

MED 0115

Optimizing Citrix Presentation Server with VMware ESX Server

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Agenda

- Citrix and VMware
- Citrix Presentation Server
- VMware VI 3.0 and CPS 4.0
- Conclusion

Citrix Systems Overview

- Leader in Application Delivery solutions
- NASDAQ 100 and S&P 500 company (CTXS)
- \$909 million in 2005 revenue (25% growth)
 - > ~50% revenue from outside of No. America
- Microsoft “ISV of the Year” winner (2003, 2005)
- 3,400+ employees in 35 countries
- 6,200 partners in over 100 countries
- 180,000 customers
 - > 94% customer loyalty
 - > 75% of all Internet users





Citrix and VMware®

- Citrix:
 - > Uses ESX in development test environment in UK and testing lab in Ft. Lauderdale
 - > Supports Citrix Access Suite deployed on VMware products
 - Knowledge Base article: CTX997956
- VMware announced Virtual Desktop Infrastructure (VDI) Alliance on 4/24/06
 - > Citrix is a member of the alliance
- VMware is supporter of Citrix Dynamic Desktop Infrastructure announced 10/22
- VMware is a Solution-level member of the Citrix Global Alliance Program

Agenda

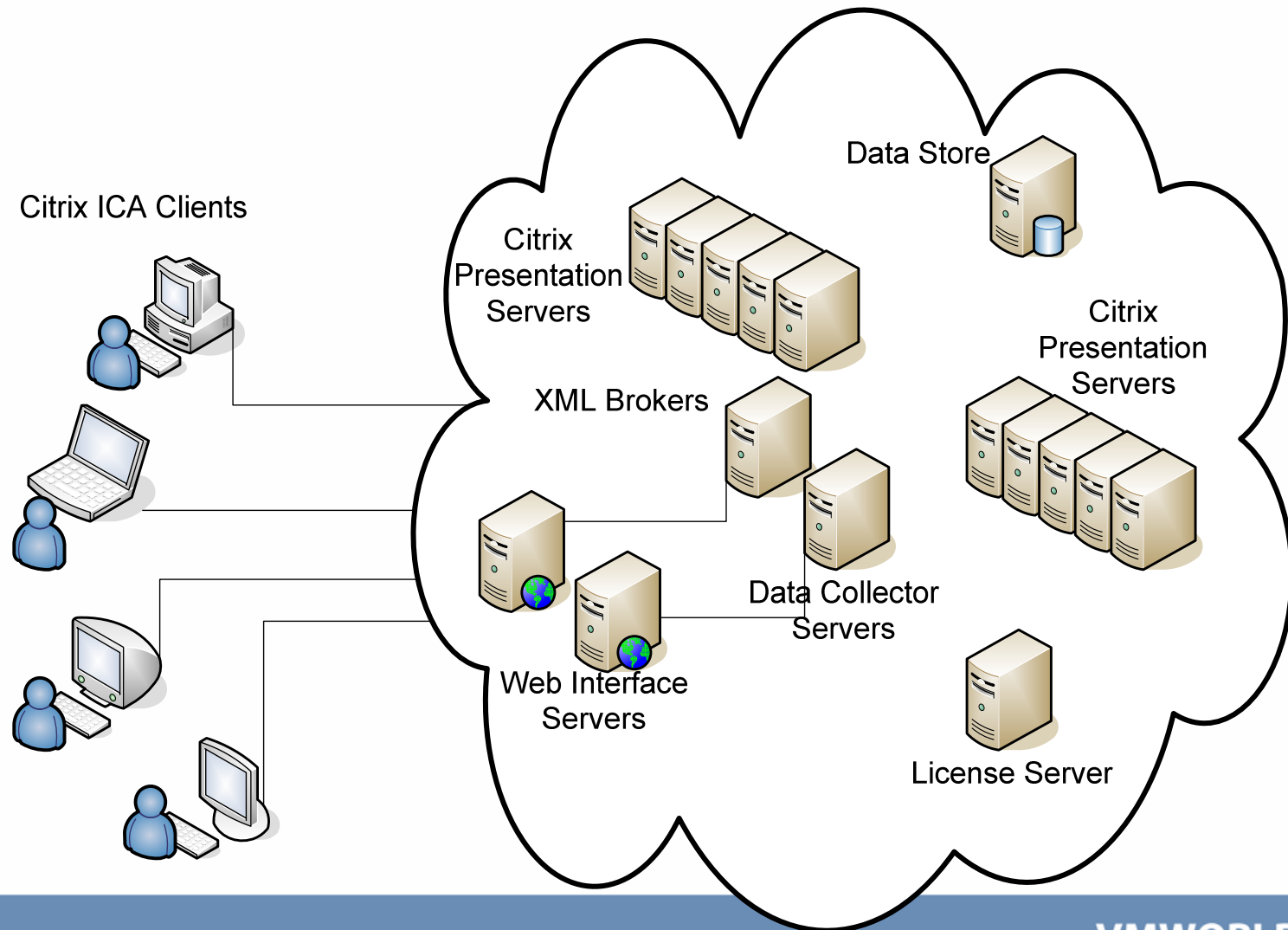
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Brief Product Overview

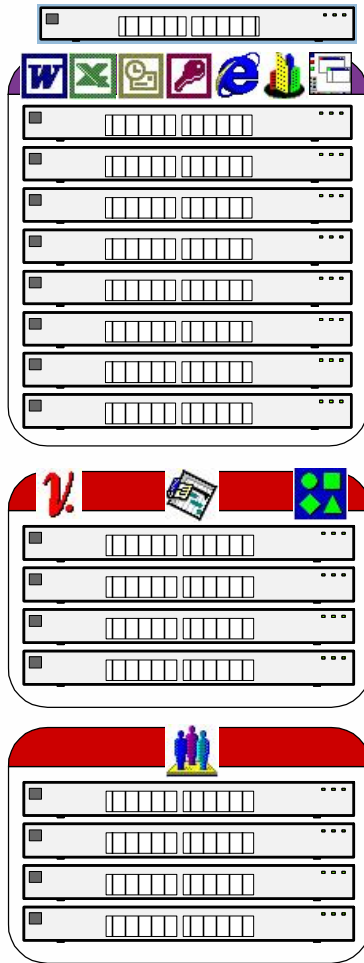
- Citrix Presentation Server
 - > The #1 application virtualization solution for providing any user with secure access to client/server applications from anywhere using any device or connection



Presentation Server Farm Architecture



Traditional CPS Deployment



- Scale Out Server Deployment
- Challenges...
 - > Physical server management
 - > Logical server management
 - > Per server software licensing costs
 - > Billing/cost allocation practices

Candidates for Virtualization

- **Citrix Servers:**
 - > Web Interface Servers
 - > Data Collector Servers
 - > License Servers
 - > Data Store Servers
 - > Presentation Servers

Single Server Scalability (SSS)

- What Citrix advises for a native environment
 - > How many users can a server running Presentation Server support?
 - Power of the server, the environment in which the server is installed, applications running on the server, way users employ those applications
 - > The answer to this question can be found by:
 - Creating a test environment that mimics the production
 - Replicating user actions performed on the servers
 - Measuring to see when and where the bottleneck occurs

Impacts to Server Scalability

- Configuring the Server
 - > Business applications
 - Applications to be tested
 - > Anti-virus software
 - > Remote deployment software
 - > Agents (SNMP, SMS, Tivoli)
- Configuring the Client
 - > Client printers
 - > Client drives
 - > Multimedia / Audio
 - > Session color depth and resolution
 - > Security Settings

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Before Virtualizing Servers

- Understand why you are looking for a virtualization solution
 - > Improving hardware server utilization
 - > Improving management of server environment

- Virtualization is not a performance panacea, and results will vary widely across environments

- Virtualization Does:
 - > Make growth easier to manage and afford.
 - > Facilitate rapid system deployment, security through virtual machine isolation and mirroring,
 - > Provide powerful system administration tools, and cost reduction from hardware consolidation to Citrix.

A Bit Of A Puzzle

- Things we know:
 - > Customers – and Citrix – are successfully deploying the combination of CPS and ESX
 - > Customer performance varies, as CPS scalability varies by use case
- Things we don't know yet:
 - > Recommendations on sizing newer 64-bit environments
- Things we know we don't know:
 - > What is the magic formula for sizing servers

Hosted Versus Bare-Metal

- ESX is a better fit to host Presentation Servers
 - > ESX Server has better management tools and more third party application support, a must for any production environment
 - > ESX Server's direct hardware access allows for better performance
 - > Better scalability (less overhead)
 - > Better memory sharing and memory allocation for virtual machines

ESX Performance

- The overhead of a virtual machine depends heavily on the applications running in the Citrix client.
 - > To determine the performance of virtual machines, test them in the environment in which they are deployed.
 - > The performance of a single virtual machine can be lower than that of a single physical machine, due to virtual machine overhead.
 - > ESX Server is likely to better utilize resources and the corresponding number of sustainable user connections only on four-way and above server class machines.
 - > When you configure your servers to maximize the number of user connections per physical server, in most cases it is best to create multiple, uniprocessor virtual machines.
 - > Distribute the user count that would have been expected from a two-way machine across two uniprocessor virtual machines.
 - Run N uniprocessor Citrix VMs ($N = \text{\#CPUs}$) no matter how many CPUs.

Decision Matrix for CPS + ESX

■ Hardware

> Single, Dual or Quad Socket System

- For ancillary servers, single socket system may suffice
- Farm considerations also apply
 - Data Store: CPU power affects some actions
 - Data Collector: Memory and CPU usage sensitive to farm size
- > For actual presentation servers, dual or quad socket systems recommended
 - With expected increase in processing cores, the right answer will be an ever-more complex choice – most likely based on your actual workload

■ Software

> Kernel Memory and Registry Size Limits

- If these were hit long before a dual processor server was used up, virtual machines provide a solid solution


> For 32-bit environments, a case can be made for ESX + CPS

- 4xCPU servers are obvious target for virtualization because of memory address limitations in 32-bit Windows Server 2003

Scaling Servers Up

- Standard Citrix Advice:
 - For 32-bit environments, dual-processor servers give the best performance
 - Diminishing returns beyond two CPUs
 - System generally runs out of kernel memory
 - Non-linear scalability

Single	Baseline
Dual	112%
Quad	18%



Virtualize for Scalability

- Citrix specific Performance improvements in VI 3.0
 - > Automatic sizing of page table caches (workload=terminalServices option no longer needed)
 - > Improved latencies on MMU operations (page faults, context switches)

- Performance Tests run by VMware labs
 - > Showcase the performance improvements in VI 3.0
 - > Demonstrate user scalability using multiple virtual machines
 - > Used Citrix Server Test Kit
 - > Standard Microsoft Word only user as defined by the kit

- In real world, the number of users supported will depend on the applications used and the activity levels of users.

Test Configuration

Client:

- 2.2 GHz 2-way
- 4GB RAM



Network
switch

Server:

- 2.2 GHz dual-core 4-way
- 32 GB RAM
- 4x 150GB 15K RPM SCSI disks
- 1 Gbps NIC



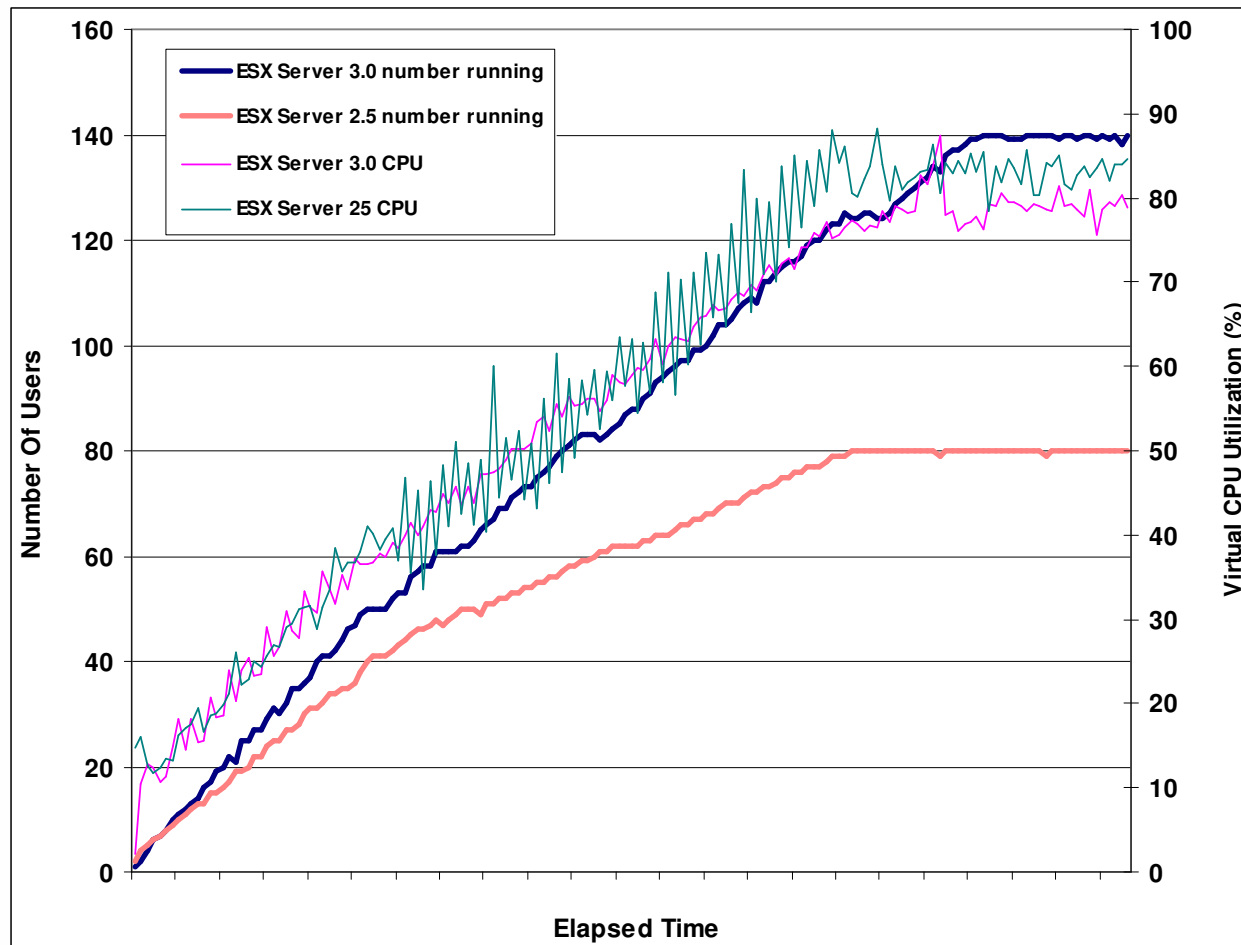
Guest:

- CPU: 1 virtual CPU
- RAM: 3.5GB
- OS: Windows Server 2003 Enterprise Edition 32-bit
- Citrix software: Citrix Presentation Server Version 4

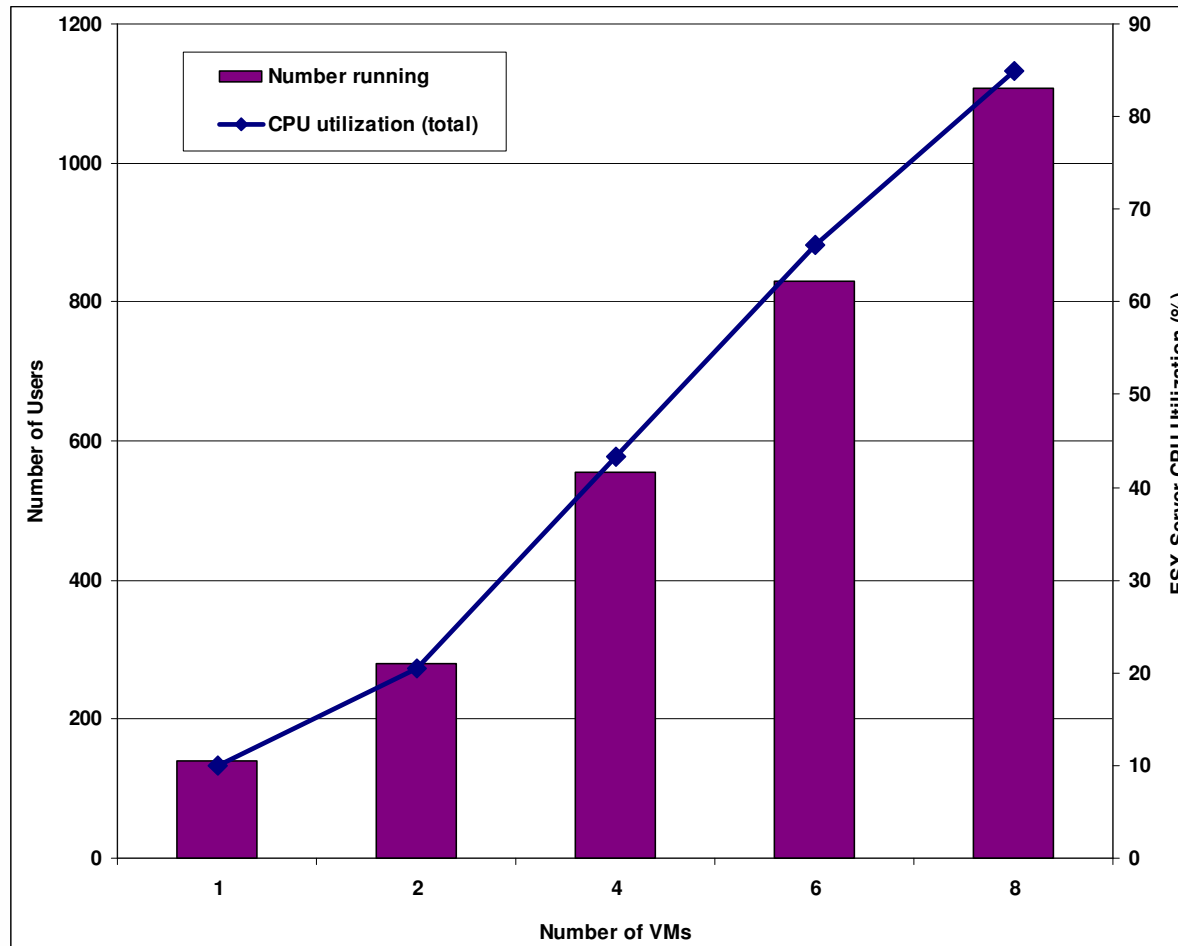
Test Methodology

- Number of Users that can be supported at 80% CPU utilization
- Success Criteria:
 - > the Output logs from all the users include start and end iteration record
 - > Meets CPU utilization goal
- Workload definition:
 - > Users log on in a regulated manner
 - > Open a word document and type for 11-15 minutes and then pause for a short time
 - > Run 80 iterations
 - > The test was stopped after a steady-state period of 30 minutes had elapsed after the last user had logged in.

Scalability: VMware ESX Server 2.5 vs. 3.0



Scalability with Multiple Virtual Machines



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Other Things You Need to Know

- Process “tuning” or prioritization apps can help, but at the cost of app response time.
 - > Look at user experience from end-point
- Set workload to terminal services (ESX versions older than VI 3.0)
 - > Allocates more memory to the virtualization components and keeps more memory reserved for the virtual machine
- Disable COM port and Visual Effects
- Processor Affinity can help sometimes
 - > When using affinity you must carefully balance and monitor workloads in order to avoid overcommitting some processors while other processors remain underutilized.

Citrix + VMware Benefits

- Citrix:
 - > Control of the application management and delivery infrastructure
- VMware:
 - > Control of the server infrastructure
 - Streamline server provisioning and management
 - Decrease hardware costs – potentially reducing the number of servers
 - Increased Server utilization

Additional Sessions

- MED0096 - Citrix and VMware: A Range of Customer Solutions, Paul Hahn, Citrix
- TAC9728 - Citrix and VMware: How these technologies work together, Thomas Huber, VMware
- MED9518 - Virtual Desktop Infrastructure: How to use VMware ESX Server to Consolidate Desktops, Russel Wilkinson, VMware

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