Hewlett Packard Enterprise

Introduction to HP-UX Virtual Partitions v6 on HPE Integrity blades

Convergence of performance and flexibility

Contents

Technical white paper

Introduction

Today's data centers need to be flexible in order to meet the increasing demands from existing customers as well as new project requests. Ideally, these demands are met quickly with minimal overhead while providing a relatively high level of isolation from other workloads. For most data centers, the best solution is one that better utilizes current capacity to satisfy these new demands and provides existing customers with the capacity they expect. The ideal solution enables IT managers the ability to keep the total cost of ownership low while maintaining high levels of responsiveness to customer demands.

To address this challenge, Hewlett Packard Enterprise has introduced the Mission-critical Converged Infrastructure as the foundation for the next decade of computing. The newest line of HPE Integrity systems combines years of trusted HPE Integrity resiliency with HPE BladeSystem efficiencies. As the foundation of the world's first Mission-critical Converged Infrastructure, HPE Integrity systems simplify and unify IT with a common modular architecture from x86 to Superdome 2 and provide:

- Always on resiliency—a secure and reliable infrastructure from CPU to solution.

- Dynamic optimization—integrated management and virtualization to optimally scale resources.

- Investment protection and stability—sustained innovation, decades of support life, and compelling value.

Specifically in the area of dynamic optimization, Hewlett Packard Enterprise has created the HPE Matrix Operating Environment, an integrated server virtualization solution suite for HPE Integrity and ProLiant servers providing a flexible computing environment to maximize the usage of server resources. The Matrix Operating Environment encompasses a number of fully integrated, complementary components that enhance the functionality and flexibility of servers including workload management, software availability, virtualization and utility pricing.

Hewlett Packard Enterprise offers a comprehensive range of partitioning and virtualization capabilities known as the HPE Virtualization Continuum (Figure 1). These capabilities span virtual machines, hard partitions, soft partitions, and containers, which can be used together for even greater combined functionality.

This paper introduces HP-UX Virtual Partitions Version 6 (vPars v6)—soft partitions that are a part of the HPE Virtualization Continuum for HP-UX. Virtual Partitions v6 provides granularity down to the processor core level and features shared I/O. Each vPar runs its own separately licensed version of the HP-UX 11i v3 Operating Environment. This approach is useful when individual applications need fewer resources than the overall server or hard partition, thus applications experience isolation from one another yielding increased reliability, application specific tuning and specific software version compatibility, if needed.

Core-level granularity and dedicated resources are well established as an integral part of HP-UX mission-critical customer deployments. HP-UX vPars v6 builds on these core strengths and introduces features making managing and enabling vPars in an HPE Converged Infrastructure easier and enables vPars running on HPE's Integrity server blades.
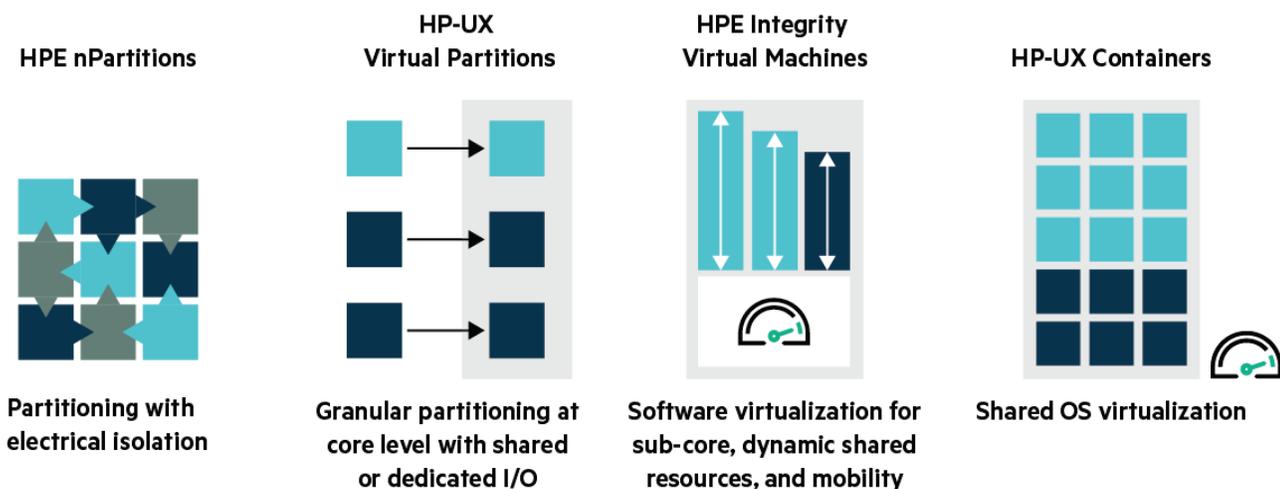

Figure 1. HPE Virtualization Continuum for HP-UX

What is HP-UX vPars v6?

HP-UX vPars v6 is a software partitioning solution enabling multiple instances of HP-UX to run simultaneously on a single Integrity server or hard partition. Each virtual partition (vPar) is assigned a subset of hardware and runs a separate instance of HP-UX, and hosts its own set of applications. HP-UX instances are isolated from each other at Operating System (OS) and application levels. This total isolation allows for different software patch levels in each vPar. HP-UX vPars v6 brings vPars functionality to the entire Integrity server blades family.

HP-UX vPars v6 provides a manageability framework that is shared as a common resource for all the vPars v6 running on that server or hard partition in a dedicated HP-UX instance known as the Virtualization Services Platform (VSP). The VSP is used to manage (create, modify, remove, start, stop…) vPars from either a command line interface (CLI) or a graphical user interface (GUI). The Integrity Virtual Server Manager (VSMGR) GUI is accessible from the System Management Homepage (SMH) of the VSP.

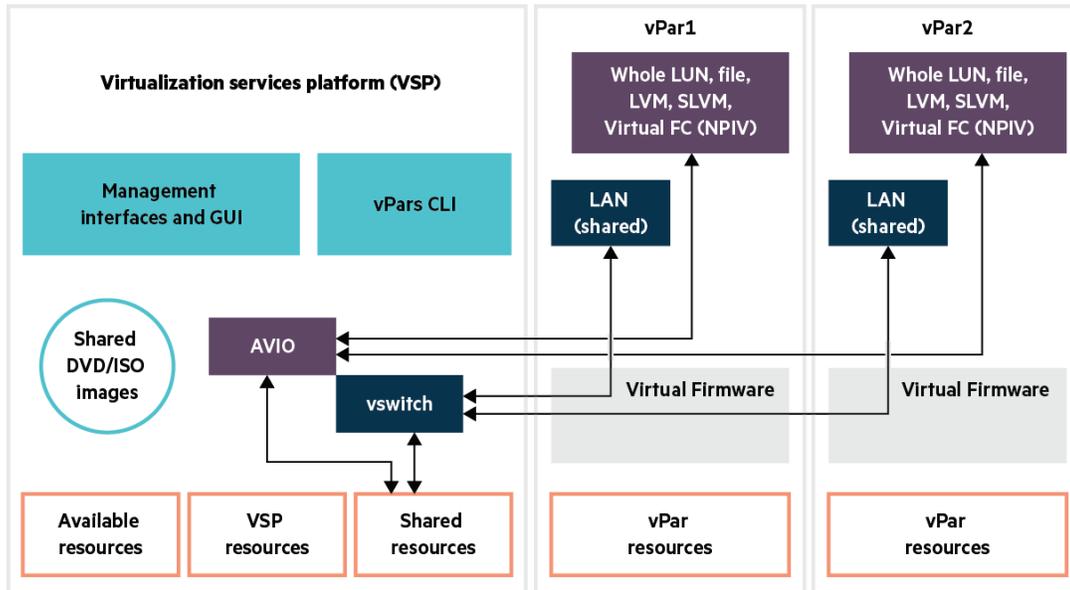Figure 2 shows a high-level view of the HP-UX vPars v6 architecture and how the VSP fits in.

Figure 2. HPE Virtualization Continuum for HP-UX

Why use HP-UX vPars v6?

Most data centers have server hardware that is underutilized. These same data centers are facing increasing demand for new applications that results in an increased demand for servers to satisfy their customers. These seemingly contradictory situations have led CIO's and administrators to the conclusion that they should be able to make better use of the resources they have already deployed. The HP-UX virtualization continuum offers several virtualization and partitioning technologies to help HP-UX customers deploy mission-critical applications in a manner that best aligns to their business goals. HP-UX vPars v6 provides a uniquely pragmatic and effective consolidation solution preserving mission-critical scalability, availability and separation while offering improved manageability and consolidation.

Increased utilization and scalability
HP-UX vPars v6 is supported across the entire Integrity server blades family. Virtual partitions can scale up from a single core up to 31 cores, allowing the consolidation of workloads of various sizes. In addition, HP-UX vPars v6 features the ability to dynamically add cores to the vPars increasing the scale to meet growth demands.

More flexibility and capacity
HP-UX vPars v6 combined with the Integrity server blades technologies provide a flexible platform for deploying many applications in a cost effective manner. The new Shared I/O functionality combined with N-Port ID Virtualization (NPIV) technology allows for dedicated virtual paths to storage, provide cost effective but highly resilient access methods for various storage solutions.

Improved performance and productivity

HP-UX vPars v6 has a redesigned architecture for I/O operations, dedicated core and memory resources combined to deliver superior performance needed to run mission-critical applications. The online addition and removal of assigned cores performed from the VSP guarantees a high level of flexibility and productivity.

HP-UX Virtual Partitions v6 features

- Support for many virtual partitions per server, each with their own instance of HP-UX 11i v3 and applications.

- Software fault isolation at operating system and application levels.

- Dedicated CPU cores (single core granularity).

- Dynamic reallocation of physical CPU cores across virtual partitions.

- Dedicated memory.

- vPar operating system fault and security isolation.

- Dedicated virtual iLO Remote Console.

- Shared network and storage I/Os.

- Support of N-Port ID Virtualization (NPIV).

- Command line and graphical user interfaces.

- Serviceguard support.

HP-UX vPars v6 resources

CPU and memory

In HP-UX vPars v6, the VSP utilizes locality information from the server to automatically assign the best available physical CPU cores and memory to a virtual partition. The CPU cores and memory assigned to a virtual partition are dedicated to that partition, and not sharable. The direct access and locality-aware assignment ensure that maximum performance is maintained for applications running in that vPar.

A single virtual partition can be as large as the entire server (cores, memory, and I/O) minus the resources reserved for the VSP. The smallest virtual partition that can be created would be a partition that has a single physical processor core and the minimal amount of memory required to bring up HP-UX.

I/O

HP-UX vPars v6 provides an efficient, shared I/O infrastructure that allows the bandwidth of Host Based Adaptors (HBAs) and Network Interfaces Cards (NICs) to be shared among a set of vPars. This increases the utilization and flexibility of the HBA or NIC, preserves performance, and solves the I/O slot limitation issues prevalent in earlier versions of HP-UX vPars. Virtual partitions are assigned virtual NICs that connect to a physical NIC (or an aggregation of physical NICs) through a virtual switch.

In HP-UX vPars v6, the granularity of I/O assignment is flexible and allows multiple vPars to share the bandwidth of a physical connection. In earlier versions of vPars, I/O assignment is at the slot granularity, and all physical connections of a multi-function I/O card are owned by a single vPar.

Virtual iLO Remote Console

Each virtual partition provides an HPE standard Integrated Lights-out (iLO) with its own unique IP address that can be securely accessed from the VSP or over the Internet to control all operations of the vPar, including the access to a fully featured Extensible Firmware Infrastructure (EFI) shell. Specific vPars administrators or group of users can be defined and dedicated to manage a single or a group of virtual partitions. This feature guarantees the isolation between vPars from a management prospective.

Managing HP-UX vPars v6

The definitions of the vPars characteristics are stored in the VSP, and changes to the vPars configuration are made using a special set of commands that can be issued only from the VSP or from the Virtualization Server Manager running in the System Management Homepage of the VSP. Registered vPar administrators can take control of virtual partitions from the VSP or over the internet, increasing security and isolation between vPars.

HP-UX vPars v6 commands

HP-UX vPar v6 commands are available only from the VSP. A summary is as follows:

`vparcreate`—Create a virtual partition.

`vparmodify`—Rename a virtual partition or modify the resources of a virtual partition.

`vparstatus`—Display information about one or more virtual partitions.

`vparremove`—Remove a virtual partition.

`vparboot`—Boot a virtual partition.

`vparreset`—Reset a virtual partition.

`vparconsole`—Connect to the iLO and the console of a virtual partition.

`vparnet`—Create and control a vPars virtual network switch.

`vparhwmgmt`—Manage the virtual partition resource pool dedicated for use by virtual partitions.

Integrity Virtual Server Manager

While earlier versions of HP-UX vPars provided limited management capabilities in a graphical user interface, HP-UX vPars v6 features the Integrity Virtual Server Manager (VSMGR), a graphical user interface part of the tools of the SMH of the VSP. The VSMGR reports general information about the VSP and allows the creation, the removal and the modification of the resources assigned to virtual partitions. In addition, it has the ability to create, remove and modify virtual switches and virtual iLO Remote Consoles.

Software licensing

The vPar license is included in the HP-UX 11i v3 VSE-OE and DC-OE operating environment bundles. Customers who have purchased these OE bundles and maintained them under HPE support contract are granted the right to download and install the new vPars v6 software as part of their right-to-new-version feature of their support contract.

HP-UX vPars v6 can be purchased as a standalone product using the BB068AAE part number. Rights to this software are also available as part of the HP-UX VSE-OE and DC-OE.

Note
HP-UX vPars v6 will be offered only through the HPE electronic delivery system. Future versions of HP-UX vPars v6 will be offered in both electronic delivery format as well in the HP-UX 11i v3 VSE-OE and DC-OE update media.

Customers who have purchased stand-alone versions of earlier versions of vPars for Superdome 2, sx1000 or sx2000 cell based servers can receive trade-in credit for HP-UX vPars v6 on the Integrity blades using the BB068AAN part number.

For more specific details on trade-in policy, purchases and licensing in your specific area, please contact your local HPE sales representative or authorized HPE partner or reseller.

Glossary

CLI: Command line interface

DC-OE: Data Center-Operating Environment

EFI: Extended Firmware Interface

GUI: Graphical user interface

iLO: Integrated Lights-Out

OE: Operating Environment

SMH: System Management Homepage

vPars: virtual Partitions

VSE-OE: Virtual Server Environment-Operating Environment

VSMGR: Virtual Server Manager

VSP: Virtualization Services Platform

For more information

For more information on HP-UX virtual partitions, please visit the following sites:

- HP-UX Virtual Partitions
- HP-UX Virtual Partitions documentation
- HPE Virtualization Continuum

Learn more at
hp.com/go/vPars

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