

Mixed HP-UX (HP-UX 11i v1/v2/v3) Considerations in vPars

A Technical White Paper on Mixed HP-UX 11i v1/v2/v3 vPars Environments



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1. Abstract

This white paper is intended for individuals who are interested in consolidating virtual partitions (vPars) running different HP-UX versions onto a single hard partition. This document describes the supported configurations and guidelines for operating mixed HP-UX versions environment and describes some tools available to aid in configuring and managing the virtual partitions. It also highlights the subtleties and possible pitfalls and recommendations for the setup and operation of this environment.

This paper assumes that the reader has a good knowledge of the HP-UX operating system and is familiar with the concepts of vPars. The reader is encouraged to refer to the [Architectural Considerations when Mixing Virtual Partitions and Operating System Versions](#) white paper to obtain an understanding of the benefits of mixing different HP-UX versions in a single virtual partitions environment.

2. HP-UX Virtual Partitions Overview

vPars allows the system administrator to create independent HP-UX operating environments from hardware resources in a system or hard partition. Each of the HP-UX operating environments can be tuned specifically for the applications that will be hosted.

A virtual partition is composed of one or more CPUs, memory, and I/O devices for mass storage and networking. The minimum amount of memory necessary to boot a virtual partition is based on the minimum required by the operating system version and is also a function of the number and type of I/O resources it owns. Please refer to the corresponding HP-UX Release Notes for detailed restrictions.

All the resources of each virtual partition are specified in a partition plan called the vPars database that resides on the boot disk of each virtual partition. The vPar commands `vparcreate` and `vparmodify` are used to create, add, delete, and modify resource assignments in the partition plan. Each virtual partition should be configured with enough I/O and memory to sustain the peak workload that will be placed on it. The CPUs on the other hand can be configured to handle steady state and peak workload conditions by using the CPU migration facilities of vPars. Starting with HP-UX 11i v3, memory can also be dynamically configured using the online memory migration feature of vPars. Please refer to the [Configuring and Migrating Memory on vPars](#) white paper for details on the memory migration feature.

The vPars product has three separate release streams for the three different HP-UX releases supported: vPars A.03.xx is supported on HP-UX 11i v1 (11.11), A.04.xx is supported on HP-UX 11i v2 (11.23), and A.05.xx is supported on HP-UX 11i v3 (11.31). Note that each vPars release stream will not install on any HP-UX release other than its supported HP-UX release.

3. Mixed HP-UX 11i v1/v2/v3 vPars Environment Overview

The vPars product now supports mixing different HP-UX releases with in the same hard partition. The benefits of supporting the mixed HP-UX 11i v1/v2/v3 vPars environment are manifold, allowing users to deploy business critical applications and test applications in the same hard partition. This section lists the various supported combinations of HP-UX releases in the same hard partition.

Mixed HP-UX 11i v1/v2/v3 vPars

vPars A.05.03 was released with HP-UX 11i v3 (11.31) and is designed to support a mixed HP-UX 11i v1/v2/v3 vPars environment. This mixed environment allows the user to boot a vPars A.05.03 monitor that supports virtual partitions running HP-UX 11i v1, HP-UX 11i v2, and HP-UX 11i v3 in the same hard partition as shown below in Figure 1. Note that the virtual partitions running HP-UX 11i v2 must have vPars A.04.02 or later installed, and that virtual partitions running HP-UX 11i v1 must have vPars A.03.05 or later installed for it to operate in a mixed HP-UX 11i v1/v2/v3 vPars environment. Since HP-UX 11i v1 is supported only on PA-RISC systems, support for mixed HP-UX 11i v1/v2/v3 vPars environment is applicable for PA-RISC systems only. However, A.05.03 will support a mixed 11i v2/v3 environment on Integrity servers.

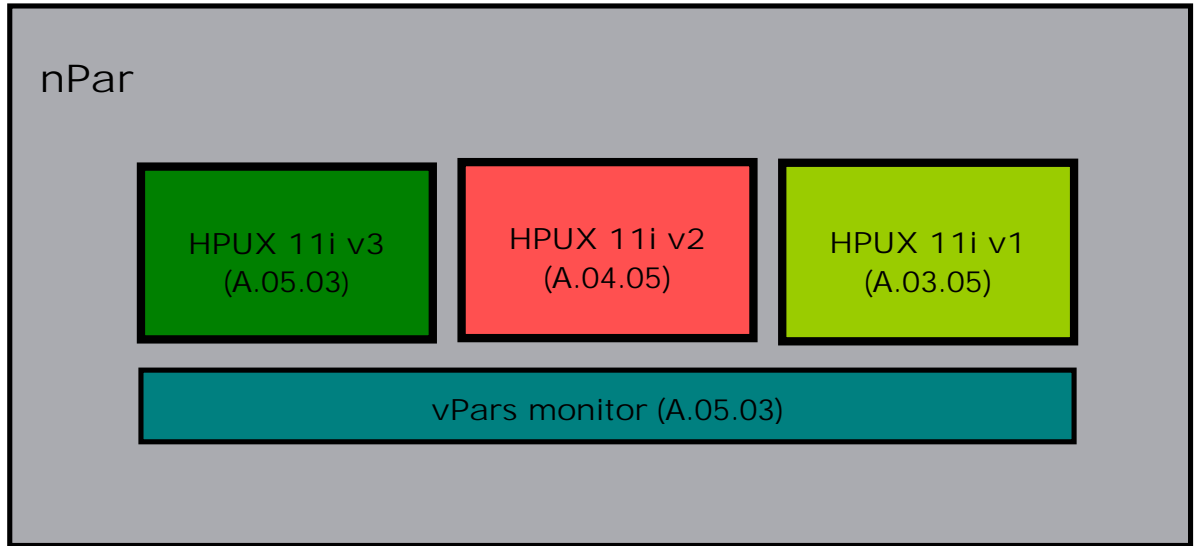


Figure 1: Mixed HP-UX 11i v1/v2/v3 vPars

Mixed HP-UX 11i v2/v3 vPars

vPars A.05.01 was released with HP-UX 11i v3 (11.31 LR) and is designed to support a mixed HP-UX 11i v2/v3 vPars environment. This mixed environment allows the user to boot a vPars A.05.01 or later vPar monitor that supports virtual partitions running both HP-UX 11i v2 and HP-UX 11i v3 versions in the same hard partition as shown below in Figure 2. Note that the virtual partitions running HP-UX 11i v2 must have vPars A.04.02 or later installed for it to operate in a mixed HP-UX 11i v2/v3 vPars environment.

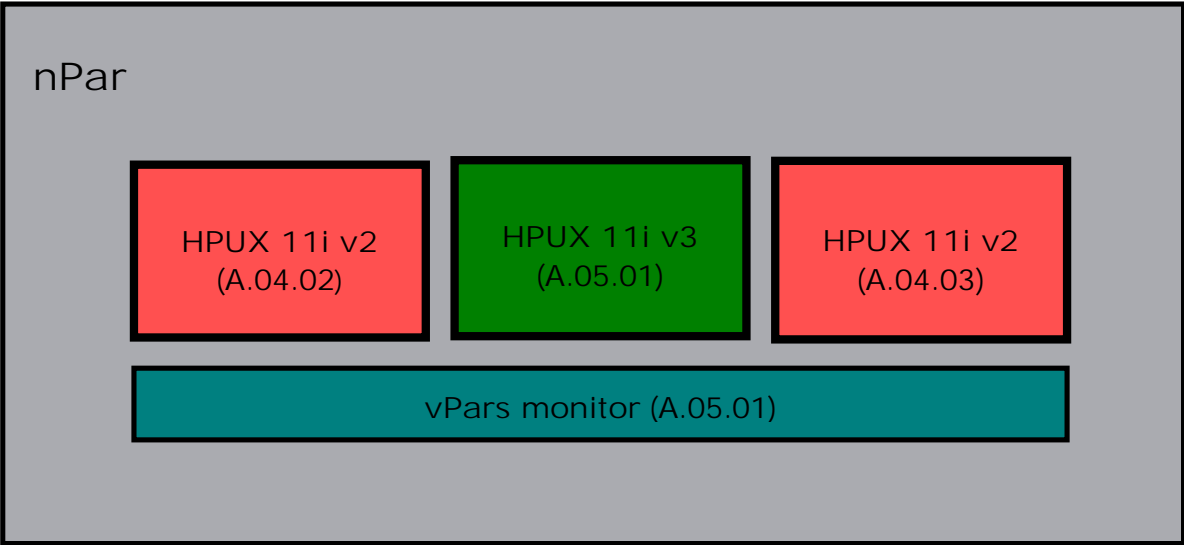


Figure 2: Mixed HP-UX 11i v2/v3 vPars Environment

Mixed HP-UX 11i v1/v2 vPars

vPars A.04.05 was released with HP-UX 11i v2 (11.23) and is designed to support a mixed HP-UX 11i v1/v2 vPars environment. This mixed environment allows the user to boot a vPars A.04.05 monitor that supports virtual partitions running both HP-UX 11i v1 and HP-UX 11i v2 in the same hard partition as shown below in Figure 3. Note that the virtual partitions running HP-UX 11i v1 must have vPars A.03.05 or later installed for it to operate in a mixed HP-UX 11i v1/v2 vPars environment. Since HP-UX 11i v1 is supported only on PA-RISC systems, support for mixed HP-UX 11i v1/v2 vPars environment is applicable for PA-RISC systems only.

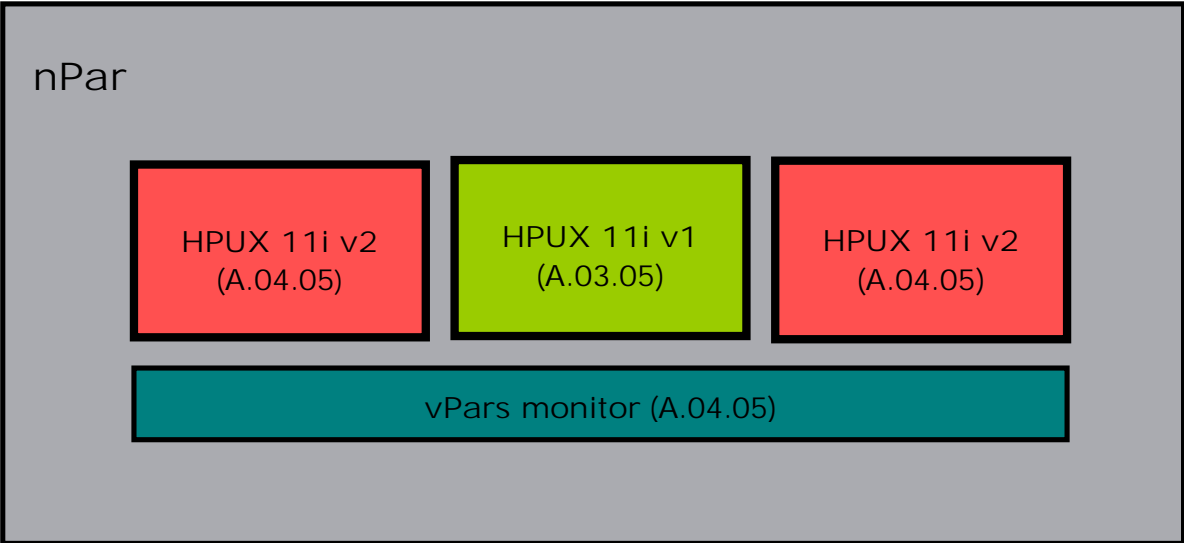


Figure 3: Mixed HP-UX 11i v1/v2 vPars

4. Configurations

4.1 Supported Configurations

The following vPars versions are supported in various mixed HP-UX combinations in vPars environment.

Mixed HP-UX 11i v1/v2/v3 vPars

For Mixed HP-UX 11i v1/v2/v3 vPars environment within the same hard partition, note that the vPars monitor that must be used is that bundled with A.05.03 or later. See the latest version of HP-UX Virtual Partitions Administrator's Guide (available at <http://docs.hp.com/en/hpux11iv3.html#Virtual%20Partitions>) which lists all the supported version combinations of vPars.

- HP-UX 11iv1: A.03.05
- HP-UX 11i v2: A.04.02, A.04.03, A.04.04, A.04.05
- HP-UX 11i v3: A.05.01, A.05.02, A.05.03

Mixed HP-UX 11i v2/v3 vPars

For Mixed HP-UX 11i v2/v3 vPars environment within the same hard partition, note that the vPars monitor that must be used is that bundled with A.05.01, A.05.02, or A.05.03 or later. See the latest version of HP-UX Virtual Partitions Administrator's Guide (available at <http://docs.hp.com/en/hpux11iv3.html#Virtual%20Partitions>) which lists all the supported version combinations of vPars.

- HP-UX 11i v2: A.04.02, A.04.03, A.04.04, A.04.05
- HP-UX 11i v3: A.05.01, A.05.02, A.05.03

Mixed HP-UX 11i v1/v2 vPars

For mixed HP-UX 11i v1/v2 vPars environments within the same hard partition, note that the vPars monitor that must be used is that bundled with A.04.05 or later. See the latest version of HP-UX Virtual Partitions Administrator's Guide (available at <http://docs.hp.com/en/hpux11iv2.html#Virtual%20Partitions>) which lists all the supported version combinations of vPars.

- HP-UX 11i v1: A.03.05
- HP-UX 11i v2: A.04.05

As a general rule of thumb, when running mixed HP-UX vPars combinations, the higher HP-UX OS release's vPar monitor has to be booted. Please refer to the "Mixed HP-UX 11i v1/v2/v3 vPars Environment" section in HP-UX Virtual Partitions Administrator's Guide for complete details on mixed

HP-UX vPars environments. Also, please refer to the HP-UX Virtual Partitions Ordering and Configuration Guide for OE and software requirements for each vPars versions.

All HP-UX features specific to that HP-UX version release will be supported on the vPar running that version of HPUX, unless otherwise noted".

Summary of Mixed HP-UX combinations in vPar environments

| Monitor Version to Boot from | Supported mixed HP-UX combinations | Supported vPar Versions | | |
|------------------------------|------------------------------------|-------------------------|------------------|------------------|
| | | 11iv1 | 11iv2 | 11iv3 |
| A.05.01 | HP-UX 11i v2/v3 | Not Supported | A.04.02 or later | A.05.01 |
| A.05.02 | HP-UX 11i v2/v3 | Not Supported | A.04.02 or later | A.05.01 or later |
| A.05.03 | HP-UX 11i v1/v2/v3 | A.03.05 or later | A.04.02 or later | A.05.01 or later |
| A.04.05 | HP-UX 11i v1/v2 | A.03.05 | A.04.05 | Not Supported |

4.2 Unsupported Configurations

The vPars A.05.03 and A.04.05 monitors support mixed HP-UX 11i v1/v2/v3 and 11i v1/v2 operating environments respectively with some restrictions. The unsupported configurations and limitations are detailed below.

- Booting mixed HP-UX environments on the vPars A.03.xx monitor is unsupported because the vPars A.03.xx monitor is not designed to handle any mixed HP-UX 11i v1/v2/v3 environments.
- Booting mixed HP-UX environments which contain 11i v3 vPars on the vPars A.04.xx monitor is unsupported because the vPars A.04.xx monitor is not designed to handle HP-UX 11i v3 mixed environments.
- vPars A.04.01 is unsupported in a mixed HP-UX 11i v2/v3 vPars or HP-UX 11i v1/v2/v3 vPars environment. Please ensure that the HP-UX 11i v2 virtual partitions have vPars A.04.02 or later installed.
- vPars A.03.04 and older vPar11i versions are unsupported in a mixed HP-UX 11i v1/v2/v3 vPars or HP-UX 11i v1/v2 vPars environment. Please ensure that the HP-UX 11i v1 virtual partitions have vPars A.03.05 or later installed.
- In mixed HP-UX environments, the vPars commands vparcreate and vparremove will not work from virtual partitions running lower versions than the monitor. The vPars command vparmodify when executed on the HP-UX 11i v1 or v2 virtual partition running on an A.05.xx monitor is restricted to work only on the calling virtual partition. Similar restrictions apply to 11i v1 partitions when booted on the 11i v2 monitor.
- The vPars features supported across virtual partitions in a mixed HP-UX 11i v1/v2/v3 vPars environment will generally be those supported in the respective vPars release stream. These include CPU migration, Flexible Administration. Also, online memory migration will work on

the 11i v3 virtual partitions even in a mixed HP-UX 11i v1/v2/v3 vPars environment. Offline memory migration will continue to work on all the virtual partitions.

- On HP Integrity systems that support Hyper-Threading, if the system has Hyper-Threading turned on using the setboot command or other means, the HP-UX 11i v2 virtual partitions will not boot. This limitation is present because HP-UX 11i v2 does not support Hyper-Threading on settings.

5. Tools to Aid Mixed HP-UX 11i v1/v2/v3 vPars Environment Configurations

- On vPars A.05.01, A.03.05, A.04.05, and later releases, the vparstatus command has a new option, "-P", which returns the HP-UX version of each of the virtual partitions configured in the hard partition. This option provides the HP-UX version for the virtual partition if the virtual partition has ever been booted. If the virtual partition has never been booted, there is no way for the product to determine the HP-UX version, and it will return Unknown.

```
# vparstatus -P
Current Virtual Partition Version:  A.05.03
Monitor Version:  A.05.03
```

```
[Virtual Partition OS Version]
```

| Virtual Partition Name | OS Version | State |
|------------------------|------------|-------|
| ===== | ===== | ===== |
| vpar01 | B.11.31 | Up |
| vpar02 | Unknown | Down |
| vpar03 | B.11.23 | Up |
| vpar04 | B.11.11 | Up |
| vpar05 | B.11.11 | Down |

- In a mixed vPars environment, running the vPars commands on a virtual partition running a lower version than the monitor will return either a warning or an error. The commands that are not allowed to operate on a different virtual partition from a lower version of vPars software are vparcreate, vparmodify and vparremove. These will return the error message below.

```
vpar11230S> vparremove -p test
vparremove: Error: Command version 1.4 is incompatible with monitor
version 1.50.
```

- All other commands will return the warning as shown below.

```
vpar11230S> vparboot -p test
vparboot: Warning: Command version 1.4 is different from monitor
version 1.50. The command will continue.
vparboot: Booting test. Please wait...
```

- The vparstatus command issued from an 11i v1 partition will not display complete information. Please refer to HP-UX Virtual Partitions Administrator's Guide under section "Features of Mixed HP-UX 11i v1/v2/v3 vPars Environments"

6. Pitfalls: What They Are and How to Avoid Them

Along with the benefits of operating virtual partitions in a mixed HP-UX 11i v1/v2/v3 vPars environment, there are certain scenarios that could result in confusion. These are listed here to help you configure your environment in such a way to obtain the full benefits of operating in a mixed HP-UX 11i v1/v2/v3 vPars environment.

- Configuration in which there are no virtual partitions running vPars A.05.03 booted: The user might have a setup where the hard partition boot disk has vPars A.05.03 installed on it but does not assign that boot disk to any of the virtual partitions. The user only boots up three virtual partitions, vPar1, vPar2 and vPar3 as shown below in Figure 4. This configuration will operate fine as long as the user doesn't want to make any modifications to the configuration such as create new virtual partitions or modify the booted virtual partitions (such as add new boot path). That is, the vPars configuration will be restrictive unless the user switches to nPars mode to make modifications to the vPars database. Each virtual partition will be able to make modifications to itself if the operation is supported. For example, addition/removal of CPUs and changing boot options, will continue to work. This is applicable to mixed HP-UX 11i v1-v2 vPar environments also running on a vPars A.04.05 monitor.

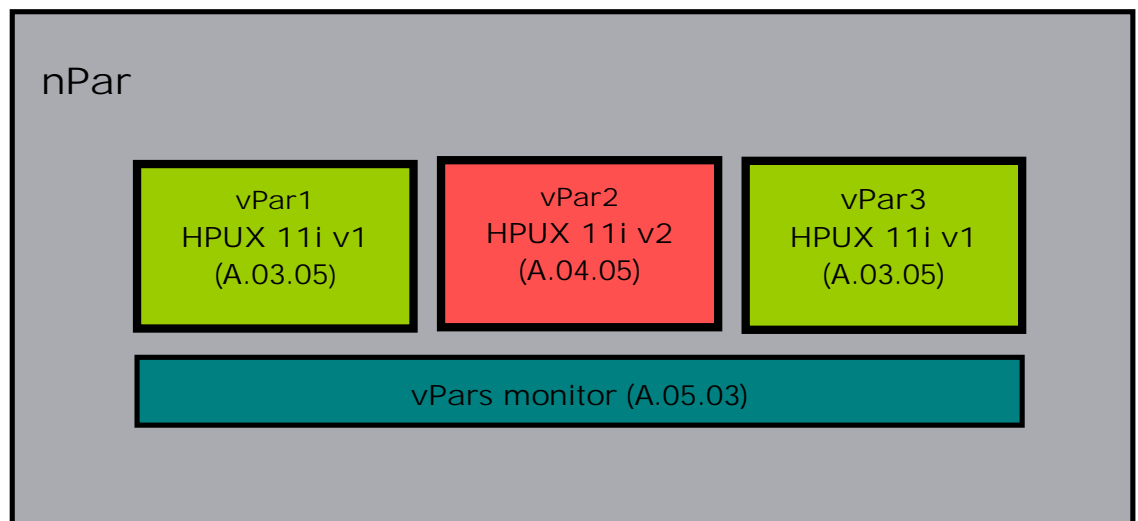


Figure 4: Mixed HP-UX 11i v3-v2-v1 vPars Environment with only 11iv2 and 11iv1 virtual partitions; no configuration changes are allowed other than those supported on self

- (HP Integrity only) nPars mode primary/alternate path not updated to HP-UX 11i v3: This scenario can occur if a virtual partitions configuration is updated from HP-UX 11i v2 to a mixed HP-UX 11i v2/11i v3 environment and the updates are done such that the nPars mode primary and secondary boot disks are not updated to HP-UX 11i v3. The result of this update will be that the user will have to manually locate a boot disk which has HP-UX 11i v3 and vPars A.05.01 (or later) installed on it to boot the A.05.01 monitor. This is an issue mainly on HP Integrity systems because it is not straightforward to find a disk (other than the primary/secondary) from the EFI shell because the HP Integrity boot loader uses EFI paths instead of the hardware paths to locate disks.

The user has multiple options to get to an HP-UX 11i v3 boot disk:

- Switch to nPars mode and modify the primary and alternate boot paths to point to a disk which has HP-UX 11i v3 (vPars A.05.01) installed on it.

- Detect an HP-UX 11i v3 boot disk using the EFI paths displayed at the EFI shell. The hardware path to EFI path mapping can be obtained by using the `-e` option to `ioscan(1M)` or by using `vprefiutil(1M)` on a virtual partition in that hard partition (if it is up) to see the EFI path mapping to an HP-UX 11i v3 boot disk.
- Flexible administration and mixed HP-UX 11i v1/v2/v3 vPars environment implications: The vPars Flexible Administrative Capability feature restricts the usage of specific vPars commands such that they can be successfully executed from only designated virtual partitions. In a mixed HP-UX 11i v1/v2/v3 vPars environment, it is recommended that you choose an HP-UX 11i v3 virtual partition as a designated virtual partition, otherwise the designated virtual partition (running HP-UX 11i v1 or v2) will have limited capabilities since not all vPars commands can execute on it. Specifically, the vPars commands `vparscreate`, `vparsmodify`, and `vparsremove` on other virtual partitions are not allowed from a HP-UX 11i v1 or v2 virtual partition.
- PCI Error Handling and Error Recovery implications: HP-UX 11i v2 supports PCI Error handling and HP-UX 11i v3 supports PCI Error Recovery in addition to Error Handling. Please refer to the [PCI Error Handling Product Note](#) for additional info on this. Please note that not all I/O cards and not all platforms support this feature. Also note that it is possible that more cards/drivers will support Error Handling and Recovery on HP-UX 11i v3 than on HP-UX 11i v2. So, it is possible that a card/driver which does not support this functionality could bring down the hard partition including all the virtual partitions if there is a failure.
- Unsupported I/O cards: HP-UX 11i v3, HP-UX 11iv2, or HP-UX 11i v1 may support certain I/O cards which are not supported on all HP-UX releases. Care must be taken to ensure that the virtual partitions are configured such that only cards that are supported by the OS version configured in the virtual partition are included in that virtual partition's definition. Please refer to the [HP-UX Virtual Partitions Ordering and Configuration Guide](#) to ensure that the virtual partitions are configured with supported I/O cards.

7. More Information

- See <http://docs.hp.com/en/vse.html#vPars> for links to vPars administration documents for all release streams.
- See <http://docs.hp.com/en/hpux11iv3.html#Virtual%20Partitions> for vPars administration documents and white papers specific to the HP-UX 11i v3 release stream. This white paper, the HP-UX Virtual Partitions Administrator's Guide, the HP-UX Virtual Partitions Ordering and Configuration Guide, and other documents are available at this site.
- See <http://www.hp.com/go/virtualization> for more information on HP's Virtualization products including vPars.
- See the Architectural Considerations when Mixing Virtual Partitions and Operating System Versions white paper for deployment scenarios for mixed operating environments. It is available at:
<http://h71028.www7.hp.com/ERC/downloads/c00721867.pdf>
- See the *Migrating from HP-UX 11i v1 Virtual Partitions to a Mixed HP-UX Version Environment* white paper for migration from 11iv1 vPars to Mixed OS version environment. It is available at:
<http://docs.hp.com/en/13473/migrateV1vParsMixedEnv.pdf>

- See the Dynamic Logical Processors for Hyper-Threading on HP-UX 11i v3 white paper for a description of the key enhancements to the HP-UX 11i v3 operating system to support the new multiple hardware thread feature (Hyper-Threading). This white paper is available at:
<http://h71028.www7.hp.com/ERC/downloads/4AA0-7695ENW.pdf>
- See the PCI Error Handling Product Note for PCI error handling and error recovery support on HP-UX. This document is available at:
<http://docs.hp.com/en/5991-5308/index.html>
- See the Overview: The Next Generation Mass Storage Stack white paper for an overview of the mass storage changes in HP-UX 11i v3. This white paper is available at:
<http://docs.hp.com/en/netsys.html#Storage%20Area%20Management>

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