



VMware ESX Server 2

Representing Physical Machines in the Virtual World

When you compare virtual machine performance to physical machine performance, many of the perceived ESX Server performance problems are due to differences in the configuration of the physical and virtual environments. To do a fair, apples-to-apples comparison between a virtual machine and a physical machine, you need to configure the virtual machine to match the physical machine as closely as possible.

Furthermore, even though troubleshooting virtual machines is similar to troubleshooting physical machines, IT professionals must take into account differences that are unique to virtual machines, such as the ESX Server machine's overhead, the number of virtual machines per physical CPU, the mix of applications running on an ESX Server machine, and so forth.

Because of the differences, you need to use a layered approach to troubleshooting so that you can:

- Determine if performance problems exist
- Isolate performance problems
- Eliminate performance problems

The following sections describe the process for troubleshooting a suspected performance problem at the machine representation layer (i.e., virtual machine layer):

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Overview

The machine representation layer is a virtual machine configured to represent the original physical machine as closely as possible — including the operating system, RAM, disk, network interface and applications.

The steps for troubleshooting at the virtual machine layer are:

1. Determine the criteria upon which you evaluate the performance of the application on the physical machine. For example, a suitable metric for an OLTP application might be throughput measured in transactions per second.
2. Configure the virtual machine using the ESX Server management interface to represent the original physical machine as closely as possible. For details on this process, refer to the online document, [Configuring a Virtual Machine](#).
3. Run the application again, within the ESX Server environment, and evaluate the results.

Determining the Evaluation Criteria

The evaluation criteria is specific for each application. For example, a suitable metric for an OLTP application might be throughput measured in transactions per second.

Configuring a Virtual Machine to Match a Physical Machine

Based on the original physical machine’s configuration, use the ESX Server Management Interface to configure the virtual machine so that it matches the following configuration as closely as possible:

Configuration	Methods for Determining Configuration ¹
CPU: Model, speed (equal to or greater than original physical machine), number of processors.	Windows Machines: Right-click My Computer , click Properties and click General for CPU information. Linux Machines: View the ASCII file, <code>/proc/cpuinfo</code> , for CPU information.
RAM.	Windows Machines: Right-click My Computer , click Properties and click General for RAM information. Linux Machines: View the ASCII file, <code>/proc/meminfo</code> , for memory information.
Storage: Type of storage (e.g., local disks, SAN, RAID array). SCSI adapter or HBA type. Queue length of adapter, if known. Number and size of disks. RAID level. For storage arrays: Connection to storage (e.g., direct connection or switch) For storage arrays: Number of LUNs and disks are distributed across the LUNs.	Use vendor-specific tools for storage arrays information, such as LUN configuration, RAID levels and so forth.



Configuration (Continued)	Methods for Determining Configuration ¹ (Continued)
Network Interface: Same bandwidth.	Windows Machines: Right-click My Computer , click Properties , click Hardware , click Device Manager then Network adapters for network interface information. Linux Machines: View the ASCII file, <code>/proc/net/netinfo</code> , for network interface information.
Guest Operating System: Same version, service pack and so forth.	Supported Operating Systems: Refer to Supported Guest Operation Systems for a list of supported operating systems and service packs. Windows Machines: Right-click My Computer , click Properties and click General for operating system information. Linux Machines: View the ASCII file, <code>/proc/version</code> , for OS information.
HAL.	Windows Machines Only: For information on HALs, go to http://support.microsoft.com and search for "hardware abstraction layer."
Applications: Same version (no new virus software or scheduled services have been added).	Windows Machines: Press Ctrl-Alt-Delete to open the Task Manager for a list of applications and processes that are running. Linux Machines: Enter the <code>ps -ef</code> shell command for a list of applications and processes that are running.

1. Use the same methods for both virtual machines and physical machines.

Running the Application Again

After configuring the virtual machine to match the physical machine, perform the following:

1. Use the VMware Management Interface to power off all but the virtual machine in question. Even idle virtual machines, if powered on, can affect performance.
2. Run the application again and analyze the results. Make certain you use the same evaluation criteria you used on the physical machine when you compare the virtual machine's performance to the physical machine's.
3. Power on all of the virtual machines on the ESX Server machine, run the application again and analyze the results.

If the performance level is still not acceptable, refer to the VMware Technical Troubleshooting Note, *Isolating Performance Problems*, for an overview of the performance troubleshooting process.