



HP storage

June 2003

Technical
blueprint

HP Pay per Use for StorageWorks XP

Executive summary

The HP Pay per Use (PPU) for StorageWorks XP program is an on-demand solution that allows you to select the storage configuration and software appropriate for you and pay monthly based on the amount of storage capacity configured for use.

The key to PPU is the HP metering technology that automatically measures and reports storage capacity utilization. The metering technology consists of two separate appliances that are shipped with the storage system and reside securely behind your firewall.

The automated metering technology is simple to use, meets your security needs, and has no impact on your operations. Storage usage data is collected periodically and sent to HP over the Internet through a highly secure process. HP uses this information to calculate the average storage capacity utilization for the month. The HP billing system generates a monthly customer invoice based on this average.

You have immediate access to detailed usage information through a Web portal. User access to this portal requires initial registration using key system identification information. Subsequent access only requires account information and a password.

Today's challenges in storage

The traditional business model for acquiring storage capacity is challenged by today's business realities. Until now, most companies acquired the storage needed by either purchasing or leasing it. A particularly conscientious company or one that operates in a volatile market will probably purchase much more capacity than they are using—just to be prepared for periodic spikes in demand. While this method does ensure that they always can serve their customers, it requires a large up-front cash outlay for infrastructure, which may not be used for weeks or even months at a time. So while responsible, this may not be an optimal way to deal with storage demands and can end up costing money.

However, if a company has limited funds, or is operating in a less volatile market, it is probably doing the opposite—purchasing just enough storage to serve its customers. While this method is more efficient, it leaves the company open to disaster when demand rises unexpectedly and without the capacity to deal with it. The company risks losing revenue by failing to meet service level agreements (SLAs)—and losing customers by failing to provide adequate service.

Aware of the limitations that purchasing and leasing agreements have imposed on storage customers, HP sought a solution that would provide greater flexibility, closer alignment between costs and revenues, and an ability to provide constant, reliable service.

Solution overview

PPU is an innovative new model for acquiring storage that meets today's challenges. It is designed for businesses with widely varying or unpredictable storage capacity demand, or for organizations that want to match their storage costs more closely with unpredictable business conditions. With PPU, you pay a variable monthly amount for storage capacity, based on usage, for a custom-configured HP XP disk storage system. Related HP storage products, software, and services can also be financed by PPU. With this solution:

- You select the storage configuration, capacity, software, and services that are appropriate for your business.
- HP quotes a rate for the entire system, depending on the configuration, 36-month term, and minimum capacity commitment.
- HP installs the storage device and a metering technology at your site.
- The metering technology measures storage capacity usage and periodically sends the information to HP.
- HP calculates the average usage for invoicing purposes.
- Each month, you are charged for the capacity used.
- HP Financial Services owns the storage assets under a PPU contract. However, at the end of the contract, you have the option to extend the lease, buy the equipment, or return the equipment to HP.
- As your storage capacity needs grow, you may add extra capacity and capability.

PPU operates by allowing storage device usage data to flow from PPU metering technology within your firewall, over the Internet, to HP usage database and billing systems. Usage detail is available to you through a Web portal. Only capacity utilization data and device identification from the selected PPU device flow from your system to HP. No information ever flows from HP into your system.

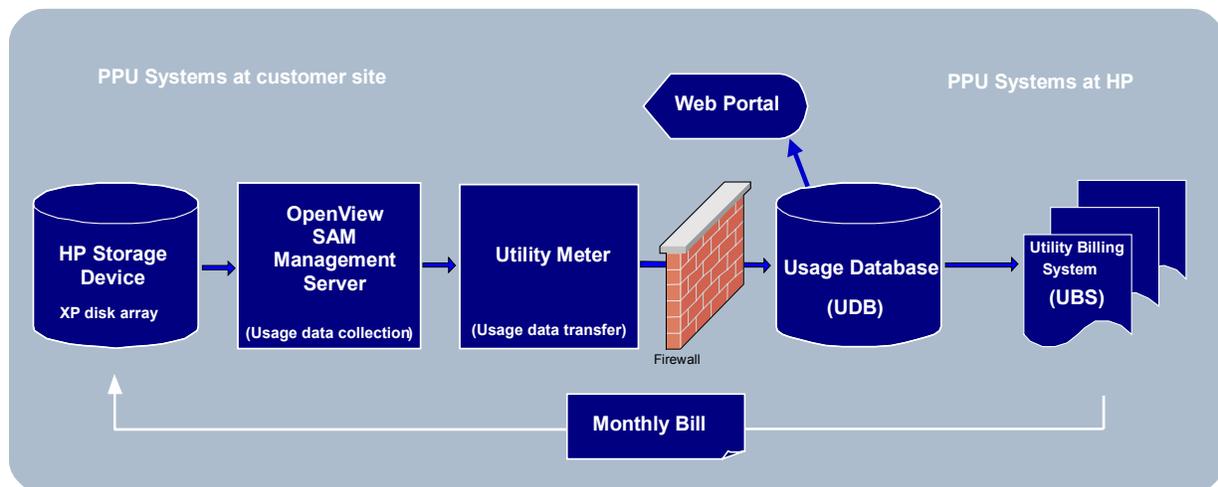


Figure 1. PPU system

Metering storage capacity

HP XP disk arrays use redundant capacity to provide extra protection for the user data stored in them. The PPU pricing model is based on measuring the amount of allocated raw capacity used. Allocated capacity is capacity that has been configured into logical devices (LDEVs) and has been assigned to a port and a logical unit (LUN). Any capacity that has not been assigned to a port is not allocated for use and, therefore, is not included in the allocated capacity usage measurement.

HP sells raw capacity in the form of array groups. Storage users consume usable storage capacity. The difference between raw and usable capacity is that raw capacity contains the usable capacity plus the redundant capacity required by the specified RAID level, meaning any measurement of capacity usage made in terms of usable capacity must be converted to raw capacity by accounting for the RAID level overhead of that configuration.

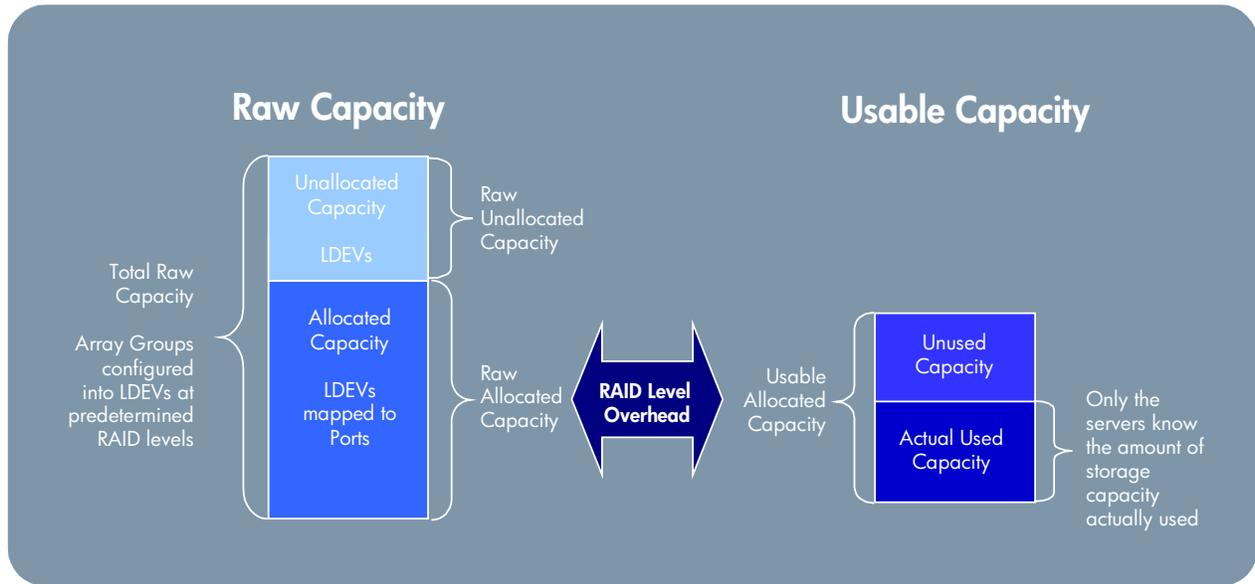


Figure 2: Measuring storage capacity usage

For RAID 0/1 LDEVs: Raw Capacity = Usable Capacity multiplied by 2

For RAID 5 LDEVs: Raw Capacity = Usable Capacity multiplied by 4/3

More than one port may be assigned to an LDEV, thus creating a redundant path to that chunk of storage capacity. Any redundant paths are excluded from the capacity usage measurement. PPU metering technology performs this accounting automatically. PPU billing is based on the amount of storage capacity that has been allocated for use. You can allocate or de-allocate storage to control the amount of allocated capacity in the system at any point. Allocated storage is averaged over the entire month and is rounded off to the nearest gigabyte.

Usage computation example

If 4 TB of storage is allocated for the first 12 days of the month and then an additional 2 TB are allocated for the remaining 18 days of the month, the average capacity utilization for the month will be:

$$(4 \text{ TB} \cdot 12 \text{ days} + 6 \text{ TB} \cdot 18 \text{ days}) / 30 \text{ days} = 5.2 \text{ TB average usage for the month}$$

Key system components

The following sections describe the key components of the PPU metering system, where each element is located, the form of data flow, and the extent of your interaction, if any.

HP storage device

You use XP disk array storage device exactly as you would without PPU. You can manage the XP storage device using Command View XP, running on a server of your choosing. The PPU metering technology on the HP OpenView Storage Area Manager (SAM) Management Server uses a Web browser connection to access the Command View XP to retrieve specific PPU storage device configuration information.

OpenView SAM Management Server

PPU uses the OpenView SAM Storage Accountant software to collect storage usage data from the PPU device. This software is installed on an HP server appliance dedicated to this purpose. When installed and configured, the OpenView SAM Management Server collects the data needed for the PPU billing. You only have to monitor that the server has power—the OpenView SAM software does everything else automatically. It reports all LUN activation and deactivation events once a day to HP, and sends a list of all existing LUNs and their sizes to HP once a month, and following any system reboots.

The PPU OpenView SAM Management Server must be able to communicate with Command View XP through a Web browser connection through a network connection.

HP personnel will install and configure OpenView SAM Management Server hardware and software.

HP Utility Meter

The HP Utility Meter is a separate appliance that can be shared with other metered capacity on-demand solutions from HP. The HP Utility Meter aggregates the PPU usage information from all PPU devices on a customer's site, validates it, and then securely transmits it to HP over the Internet.

The HP Utility Meter requires a network connection for communicating with both the PPU OpenView SAM Management Server and for communicating with the HP billing facility over the Internet.

HP personnel install and configure the HP Utility Meter.

Usage database

The HP Data Aggregator (between your firewall and the HP firewall) receives the transmitted usage data and transports it to the usage database, located behind the HP firewall within an HP facility. The usage database collects all usage data, checks for errors and missing data, and presents that collected usage data on a customer viewable web portal. The usage database converts the measured usable capacity into raw capacity based on the storage device configuration.

PPU Web portal

Detailed usage data is available to PPU customers through the PPU Web portal. You can access usage data and drill down to the lowest level of usage information residing on the usage database. Data privacy is critical—only authenticated users with system-specific ID information and a password can view usage data for that system.

You can explore the PPU web portal and view a sample usage report by logging in to a guest account at:

www.hp.com/go/payperuse

Login Name: ppuguest@yahoo.com

Password: data4ppu

Utility billing system

HP Financial Services' utility billing system acquires the customer usage information from the utility database once a month and generates a customer bill. HP Financial Services handles all the financial arrangements, invoicing, and collection for PPU.

Configuration requirements

PPU is designed to be as transparent to the user as possible. You use your storage device as you would without PPU being present. However, metering storage usage does add a few configuration requirements:

- You can choose any valid storage configuration including all storage HW (1Y), SW (1Y), and related storage services.
- You must install Command View XP. You can use this copy of Command View XP to manage the XP storage device in the normal manner. The OpenView SAM Management Server uses a Web browser connection (Netscape 4.7 or greater; Internet Explorer 5.0 or greater) to communicate with this Command View XP station.

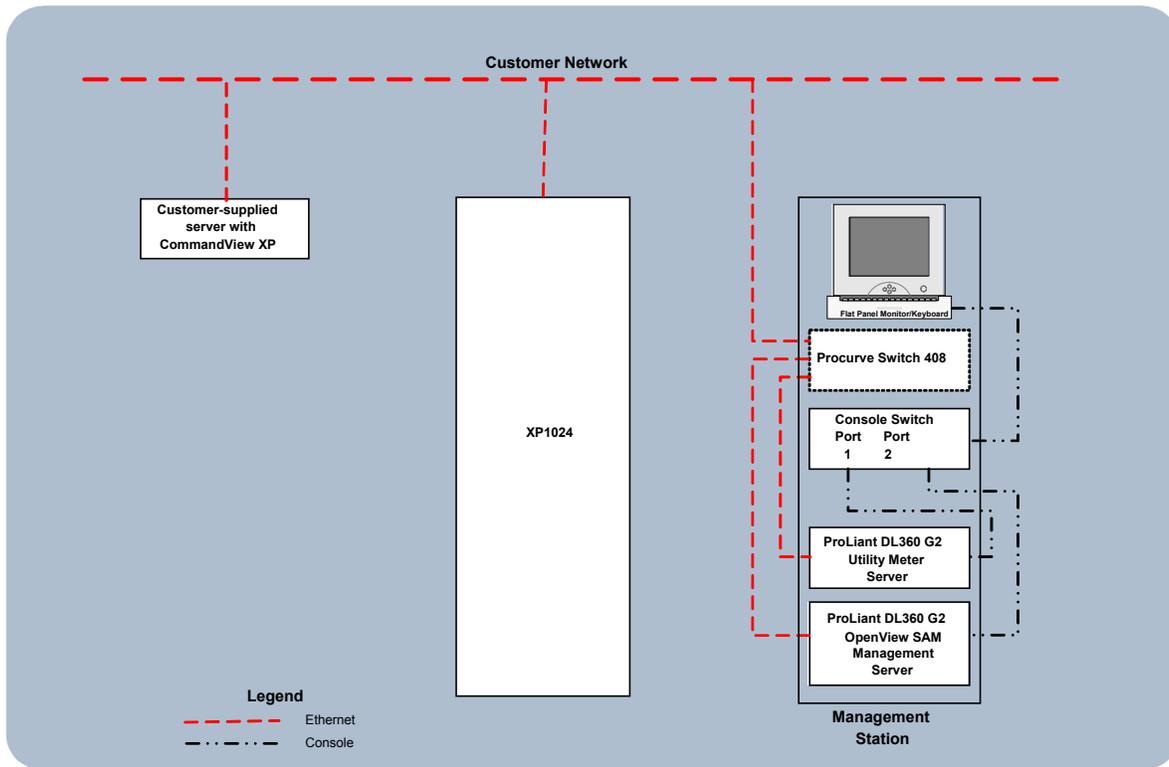


Figure 3. PPU component connections on customer site

Required software

The following software is required to be on the PPU order. CommandView is typically specified by the configuration and does not need to be ordered twice. Examples of CommandView XP are shown for the XP1024.

QTY	PART #	OPT#	DESCRIPTION
1	B9357AC		HP CommandView XP LTU for new XP1024 Sale
			Minimum requirements for XP1024 PPU Solution, may alternatively be ordered with equal or greater support level as part of the customer's XP order
1	H4405Y	8FO	HP CommandView XP 3 year support
1	H9273A	380	HP CommandView XP implementation
1	J5380AA		HP OpenView SAM Accountant w 2TB LTU
			Base product
1	J5380AA	3Y3	HP OpenView SAM Accountant 3 year support
2	H9142A		HP OpenView SAM Accountant implementation
			Implementation days
1	H9142A	001	HP OpenView SAM Accountant PPU implementation
			Added install steps required for PPU
?	J5381AA		HP OpenView SAM Accountant 5-TB LTU extension
			Order if required for PPU storage capacity.
?	J5382AA		HP OpenView SAM Accountant 10-TB LTU extension
			Order if required for PPU storage capacity.
?	J5383AA		HP OpenView SAM Accountant 50-TB LTU extension
			Order if required for PPU storage capacity.

Required hardware

The following hardware is required to be on the PPU order. Fibre Channel cable lengths can be substituted for lengths appropriate for the site. One FC HBA, GBIC, and cable are required for each PPU XP (up to three) to be supported by this instance of metering technology.

QTY	PART #	OPT#	DESCRIPTION
1	337908-001		CL360R2 P1400 PPU uMeter
			PPU "Utility Meter" Package includes:
		233271-001	DL360 R02 P1400 256 US
		(two) 164184-B21	Z18G 10K U3 UNI ALL
		201703-B21	Z512 REG PC133 2X256 ALL
		311812-001	BRICK RH PROF 7.3 ENG US
		316454-001	SOD VI: SOFTWARE
		245265-003	BTO, COMPOSITE OEM LBL,STONE
		268156-001	ASSY, CTO5 LBR VAR FLAG
1	HA114A1	5C10	PPU "Utility Meter" Support Services
1	313038-001		PPU ProLiant DL360 G2 package
			PPU "OpenView SAM server" Package includes:
		233271-001	ProLiant DL360R02 P1400-512K 255MB
		201694-B21	1024-MB PC 133-MHz ECC SDRAM
		142673-B22	18.2 GB Wide Ultra3 10K Disk Drive
1	T1506AV		Microsoft Windows 2000 Server w SP2 for "OpenView SAM server"
1	J1470A		HP Rackmount Flat Panel Monitor/Keyboard
1	J1473A		HP Rackmount Console Switch, 1x4
2	J1483A		HP Console Switch Cable, 4 Foot 1 for Utility Meter, 1 for OpenView SAM Server
1	J4097B		HP Procurve Switch 408
1	5183-7210		HP Procurve Switch mounting kit
2	C7533A		Ethernet Cable 4-ft CAT5 M/M NetServer (1) and Utility Meter Server (1) to Network Switch
1	C7536A		Ethernet Cable 14-ft CAT5 M/M Network switch to customer LAN

Security

PPU metering system is designed to protect your security and confidentiality. Security features include:

- **Data transmission** — All usage information is sent directly from the PPU Utility Meter to the HP PPU Utility collection server by a secure http connection.
- **Customer firewall** — All PPU appliances reside within the firewall. No "data" ever comes *into* your PPU system—data is only sent out. Only e-mail is sent into your system (to the authorized contact). The PPU metering system within the firewall is at least as secure as the rest of your secure network, used every day by employees who use the Internet, upload and download information, and send and receive e-mails—typically non-encrypted.

- **Notifications** — E-mail reminder notices are sent in the event the PPU Utility Collection Server does not receive complete usage information. This information is sent to the system contact's e-mail address—just like any Internet e-mail sent to an employee.
- **Web portal** — All users wanting to access the Web portal must first register to a specific account, identified by customer ID, and must have system-specific identification information for each PPU system before they are allowed to access usage data for those systems. Subsequent logins require the user password (six-month aging) plus the account information. If users fail to provide valid access information after a few attempts, they are “locked out” until they call HP to get back in.
- **Blocking usage access through the Web portal** — You can request that usage data for some or all of their systems is not viewable from the Web.

Ordering information

All hardware and software must be ordered with at least three years of support. CommandView XP is required for PPU, but it is typically specified in the customer's configuration, and does not need to be ordered twice. PPU metering technology software License to Use (LTUs) must be ordered to cover the entire installed capacity of the system. When upgrading a PPU system, PPU software LTUs must be ordered to cover the entire newly installed capacity and support must be included on the entire system that will cover the new term of the agreement.

Value of PPU

PPU for StorageWorks XP solution was designed for organizations that require greater flexibility in IT resources because of variable and uncertain business demands and that want IT costs to reflect the business value delivered. PPU integrates products, services, and financing to deliver IT resources when they are needed, where they are needed, with payment based on usage.

- Can be used with any other HP PPU
- Ensures that costs are aligned with usage with PPU metering.
- Eliminates large up-front storage investments.
- Provides reserve capacity that can improve service levels by ensuring that the capacity is available when needed.
- PPU makes the cost of storage visible for better decision making.
- PPU results in less frequent procurement and simplified storage capacity planning.

Why HP

In addition to being the only company that has the metering technology to track usage at this level and bill accordingly, HP is the only company that can provide PPU pricing across such a broad range of products, including servers, software, storage, and services. In an effort to make data center operation as simple and revenue-aligned as possible, HP continually adds products to its PPU pricing plan, and eventually HP envisions being able to roll all HP data center products and services into PPU pricing arrangements.

It is all part of the HP commitment to continual innovation and expanding flexibility. HP believes that by offering an innovative utility pricing program that is designed to help its customers balance costs and ultimately succeed, it will succeed as well.

For more information

To learn more about the HP Utility Pricing for storage solutions, contact your local HP sales representative or visit us at www.hp.com/go/storage.

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