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VMware ESX Server 2

Performance Tips and Tricks

How well your ESX Server machine performs depends on many variables, such as the number of virtual machines running on a physical machine, the number of CPUs on the physical machine, the amount of RAM, the application mix on a server and the network bandwidth.

This note provides several useful tips for tuning your ESX Server machine. It is not intended to be a definitive list, but rather a solid starting point to help you get the most from your server.

The following sections list performance tips and tricks for a machine running ESX Server:

Physical Machine Setup

You can avoid many problems by making certain the physical machine running ESX Server is validated and set up for production work.

Validating Hardware

It is important to validate your physical machine by:

- Testing the memory for 72 hours before deployment.
- Checking performance of the hardware components using a Windows or Linux operating system to make sure they are running at their maximum capacities. (Run benchmarks if necessary.)
- Checking installed items against supported hardware list. For more information, see Related Publications on page 4.

Hardware Setup for Production Work

Provide adequate resources before you attempt deployment. The basic hardware configuration for production is:

- Two 1.8GHz CPUs with 512MB cache.
- 4GB RAM.
- 36GB storage (it is typical to put virtual machine storage on external RAID or SAN disks; if storage is local, use SCSI hard disks).

- Two Gigabit NICs for virtual machines, one 10/100 Mbps for the service console and one Gigabit NIC for VMotion. Make certain the ESX Server machine is attached to a Gigabit switch.

Plan the deployment so you allocate enough resources to the service console to prevent problems caused by insufficient RAM, swap space and disk space.

The following table lists the symptoms of insufficient resources.

Resource Type	Symptoms of Insufficient Resource
Service Console RAM	• Poor Remote Console performance • Poor VMware Management Interface performance
Service Console Swap	• Randomly killed processes, especially the VMware Management Interface • Inability to start new virtual machines
Service Console Disk	Inability to launch new VMware Management Interfaces and to write diagnostic messages to log files because of a full file system

You can use VirtualCenter to view resource utilization. If you do not have VirtualCenter, you can use `esxtop` and `vmkusage` to view resource utilization. See Using esxtop to Troubleshoot Performance Problems for details on how to use `exstop`.

Performance Tuning Tips and Tricks

This section lists several useful performance tuning tips and tricks for the service console and virtual machines.

Service Console

The service console is used to administer and manage the vmkernel. (The vmkernel is a proprietary kernel that acts as a host for virtual machines). The service console supports the Web-based VMware Management Interface, as well as remote access to a virtual machine's keyboard, display and mouse. Tuning tips and tricks for the service console include:

- Use the service console only for virtual machine administration. Log on to the actual virtual machine to run non-administrator tasks.

- System management agents may impact on the performance of the service console. Use the VMware Management Interface to increase the service console's memory allocation to 256MB before you install a system management agent.

Virtual Machines

A virtual machine is a virtualized x86 PC world on which a guest operating system and an associated application run. Tuning tips and tricks for the virtual machines include:

- Run one application per virtual machine.

- Make certain to install VMware Tools on every virtual machine. VMware tools contain drivers that increase virtual machine performance and decrease the overall load on the ESX Server machine.

- Defragment the hard drives that run the guest operating systems.

- Disable the following devices if your application or guest operating system does not use them:

  - COM port 1.

- COM port 2.

- LPT port 1.

- Floppy drive.

- CD-ROM (disable the auto-detect).

- USB adapters.

Disabling these devices frees IRQ resources and eliminates IRQ sharing conflicts within the guest operation system that can cause performance problems. Enable devices only when you need them.

- Disable any unnecessary programs and services.

  - Turn off screen savers.

  - Do not run X Windows Systems on Linux virtual machines if possible.

- Schedule antivirus and backup programs to run during off-peak hours.

- Allocate sufficient key resources for a virtual machine's application. For example:

  - Dedicate a LUN to a database application.

  - Configure the minimum CPU settings high enough to guarantee CPU resource allocation for low-latency applications (as opposed to share-based CPU allocation). The trade-off is a lower consolidation ratio (that is, the number of virtual machines you can run on a server).

The following table list application types and their key resources.

Application Type	Key Resources
Web Server	- RAM - CPU - Network bandwidth
Application Server	- RAM - CPU
Rendering Engine	- CPU
File Server	- RAM - CPU - Network bandwidth - Disk bandwidth
Terminal Server	- RAM - CPU
Database Server	- RAM - CPU - Network bandwidth - Disk bandwidth
Mail Server	- RAM - CPU - Network bandwidth - Disk bandwidth

Related Publications

Refer to the following documents for additional information.

- ESX Server 2 Systems Compatibility Guide lists supported operating systems and servers.

- ESX Server 2 I/O Compatibility Guide lists supported device drivers.

- ESX Server 2 SAN Compatibility Guide lists supported storage arrays.

- ESX Server 2 Best Practices provides specific, recommended guidelines for deployment.