

Chapter 17

Virtual Partitions (vPars)



***HP-UX Handbook
Revision 13.00***

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Introduction

This chapter provides an overview of the Virtual Partitions (vPars) product. Virtual Partitions (vPars) is not included with the HP-UX operating system. The detailed product information can be found at <http://docs.hp.com/>:

- HP-UX Virtual Partitions Ordering and Configuration Guide
- Installing and Managing HP-UX Virtual Partitions
- Read Before Installing HP-UX Virtual Partitions
- HP-UX Virtual Partitions Release Notes
- Whitepapers

Virtual Partitions Environment, `vpmon` and `vpdb`

Virtual Partitions (vPars) allows you to run multiple instances of HP-UX on the same node. The instances of HP-UX are fully isolated from each other. Each partition is assigned its own subset of hardware. Each virtual partition (vPar) may have a different patch level of the operating system.

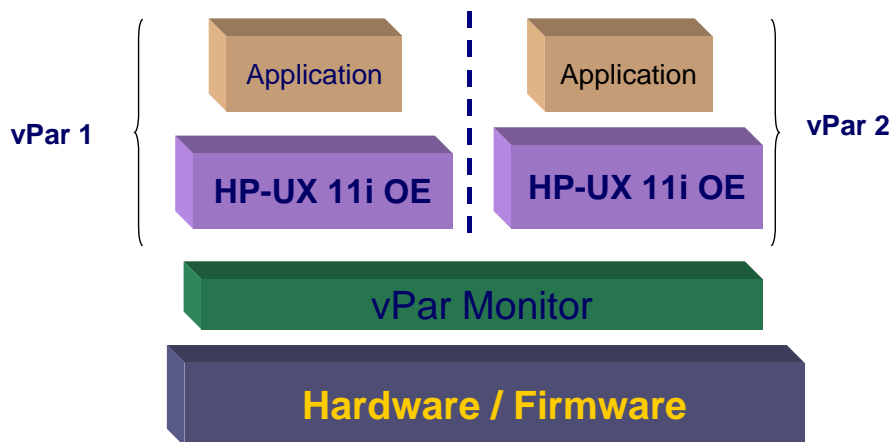
Virtual partitions use dedicated resources. When assigned to a vPar, a resource is exclusively owned by it. I/O and memory are allocated to a booting kernel by the vPars monitor. All CPUs not assigned to a vPar kernel reside in a CPU float pool; CPUs can be assigned temporarily to a running vPar kernel from the pool.

vPars administration can be performed on any vPar on the same hard partition as the superuser's local vPar.

The major difference when running virtual partitions is the additional layer of low-level control software called the vPars monitor (`vpmon`). It is stored in `/stand` on the boot device of every virtual partition and it is loaded before starting a partition running HP-UX. The monitor enables the system to run vPars. If the monitor is not started, the original kernel can be booted as well. Then, only one instance of HP-UX can be run without the vPars monitor.

`vpmon` runs on the processor elected as nPar's "monarch" early in the boot sequence. The monarch is usually the first CPU – logical CPU 0; `ioscan` or `vpmon`'s `scan` command can help identify the monarch.

The following picture shows the Monitor:



The vPars monitor manages the assignment of the hardware resources to the virtual partitions, boots virtual partitions and their kernels, and emulates certain firmware calls. Once a virtual partition is launched, the monitor transfers the ownership of the hardware to the virtual partition.

The commands for the vPars monitor are shown in section [Monitor Commands](#) or at <http://docs.hp.com>.

To run a vPar the monitor needs a database where all partitions configuration information is stored. The vPars database is called `/stand/vpdb` and resides on each virtual partition (by default on the boot device).

The vPars database is created with the first vPar. The default is `/stand/vpdb`, but alternate database configurations are possible. It stores the partition name, resources such as CPU, memory, LBAs, boot devices, boot options. You can create, modify, and view the database contents using vPars commands.

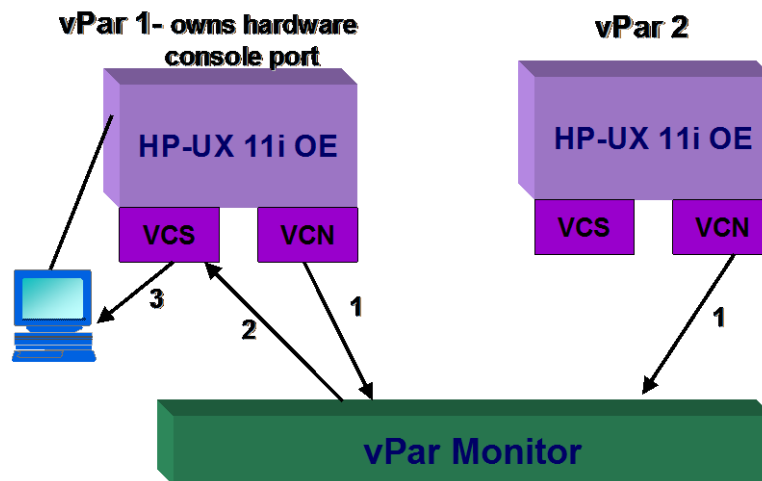
Once the monitor is booted, the selected database is copied into memory and becomes the “master copy”. The master copy is used to compare and synchronize the other **run state** vPars. If the database does not exist on the vPar during boot-up, it will be created. The operating system of each virtual partition also keeps a local copy of the partition database in a file, by default `/stand/vpdb`, on its local boot disk.

Whenever you execute a vPars command from the shell of a partition, the change is first made to the monitor’s master copy. Then, the local copy is updated from the master copy. The operating system of each running partition automatically updates its local copy from the master copy every five seconds. This synchronization ensures that the virtual partitions and changes to the partition database are preserved, when the entire hard partition is rebooted.

NOTE: The monitor can only synchronize to the database files of running virtual partitions. If you reboot the hard partition, you should boot the monitor from the boot disk of a virtual partition that was running during your most recent partition configuration change.

To create or modify a virtual partition see section [vPars commands](#) or the online manuals at <http://docs.hp.com>.

Virtual Console



The console device should be assigned to the first vPar (PA-RISC). All vPars share the same console device. Each virtual partition has its own virtual console. You can use **Ctrl-A** to cycle between all running vPars.

For **PA-RISC** based servers:

1. Each vPar has its console I/O sent to its **vcn** (Virtual Console) driver. The **vcn** driver then sends the console I/O to the monitor.
2. From the vPars monitor, the console I/O is sent to the **vcs** (virtual console slave) driver of the partition that owns the hardware console port.
3. Finally, the **vcs** driver sends the console I/O to the physical hardware console. It is this **vcs** driver that manages the console I/O to the actual hardware console port.

The size of the circular buffer for the console output is 8K.

When the partition that owns the hardware console port is not running, the vPars monitor takes the management of the I/O to the hardware console port and access is still available to the virtual console displays.

On **Integrity**, the console is virtualized by the firmware (no **vcs** driver).

Daemons and vPar states

The daemon **vpard** is started with the script `/sbin/init.d/vpard`. It synchronizes the master database and the local disk databases for all vPars in state **“up”**, at a default interval of **5 seconds**. The **vpard** daemon also helps to manage communications for the **virtual console**.

The daemon **vphbd** is started with the script `/sbin/init.d/vparhb`. It provides a heartbeat status, written to the local disk. The default for **“sleeping”** between heartbeats is 360 seconds (6 minutes). If **10 heartbeats** are missed, the vPar is considered **“hung”**. This state is maintained within the master database.

Once the Monitor is booted, the selected database (`/stand/vpdb` by default, or, the database specified when booting the monitor) is copied into memory and becomes the master copy. The master copy is used to compare and synchronize the other vPars in **run state**. If the database does not exist on a vPar as it boots, it will be created. The daemon **vpard** communicates with the monitor to ensure the local databases are properly synchronized. Updates occur **every 5 seconds** by default.

The state of a virtual partition is monitored by the `vpmon` and reported by the `vparstatus` command. States are defined as follows:

Up	The vPar has notified the monitor that it is up. This is the normal state of a running virtual partition. However, it does not necessarily mean that the vPar has completed its initialization and is fully operational.
Down	The virtual partition is fully halted. This could be a result of a normal <code>/sbin/shutdown -h</code> command, a <code>vparreset -h</code> sent to the vPar, or of a partition with its AUTOBOOT attribute set to “manual”. It is also the initial state of a virtual partition immediately after the virtual partition monitor is started.
Load	The monitor is loading the kernel image of the virtual partition. This state precedes the boot state.
Boot	The virtual partition has been launched, but has not yet completely booted.
Crash	The virtual partition is shutting down ungracefully (either a panic or a reset).
Shut	The virtual partition is shutting down gracefully.
Hung	The virtual partition has stopped sending heartbeat messages to the Monitor.
N/A	The virtual partition is in an alternate database file, and shows no state.

Differences between vPars and HP Integrity Virtual Machine

vPars segments a system using dedicated CPUs and I/O hardware per partition; these are exclusively under the control of the vPar's booted kernel. Integrity Virtual Machine allows sub-CPU granularity and shared I/O on the same I/O hardware among kernels known as guests.

A vPar uses dedicated CPUs and LBAs. PCI-Interfaces attached to the same LBA can not be shared.

vPars has minimum overhead, while Integrity VM maximizes resource utilization.

Supported Systems and Requirements for vPars

- vPars versions A.03.XX and earlier are supported only on HP-UX 11i v1 (11.11).
- vPars version A.04.xx is supported only on HP-UX 11i v2 (11.23).
- vPars version A.05.xx is supported only on HP-UX 11i v3 (11.31).

Versions A.05.xx and earlier do not allow to mix HP-UX 11i v1, 11i v2 and 11i v3 on different vPars on a server.

Supported Systems and required Firmware for vPars

Please check “HP-UX Virtual Partitions Ordering and Configuration Guide” at <http://docs.hp.com/en/1705/oc.pdf>, Chapter “4.2 Hardware”, for system and firmware requirements for the different vPars versions or visit the following links:

- 11i v1: <http://docs.hp.com/en/oshpux11i.html#Virtual%20Partitions>
- 11i v2: <http://docs.hp.com/en/oshpux11iv2.html#Virtual%20Partitions>
- 11i v3: <http://docs.hp.com/en/oshpux11iv3.html#Virtual%20Partitions>

These documents also have the latest information concerning supported mass storage HBAs and support requirement for SAN boot.

Requirements for vPars

- To use vPars on a node you need to install T1335AC for vPars on 11i v1, T1335BC on 11i v2 and T1335CC on 11i v3. The product bundle includes all patches that are necessary to enable vPars.

- Minimum Requirements for each vPar:
 - One processor;
 - enough physical memory to run HP-UX 11i and applications; recommended 1GB of memory available per each installed CPU;
 - one unique LAN card recommended (on a PCI bus/Local Bus Adapter LBA uniquely owned by the vPar), because each vPar has an independent kernel and works as a separate system;
 - one unique boot device (connected through SCSI or Fiber Channel card, on a PCI bus/Local Bus Adapter uniquely owned by the vPar).

Each virtual partition requires its own installation.

The partitions should run the same HP-UX revision, but they may have different patch levels. Starting with vpars Version 5.0, different HP-UX releases and vPars versions are supported. In some cases, vPars software is sensitive to firmware revisions.

Comparison between vPars on PA-RISC and Integrity

Booting

- **Mode:** vPars or nPars mode has to be set on Integrity to be able to boot the nPartition into standalone (nPars) or vPars environment (see below “Switching between vPar and nPar mode - Integrity only”). PA-RISC does not require setting a mode.
- **LAN card:** Performing `vparboot -I` on Integrity uses the LAN card of the target partition to obtain the bootable kernel. On PA-RISC, the LAN card of the source partition is used. See also “[Installing and Managing HP-UX Virtual Partitions](#)”, section “Ignite-UX, the LAN, the LAN card, and `vparboot -I`”, p. 65.
- **Boot string:** On Integrity platforms, the boot string used at the `hpux.efi` prompt (`hpux>`) is “`boot vpmn`”. On PA-RISC, the boot string at the boot prompt (`HPUX>`) is “`hpux /stand/vpmn`”.

vPars Commands

Integrity only

- `vparsfiutil`: Unix shell command to display or manage the **HP-UX hardware path to EFI path mappings** of bootable disks within the vPars database.

- `vparsenv`: Unix shell command that allows you to **set the mode** (vPars or nPars) for the next reboot of the nPartition or to set the memory granularity unit size in the firmware.
- `vparsconfig`: EFI command that allows you to **set the mode** (vPars or nPars) and forces a reboot of the nPartition. **Note:** `vparsconfig` is **not a built-in EFI command**; you will need to go to the `fsN:\>` disk prompt to execute this command.
- `vparsconfig` is installed in the EFI partition of the root disk when vPars is installed. Specifically, the file `vparsconfig.efi` is installed in `\efi\hpux`.

PA-RISC only

- `vparsreloc`
- `vparsutil`

There is quite a comprehensive chart about the differences between vPars on PA-RISC and Integrity in the manual [Installing and Managing HP-UX Virtual Partitions](#) for all OS versions; it covers aspects like boot, commands, configuration, etc.

Processor and Cell-Based Systems with vPars

Processor-based systems (PA-RISC only)

Only rp5430, rp5470, and rp7400 (L1500, L3000, N4000) can be partitioned into virtual partitions. The administrator selects CPUs, LBAs and memory as resources for the vPars. The vPars share the SBAs and physical console, although the core I/O must be assigned to a vPar (usually the first).

Cell-based systems (PA-RISC and Itanium)

The CPUs and memory modules are located in cells. I/O is accessed through the cell physically connected to the I/O chassis. A cell can be physically connected to one I/O chassis, and an I/O chassis can be physically connected to one cell. The LBA is located in the I/O chassis.

Virtual Partitions can use resources only within their nPar. Not all nPars of a cell-based System need to be running vPars.

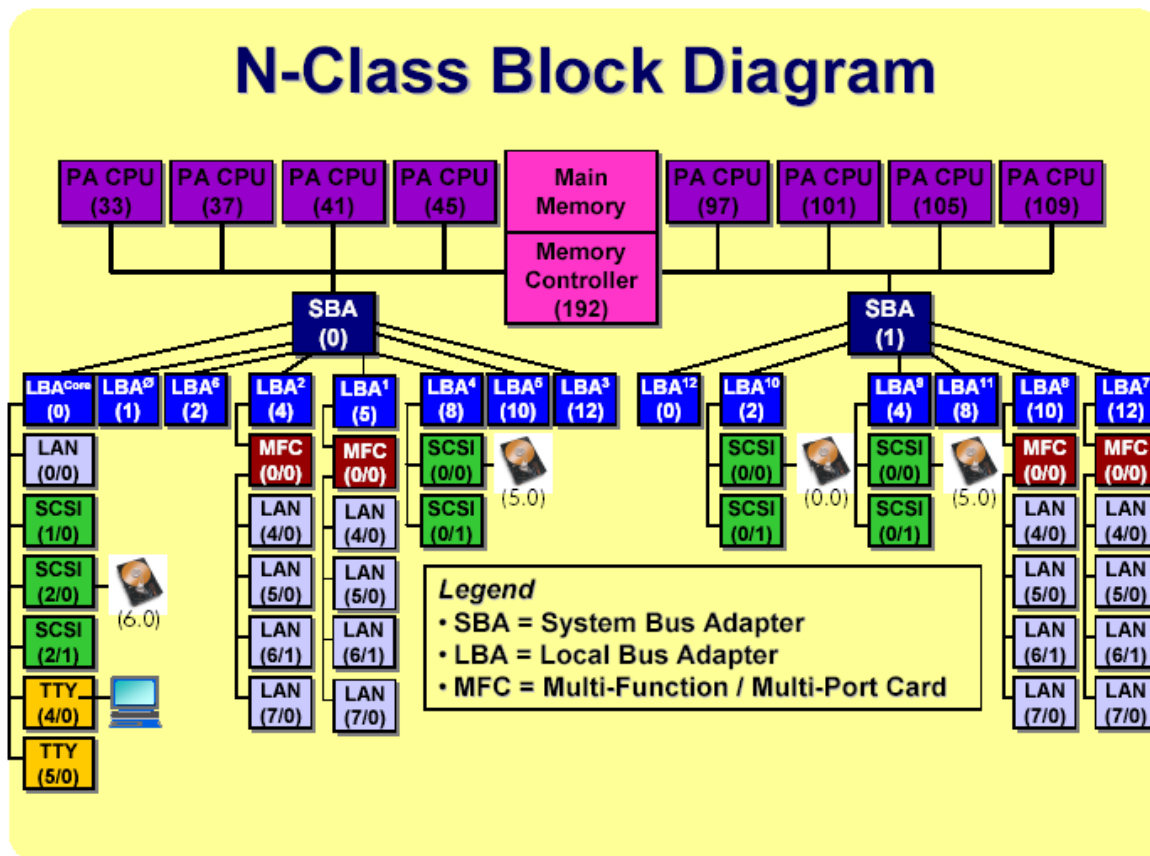
The number of vPars per nPar is limited by the number of CPUs and the number of LBAs. At least one LBA per vPar is required to host a LAN and a mass storage combo interface.

With a virtually partitioned nPars you can boot the OS into either the nPar (giving all resources to a single kernel) or the vPars.

Planning a Virtual Partition (an Example)

This section gives an overview of how to break down a system into partitions. The N-Class block diagram helps to identify the usage of bus adapters to create a partition plan from the `ioscan` output.

N-Class Block Diagram



ioscan

H/W Path	Class	Description
=====	=====	=====
0	root	
0	ioa	System Bus Adapter (803)
0/0	ba	Local PCI Bus Adapter (782)
0/0/0/0	lan	HP PCI 10/100Base-TX Core
0/0/1/0	ext_bus	SCSI C895 Fast Wide LVD
0/0/1/0.7	target	
0/0/1/0.7.0	ctl	Initiator
0/0/2/0	ext_bus	SCSI C875 Ultra Wide Single-Ended

```

0/0/2/0.6          target
0/0/2/0.6.0        disk SEAGATE ST39102LC
0/0/2/0.7          target
0/0/2/0.7.0        ctl Initiator
0/0/2/1            ext_bus SCSI C875 Ultra Wide Single-Ended
0/0/2/1.7          target
0/0/2/1.7.0        ctl Initiator
0/0/4/0            tty PCI Serial (103c1048)
0/0/5/0            tty PCI Serial (103c1048)
0/1                ba Local PCI Bus Adapter (782)
0/2                ba Local PCI Bus Adapter (782)
0/4                ba Local PCI Bus Adapter (782)
0/4/0/0            ba PCItoPCI Bridge
0/4/0/0/4/0        lan HP A5506A PCI 10/100Base-TX 4 Port
0/4/0/0/5/0        lan HP A5506A PCI 10/100Base-TX 4 Port
0/4/0/0/6/0        lan HP A5506A PCI 10/100Base-TX 4 Port
0/4/0/0/7/0        lan HP A5506A PCI 10/100Base-TX 4 Port
0/5                ba Local PCI Bus Adapter (782)
0/5/0/0            ba PCItoPCI Bridge
0/5/0/0/4/0        lan HP A5506A PCI 10/100Base-TX 4 Port
0/5/0/0/5/0        lan HP A5506A PCI 10/100Base-TX 4 Port
0/5/0/0/6/0        lan HP A5506A PCI 10/100Base-TX 4 Port
0/5/0/0/7/0        lan HP A5506A PCI 10/100Base-TX 4 Port
0/8                ba Local PCI Bus Adapter (782)
0/8/0/0            ext_bus SCSI C875 Fast Wide Differential
0/8/0/0.5          target
0/8/0/0.5.0        disk SEAGATE ST39175LC
0/8/0/0.7          target
0/8/0/0.7.0        ctl Initiator
0/8/0/1            ext_bus SCSI C875 Fast Wide Differential
0/8/0/1.7          target
0/8/0/1.7.0        ctl Initiator
0/10               ba Local PCI Bus Adapter (782)
0/12               ba Local PCI Bus Adapter (782)
1                  ioa System Bus Adapter (803)
1/0                ba Local PCI Bus Adapter (782)
1/2                ba Local PCI Bus Adapter (782)
1/2/0/0            ext_bus SCSI C875 Fast Wide Differential
1/2/0/0.0          target
1/2/0/0.0.0        disk SEAGATE ST39102LC
1/2/0/0.7          target
1/2/0/0.7.0        ctl Initiator
1/2/0/1            ext_bus SCSI C875 Fast Wide Differential
1/2/0/1.7          target
1/2/0/1.7.0        ctl Initiator
1/4                ba Local PCI Bus Adapter (782)
1/4/0/0            ext_bus SCSI C875 Fast Wide Differential
1/4/0/0.5          target
1/4/0/0.5.0        disk SEAGATE ST39175LC
1/4/0/0.7          target
1/4/0/0.7.0        ctl Initiator
1/4/0/1            ext_bus SCSI C875 Fast Wide Differential
1/4/0/1.7          target
1/4/0/1.7.0        ctl Initiator
1/8                ba Local PCI Bus Adapter (782)
1/10               ba Local PCI Bus Adapter (782)
1/10/0/0            ba PCItoPCI Bridge
1/10/0/0/4/0        lan HP A5506A PCI 10/100Base-TX 4 Port
1/10/0/0/5/0        lan HP A5506A PCI 10/100Base-TX 4 Port
1/10/0/0/6/0        lan HP A5506A PCI 10/100Base-TX 4 Port
1/10/0/0/7/0        lan HP A5506A PCI 10/100Base-TX 4 Port
1/12               ba Local PCI Bus Adapter (782)

```

```

1/12/0/0          ba      PCIToPCI Bridge
1/12/0/0/4/0      lan     HP A5506A PCI 10/100Base-TX 4 Port
1/12/0/0/5/0      lan     HP A5506A PCI 10/100Base-TX 4 Port
1/12/0/0/6/0      lan     HP A5506A PCI 10/100Base-TX 4 Port
1/12/0/0/7/0      lan     HP A5506A PCI 10/100Base-TX 4 Port
32                pbc      Bus Converter
33                processor Processor
36                pbc      Bus Converter
37                processor Processor
40                pbc      Bus Converter
41                processor Processor
44                pbc      Bus Converter
45                processor Processor
96                pbc Bus Converter
97                processor Processor
100               pbc      Bus Converter
101               processor Processor
104               pbc      Bus Converter
105               processor Processor
108               pbc      Bus Converter
109               processor Processor
192               memory   Memory

```

Referring to the full ioscan we create three vPars:

- Resources assigned to **vpar1** are marked in blue.
- Resources assigned to **vpar2** are marked in green.
- Resources assigned to **vpar3** are marked in orange.

Partition information

The partition plan shows the following:

Name of vpars	vpar1	vpar2	vpar3
Processors	2	2	2
Memory	1 GB	4 GB	2 GB
I/O Path (LBS's)	0/0, 0/4	0/8, 1/1	0/5, 1/4
Boot Path	0/0/2/0.6.0	0/8/0/0.5.0	1/4/0/0.5.0

Console:

The hardware console port is at 0/0/4/0 which uses LBA at 0/0. The LBA is owned by vpar1 so when we create the virtual partitions, vpar1 will be created first.

To create these Partitions we need `vparcreate(1m)`.

```

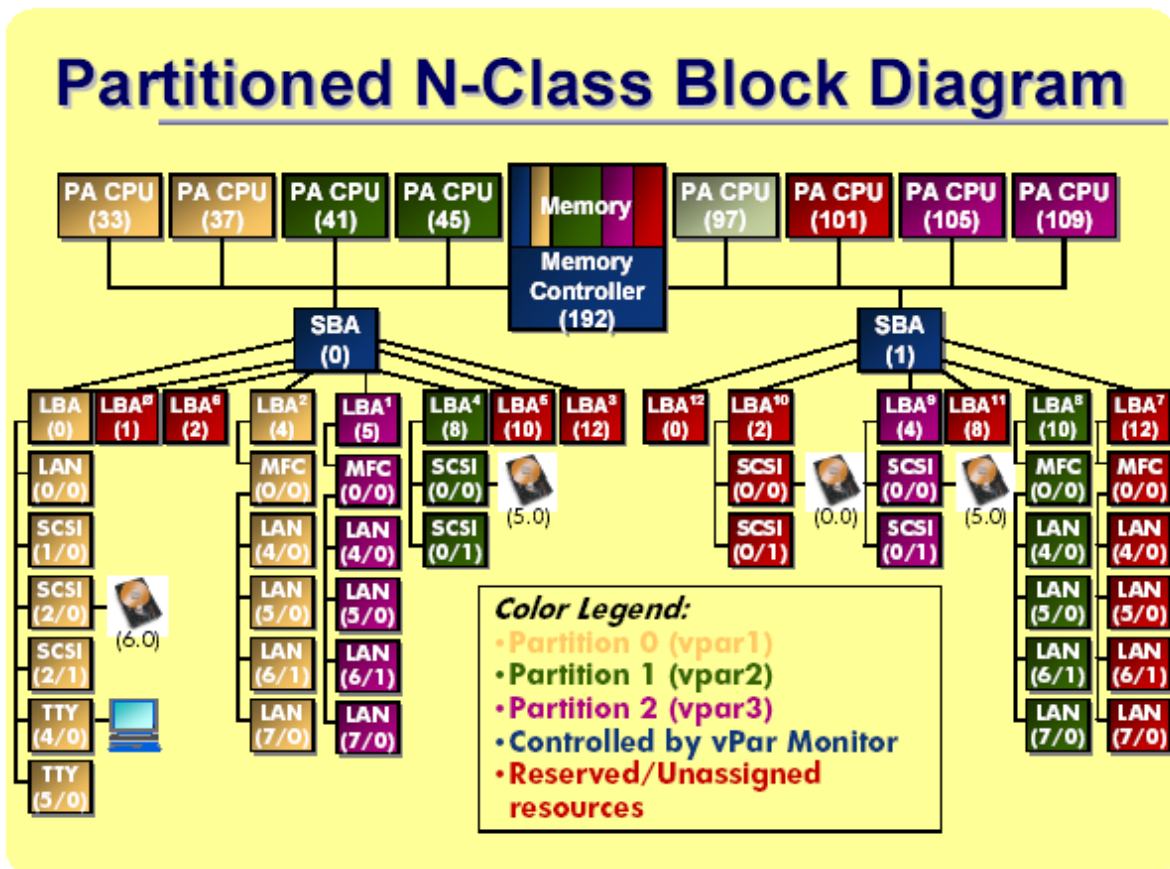
# vparcreate -p vpar1 -a cpu::2
-a mem::1024
-a io:0/0 -a io:0/4 -a io:0/0/2/0.6.0:boot
-B auto

```

```
# vparcreate -p vpar2 -a cpu::2
                        -a mem::4096
                        -a io:0/8 -a io:1/1 -a io:0/8/0/0.5.0:boot
                        -B auto

# vparcreate -p vpar3 -a cpu::2
                        -a mem::2048
                        -a io:0/5 -a io:1/4 -a io:1/4/0/0.5.0:boot
                        -B auto
```

We see the three partitions in our block diagram now:



Note: When using vPars A.03.01 or earlier, I/O is assigned only at or below LBA level. For correct I/O allocation, you must specify the LBA. With vPars A.03.02 or later, I/O can be assigned at or below SBA level now.

Take always special consideration to core I/O devices owning the console hardware, when creating and modifying vPar configurations. A good practice is to always include it in the first vPar used. Taking this resource away from this vpar can cause a loss of console access.

On cell-based systems, the CPU path includes the cell number and should look like cell/CPU. A typical `vparcreate` command would look like:

```
# vparcreate -p vpar1 -a cpu::2 -a cpu:::4 -a cpu:0/12 -a cpu:0/13
```

Installing vPars

Installation of vPars always begins with a non-vPar system that is already running HP-UX 11i (v1 – 3). The vPars product bundle is then added to this installation to create the partitions.

The usual procedure is to create the first vPar, then boot this vPar to install and configure other partitions from it. An Ignite-UX server is used in most cases. From A.03.03 and A.04.02 releases onwards it is also possible to use a tape to install additional vPars.

Check the whitepaper “Booting, Installing, Recovery, and Sharing in a vPars Environment from DVD / CDROM / TAPE / Network” on the following links:

- 11i v1: <http://docs.hp.com/en/oshpux11i.html#Virtual%20Partitions>
- 11i v2: <http://docs.hp.com/en/oshpux11iv2.html#Virtual%20Partitions>
- 11i v3: <http://docs.hp.com/en/oshpux11iv3.html#Virtual%20Partitions>

vPars Product Bundles and Required Patch Bundles

Product Bundles

Product Information Table (read horizontally from left to right):

Product Number	contains vPars version	that supports only HP-UX 11i version	using HP-UX Release	supporting Server Platforms
T1335CC	vPars A.05.xx and later	11i v3 (11.31) you can run multiple HP-UX 11i v3 and 11i v2 OEs within one nPartition	February 2007 or later	PA-RISC and Integrity
T1335BC	vPars A.04.xx and later	11i v2 (11.23)	May 2005 or later	PA-RISC and Integrity
T1335AC	vPars A.03.xx and earlier	11i v1 (11.11)	December 2000 or later	PA-RISC

For more information on the required vPars version by an OS version see: <http://docs.hp.com/en/1705/oc.pdf>.

Required Patch Bundles

vPars A.05.xx: There are no patch bundles required for vPars. However, the vPars A.05.01 release requires the patch PHSS_36739 to resolve issues with the vPars dynamic memory migration feature. This patch fixes JAGag43006 (“Memory got removed from an active partition during memory OLA”). The patch is available at the HP IT Resource Center (at <http://itrc.hp.com>, select “maintenance and support for hp products”).

vPars A.04.xx: From the HP-UX 11i v2 (11.23) Update Release, verify the following

- FEATURE11i (with required patches for vPars install)
- HWEnable11i (with required patches for new hardware)
- QPKAPPS & QPKBASE (with recommended patches)
- OnlineDiag, nPar, iCAP, WBEM, and other bundles (with changes).

See the version specific HP-UX Virtual Partitions Release Notes for further required patches.

vPars A.03.xx: After installing HP-UX 11i v1 (11.11), you should install the latest HP-UX 11i v1 Support Plus CD or online at <http://itrc.hp.com>.

Difference between PA-RISC and Integrity Servers

One major difference between PA-RISC and Integrity systems is the LAN card in use, when using `vparboot -I` and an Ignite server to install vPars,

On PA-RISC systems, the install kernel `WINSTALL` and the install file system `WINSTALLFS` are transferred to the vPars monitor via the running vPar’s LAN card contacting the Ignite-UX server. They are then placed into the memory of the target vPar by the vPar monitor. The target vPar boots up using `WINSTALL` and `WINSTALLFS` to communicate with the Ignite-UX server to continue installation.

On Integrity servers, the `vparboot` command triggers the monitor to execute a `lanboot select` in the EFI shell. It prompts the user to select one of the LAN cards of the target vPar to be used for installation (it is required to use Ctrl-A to switch to the target console to do this selection).

The difference between vPar mode and nPar mode is also new to Integrity systems. To run vPars on an Integrity server it is required to set the firmware in vPar mode. This can be done either by `vparenv` allowing you to set the mode (vPars or nPars) for the next reboot of the nPar, or by setting the memory granularity unit size in the firmware. Example:

```
# vparenv -m vPars
```

The EFI command `vparconfig` can be used alternatively. It is being installed in the EFI partition of the root disk with the installation of the vPars product. The file `vparconfig.efi` is located in `\efi\hpux`. Example:

- Shell> fs0:
- fs0:\> vparconfig reboot vPars
- ...
- Shell> fs0:
- fs0:\> hpux vpmom

Installation from Ignite-UX

Ignite-UX Version considerations

vPars A.05.xx: See the Ignite-UX product documentation for the Ignite-UX version required for HP-UX 11i v3; vPars itself has no special requirements. At this time, HP-UX 11i v3 requires Ignite-UX version C.7.1.x or later.

vPars A.04.xx: Ignite-UX version C.6.2.241 or later is required.

Note: Please do not use Ignite-UX version C.6.3.xx. For the latest version of Ignite-UX, see Ignite-UX at the Software Depot website at <http://www.hp.com/go/softwaredepot>.

Note: Ignite-UX C.6.8 or later will not work with vPars A.04.01 on PA-RISC systems. Either use an Ignite version earlier than C.6.8 and later than C.6.2.241 or upgrade to vPars A.04.02.

vPars A.03.xx: Ignite-UX version B.3.7 or later is required. Starting with Ignite-UX C.6.xx the path for the bootable kernel is `/opt/ignite/boot/Rel_B.11.xx/WINSTALL` instead of `/opt/ignite/boot/WINSTALL` as in the B.05.xx version of Ignite-UX.

`#vparboot -I` results in an Ignite-UX install being initiated, when installing the vPar from the Ignite-UX server. The form and behavior is different on PA-RISC and Integrity systems.

Installation

PA-RISC: The argument to the `-I` option is the Ignite Server IP and the path of the install kernel. The path to the install kernel varies from Ignite-UX release to release. The vPar that

issues `vparboot` will `tftp` the Ignite kernel and file system from the Ignite Server and pass them to the `vpmon`. `vpmon` will load them into the newly created vPar and boot it. The Ignite files passed to the `vpmon` include the IP address of the Ignite Server. A LAN boot is not done; therefore no booting IP addresses will be needed on the Ignite Server for the vPar.

Integrity: There is no argument to the `-I` option. A `lanboot select` displays a list of the LAN cards that can be used to issue a `bootp` request for the new vPar. An Ignite-UX server configured with a `bootptab` entry for the vPars MAC address is required. The Ignite-UX server cannot be specified by its IP address. A broadcast is done, and the first server to reply will be used. You will have an opportunity to cancel and try again if a reply does not come from the correct server.

Installation of PA-RISC systems

What follows is a typical installation (our example `vpar2`) using an Ignite-UX server. After running `vparcreate` to create the virtual partitions on the stand-alone server (see previous chapter), these steps have to be done

1. Boot the vPars monitor and the first virtual partition

```
ISL> hpx /stand/vpmon vparload -p vpar1
```

2. Continue to boot `vpar2` using the Ignite-UX server, boot the target virtual partition from the running virtual partition using `vparboot`.

```
# vparboot -p vpar2 -I \  
<ignite_server>,/opt/ignite/boot/Rel_B.11.11/WINSTALL
```

A message will pop up showing:

```
<MON> vpar2 loaded
```

3. Use `Ctrl-A` to switch to the console of `vpar2` and continue installation using the Ignite installation interface.
4. Enter the boot disk path, LAN info, hostname, and IP address of the target partition into the Ignite-UX interface and install HP-UX, desired patches, the Quality Pack bundle, the vPars bundle, and the desired vPars-related bundles. The virtual partition will automatically reboot after installation.

Installation of Integrity systems

1. After creating virtual partitions using `vparcreate` (see previous chapter), set the `nPartition` to boot into vPars mode:

```
# vparenv -m vPars
```

2. Reboot the system and run the EFI shell from the EFI Boot Manager:

```
# shutdown -r
```

3. From the EFI shell, boot the monitor and the first virtual partition:

```
Shell> fs0:  
Fs0:\> hpux  
HPUX> boot /stand/vpmon vparload -p vpar1
```

4. Set the `TERM` variable to `hpterm`.

5. From the `vpar1` console boot `vpar2` using `vparboot`

```
# vparboot -p vpar2 -I
```

A message will popup showing:

```
<MON> vpar2 loaded
```

6. Use `Ctrl-A` to switch to the console of `vpar2`.

7. Select the MAC address of the LAN card for booting from an Ignite-UX server:

```
01 Acpi(000222F0,0)/Pci(1|0)/Mac(00306E0E5268)  
Select Desired LAN: 1  
Selected Acpi(000222F0,0)/Pci(1|0)/Mac(00306E0E5268)  
Running LoadFile()  
CLIENT MAC ADDR: 00 30 6e 0e 52 68  
DHCP...
```

8. Alternatively, for the target vPars shell run:

```
Shell> lanboot select  
01 Acpi(000222F0,0)/Pci(1|0)/Mac(00306E0E5268)  
Select Desired LAN: 1  
Selected Acpi(000222F0,0)/Pci(1|0)/Mac(00306E0E5268)  
Running LoadFile()  
CLIENT MAC ADDR: 00 30 6e 0e 52 68  
DHCP...
```

Note: `lanboot` will show only the LAN cards that are supported to boot with your existing configuration. If the card(s) you expect to see are not displayed, it may be necessary to issue `reconnect -r` at the EFI prompt. Then, try `lanboot select` again.
Example:

```
Shell> reconnect -r  
Shell> map -r
```

9. Continue the installation using the Ignite-UX installation Interface

Updating the vPars Product

There are three different possible reason to update:

- Updating from a vPars version to a newer one of the same release, e.g. from A.04.xx to A.04.yy
- Updating from vPars A.03.xx to A.04.xx with `update-ux` (PA-RISC only)
- Update from vPars A.04.xx to A.05.xx with `update-ux` (Integrity only)

All the steps are described in the manual “Installing and Managing HP-UX Virtual Partitions (vPars)”, e.g. <http://www.docs.hp.com/en/T1335-90057/T1335-90057.pdf>.

It is possible to use `update-ux` to upgrade HP-UX 11i v1 with vPars A.03.xx to HP-UX 11i v2 with vPars A.04.xx in one go. Please follow the upgrade steps described in chapter 4 of the manual “Installing and Managing HP-UX Virtual Partitions” (<http://docs.hp.com/en/6769/T1335-90038.pdf>). It is recommended to save the first virtual partition as the last one to upgrade and to upgrade the other virtual partitions first. This ensures all other vPars have finished their upgrade, when the nPar reboots after the upgrade.

Ignite-UX Recovery

For information on Ignite-UX refer to <http://docs.hp.com/en/IUX>

Making an Archive of a Virtual Partition

For vPars version A.03.02 and earlier, and A.04.01 `make_tape_recovery` cannot be used to recover a system from within a virtual partition, although it has been supported on vPars enabled servers from A.02.03. However recovery using tapes must then be done outside vPars. You need to use `make_net_recovery`. The program `make_net_recovery` works the same for making archives of both non-vPars and vPars hard partitions.

With the A.03.03 release of vPars, `make_tape_recovery` is now supported as a recovery method within a virtual partition. A recovery tape being created by the `make_tape_recovery` command on a tape device connected to the vPar can be used for recovery the same way as a “normal” system.

A new device attribute similar to a boot device is being added to the virtual partition resource definitions. It is called `TAPE`. Here is an example:

```
# vparcreate -p vpar2 -a io:1/0/14/0/0/4/0.5.0:TAPE
```

`vparstatus -v` shows:

```
# vparstatus -p vpar2 -v
[Virtual Partition Details]
Name: vpar2
.
.
.
[IO Details]
1.0.14
1.0.12
1.0.14.0.0.4.0.10.0.0.0.0.0.0.0 BOOT
1.0.14.0.0.4.0.5.0.0.0.0.0.0.0.0 TAPE
```

Create the tape-based recovery archive using `make_tape_recovery` on vpar2:

```
# make_tape_recovery -A
```

To recover vpar2 do the following from vpar1 with the recovery tape inserted in the tape drive 1/0/14/0/0/4/0.5.0:

```
vpar1# vparboot -p vpar2 -B TAPE
```

The recovery may continue as a normal tape-based system recovery.

Recovering a Virtual Partition

In chapter 7 of the recent update of the manual “Installing and Managing HP-UX Virtual Partitions” (<http://docs.hp.com/en/7042/T1335-90041.pdf>) are detailed procedures for vPars recovery:

- Using `make_net_recovery` within a vPars environment
 - Recovering a virtual partition from a running vpar
 - Recovering all the virtual partitions of a hard partition
- Using `make_tape_recovery` outside of a vPars environment
 - Archiving and recovering a virtual partition using `make_tape_recovery`
 - Archiving and recovering a virtual partition using another virtual partition as the Ignite-UX server
- Using `make_tape_recovery` within a vPars environment in conjunction with an Ignite-UX boot server
- Using `make_tape_recovery` within a vPars environment

Change of vPars install path in Ignite-UX C.6.0

If you are using Ignite-UX C.6.0 or later, the `vpar boot` command used to install an HP-UX 11.11 virtual partition will change:

Before Ignite-UX C.6.0:

```
# vparboot -p <partition_name> -I WINSTALL
```

Ignite-UX C.6.0:

```
# vparboot -p <partition_name> -I /opt/ignite/boot/Rel_B.11.11/WINSTALL
```

Using Virtual Partitions

This chapter describes the usage of the virtual partition software and its commands. There is also information on how to boot the monitor and the partition.

Booting the Monitor

The vPars monitor is `/stand/vpmon`. This file will be loaded before the HP-UX kernel is loaded.

On PA-RISC systems the monitor will be loaded at the ISL prompt:

```
ISL> hpux /stand/vpmon
ISL> hpux /stand/vpmon -a (loads all vPars with auto flag set)
ISL> hpux /stand/vpmon vparload -p vpar1 (loads the vPars directly)
```

On Integrity systems the monitor is loaded through the EFI shell:

```
Shell> fs0:
Fs0:\> hpux
HPUX> boot /stand/vpmon vparload -p vpar1
HPUX> boot /stand/vpmon vparload -p vpar1 -o "-is"
```

vPars mode is required on an Integrity system to load the monitor. See the section “EFI Commands (Integrity only)”.

With no arguments to `/stand/vpmon`, the monitor will load into interactive mode with the following prompt:

```
MON>
```

The following options are available when booting the Monitor:

`-a` boots all virtual partitions that have the `autoboot` attribute set. For more information, see `vparmodify(1M)`.

`-D database_filename` boots the virtual partitions using an alternate partition database file. For more information, see “Using an Alternate Partition Database File” at <http://docs.hp.com>. The default partition database file is `/stand/vpdb`.

Note: Once the `vpmon` has been loaded, the EFI partition or LIF area is no longer accessible. `vpmon` looks into the vPars database to find the hardware path and kernel path for each vPar.

`vpmon` does not give you an opportunity to interact with the boot of a vPar. Any boot options must be specified either in the database or by the command used to manually boot a vPar.

The boot disk of every vPar will contain both `vpmon` and a copy of the vPars database. This makes it possible to boot from any of the vPars boot disks.

A.03.xx and earlier: When the system monarch CPU is not owned by any virtual partition, you will also see the monitor prompt `MON>` while toggling between the virtual consoles.

A monarch CPU exists in both non-vPars and vPars servers. After a server is powered on, the monarch CPU determines what other CPUs are configured on the server and then launches these other CPUs to create a multi-CPU server. Typically, the CPU with the lowest numbered hardware path address (belonging to the core cell for nPar systems) is the monarch CPU. To see the lowest numbered hardware path on a non-vPars server use `ioscan`; on a vPars server use the Monitor command `scan`.

A.04: When any CPU is available, you will see the `MON>` prompt.

EFI Commands (Integrity only), vPar and nPar Modes

There is a variable in the EFI NVRAM of Integrity systems that is used to determine whether the monitor will be allowed to boot. When the mode is set to nPar the monitor cannot boot. When the mode is set to vPar, the nPar cannot be booted stand-alone; only the monitor can be booted.

The `vparconfig` command in the EFI shell is new to Integrity servers. It is used to switch between nPar and vPar mode on a cell-based Integrity Server. Note, that the `vparconfig` command is not a built-in command of the EFI shell. You will first have to select an EFI partition of a boot disk that has the vPars software installed.

Examples:

Set the mode to vPars and then immediately reboot the nPartition into vPars mode:

```
Shell> fs0:
fs0:\> vparconfig reboot vPars
```


Set the mode to nPars and then immediately reboot the nPartition into nPars mode:

```
Shell>fs0:
fs0:\> vparconfig reboot nPars
```

It is also possible to use `vparsenv` to set the mode. `vparsenv` displays and sets the environment for the next boot. Use this command from the HP-UX shell prompt to display or change the settings of the mode:

```
# vparsenv -m vPars
```

Using `vparsEFIutil -u` to update the EFI path mapping in the vPars database

It is essential for the vPars database to contain a hardware path to the EFI path mappings on Integrity systems, so the boot loader can find the right EFI path to boot. However, any change of the EFI path to an existing boot disk, including adding a boot disk mirror, will not be automatically updated in the vPars database. This could lead to boot failure of virtual partitions. Changing the boot path using the `vparsmodify` command does not update the EFI path mapping in the vPars database `vpdb`.

To update the EFI path of a boot disk (e.g. after creating a boot mirror disk), it is essential to execute `vparsEFIutil -u` on each virtual partition.

Use `vparsEFIutil` without options to display the current hardware to the EFI path mapping.

Boot configurations

Setting the Primary or Alternate Boot Paths

setboot: `setboot` affects only the virtual partition from which you execute the command.

- To set the primary boot path: `#setboot -p 0/8/0/0.5.0`
- To set the alternate boot path: `#setboot -a 0/8/0/0.2.0`

vparscreate: within the `vparscreate` command, you can specify the primary or alternate boot paths with the `BOOT` and `ALTBOOT` attributes:

- To set the primary boot path:
`#vparscreate -p vPar1 -a io:0.8.0.0.5.0:BOOT`
- To set the alternate boot path:

```
#vparcreate -p vPar1 -a io:0.8.0.0.2.0:ALTBOOT
```

- To set both the primary and alternate boot paths on the same command line:

```
#vparcreate -p vPar1 -a io:0.8.0.0.5.0:BOOT -a
io:0.8.0.0.2.0:ALTBOOT
```

vparmodify: if the virtual partitions are already created, you can specify the primary or alternate boot paths with the `BOOT` and `ALTBOOT` attributes within the `vparmodify` command:

- To set the primary boot path:

```
#vparmodify -p vPar1 -a io:0.8.0.0.5.0:BOOT
```

- To set the alternate boot path:

```
#vparmodify -p vPar1 -a io:0.8.0.0.2.0:ALTBOOT
```

- To set the primary and alternate boots paths on the same command line:

```
#vparmodify -p vPar1 -a io:0.8.0.0.5.0:BOOT -a
io:0.8.0.0.2.0:ALTBOOT
```

`setboot` does not read from or write to stable storage on a vPars systems. Instead, the `setboot` command reads from and writes to the vPars partition database, affecting only the entries of the virtual partition from which the `setboot` command was run.

Using `vparmodify` to change a boot path in the vPars database does not update the EFI path in the vPars database. To update the EFI path of a boot disk in the vPars database (for example, after creating a boot disk mirror), execute `vpafefiutil -u` (-u for update) on each virtual partition.

To modify the paths in stable storage of a PA-RISCstem, use the `parmodify` command or go to the BCH.

For Integrity-Systems, you must reboot the `vpmon` and set the new UID of the Disk in the EFI Shell.

Monitor commands

The following table gives an overview of the Monitor commands at the `MON>` prompt. The most useful command is `vparload`. The `vparload` command does the same as the `vparboot` command from a running partition.

Command	Explanation
readdb	reads an alternative database.
vparload	boots or loads a vPars from the Monitor. Examples:

	MON> vparload -all MON> vparload -auto MON> vparload -p vpar1 MON> vparload -p vpar1 -o "-is" -b /stand/vmunix.prev This command performs the same function as the <code>vparboot</code> command from the HP-UX shell prompt.
bootpath	Shows the boot path from which <code>vpmon</code> was loaded
reboot	reboots the monitor and the whole server similar to CTRL-B, RS
cat	can be used for listing a file, similar to the cat(1) command within HP-UX. The default directory is <code>/stand</code>
cbuf	displays console buffer
help or <code>?</code>	displays the list of Monitor commands.
lifls	lists the contents of the LIF (Logical Interchange Format) volume.
getauto	returns the contents of the AUTO file within the LIF volume.
log	displays the contents of the Monitor log.
ls	Lists the files in a directory. The default directory is <code>/stand</code>
scan	displays the hardware found by the Monitor.
toddriftreset	resets the Time Of Day (TOD) real-time clock drift.
vparinfo	displays information about a vPars, or, about unassigned hardware.
<code>monadmin</code>	Enable and disable flexible admin capability

Examples:

readdb

```
MON> readdb <filename>
```

Reads an alternate partition database filename for partition configuration information filename must be an absolute path and reside on a HFS file system. If you have a backup copy of the partition database in the file `/stand/vpdb.backup`, you can read the database configuration information using:

```
MON> readdb /stand/vpdb.backup
```

vparload

```
MON> vparload -all
MON> vparload -auto
MON> vparload -p partition_name [-b kernelpath] [-o boot_options] [-B
    hardware_path]
```

Boots the virtual partition; this command is similar to `vparboot`.

`-all` boots all virtual partitions, regardless of the autoboot attribute. For more information on the autoboot attribute, see the `vparcreate (1M)` or `vparmodify (1M)` manpages.

`-auto` boots all virtual partitions that have their autoboot attribute flag set to `AUTO`.

- b `kernelpath` boots the virtual partition using the kernel `kernelpath`, such as `/stand/vmunix.prev`, instead of the default kernel `/stand/vmunix`.
- o `boot_options` boots the virtual partition using the options `boot_options`, such as `-is` for single-user mode or `-lm` for LVM maintenance mode.
- B `hardware_path` boots the virtual partition using the disk device at the `hardware_path`

To boot the partition `vpar2` into single-user mode:

```
MON> vparload -p vpar2 -o "-is"
```

To boot the partition `vpar2` using the kernel `/stand/vmunix.other`:

```
MON> vparload -p vpar2 -b /stand/vmunix.prev
```

To boot the partition `vpar2` using the disk device at `0/8/0/0.2.0`:

```
MON> vparload -p vpar2 -B 0/8/0/0.2.0
```

Note: The option `-b kernelpath` allows you to change the target kernel for the next boot of `partition_name` only. To make a permanent change to the partition database, use `vparmodify`. For example, to change the partition database information so `vpar2` always boots using `/stand/vmunix.other`:

```
# vparmodify -p vpar2 -b /stand/vmunix.other
```

See the `vparmodify(1M)` manpage for more information on modifying the partition database.

bootpath

Displays the device from which the vPars Monitor (`/stand/vpmon`) was booted.

```
MON>bootpath
disk(0/0/2/0.6.0)
```

reboot

This command reboots the entire hard partition. Other hard partitions are not affected.

cat

```
cat <filename> [openonly]
```

This command displays the contents of a file. When `openonly` is specified, the message “open succeeded” is printed only, if the monitor was able to open the `filename`. This command is similar to the UNIX command `cat`. The file must be a text file on an HFS file system. `/stand` is the default directory. To display the file `/stand/notes.txt`

```
MON> cat notes.txt
10/13/2001: built new kernel today. if problems arise, revert to saved kernel
vmunix.original
```

cbuf

cbuf partition_name

Displays the contents of the console buffer of a partition.

help

help or ? lists all monitor commands.

lifs

Lists the files in the LIF area

getauto

Displays the contents of the AUTO file in the LIF area

```
MON> getauto
hpux /stand/vpmon
```

log

Displays the contents, including warning and error messages, of the Monitor log. The Monitor log holds up to 16KB of information in a circular log buffer. The information is displayed in chronological order.

ls

ls [-alniFH][directory]

Lists the contents of directory. This command is similar to the Unix ls command. Directory must be on a HFS file system. /stand is the default directory. The ls command-line options are the same as the Unix shell ls options. For detailed explanations, see the ls(1M) manpage. Example to view the listing of files in vpar2's /stand directory:

```
MON> ls /stand
lost+found      ioconfig      bootconf      system
system.d        vmunix        dlkm.vmunix.prev  build
kernel          rootconf      vpdb          vpmon.dmp
vmunix.backup   system.prev   vmunix.prev    dlkm
vpdb.backup      vpmon
```

scan

Lists all hardware discovered by the Monitor and indicates which virtual partition owns each device.

toddriftreset

Reset the drifts of the real-time clock. Use this command if you reset the real-time clock of the hard partition at the BCH prompt.

vparinfo

```
vparinfo [partition_name]
```

This command is for HP internal use only.

- a all entries
- l long listing
- n numerical UIDs and GIDs
- i inode
- F appends a character after the entry; depending on the file type, such as a / (slash) for a directory when no partition name is given, `vparinfo` displays all unassigned resources and the names of all existing virtual partitions; when `partition_name` is given, `vparinfo` displays the resources assigned to `partition_name`.

monadmin

```
monadmin [-S on|off] | [-a|-d partition_name] | [-l]
```

This command is used with flexible vPars administrative capability to:

- Enable or disable this admin capability;
- list the designated-admin virtual partitions;
- add or delete a vPars from that list.

This capability is being set to off by default.

vPars Commands

Command	Explanation
---------	-------------

vparcreate	Create a new virtual partition
vparboot	Boot a virtual partition
vparmodify	Modify the attributes of a virtual partition
vpardump	Manages Monitor dump files
vparextract	Extracts memory images from a running virtual partition system
vparreloc	Relocates the load address of a <code>vmunix</code> file, determines if a <code>vmunix</code> file is relocatable and promotes the scope of symbols in a relocatable <code>vmunix</code> file
vparremove	Remove a virtual partition
vparreset	Reset a virtual partition
vparstatus	Display information about one or more vPars
vparutil	Gets and sets SCSI parameters for SCSI controllers from a virtual partition
<code>vparsenv</code> (integrity only)	Switching between nPars and vPars mode on integrity servers
<code>vparadmin</code>	Command to manage flexible administrative capability (only A.03.03 and A.04.02)

vparcreate

`vparcreate` is used to create a new virtual partition. Let's have a look at a short example to see how to use `vparcreate`. To create a virtual partition named `vpar1` with the following resources: Three total CPUs (two bound CPUs at hardware paths 41 and 45 and one unbound CPU) with a maximum of four (bound plus unbound) CPUs, 1280 MB of memory, all hardware where the path begins with 0/8 or 1/10, a boot disk at 0/8/0/0.5.0

Use the corresponding `vparcreate` command line options:

resource or attribute	vparcreate option
virtual partition name is <code>vpar1</code>	<code>-p vpar1</code>
three total CPUs	<code>-a cpu::3</code>
of which two are bound CPUs and a maximum of four CPUs	<code>-a cpu:::2:4</code>
at hardware paths 41 and 45	<code>-a cpu:41 -a cpu:45</code>
1280 MB of memory	<code>-a mem::1280</code>
all hardware where the path begins with 0/8	<code>-a io:0/8</code>
all hardware where the path begins with 1/10	<code>-a io:1/10</code>
hardware at 0/8/0/0.5.0 as the boot disk	<code>-a io:0/8/0/0.5.0:boot</code>

The resulting `vparcreate` command line is:

```
vpctest# vparcreate -p vpar1
-a cpu::3 -a cpu:::2:4 -a cpu:41 -a cpu:45
-a mem::1280
-a io:0/8 -a io:1/10 -a io:0/8/0/0.5.0:boot
```

It is recommended to configure LBA with the physical hardware console port as part of the first virtual partition created.

vparboot

The `vparboot` command is used to boot a second vPars from a running vPars. The `vparboot` command has several options as the [vparload](#) command at the Monitor prompt. Examples:

Boot vpar2 partition from running vpar1 partition:

```
vpar1# vparboot -p vpar2
```

Boot vpar2 partition to single user mode from running vpar1 partition:

```
vpar1# vparboot -p vpar2 -o "-is"
```

vparmodify

With `vparmodify` we can change the resources and attributes of an existing virtual partition. The options are similar to the `vparcreate` command. The difference here is to use the option `-d` to delete a resource or attribute. Another option is `-m` to modify the attributes or resources in a vPars. Examples:

Modify the primary boot path to vpar1:

```
vpctest# vparmodify -p vpar1 -m io:0/8/0/0.5.0:BOOT
```

Set the alternate boot path:

```
vpctest# vparmodify -p vpar1 -a io:0/8/0/0.2.0:ALTBOOT
```

Modifying a virtual partition can be done by deleting and then adding a resource. Otherwise we can use `vparmodify -m` to modify a resource. The next table shows the different options for `vparmodify` for adding, removing, or deleting resources. See also the `manpage vparresources(5)` on a running vPars system.

Task	Syntax	allowed with vpars running
-a (add)	cpu:path cpu:num cpu::[min][:[max]] (vparcreate only) io:path[:attr1[,attr2]] mem::size mem:::base:range	No Yes N/A No No No
-m (modify)	cpu:num cpu::[min][:[max]] io:path[:attr1[,attr2]] mem::size	Yes No No No
-d delete	cpu:path	No

	cpu::num	Yes
	io:path[:attr1[,attr2]]	No
	mem::size	No
	mem:::base:range	No

vpardump

The `vpardump` command is used to create and analyze a virtual partition's monitor dump file. `vparmon` is the image of the virtual partition monitor and `dumpfile` is the crash dump file corresponding to that image. `vpardump` is usually run from the `vparinit` rc script to analyze a crash dump during the HP-UX boot. If no options are specified, `vpardump` checks whether the dump file has been cleared or not. If not, it analyzes the dump file and prints information about the crash to `stdout`. Then, `vpardump` marks the dump file as cleared. If the dump file is not specified, the string `.dmp` is appended to `vparmon` as in `/stand/vparmon.dmp`. If `vparmon` is not specified, it defaults to `/stand/vpmon`.

vpextract

This extracts memory images from a running virtual partition system. A useful initial troubleshooting method for virtual partitions is to use `vpextract -l` to print the log buffer of the vPars monitor. It contends time stamps (vPars version 3.02 and earlier) with warning and error messages about critical activities related to vPars monitor.

vparreloc

Relocate the load address of a `vmunix` file, determine if a `vmunix` file is relocatable, or promote the scope of symbols in a relocatable `vmunix` file

vparremove

The `vparremove` command deletes a virtual partition previously created using the `vparcreate` command. All resources associated with the virtual partition are made available for allocation to other partitions. Example:

```
vpctest# vparremove -p vpar1
Remove virtual partition vpar1? [n]: y
```

vparreset

The `vparreset` command simulates, at the virtual partition level, the RS and TOC operations at a "Control-B prompt" on the system console. This can be done from another running vPars on the same system. Other running partitions are not affected. Example:

To TOC the vPars `vpar1`

```
vpctest# vparreset -p vpar1 -t
```

To shutdown `vpar1`

```
vpctest# vparreset -p vpar1 -h
```

vparstatus

Display information about one or more virtual partitions on a system. If the monitor is not loaded the vparstatus shows a message. The output also shows the state of a vPars. Examples:

Running vparstatus on system where vpar is configured, but not running at this time.

```
# vparstatus
vparstatus: Warning: Virtual partition Monitor not running, Requested
resources shown.
[Virtual Partition]
Boot
Virtual Partition Name State Attributes Kernel Path Opts
=====
mars                    N/A    Dyn,Auto /stand/vmunix
jupiter                 N/A    Dyn,Auto /stand/vmunix

[Virtual Partition Resource Summary]
CPU Num Memory (MB)
CPU Bound/ IO # Ranges/

Virtual Partition Name Min/Max Unbound devs Total MB Total MB
=====
mars                    2/4      1      2      256
jupiter                 1/4 1     0      3      256
```

vparstatus shows the following stated of a running vPars

State	Description
load	A vPars is loading/booting
boot	A vPars is loaded into memory
up	A vPars is up and running.
shut	A vPars is shutting down.
down	A vPars is down.
crash	A vPars is crashing (panic - HPMC, TOC)
hung	A vPars is not responding.

The complete status and configuration can be listed by vparstatus too.

```
# vparstatus -v -p vpar1

[Virtual Partition Details]
Name:          vpar1
State:         N/A
Attributes:    Dynamic, Autoboot
Kernel Path:   /stand/vmunix
Boot Opts:
```

```

[CPU Details]
Min/Max: 1/3
Bound by User [Path]:
Bound by Monitor [Path]: <no path>
Unbound [Path]:

[IO Details]
2.0.0
2.0.1
2.0.1.0.0.1.0 BOOT
2.0.4

[Memory Details]
Specified [Base /Range]:
      (bytes) (MB)
Total Memory (MB): 1024

```

New options added to `vparstatus` in 3.01 are:

- `vparstatus -m` to show monitor status, console path, hardware path the monitor is booted from, file system path of the monitor and `vpdb` file that is being used;
- `vparstatus -V` to show vPars version;
- `vparstatus -e` to extract the `vpmon` log buffer.

When migrating CPUs using `vparmodify`, it may not happen instantaneously. If there is a pending reconfiguration of a CPU on a virtual partition, `vparstatus` will append a letter `p` next to the number of CPUs in the summary output and words (migration pending) will be displayed in the detailed output.

vparutil

The `vparutil` command gets and sets SCSI parameters for SCSI controllers within a running virtual partition. When setting the SCSI parameters with the `-s` option, the virtual partition owning the specified SCSI controller must be in down state. If not, the command will fail with the appropriate error code.

vparsenv (Integrity only)

Use command `vparsenv` to set the mode on Integrity Server. Example:

```
# vparsenv -m vPars
```

Set the mode to vPars for the next nPartition reboot.

```
# vparsenv -m nPars
```

Set the mode to nPars for the next reboot.

vparadmin (vPars A.03.03 and A.04.02 or later)

The command allows to:

- Turn on or turn off the vPars flexible administrative capability;
- change flexible admin capability password;
- list the current configuration in the designated admin vPars list;
- adding or deleting vPars to or from the designated admin vPars list.

Example:

```
# vparadmin -l
```

To list the designated admin vPars list

```
# vparadmin -a vpar1
```

Add vpar1 to the designated admin vPars list. You will need to provide the flexible admin capability password

```
# vparadmin -c
```

to change flexible admin capability password.

What is new in this version?

vPars A.05.xx Releases

vPars A.05.01:

- **Dynamic Memory Migration:** You can add memory to or delete memory from a virtual partition while it is up (online). When memory is assigned to a virtual partition, it can be categorized as “float” (i.e., can be added or deleted while the virtual partition is up), or “base” (i.e., cannot be deleted while the virtual partition is up). By default, all memory assigned to a virtual partition during the vPar creation or memory addition, is considered base memory. For more information, see the A.05.01 resources chapter in the “HP-UX Virtual Partitions Administrator's Guide”.
- **Hyperthreading** can be enabled in a vPars environment, if the processor hardware supports it. Each vPar operating system and applications will be able to take advantage of CPU threading, just as in an nPar environment. Processor assignments and migration will continue to be supported at the CPU core level though. For more

information, see the “A.05.01 Resources” chapter in the “HP-UX Virtual Partitions Administrator's Guide”.

- **Mixed HP-UX 11i v2/v3 vPars Environments:** You can now have a vPars A.05.01 monitor and database that simultaneously supports virtual partitions running vPars A.05.01 on HP-UX 11i v3 (11.31) and virtual partitions running vPars A.04.02 or above on HP-UX 11i v2 (11.23). For detailed information, see the “Mixed HP-UX 11i v2/v3 vPars” section in the “Planning” chapter of the “HP-UX Virtual Partitions Administrator's Guide”.
- **Obsolescence Notes:** vPars A.03.02 is no longer supported. See “Obsolescence of vPars Releases” (page 16). Servers that are not nPartition-able are not supported under A.05.01. These servers are the rp54x0/L-Class and rp7400/N4000. See “Servers” (page 18). These servers remain supported for A.03.xx and A.04.xx.

vPars A.04.xx Releases

vPars A.04.04:

- Support for PA-RISC Servers using the **HP sx2000 Chipset:** rp7440, rp8440, and HP 9000 Superdome.
- **Pre-enablement of SCSI Tape Boot and Recovery for Integrity Servers:** Tape devices from within the vPars environment can be used on Integrity servers running vPars A.04.04 – this includes recovery using tape devices. **Note:** use only the tape devices that are already supported with Integrity servers in stand-alone mode. vPars does not support devices beyond those that are supported by the server itself.

vPars A.04.03:

- **Tape devices on PA-RISC Servers:** Use of tape as boot devices from within the vPars environment; this includes recovery using tape devices. For more information, see the recovery chapter in the “HP-UX Virtual Partitions Administrator's Guide”. **Note:** Only tape devices that are already supported for PA-RISC servers in standalone mode can be used; vPars does not support devices beyond what is supported by the server itself.
- **Obsolescence Note:** vPars A.03.01 is no longer supported. See “Obsolescence of vPars Releases” (page 16).

vPars A.04.02:

- Support for the new **sx2000 chipset on Integrity** servers like Integrity Superdome, rx8640, rx7640 and also PA cell-based server with PA-RISC 8900 CPU like rp8440 and rp7440.
- **vPars Flexible Administrative Capability on Integrity Servers:** Limit administration capability for certain virtual partitions, only the superuser within the designated vPars can perform vPars administration affecting other vPars. A super-user for a non-designated virtual partition can perform tasks that affect that particular vPar only.

vPars A.04.01:

- First release of vPars on Integrity platform (IA-64), updates for PA-RISC systems;
- works in combination with HP-UX 11i v2 only;
- new Product number T1335BC only for 11i v2, T1335AC (A.03.xx) is for 11i v1;
- added support for HP Integrity Superdomes, rx8620, rx7620
- Restriction for bound and unbound CPU has been removed; all CPUs are fully dynamic
- Support for cell local memory and cell local processors.

New commands like `vparconfig`, `vparsenv` and `vparsfiutil` added.

vPars A.03.xx Releases

vPars A.03.03:

- Flexible vPars Administrative Capability feature has been added. It allows restriction of execution of certain vPars command such as `vparmodify` and `vparreset`. The security can be set to either ON or OFF from vPars monitor's prompt. New security commands added are `monadmin` (at monitor prompt) and `vparadmin` (HP-UX shell). For more info check chapter 8 of "vPars A.03.03 Admin Guide" (<http://docs.hp.com/en/7042/T1335-90041.pdf>).
- Support for `TAPE` device as a vPars device attribute. Main advantage is the ability to use `make_tape_recovery` within a virtual partition. See Ignite recovery part of this document for more details.

vPars **A.03.02** (out-of-support):

- It is now possible to use **SBA** (System Bus Adapter) as a I/O resource instead of LBA during vPars configuration.
- **Autoboot** attributes have been extended with the **autosearch** option. Attribute **autosearch** can have the values “search” and “nosearch”. Value “nosearch” means that only the primary boot path is attempted, while “search” will try the alternate boot path, if the primary path boot failed. More on this at page 134 of “vPars A.03.02 Admin Guide” (<http://docs.hp.com/en/6018/T1335-90031.pdf>).
- Now vPars commands will also be logged into `syslog.log` on the partition where the commands are executed.
- The command `vparstatus -e` will show the `vpmon` log, similar as `vpextract`, `vparstatus -m` will get the info about vPars monitor.

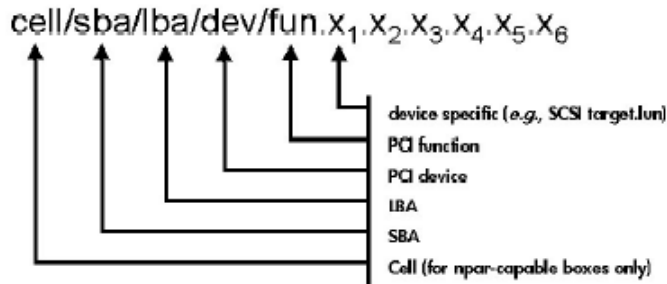
vPars A.02.xx Releases

vPars **A.02.03** and **A.03.01** (both out-of-support)

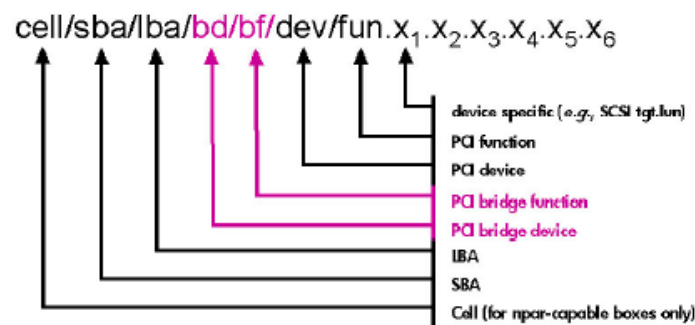
- Support for dual-core PA-8800 processor systems in A.03.01: RP7420 and RP8420, Superdome
- **New IO hardware:** Server Expansion Unit (SEU) and keystone KIOX expander in A.03.01, additional combo cards in A.02.03.
- New output from `vparstatus` command shows CPU migration pending status. Pending means that we have unbound CPUs migrating to and from that virtual partition. More info on page 153 of “vPars A.03.01 Admin Guide” (<http://docs.hp.com/en/T1335-90027/T1335-90027.pdf>).

vPars **A.02.02** (out-of-support)

- **New I/O hardware:** Superdome IO expander, A5838A SCSI/LAN Combo card (previously not supported for boot/dump, requires new hardware path format).
- **Hardware path specification format change.** Prior to A.02.02, vPars allowed hardware path notations for boot devices to be incompletely specified in the database. It was possible to add a boot device without the complete hardware path from `ioscan`. For example, `ioscan` shows `0/0/1/1.0.0`. Then, we can add this device to vPars and the monitor expands it by default to the full device path `0/0/1/1.0.0.0.0.0.0.0`, if it is needed.



- A.02.02 supports the **SCSI/LAN Combo card as boot device**. This card has a built in PCI-Bridge below the LBA. The full path length for a device is now longer than it was in A.02.01 and the database was modified to accommodate this.



- The notation to add hardware paths to a virtual partition can be done with the output from `ioscan` or the full I/O path with only dots in it. vPars accept both commands and handles them differently. The database has no delimiter and cannot check which card is present here. The monitor padded usually six zeros (with a dot to the path) after the first dot. vPars handled the slashes and dots as the same and `vparstatus` only prints dots as a delimiter for the hardware path. Now, the hardware path can reach thirteen elements. Because we can use slashes and dots in the hardware path, the monitor has the following rule to handle this: Paths with all slashes or all dots will not be padded.
- A hardware path that contains a dot after one or more slashes may be padded by vPars. In this case, the element after the last slash is assumed to be the PCI function, so the path will be padded with zeroes up to six elements after the first dot.
- It is important to specify the hardware path for a combo card or any device in A.02.02 to a complete `ioscan` output or with the correct information with all dots.

vPars A.02.01 (out-of-support)

- Superdome support;
- WLM, iCOD support;
- Graphical User Interface (GUI), vPars Manager (`vparmgr`).

Virtual Partitions Product Support Policy

The HP-UX vPar product T1335AC is not bundled with the Application (DART) DVD/CD-ROM, it needs to be ordered separately. Due to the high level of integration, defect fixes for the vPar product are not issued as individual patches. Product defect fixes and enhancements are delivered via the latest version of the product. All vPars versions are full releases and contain all product components. No patches for previous vPars releases will be created. HP strongly recommends customers to upgrade vPars as soon as new versions are available.

HP-UX vPars releases will have a minimum support life cycle of two years. Here is a support life-cycle table:

vPars Support Matrix (March 2007)

vPars A.05.xx on 11i v3*

vPars Version	Release Date	Minimum End of Support Date	Status
A.05.01	Feb-2007	Mar-2010	Supported

vPars A.04.xx on 11i v2*

vPars Version	Release Date	Minimum End of Support Date	Status
A.04.01	Sep-2005	Sep-2007	Supported
A.04.02	Mar-2006	Mar-2008	Supported
A.04.03	Sep-2006	Sep-2008	Supported

vPars A.03.xx on 11i v1*

vPars Version	Release Date	Minimum End of Support Date	Status
A.03.01	Apr-2004	May-2006	Unsupported
A.03.02	Dec-2004	Dec-2006	Unsupported
A.03.03	Oct-2005	Oct-2007	Supported
A.03.04	Mar-2007	Mar-2010	Supported

vPars A.02.xx on 11i v1*

vPars Version	Release Date	Minimum End of Support Date	Status
A.02.01	-	Jul-2004	Unsupported
A.02.02	-	Jan-2005	Unsupported
A.02.03	-	Dec-2005	Unsupported

For more information see the document: <http://docs.hp.com/en/1705/oc.pdf>.

Crash Dump Handling on vPars Systems

If a vPar crashes and writes a dump, the crash handling is the same as on an nPar. The dump is written to `/var/adm/crash` and can be analyzed using the same tools as on an nPar systems. The only difference is a monitor (`vpmon`) crash.

Resetting a Virtual Partition

Just as it is occasionally necessary to issue a hard reset (RS) or a soft reset (TOC) for a non-vPars OS instance, is it occasionally necessary to issue similar resets for a vPars OS instance.

Hard Reset

A hard reset cold-boots a hard partition (not running vPars). To issue a hard reset, the administrator issues CTRL-B at the console to connect to the service processor and then types the command `RS` (reset) and the hard partition reboots (cold).

A hard reset will reset the hard partition running vPars – including the monitor and all virtual partitions.

Use `vparreset -h` from a running virtual partition to perform a reset on a vPar and to prevent it from rebooting. For example, if `vpar2` is hung, we can execute `vparreset` from running partition `vpar1`:

```
vpar1# vparreset -p vpar2 -h
```

The `-h` option also inhibits the autoboot behavior (just like `shutdown -h` does); therefore `-h` can be used to break out of a reboot loop. Because `-h` overrides the autoboot setting for that virtual partition, the partition must be manually restarted via `vparboot` (e.g., `vpar1# vparboot -p vPar2`).

Other virtual partitions are unaffected by one virtual partition's reset.

Soft Reset (TOC)

On a hard partition **not** running vPars, a soft reset (TOC) allows HP-UX to attempt to capture a state and potentially create a crash dump and then the hard partition reboots. To issue a soft reset, the administrator types a CTRL-B at the console to connect to a service processor and then types the command `TC` (transfer of control).

On vPars System, a TOC from the MP/GSP will force all the virtual partitions to dump as well as the Monitor image, and then the hard partition reboots.

Use `vparreset -t` (for TOC) from another running virtual partition to perform a soft reset on a vPar. For example, if `vpar2` is hung, we can execute `vparreset` from the running partition `vpar1`:

```
vpar1# vparreset -p vpar2 -t
```

The target virtual partition either shuts down or reboots according to the setting of the `autoboot` attribute of that virtual partition.

Other virtual partitions are unaffected by one virtual partition's reset.

Note: Unlike the `RS` and `TC` commands, the `vparreset` command also displays Processor Information Module (PIM) data unless the `-q` option is specified.

The target virtual partition on cell-based systems will not be rebooted until all the virtual partitions within the nPartition are shut down and the virtual partition monitor is rebooted.

The monitor dump

If the monitor crashes, the whole nPar and all vPars on it go down.

On PA-RISC, the monitor writes a dump to `/stand/vpmon.dmp`. This file is also present on a running vPar. The file reserved the space to save the crashdump for the Monitor.

On Integrity, the Monitor dump is written to the file `vpmon.dmp` in the EFI partition of the monitor's boot disk. The file can be found at `fsN:/efi/hpux/vpmon.dmp`.

When the virtual partition owning the monitor's boot disk is booted, the following files will be created in `/var/adm/crash/vpar`:

- `vpmon` (copy of the executable image of the monitor at dump time)
- `vpmon.dmp` (monitor dump file)
- `summary` (analysis of the crash including PIM info for each CPU)

All three files should be collected for analysis. The HP-UX crash dumps from running virtual partitions may also be required.

A quick way to check, if there is a crash dump in a `vpmon.dmp` file, is to run the following command:

```
$ strings /stand/vpmon.dmp | egrep -v 'ZDUMP_IMAGE_LIST|VPAR Monitor Memory Image'  
VPAR
```

VPAR indicates no available crash dump.

Note: On PA-RISC, `/stand/vpmon.dmp` is a special file. Do not delete, move, rename, or modify this file. If you need to look at the contents of the monitor dump file, use the `vpmon.dmp.n` file located in `/var/adm/crash/vpar`.

Monitor Dump Analysis Tool

The vPars monitor is not a HP-UX kernel and you cannot use a kernel dump analysis tool to examine a monitor dump file. Contact your HP Support Representative to analyze the monitor dump file.

The vPars Monitor Event Log

In any running virtual partition extract the monitor's event log:

```
# vparextract -l
```

There is one instance of the monitor at `/stand/vpmon`, and one log file only. No need to run the command in every partition!

If no HP-UX instances are running, use the monitor's log command to get similar information:

```
MON> log
```

The monitor log is very important to track eproblems on a running vPar. Any console outputs or GSP logs that seem relevant are also appreciated.

The tool `vpars-collect`

The `vpars-collect.sh` script is useful to collect vPars configuration and version information.

`vpars-collect.sh` runs a number of commands including `vparstatus(lm)` and `vparextract`. `vpars-collect.sh` must be run as root. You need to run the script run in one virtual partition only to collect the complete information for all.

The script collects the outputs in `/var/tmp`. The directory name includes the hostname and process ID.

Upon completion, the outputs are packaged twice, first into a `.tar.gz` file suitable for transfer to HP, and a (nearly) complete subset in a `<hostname>.txt` file that can be mailed without using MIME, or attached to a CR in Chart.

`vpars-collect` and some additional tools can be found at: <http://wtec.cup.hp.com/~hpux/vm-pm/vpars/tools.htm> (HP Internal).

Interaction of vPars with other products

- Please check the current “vPars Ordering and Configuration Guide” (<http://docs.hp.com/en/1705/oc.pdf>) for the latest information about interaction of vPars with iCAP, WLM, PPU, DIAGNOSTIC and Serviceguard products.

Additional Information

HP-UX Virtual Partitions Ordering and Configuration Guide

<http://docs.hp.com/en/1705/oc.pdf> Content: Purchasing and licensing, supported configurations, features of vPars software by release, obsolescence of vPars releases, supported hardware configurations, minimum system firmware requirements, number of virtual partitions per nPartition, supported mass storage devices and networking cards, required software products versions.

Some Useful Manuals

UX 11i v1 (releases 3.x): <http://docs.hp.com/en/oshpux11i.html#Virtual%20Partitions>

UX 11i v2 (releases 4.x): <http://docs.hp.com/en/oshpux11iv2.html#Virtual%20Partitions>

UX 11i v3 (releases 5.x): <http://docs.hp.com/en/oshpux11iv3.html#Virtual%20Partitions>

- Installing and Managing HP-UX Virtual Partitions
- Read Before Installing HP-UX Virtual Partitions Manual on
- HP-UX Virtual Partitions Release Notes
- HP-UX Virtual Partitions Administrator's Guide

Various vPars-related whitepapers

- [Bootting, Installing, Recovery, and Sharing in a vPars Environment from DVD / CDROM / TAPE / Network](#)
- [Securing Virtual Partitions with HP-UX Role-Based Access Control](#) (UX 11i v2)
- [Using Golden Images with Virtual Partitions](#)

- [Resizing vPars automatically with HP-UX Workload Manager](#)
- [Kernel Memory Allocation](#) (UX 11i v1)
- [LPMC and resulting CPU States](#) (UX 11i v1)

Product Support Plan (PSP)

http://wwwpsp.atl.hp.com/lmx_mount/supplan/psp/12/psp12064.htm (HP Internal)

vPars Training Web Page

<http://cso.fc.hp.com/ssil/uxsk/hpux/products/vPars> (HP Internal)

vPar Newsletter for support community

<http://wtec.cup.hp.com/~hpux/vm-pm/vpars/news/> (HP Internal)