

# HPVM & OpenVMS

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**Sep 2009**



Germany Technical Update Days 2009

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# Agenda

- Introduction to Virtualization
- What is HPVM?
- OpenVMS on HPVM
  - Configuration (How to configure OpenVMS as a guest?)
  - Installation of OpenVMS
- Q & A



# Introduction to Virtualization



# Virtualization

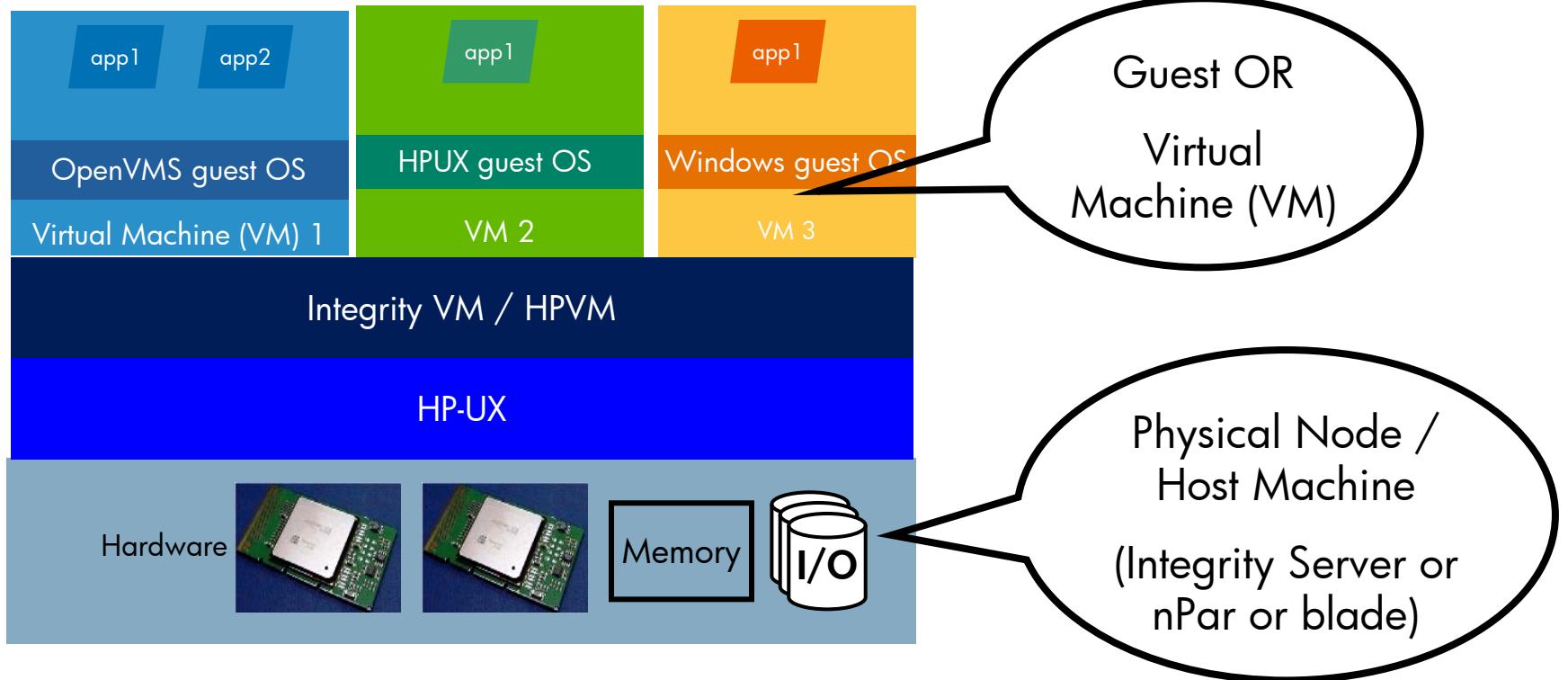
- Virtual machines run in software that emulates computer hardware
  - Host machine – hardware running the virtual machine software
  - Host operating system – operating system running the virtual machine software
  - Hypervisor – slimmed down host operating system that virtualizes the physical hardware
  - Guest system – operating system
- Examples of Virtual Machines
  - VAX VMM Security Kernel
    - ( Karger et al in IEEE Transactions on Software Engineering 1991 )
  - Xen, HPVM for Itanium hardware



# Virtualization

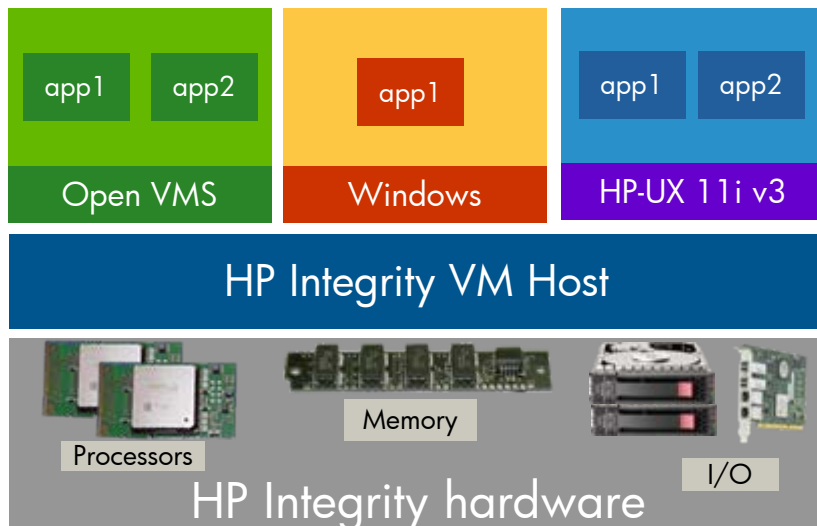
- Advantages of virtual machines
  - Hardware Consolidation
    - Run operating systems where the physical hardware is unavailable
    - Emulate more machines than are physically available
    - Timeshare lightly loaded systems on one host
  - Flexibility
    - Easier to create new machines, backup machines, etc.
    - Software testing using “clean” installs of operating systems and software
    - Debug problems (suspend and resume the problem machine)
    - Easy migration of virtual machines (shutdown needed or not)

# What is Integrity VM/HPVMM?



# HP Integrity Virtual Machines (VM)

## Optimum utilization across multiple OS



- Runs on any HP Integrity: server, nPartition, or blade
- Up to 20 VMs per core
- Virtual machines with shared processors and shared I/O
- Dynamic resource allocation built in
- OS fault and security isolation
- Designed for heterogeneous guests (OpenVMS, HPUX, Linux and Windows)

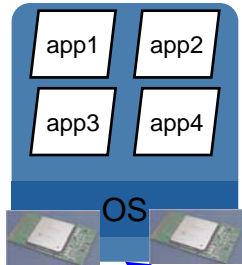
# Virtual CPUs



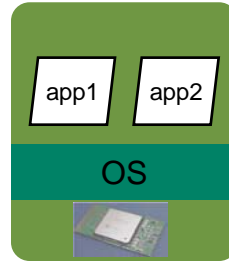


# Dynamic CPU allocation

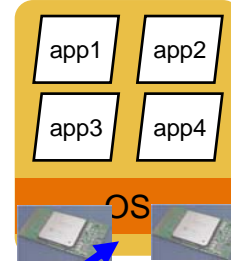
Virtual Machine 1



Virtual Machine 2



Virtual Machine 3



Example:  
guaranteed  
80% CPU  
allocation

Host (Integrity VM + platform OS)

Virtual machines  
automatically benefit  
from instant capacity  
on host



Instant  
Capacity

# Virtual CPU

- VMs are created with one or more vCPUs
- A single VM can have as many vCPUs as physical cores
- Maximum of 8 virtual CPUs per VM
- Up to 20 vCPUs per physical core
- Changing the number of vCPUs in a VM requires a reboot of the VM

# Virtual CPU Resource guarantee

- Maximum processing power
- A resource guarantee (an “entitlement”)
- Entitlements can be set in range of 5% to 100%
- Entitlements in 1% increments
- If a VM is not using its entitlement, other VMs can use it

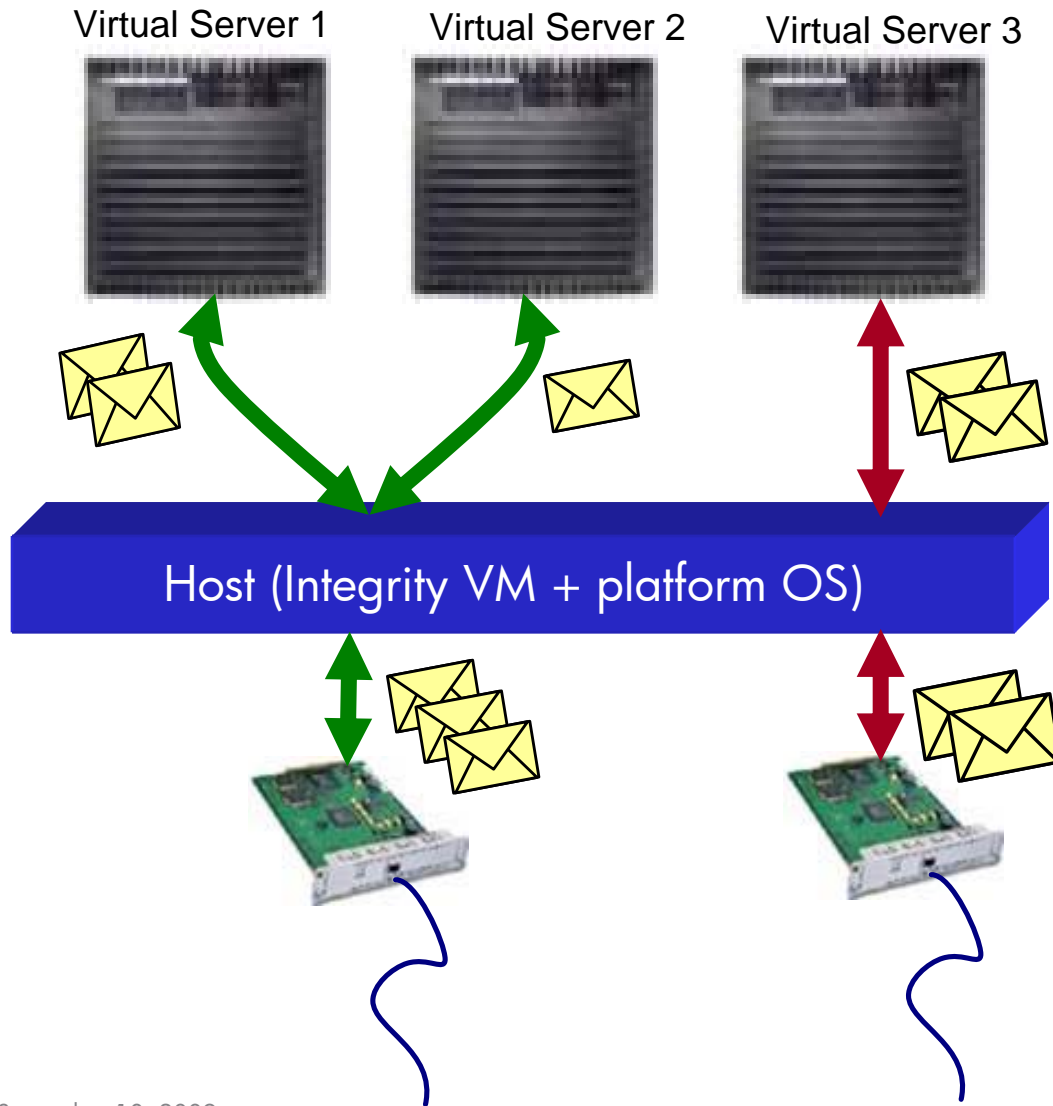
# Virtual CPU Scheduling

- Integrity VM schedules vCPUs
- Scheduling is according to, and guaranteeing a VM's entitlement
- Integrity VM distributes remaining cycles

# Sharing of Physical Resources



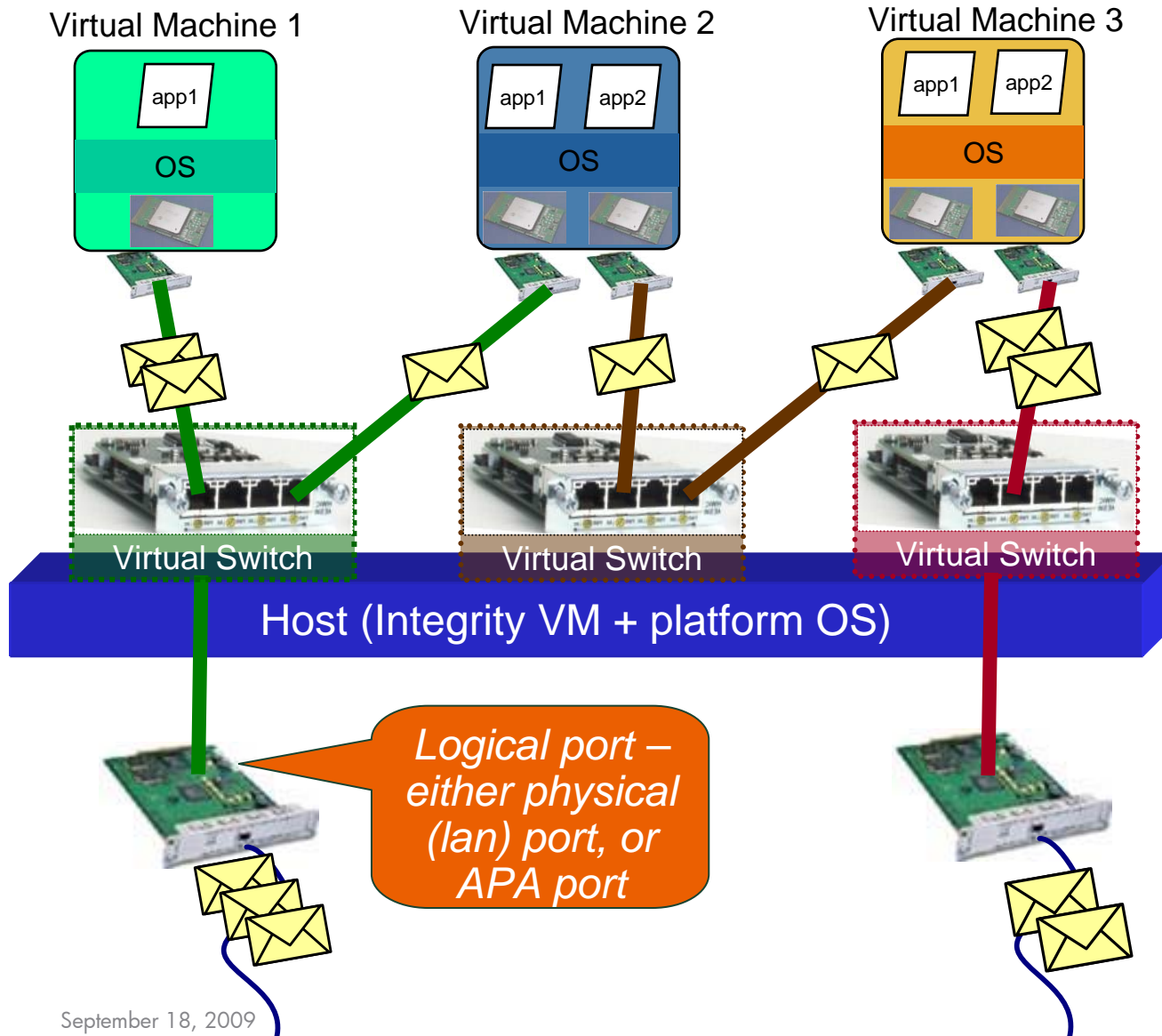
# Dynamic I/O Sharing



Virtual server's I/O packets directed to I/O cards by Integrity VM

I/O card can be dedicated to a virtual machine for performance isolation

# Dynamic Network Sharing

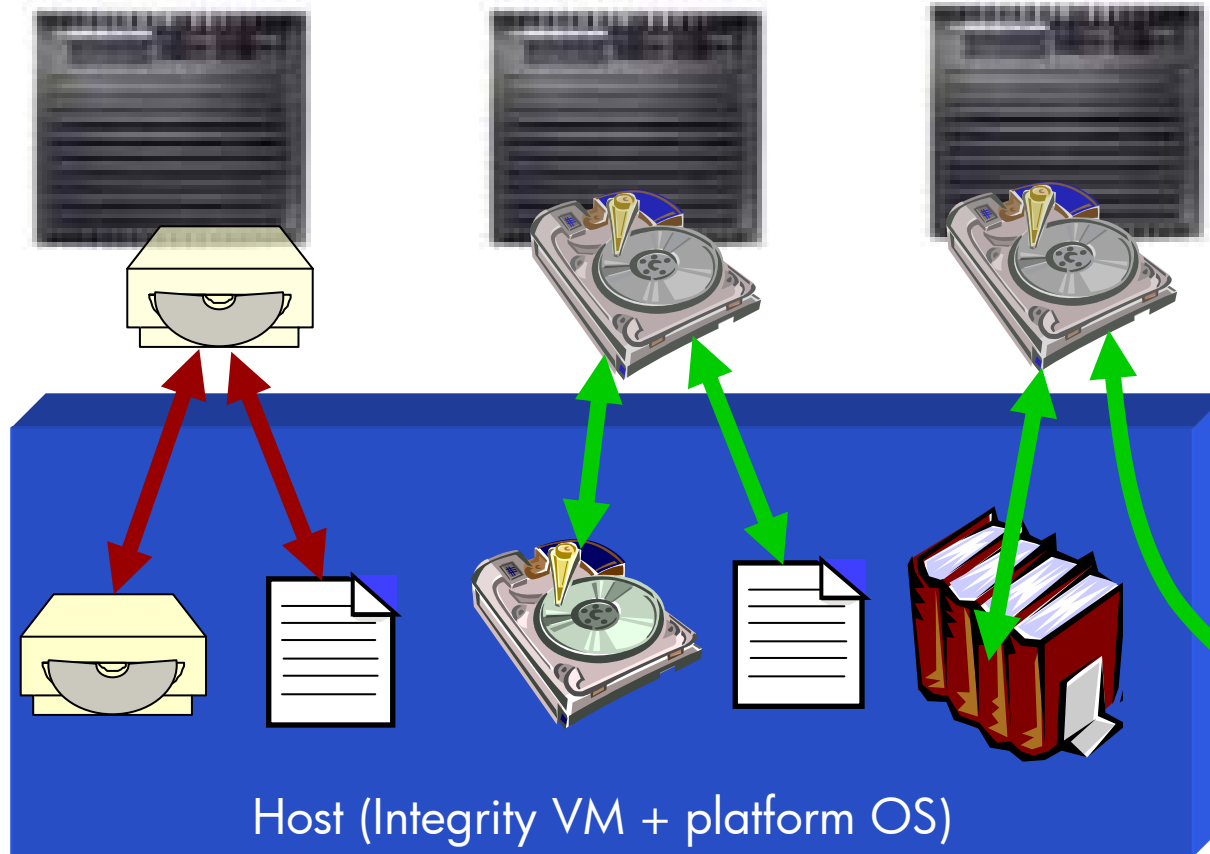


Virtual machine's network packets directed to physical NIC by the Integrity VM Host

Virtual NIC may be defined without a logical port for guest-to-guest communication

NIC can be isolated to a virtual machine

# Storage Virtualization



DVD virtualized on host by:

- Physical DVD
- File

Disk virtualized on host by:

- Physical disk
- File
- Logical volume
- SAN

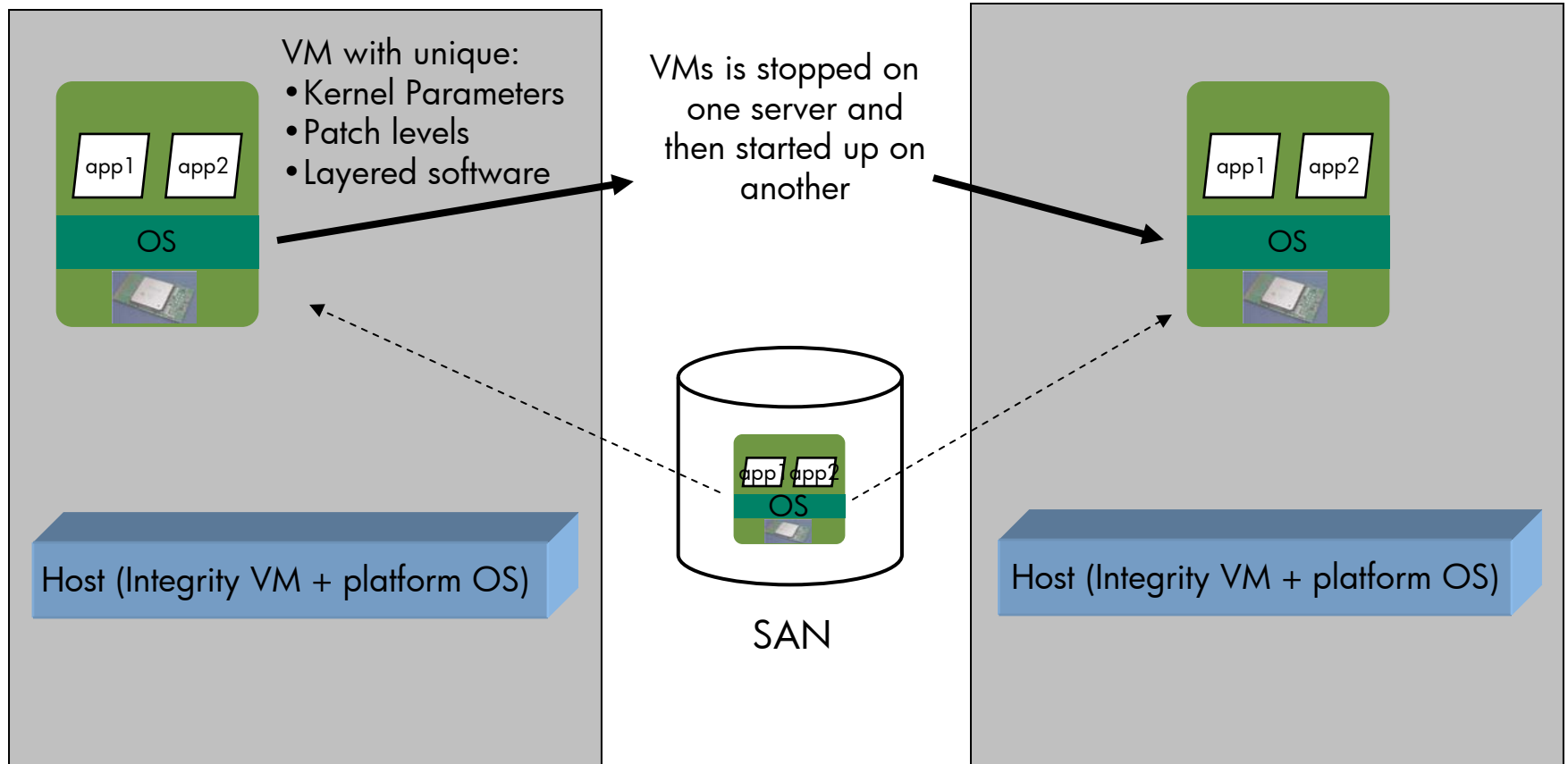




# Guest Migrations



# Offline virtual machine migration

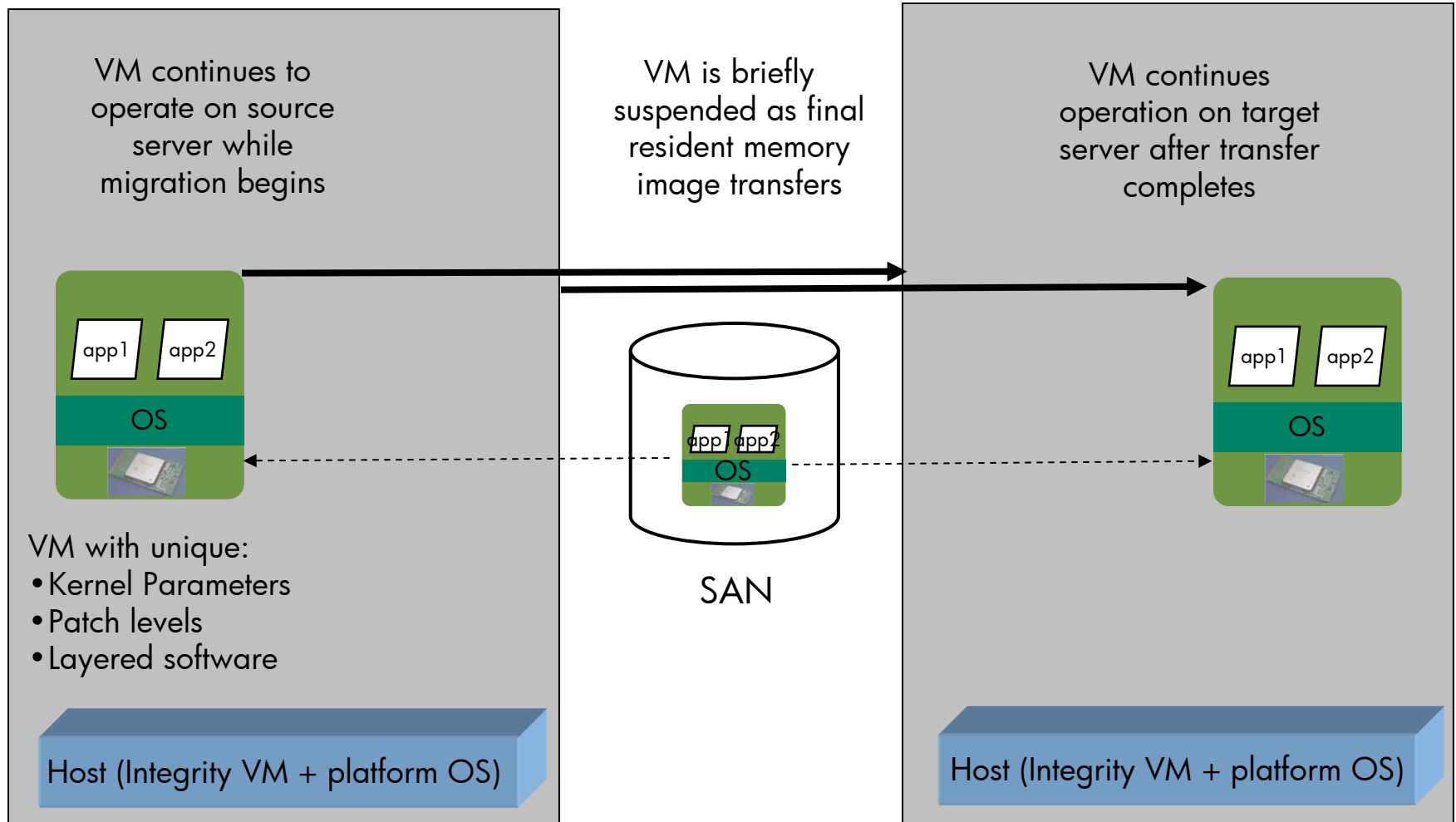


# What is "Online Migration?"



- Online VM (Guest) Migration is a new Integrity VM feature enabling a running VM, its OS and its applications to be moved to a different VM Host system without service interruption.
- While the VM is moved from one VM Host to another VM Host, the guest OS and all its applications will remain active without an OS reboot or application restart.

# Online virtual machine migration

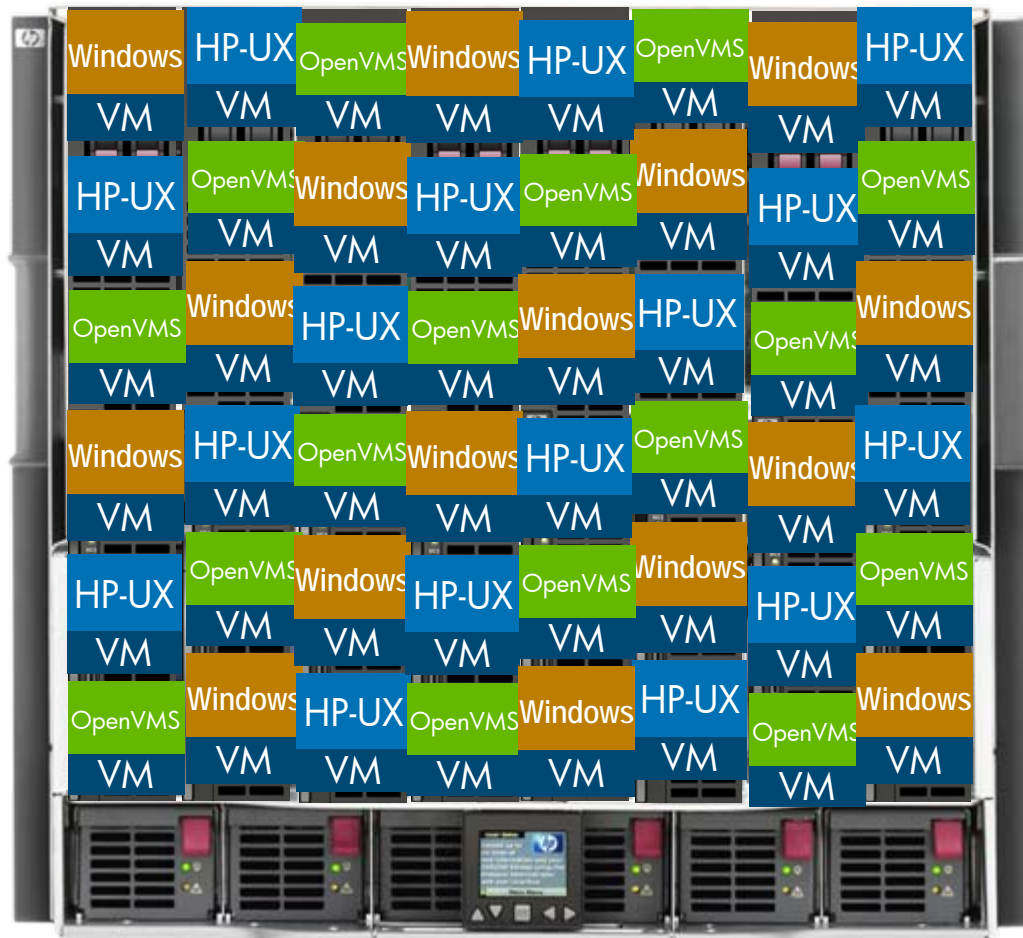


# VMs and Blades



# Integrity Virtual Machines & Blades

## Scaling up and out



Eight server blades per enclosure

Up to 80\* virtual machines per blade...

In a single enclosure....

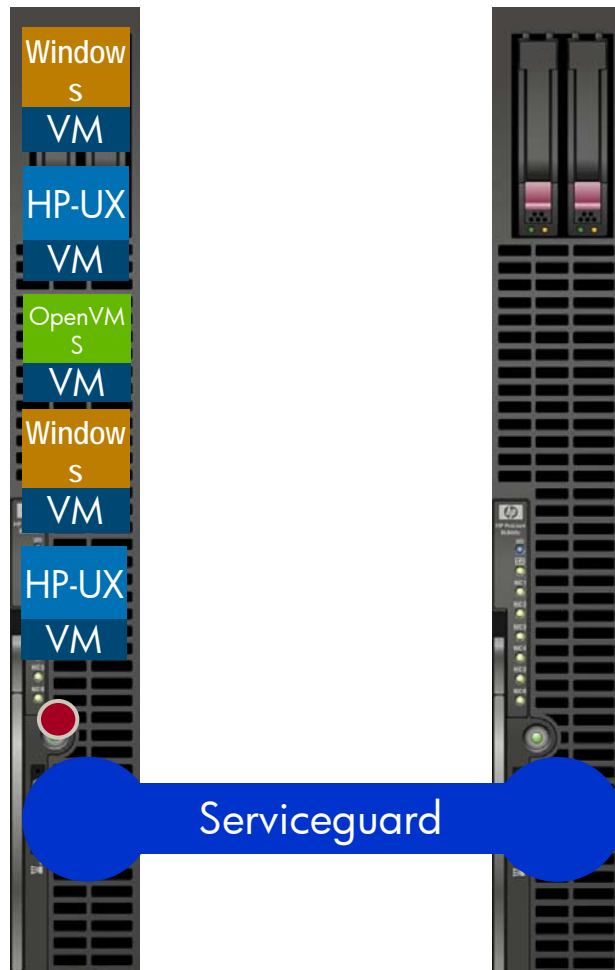
Up to 640\* servers

Processor resources balanced with I/O connectivity to make consolidation practical and effective



# Integrity Virtual Machines & Blades

## High Availability



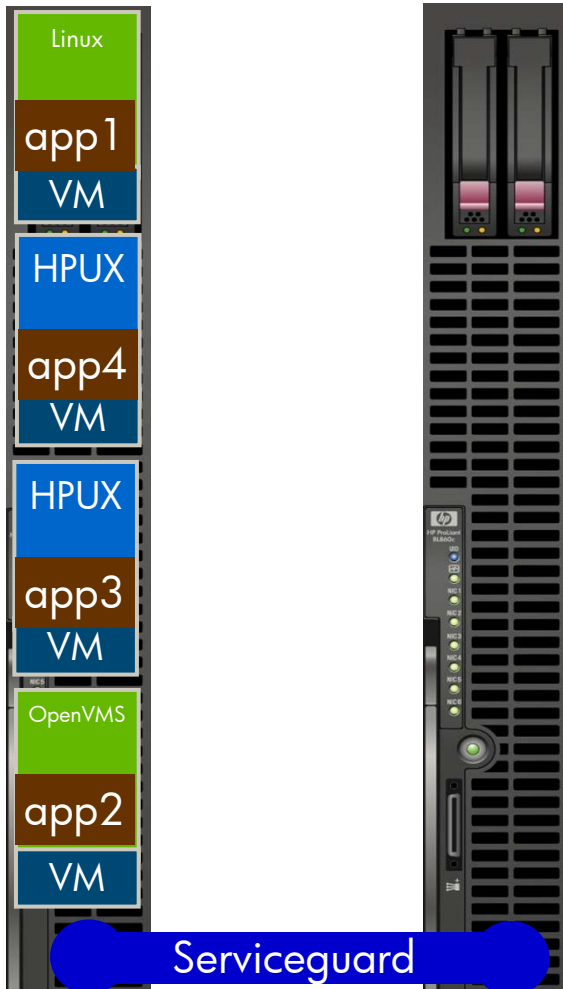
HP provides superior high availability for virtualization with *Integrity VM as Serviceguard package* technology

Virtual system uptime maintained – planned or unplanned...

... all in a single enclosure

# Integrity Virtual Machines & Blades

## Load Balancing



Integrity Blades, Virtual Machines, and Serviceguard together provide reliable load balancing...

... in many dimensions

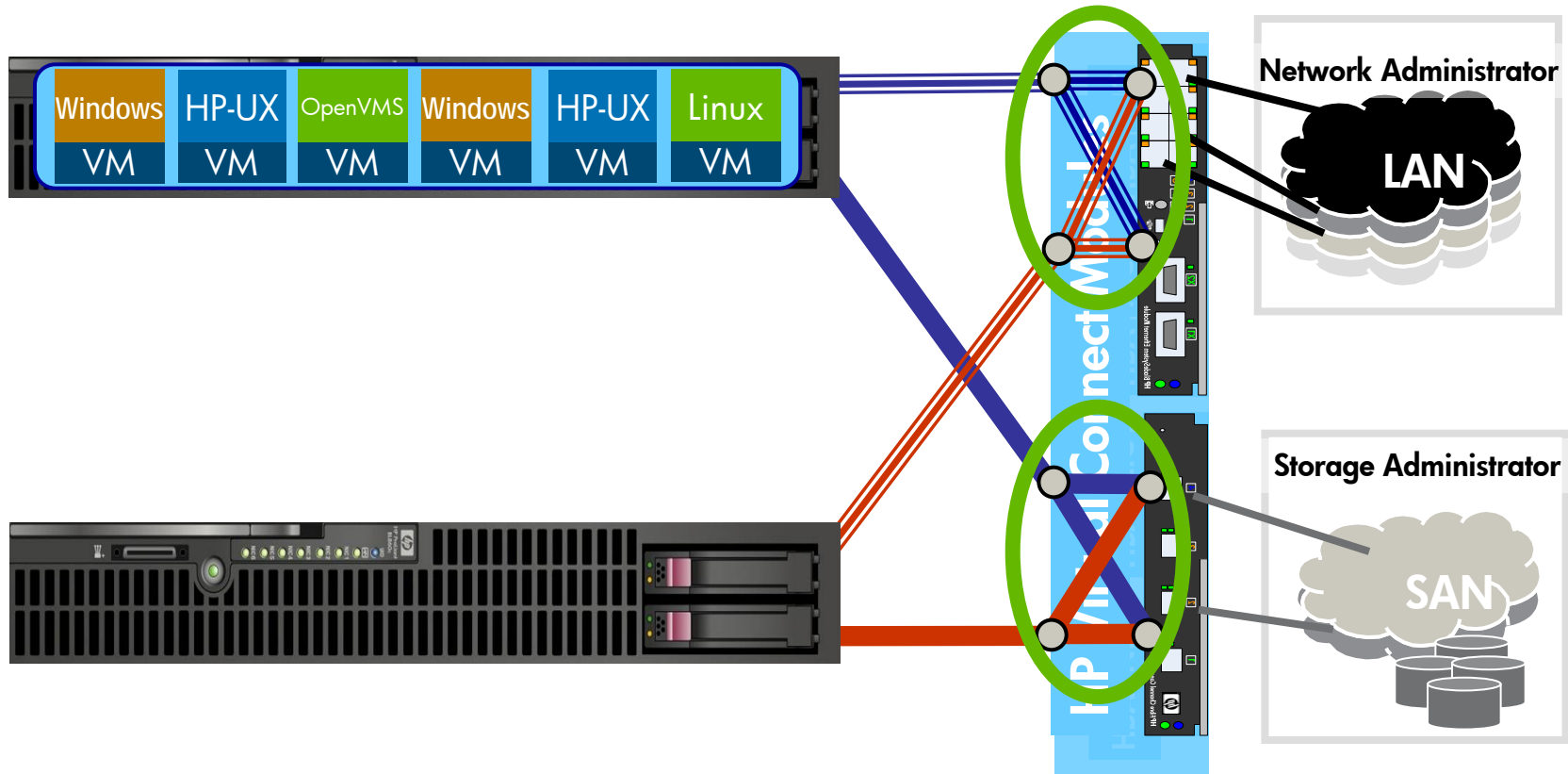
... in a single enclosure





# Integrity Virtual Machines & Blades

## High Availability with Virtual Connect



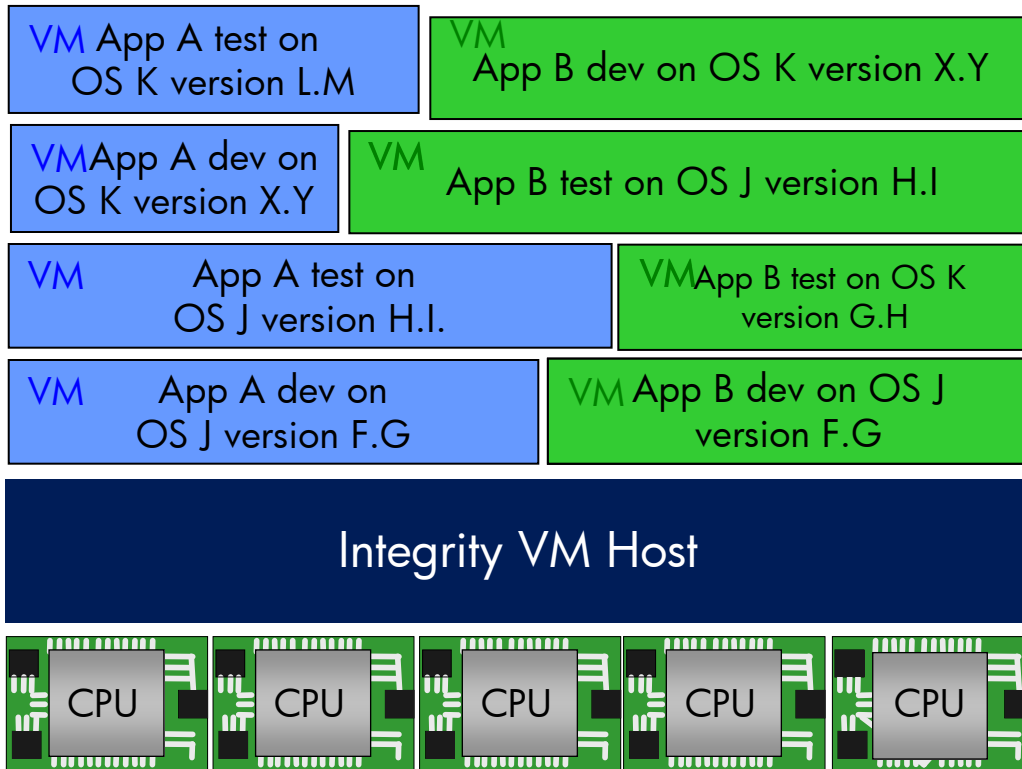
Virtual Connect enables & simplifies transfer of entire VM Host systems from one blade to another, addressing planned downtime

# HPVM Deployment



# HPVM deployment

## Hardware consolidation for test and development



### Scenario:

- Monolithic & distributed application development & testing
- Qualification on multiple OS versions
- Development & testing on multiple configurations

### Benefits

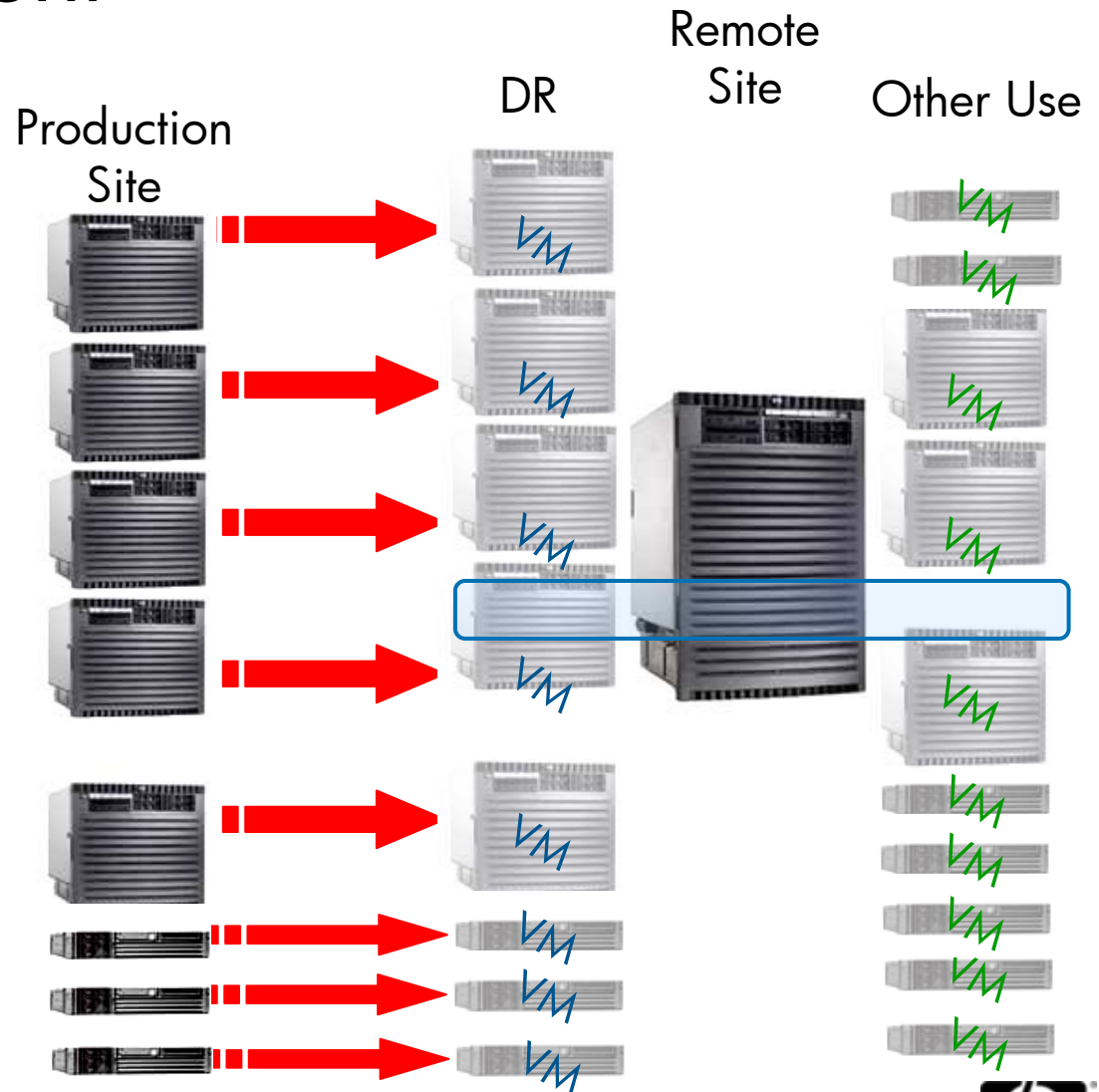
- Cheaper – Fewer “test” boxes
- Faster – Ready to boot or ready to use



# HPVM deployment

## Disaster Recovery

- Benefits
  - Redundant virtual servers
  - Fewer physical servers at DR site
  - DR servers ready-to-boot/active standby; otherwise used for development, test, evaluation, ...



# HPVM deployment

## Hardware Consolidation

- Consolidation of end-of-support-life servers with legacy applications
- Lower power consumption
- Reduce cooling needs
- Less floor space
- Deployment agility
- Resource allocation flexibility
- Cut HW, SW & maintenance costs



# OpenVMS Guest on HPVM



# OpenVMS Guest on HPVM

- OpenVMS Guest field test kit available
- Supported on OpenVMS V8.4 & HPVM 4.1
- Supports Montecito, Montvale and future processors (VT-i)
- AVIO storage drivers
- AVIO network drivers
- Monitor and other enhancements

# OpenVMS guest on HPVM contd.

## Cluster Support

- OpenVMS guest is cluster enabled
  - Cluster nodes can be physical or virtual
  - Pure Virtual Node clusters
  - Multiple VM clusters on the same host
- Supports LAN interconnect and IPCI
- Supports MSCP served disks



# Configuring an OpenVMS Guest

- Configuring by HP-UX commands
- [Video](#)

# OpenVMS guest Field testing

- Field test ongoing
- If you are interested in participating please contact your VMS ambassador or [OpenVMS.Programs@hp.com](mailto:OpenVMS.Programs@hp.com)

# Q & A

