40 and “Configuring PPU Software” on page 45.

**Step 1.** Open **Services.msc**, also known as the Services applet. Look for “HP Pay Per Use”, or open a command window, type **sc query ppuservice**, and press **Enter**. If the service is not listed, then PPU is not installed. Therefore, proceed to the next section “Installing on Windows Server 2003 Systems” on page 40. If the service is listed, then PPU is installed. Proceed to the next step to verify that the service is started and operating correctly.

**Step 2.** To verify that the PPU service is running, perform one of the following:

- Open the `services.msc` applet (**Start>Programs>Administrative Tools>Services**), find “HP Pay Per Use” and ensure the status shows as “started”. If not, right click to start. Or,
- From a `cmd.exe` shell, type “`sc query ppuservice`”. If it is not running, you should see output similar to this:

```
SERVICE_NAME: PPUService
TYPE: 110  WIN32_OWN_PROCESS  (interactive)
STATE: 1  STOPPED
        (NOT_STOPPABLE,NOT_PAUSABLE,IGNORES_SHUTDOWN)
WIN32_EXIT_CODE: 0  (0x0)
SERVICE_EXIT_CODE: 0  (0x0)
CHECKPOINT: 0x0
WAIT_HINT: 0x0
```

Type “`sc start ppuservice`” to start this service. If the service is already started, you should see output like this:

```
SERVICE_NAME: PPUService
TYPE: 110  WIN32_OWN_PROCESS  (interactive)
STATE: 4  RUNNING
        (STOPPABLE,NOT_PAUSABLE,ACCEPTS_SHUTDOWN)
WIN32_EXIT_CODE: 0  (0x0)
SERVICE_EXIT_CODE: 0  (0x0)
CHECKPOINT: 0x0
WAIT_HINT: 0x0
```

- Step 3.** Configure the PPU software to communicate with the utility meter, and test its proper function, by executing the following command:

```
C:\Program Files (x86)\Hewlett-Packard\ppu> ppuconfig -m  
meter
```

(where *meter* is the hostname or IP address of a valid utility meter), and press **Enter**. If the PPU Service is running and the Utility Meter is valid and reachable, you should see no response.

The `ppuconfig -m meter` command/option also starts the Windows Pay per use service if it is not running.

- Step 4.** Verify that communication can be established between the Pay per use software and the configured utility meter, by executing the command:

```
C:\Program Files (x86)\Hewlett-Packard\ppu> ppuconfig -t
```

You should see output similar to:

```
Testing the connection to a utility meter. This operation  
can take 2-3 minutes to complete...
```

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

If the meter is incorrect, or otherwise not reachable, you might see something like:

```
C:\Program Files (x86)\Hewlett-Packard\ppu> ppuconfig -t
```

```
Testing the connection to a utility meter. This operation  
can take 2-3 minutes to complete...
```

```
ERROR: Unable to send Pay Per Use report to utility meter.
```

```
Received the following error:
```

```
Invalid locator: meter.hp.com:5989
```

```
ERROR: Test of connection to specified utility meter failed.
```

```
Verify that the configuration parameters are correctly  
specified, that the utility meter and network are  
working properly, and that compatible versions of the  
utility meter and PPU agent software are installed.
```

If **Steps 1** through **Step 4** provide the expected results (as described above), your PPU system is operational, and the PPU software is installed and configured correctly. If there are unexpected results, you

may need to redo either the installation or configuration steps. See the sections “Installing PPU Software” on page 38 or “Configuring PPU Software” on page 45 for details.

### **Errors During Verification**

Use the following error descriptions to determine the nature of problems encountered during PPU verification. Then refer to “Configuring PPU Software” on page 45 for instructions on how to fix the problem.

#### **PPU service is not installed**

If you receive the following output from the command `sc query ppuserice`, PPU is not installed and you should proceed to the next section, “Installing PPU Software” on page 38:

```
[SC] EnumQueryServicesStatus:OpenService FAILED 1060:
```

The specified service does not exist as an installed service.

#### **PPU service is running, but utility meter is invalid or unreachable**

After issuing the `ppuconfig -m meter` command, an error of this type is indicated by either of the following error messages:

```
Unable to send Pay per use report to utility meter. Received  
the following error: Invalid locator: <utility meter  
hostname or IP address>
```

or,

```
Test of connection to specified utility meter failed. Verify  
that the configuration parameters are correctly specified,  
that the utility meter and network are working properly, and  
that compatible versions of the utility meter and PPU agent  
software are installed.
```

### **Verifying PPU Functionality on OpenVMS Systems**

Perform the following steps on each of your OpenVMS partitions to verify the PPU software is installed and configured to communicate with the utility meter:

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

```
$ product show product PPU
```

You should see output similar to:

```
-----  
PRODUCT                KIT TYPE STATE  
-----  
HP I64VMS PPU V8.0    Full LP   Installed
```

- Step 2.** Configure the PPU software to communicate with the utility meter by executing the following DCL command:

```
$ ppu config/meter_address=meter
```

Where *meter* is the hostname or IP address of a valid utility meter.

---

**IMPORTANT**

You need to configure the PPU software so your 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 45 for details on configuring the utility meter settings.

---

- Step 3.** Verify that communication can be established between the Pay per use software and the configured utility meter by executing the DCL command:

```
$ ppu config/test_connection
```

You should see output similar to:

Round trip communication with the utility meter succeeded.

## Installing PPU Software

If you currently have PPU software installed that is older than version B.05.00 (for example, version B.04.01), contact your HP sales representative to find out how to update to PPU 8.x software.

### Find the Latest Patches (HP-UX)

This document lists the patches required to install and run PPU 8.x software known at the time of publication. To find the most current patches, go to the HP Software Depot at <http://www.hp.com/go/softwaredepot> and perform the following steps:

- Step 1.** Enter the PPU software product T2351AA into the **search** text box then click the **search** button.
- Step 2.** Click the **Pay per use Agent Software** link that appears as a result of your search.
- Step 3.** Click the **installation** link, near the bottom of the page.

The required patches for PPU 8.x are listed. You can then retrieve the necessary patches from the HP web site: <http://itrc.hp.com>

### Installing from the HP-UX Media (HP-UX)

Follow this procedure to install the PPU 8.x software on your HP-UX 11i v1 or 11i v2 system from either the Operating Environment or Applications Software media:

- Step 1.** Log in as `root`.
- Step 2.** Determine the drive device file by entering the following command:  

```
ioscan -fnC disk
```
- Step 3.** Insert the Operating Environment or Applications Software media 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**) and the `/cdrom` directory. To mount the drive, enter a similar command as:

```
mount -r /dev/dsk/c1t2d0 /cdrom
```

- Step 5.** Install the PPU 8.x bundle T2351AA from the media:

```
swinstall -s /cdrom T2351AA
```

- Step 6.** Continue with “Configuring PPU Software” on page 45.

### Installing from the HP Software Depot (HP-UX)

- Step 1.** Do a search for the PPU product T2351AA at the HP Software Depot web site: <http://www.hp.com/go/softwaredepot>

- Step 2.** Click the **Pay per use Agent Software** link that appears as a result of your search

- Step 3.** Read the “overview” page, then click the **installation** link (at the bottom of the page).

- Step 4.** Read the “installation” page, then click the **receive for free** button.

- Step 5.** Fill in the registration information, click the appropriate operating system link, and then click the **Next** button.

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

You can rename the download but the filename is a name similar to these:

```
/var/tmp/T2351AA_B.08.00.01.05_HP-UX_B.11.23_IA+PA.depot  
/var/tmp/T2351AA_B.08.00.01.05_HP-UX_B.11.11_32+64.depot
```

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

- Step 8.** Install the appropriate PPU bundle (11i v2 example):

```
swinstall -s \  
/var/tmp/T2351AA_B.08.00_HP-UX_B.11.23.IA+PA.depot '**
```

You can also use the interactive `swinstall` to install the depot file by setting the target to `/var/tmp/<package_name>`. The PPU 8.x software is a low-overhead and non-intrusive software module. The file-system size increases by approximately 5MB and a reboot is not required.

**Step 9.** Continue with “Configuring PPU Software” on page 45.

### Installing on Windows Server 2003 Systems

Before installing the PPU software, ensure that all drivers, utilities, and security updates for your system available on the Smart Setup and Smart Update media have been installed. In particular, the Smart Components containing the prerequisite products HP WMI nParProvider, HP WMI Mapper, and HP Baseboard Management Controller Driver (the Driver is automatically installed by the Support Pack) should already have been installed.

---

**NOTE**

Do not install the PPU software on a remote management station. You must install this software on a hard partition of the HP Integrity server running the Windows Server 2003 (Enterprise or Datacenter Edition) 64-bit operating system.

---

To install the PPU software on each hard partition running Windows Server 2003:

- Step 1.** Log onto the first Windows partition of the target server as Administrator (use the administrative logon and password, or use an account with Administrator privileges).
- Step 2.** Browse the Smart Setup CD or the <http://www.hp.com/support/itaniumservers> website for your appropriate server type and then navigate to the Pay per use (PPU) package. The title of the Smart Component is **hp CPU PayPerUse Agent for Windows Server 2003 64-bit Edition**.
- Step 3.** When the component is displayed, click **Download** and choose **Run**.
- Step 4.** Ensure that you have the latest version of the PPU installer, `cp006445.exe`.



- Step 5.** In the **HP Package Setup** screen, you can choose **Extract** or **Install**. Choose **Install** to complete the installation with minimal prompting for a “typical” installation. Choose **Extract** if you wish more control over the installation options; in the case of PPU, the only significant installation option is whether or not PPU should be installed in a directory other than the default location.
- Step 6.** In all cases, you will be prompted to accept a license agreement during the installation.
- Step 7.** When the installation is complete, reboot the partition if you are prompted to do so - or if you previously deferred a reboot after the installation of the WMI nPartition Provider. (If the installation fails or the PPU service fails to start, you should definitely reboot and try reinstalling PPU.)
- Step 8.** The installation also updates the system `PATH`, so if you do not reboot after the installation, you should close and reopen any command prompt windows that you plan to use for configuration and management of PPU.

### Additional Windows Installation Considerations

The packaging and installation of Pay per use changed between the initial version 7.01 and version 7.1. In 7.01, Pay per use was included with the WMI nPar Provider component, and only visible as a subcomponent of the WMI nPar Provider. Do not mix installation modes between the old and the new methods (PPU as a subcomponent or nPar or PPU as a separate entity). After a successful PPU installation, PPU is listed separately under **Add or Remove Programs**. Do not attempt to reinstall PPU by modifying the WMI nPar Provider package.

Upgrading the WMI nPar Provider or WMI Mapper may cause the PPU service to stop running. After upgrading the WMI nPar Provider or WMI Mapper, reboot or check the status of the **HP Pay Per Use** service in the Windows Services applet to make sure the service is still running.

---

**NOTE**

When the WMI Mapper is upgraded from Smart Setup version 4.5 or later, you must also reinstall the PPU agent from Smart Setup version 4.5 or later. Without the reinstallation of PPU, the PPU service will fail to start properly.

---

If the installation fails, or the PPU service fails to start, it may be because of a deferred but necessary reboot after installing the WMI nPar Provider. Try rebooting, and if necessary, reinstalling PPU.

### Installing from the OpenVMS I64 OE DVD

Follow this procedure to install the PPU V8.x software on your OpenVMS V8.3 system. The PPU product kit is located on the OpenVMS I64 OE DVD.

- Step 1.** Log into a privileged system account.
- Step 2.** Insert the OpenVMS I64 OE DVD into a DVD-R device accessible to the partition where you intend to install the software.
- Step 3.** Mount the DVD drive with the DCL MOUNT command as below:

```
$ mount DQA0:I64083 I64083
%MOUNT-I-WRITELOCK, volume is write locked
%MOUNT-I-MOUNTED, I64083 mounted on _DQA0: (NODE)
```

- Step 4.** Set your default working directory or define the logical PCSI\$SOURCE to the directory on the DVD where the PPU kit resides. You may use the two directory locations below in either of the DCL commands:

```
$ DEFINE PCSI$SOURCE DQA0:[PPU_I64080.KIT]
```

or

```
$ SET DEFAULT DQA0:[KITS.PPU_I64080]
```

The PSCI kit file, HP-I64VMS-PPU-V0800--1.PSCI, will be located in the kit directory.

- Step 5.** Install the PPU V8.x kit from the media with the DCL command:

```
$ PRODUCT INSTALL PPU
```

You will see output similar to below when installing the kit:

```
Performing product kit validation ...
%PSCI-I-VALPASSED, validation of
$DQA0:[000000]HP-I64VMS-PPU-V0800--1.PSCI$COMPRESSED;1
succeeded
```

The following product has been selected:

HP I64VMS PPU V8.0 Layered Product

Do you want to continue? [YES]

Configuration phase starting ...

You will be asked to choose options, if any, for each selected product and for any products that may be installed to satisfy software dependency requirements.

HP I64VMS PPU V8.0

\* This product does not have any configuration options.

Execution phase starting ...

The following product will be installed to destination:

HP I64VMS PPU V8.0 DISK\$SYSDEVICE:[VMS\$COMMON.]

Portion done: 0%...50%...90%...100%

The following product has been installed:

HP I64VMS PPU V8.0 Layered Product

\$

- Step 6.** Execute the OpenVMS PPU configuration utility to verify your software environment and register the WBEM providers required by PPU.

**\$ @sys\$manager:ppu\$config.com**

hp OpenVMS Industry Standard 64  
Pay Per Use (PPU) configuration utility

Are you ready to start the configuration process? (Y/N): **Y**

Starting configuration of the nPar provider:

Starting configuration of the iCAP provider:

Verifying providers status...

providers OK!...

Registering PPU Command Language Definition file...

Command Language Definition file successfully registered

%DCL-I-SUPERSEDE, previous value of PPU\$ROOT has been

Installing and Configuring PPU Software  
**Installing PPU Software**

superseded

Please add the following lines to your STARTUP procedure:

```
$ DEFINE/SYS/EXEC/TRANS=CONCEAL PPU$ROOT
`F$TRNLNM("SYS$SPECIFIC")
$ @SYS$STARTUP:PPU$STARTUP

*****
* Congratulations!                                     *
*                                                       *
* PPU has been successfully configured                 *
*                                                       *
* Warning: Do not attempt to start the PPU software   *
* before setting up the address of the utility meter with *
*                                                       *
*   ppu config/meter_address                          *
*                                                       *
*****
```

**Step 7.** Add the PPU startup and PPU shutdown procedures to your site specific startup and shutdown procedures.

As instructed by the installation, add the following two lines to your startup procedure, SYS\$MANAGER:SYSTARTUP\_VMS.COM:

```
$ DEFINE/SYS/EXEC/TRANS=CONCEAL PPU$ROOT `F$TRNLNM("SYS$SPECIFIC")
$ @SYS$STARTUP:PPU$STARTUP
```

Note: You may define the PPU\$ROOT logical to a device and directory of your choosing. The root does not have to reside on the system device.

Add the line below to your site specific shutdown procedure, SYS\$MANAGER:SYSHUTDWN.COM:

```
$ @SYS$MANAGER:PPU$SHUTDWN
```

**Step 8.** Continue with “Configuring PPU Software” on page 45.

## Configuring PPU Software

After you have successfully installed the PPU 8.x software, you need to configure the PPU software connection to the utility meter. The utility meter must be configured on every partition in the complex (including virtual partitions on HP-UX systems).

---

### 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.

You may need to perform up to three steps to configure a partition. At a minimum, you must set the name of the utility meter. If you want to specify a name other than your partition's hostname as the system identifier, you must perform additional steps. If you want to set a cap, or maximum, for the number of active cores (HP-UX and OpenVMS systems only), you must also perform additional steps.

To summarize, in order to configure the PPU software you must do the following:

- Step 1.** Configure the utility meter (required)
- Step 2.** Configure the system identifier of the partition (optional)
- Step 3.** Configure the cap limiting the number of active cores on the partition (optional; HP-UX and OpenVMS only)

### Configuring the Utility Meter (Required)

#### For HP-UX

To configure the utility meter, execute the following command on each partition:

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

Where *meter* is the fully-qualified hostname or IP address of the utility meter. This command/option performs a communication test to the utility meter and starts the ppud daemon.

### For Windows Server 2003

To configure the utility meter, open a command window on each Windows partition on the server and execute the following command:

```
C:\Program Files (x86)\Hewlett-Packard\ppu>  
ppuconfig -m meter
```

Where *meter* is the fully-qualified hostname or IP address of the utility meter. This command/option performs a communication test to the utility meter and starts the PPU Service. The command assumes that PPU was installed in the default location.

---

#### IMPORTANT

---

The PPU 8.x software is inoperable if the Utility Meter software is not version 7.3 (or higher).

### For OpenVMS

To configure the utility meter, execute the following DCL command on each partition:

```
$ ppu config/meter_address=meter
```

Where *meter* is the fully-qualified hostname or IP address of the utility meter. After the utility meter is defined, you must start the PPU\_SERVER process. Use the DCL command below to start the server:

```
$ ! note the location of PPU$ROOT is not required to be  
$ ! SYS$SPECIFIC but it must be consistent with the  
$ ! definition in SYSTARTUP_VMS.COM  
$ !  
$ DEFINE/SYS/EXEC/TRANS=CONCEAL PPU$ROOT 'F$TRNLNM("SYS$SPECIFIC")  
$ @SYS$STARTUP:PPU$STARTUP  
%RUN-S-PROC_ID, identification of created process is 00000438  
8 cores are now active
```

## Configuring the System Identifier (Optional)

### For HP-UX

The system identifier of a partition enables you to track your PPU system. The default system-identifier is the hostname of your partition. If you want to protect the identity of the hostname for your partition, you can change the system identifier to any value you choose. Examples of a system identifier are: an asset number, an HP support tag, or a description of a physical location.

To set the system identifier of the partition, execute the following command:

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

Where *system\_id* is an identifier for your partition.

---

#### NOTE

You can set the utility meter and system identifier with the single command: `/usr/sbin/ppuconfig -m meter -s system_id`

---

### For Windows Server 2003

The system identifier of a partition enables you to track your PPU system. The default system-identifier is the hostname of your partition. If you want to protect the identity of the hostname for your partition, you can change the system identifier to any value you choose. Examples of a system identifier are: an asset number, an HP support tag, or a description of a physical location.

To set the system identifier of the partition, execute the following command:

```
C:\Program Files (x86)\Hewlett-Packard\ppu>  
ppuconfig -s system_id
```

Where *system\_id* is an identifier for your partition.

---

**NOTE**

You can also set the utility meter and system identifier with a single command:

```
C:\Program Files (x86)\Hewlett-Packard\ppu>  
ppuconfig -m meter -s system_id
```

---

**For OpenVMS**

The system identifier of a partition enables you to track your PPU system. The default system identifier is the hostname of your partition. If you want to protect the identity of the hostname for your partition, you can change the system identifier to any value you choose. Examples of a system identifier are: an asset number, an HP support tag, or a description of a physical location.

To set the system identifier of the partition, execute the following DCL command:

```
$ ppu config/system_id=system_id
```

Where *system\_id* is an identifier for your partition.

---

**NOTE**

You can set the utility meter and the system identifier with the single command:

```
$ ppu config/system_id=system_id/meter_address=meter
```

---

**Limiting the Number of Active Cores (Optional;  
HP-UX and OpenVMS)**

You can specify the number of active cores on each partition in your PPU system. To cap the number of active cores for a given partition, execute the following command:

```
HP-UX: /usr/sbin/ppuconfig -rc number
```

```
OpenVMS: $ PPU CONFIG/CAP=number [/RECONCILE]
```

Where *number* is the maximum number of active cores you want in the partition.



The `-r` option on the HP-UX command and the `/RECONCILE` qualifier on the OpenVMS command causes the cap to take effect immediately (limiting the number of active cores without waiting for a reboot).

---

**NOTE**

---

You cannot limit the number of active cores with the `-c` option in a virtual partition environment (vpar).

See “ppuconfig (1M) Manpage” on page 102 for details on specifying a cap limiting the number of active cores.

## Viewing the System Settings (HP-UX, Windows and OpenVMS)

You can use the `ppuconfig` command (with no options) to view the settings for the utility meter and system identifier, and if a cap limiting the number of active cores is set.

**Example 3-1****Viewing system settings using the ppuconfig command**

Use the following commands to verify general system settings:

HP-UX:

```
/usr/sbin/ppuconfig
```

OpenVMS:

```
$ PPU CONFIG
```

Windows Server 2003:

```
C:\Program Files (x86)\Hewlett-Packard\ppu> ppuconfig
```

You should see output similar to:

```
Utility Meter IP/Hostname:          meter1.corp.com
System Identifier:                  superdome1
Cores to be active at next reboot (cap):    all
Cores that can be activated without reboot:  0
Active Cores:                       4
```

See the “ppuconfig” descriptions in the appropriate system-specific Appendix (B or C) for details of the `ppuconfig` command.

## Verifying the PPU Software Connection to HP

After specifying the utility meter (required), system identifier (optional), and active core limit cap (optional), execute the following command to verify the PPU software is communicating with the utility meter:

HP-UX:

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

OpenVMS:

```
$ PPU CONFIG/TEST
```

Windows Server 2003:

```
C:\Program Files (x86)\Hewlett-Packard\ppu> ppuconfig -t
```

You should see output similar to:

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

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

If you receive the correct message, your partition is properly configured to communicate with the utility meter, and no further configuration of the PPU software is necessary.

To verify the utility-meter connection to HP, go to the PPU portal (see “PPU Web Portal” on page 56 for details) and confirm that a PPU test usage-report has been posted to the portal. The usage report is available from the **meter connectivity verification** link. You need to enter the System Serial Number and system unique ID.

The existence of the report verifies that communication is established from the PPU software, to the utility meter, and ultimately to HP.

## Verifying the PPU Agent is Running

---

### NOTE

The PPU Agent is the software component that provides information to the utility meter. On HP-UX systems, this component is the ppud daemon. On Windows systems, this component is the PPU Service. On OpenVMS this is the PPU\_SERVER process. The PPU Agent must be running on each partition in the complex (including virtual partitions on

HP-UX systems). If the PPU Agent is not running on a partition, utilization information for that partition is not sent to HP, which may assume 100 percent utilization of the partition core(s).

---

### For HP-UX

The `ppud` daemon is started when you specify a utility meter using the `ppuconfig -m meter` command. It also is started by `init` at reboot and is respawned if its process is stopped.

---

### NOTE

If the `ppud` daemon is killed, it is automatically respawned by `init`. See “`ppud (1M) Manpage`” on page 100 for details of the `ppud` daemon.

---

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 partition. If it is running, and the utility meter is properly configured, utilization information is sent to HP and your partition is correctly configured.

If the `ppud` daemon is not listed as an active process, inspect the `/etc/inittab` file for an entry similar to the following (look toward the bottom of the file):

```
ppud:23456:respawn:/usr/lbin/ppud # Pay per use daemon
```

If the entry does not exist in the `/etc/inittab`, start the `ppud` daemon by specifying the utility meter with the following command:

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

Where *meter* is the fully-qualified hostname or IP address of the utility meter. This command/option performs a communication test to the utility meter and starts the `ppud` daemon.

**Time Zone Specification** The `ppud` daemon performs periodic operations based on the time of day. The daemon is spawned by `init` and obtains its time zone specification from the `/etc/default/tz` file. By default the time zone is set to `EST5EDT`. You can specify which time zone

the `ppud` daemon uses to interpret its current time by modifying the entry in the `/etc/default/tz` file. Refer to the *environ* (5M) manpage for details of the TZ format.

### For Windows Server 2003

The PPU Service starts when the PPU software is installed (using the process described in “Installing PPU Software” on page 38), or when you specify a utility meter using the `ppuconfig -m meter` command. Thereafter it starts automatically each time the partition boots.

To verify the PPU Service is running:

- Step 1.** Click **Start > Programs > Administrative Tools > Services**.
- Step 2.** Verify that the **HP Pay Per Use** service appears in the list of services, and its status is listed as “Started” (meaning it is active).

If the PPU Service is running, and the utility meter is properly configured, utilization information is sent to HP and your partition is correctly configured.

### For OpenVMS

To verify the PPU server is running, you may use the `PPU CONFIG` command.

#### \$ PPU CONFIG

```
Utility Meter IP/Hostname:          meter1.corp.com
System Identifier:                  superdomel
Cores to be active at next reboot (cap):  5
Cores that can be activated without reboot: 3
Active Cores:                       5
```

```
ERROR" The Pay per use server (PPU_SERVER) is not running.
```

Alternatively, you can use the `DCL PIPE` command to verify the `PPU_SERVER` process is running. The `SEARCH-I-NOMATCHES` message listed below indicates the server is not running:

```
$ pipe show sys | search sys$pipe PPU_SERVER
%SEARCH-I-NOMATCHES, no strings matched
```

```
$ pipe show sys | search sys$pipe PPU_SERVER
00000438 PPU_SERVER  HIB  10 2470 0 00:00:00:33 967 1408
```

## Reinstalling or Updating PPU Software

To update just the PPU software on one or more partitions, you do not need to do anything special to preserve the PPU configuration. Simply follow the installation instructions from “Installing PPU Software” on page 38 for your appropriate platform (HP-UX or Windows). (On HP-UX, if you happen to be reinstalling the same PPU version as was previously installed, perhaps to ensure a clean installation, you may need to include the option `-x reinstall=true` on the `swinstall` command to force a new installation.)

However, if you reinstall HP-UX or Windows on a partition (for example, installing HP-UX by either cold-installing or installing from a “golden image”), you need to perform the following steps to preserve your PPU configuration:

- Step 1.** Before reinstalling, execute the `ppuconfig` command and record the configuration information (utility meter, system identifier, and core information) from the output.
- Step 2.** Reinstall HP-UX or Windows on the partition and install the PPU software. (See “Installing PPU Software” on page 38 for details.)
- Step 3.** Using the recorded output from **Step 1**, configure the PPU settings with the `ppuconfig` command. (See “Configuring PPU Software” on page 45 for details.)

---

## Uninstalling PPU Software

---

### IMPORTANT

You should not uninstall the PPU software from a partition. If you uninstall the PPU software, you may be charged for 100 percent utilization of the cores in the partition.

---

### For HP-UX

To uninstall the PPU software, execute the following command:

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

---

**NOTE**

Executing the above `swremove` command deliberately produces warning messages - because this is not a recommended operation. However, if the Execution Phase succeeds, the PPU software was successfully removed.

---

You can verify the PPU software was successfully uninstalled by issuing the following command:

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

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

### For OpenVMS

To uninstall the PPU software, execute the following command:

```
$ PRODUCT REMOVE PPU
```

Confirm the removal, if prompted.

### For Windows Server 2003

To uninstall the PPU software:

- Step 1.** Click **Start > Settings > Control Panel**, then double-click **Add or Remove Programs**.
- Step 2.** Highlight **HP CPU PayPerUse v7.1** in the list of currently installed programs and click **Remove**.
- Step 3.** Confirm the removal, if prompted.

---

# 4

## Using the PPU Software

This chapter covers the following topics:

- “PPU Web Portal” on page 56
- “PPU Usage Report” on page 58
- “Understanding Utilization Capping (HP-UX and OpenVMS)” on page 64
- “New Partition Creation” on page 65
- “Partition Resizing” on page 67

## PPU Web Portal

You have access to detailed PPU usage information through a web portal. The PPU web portal contains the sample usage information for every five-minute measurement interval. You can access the information for a particular day, or a selected range of days.

---

### NOTE

In an HP Integrity Virtual Machines environment (HPVM), the usage information for billing purposes is based on the overall usage for the VM Host. However, you can examine the usage report at the portal to see a detailed breakdown of the usage for each virtual machine guest. Guest information is associated with the Virtual CPU column.

---

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

**<http://www.hp.com/go/payperuse>**

Initial access to the PPU web portal requires registration using your system-identification information. The system-identification consists of the system serial number plus a unique ID. The unique ID can be identified from the MP on partitionable systems, from the `getconf CS_MACHINE_IDENT` command on HP-UX partitionable systems, or it can be found at the tag `<uniqueidentifier>` in a PPU usage report. See “PPU Usage Report” on page 58 for more 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 after it was collected. For example, usage data for today is available at the portal two days from today.

---



## For OpenVMS

The system-identification information can be displayed for the partition by entering the following DCL command:

```
$ ppu show portal  
Unique ID: aldb8784-1111-2222-3333-908070A0B03f  
System serial number: XX07740001
```

## PPU Usage Report

The most recent PPU usage report is retained on your partition. On HP-UX systems, you can access this usage report at:

```
/var/ppu/PPUReport.xml.
```

On OpenVMS systems, you can access the usage report at:

```
SYS$SYSROOT:[PPU]PPUReport.xml;*
```

The previous 50 versions of the usage report are retained at this location.

On Windows systems, you can access the usage report in the directory where PPU is installed. By default, this location is:

```
C:\Program Files (x86)\Hewlett-Packard\ppu\PPUReport.xml.
```

---

### NOTE

If the connection between the PPU software and the utility meter is broken, PPU usage reports are cached to disk (at `/var/ppu/cache` on HP-UX systems, and at

```
C:\Program Files (x86)\Hewlett-Packard\ppu\cache
```

 on Windows systems) until the connection is re-established. After the connection is broken, the PPU software checks for a good connection every 5 minutes. The cached PPU usage reports are encrypted and cannot be viewed.

---

The PPU usage reports are easier to read if you open them with a browser that can interpret XML, but note that the XML interpretation will also attempt to access the utility meter referenced in the XML file. If your browser does not support XML, or you do not have network access to the utility meter, you can open this file with a text-based editor such as Wordpad on Windows.

Example 4-1 shows a typical PPU usage report from an HP-UX system. For the same type of usage, a report from an OpenVMS or Windows system might differ in the system information such as `OSType` and `CPUType`. On Windows systems, because the Windows version of PPU is V7.1, `ReportVersion` would be 1.0 and there would be no entry for `IsHPVirtualMachine`.

### Example 4-1 PPU 8.x Usage Report (HP-UX example)

```
<?xml version="1.0" ?>
<!DOCTYPE PPUReport (View Source for full doctype...)>
-<PPUReport>
```

```
-<ReportData>
  <ReportType>Asset</ReportType>
  <ReportVersion>2.0</ReportVersion>
</ReportData>
-<System>
  -<SystemInfo>
    -<ComplexInfo>
      <SerialNumber>XYZ4032503</SerialNumber>
      <ProductNumber>A6752A</ProductNumber>
      <UniqueIdentifier>AZ299uk4343345994</UniqueIdentifier>
      <TotalCPUs>8</TotalCPUs>
      <IsHardPartitioned>>true</IsHardPartitioned>
    </ComplexInfo>
    -<OSInstanceInfo>
      <SystemIdentifier>Asset#:890343</SystemIdentifier>
      <OSType>HP-UX</OSType>
      <OSVersion>B.11.11</OSVersion>
      <IsVirtualPartition>>false</IsVirtualPartition>
      <IsHPVirtualMachines>>false</IsHPVirtualMachines>
      <CPUType>778</CPUType>
    </OSInstanceInfo>
  </SystemInfo>
  -<Usage>
    <TotalNumCPUs>4</TotalNumCPUs>
    <NumActiveCPUs>4</NumActiveCPUs>
    <UTCsSampleStartTime>1033822800</UTCsSampleStartTime>
    <LocalSampleStartTime>Sat Oct 5 00:00:00 2002</LocalSampleStartTime>
    <Timezone>MDT</Timezone>
    <SampleDuration>300</SampleDuration>
    -<UsageEntry>
      <CPUID>4</CPUID>
      <CPUSpeed>440</CPUSpeed>
      <PercentCPUUsage>75.000</PercentCPUUsage>
    </UsageEntry>
    -<UsageEntry>
      <CPUID>5</CPUID>
      <CPUSpeed>440</CPUSpeed>
      <PercentCPUUsage>80.000</PercentCPUUsage>
    </UsageEntry>
    -<UsageEntry>
      <CPUID>6</CPUID>
      <CPUSpeed>440</CPUSpeed>
      <PercentCPUUsage>40.000</PercentCPUUsage>
    </UsageEntry>
    -<UsageEntry>
      <CPUID>7</CPUID>
```

Using the PPU Software  
**PPU Usage Report**

```
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>65.000</PercentCPUUsage>
  </UsageEntry>
</Usage>
-<Usage>
  <TotalNumCPUs>4</TotalNumCPUs>
  <NumActiveCPUs>4</NumActiveCPUs>
  <UTCSTimeSampleStartTime>1033823100</UTCSTimeSampleStartTime>
  <LocalSampleStartTime>Sat Oct 5 00:05:00 2002</LocalSampleStartTime>
  <Timezone>MDT</Timezone>
  <SampleDuration>300</SampleDuration>
  -<UsageEntry>
    <CPUID>4</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>52.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
    <CPUID>5</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>78.000</PercentCPUUsage>
  </UsageEntry>

  -<UsageEntry>
    <CPUID>6</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>84.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
    <CPUID>7</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>36.000</PercentCPUUsage>
  </UsageEntry>
</Usage>
-<Usage>
  <TotalNumCPUs>4</TotalNumCPUs>
  <NumActiveCPUs>4</NumActiveCPUs>
  <UTCSTimeSampleStartTime>1033823400</UTCSTimeSampleStartTime>
  <LocalSampleStartTime>Sat Oct 5 00:10:00 2002</LocalSampleStartTime>
  <Timezone>MDT</Timezone>
  <SampleDuration>300</SampleDuration>
  -<UsageEntry>
    <CPUID>4</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>17.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
```

```
<CPUID>5</CPUID>
<CPUSpeed>440</CPUSpeed>
<PercentCPUUsage>41.000</PercentCPUUsage>
</UsageEntry>
-<UsageEntry>
  <CPUID>6</CPUID>
  <CPUSpeed>440</CPUSpeed>
  <PercentCPUUsage>28.000</PercentCPUUsage>
</UsageEntry>
-<UsageEntry>
  <CPUID>7</CPUID>
  <CPUSpeed>440</CPUSpeed>
  <PercentCPUUsage>36.000</PercentCPUUsage>
</UsageEntry>
</Usage>
-<Usage>
  <TotalNumCPUs>4</TotalNumCPUs>
  <NumActiveCPUs>4</NumActiveCPUs>
  <UTCStartTime>1033823700</UTCStartTime>
  <LocalSampleStartTime>Sat Oct 5 00:15:00 2002</LocalSampleStartTime>
  <Timezone>MDT</Timezone>
  <SampleDuration>300</SampleDuration>
  -<UsageEntry>
    <CPUID>4</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>45.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
    <CPUID>5</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>63.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
    <CPUID>6</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>55.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
    <CPUID>7</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>49.000</PercentCPUUsage>
  </UsageEntry>
</Usage>
-<Usage>
  <TotalNumCPUs>4</TotalNumCPUs>
  <NumActiveCPUs>4</NumActiveCPUs>
```

## Using the PPU Software

### PPU Usage Report

```
<UTCStartTime>1033824000</UTCStartTime>
<LocalSampleStartTime>Sat Oct 5 00:20:00 2002</LocalSampleStartTime>
<Timezone>MDT</Timezone>
<SampleDuration>300</SampleDuration>
-<UsageEntry>
  <CPUID>4</CPUID>
  <CPUSpeed>440</CPUSpeed>
  <PercentCPUUsage>15.000</PercentCPUUsage>
</UsageEntry>
-<UsageEntry>
  <CPUID>5</CPUID>
  <CPUSpeed>440</CPUSpeed>
  <PercentCPUUsage>23.000</PercentCPUUsage>
</UsageEntry>
-<UsageEntry>
  <CPUID>6</CPUID>
  <CPUSpeed>440</CPUSpeed>
  <PercentCPUUsage>40.000</PercentCPUUsage>
</UsageEntry>

-<UsageEntry>
  <CPUID>7</CPUID>
  <CPUSpeed>440</CPUSpeed>
  <PercentCPUUsage>27.000</PercentCPUUsage>
</UsageEntry>
</Usage>
-<Usage>
  <TotalNumCPUs>4</TotalNumCPUs>
  <NumActiveCPUs>4</NumActiveCPUs>
  <UTCStartTime>1033824300</UTCStartTime>
  <LocalSampleStartTime>Sat Oct 5 00:25:00 2002</LocalSampleStartTime>
  <Timezone>MDT</Timezone>
  <SampleDuration>300</SampleDuration>
  -<UsageEntry>
    <CPUID>4</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>44.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
    <CPUID>5</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>53.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
```

```
<CPUID>6</CPUID>
<CPUSpeed>440</CPUSpeed>
<PercentCPUUsage>32.000</PercentCPUUsage>
</UsageEntry>
-<UsageEntry>
  <CPUID>7</CPUID>
  <CPUSpeed>440</CPUSpeed>
  <PercentCPUUsage>28.000</PercentCPUUsage>
</UsageEntry>
</Usage>
-<HardPartition>
  <UpdateTimestamp>Sat Oct 5 00:00:00 2002</UpdateTimestamp>
  <LocalID>0</LocalID>
  <NumHardPartitions>2</NumHardPartitions>
  <NumFreeCPUs>0</NumFreeCPUs>
  -<HardPartitionEntry>
    <ID>0</ID>
    <IsActive>true</IsActive>
    <NumCPUs>4</NumCPUs>
  </HardPartitionEntry>

  -<HardPartitionEntry>
    <ID>1</ID>
    <IsActive>true</IsActive>
    <NumCPUs>4</NumCPUs>
  </HardPartitionEntry>
</HardPartition>
</System>
<Checksum />
</PPUReport>
```

---

## Understanding Utilization Capping (HP-UX and OpenVMS)

---

### NOTE

PPU for Windows does not support Utilization Capping. Instead, you can control the number of available cores in a particular partition using either the `parmgr` command, or the deconfigure option of the Extensible Firmware Interface.

---

You are billed by HP according to the usage of the active cores in your PPU system. For example, if you are on the percent utilization metric and have a 32-core PPU Superdome system, you are billed the same amount whether you utilize all 32 cores at 50 percent utilization, or you utilize 16 cores at 100 percent utilization.

You can cap the usage of cores in your PPU system in any of these ways:

- `ppuconfig` command — The `ppuconfig` command provides the easiest way to limit computing resources (except in a virtual partition, where it is not allowed). To specify an immediate cap (maximum) on the number of active cores in a partition, use the `ppuconfig -rc number` command — where *number* is the number of active cores you want in the partition. You must have at least one active core per cell board. See “`ppuconfig (1M) Manpage`” on page 102 for details of the `ppuconfig` command on HP-UX systems.
- Workload Management (WLM/gWLM) — workload management in combination with PPU provides a utility for setting computing resources. Both WLM and gWLM 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. Refer to the most current User’s Guide for WLM or gWLM for details.
- Partition management — With either the `parmodify` command or `parmgr`, you can assign and activate or unassign and deactivate cells to control the number of active cores. Refer to the most current *HP System Partitions: Administration for nPartitions* for details.



- Deconfigure — Use the appropriate boot-level interface for your server system to control the number of available cells or cores in your partition. On Integrity servers, you use the Extensible Firmware Interface (EFI) and on PA-RISC systems, you use the HP-UX boot console handler (BCH). The basic procedure is:
  1. Reboot your partition and stop the boot process at the boot-level interface (BCH or EFI).
  2. Deconfigure the cores using the appropriate `cpuconfig` or `cellconfig` command and per the configuration rules.
  3. Boot the partition.

### Special Consideration for OpenVMS

HP recommends that you use the `PPU CONFIG/CAP=n/RECONCILE` command to activate and deactivate cores on OpenVMS I64 PPU systems. If the DCL commands `START/CPU` or `STOP/CPU` are used to activate or deactivate cores, the operation is allowed. The output of the `PPU CONFIG` command will list an active core value based on the results of the DCL command. This active core value will differ from the cap value entered in the PPU command. Enter the `PPU CONFIG/RECONCILE` command to adjust the number of active cores to the PPU cap value.

In a future version of PPU, the `PPU_SERVER` process will dynamically adjust the active core value to the PPU cap value.

---

## New Partition Creation

You must install and configure the PPU software on any newly created partitions in the complex (including virtual partitions on HP-UX systems). See “Installing PPU Software” on page 38 for installation details. See “Configuring PPU Software” on page 45 for configuration details.

Using the PPU Software  
**New Partition Creation**

---

**IMPORTANT**

Any partition not having the PPU software installed and configured (and reporting to the utility meter) can be assumed to have 100% utilization of all cores in the partition.

---

## **Partition Resizing**

Partitions can be resized generally without affecting PPU, other than changes in reported usage. If the cap limiting the number of active cores (`ppuconfig -c`) is in use, the cap may need to be adjusted when a partition is resized.

Using the PPU Software  
**Partition Resizing**

---

# 5

# Troubleshooting

This chapter covers the following topics:

- “General Troubleshooting” on page 70
- “Troubleshooting the PPU Software” on page 71

## General Troubleshooting

As a first step in troubleshooting problems with the PPU software, the following are some general guidelines to consider before proceeding to the platform-specific troubleshooting sections.

If usage data for all partitions is missing at the portal or a connectivity test fails (`ppuconfig -t`) for all partitions, this may indicate a configuration problem with the utility meter.

If usage data for only some partitions is missing at the portal, or a connectivity test fails only for some partitions, you may have configuration problems for specific partitions. In this case, you should check for errors logged by the PPU agent in the failing partitions, check that the PPU agent is installed, properly configured and running in the failing partitions, and check the network connection from the partition to the utility meter.

Finally, you should be sure `parstatus` is working. For failures in virtual partitions, check the vPar commands such as `vparstatus`.

For troubleshooting commands specific to HP-UX, OpenVMS, and Windows, see the following sections.

## Troubleshooting the PPU Software

### For HP-UX

You can troubleshoot your PPU system by performing the following individual steps:

- Step 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 output similar to:

```
T2351AA      B.11.23.08.00.01.05      HP-UX Pay per use (PPU)
```

If you do not receive the correct output, see “Installing PPU Software” on page 38 for details on installing the PPU software.

- Step 2.** Verify that the PPU system is configured to communicate with the utility meter, and the connection to HP 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 45 for details of configuring the utility meter.

- Step 3.** Go to the PPU portal and verify that a test usage report for the partition is posted on the portal. (See “PPU Web Portal” on page 56 for details.)

- Step 4.** 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 see “Verifying the PPU Agent is Running” on page 50.

- Step 5.** Look in the syslog file `/var/adm/syslog/syslog.log` for ppud errors.

- Step 6.** Verify that the executable and configuration files have not been deleted and the permissions are set correctly as listed in Table 5-1:

**Table 5-1 PPU Executable and Configuration Files**

| File                                | Permissions |
|-------------------------------------|-------------|
| /usr/sbin/ppuconfig                 | 500         |
| /usr/lib/libppu.so                  |             |
| /usr/lib/hpux64/libppu.sl (PA-RISC) | 555         |
| /usr/sbin/ppud                      | 500         |
| /etc/ppu/ppu_config                 | 644         |
| /etc/ppu/ppuclient.pem              | 400         |

- Step 7.** If any of the files in **Step 6** are missing or corrupted, then reinstall the PPU software. See “Installing PPU Software” on page 38 for details.
- Step 8.** Ensure that the kernel driver diag2 is built into the kernel.
- Step 9.** Ensure that the WBEM bundle B8465BA is installed (version 1.05 or higher, or version 2.0 or higher for PA-RISC systems on HP-UX 11i v2).
- Step 10.** Ensure that the NParProvider bundle (version B.12.01.06.01 or higher for HP-UX 11i v1, or B.23.01.06.01 or higher for HP-UX 11i v2) is installed.
- Step 11.** Ensure that the Utility Meter software is version 7.3 or higher.
- Step 12.** For HP-UX 11i v1 systems, verify that the required 11i v1 patches are installed. See “Required Patches for PPU on HP-UX 11i v1” on page 26 for details.

### For Windows Server 2003

If you experience problems with your Windows PPU system you should first refer to the Windows Application Event Viewer to see if there are specific error messages associated with the problem (click **Start > Programs > Administrative Tools > Event Viewer**, and double-click on **System** and/or **Application**).



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

- Step 1.** Follow the procedure described in “Verifying PPU Installation and Functionality on Windows Systems” on page 33 to verify the PPU software is installed correctly and configured for communications with the utility meter.
- Step 2.** Verify that the PPU system is configured to communicate with the utility meter, and the connection to HP is functional, by executing the following command:  
`C:\Program Files (x86)\Hewlett-Packard\ppu> 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 45 for details of configuring the utility meter.
- Step 3.** Go to the PPU portal and verify that a test usage report for the partition is posted on the portal. (See “PPU Web Portal” on page 56 for details.)
- Step 4.** Open **Services.msc**, also known as the Services applet. Look for “HP Pay Per Use”, or open a command window, type `sc query ppuservice`, and press **Enter**. If the PPU service is not listed, you will need to install the PPU software as described in “Installing PPU Software” on page 38.
- Step 5.** Verify that the Administrators Group and local System accounts have full read/write permissions on the PPU directory.
- Step 6.** Verify the following files exist in the PPU installation directory (C:\Program Files (x86)\Hewlett-Packard\ppu):
- ppuconfig.exe
  - ppuservice.exe
  - ppu\_config  
(if this file is missing for some reason, it can be recreated by running the `ppuconfig` command, and specifying a utility meter with the `-m` option and system identifier with the `-s` option)
  - ppuclient.pem  
(this is a PPU-specific SSL (Secure Socket Layer) certificate required for communicating with the utility meter server)

If any of these files are missing or corrupted, reinstall the PPU software. See “Installing PPU Software” on page 38 for details.

- Step 7.** Verify the **WMI nParProvider** service is running. Click **Start > Programs > Administrative Tools > Services** and scan the list to find the service, and verify the status is “Started”. Or alternatively, run the “sc query wminparprovider” command from a command window, and verify the service is running. Output should be similar to the following:

```
C:\Program Files (x86)\Hewlett-Packard\ppu>sc query
wminparprovider

SERVICE_NAME: wminparprovider
        TYPE               :10  WIN32_OWN_PROCESS
        STATE                :4   RUNNING
                (STOPPABLE, PAUSABLE, IGNORES_SHUTDOWN)
        WIN32_EXIT_CODE      :0   (0x0)
        SERVICE_EXIT_CODE   :0   (0x0)
        CHECKPOINT          :0x0
        WAIT_HINT           :0x0
```

- Step 8.** Check that the Utility Meter software is version 7.3 or higher.
- Step 9.** Check that the Baseboard Management Controller Driver (HP Health Driver) is installed. The WMI nParProvider component requires this device driver in order to provide a communication path between the MP and the operating system running on an nPartition.

### For OpenVMS

To troubleshoot your OpenVMS PPU system, perform the following individual steps:

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

```
$ product show product PPU
```

You should see output similar to:

```
-----
PRODUCT          KIT TYPE STATE
-----
HP I64VMS PPU V8.0 Full LP  Installed
```

-----  
Refer to “Installing PPU Software” on page 38 to install the PPU product.

- Step 2.** Verify the PPU root logical is defined and the configuration files are present:

```
$ show log/sys PPU$ROOT/full  
"PPU$ROOT" [exec] = "DKC600:[SYOS0.]"  
[concealed](LNM$SYSTEM_TABLE)
```

```
$ directory PPU$ROOT:[PPU]ppu$config.dat  
$ directory PPU$ROOT:[PPU]PPUCLIENT.PEN
```

Refer to “Installing PPU Software” on page 38 for information on defining the PPU root logical and configuring PPU after the installation.

- Step 3.** Verify all the PPU software files are present. Below is a list of required PPU files:

```
[SYSS$STARTUP] PPU$STARTUP.COM  
  
[SYSEXEXE] PPU$SHUTDOWN.EXE  
[SYSEXEXE] PPUCONFIG.EXE  
[SYSEXEXE] PPU_SERVER.EXE  
  
[SYSLIB] LIBHPNPARPROVIDER.EXE  
[SYSLIB] LIBICODPROVIDERMODULE.EXE  
  
[SYSMGR] PPU$CONFIG.COM  
[SYSMGR] PPU$SHUTDOWN.COM  
  
[SYSUPD] PPU.CLD  
[SYSUPD] PPUCLIENT.PEM
```

If any of these files are missing, you will need to reinstall the PPU product.

- Step 4.** Verify the PPU system is configured to communicate with the utility meter, and the connection to HP is functional, by executing the following command:

```
$ ppu config/test_connection
```

You should see output similar to:

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

If you do not see the above output, refer to “Configuring PPU Software” on page 45 for details on configuring the utility meter.

**Step 5.** Go to the HP PPU portal and verify that a test usage report for the partition is posted on the portal.

**Step 6.** Ensure that the PPU\_SERVER process is running.

To verify the PPU server is running, you may use the PPU CONFIG command.

```
$ PPU CONFIG
```

```
Utility Meter IP/Hostname:          meter1.corp.com
System Identifier:                  superdome1
Cores to be active at next reboot (cap): 5
Cores that can be activated without reboot: 3
Active Cores:                       5
```

```
ERROR: The Pay per use server (PPU_SERVER) is not running.
```

Alternatively, you can use the DCL PIPE command to verify the PPU\_SERVER process is running. The SEARCH-I-NOMATCHES message listed below indicates the server is not running:

```
$ pipe show sys | search sys$pipe PPU_SERVER
%SEARCH-I-NOMATCHES, no strings matched
```

```
$ pipe show sys | search sys$pipe PPU_SERVER
00000438 PPU_SERVER  HIB  10 2470 0 00:00:00:33 967 1408
```

**Step 7.** Ensure that the WBEMCIM supporting software product is installed.

```
$ product show product wbemcim
```

You should see output similar to the following:

```
-----
PRODUCT                                KIT TYPE      STATE
-----
HP I64VMS WBEMCIM A2.0-A051013F  Full LP      Installed
```

-----  
1 item found

If you do not see this output, refer to the OpenVMS operating system Installation manual for more information on installing WBEMCIM.

- Step 8.** Search the `sys$manager:OperatorLog` file for errors from the PPU server:

```
$ search/exact SYS$MANAGER:OPERATOR.LOG;* "ppud:"
```

If the logical name `OPC$LOGFILE_NAME` is defined to direct the operator log file to a location other than `SYS$MANAGER:OPERATOR.LOG`, search using the `OPC$LOGFILE_NAME` logical or location value as the filename parameter.

- Step 9.** Ensure the Utility Meter software is version 7.3 or higher.
- Step 10.** Ensure that the system serial number and Unique ID match the values that are listed on the HP PPU portal web site:

```
$ ppu show portal  
Unique ID: a1db8784-1111-2222-3333-908070A0B03f  
System serial number: XX07740001
```

- Step 11.** Verify that the `PPU$STARTUP.COM` procedure is executed in `systartup_vms.com` and that the `PPU$SHUTDOWN.COM` procedure is executed by `syshutdwn.com` to ensure accurate reporting results. Refer to “Configuring PPU Software” on page 45.

Troubleshooting  
**Troubleshooting the PPU Software**

---

# 6

## Frequently Asked Questions

This chapter covers frequently asked questions on the following topics:

- “Pay per use Program” on page 80
- “Pay per use Software” on page 82

## Pay per use Program

### What is Pay per use?

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

- Core percent utilization (*percent core*)
- Number of active cores (*active core*)

---

### NOTE

Currently, the “Core Percent Utilization” pricing model is the only one provided on Integrity servers running Windows Server 2003.

---

### What is the benefit of Pay per use, as opposed to traditional core usage financing?

With Pay per use, your billing is based on actual core usage. The billing amounts vary as your core usage increases or decreases. 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. PPU charges vary on actual core usage. With PPU, a fixed charge and a variable charge appear on your monthly statement. The fixed charge is similar to a standard lease, and the variable charge is based on actual core usage.

### Can one HP enterprise server be under both a Pay per use (PPU) and Instant Capacity (formerly iCOD) contract at the same time?

No, the PPU and Instant Capacity software bundles are mutually exclusive. They can both be installed on the same HP enterprise server, but because the server can only be purchased using either PPU or Instant Capacity (but not both), the server can only be configured for the purchased pricing solution.



**What HP enterprise servers support Pay per use versions 8.x?**

See “Most Recent PPU Versions and Supported Platforms” on page 20 for the list of supported HP servers for PPU 8.x.

## Pay per use Software

### What software product is required for PPU 8.x systems?

With HP-UX systems, the HP Pay per use (PPU) 8.x software product is T2351AA.

You can verify PPU is installed by executing:

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

Output should be similar to this:

```
T2351AA      B.11.23.08.00.00.05      HP-UX Pay per use (PPU)
```

For Windows on Integrity, launch the Control Panel and select **Add or Remove Programs** to verify that the PPU Service is displayed as “HP CPU PayPerUse v7.1”.

On OpenVMS systems, the HP Pay per use (PPU) 8.x product is BA485AA.

For all operating systems, another requirement is network access to a utility meter running software version 7.3 or later. The utility meter software can be found at [www.hp.com/go/softwaredepot](http://www.hp.com/go/softwaredepot) by searching for “Pay Per Use Meter Software”.

### What patches are required for running PPU 8.x software on an HP enterprise server that is running HP-UX 11i v1?

See “Required Patches for PPU on HP-UX 11i v1” on page 26 for the required patches for PPU 8.x on HP-UX 11i v1.

### What patches or OS updates are required for running PPU 7.1 software on HP Integrity servers running Microsoft Windows Server 2003?

There are none at the time of publication of this document. See the following web sites for the most recent information.

- HP web site (search for “PPU”): <http://www.hp.com/go/softwaredepot>
- Technical support for all HP Integrity servers:  
<http://www.hp.com/support/itaniumservers/>

**How can I get the PPU 8.x software bundle for either HP-UX 11i v1 or 11i v2?**

The PPU 8.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”):  
<http://www.hp.com/go/softwaredepot>
- September 2006 HP-UX 11i v2 Operating Environment media
- September 2006 HP-UX 11i v2 Applications Software media
- September 2006 HP-UX 11i v1 Applications Software media

See “Installing PPU Software” on page 38 for details of installing the PPU 8.x software bundle T2351AA.

**How can I get PPU software for Windows Servers (64-bit Enterprise or Datacenter Editions)?**

The PPU 7.1 software is available on the Smart Setup media associated with HP Integrity Servers for Microsoft Windows Server 2003 64-bit version, Installer Media 4.5 or higher, and at <http://www.hp.com/support/itaniumservers/> (search for PPU).

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

Make sure that the PPU software is installed and the connection is properly configured to the utility meter for the partition. All partitions (including virtual partitions with HP-UX systems), must have the PPU software installed and the PPU software configured to connect to the utility meter. See “Troubleshooting the PPU Software” on page 71 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. On OpenVMS systems, the previous 50 versions of the usage report are retained. For a complete history of your usage reports go to the PPU web portal. See “PPU Web Portal” on page 56 for details.

You can view the latest PPU usage report for your HP-UX system by invoking a web browser that supports XML and opening the `PPUReport.xml` file found at: `/var/ppu/`. On Windows systems, you can

use a browser that supports XML, or if your browser does not support XML, you can use a text-based editor such as Wordpad to open the PPUReport.xml file found at:

C:\program files (x86)\Hewlett-Packard\ppu\ (or whichever directory PPU was installed in).

**When is information sent by the PPU software?**

A system report is sent from the PPU software to the utility meter at the following times:

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

**What is the difference between PPU versions 7.x and 8.x? (HP-UX only)**

PPU can now be run in an HP Integrity Virtual Machines environment (HPVM). In this case, the usage information for billing purposes is still the overall usage for the VM Host. However, you can examine the usage report at the portal to see a detailed breakdown of the usage for each virtual machine (also called a “guest”). In an HPVM environment, PPU needs to be installed and configured only on the VM Host, not on the guests.

The error messages and man pages have been enhanced and updated, and a new documentation file,

`/usr/share/doc/PayPerUseOverview.htm`, is provided to link to the most current documentation files on the HP documentation web site.

PPU now includes support for HP Integrity rx7640 and rx8640 servers.

The Utility Pricing program has changed terminology to be consistent with the new HP definitions of “processor”, “CPU”, and “core” that account for the wide range of packaging available in modern chips. The two metrics for measuring pricing and utilization are now called Percent Core and Active Core (previously known as Percent CPU or Processor Percent, and Active CPU or Number Active Processors).

See the Pay per use Release Notes for details of the changes from versions 7.x to 8.x.

**What is the difference between PPU versions 6.x and later versions?  
(HP-UX only)**

The main difference between these PPU versions (HP product T2351AA) is that with versions 6.x only the percent utilization metric can be measured and contractually arranged with HP. With PPU versions 7.x and 8.x, either the percent core or the active core metric can be arranged contractually with HP. Also, PPU versions after 6.x enable you to set a cap limiting the number of active cores, and add support for virtual partitions on HP-UX 11i v2 systems.

**What is the difference between PPU versions 7.01 and 7.1 on Windows systems?**

The packaging and installation of Pay per use changed with the 7.1 release. Previously, Pay per use was included with the WMI nPar Provider component, and visible only as a subcomponent of the nPar Provider. With the 7.1 release, PPU is a separate Smart Setup component with its own installation process, and, after a successful installation, PPU should have its own entry in the list of currently installed programs as shown from the **Control Panel/Add or Remove Programs**.

Frequently Asked Questions  
**Pay per use Software**

---

# A

## Special Considerations

This appendix describes special considerations for PPU systems.

This appendix includes:

- “Inactive Partitions in PPU Systems” on page 88
- “PPU Percent Utilization Information Verification (HP-UX)” on page 91
- “PPU Security” on page 94
- “OpenVMS Command Mapping” on page 95

---

## Inactive Partitions in PPU Systems

Baseline usage for the PPU program is included in the minimum monthly payment. Your baseline usage is defined in your Master Lease Agreement with HP. Inactive partitions in PPU systems are covered under baseline usage.

---

### NOTE

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

An inactive partition has all of the cells in the partition inactive. An inactive cell is either powered off, or in a state prior to boot-level control (prior to BCH/EFI), defined as “waiting on SINC\_BIB”.

---

### IMPORTANT

If you shut down a partition for 24 hours or more, you should also power it off to avoid additional charges. To power off the partition, execute the PE command from the system MP.

For HP-UX systems, to configure a partition to “waiting on SINC\_BIB”, execute the following command:

- `shutdown -R -H`

If you have already shut down your partition without these options, you can still place it into an inactive state by doing one of the following through the GSP interface:

- Enter the RR command to put the partition in a “waiting on SINC\_BIB” state.
- Enter the PE command to power down all the cells in the partition.

For Windows systems, use a menu path of **Start > Shutdown** to shut down the Windows partition. Once the partition is shut down you can put it into an inactive state also by using one of the GSP interface commands:

- Enter the RR command to put the partition in a “waiting on SINC\_BIB” state.



- Enter the PE command to power down all the cells in the partition.
- HP receives usage reports from active partitions in your PPU system. Any inactive partitions are identified in the PPU usage reports.

---

**NOTE**

---

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

Active cell boards, which are assigned to active partitions, must have at least one active core. If your partition does not have any near-term need to have at least one core active per active cell board, then you can do one of the following:

- Deactivate the partition.
- Unassign cell boards from partitions. When you unassign a cell board from a partition, all cores on that cell board are inactive. Unassigned 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 through the GSP interface:

- Reset the failed partition, by entering the RS command.
- Power down all of the cells in the failed partition by using the PE command.

The other partitions in the complex report the failed partition as inactive.

**Dual-core and Inactive Cells**

When a partition contains dual-core processors, then if PPU is running on another partition in the complex, PPU may need to make an assumption about the number of cores per processor and report the number of cores for the inactive partition as if it contained single-core processors. (This only affects the value TotalCPUs in the usage report.) For systems running PPU V8, the assumption is made only if all cells in the partition are inactive; if any cell in the partition is active, PPU can

Special Considerations

**Inactive Partitions in PPU Systems**

determine the correct number of cores per processor for the cells in the partition. For systems running PPU V7, PPU assumes single-core processors for any cell that is inactive in a partition.

## PPU Percent Utilization Information Verification (HP-UX)

Your PPU system's core utilization information is available from the HP PPU web portal. See "PPU Web Portal" on page 56 for details of the PPU web portal.

If you want to verify PPU percent utilization information against the PPU web portal information, use the `sar` command to compare core utilization numbers. The `sar` command is an HP-UX system activity reporter that samples and accumulates core utilization. Refer to the `sar` (1M) manpage for details on the `sar` command.

An overview of the core utilization verification process is:

1. Create core utilization numbers for your PPU system with the `sar` command.
2. Go to the PPU web portal and capture core utilization numbers for the same PPU system and duration of time.
3. Verify the `sar` utilization numbers against the PPU web portal utilization numbers.

Use the following procedure to perform the utilization verification process:

---

### NOTE

Because the PPU web portal's utilization reports contain 30 minutes of information, beginning on the hour or on the half hour, perform **Step 1** immediately at the start of a hour, or at 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.

---

## PPU Percent Utilization Information Verification (HP-UX)

**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, 12 utilization samples are taken every 5 minutes; therefore, one hour of utilization data is collected. Because the PPU web portal also reports in 5-minute increments, 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 -f /tmp/sarOut > /tmp/sarOut.report
```

In this step, the binary output from the `sar` command in **Step 1** is converted into a readable (text) format, and captured in the file `/tmp/sarOut.report`.

**Step 3.** Go to the PPU web portal and locate the core utilization reports for the PPU system 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 core utilization numbers from the PPU web portal reports and the core utilization numbers from the `sar` command, which are located in the file `/tmp/sarOut.report`.

The PPU web portal report and the information from the `sar` command differ as follows:

- The `sar` command reports the core as the system’s “SPU” number and the PPU web portal report uses the “CPU ID”.
- For the same 5 minute interval, the `sar` command’s time stamp is for the end of the interval and the PPU web portal report’s time stamp is for the beginning of the interval. For example, compare the `sar` utilization numbers for 12:05pm to the PPU web portal report utilization numbers for 12:00pm.
- To verify core 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.

**PPU Percent Utilization Information Verification (HP-UX)**

- The `sar` command rounds core percent utilization up to the nearest integer; therefore, individual measurements for the same time period can vary by one percent. Also, since it may be difficult to get the timing of a `sar` measurement to align exactly with the timing of a PPU measurement, comparisons of specific measurements may also vary due to timing differences, but comparisons of the average utilization over time should match within one percent range.

## PPU Security

The PPU software transmits the following information to the utility meter:

- System identification:
  - Serial number
  - Product number
  - System identifier
  - System Unique ID
  - OS Information
- System configuration:
  - Number and type of partitions
  - Cores in partitions
- System state:
  - Core state
  - Core usage
  - HPVM guest usage, if any
  - Partition state

The default system identifier for your PPU partition is its hostname. You can use the `ppuconfig -s` command/option if you want to specify a different system identifier for your PPU partition.

---

**NOTE**

All data that is transferred from the PPU software to the utility meter is obscured.

---

---

## OpenVMS Command Mapping

The following table shows the mapping of the HP-UX PPU commands and their OpenVMS equivalents.

**Table A-1**      **OpenVMS Command Mapping**

| HP-UX Style               | OpenVMS Style                              |
|---------------------------|--|
| <code>ppuconfig -s</code> | <code>ppu config/system_id=xxxx</code>     |
| <code>ppuconfig -m</code> | <code>ppu config/meter_address=xxxx</code> |
| <code>ppuconfig -t</code> | <code>ppu config/test_connection</code>    |
| <code>ppuconfig -c</code> | <code>ppu config/cap=n</code>              |
| <code>ppuconfig -r</code> | <code>ppu config/reconcile</code>          |
| <code>ppuconfig -h</code> | <code>ppu config/host</code>               |

Special Considerations  
**OpenVMS Command Mapping**



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## **B PPU Manpages (HP-UX only)**

This appendix contains the following command references for PPU on servers running HP-UX.

- “ppu (5) Manpage” on page 98 — An overview of the PPU software
- “ppud (1M) Manpage” on page 100 — A data provider that reports system configuration and core usage information
- “ppuconfig (1M) Manpage” on page 102 — For setting the configuration values of a Pay per use system

---

### **NOTE**

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

---

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## **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. Depending on the type of contract a PPU system is under, utilization can be either of the actual percentage utilization of each core, or a count of the number of active cores in the system. 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; it is also posted on the Utility Pricing Solutions portal for viewing at **<http://www.hp.com/go/payperuse>**.

PPU can be run in an HP Integrity Virtual Machines environment (HPVM). In this case, the usage information for billing purposes is still the overall usage for the VM Host. However, you can examine the usage report at the portal to see a detailed breakdown of the usage for each virtual machine (also called a “guest”).

In an HPVM environment, PPU needs to be installed and configured only on the VM Host, not on the guests. The `ppuconfig` command will report an error if invoked on a VM guest.

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**

ppud

#### **DESCRIPTION**

ppud is a daemon that provides system configuration and core usage information to a utility meter system for billing purposes. This daemon runs on Pay per use systems and meters core utilization and system configuration information. The ppud daemon sends this information to a utility meter as an XML file.

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. If the connection to the utility meter fails, the ppud daemon caches the report data until the connection is restored.

The ppud daemon re-spawns itself if killed. The following entry is added to `/etc/inittab` in order to have ppud start and re-spawn itself:

```
ppud:23456:respawn:/usr/sbin/ppud # Pay per use daemon
```

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 does not need to be restarted when the meter configuration is changed via the `ppuconfig` command.

The ppud daemon reports errors via `syslog`.

To unconfigure Pay per use, execute:

```
swremove -x enforce_scripts=false T2351AA
```

Warning: if this is a Pay per use system and the daemon is not running, usage reports will not be sent to HP and usage may be assumed to be 100%.

The ppud daemon performs periodic operations based on the time of day. The ppud daemon is spawned by `init` and gets its timezone specification from the `/etc/default/tz` file. By default the timezone specified in `/etc/default/tz` is `EST5EDT`. You can specify which timezone the ppud daemon uses to interpret its current time by modifying the `/etc/default/tz` file. Refer to *environ* (5) for details of the TZ format. A restart of the ppud daemon is required before the new timezone value takes effect (i.e., kill the `/usr/sbin/ppud` process).

For more information see the Pay per use User's Guide located at `/usr/share/doc/PayPerUseUserGuide.pdf`.

## AUTHORS

ppud was developed by HP.

## FILES

`/etc/default/tz`

File contains the timezone value used by ppud. The format for the file is the same as the TZ environment variable format without the prefix `TZ=`. See *environ* (5) for details of the TZ format.

`/var/ppu/cache`

Directory contains the report data that is cached if the connection to the utility meter fails.

## SEE ALSO

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

## ppuconfig (1M) Manpage

### ppuconfig (1M)

#### NAME

ppuconfig – configure Pay per use daemon

#### SYNOPSIS

```
ppuconfig  
ppuconfig -m meter  
ppuconfig -s system_id  
ppuconfig -h  
ppuconfig -c {cap|all} [-r]  
ppuconfig -r  
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.

After initially configuring the utility meter with the ppuconfig -m command, use the ppuconfig -t command to perform a round trip communication test with the meter and to perform other validation checks. If the ppud daemon is not running, this command will start the daemon.

When ppuconfig is used to modify the configuration information related to the utility meter, it is not necessary to restart the ppud daemon. When configuration information is modified also use ppuconfig -t to verify the new configuration.

`ppuconfig -c` can be used to place a cap on the number of active cores, thereby limiting the maximum utilization reported to HP. This option is not allowed in a virtual partition environment.

For more information see the Pay per use User's Guide located at `/usr/share/doc/PayPerUseUserGuide.pdf`.

## Options

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

`-c {cap|all}` Specifies the number of cores that should be active on this partition the next time it boots. Upon the next partition reboot, cores may be deactivated until this value is reached. Specification of the value "all" means that all cores that can be active, should be active. "all" is the default cap.

To specify a cap and make it take effect immediately, specify the `-r` option in conjunction with the `-c` option.

Note: the `-c` option does not apply to virtual partitions. To limit the number of active cores in a virtual partition, use the `vparmodify (1M)` command to assign or unassign cores.

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

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

`-r` Reconcile. Instructs `ppuconfig` to activate or deactivate cores to get to the specified cap value. `ppuconfig` will only deactivate cores from the default processor set (pset 0) and will never deactivate the last core in a cell or the last core in the partition.

Note: this option does not apply to virtual partitions.

- `-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. This identifier is transmitted to HP and shows up on the Utility Pricing Solutions portal (<http://www.hp.com/go/payperuse>) to help you identify your system.
- `-t` Perform a communication test between Pay per use software and the configured utility meter. Perform other validation checks to make sure PPU information can be acquired. Start the `ppud` daemon if it is not running.

## RETURN VALUES

`ppuconfig` exits with one of these values:

- 0 Success.
- >0 Failure; error message sent to `STDERR`

## EXAMPLES

The following example shows configuration of the utility meter to a system called `alpha.corp.com` followed by a communication test of that meter.

```
ppuconfig -m alpha.corp.com
```

```
ppuconfig -t
```

The following example shows how to cap the number of active cores to three and make it take effect immediately.

```
ppuconfig -rc 3
```

The following example shows how to remove a cap from the system and always have all cores active.

```
ppuconfig -c all
```



The following example shows how to set the system ID for this system. The system ID can be any text that helps you better identify your system.

```
ppuconfig -s "rp8410 in bldg 7 1st floor system  
room:ID#234879"
```

## 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.

/var/ppu/PPUReport.xml

File created every 30 minutes containing a report of the core utilization over the last 30 minutes for this partition.

## SEE ALSO

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

PPU Manpages (HP-UX only)  
**ppuconfig (1M) Manpage**

---

# C

## PPU Service and Command References (Windows only)

This appendix contains the following command and service references for PPU on Integrity servers running Windows Server 2003.

- “PPU Software” on page 108 — an overview of the PPU software
- “HP Pay Per Use Service” on page 109 — a data provider that reports system configuration and core usage information
- “ppuconfig Command” on page 110 — a command for setting the configuration values of your Pay per use system

---

## PPU Software

**Name** Pay per use software for Windows Server 2003

**Description** Pay per use (PPU) is a program where customers pay only for the computing capacity they use. The PPU Software provides services for metering resource utilization on supported HP systems. For billing purposes, utilization is determined by the actual percentage utilization of each core.

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` Command” on page 110).

The data that is sent to HP is aggregated and then sent to billing; it is also posted on the utility portal for viewing at:

**<http://www.hp.com/go/payperuse>.**

By default, the PPU Software is installed at this location:

C:\Program Files (x86)\Hewlett-Packard\ppu

For more information, see the *Pay per use User's Guide* located on your SmartSetup media at:

\contents\doc\en\_us\PayPerUseUserGuide.pdf.

**See Also** “HP Pay Per Use Service” on page 109  
“`ppuconfig` Command” on page 110

---

## HP Pay Per Use Service

**Name** `ppuservice`

**Description** `ppuservice` (HP Pay Per Use Service) is a Windows service that provides system configuration and core usage information to your utility meter for billing purposes. The service meters core utilization and server configuration information, and sends that information to the utility meter as an XML file. Messages and errors are logged to the Windows Event Log.

Reports are written to the cache directory (C:\Program Files (x86)\Hewlett-Packard\ppu\cache) before being forwarded to the utility meter at 30-minute intervals. If the connection to the utility meter fails, the report data is cached until the connection is restored. Reports are best viewed using a web browser that can interpret XML. If your browser does not support XML, you can open these files with a text-based editor such as Wordpad on Windows.

`ppuservice` is first started during installation or when you specify your utility meter using the `ppuconfig` command. Thereafter it restarts automatically any time the partition is rebooted. If for some reason the service is killed manually, it can also be launched again by running the `ppuconfig -m meter` command.

Note that `ppuservice` requires the `nParProvider` service to be running. If the `nParProvider` service stops while `ppuservice` is running, eventually `ppuservice` will detect this, and will issue an event log error and will display a message similar to “ERROR: HP Pay per use is not supported on this class system, or the local HP WMINParProvider is not running. Please double check your configuration”. This causes the PPU service to stop as well. If this happens, the administrator can start both services using the `services.msc` applet.

**See Also** “PPU Software” on page 108  
“`ppuconfig` Command” on page 110

## ppuconfig Command

---

### ppuconfig Command

**Name** ppuconfig

**Synopsis**

```
ppuconfig
ppuconfig -m meter
ppuconfig -s system_id
ppuconfig -h
ppuconfig -t
```

**Description** ppuconfig is a command-line tool for configuring communication between ppuservice and a utility meter. A utility meter must be specified for a Pay per use system before ppuservice can 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 issued without any options at all, the current system settings are displayed.

If this is the first time you are supplying utility meter configuration information, after specifying the utility meter with the ppuconfig command, you should issue the ppuconfig -t command to perform a round trip communication test.

When using ppuconfig to modify your PPU configuration with the utility meter, it is not necessary to restart ppuservice. However, when doing this, it is recommended that you issue the ppuconfig -t command 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.

-s *system\_id* Specifies an identifier for the partition 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. This identifier is transmitted to HP and shows up on the PPU portal to help you identify your system.

- h Specifies that the hostname should be used as the system identifier for the Pay per use system when reporting usage information.
- t Perform communication test between Pay per use software and the configured utility meter.

**Examples**

The following example shows configuration of the utility meter to a system called alpha.corp.com followed by testing communication with that meter in a default installation.

```
C:\Program Files (x86)\Hewlett-Packard\ppu> ppuconfig -m alpha.corp.com
```

```
C:\Program Files (x86)\Hewlett-Packard\ppu> ppuconfig -t
```

The following example shows how to set the system identifier for this system in a default installation. The system identifier can be any text that helps you better identify your system.

```
C:\Program Files (x86)\Hewlett-Packard\ppu> ppuconfig -s "rx8620 in bldg 7 1st floor:ID#234879"
```

**See Also**

“PPU Software” on page 108  
“HP Pay Per Use Service” on page 109

PPU Service and Command References (Windows only)

**ppuconfig Command**



---

**D**      **Glossary**

## Pay per use Terminology

The following terms are commonly used in conjunction with Pay per use (PPU):

### **configured core**

A core that has been configured at the boot console handler (BCH or EFI) and is available for activation.

### **deconfigured core**

A core that has not yet been configured at the boot console handler (BCH or EFI). The PPU software cannot activate a core 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 the operating system or be further divided into virtual partitions (on HP-UX).

### **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.

**Instant Capacity**

Also called iCAP, and formerly known as Instant Capacity On Demand, or iCOD. The HP Utility Pricing Solutions product that has a pricing model based on an initial purchase of components (cores, cell boards, and memory) without usage rights. With Instant Capacity you initially purchase a specified number of activated components and a specified number of deactivated components. To activate an Instant Capacity component, you purchase the usage rights and obtain rights through the application of an RTU codeword.

**Pay per use**

The HP Utility Pricing Solutions product that has a pricing model in which you are charged for actual core usage. You acquire a specific hardware platform, and number of core(s), and are charged for the actual usage, based on either the percent of core utilization or the number of active cores.

**portal**

An HP web site that gives customers an interface to view their PPU utilization information. See “PPU Web Portal” on page 56 for details.

**PPU Agent**

The software component that provides information to the utility meter. On HP-UX systems, this component is implemented as a daemon (“ppud” daemon). On OpenVMS systems, this component is implemented as a process (PPU\_SERVER). On Windows systems, this component is implemented as a service.

**usage database**

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

**utility meter**

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

**virtual machine**

A software entity provided by HP Integrity Virtual Machines (Integrity VM). This technology allows a single server or nPartition to act as an Integrity VM Host for multiple individual virtual machines (also known as “VM Guests”), each running its own instance of an operation system (referred to as a “guest OS”). Each VM Guest emulates a real Integrity machine, including firmware. Virtual machines are servers in the Virtual Server Environment (VSE).

**virtual partition**

On HP-UX, 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).

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