

TA30

Scaling Your Virtual Infrastructure for Larger Workloads

Mike DiPetrillo

Principal Systems Engineer

VMware

A Level Set

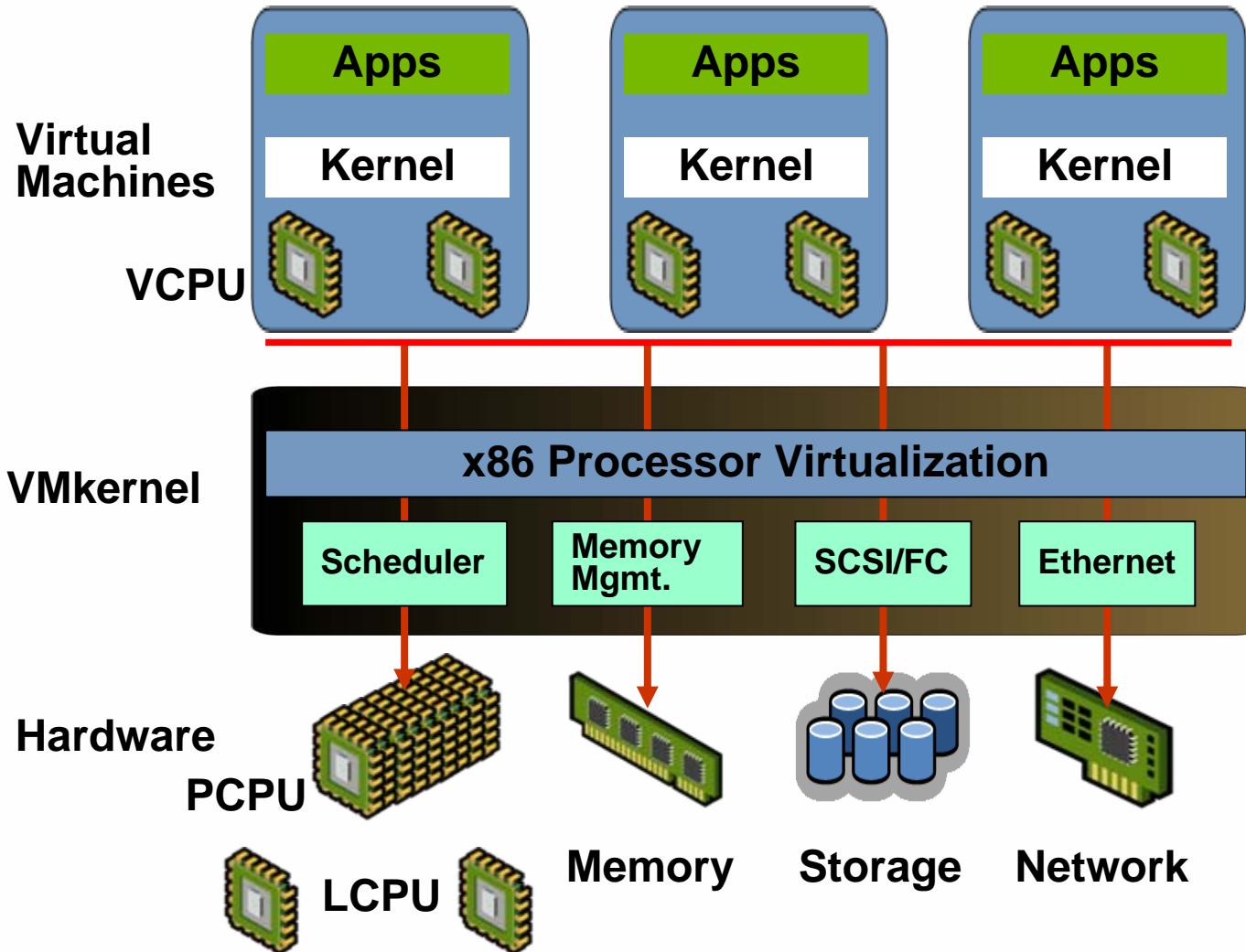
- **This session is more of a general overview.**
- **For workload specific detailed information see the**
- **“Workloads and Virtual Appliances” track**

Scaling Apps Workflow





Virtual Architecture



Potential Bottlenecks in Virtualization

- **There are several places within the virtual infrastructure where bottlenecks can occur.**
- **Typically bottlenecks only occur when VMs are oversubscribed.**
 - › Too many VCPUs to PCPUs
 - › Too much memory allocated versus physical memory
 - › Too much network throughput with not enough NICs

Look beyond the virtualization layer for bottlenecks

Often times a network bottleneck in a VM is really related to the downstream receiving server's slow disks.





Look at Performance Before you Start



Use VMware Capacity Planner or other 3rd party solutions

Analysis - Dashboard Reports - Support - Administration -

Performance Stats Dashboard (Prime Time)

Group	% CPU	CPU Queue	Available Bytes	Pages/sec	PageFile % Av.	PDsk % Busy	PDsk Av. Queue	Bytes Tot/s
Industry Average	9.27	2.09	674.30	45.13				
Not Grouped(11)	1.63	1.20	1,428.75	0.42				
Application Servers (2)	1.20	3.30	502.18	0.01				
Citrix (2)	9.35	0.15	2,702.16	24.97	0.54	13.70	0.14	9,078.11
Domain Controllers (15)	1.32	3.14	716.23	2.65	1.23	3.83	0.04	10,719.01
E-Mail Servers (1)	5.91	0.00	1,817.27	7.58	1.47	10.44	0.52	57,981.34
File Servers (12)	2.70	0.29	1,246.10	15.16	2.04	1.04	0.01	18,909.16
Home Grown Apps (4)	3.99	0.11	942.56	2.59	1.68	2.13	0.04	6,585.11
SQL Servers (2)	19.06	1.15	47.17					
Test Servers (3)	0.90	2.56	192.74					

The amount of the Page File instance in use in percent. See also Process: Page File Bytes.

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Citrix – Good and Bad

○ **Bad** Citrix Apps for VMs**

- Well behaved Citrix Apps
 - Get 80 – 100 users on your normal physical system (2-way)
- Traditional apps
 - Microsoft Office

○ **Good Citrix Apps for VMs**

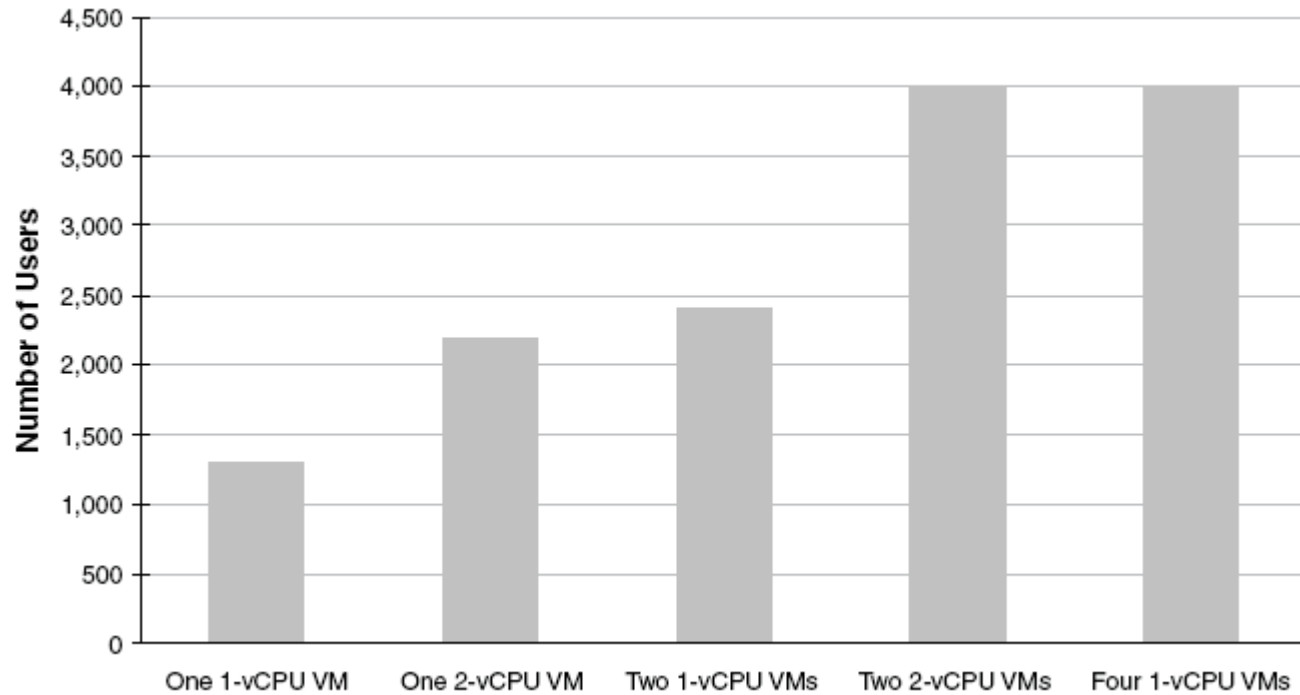
- Kernel bound or CPU bound applications
 - Medical, finance, home grown
 - Get 10 or 20 users on your normal physical system (2-way)

** Bad does not mean they won't run – it simply means you don't get any more benefits for performance.

Citrix - Kernel Bound and CPU Bound

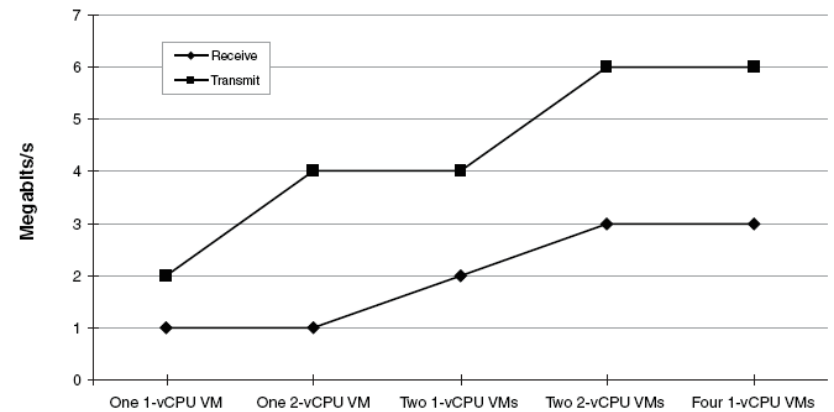
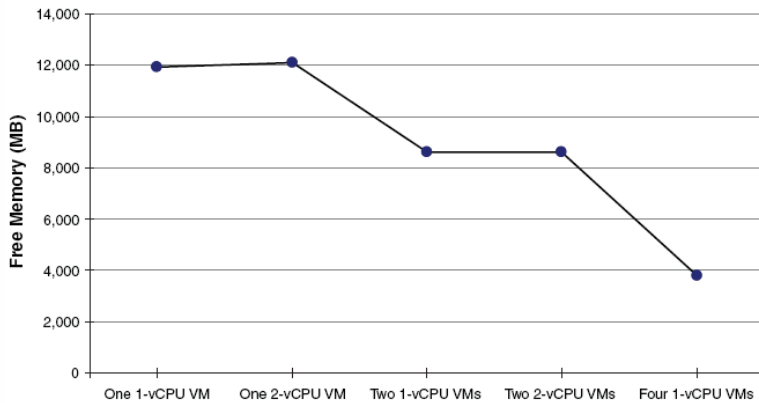
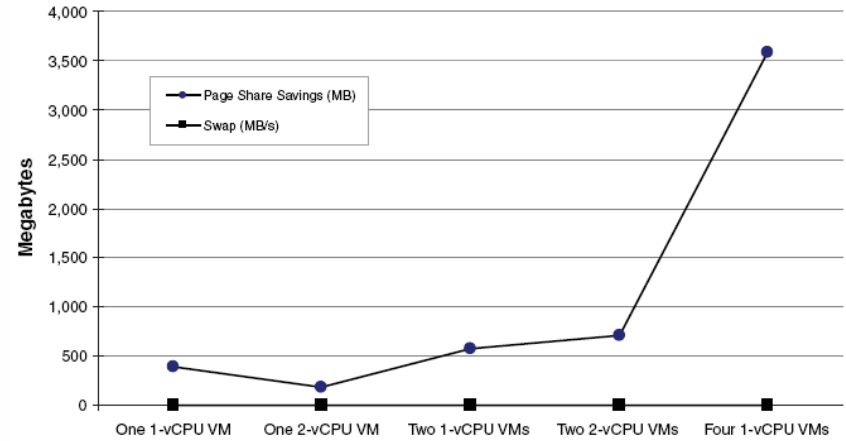
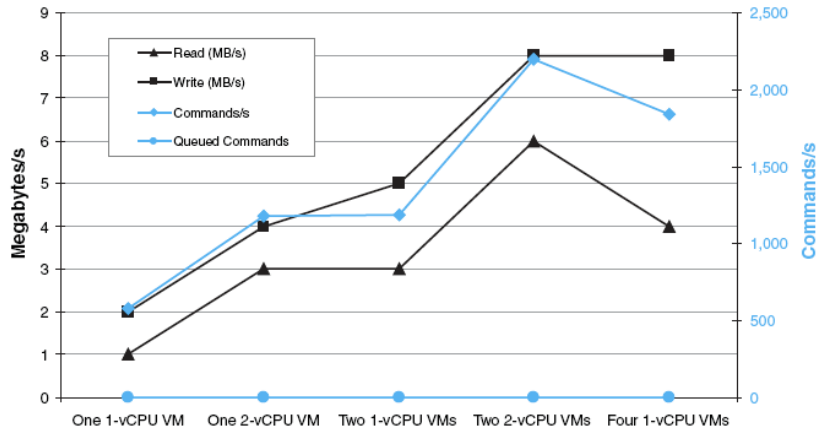
- **Windows kernel only has access to so much memory (4 GB)**
- **Typical applications written to run on single PC environment**
- **When application run in Citrix it runs out of kernel memory**
- **Adding more memory to the server does not help since the kernel can still only access 4 GB**

Scaling Exchange



<http://www.vmware.com/resources/techresources/978>

Scaling Exchange

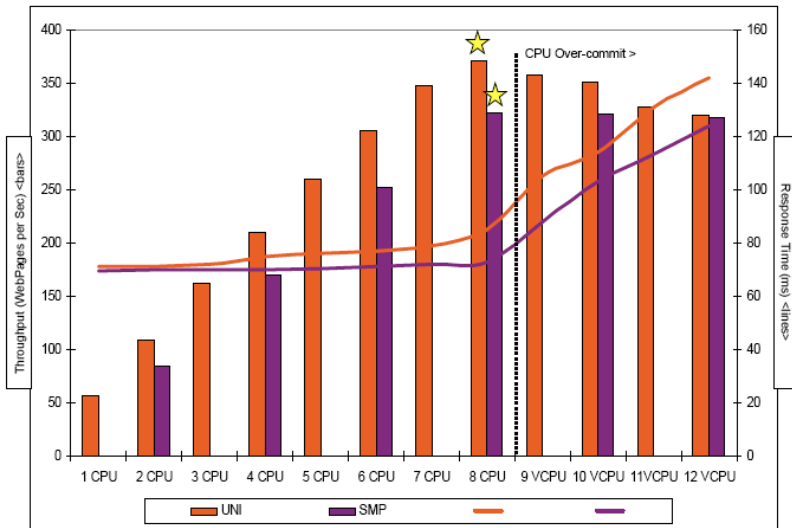


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Scaling Websphere

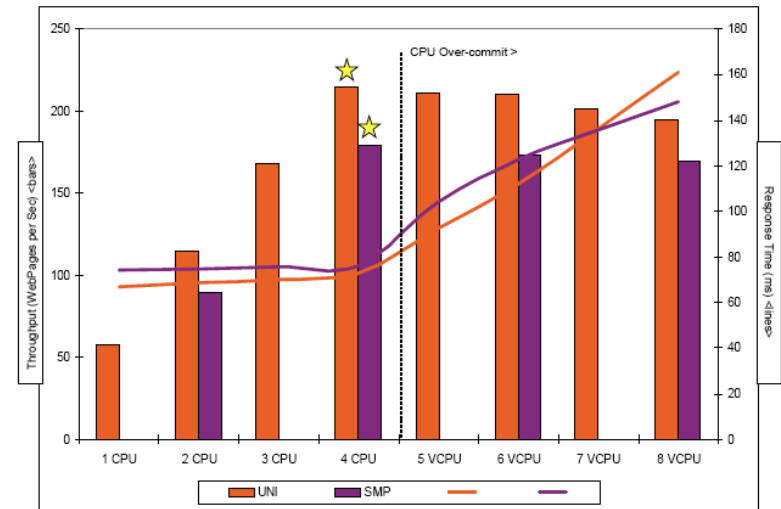
8-way VMware Throughput and Response Time

• Using UNI VMs helps avoid SMP scaling issues



4-way VMware Throughput and Response Time

• Best Performance when Virtual CPUs = real CPUs



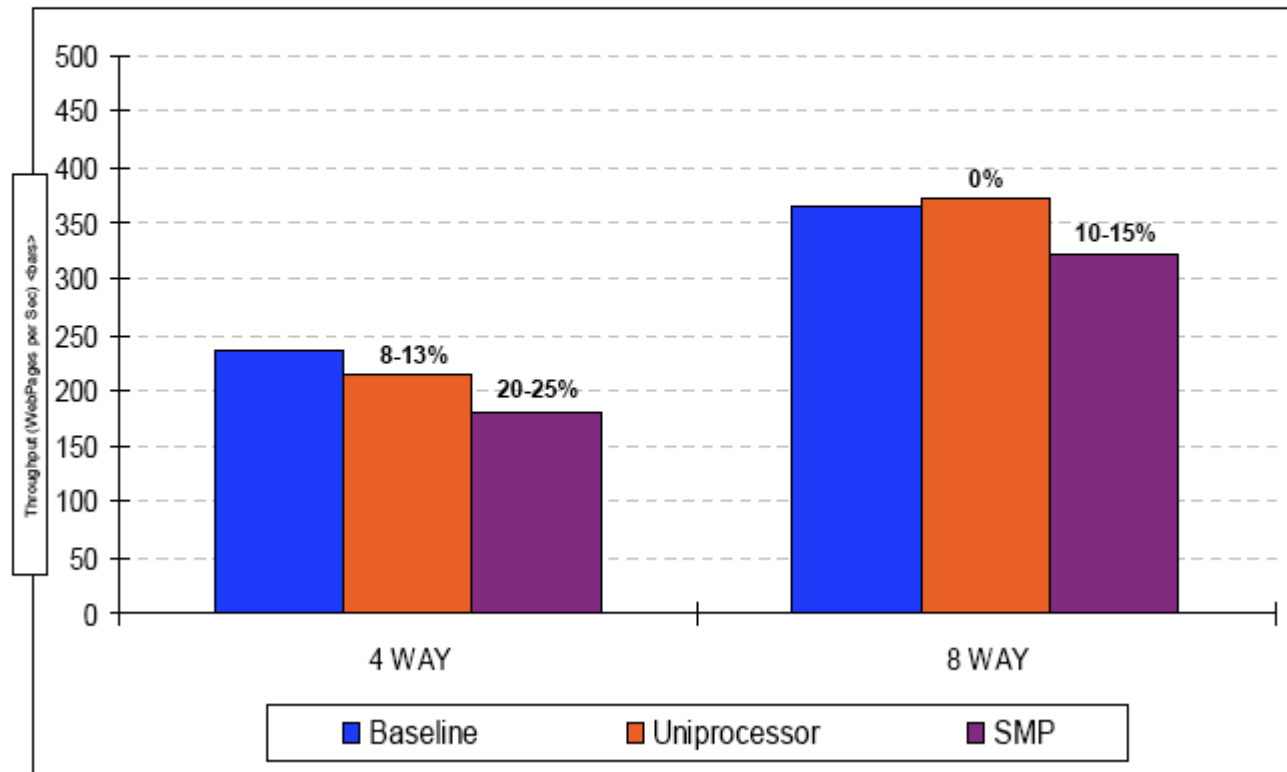
<http://www.vmware.com/resources/techresources/527>

Scaling Websphere

Best Throughput Comparisons

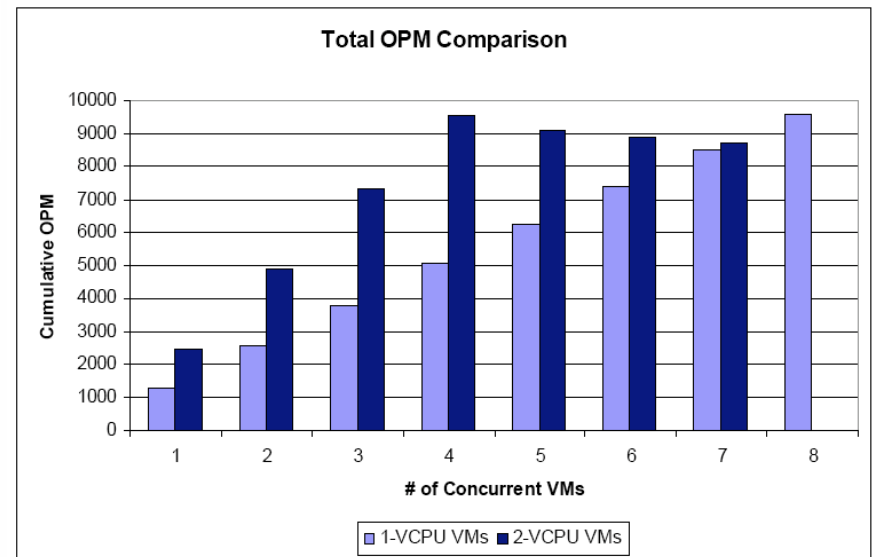
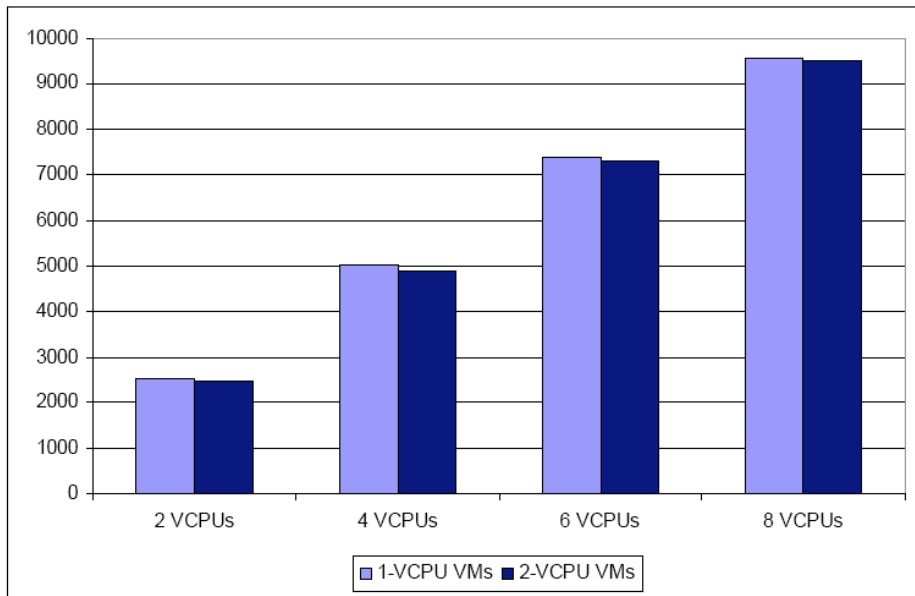
★ Note: Same Response Times Comparisons, Not Optimal Throughput Configurations

- ESX Server demonstrates a stable platform and good performance



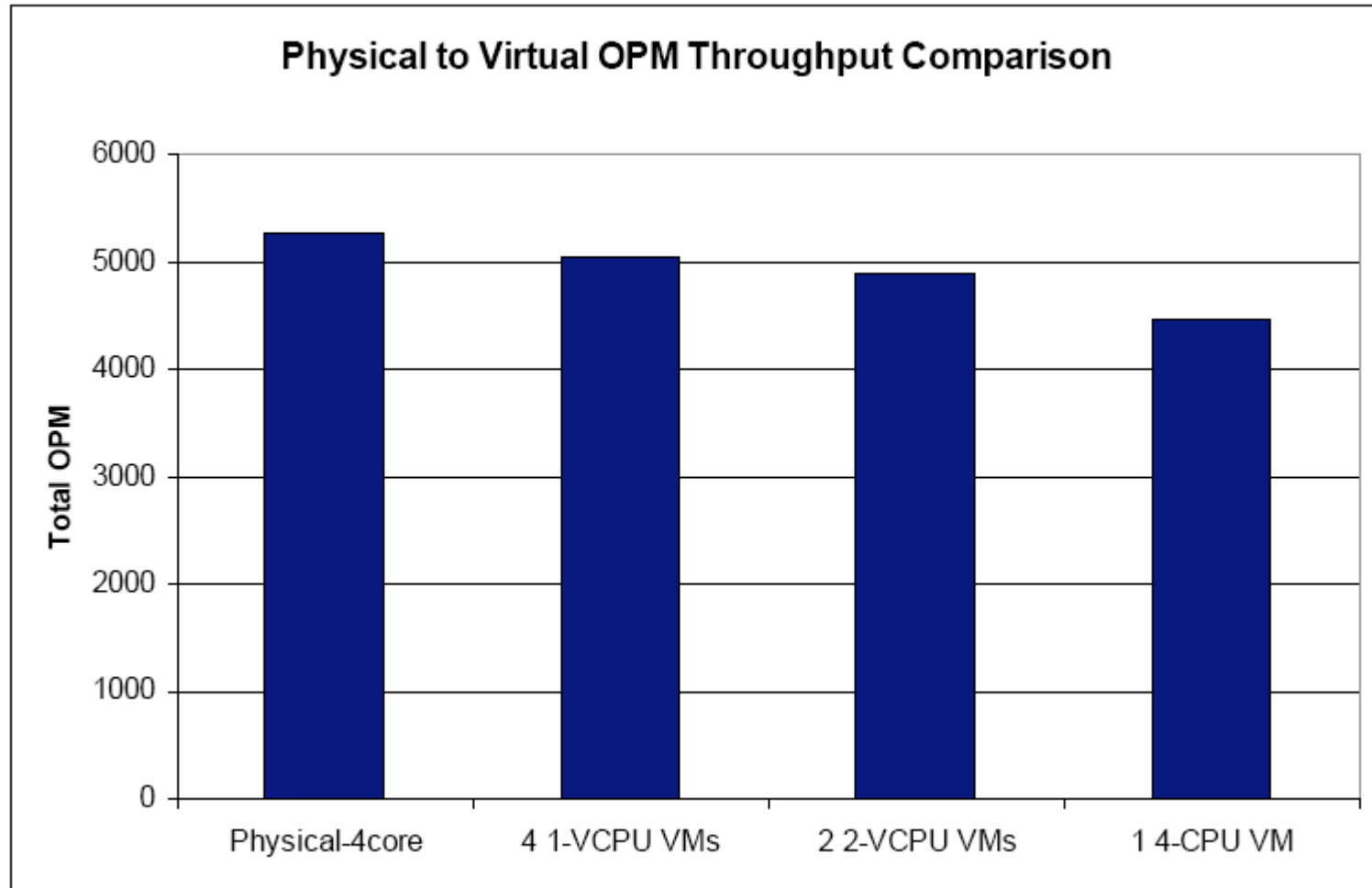
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Scaling Databases – A Study of Throughput



<http://www.vmware.com/resources/techresources/643>

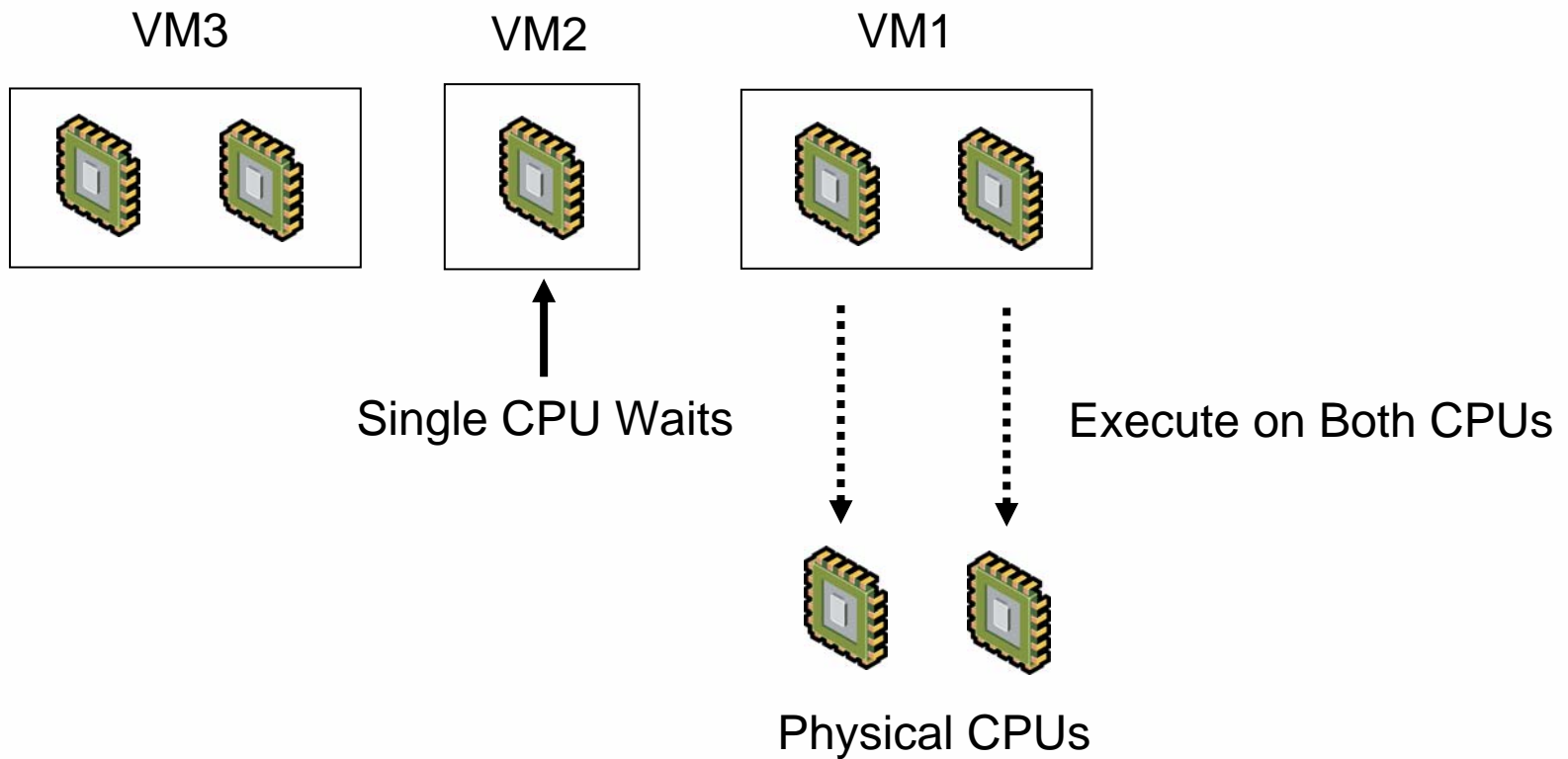
Scaling Databases – A Study of Throughput



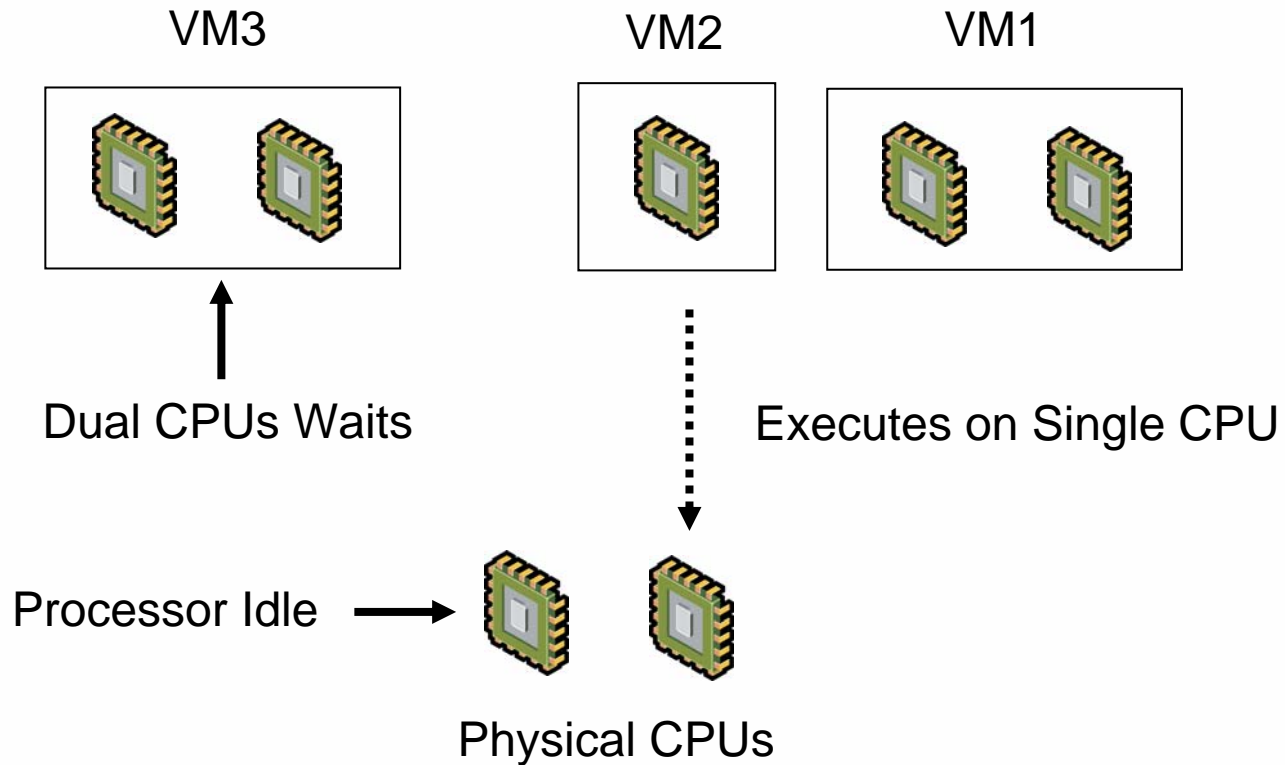
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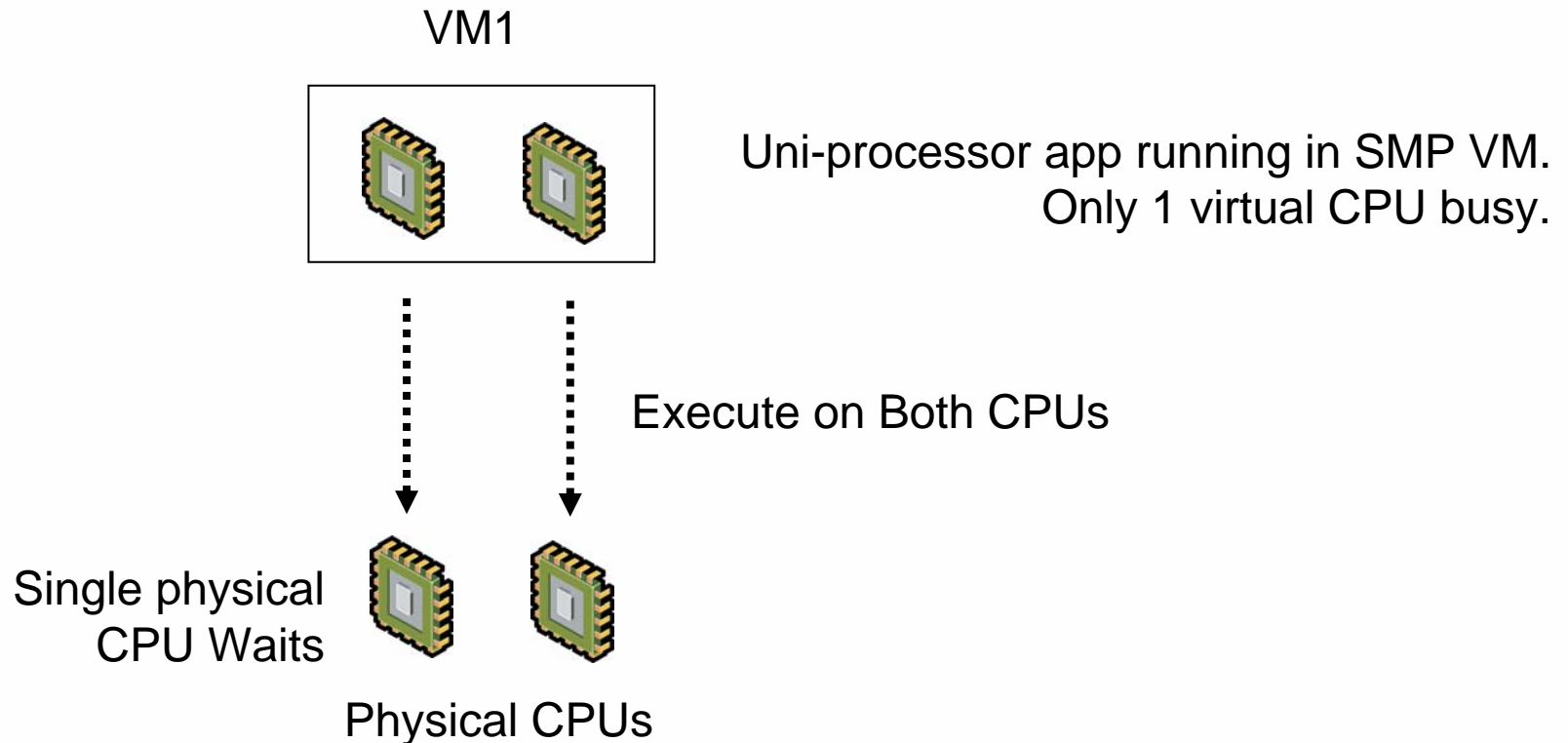
Use SMP Sparingly



Use SMP Sparingly

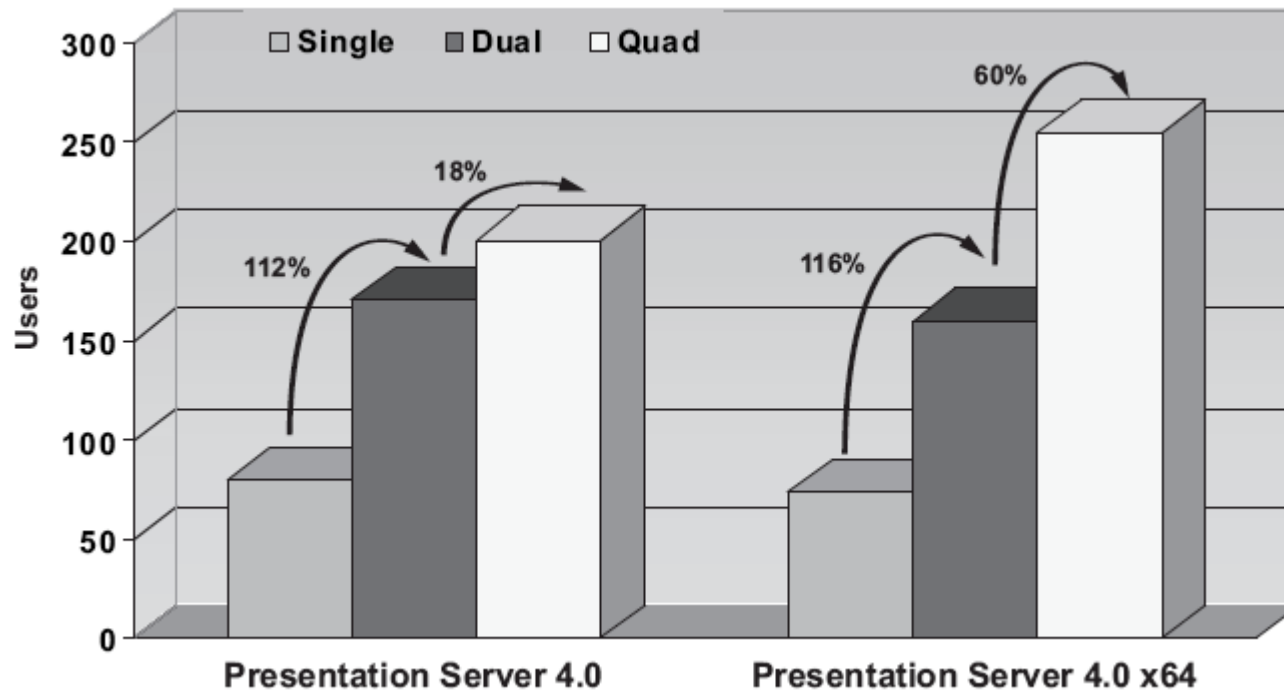


Use SMP Sparingly



Use 64-bit Sparingly

An example using Citrix



http://www.citrix.com/site/resources/dynamic/salesdocs/CPS4_x64_Performance_and_Scaling_Capabilities.pdf

Other Hints

- **CPU pinning can help you gain a few percentage points**
 - This impacts mobility
- **Monitor memory closely after a VM starts**
 - After a few minutes the VM will “calm down” and show true memory utilization
- **Look for new advances in the Linux kernel (VMI and paravirt-ops), timing adjustments (RHEL kernel), etc**
 - These can offer better performance for CPU hungry applications

**Monitor the
Progress**

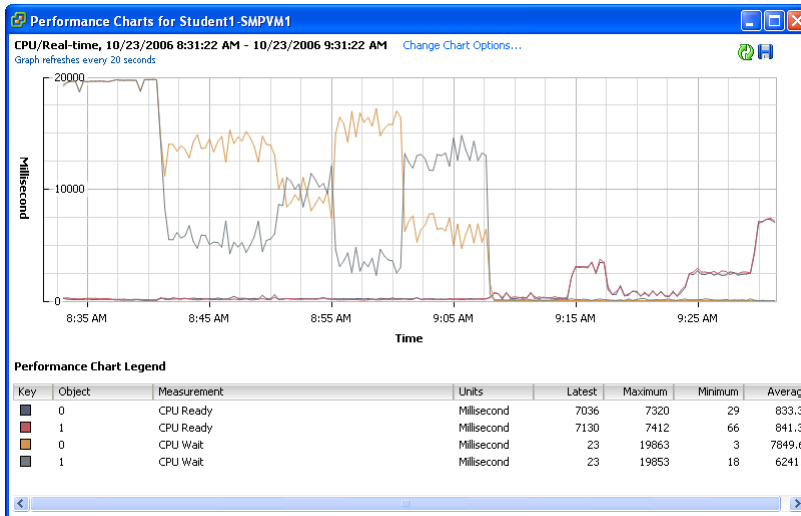
Know Your
Environment

Size VMs
Correctly

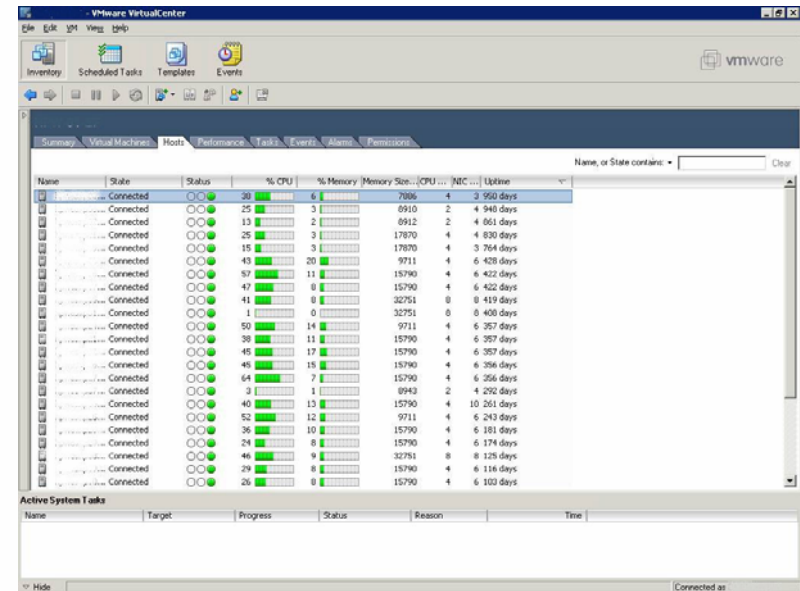
Know Your
Apps

Pick the
Right Apps

Monitoring the Virtual World

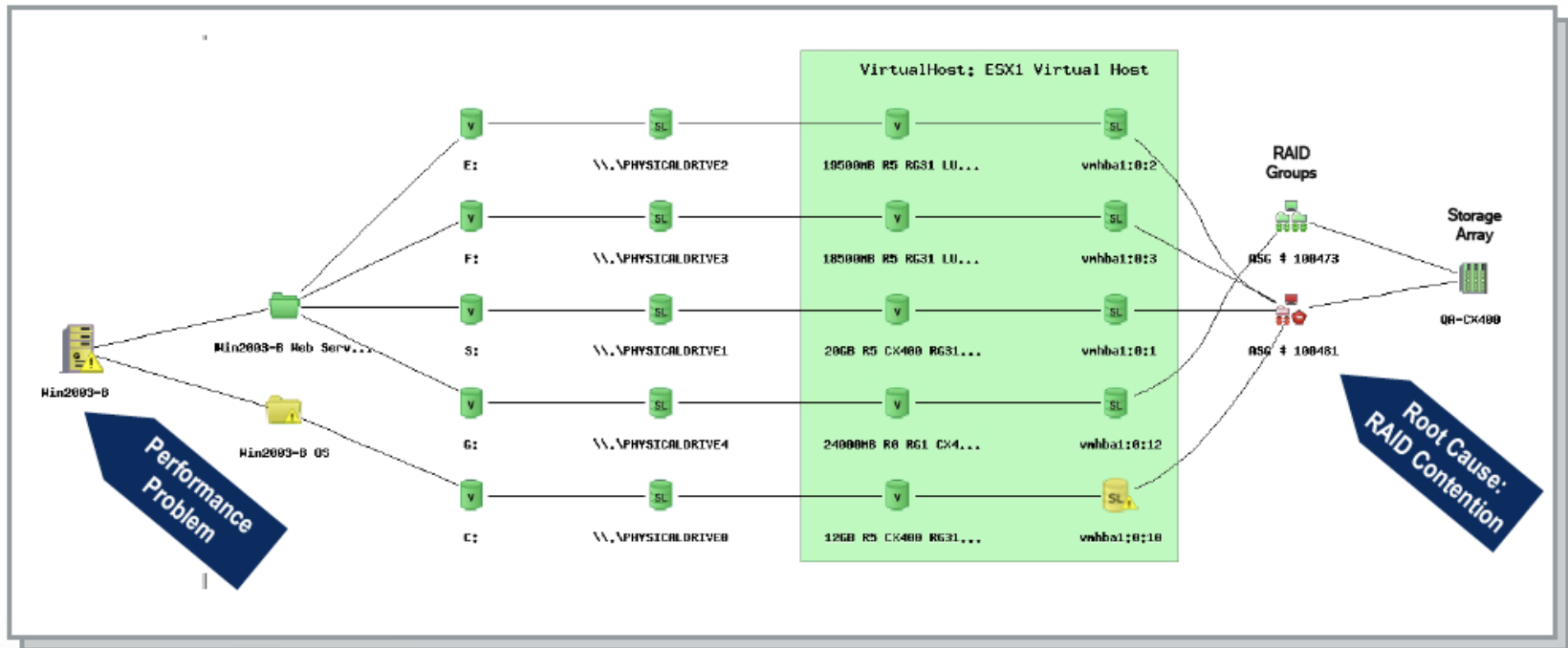


Use VMware Virtual Center to monitor the performance of the virtual machines.



Monitoring the Physical World

Pay close attention to the relationship between physical and virtual



Scaling Apps Workflow



Questions?

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VMWORLD 2007

EMBRACING YOUR VIRTUAL WORLD

BREAKOUT SESSION