VMware/MS Virtual Server Technical Overview

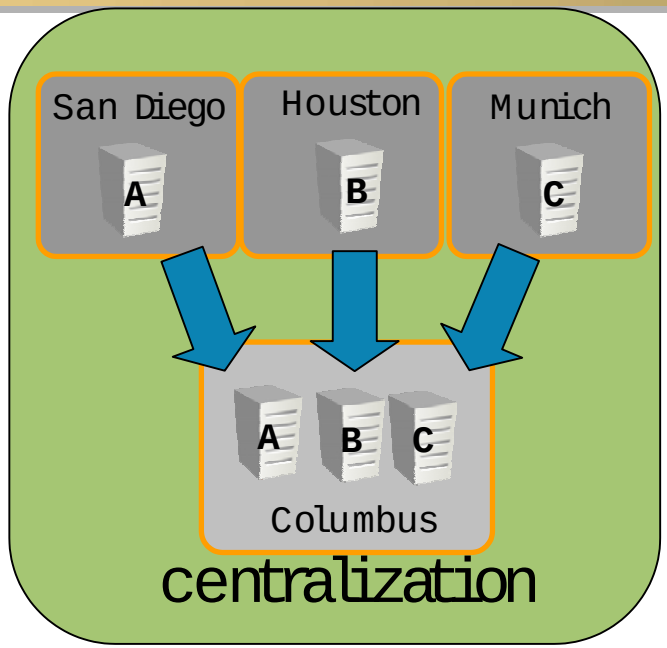
HP WORLD 2003
Solutions and Technology Conference & Expo

HP Confidential

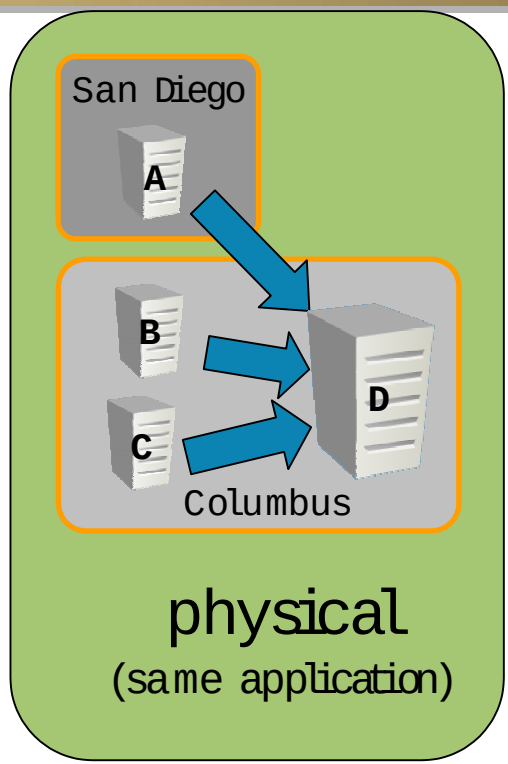
Contents

- IT Consolidation overview
- Server Consolidation solutions
- Summary and Q&A

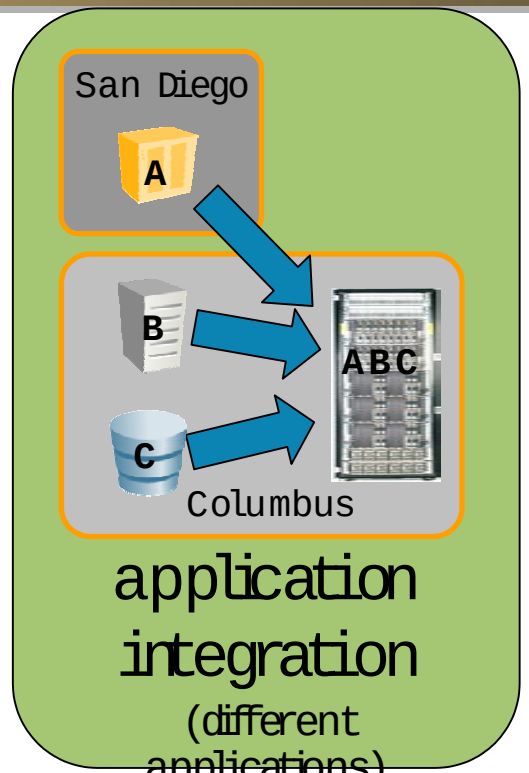
Consolidation overview (IDC)



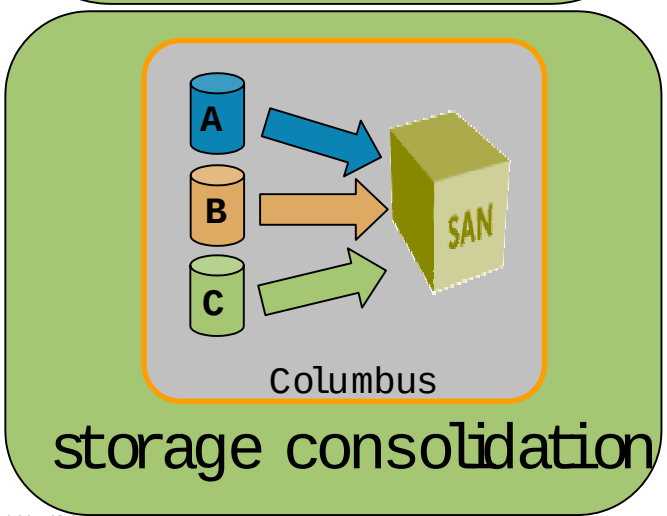
centralization



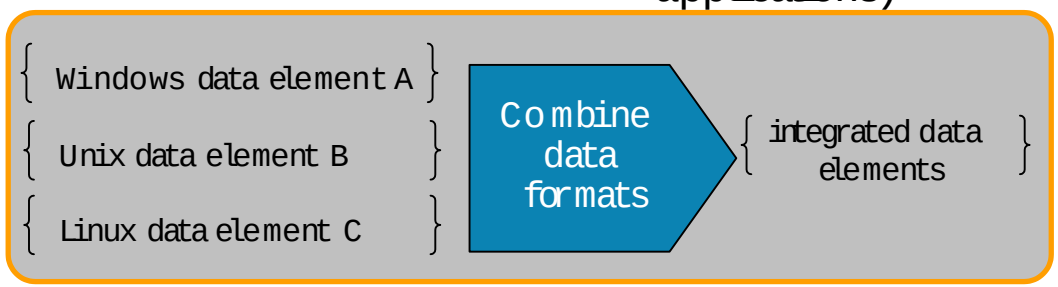
physical
(same application)



application integration
(different applications)



storage consolidation



data integration

IT consolidation: getting healthy in healthcare

HP WORLD 2003
Solutions and Technology Conference & Expo

Challenge

Years of server sprawl & IT growth lead to need for new $7 mill. data center

Solution

Through an infrastructure consolidation workshop, plans were started for a variety of consolidation projects for servers, storage and desktops and ProLiant Essentials Rapid Deployment Pack

Results

The following platforms were consolidated to reduce complexity, add $7M cost avoidance savings and provide 5 years of datacenter capacity

- File servers 38 → 19
- Exchange servers 33 → 19
- SMS servers 15 → 8
- Print servers 15 → 7
- Dev & test servers 90 → 31
- Database servers 65 → 15
- 40 racks saved
- 10 Terabyte SAN deployed
- Migration from NT4 to W2K & AD

- IT Consolidation overview
- **Server Consolidation solutions**
  - **HP ProLiant platforms**
  - **HP Workload Management Pack/RPM**
  - **VMware**
  - **HP Services & Support**
- Summary

Server Consolidation Case Study: National Gypsum

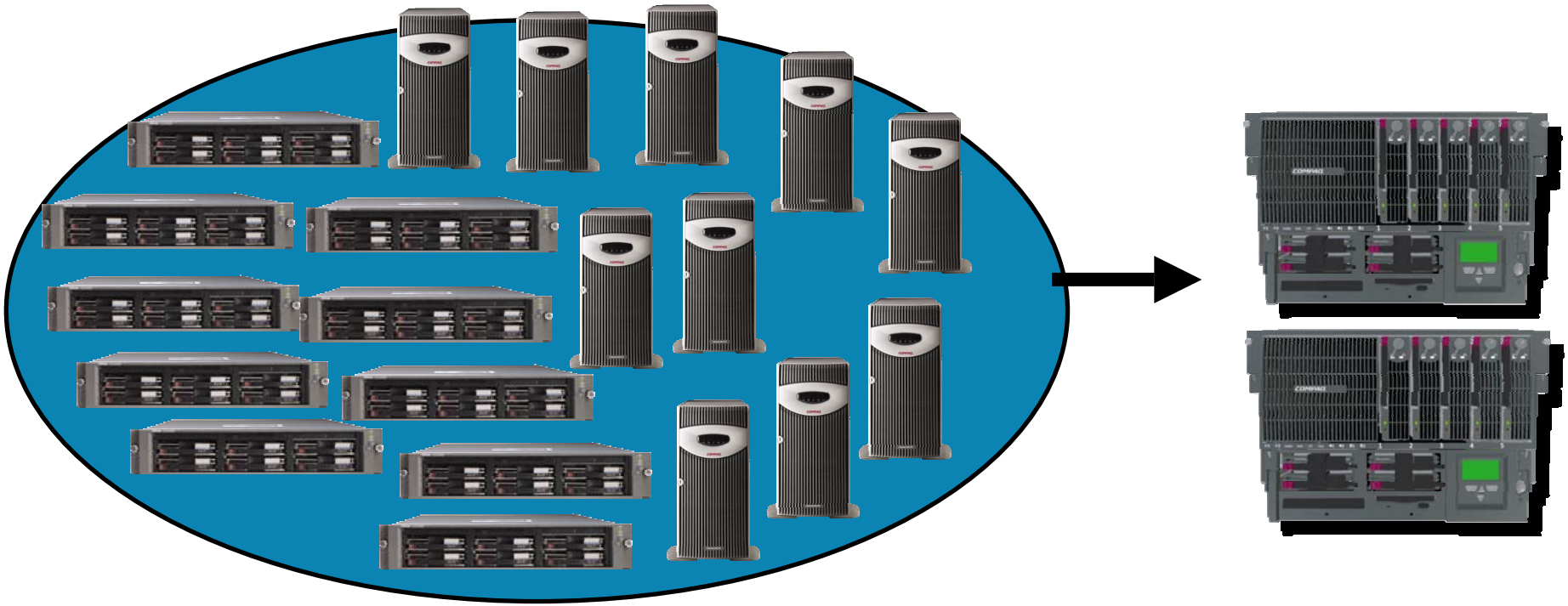
HP WORLD 2003
Solutions and Technology Conference & Expo

Business Challenge

Decrease the number of eBusiness application servers in order to: Reduce hardware, software and maintenance costs; Shrink app development and test time; Curtail management complexity.

HP Adaptive Infrastructure Solution

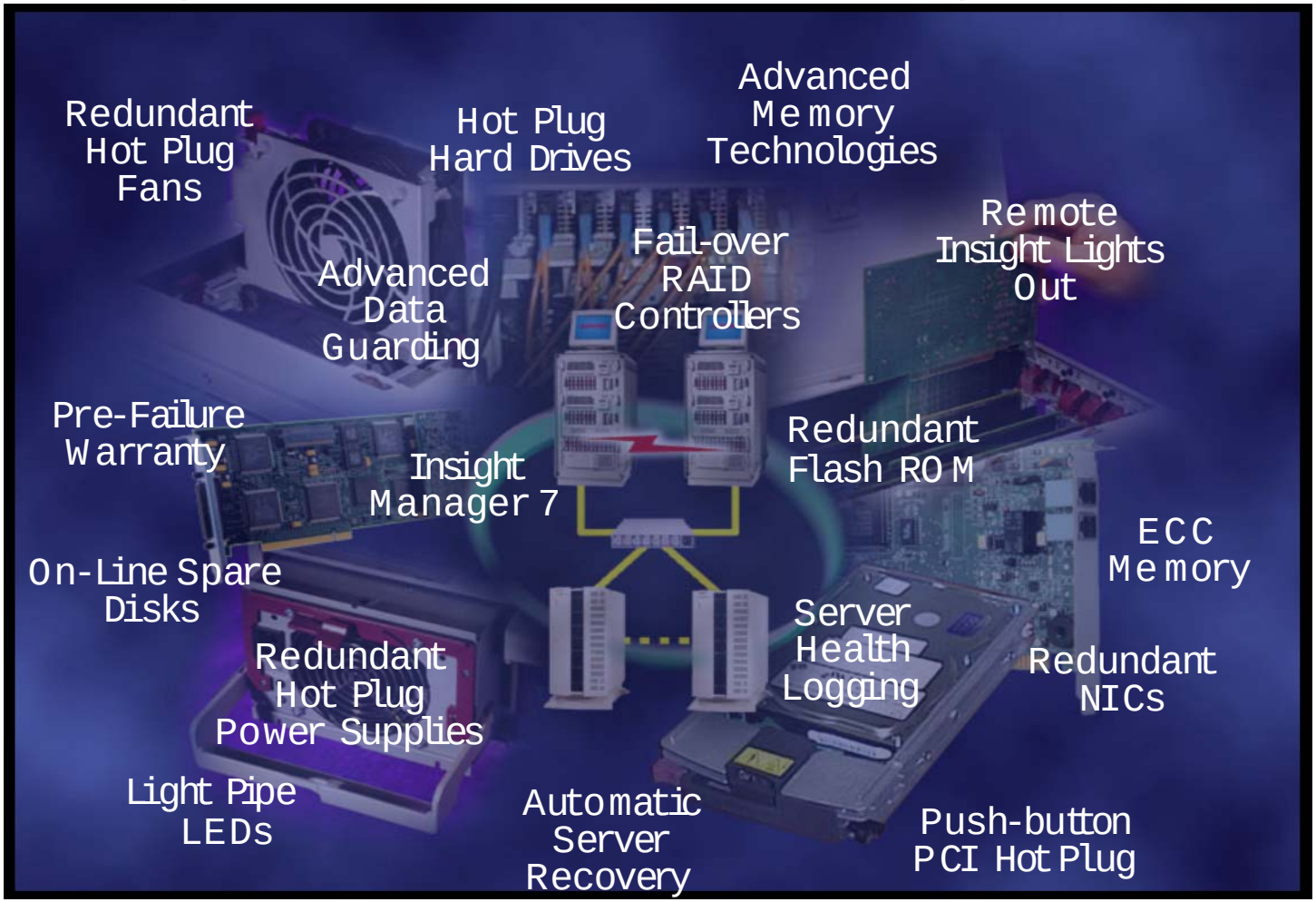
National Gypsum used a combination of ProLiant hardware, ProLiant Essentials Software and VMware ESX server software and consolidated their **20** disparate eBusiness platforms onto **2** ProLiant 8-ways.



ProLiant Value Add: Single Server High Availability

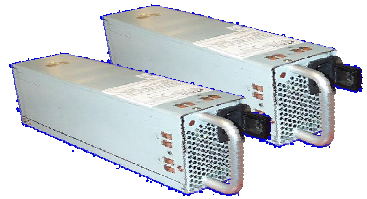
HP WORLD 2003
Solutions and Technology Conference & Expo

Provide redundancy and management to prevent downtime due to server component

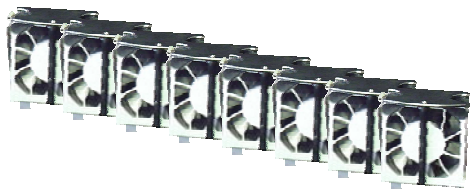


Redundant Server Components

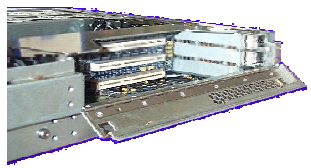
- Hot-Pluggable, redundant power supplies
  - Health LEDs indicate power supply status



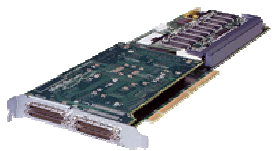
- Hot-Pluggable, redundant system fans
  - Health LEDs indicate fan status
  - Thermal Sensing and variable speed



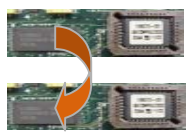
- Hot-Pluggable PCI slots
  - Easy replaced of failed components



- Smart Arrays for disk RAID
  - RAID 0, 1, 1+0, 5, ADG



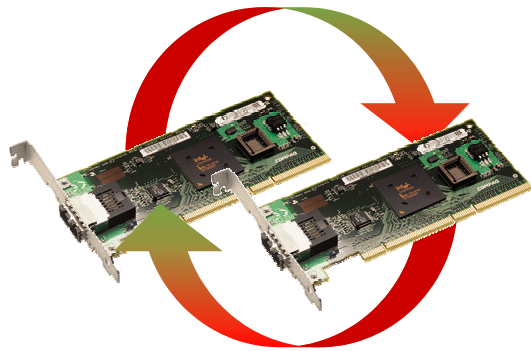
- Redundant System ROMs



Redundant components should be a standard part of every server – a small investment can prevent an expensive downtime event

Network Fault Tolerance (NIC Teaming)

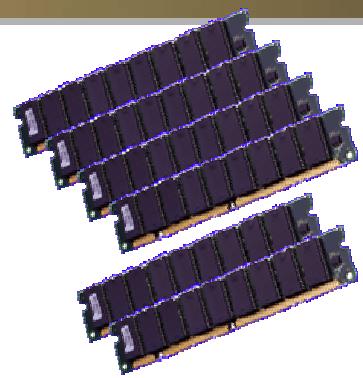
- Simple redundancy
- Two to eight NICs in a fault-tolerant team
- Works with all HP *NCxxx* NICs
  - Single port, multi-port, or embedded
- Enabled with the Network Teaming and Configuration Utility
- Any speed, any media
- Team can be split across switches
- Key element in cluster redundancy



HP delivers value-add through Advanced Memory Protection

On-Line Spare Memory

- One Set of DIMM's can be allocated as a backup
- ECC error automatically moves data to backup DIMM's and shuts down bad DIMM



ProLiant Exclusive

Hot Plug Mirrored Memory

- Two Memory Cards can be configured as "mirror's" to each other for maximum redundancy
- When mirrored, cards can be "Hot Swapped"
- Includes On-Line Spare Option

ProLiant Exclusive

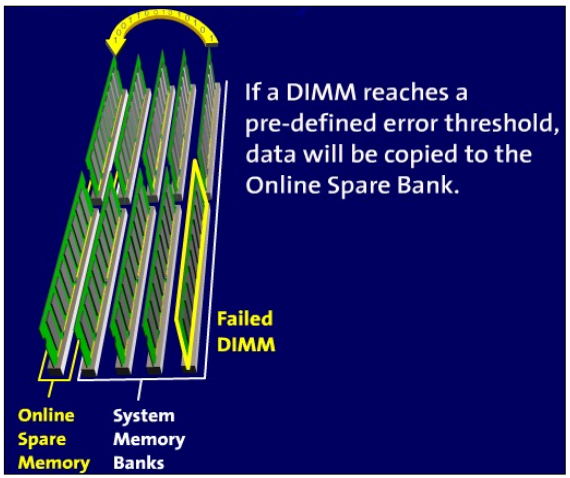
Hot Plug RAID Memory

- Extra DIMM per Bank for Redundancy
- Hot Add
- Hot Replace

ProLiant Advanced Memory Technologies

HP WORLD 2003
Solutions and Technology Conference & Expo

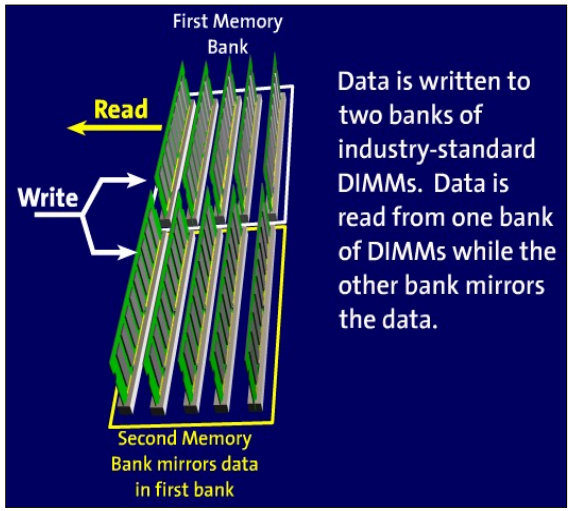
Online Spare



300 Series

DL380 G2
DL380 G3

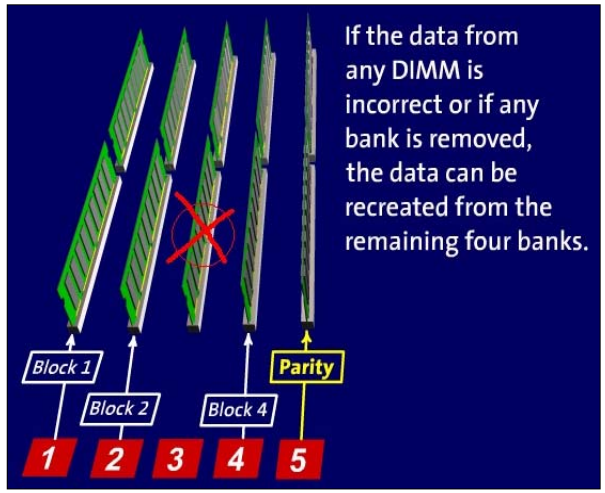
Hot Plug Mirror



500 Series

ML530 G2
DL580 G2

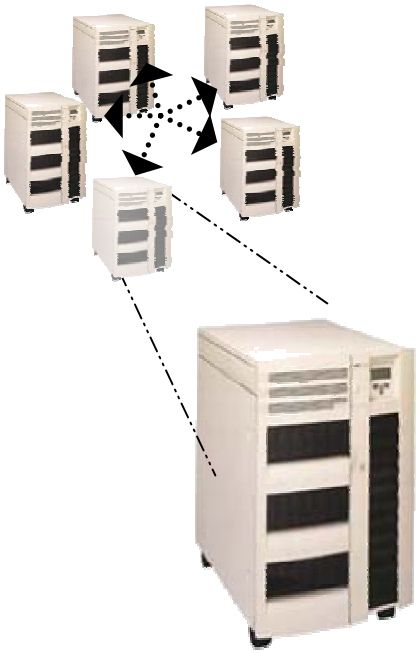
Hot Plug RAID



700 Series

DL740
DL760 G2

HP partitioning continuum strategy



Multiple clustered nodes

Hard partitions

- OS image with HW isolation
- OS image with HW isolation
- OS image with HW isolation

Virtual partitions

hard partition

- OS image with SW isolation
- OS image with SW isolation
- OS image with SW isolation

Resource partitions

1 OS image

- Application 1 with guaranteed compute resources
- Application 2 with guaranteed compute resources
- Application n with guaranteed compute resources

Based on CPUs or percentages

Consolidated workload manager (future)

Current servers

HP Superdome and future servers

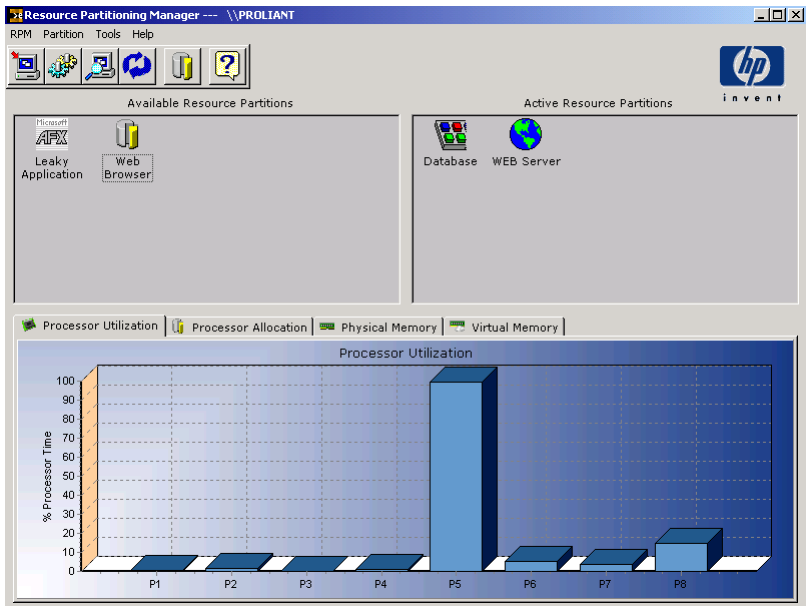
vmware

HP ProLiant Essentials Workload Management Pack (WMP with RPM)

Isolation
highest degree of separation

Flexibility
highest degree of dynamic capabilities

ProLiant Essentials Workload Management Pack 2.0



- Controls and Dynamically Allocates System Resources
- Maximizes Utilization
- Improved Availability

Workload Management Pack 2.0

- **Built using the Microsoft Windows 2000 Job Objects API**
- Software solution enhancing server consolidation and resource optimization in ProLiant server environments running Windows 2000 and beyond
- Part of the ProLiant Essentials
- Will utilize and manage all memory and CPU's visible to Windows
- Licensed per server for $499 regardless of number of processors
- Support statements from Microsoft, SAP, Oracle, etc.
- Free 30-day evaluation SW available for download at hp.com

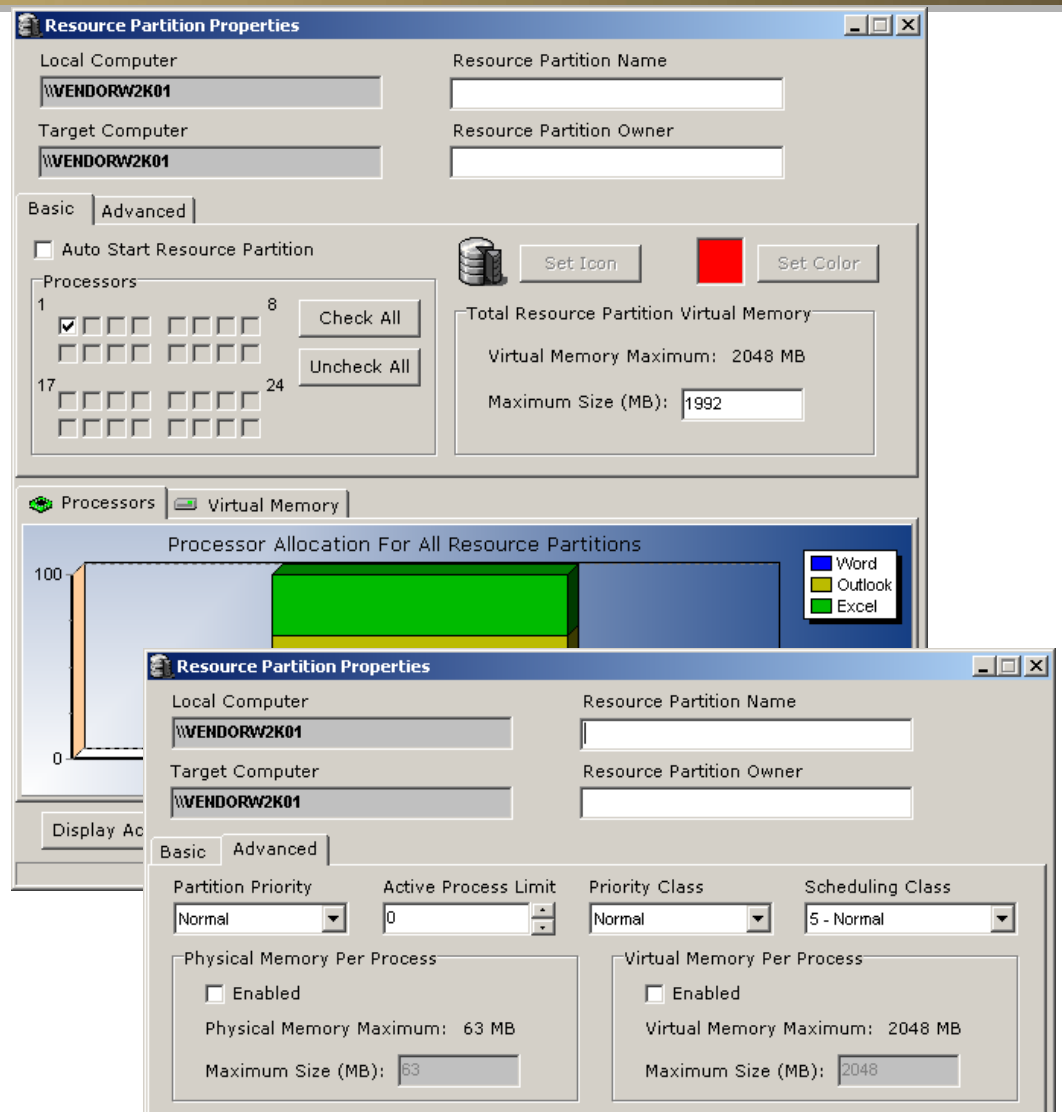
http://h18004.www1.hp.com/products/servers/proliantessentials/rpm-eval.html

How WMP works: defining partitions

HP WORLD 2003
Solutions and Technology Conference & Expo

Administrators define

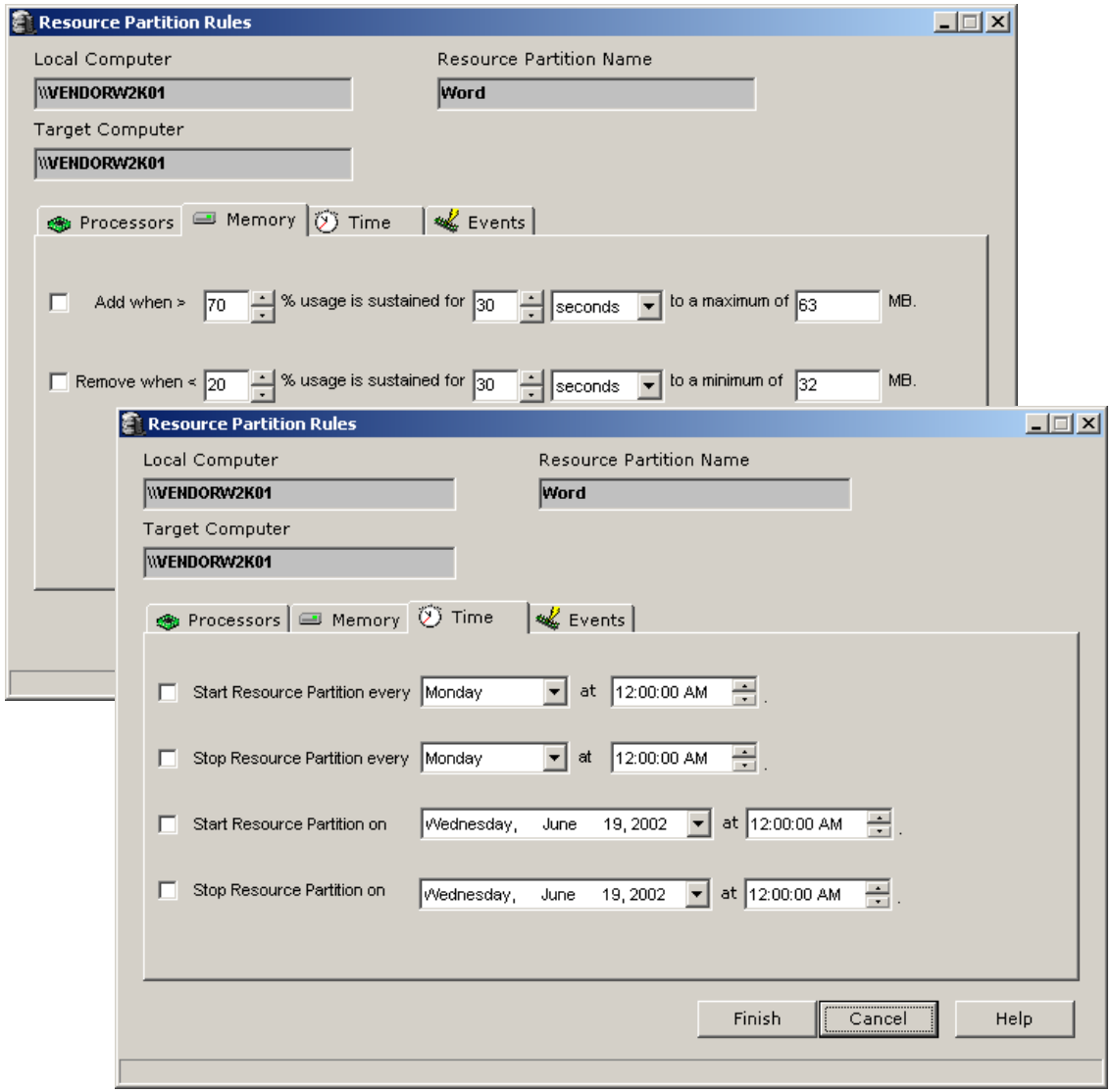
- which processors the partition has access to
- the maximum memory available to the partition
- the partition priority



Dynamic Rules Engine

Controls the automatic allocation of resources based on user-defined parameters including:

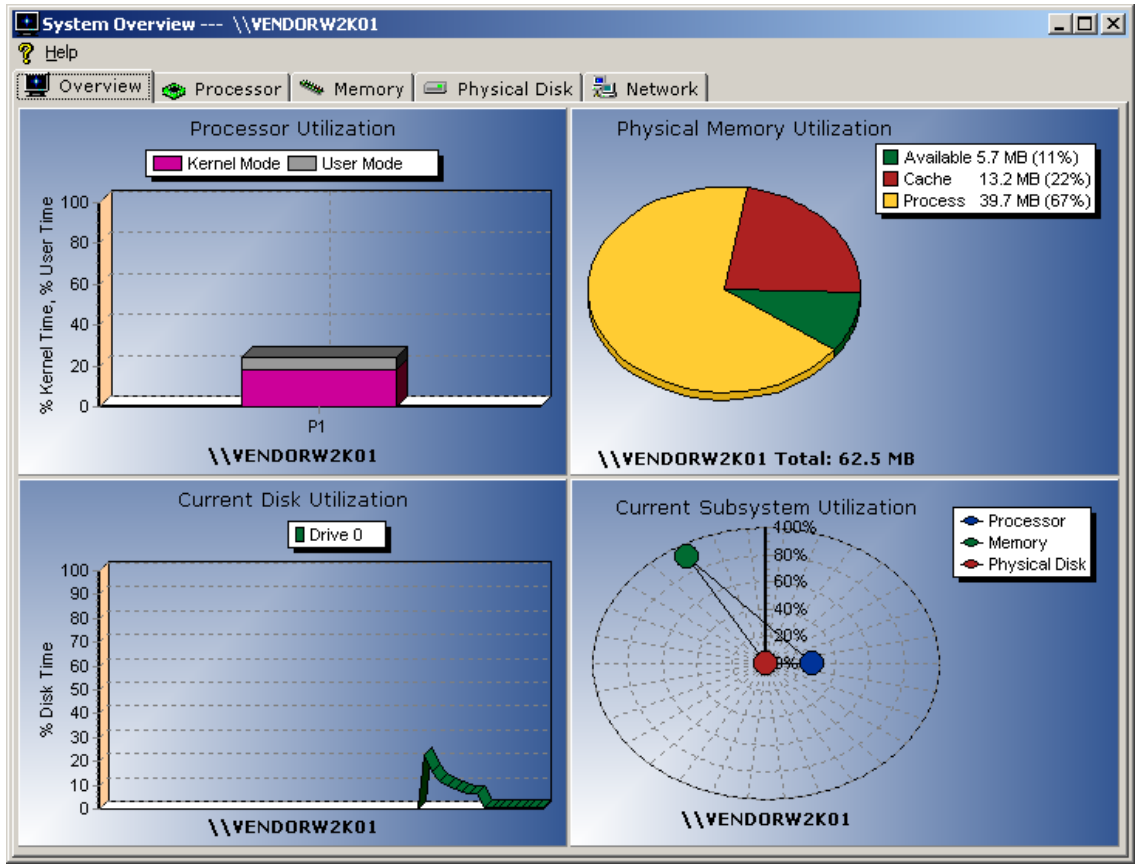
- upper and lower bounds on processor and memory utilization
- auto activation or deactivation of partitions
- auto restart of partitions that exceed preset memory utilization limits



Performance overview

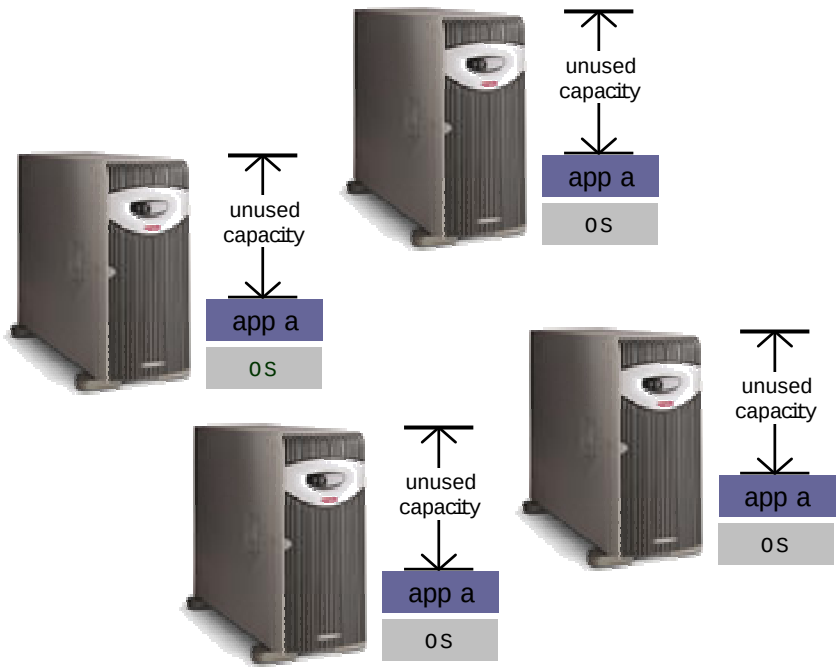
- WMP includes system and partition level views of:
  - processor,
  - memory,
  - disk, and
  - network performance

- These views can be used to quickly assess potential areas for improvement.



Minimize server management costs with WMP

Configured for headroom



4X	hardware	costs x 4
	monthly management	costs x 4
	software	costs x 4
	OS licensing	costs x 4

Configured for minimal management costs

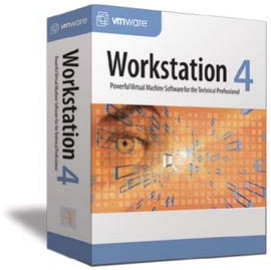
1X	hardware	costs x 1
	monthly management	costs x 1
	OS licensing	costs x 1
	software	costs x 4

… with **HP ProLiant Essentials Workload Management Pack**, Microsoft® Windows® applications can be consolidated onto a single server, reducing ongoing management and licensing costs

Partner Solutions

- Independent, profitable, privately held company
- The first company to bring mainframe-class virtual machine technology to industry standard computers
- The only virtual machine product line that spans the enterprise – from the data center to the desktop
- More than 1 million registered users and more than 5,000 corporate customers in more than 100 countries

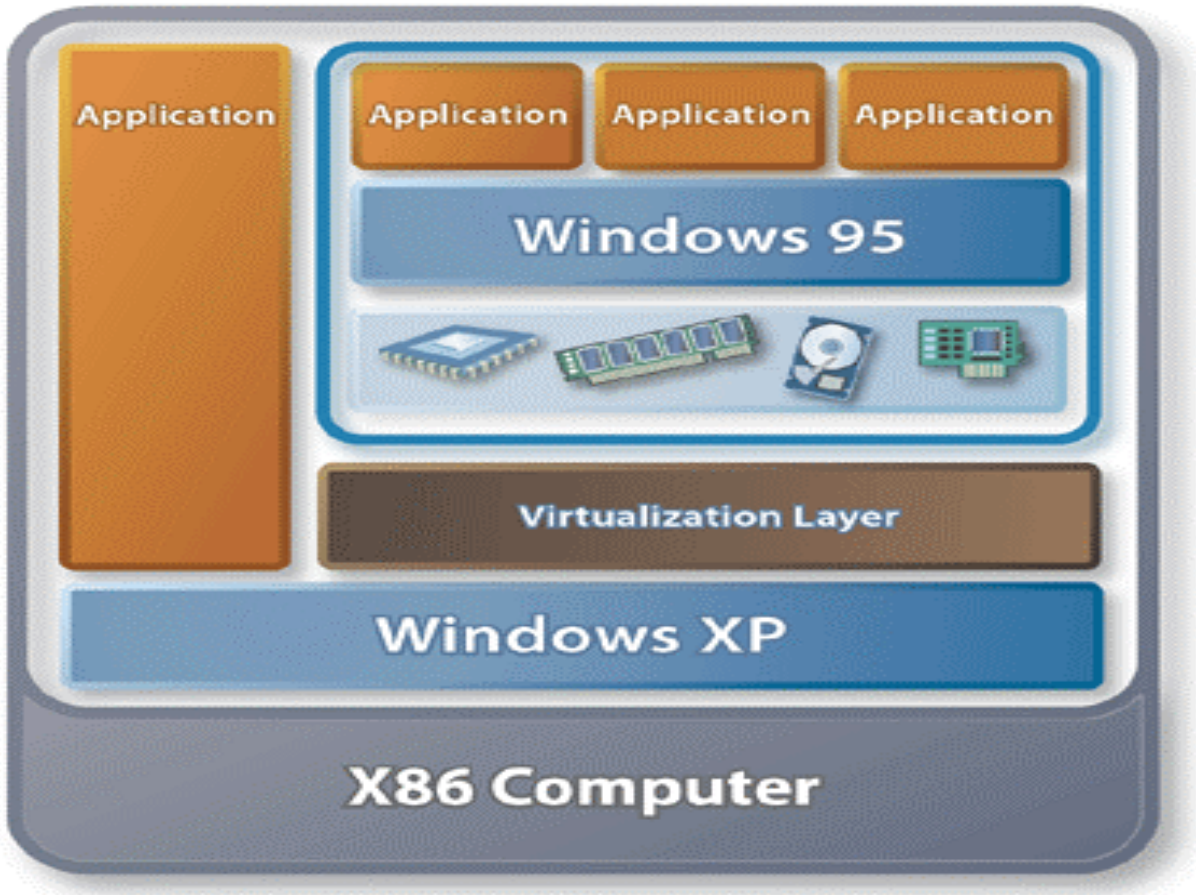
Current VMware products



	ESX and GSX Server Products	Workstation Product
Target Customer	Corporate IT operations Software developers, QA engineers System administrators Trainers/Educators/SEs Tech support/Customer service reps	Software developers, QA engineers System administrators Trainers/Educators Sales reps/ Marketing professionals Tech support/Customer service reps
Target Markets	Server Consolidation Business Continuity/High Availability Software Lifecycle Management Application Compatibility/OS Migration	Software Lifecycle Management Application Compatibility/OS Migration Help Desk & Tech Support Optimization Training & Demos
First Shipped	2001	1999

VMware GSX Server

VMware GSX Server runs as an application on a host operating system



VMware GSX Server 2.5 Host Operating Systems

Microsoft

- Windows Server 2003 (Web, Standard and Enterprise)
- Windows 2000 Server, Advanced Server, Datacenter Server, Service Packs 3
- Windows NT 4.0 Server, Service Packs 3, 4, 5, 6a

Linux

- Red Hat Linux Enterprise Server 2.1
- Red Hat Linux (6.2, 7.x, 8.0, 9.0)
- SuSE Linux (6.x, 7.x, 8.x, Enterprise Server 7, 8)
- Mandrake Linux (8.2, 8.1, 8.0, 9.0, 9.1)
- Turbo Linux (7.0, 6.0)

VMware GSX Server 2.5 Guest Operating Systems include

WORLD 2003
Solutions and Technology Conference & Expo

Microsoft

- Windows Server 2003 (Web, Standard and Enterprise)
- Windows XP (Professional and Home Edition)
- Windows 2000 Server (Professional, Server and Advanced Server, Service Pack 3)
- Windows NT 4.0 (Workstation and Server, Service Pack 6a)
- Windows Me, 98, 98 SE, 95, 3.1
- MS-DOS 6

Linux

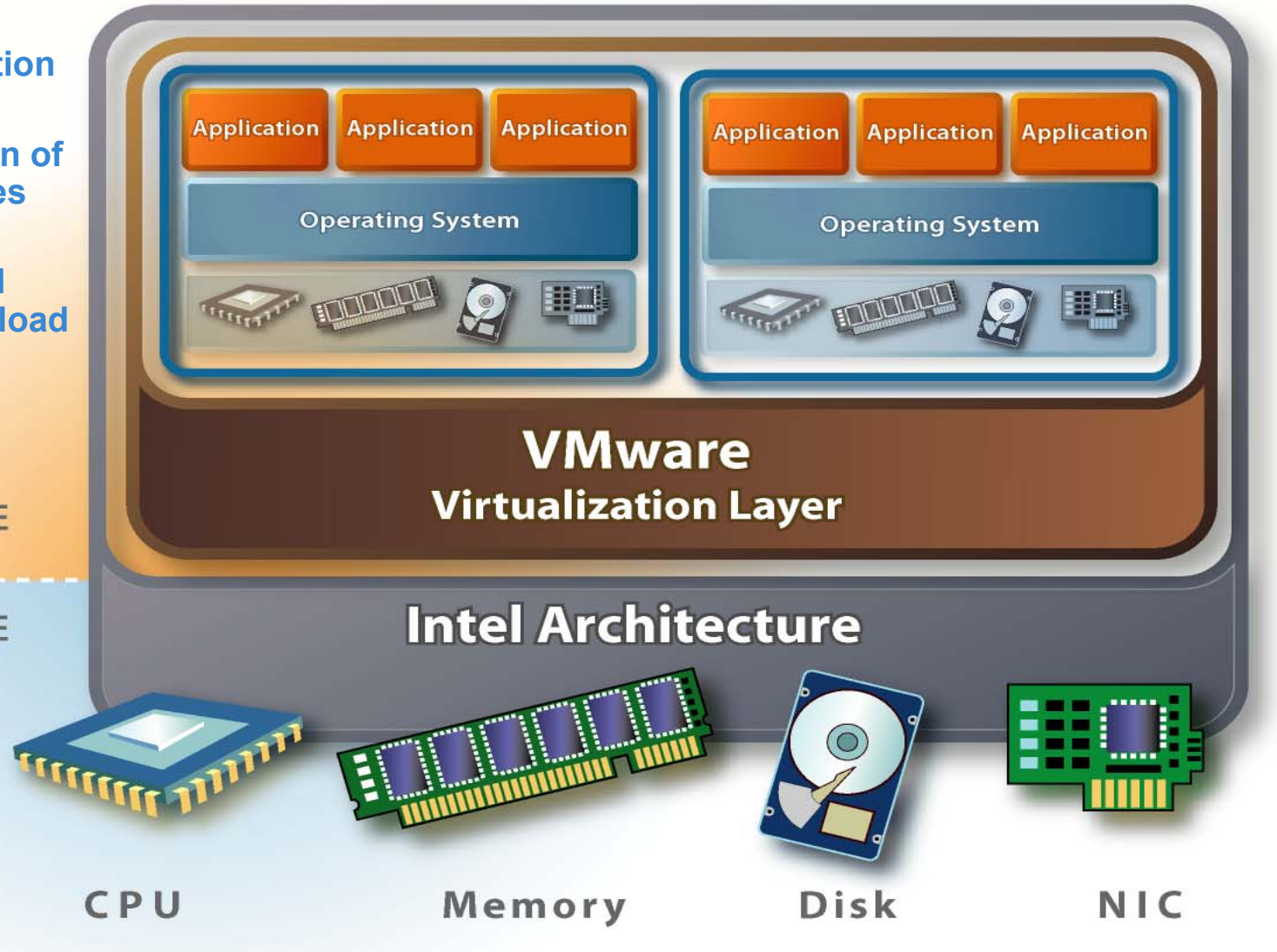
- Red Hat Linux Enterprise Server 2.1
- Red Hat Linux (6.2, 7.x, 8.0, 9.0)
- SuSE Linux (6.x, 7.x, 8.0, 8.1, 8.2, Enterprise Server 7, 8)
- Turbolinux (6.0, 7.0)
- Mandrake Linux (8.x, 9.0, 9.1)

Novell

- Novell NetWare 4.2, 5.1 and 6.0

ESX Server runs directly on system hardware

- Complete isolation
- Dynamic policy driven allocation of all HW resources
- Can be moved across physical boundaries for load balancing



VMware ESX Server Guest Operating Systems

Microsoft

- Windows Server 2003 (Web, Standard and Enterprise Server)
- Windows 2000 (Server, Advanced Server, Terminal Services)
- Windows NT 4.0 (Server 4.0)

Linux

- Red Hat Linux 7.1 and higher
- SuSE Linux 7.3 and higher

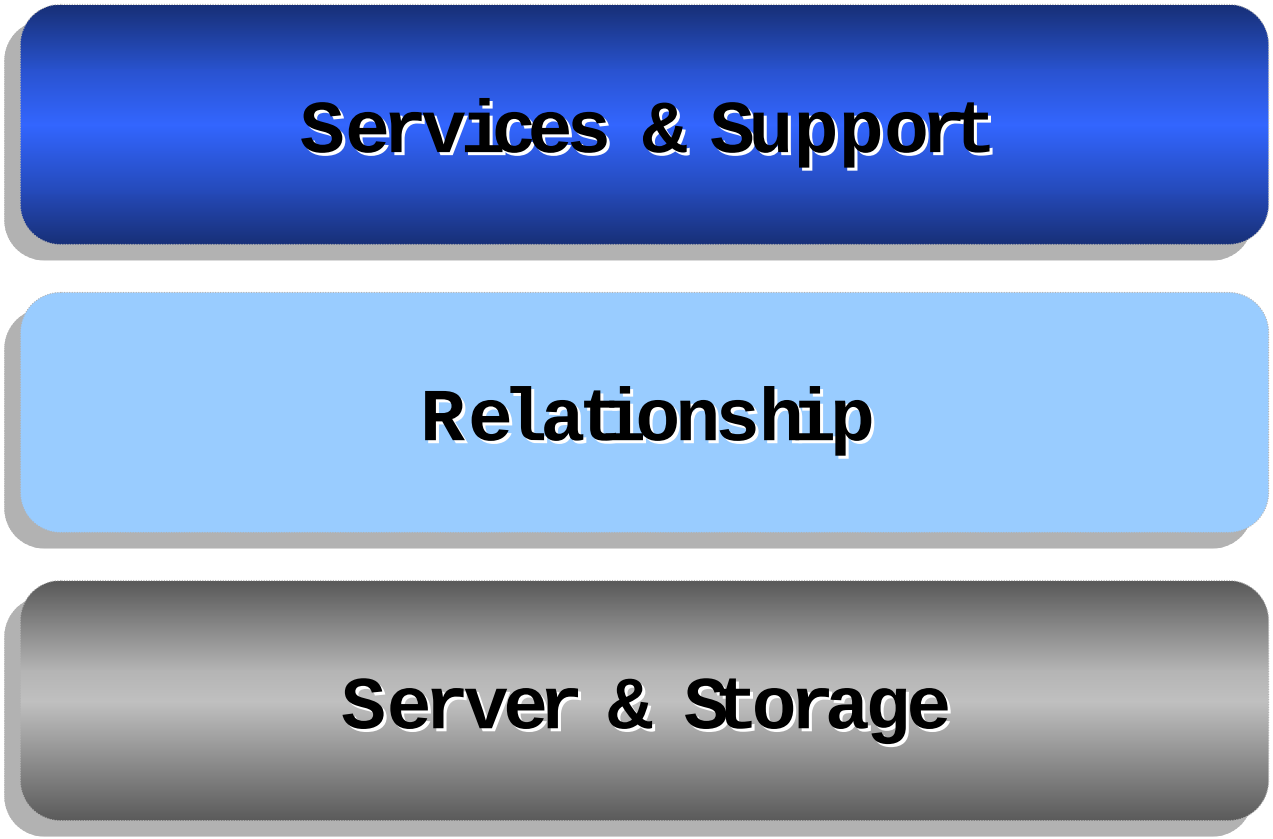
FreeBSD

- FreeBSD 4.5

Product Comparison

	VMware ESX	VMware GSX	Microsoft Virtual Server
Shipping product	Yes	Yes	No, in Beta
Host OS	Self-hosted	Windows, linux	Windows
Dynamic Resource Management	CPU, Memory, Disk, I/O, Network	None	CPU
Max. Memory Host OS (PAE)	64GB		64GB
Max. VMs per Host	8 per CPU, 64 Max	4 per CPU, 32 Max	64 Max.
Programmatic Interface (API)	Perl	COM	COM, DCOM
HW Device Support	VMware	Host OS	Host OS
Physical to Virtual Tool	Yes	No	No
Memory Management	Memory Sharing, Overcommit	Memory Hard Allocated	Memory Hard Allocated
Overall Performance *(compared to native)*	85%-95%	65%-75%	Benchmarking not allowed in Beta
Guest OS	Windows, Linux, FreeBSD	Windows, Linux, Netware, DOS	Windows
Guest OS Max. Memory	3.6GB	2.0GB	3.6GB

HP & VMware Solution



HP has more ProLiant servers certified by VMware than any other vendor

What's new – May 28, 2003 announcement

- HP and VMware extend partnership
- HP now provides ***one-stop*** shopping for VMware-based solutions including:
  - HP Consulting
  - HP Customer Support & Subscription Services
  - VMware software
  - Industry-standard HP ProLiant servers
  - HP StorageWorks
- HP can now offer VMware ESX Server, GSX Server, Workstation and HP-branded services for Microsoft Windows and Linux operating systems and associated applications running in VMware virtual machines
- HP customers, worldwide, will have the ability to set up a single point for support through the HP portfolio of service contracts

"VMware and HP have a shared vision for support of an agile data center and our partnership supports the HP Adaptive Enterprise strategy. Together, VMware and HP have great capabilities to address customer needs for IT Consolidation and other solutions that compute virtualization is facilitating."

– Diane Greene
President & CEO, VMware Inc.

Relationship highlights

- This agreement builds on a relationship announced in June 2002 that laid the groundwork for HP and VMware to jointly market and develop products and services designed to simplify HP customer's configuration, deployment, management and support of HP ProLiant servers in consolidated environments

- As a charter member of the VMware Preferred Hardware Partner Program, HP offers over a dozen 2-way, 4-way and 8-way ProLiant platforms certified with VMware ESX Server, currently more than any other VMware solution partner (May 28, 2003)

HP & VMware relationship

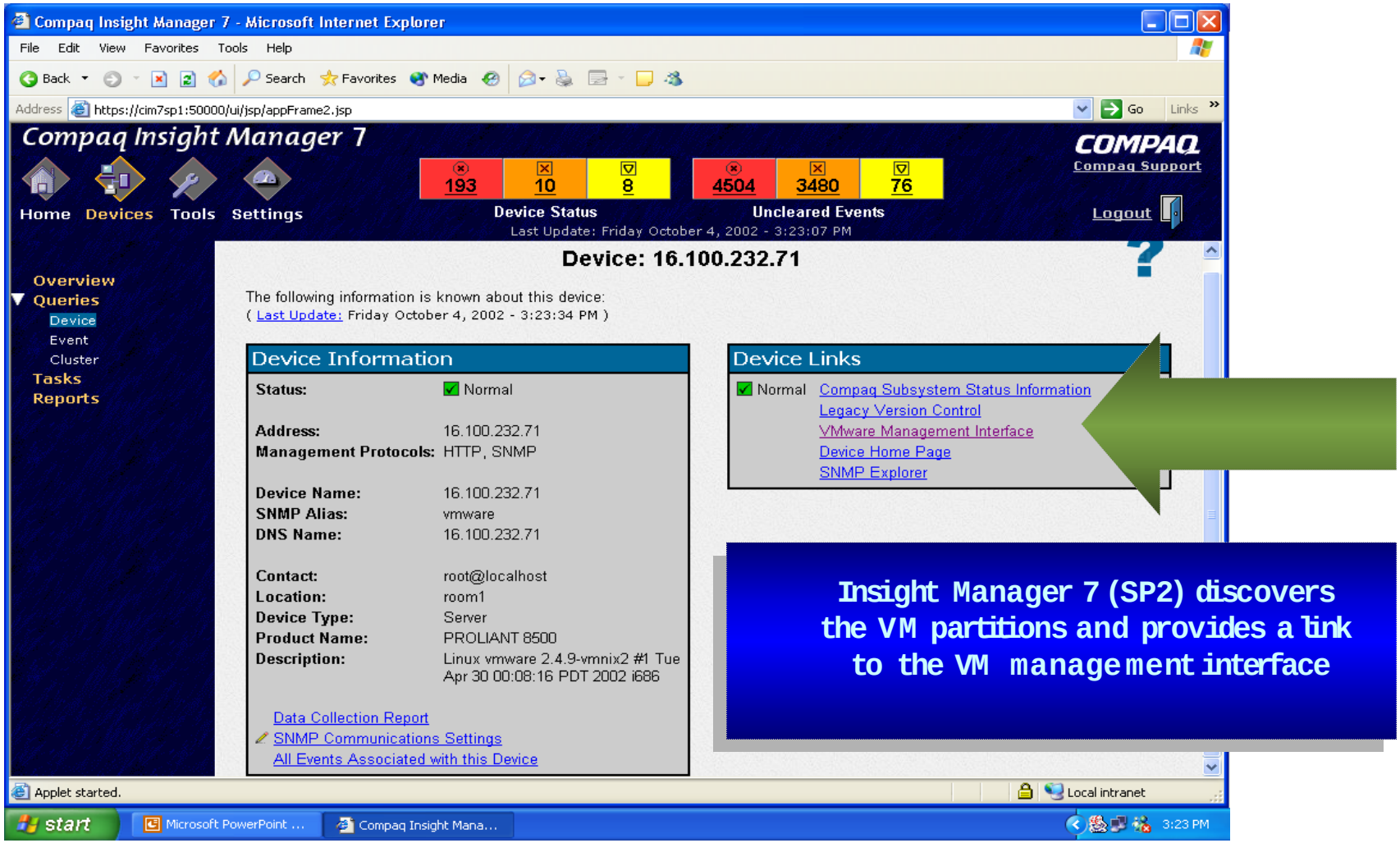
- Strong relationship dates back to Summer 2000
  - ✓ part of our Service Provider initiative
- Worldwide Alliance Agreement – June 2002
  - ✓ legal umbrella with project statements
  - ✓ joint product & solutions engineering
  - ✓ support & services
  - ✓ field training and go-to-market
  - ✓ HP member of VMware Preferred Hardware Partner Program
  - ✓ joint customer engagements
  - ✓ free 90-day evaluation licenses available for customer engagements
- Cooperative Support Agreement – Sep 2002
  - ✓ solution around 8-Way ProLiant; call passing between HP and VMware
- VMware SW Resale Agreement – Feb 2003
  - ✓ enables HP to resell VMware software and VMware-branded support
- Enhanced VMware Resale and HP-branded Services Agreement – May 2003
  - ✓ one-stop solution for product acquisition and support
  - ✓ rich portfolio of solutions that meet customer needs and price points

Product/Solution Overview – ProLiant Servers

http://www.vmware.com/hp/

- 13 ProLiants certified with VMware including:
  - 2-Way:
    - ProLiant DL320, DL360, DL360 G2, DL360 G3, DL380, DL380 G2
  - 4- Way:
    - ProLiant DL560 (4P/2U), DL580, DL580 G2
  - 8-Way:
    - ProLiant DL740, DL760, DL760 G2, ProLiant 8500
- More in process, including Blades and DL380 G3
- This provides customers with a wider choice to meet their individual solution needs and price points
- HP has more servers certified by VMware than any other vendor as of May 23, 2003!
  - IBM has 5
  - Dell has 10

VMware integration with HP Insight Manager



"Within the last year that we have been using VMware ESX Server on HP ProLiant servers, we have been able to implement new ways of supplying more cost-effective production server environments. We've also been able to explore new methods to ensure a more reliable disaster recovery plan."

– Brian Garrison
Systems Engineer, Volvo IT North America

VOLVO

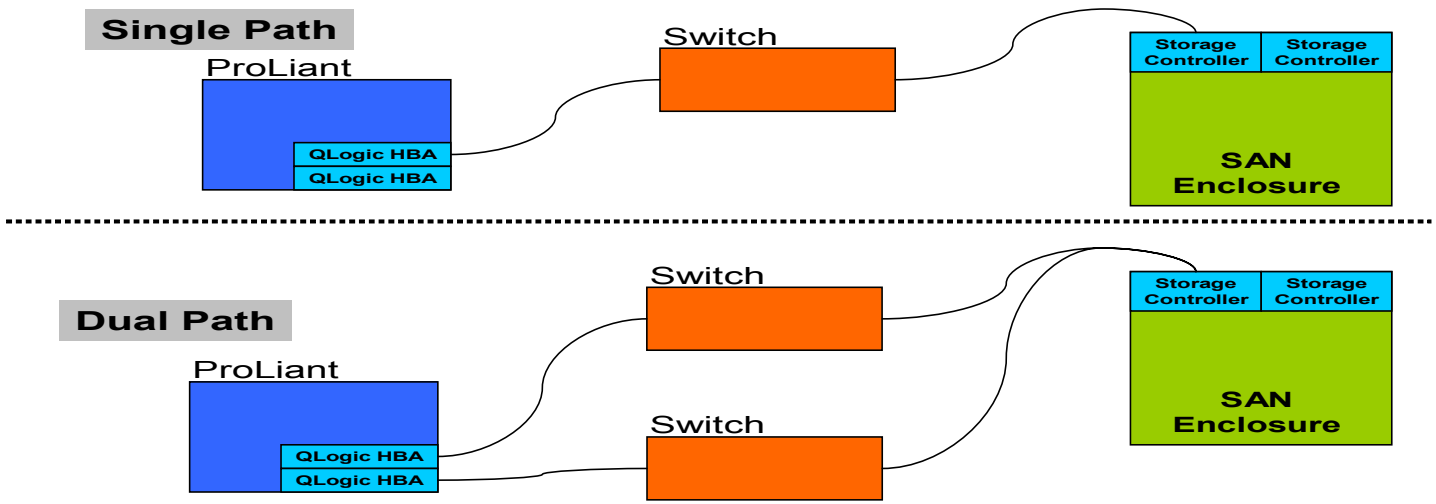
"As a result of our strong partnership, the combination of VMware software and the new ProLiant 8-Way servers with Hot Plug RAID Memory is an ideal platform for customer solutions including server consolidation, clustering, software development and testing."

– Diane Greene
President & CEO, VMware Inc.

Product/Solution Overview – StorageWorks

- HP and VMware have confirmed connectivity between the HP StorageWorks FCA2214 for Linux (QLogic 2Gb PCI-X fibre channel HBA for Linux) and the HP StorageWorks MSA and EVA families. Dual path HBA failover support is available in both ESX 1.5.2 and ESX 2.0
- Currently, storage controller failover is not supported with ESX Server 1.5.2 and is planned for ESX Server 2.x later this year

VMware ESX Server Connectivity to MSA and EVA SANs



Product/Solution Overview – HP Services

- HP Services -- customer support
  - HP customers, worldwide, will have the ability to set up a single point for support and subscription through the HP portfolio of service contracts, including:
    - software support 24x7
    - software support 9x5
    - installation and start-up
    - Windows, Linux, and Novell support in VMware virtual machines

- HP Services -- consulting & integration
  - services for VMware, part of HP's premier IT Consolidation practice, include:
    - consolidation value workshop
    - assessment
    - plan & design
    - implementation
    - migration
    - uptime guarantee
    - details at: http://h18004.www1.hp.com/products/servers/consolidation/index.html

WMP & VMware -- Complementary Products

HP Workload Management Pack

WMP 2.0

-

VMware Server Products

- enables multiple, disparate OS instances on a single physical machine.
  - maximum of 1 CPU per virtual machine (w/SMP max 2 CPUs/VM)
  - applications are "untrusted" or the interaction between different applications running on the same OS is undefined (e.g. custom or internally developed applications)
  - customer doesn't want to change software architecture (support for legacy OSs and Apps)
  - application runs on Linux or Windows or Novell

- IT Consolidation Overview
- Server Consolidation Solutions
- **Summary and Q&A**

Summary

- IT Consolidation and Workload Management under consideration by majority of IT departments

- HP provides a comprehensive, one-stop suite of offerings to evaluate, design, implement, and support IT Consolidation and Workload Management projects

Some Key Links

- Internal web site: http://iss.esgonline.hp.com/iss/workgroup/solutions/vmware/index.asp
- Link to request an evaluation license: http://iss.esgonline.hp.com/iss/workgroup/solutions/vmware/request.asp
- HP partner page on vmware.com: http://www.vmware.com/hp/
- VMware webinar web site: http://vmwareevents.webex.com/vmwareevents/onstage/mainframe.php?Rnd3206=0.629364062205561

hp
invent