



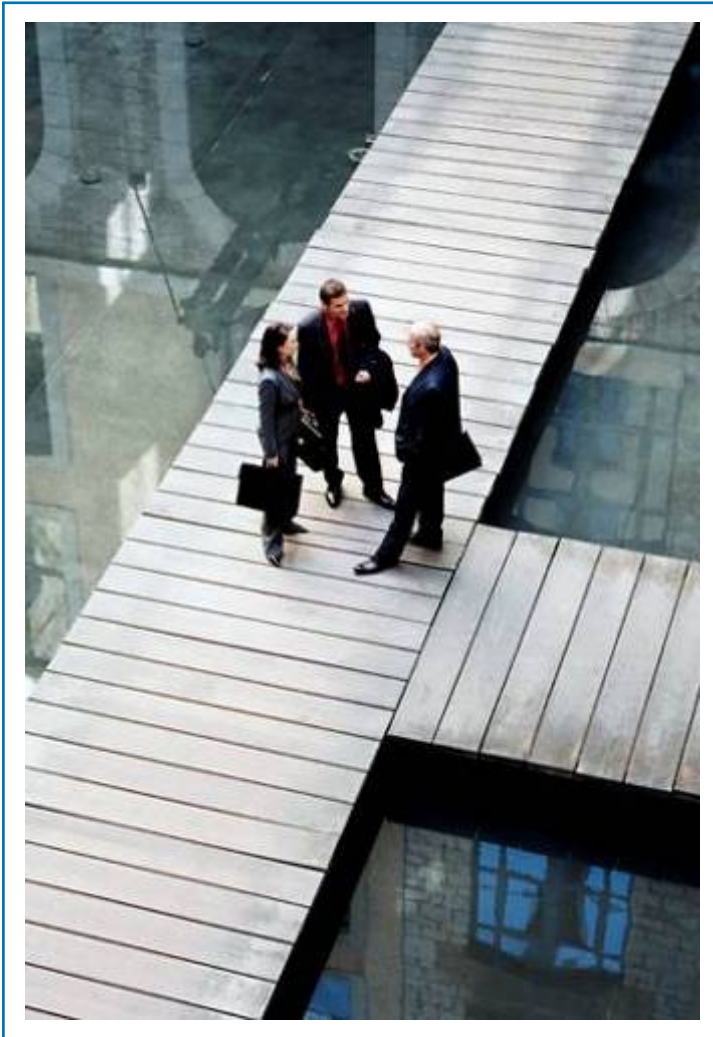
# Optimize your Oracle workload thanks to HP VSE

Yann Allandit, HP  
Oracle pre-sales consultant



# HP & Oracle Alliance

ORACLE



- Over 25 years of partnership
- Over 140,000 joint customers
- Leading Emea Market share on Oracle with 49% installations on HP
- Executive alignment
- Joint engineering and product development
- HP is Oracle's largest customer
- Oracle tests its products on HP systems
- 13 worldwide joint Solution Centers
- HP is Oracle's first major server vendor to offer a joint solution offering



# HP/Oracle Cooperative Technology Center



- Located at HP in Germany, France & Oracle UK
- 7 HP & Oracle employees in one team
- Delivering services to HP, Oracle & Partners
- Founded in spring 1994
  - Technical pre-sales assistance/consulting for partners & customers
    - customer workshops/demos, proof of concept projects, benchmarks, RFX contributions, architecture consulting, complex sizing and configuration assistance, customer presentations, .....
  - Know-How Transfer & Country Enablement
  - Evaluation and tests of new products/features
  - Technology transfer to and from US labs

# Agenda

- Why HP virtualization?
- Benefits of Oracle in HP VSE
  - Implementation case
- HP VSE components
  - G/T/iCAP,
  - nPARs,
  - vPARs,
  - HPVM,
  - gWLM







Virtualization challenge

# Customers pain points

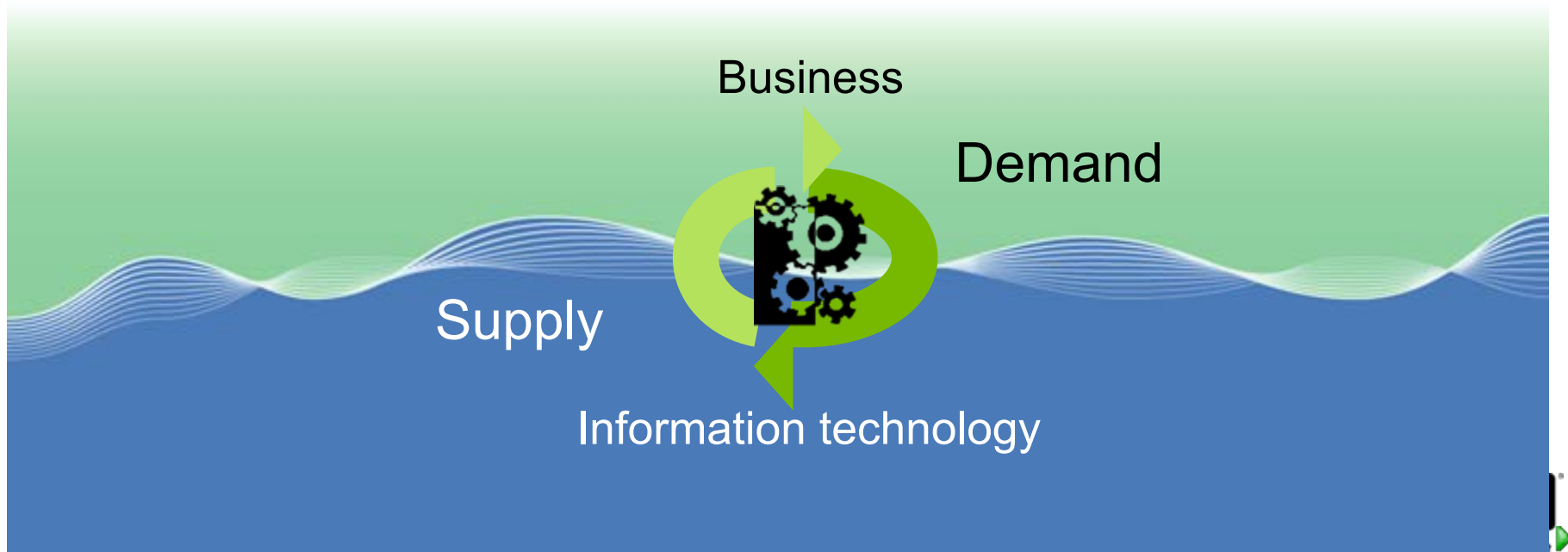
- “We’ve got too many applications, too much customization and too many underutilized servers.”
- “We struggle to meet service level agreements and fast response times for critical workloads.”
- “We can’t implement new projects fast enough.”
- “We’re asked to reduce headcount every year but the work never seems to go away.”

“Our IT environment is too expensive to manage and maintain.”



# Definition of Virtualization

An approach to IT that pools and shares resources  
so utilization is optimized and  
supply automatically meets demand









# Partitioning Continuum

## Single Physical Node

Single OS image per node within a cluster

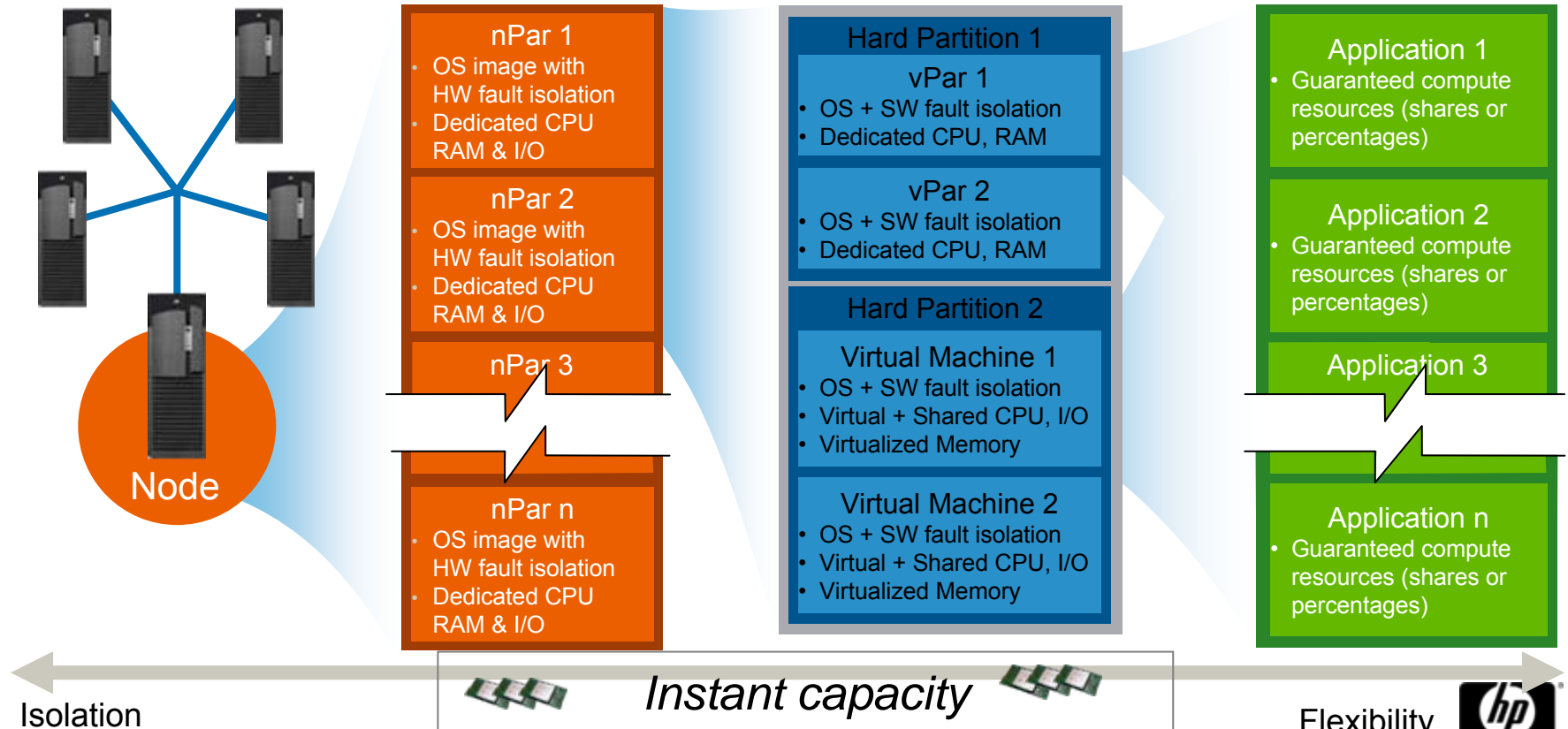
## nPartitions

Hard partitions within a node

## Virtual Partitions & HP Integrity Virtual Machines

Within a hard partition (or server)

## Secure Resource Partitions -- Partitions within a single OS image with security containment





hp

Implementation Case



# Business Case Scenario – Resource Flexing

Temporary spike in application demand results in poor service response times.... poor response means lost revenue!

- “We struggle to meet service level agreements and fast response times for critical workloads...”
- Capability sets needed for efficient response:
    - Integrated Oracle and HP Management framework
    - HP Virtual Server Environment
    - Global Workload Manager and Partitioning Continuum

A photograph of a flight information display board. The board shows flight times and destinations for various cities. The text is partially obscured but includes city names and times.

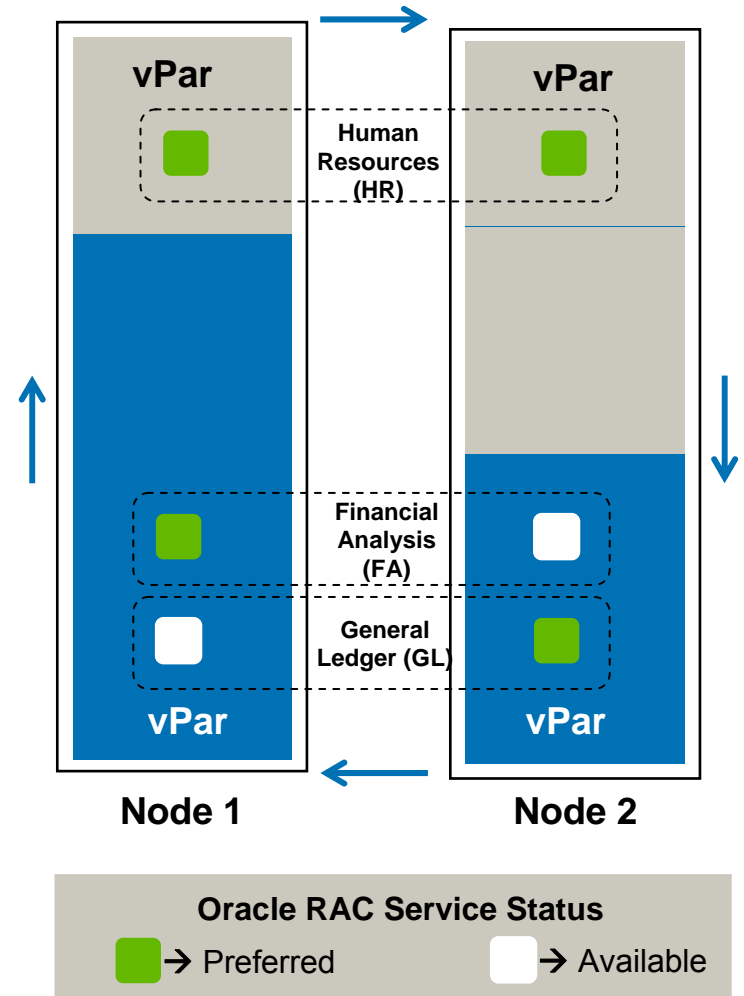
# Dynamic Resource Flexing with HP VSE and Oracle RAC

## Database Load

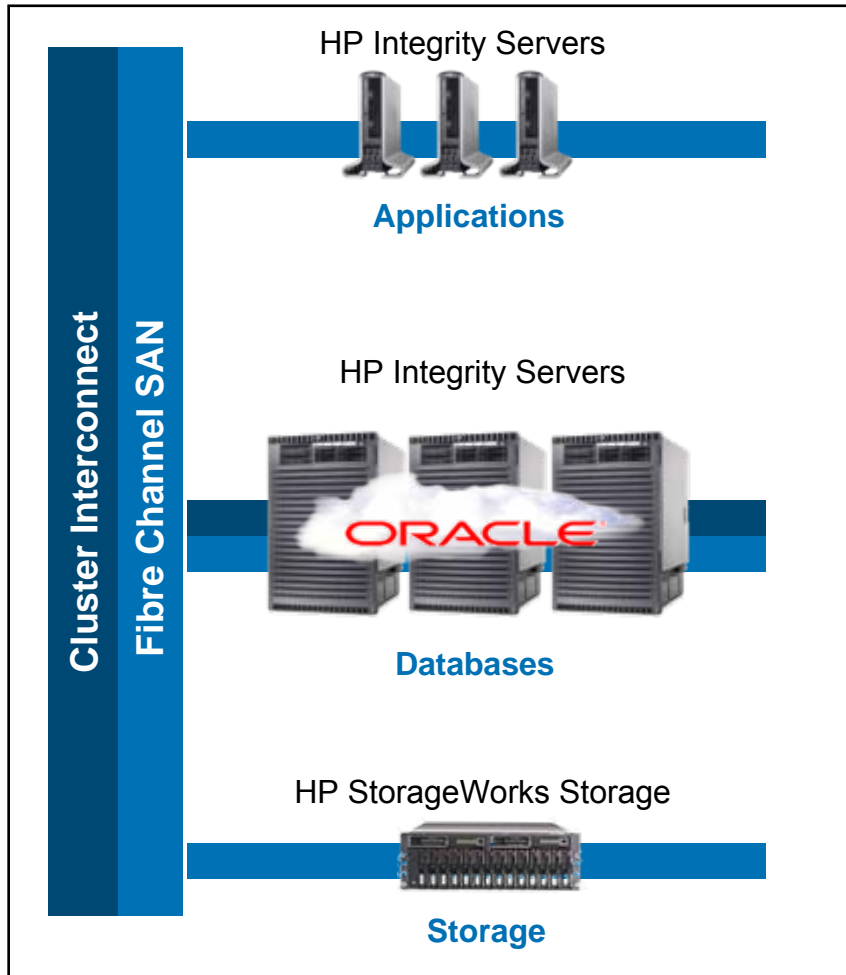
- Increase in database workload as sales reporting begins
- Continued increase in database workload as sales reporting continues
- Sales reporting activity subsides, database workload returns to normal levels

## VSE Response

- Sense service level breached and **scales up** – moves CPUs from HR to FA on Node 1
- Sense capacity exhausted on Node 1 and **scales out** – activates FA on Node 2
- Sense reduced demand and **scales back** – deactivates FA on Node 2 and moves CPUs back from FA to HR on Node 1



# The HP VSE Reference Architecture for Oracle RAC on HP-UX 11i



- Application Components
  - Oracle 10g RAC
  - Oracle 10g Application Server
  - Oracle Enterprise Manager 10g Database Control
- Availability
  - HP Serviceguard Cluster File System for RAC
- Partitioning
  - HP Virtual Partitions - database
  - HP Resource Partitions - apps
- Intelligent Control
  - HP Systems Insight Manager
  - HP Integrity Essentials Virtualization Manager





HP Adaptive Infrastructure  
components

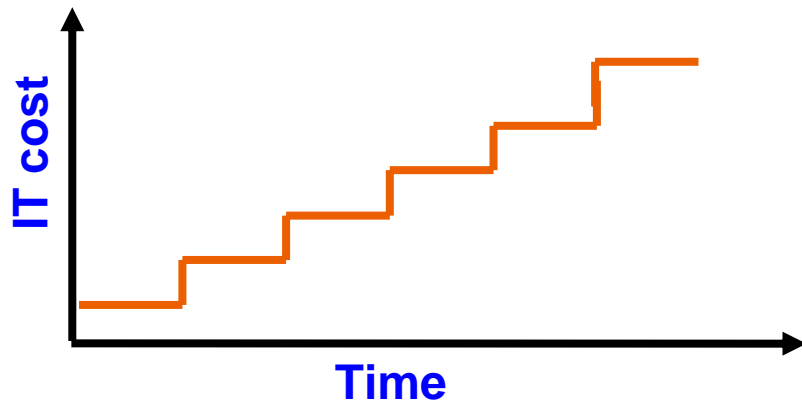
# What are the virtualization challenges for your Oracle environment



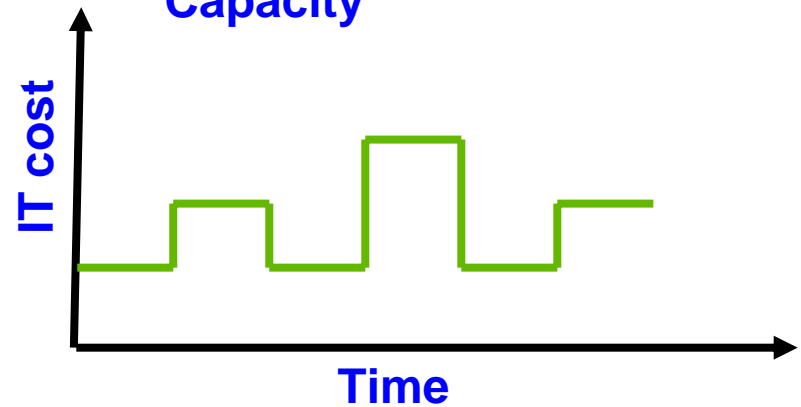
- Manage your CPU capacity as a pool of resources
- Define the right granularity for your Oracle Compartment
- Automatically meet with your SLO
- Provide High Availability

# HP offers different utility pricing options for different capacity needs

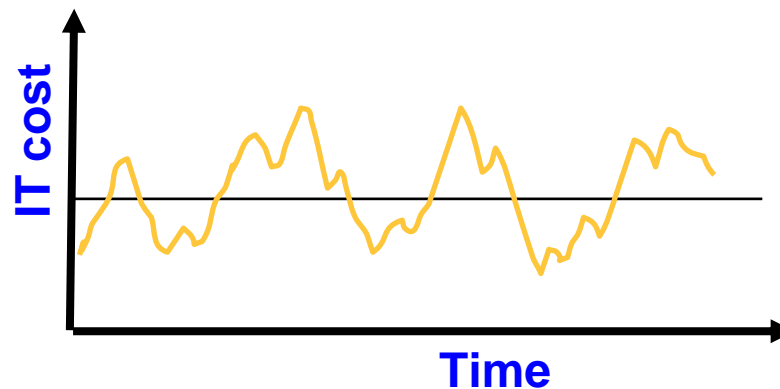
Instant Capacity



Temporary Instant Capacity

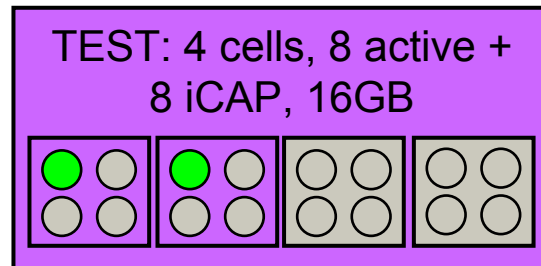
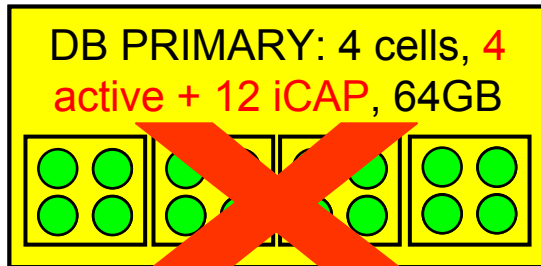


Pay per use

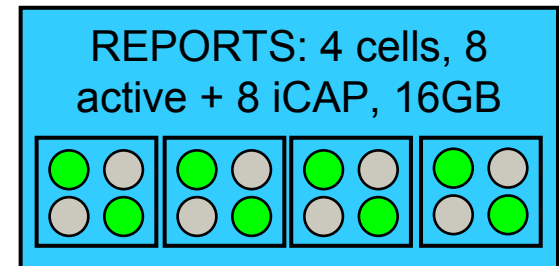
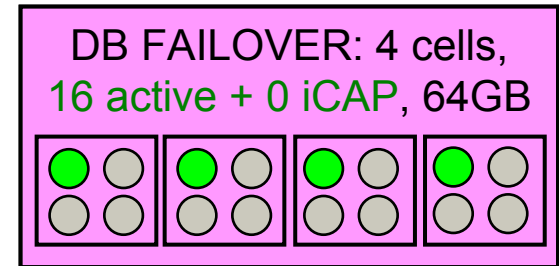


# (G/T)iCAP :Exchanging RTUs at no cost

GiCAP Group Manager



London



Reading

# Instant Capacity

- Instant Capacity (iCAP)
  - CPUs can be activated on-line – no reboot required
  - Activation of entire Cell Boards requires reboot of partition that needs to be enlarged (work without reboot in HP-UX V3)
  - CPUs / Cell Boards are paid for when they are activated
  - Price paid is current price when activated
  - CPUs can be deactivated in one nPar/vPAR and activated in another
- Temporary Capacity Instant (TiCAP)
  - Capacity is purchased in 30 Day increments
  - Activating iCAP CPU`s deduct minutes from the “bank”
  - Deactivating the iCAP CPU`s stops the deductions
  - Any number of iCAP CPUs can be activated
  - Excellent solution for:
    - Short term peaks in application load
    - Lower cost failover server
- Global iCAP (GiCAP) pushes the envelope across servers and even across sites
  - Excellent for failover / disaster recovery iCAP pools: in case of an outage, the number of defective CPUs can be activated on any server out of the pool
  - Shift resources between production and non-production, even if they are on different servers or datacenters



# What are the virtualization challenges for your Oracle environment

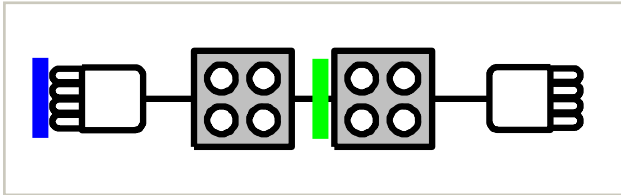
- Manage your CPU capacity as a pool of resources
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- Automatically meet with your SLO
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# Hard partitions aka nPars

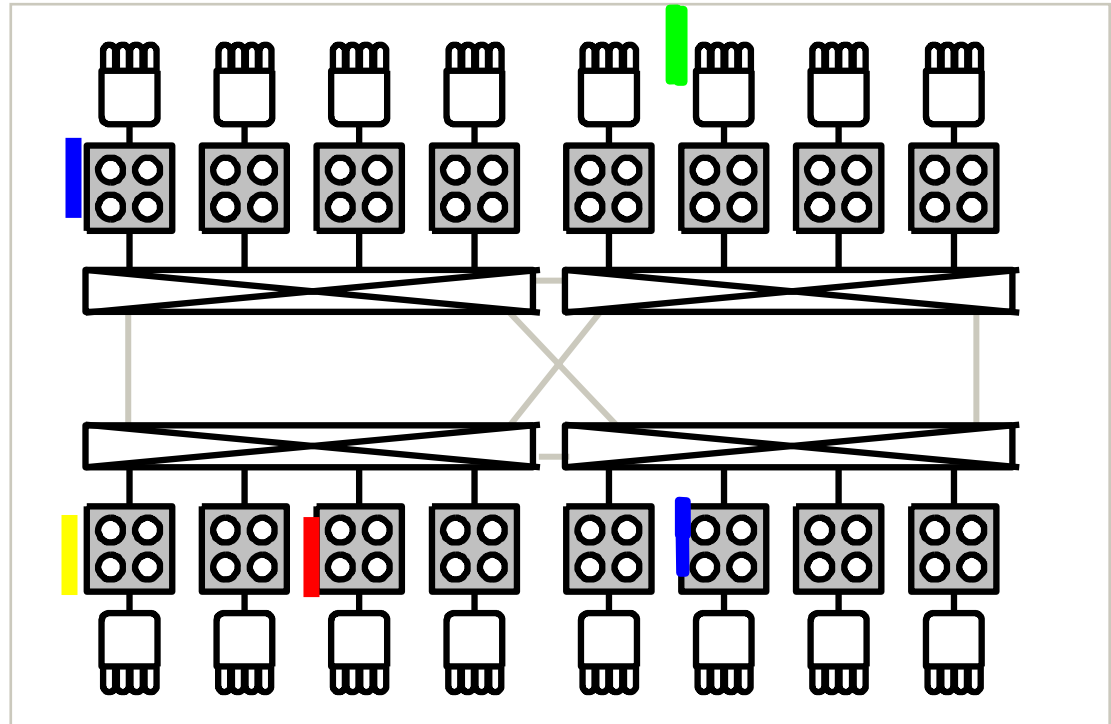
## Full electrical isolation between partitions

New with HPUX V3 : full cell OLAD

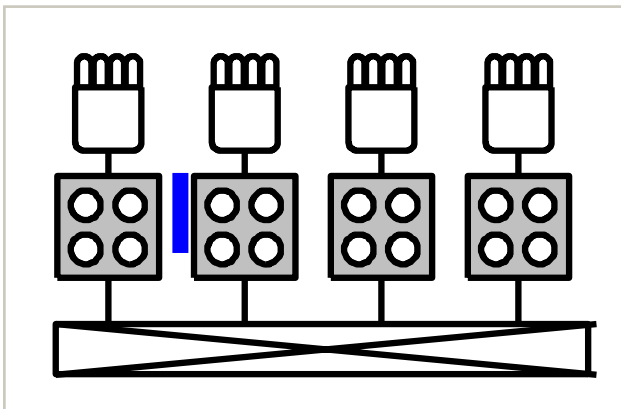
### 8 Socket system



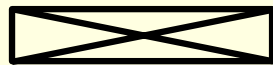
### 64 Socket system



### 16 Socket system



### Legend



Two crossbar switches



4 Socket Cell



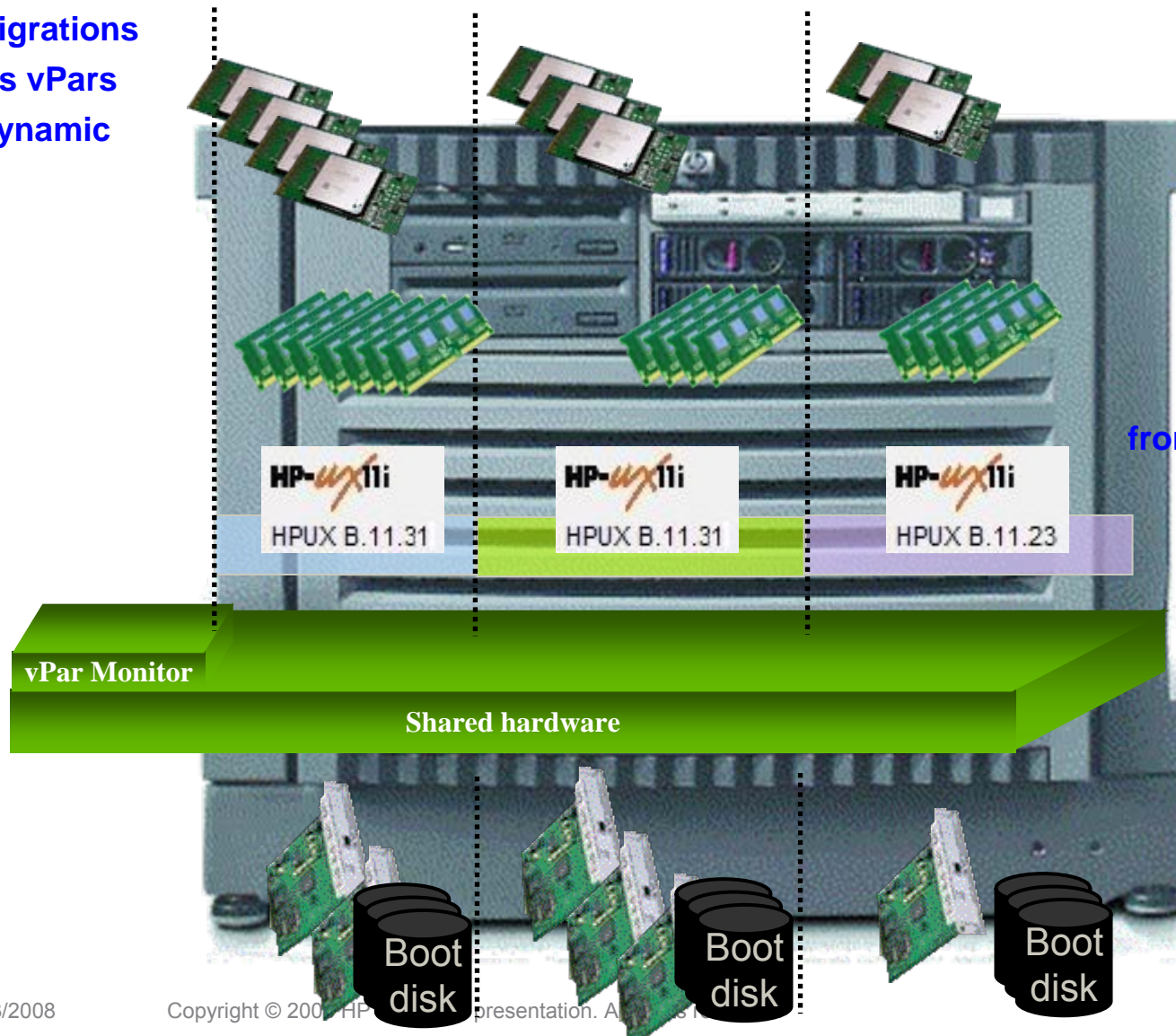
I/O Backplane

# Sweet Spots for nPars

1. Create an nPar for each Mission Critical Application to provide complete hw fault and OS isolation
2. Each nPar can run a unique instance of an operating system (HP-UX, Linux, Windows, OpenVMS)
3. nPars are supported on both PA-RISC and Integrity
4. nPars can be either PA-RISC or Integrity on Superdomes (excellent for mixed environments or during transitions)
5. nPars can be further sub-partitioned with vPars, Integrity Virtual Machines, or Secure Resource Partitions

# vPar V5 : Illusion of separate hardware platform and dynamic CPU and Memory movement

CPU migrations across vPars are dynamic



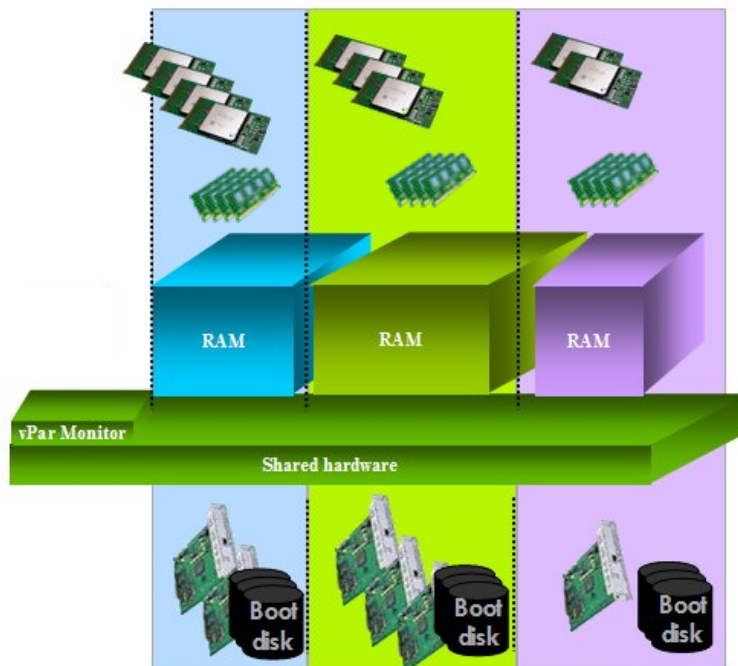
Memory can move from 11iV3 vPar to 11iV vPar

Each vPar owns HBAs and at least a boot disk

# HP-UX Virtual Partitions aka vPars

## Dynamic granularity is one CPU

Multiple HP-UX instances  
running on the same system  
or in the same nPar



### Increased system utilization

- partitioning a single physical server or hard partition into multiple virtual partitions

### Increased Flexibility

- multiple independent instances of HP-UX
- dynamic CPU migration across virtual partitions
- dynamic memory movement between HPUX V3 virtual partitions

### Increased Isolation

- application isolation across virtual partitions
- OS isolation, HPUX V2 and HPUX V3
- individual reconfiguration and reboot

### Sweet spot

Linked to a SAN with snapshot/snapclone facility

- One or two production virtual partitions
- One development vPar
- One test vPar

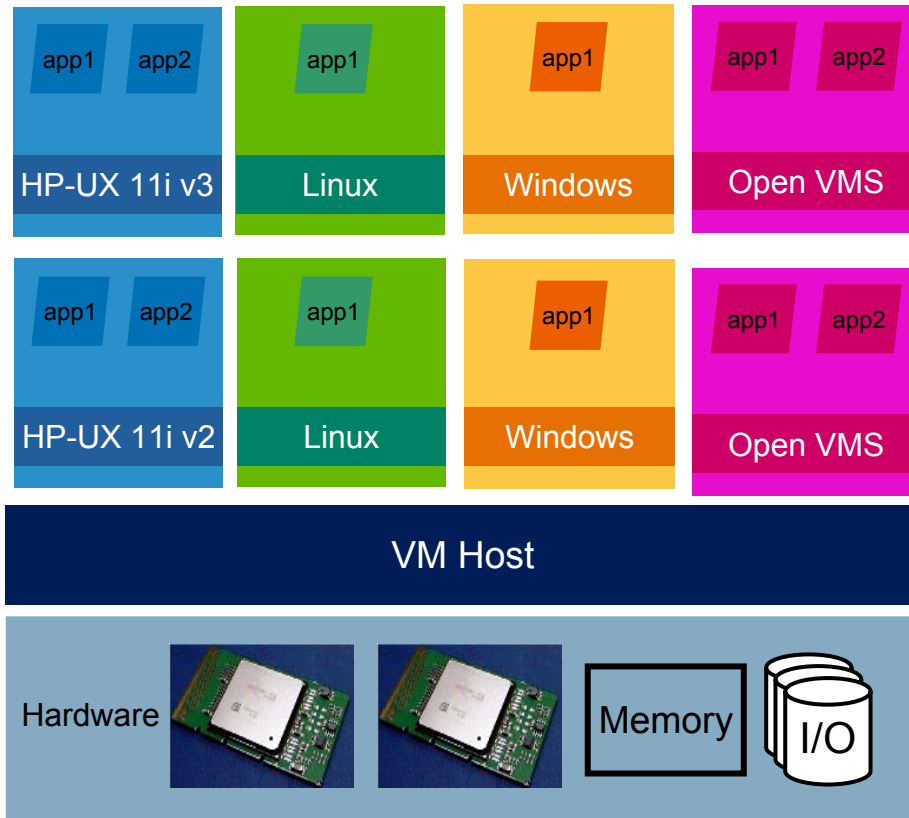


# Sweet Spots for vPars

1. If you want to share CPU resources between workloads in different partitions (ex : 1 Production vPar, 2 dev & test vPars)
  - a. Allows active CPUs and memory to be dynamically reallocated
  - b. iCAP CPUs can be activated (either permanently or with TiCAP) in any vPar within the same nPar
2. If you require finer granularity than nPars (i.e. an entire cell not needed for the workload), and...
  - a. Need OS isolation or different versions of the OS
  - b. Have I/O intensive applications

# HP Integrity Virtual Machines (VM)

Optimum utilization across multiple OS



HP-UX 11i software can be licensed by virtual machine!

- Sub CPU virtual machines with shared I/O
- Runs on a server or within an nPar
- Dynamic resource allocation built in
- Resource guarantees as low as 5% CPU granularity
- OS fault and security isolation
- Supports all (current and future) HP Integrity servers
- Designed for multi OS
  - HP-UX 11i v2 & V3 guests
  - Linux guest support
  - Windows guest support
  - OpenVMS guests in future
- Integrated with VSE

# How Oracle can benefit of Integrity VM

1. Easy, efficient means of HW consolidation
  - HW sharing increases utilization
  - OS isolation eliminates effort and complexity of combining workloads on same application stack
  - Fast system deployment and provisioning
2. Applications that don't normally need dedicated hardware (or a whole CPU) but do need OS isolation, different OS versions, different Operating Systems, and/or different application stack versions
3. Good choice for smaller non-cell based systems
4. Features for Oracle
  - Sub cpu partitioning
  - Workload management
    - HPVM entitlement
    - Integration with gWLM for SLO purpose
  - Dynamic memory allocation

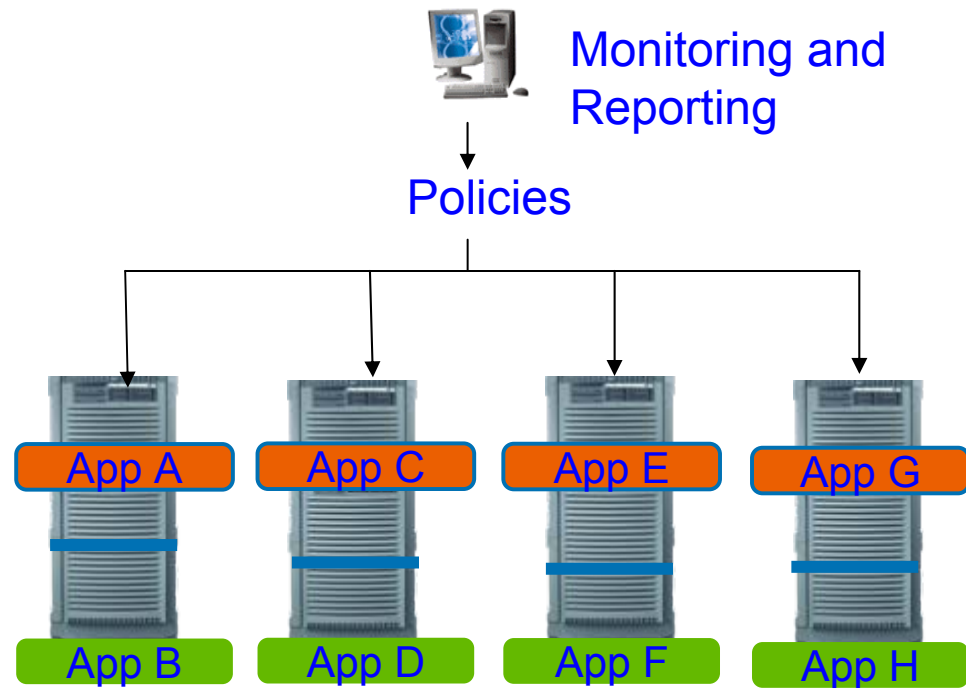
# What are the virtualization challenges for your Oracle environment

- Manage your CPU capacity as a pool of resources
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# HP Global Workload Manager to manage large, multi-system VSE

Dynamic, multi-system workload management  
for HP-UX 11i and Linux

- Goal-based policy engine for managing workloads across multiple systems simultaneously
- Easy to use management integrated with HP Systems Insight Manager
- Enables central IT to deliver an IT utility supporting multiple LOBs  
Resources can be assigned to LOB based on:
  - Own/borrow/lend model
  - Fixed entitlement model
  - CPU utilization model
  - Service Level Objectives
- Based on HP-UX Workload Manager, the only goal-based policy engine for UNIX

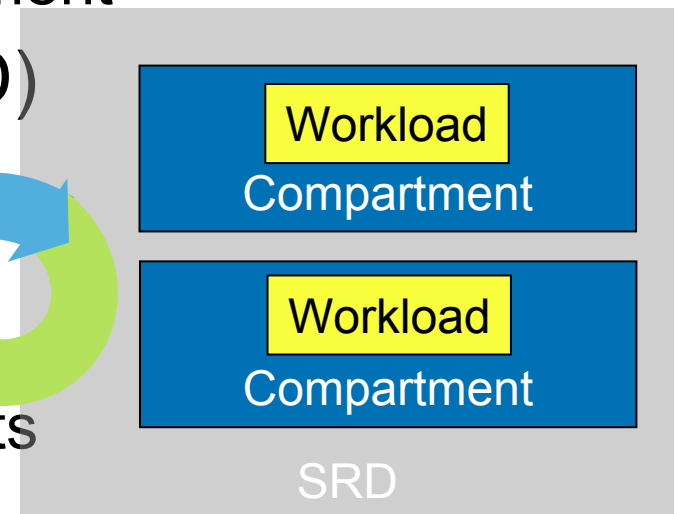


Dynamic resource and workload  
reallocation



# gWLM terms

- Workload
  - Collection of processes that are a set of executables
- Compartment
  - It is a system division as a nPar, a vPar, a HP VM guest, a PSET or a FSS group
  - The workload runs in the compartment
- Shared Resource Domain (SRD)
  - A collection of compartments that share physical resources
- Policy
  - A collection of settings that instructs gWLM how to manage workload resources within the SRD



# HP Global Workload Manager

## Centralized Workload Management

**HP Systems Insight Manager - Microsoft Internet Explorer**

Address: <https://gaudix.etc.vbe.cpqcorp.net:50000/mxportal/home/MxPortalFrames.jsp>

User: root  
[Home](#) | [Sign Out](#)

**VSE Management: Global Workload Manager**

Tools | Deploy | Configure | Diagnose | Optimize | Reports | Tasks & Logs | Options | Help

System | Workload | Shared Resource Domain | Capacity Advisor

Tools | Create | Modify | Delete | Policy | Report

Show:  Deployed SRDs  Undeployed SRDs [Refresh Data](#)

<input type="checkbox"/>	SRD Name	Policy Status	Mode	TICAP	State	Size	CPU Utilization	Last Update
<input type="checkbox"/>	titane.srd	✓	Managed		Deployed	4	72.294%	Mar 01, 2007 15:28:30

**Details for SRD: titane.srd**

Shared Resource Domain: [titane.srd \(Modify SRD\)](#)

Mode: Managed

State: [Deployed \(Undeploy SRD\)](#)

<input type="checkbox"/>	Workload	CPU Utilization	Type	Policy	Status	Request	Allocation	Size	Hostname
<input type="checkbox"/>	hpux.2	73.959%	hpvm	<a href="#">own_5_3_P150</a>	✓	2.28	2.31	2.31	titane.etc.vbe.cpqcorp.net
<input type="checkbox"/>	linux.2	0%	hpvm	<a href="#">Owns 0.1 CPU-Max 1 CPU</a>	⚡	0	0	0	titane.etc.vbe.cpqcorp.net
<input type="checkbox"/>	oracle.2	33.376%	hpvm	<a href="#">Owns 0.1 CPU-Max 1 CPU</a>	✓	0.07	0.14	0.14	titane.etc.vbe.cpqcorp.net
<input type="checkbox"/>	titane.OTHER	11.846%	hpvm	<a href="#">Owns 0.1 CPU-Max 1 CPU</a>	✓	0.05	0.15	0.15	titane.etc.vbe.cpqcorp.net
<input type="checkbox"/>	windows.2	79.914%	hpvm	<a href="#">zCustom tivmwin_va</a>	✓	1.08	1.4	1.4	titane.etc.vbe.cpqcorp.net
<b>Totals:</b>						Req = 3.48	Alloc = 4	Size = 4	

**Unknown** - Data is not yet available. Data should appear on the next screen refresh. Causes could be a recent configuration change that has not yet completed, or a transient network issue. You may use the [Refresh Data](#) button for an immediate refresh.

HP logo

**System Status**  
Legend... Customize...  
Updated: Thu, 3/1/2007, 3:26:02 PM CET  
9 41 1 50 Uncleared Event Status

**Search**  
Search  
Advanced Search...

**Systems and Events**  
System Overview  
All Systems  
All Events

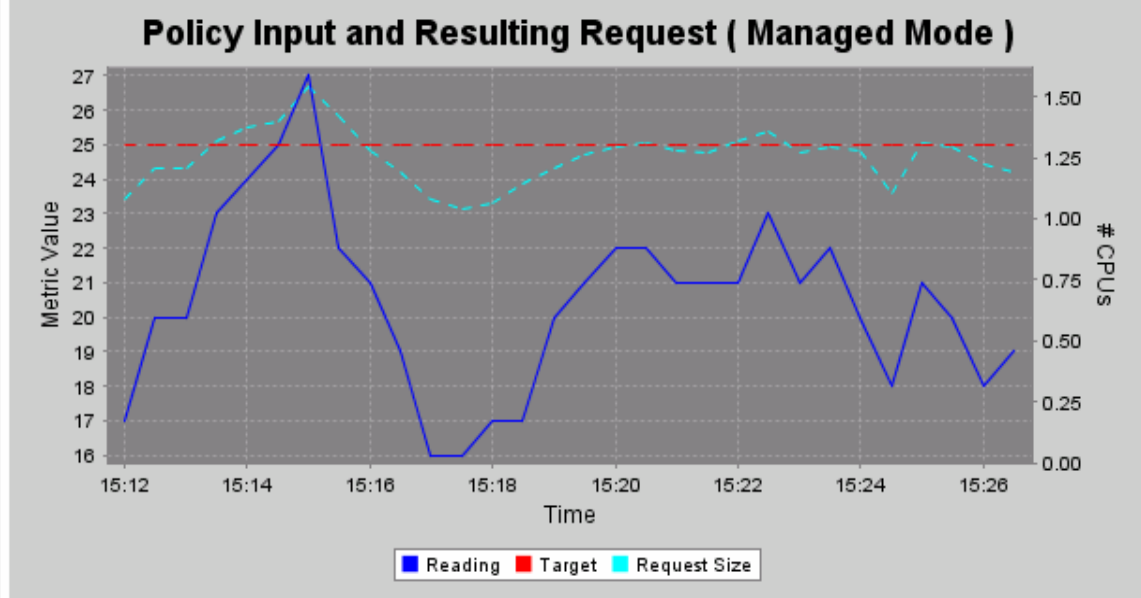
- Systems
  - Private
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    - Systems by Type
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      - All Servers
      - All VSE Resources
        - All nPartition Servers
        - All HP Integrity Virtual M
        - All Virtual Partition Ser
        - All Resource Partitions
        - All Shared Resource Do
        - All HP Serviceguard Clu
        - All Standalone Servers

### HP gWLM: View Real-time Reports

Generate and view gWLM real-time workload and policy reports  
 Request Size  Allocation  Size  Owned  Effective PolicyMin  Effective PolicyMax

Refresh Graph Graph range: 15 mins Real-time cache: 20 mins

#### Workload windows.2 Affected by Policy zCustom\_tivmwin\_ya



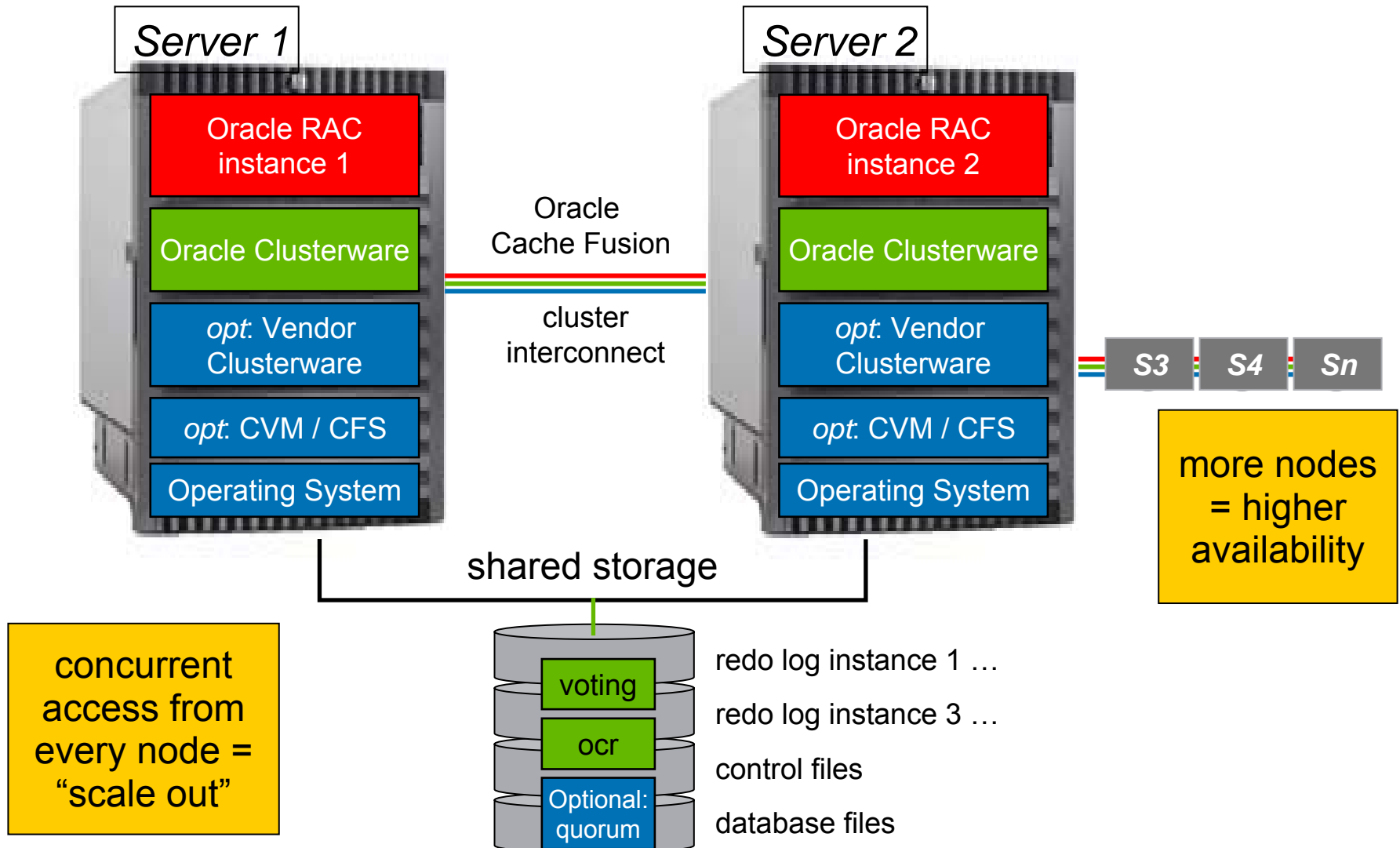
Reading  Target  Request Size (right axis)  
Refresh Graph Graph range: 15 mins Real-time cache: 20 mins

# What are the virtualization challenges for your Oracle environment



- Manage your CPU capacity as a pool of resources
- Define the right granularity for your Oracle Compartment
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# Oracle RAC Architecture



# Conclusion

1. HP VSE automatically allocate the right amount of resources based on SLO requirements
2. Various level of granularity. From sub-cpu to cell.
3. Multi-OS support (Linux, HP-UX, Windows, Open VMS)
4. HP VSE is fully integrated with Oracle RAC
5. Disaster tolerant solution



# Q & A

