Hands on with HP Insight Dynamics – VSE and VSE Management Software

Dave Beasley, Toran Kopren
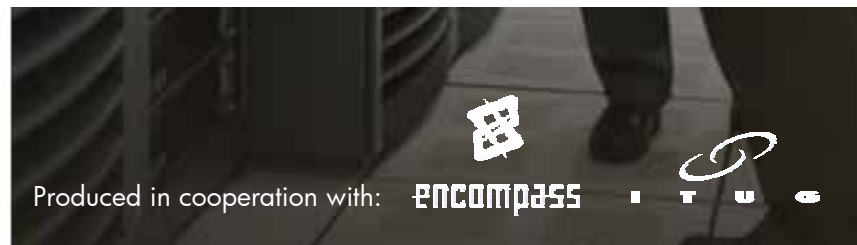
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HP Technology Forum & Expo 2008

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HP Insight Dynamics – VSE and VSE Management Software

Agenda

- High Level Overview
  - VSE Management Software (VSE 4.0) for HP-UX/Integrity
  - ID-VSE for ProLiant and BladeServers
- Lab Environment and Instructions
  - ID-VSE labs
    - Virtualization Manager
    - Capacity Advisor
    - Logical Servers (Blades and Virtual Machines)
  - VSE 4.0 labs
    - Virtualization Manager
    - Capacity Advisor
    - Global Workload Manager

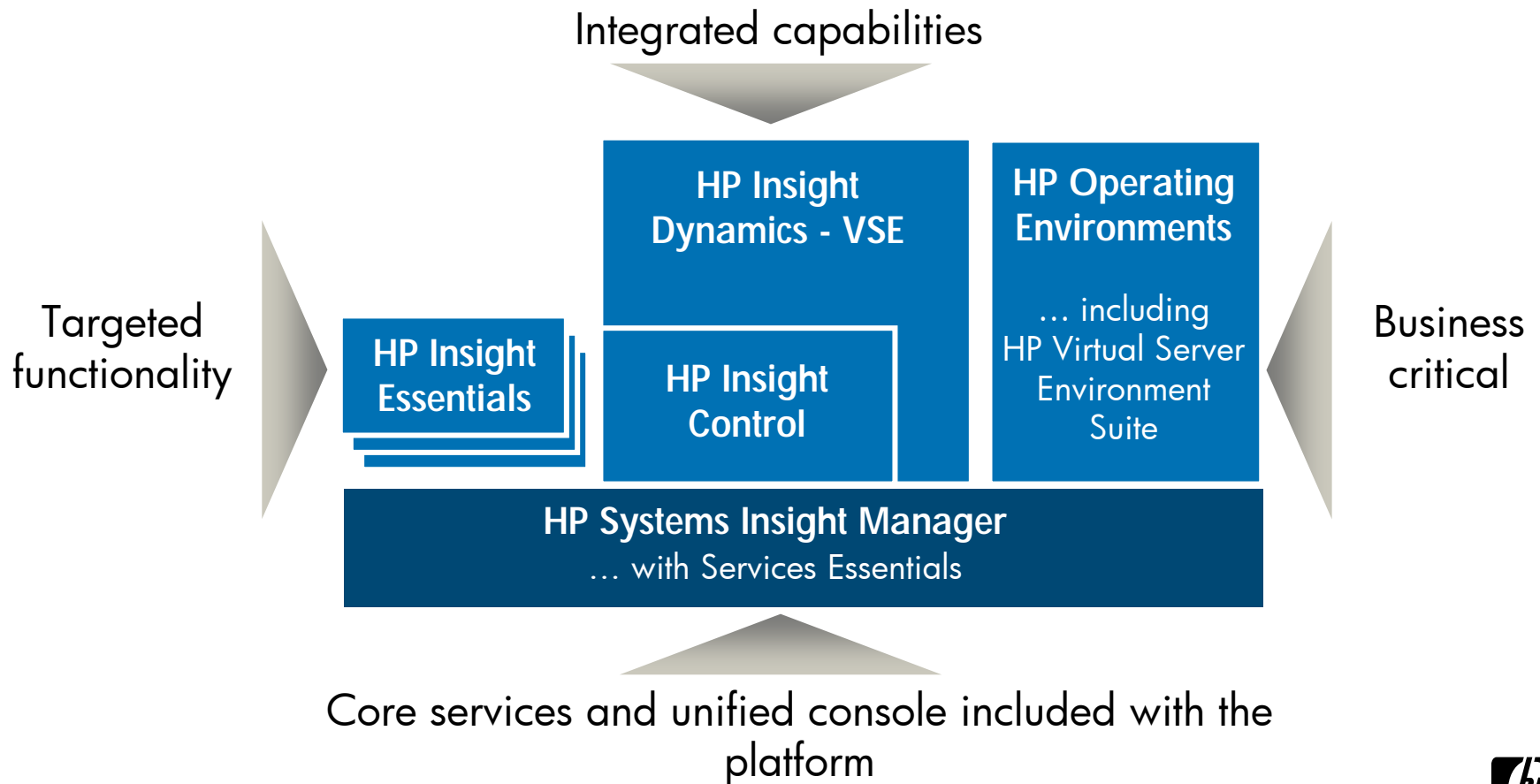# HP Insight Dynamics – VSE and VSE Suites delivered in convenient packages

HP Insight Dynamics – VSE Suites for HP ProLiant and HP BladeSystem with ProLiant blades

new

HP Virtual Server Environment Suite for HP Integrity

new release

The HP Insight Software Portfolio

Continuously controlling and optimizing HP platforms

Integrated capabilities

Targeted functionality

HP Insight Essentials

HP Insight Dynamics - VSE

HP Insight Control

HP Operating Environments

… including HP Virtual Server Environment Suite

Business critical

HP Systems Insight Manager
… with Services Essentials

Core services and unified console included with the platform

HP Insight software portfolio for HP servers

HP Insight Dynamics – VSE Suite

for ProLiant and BladeSystem ProLiant

- Capacity planning (CapAd)
- Virtualization management (Vman)
- Logical server management (Vman)
- Server migration - P2P, V2P, V2V, P2V (SMP Universal)
- **with Insight Control Suite**

HP VSE Suite

for Integrity (incl. blades)

- Capacity planning (CapAd)
- Virtualization management (Vman)
- Logical server management* (Vman)
- Workload management (GWLM or HP-UX WLM)
- Soft partitioning (HP Integrity VM or vPar)

HP Insight Control Suites

for ProLiant and BladeSystem ProLiant

- Virtualization mgmt (VMM)
- Power management (IPM)
- Rapid server deployment (RDP)
- Performance management (PMP)
- Patch management (VPM)
- Remote management (iLO Adv for ML/DL / iLO Sel for blades)
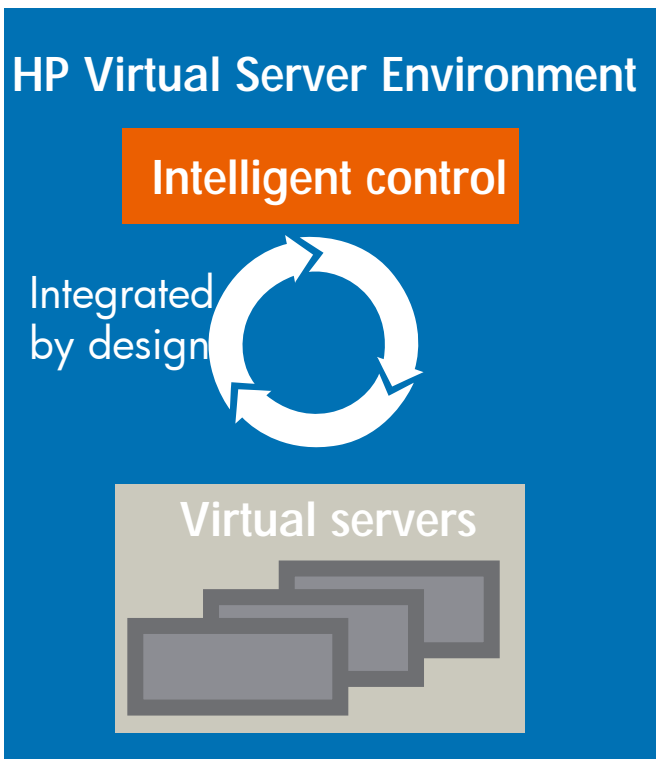- Central management (SIM)

* Q408 for Integrity

HP VSE Suite delivers new VSE functionality for Integrity

HP Virtual Server Environment

Intelligent control

Integrated by design

Virtual servers

Added to current VSE Suite products at no additional cost

- **New:** "Logical server" profiles that can be easily provisioned and moved for Integrity server blades and Integrity Virtual Machines
  – Bring the flexibility of virtualization to physical servers

  Q1'09

- **New:** Simulate large consolidations with new Smart Solver technology for Capacity Advisor
  – Real-time capacity planning including power

  Now

- **New:** Manage VSE for Integrity servers from same Windows-based management server used for ProLiant
  – Control physical and virtual resources in the same way

  Now

- **New:** Use Predictive Controls to anticipate workload needs with gWLM
  – Allocate system resources before they're required based on previous usage patterns

  Now

HP Global Workload Manager (gWLM)

New for Q2'08:

- Windows ProLiant CMS (w/ MS SQL)

- gWLM-GiCAP integration allows for sharing of resources across/between different complexes

- Time-Based Policies allowing for "time of day/week/month" based policy management

- Predictive control that recognizes demand pattern to preserve service levels in a more pro-active way

Now

Monitoring and Reporting

Policies

App A | App C | App E | App G

App B | App D | App F | App H
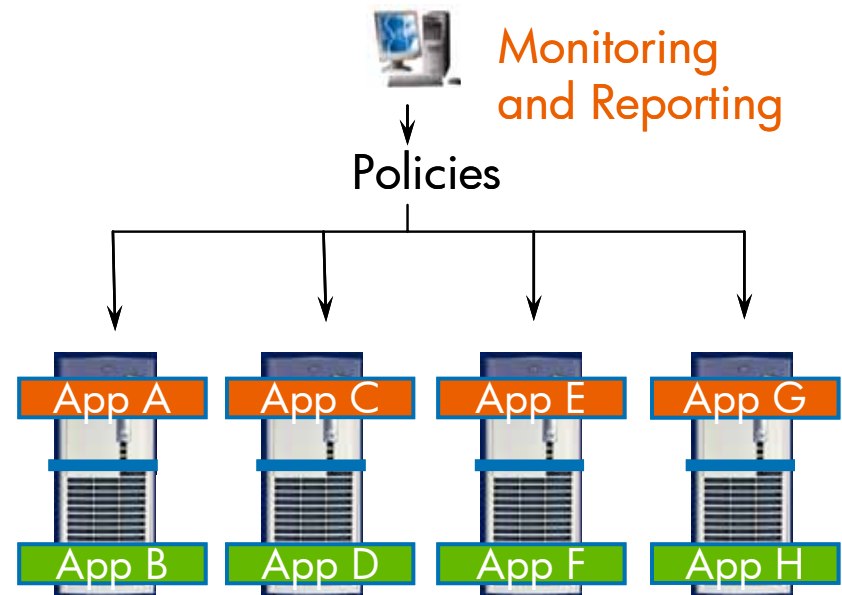
Allocate resources among multiple workloads to increase server utilization while meeting service levels

New HP Insight Dynamics - VSE
Continuously analyze and optimize your infrastructure

- Bring the flexibility of virtualization to physical servers
- Real-time capacity planning for servers and power
- Control physical and virtual resources in the same way
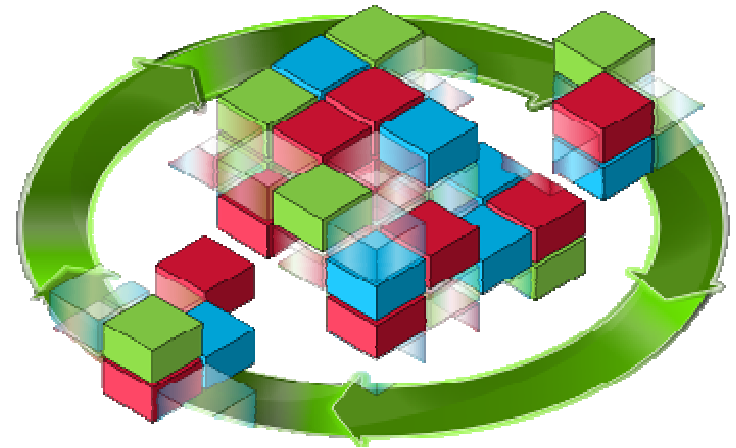
Building on the value of
HP Systems Insight Manager,
Insight Control and
Virtual Server Environment

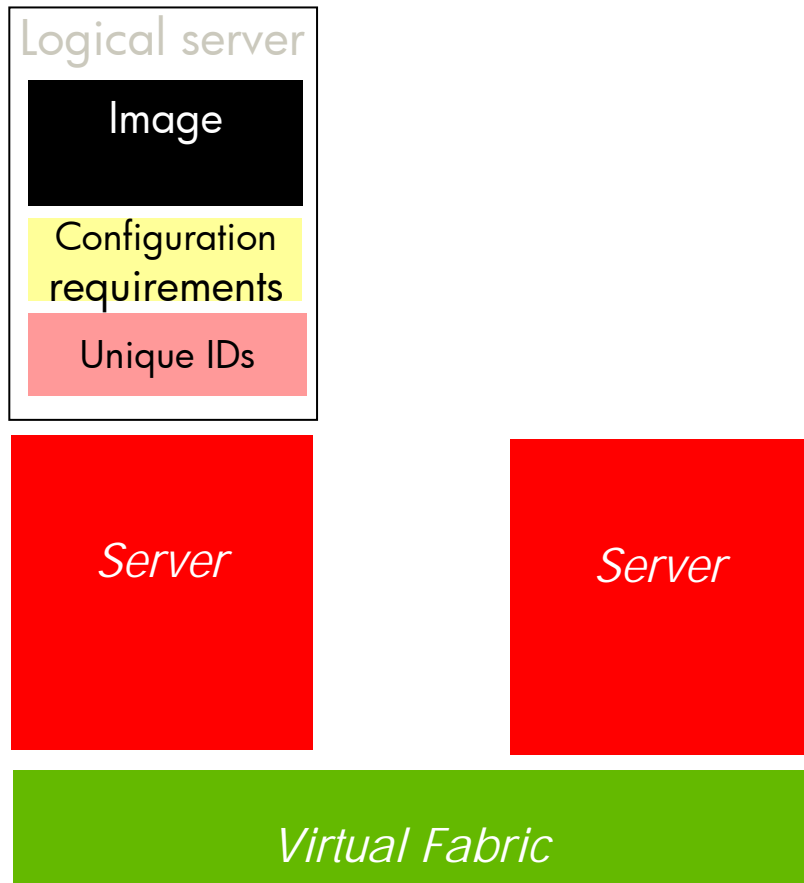**Addressing key data center issues:
cost, speed, quality and energy**

Logical Servers

Bring flexibility of virtualization to physical servers

Available for Integrity Q1'09

Logical server

Image

Configuration requirements

Unique IDs

Server

Server

Virtual Fabric

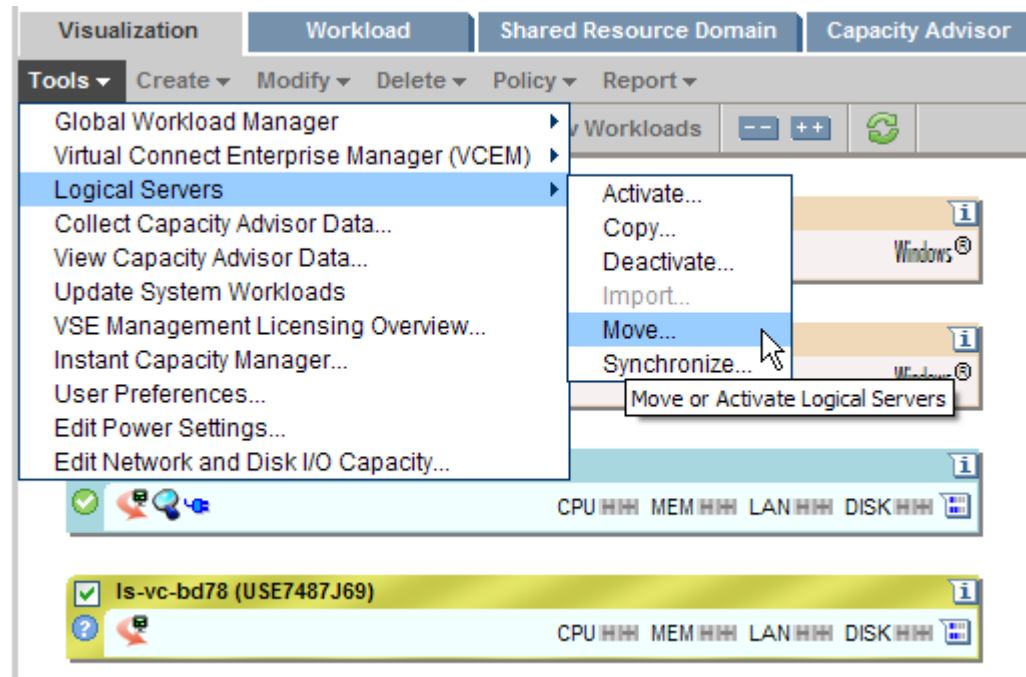## HP Logical Server technology

- A server profile that is easily created and freely moved across physical and virtual machines

Logical servers can be:

- Active physical blade servers

- Active virtual machines

- Offline templates

Logical server management

Logical servers can be provisioned via templates and freely adjusted and migrated

- Bring logical servers on-line quickly for increased capacity, new projects or server recovery

- Shorten maintenance window by rapidly moving server profiles

- Drag and drop capabilities to move logical servers

Activating a Logical Server
5-star rating provided for best target (Cap Ad data used if available)

Activate: Assign Logical Servers to Target Hosts   Maximize ?

Go Back

Selected Source Logical Servers

Source Server Name ↑	Status	Location	Platform	CPU	Memory	Storage	Network
va68vp01_ls	New		Microsoft Windows / HP ProLiant	1	512MB	10GB	HP-internal-intranet

Capacity Advisor Metric View Selection Peak ▼

Target Hosts

	Location ↑	Platform	Headroom	CPU	Memory	Disk Bandwidth	Network Bandwidth
○	Bay: 2, Enclosure: enclosure1-top, VC Domain Group: vseatc-dg-1, Serial # USM71000JR	Server Blade	★★★★★	13.13%	2.08%	NA	NA
◉	Bay: 3, Enclosure: enclosure1-top, VC Domain Group: vseatc-dg-1, Serial # USE7507PB0	Server Blade	★★★★★	15.00%	6.25%	NA	NA
○	Bay: 5, Enclosure: enclosure1-top, VC Domain Group: vseatc-dg-1, Serial # USE7507PB2	Server Blade	★★★★★	15.00%	6.25%	NA	NA

☑ Power on the VM or the Blade

Rejected Targets

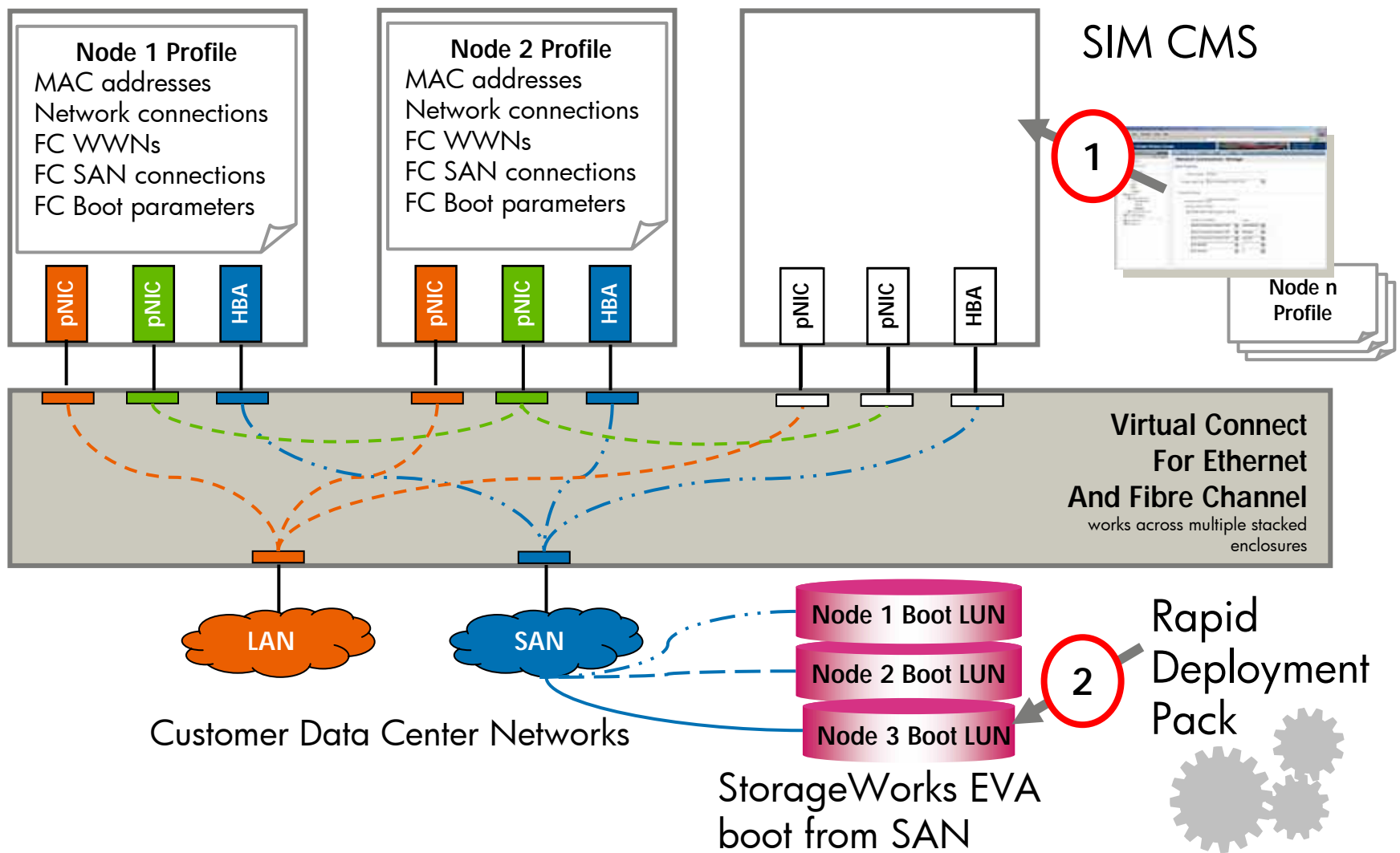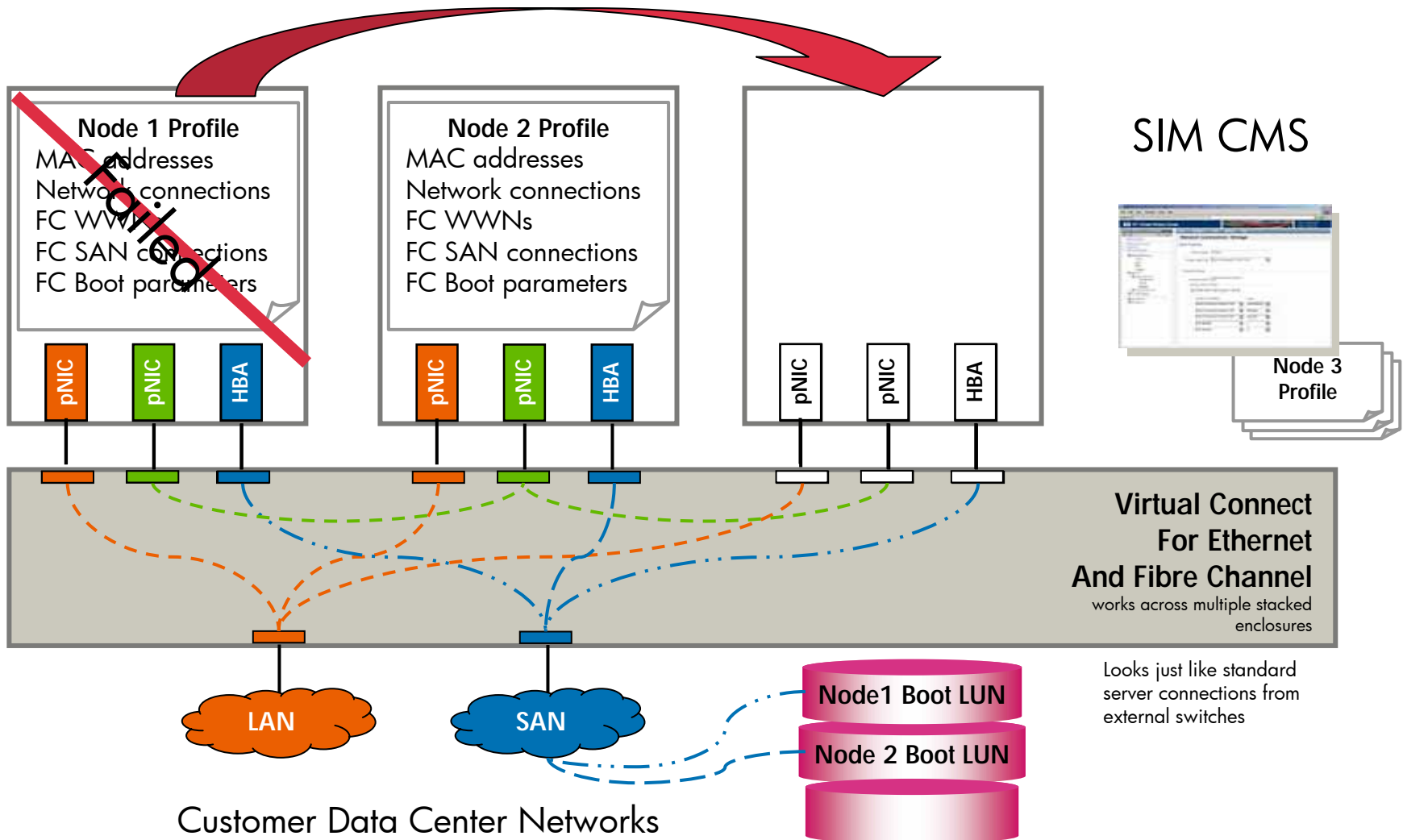| Location	Rejection Description
There are no rejected targets to display	

Activate   Cancel

Possible Use Cases for Logical Servers:

- Reduce Time to Deploy New Servers
  - Logical Servers can be standard blueprints for new servers
  - Reduces time and possible configuration errors
  - Host Chooser can help with best place to activate new server
- Conveniently Expand and Contract Application Server Pools
  - Activate and Deactivate on demand
- Re-use resources for another purpose
  - Deactivate one logical server to free resources; Activate another
- Move servers to different locations for maintenance purposes
  - minimal or no downtime
  - Does not require Network Administrator or SAN Administrator involvement

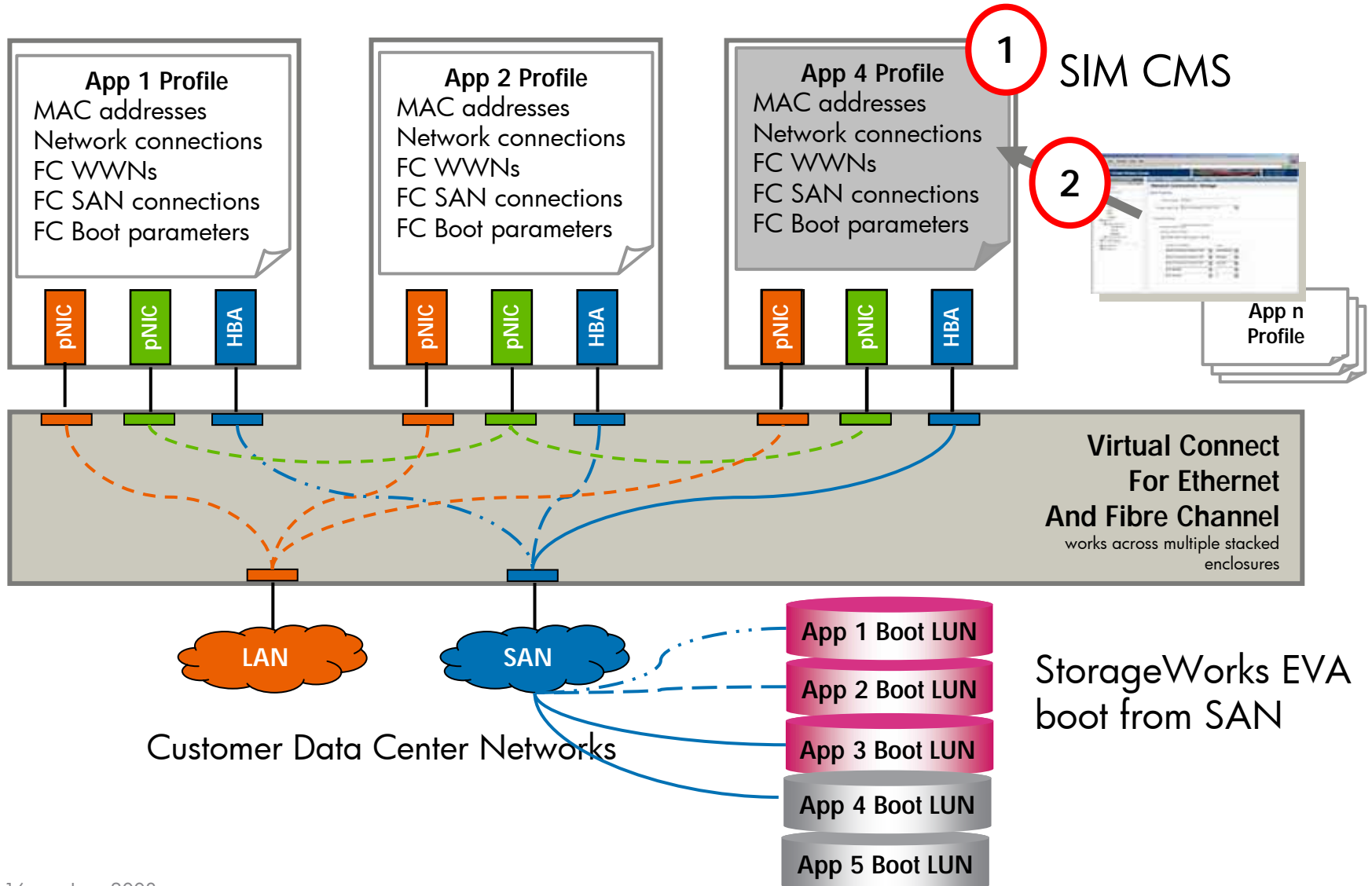- ✓ Manage both Physical and Virtual Resources in same way!

Provision new node quickly with logical servers

Node 1 Profile
MAC addresses
Network connections
FC WWNs
FC SAN connections
FC Boot parameters

pNIC | pNIC | HBA

Node 2 Profile
MAC addresses
Network connections
FC WWNs
FC SAN connections
FC Boot parameters

pNIC | pNIC | HBA

pNIC | pNIC | HBA

SIM CMS

1

Node n
Profile

**Virtual Connect
For Ethernet
And Fibre Channel**
works across multiple stacked
enclosures

LAN

SAN

Customer Data Center Networks

Node 1 Boot LUN

Node 2 Boot LUN

Node 3 Boot LUN

2

Rapid
Deployment
Pack

StorageWorks EVA
boot from SAN

Swift server replacement: <u>Logical server migration</u>

Node 1 Profile
MAC addresses
Network connections
FC WWNs
FC SAN connections
FC Boot parameters

Failed

pNIC
pNIC
HBA

Node 2 Profile
MAC addresses
Network connections
FC WWNs
FC SAN connections
FC Boot parameters

pNIC
pNIC
HBA

pNIC
pNIC
HBA

SIM CMS

Node 3
Profile

**Virtual Connect
For Ethernet
And Fibre Channel**
works across multiple stacked
enclosures

LAN

SAN

Node1 Boot LUN

Node 2 Boot LUN

Looks just like standard
server connections from
external switches

Customer Data Center Networks

Redeploy resources where needed with logical server management

App 1 Profile
MAC addresses
Network connections
FC WWNs
FC SAN connections
FC Boot parameters

pNIC pNIC HBA

App 2 Profile
MAC addresses
Network connections
FC WWNs
FC SAN connections
FC Boot parameters

pNIC pNIC HBA

App 4 Profile
MAC addresses
Network connections
FC WWNs
FC SAN connections
FC Boot parameters

pNIC pNIC HBA

1
2

SIM CMS

App n Profile

Virtual Connect For Ethernet And Fibre Channel
works across multiple stacked enclosures

LAN

SAN

Customer Data Center Networks

App 1 Boot LUN
App 2 Boot LUN
App 3 Boot LUN
App 4 Boot LUN
App 5 Boot LUN

StorageWorks EVA boot from SAN

Capacity Advisor

Real-time capacity planning for server and power

Enables day-to-day planning
based on unique HP labs technology

Virtual

VM VM VM VM

VM VM VM VM

Physical

Smart
Solver
Technology

Optimize
utilization

Maximize
energy efficiency

Optimize
performance

5-star rating shows best-fit workload placement
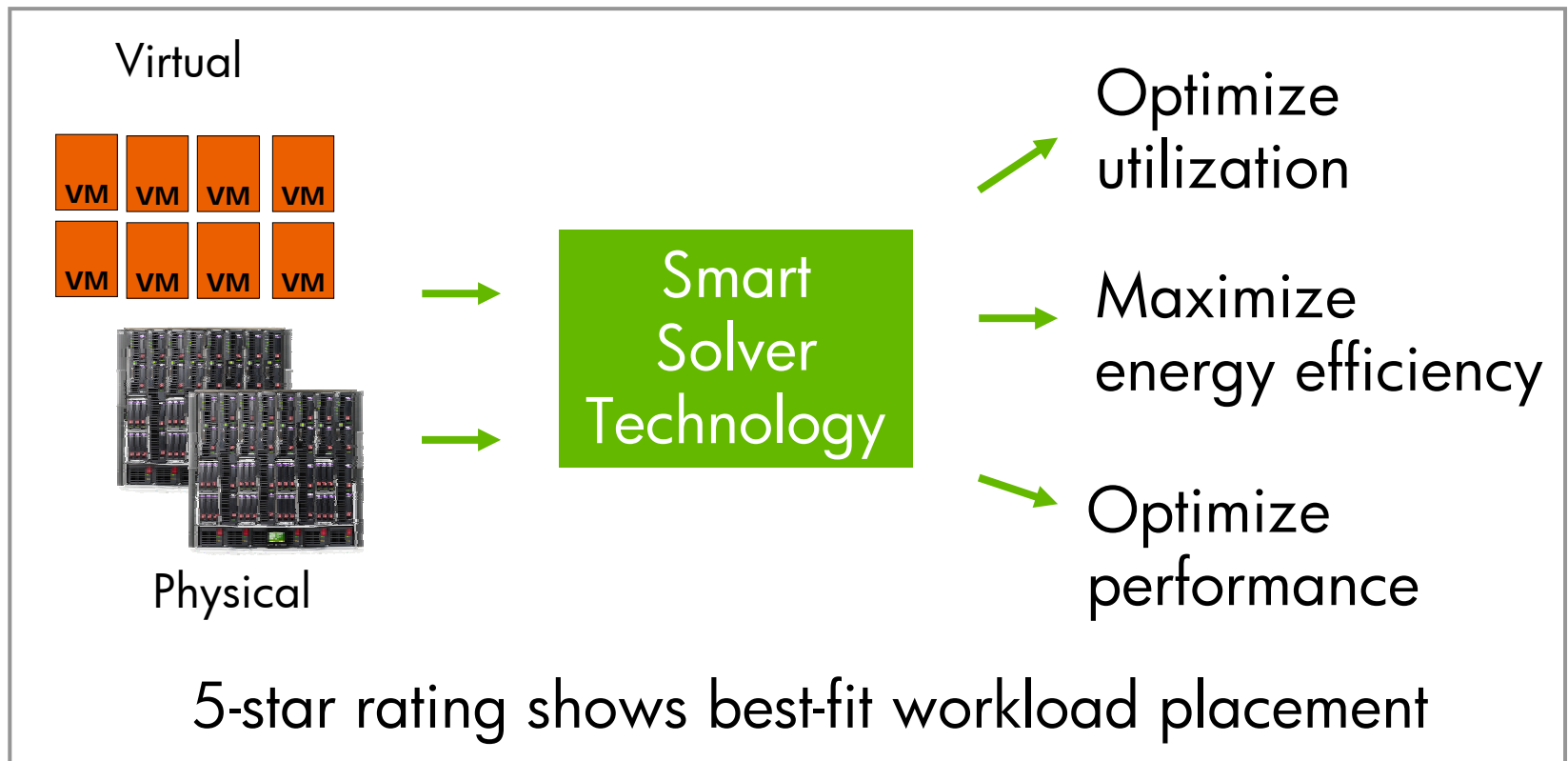
HP Insight Dynamics – VSE
Capacity planning functionality overview

- Eliminate guesswork and months of tedious capacity planning and research

- Make better decisions faster, matching your business priorities

Measure utilization for CPU, memory, network, disk & power

Collects more than a thousand data points per server per day

New power measurement for Integrity available Q2'08

Available for Integrity Q2'08

New Smart Solver technology for consolidation or re-balancing

Available for Integrity Q2'08

New 5-Star rating system for best-fit placement

Data collected remains onsite

Create inventories and reports

Most advanced real-time capacity planning tool based on unique HP labs technology

HP Insight Dynamics – VSE: Capacity planning to optimize utilization

The new math: 8+8 = 12

8 Core Peak
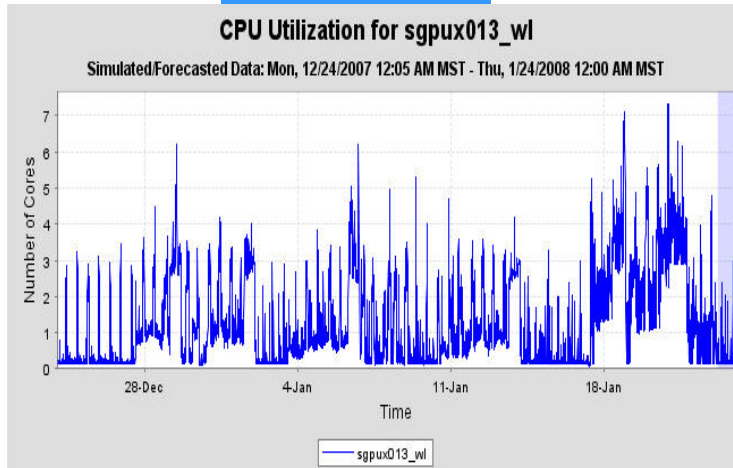
8 Core Peak

=
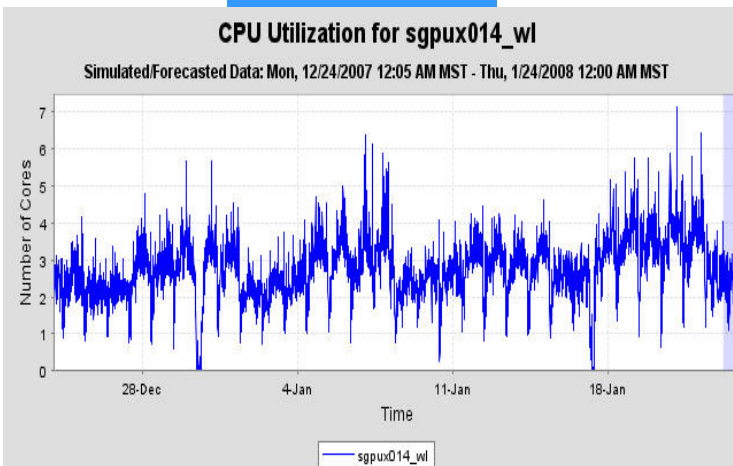
- Peaks for different workloads do not all happen at the same time.

12 Core Peak
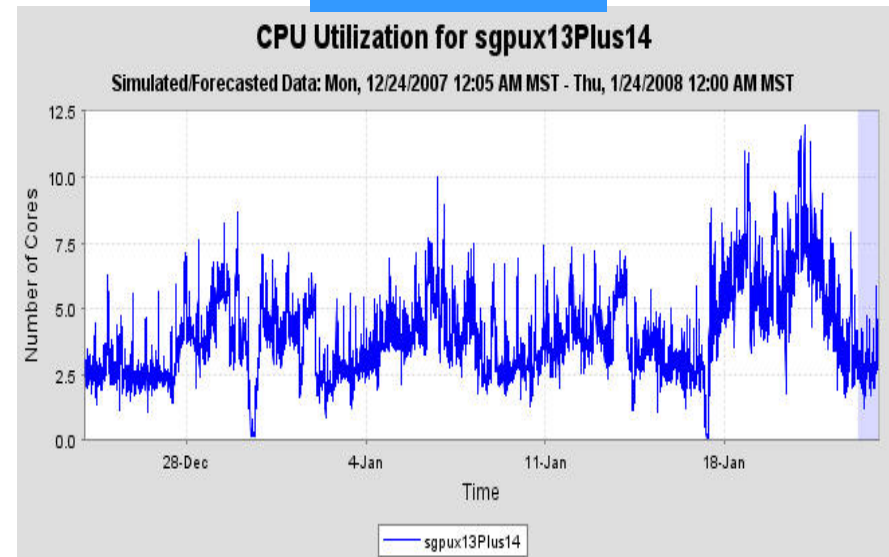
- Two workloads each have an 8 CPU peak demand but the peak of their sum is 12 CPUs.

We allow Quality of Service to be considered

CPU Utilization for sgpux235

Peak — 99.9% — 99%
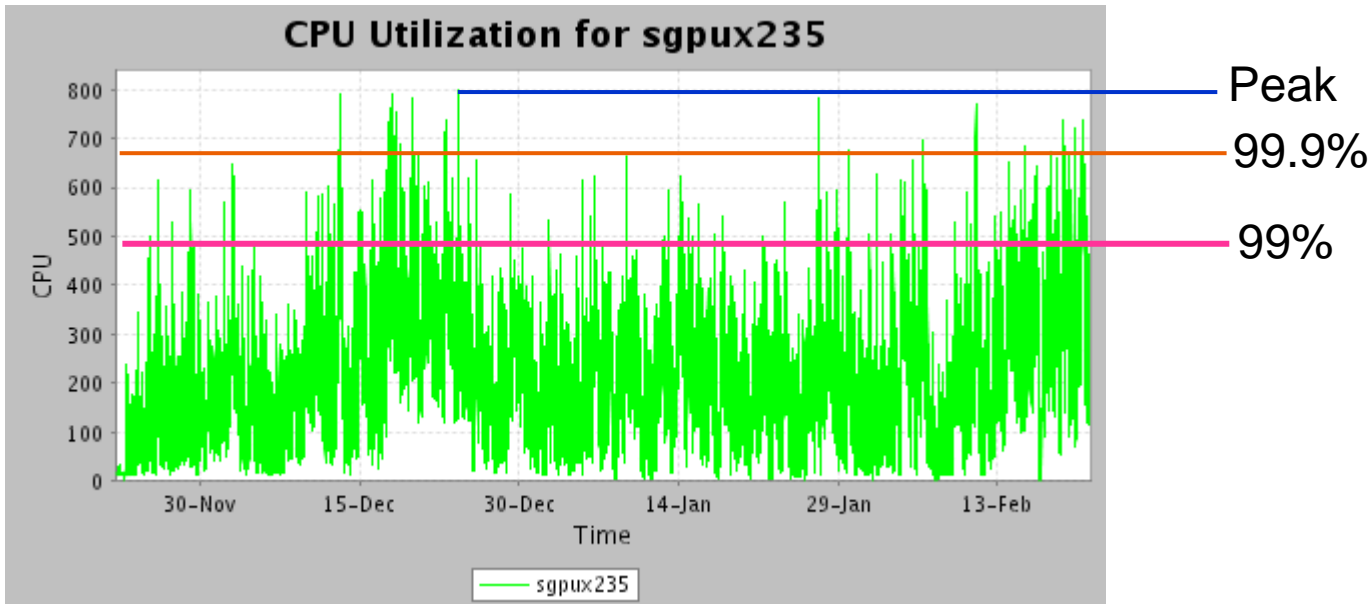
In an HP-labs study, an average of 40% fewer Cores were needed to meet 99% of the demand as were needed to meet 100% of the demand

Forecasting utilization is easy

- Enter a growth rate for a workload we will synthesize a trace for it
- Trending analysis will help find the growth rate when there is no business plan
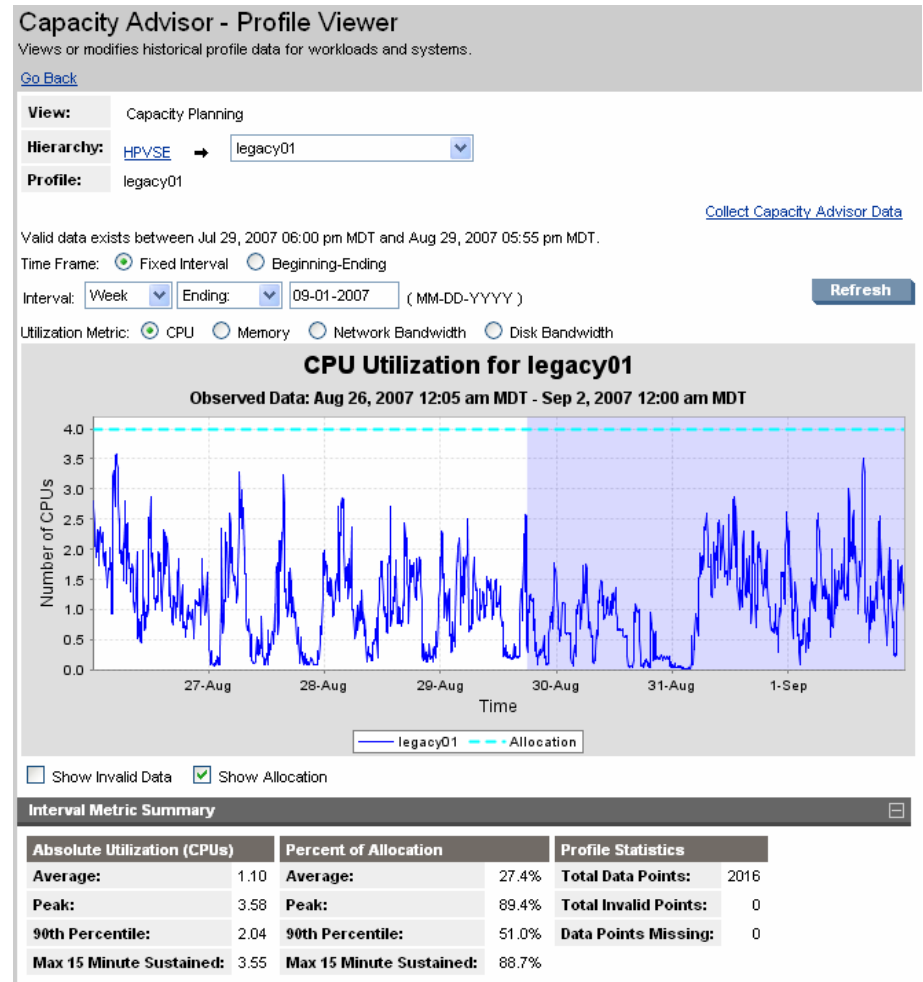
Power

- Power is read on systems that support metering
- Power can be estimated for all systems
- Power forecasts are made by calibrating with Core data
- Power estimates can be made for what-if configurations
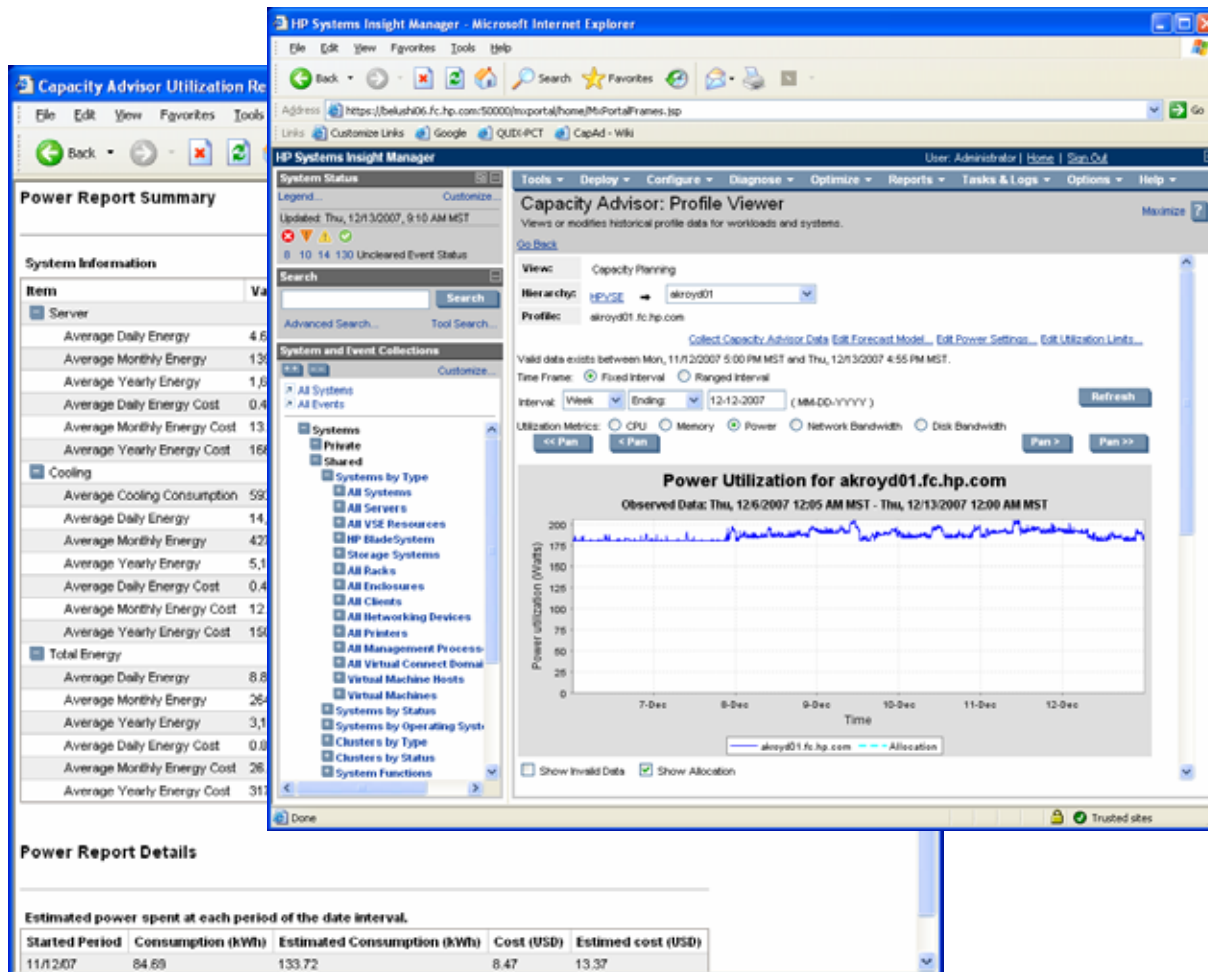
Scenario Comparison report

Scenario Details Table

Metric	Optimize Power - Baseline	Optimize Power - 8 core vm host	Optimize Power - 4 core vm hosts
☐ Scenarios Overview			
Headroom Rating	★★★★★	★☆☆☆☆	★★★★★
Memory (GB)	23.98GB	36.00GB	32.00GB
Number of Physical Servers including VM hosts	10	1	2
Number of VM Hosts	0	1	2
Number of VMs	0	10	10
Number of HP-UX instances	0	0	0
Number of Windows instances	10	10	10
Number of Linux instances	0	0	0
☐ Power and Energy			
Average W	1467.73 W	470.80 W	720.01 W
Average kWh/month	1056.76 kWh	338.98 kWh	518.41 kWh
kWh/month HVAC	1320.95 kWh	423.72 kWh	648.01 kWh
Total kWh	2377.72 kWh	762.70 kWh	1166.41 kWh
Energy cost/month	$ 285.33	$ 91.52	$ 139.97
☐ Absolute Utilization			
Average CPU	3.19 cores	2.42 cores	2.22 cores
Average Memory	15.75 GB	24.50 GB	25.02 GB
☐ Relative Utilization			
Average CPU	18.75 %	30.27 %	27.71 %
Average Memory	65.66 %	68.05 %	78.18 %

Utilization Limits

- Quality of Service can be specified for resource utilization
- Limits are used pervasively through the tool
  - Solver uses limits to know when a system is full
  - Limits are used in 5-star calculations
  - Going over the limits are reported when doing manual planning
- Limits can be soft

Utilization Limits Editor - Global Utilization Limits Model

Edit the utilization limits model which is used as a default for all workloads when a more specific utilization is not specified.

Maximize

Description:

Utilization Limit Definition Type: Sustained Utilization

Metric	Utilization Value(%)	Duration(minutes)	Comment
CPU Utilization%			

Note: The utilization value above which system or application performance becomes unacceptably slow. A value of 90.0 in this field specifies 90% utilization for the metric.
Note: The number of consecutive minutes for which the 5-minute average utilization may exceed the threshold value. The duration specified must be a multiple of 5 minutes.

Add

	Metric	Utilization Value(%)	Exception allowed	Comment
☐	CPU Utilization%	70.0	15 Minutes	
☐	CPU Utilization%	90.0	5 Minutes	
☐	Disk IO%	65.0	3.0 Percent of Time	
☐	Memory Utilization%	100.0	0.0 Percent of Time	
☐	Network IO%	60.0	5.0 Percent of Time	

Remove

Note: This utilization limits model is new, using values from the Global Default model as defaults, and will not persist unless the OK button is pressed.

Reload Model   OK   Cancel

Trusted sites

HP Smart Solver

- Able to plan server consolidations to VMs or simply stacking application instances
- Automatic load balancing can help reduce bottlenecks in the data center
- Planning can use historic data or forecasted data
- Utilization limits are honored

HP capacity planning with easy-to-use 5-star-ratings
Servers are provisioned and redeployed based on best fit algorithms

Moving Workload:

Name ↑	CPU Utilization	Memory Utilization	Network I/O Utilization	Disk I/O Utilization	CPU Multiplier	Memory Multiplier	Forecast Growth Rate CPU Memory Network Disk I/O I/O	Contained In
new_app_server	N/A	N/A	N/A	N/A	1.0	1.0	0% / 0% 0% / 0%	Not Assigned/Parked

Note:
The current simulation contains both historical and projected data.
Parked workload utilization values are not relevant until the workload has been moved to a system.

To: (Selected System)

|	System Name • workload	Headroom ↓ Rating	CPU Utilization	Memory Utilization	Network I/O Utilization	Disk I/O Utilization	Platform	System Type
⊙	akroyd01 • akroyd01.fc.hp.com	★★★☆☆	33.29/38.64 % of 2 Cores @ 2.01 GHz	76.00/80.40 % of 2.00 GB	99.66/103.96 % of 838.86 Mb/s	6.37/9.71 % of 1,638.40 MB/s	Windows® ProLiant DL145 G2	Server, Windows Server, HP ProLiant
○	akroyd05 • akroyd05.fc.hp.com	★☆☆☆☆	73.93/76.75 % of 1 Core @ 2.00 GHz	76.48/98.77 % of 1.00 GB	98.82/112.57 % of 837.69 Mb/s	8.09/12.92 % of 1,638.40 MB/s	Windows® ProLiant DL145 G2	Server, Windows Server, HP ProLiant
○	akroyd02 • akroyd02.fc.hp.com	☆☆☆☆☆	60.20/66.35 % of 1 Core @ 2.01 GHz	85.85/108.46 % of 1.00 GB	98.21/110.36 % of 838.86 Mb/s	8.40/12.43 % of 1,638.40 MB/s	Windows® ProLiant DL145 G2	Server, Windows Server, HP ProLiant
○	akroyd03 • akroyd03.fc.hp.com	☆☆☆☆☆	89.38/92.93 % of 1 Core @ 2.01 GHz	82.88/102.93 % of 1.00 GB	35.15/100.93 % of 837.69 Mb/s	15.05/16.83 % of 1,638.40 MB/s	Windows® ProLiant DL145 G2	Server, Windows Server, HP ProLiant
○	akroyd04 • akroyd04.fc.hp.com	☆☆☆☆☆	95.49/99.65 % of 2 Cores @ 2.01 GHz	79.08/89.64 % of 2.00 GB	41.85/101.12 % of 837.69 Mb/s	14.13/17.41 % of 1,638.40 MB/s	Windows® ProLiant DL145 G2	Server, Windows Server, HP ProLiant
○	akroyd06 • akroyd06.fc.hp.com	☆☆☆☆☆	100.00/110.70 % of 1 Core @ 2.01 GHz	99.17/121.76 % of 1.00 GB	40.15/102.21 % of 837.69 Mb/s	3.30/7.25 % of 1,638.40 MB/s	Windows® ProLiant DL145 G2	Server, Windows Server, HP ProLiant

Note:
The current simulation contains both historical and projected data.

Virtualization Manager

Control physical and virtual resources in the same way

- Visualize and manage logical servers whether they are built on physical or virtual machines

- Works across multiple OSs and virtual machine technologies

- Integrated by design, easily move from high-level environment views to specific management tasks
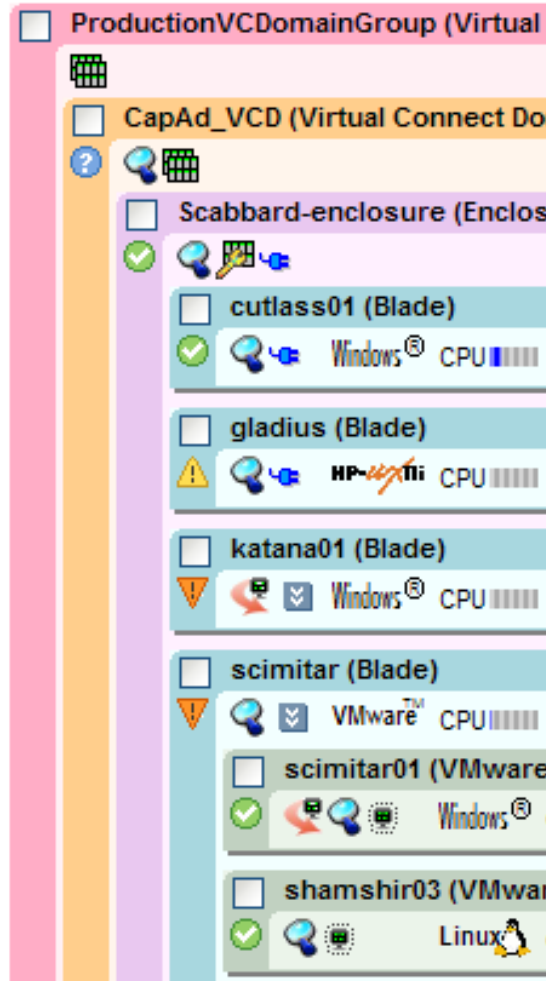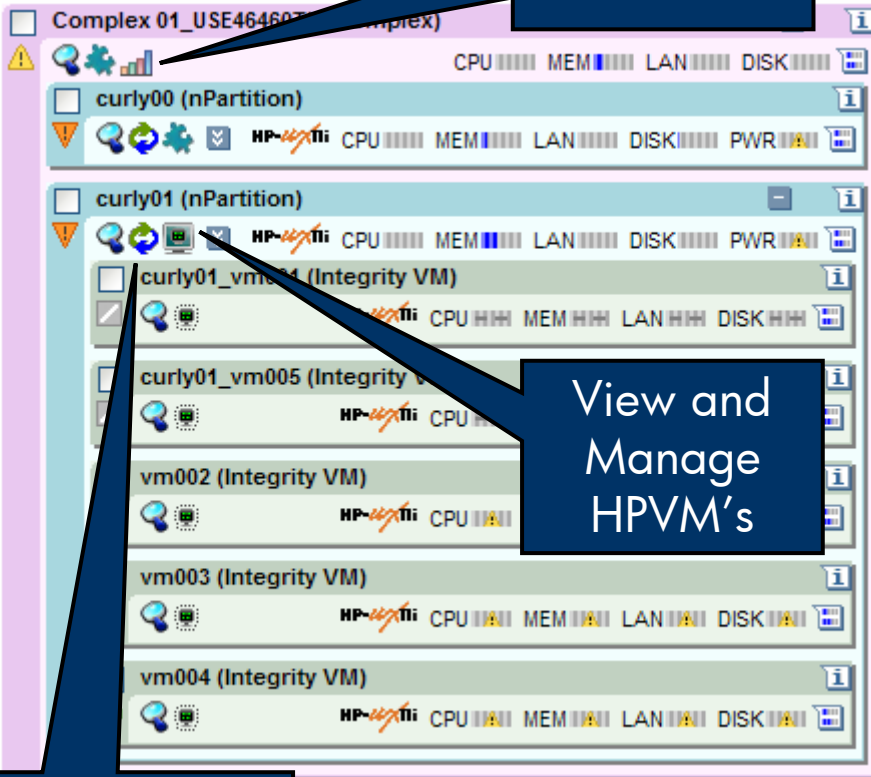

Network Groups and Domains

Blade Enclosures

Integrity and ProLiant Servers

Virtual Servers
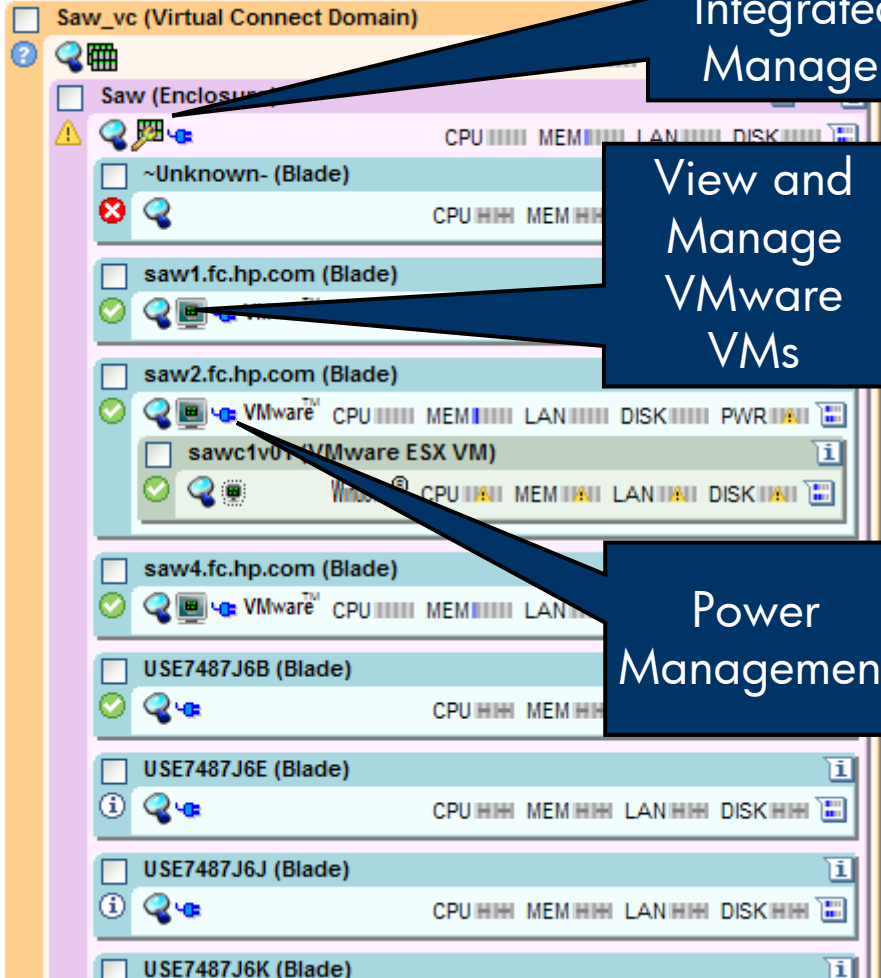
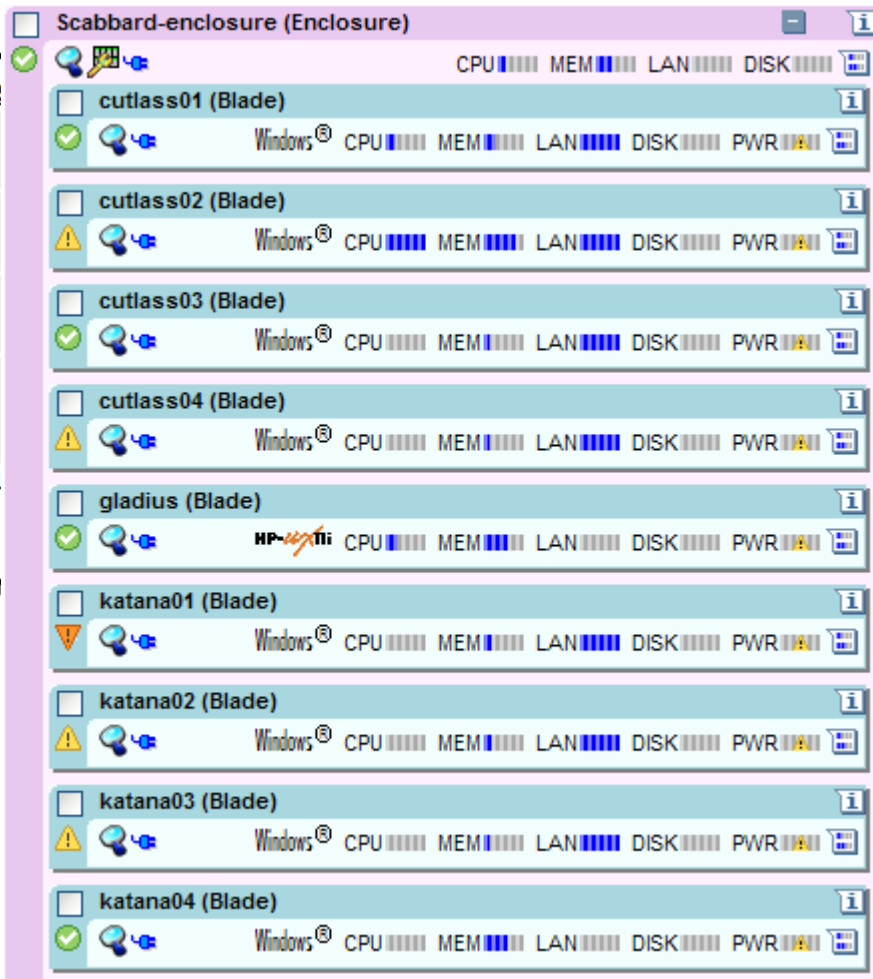**Builds on HP Systems Insight Manager**

Instant Capacity

HP BladeSystem Integrated Manager

View and Manage VMware VMs

View and Manage HPVM's

Power Management

Managed by gWLM

Complex 01_USE464607... (Complex)

CPU MEM LAN DISK

curly00 (nPartition)
HP-UXIi CPU MEM LAN DISK PWR

curly01 (nPartition)
HP-UXIi CPU MEM LAN DISK PWR

curly01_vm004 (Integrity VM)
HP-UXIi CPU MEM LAN DISK

curly01_vm005 (Integrity VM)
HP-UXIi CPU

vm002 (Integrity VM)
HP-UXIi CPU

vm003 (Integrity VM)
HP-UXIi CPU MEM LAN DISK

vm004 (Integrity VM)
HP-UXIi CPU MEM LAN DISK

Saw_vc (Virtual Connect Domain)

Saw (Enclosure...)
CPU MEM LAN DISK

~Unknown- (Blade)
CPU MEM

saw1.fc.hp.com (Blade)

saw2.fc.hp.com (Blade)
VMware CPU MEM LAN DISK PWR

sawc1v01 (VMware ESX VM)
CPU MEM LAN DISK

saw4.fc.hp.com (Blade)
VMware CPU MEM LAN

USE7487J6B (Blade)
CPU MEM

USE7487J6E (Blade)
CPU MEM LAN DISK

USE7487J6J (Blade)
CPU MEM LAN DISK

USE7487J6K (Blade)

Information Callout

System Utilization Data

Aggregate Utilization Data

31

HP Systems Insight Manager
HP-UX Central Management Server

HP-UX CMS
Integrity

Managed from a
common console

Integrity Essentials

HP Systems Insight
Manager

Can
Manage

Integrity Servers

Integrity Blades

Note: no plans to support VCEM, logical server capability or RDP from HP-UX-based CMS.

Note: HP 9000 servers are also supported.

HP Systems Insight Manager
Windows Central Management Server

One common console

Windows CMS on ProLiant

Insight Essentials

HP Systems Insight Manager

Note: HP 9000 servers are also supported.

Can Manage

- New: Windows CMS supports all current Integrity tools

- Note: VCEM and LSM will be **only** supported on Windows CMS

ProLiant ML/DL

ProLiant Blades

Integrity Servers

Integrity Blades

Lab Environment and Instructions

Hands On Labs

- Labs may be done in any order; we recommend the order shown on the next slide

- Some labs are designed for HP-UX/Integrity, others for Windows/ProLiant, some are for both.

- There are two students for each desktop PC. Each desktop has been assigned a user name, password, and hardware.

Hands On Labs

Topic	Exercises	ProLiant	Integrity	Est. Time
Virtualization Manager	Explore Tabs and Features	x	x	30 min.
	Create Custom Folders	x	x	10 min
	Create Sub-OS Workloads		x	30 min
	Integrity Virtual Machines Manager		x	10 min
Capacity Advisor	Server Consolidations (manual and automated)	x	x	60 min
Logical Servers	Blade Logical Server Labs			60 min
	Storage Pool Lab (optional)	x		15 min
	VM Logical Server Labs			30 min
Global Workload Manager	Manage Integrity VMs			15 min
	Manage FSS groups***		x	15 min
	Conditional Policies (time)			15 min

Hardware Assignments

Username	Password	Integrity VM Host	ESX VM	Windows Blade	Spare Blade
user1	user1	ivmhost21	esxvm111	blade21 (Enclosure2, Bay 13)	Enclosure3, Bay 5
user2	user2	ivmhost22	esxvm112	blade22 (Enclosure2, Bay 14)	Enclosure3, Bay 6
user3	user3	ivmhost23	esxvm113	blade23 (Enclosure2, Bay 15)	Enclosure3, Bay 7
user4	user4	ivmhost24	esxvm114	blade24 (Enclosure2, Bay 16)	Enclosure3, Bay 8
user5	user5	ivmhost31	esxvm121	blade31 (Enclosure3, Bay 13)	Enclosure4, Bay 5
user6	user6	ivmhost32	esxvm122	blade32 (Enclosure3, Bay 14)	Enclosure4, Bay 6
user7	user7	ivmhost33	esxvm123	blade33 (Enclosure3, Bay 15)	Enclosure4, Bay 7
user8	user8	ivmhost34	esxvm124	blade34 (Enclosure3, Bay 16)	Enclosure4, Bay 8
user9	user9	ivmhost41	esxvm131	blade41 (Enclosure4, Bay 13)	Enclosure2, Bay 5
user10	user10	ivmhost42	esxvm132	blade42 (Enclosure4, Bay 14)	Enclosure2, Bay 6
user11	user11	ivmhost43	esxvm133	blade43 (Enclosure4, Bay 15)	Enclosure2, Bay 7
user12	user12	ivmhost44	esxvm134	blade44 (Enclosure4, Bay 16)	Enclosure2, Bay 8

Got questions? Get answers!

Make the most of your infrastructure

www.hp.com/go/TechForumInsight

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about the Insight Software you've seen here at Tech Forum with white papers, podcasts, and videos

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for our online customer community to get tips, tricks, forums, and special webinars

Use Customer Connect Access Code "TechForum08"
and be entered into a drawing (grand prize: Nintendo Wii)