



VMware ESX Server 2

Performance Problem Report Check List

To help troubleshoot performance problems, VMware has created a performance problem report check list. The Technical Troubleshooting Note, [Isolating Performance Problems](#), describes the process in which the customer and VMware technical support engineering work together to isolate and resolve performance problems.

Start by eliminating the following (see the Technical Troubleshooting Note, [Representing Physical Machines in the Virtual World](#)):

- Perception issues
- Incorrect configuration (ESX Server machine and guest operating system)
- Sizing problems (overcommitment of resources)
- Hardware issues

VMware technical support may ask you to supply some or all of the items listed in the check list. VMware technical support uses the check list data to iteratively continue the process of elimination until the problem is solved.

Following is the performance problem report check list.

1. The ESX Server version and build number.
2. The physical hardware description, including:
 - Hardware model
 - Processor model, speed, and number of processors
 - RAM
 - NIC
 - Storage
 - Type of storage (for example, local disks, SAN, or 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 (for example, direct connection or switch)
 - For storage arrays: number of LUNs and disks distributed across the LUNs
 - Number of NUMA nodes



3. Does the problem happen with a single virtual machine, or only with multiple virtual machines? If it is the latter, how many virtual machines does it take for the problem to show up?
4. Description(s) of the virtual machine(s):
 - How the virtual machine was created (P2V, fresh installation, or migration from previous version)
 - Number of VCPUs
 - Guest operating system, including service pack levels if applicable
 - For Windows virtual machines, which HAL is installed
 - List of all applications installed in the virtual machine (can use `msinfo` utility for Windows guests)
 - List of all virtual machines running on the server at the time of the performance problem
 - List of all other non-VMware applications running on service console (for ESX Server)
5. Check for the following:
 - Do any virtual machines on the ESX Server machine have shares or affinity settings?
 - Is there an anti-virus program running in the virtual machine? If so, does turning it off have an effect? When you turn it off, make sure that all its associated services have also been stopped.
 - Are any system management agents running either in the guest, or service console (ESX Server)?
 - Is the remote console attached? If so, are any animation or graphics being displayed?
 - Does the guest have a USB controller? See Knowledge Base article 1231.
 - For ESX Server 2.0.x, if the guest is win2000 SMP, is the idler installed? The idler is not necessary for ESX Server 2.1 and later.
 - For Citrix, follow the steps described in Knowledge Base articles 869 and 1086. If you could not install the hot-fix described in Knowledge Base article 869, explain why.
 - For Linux guests, does the Linux version have the Native Posix Threads Library (NPRTL)? If so, see Knowledge Base article 1470.
6. Classify the performance problem:
 - a. Worse performance than for a previous version of ESX Server
 - b. Poor performance compared to native
 - c. High CPU utilization
7. Quantify the performance problem. First, what is the metric being used to quantify performance: is it time, throughput, or something else? Exactly how is this being measured?
 - a. If performance is worse than for a previous version, state the performance under both versions of the product. Make sure that both versions are running in *identical* environments, if possible.
 - Are both versions of virtual machine run on the same physical machine?
If you are not running both versions on the same machine, state the hardware configurations (see step 1) used for both machines.



- All software installed in the virtual machine is the same, with the exact same versions of that software.
 - The virtual machine configuration files are the same.
 - Any other virtual machines running on the system are the same.
- b. If performance is poor compared to that in the native machine, state the performance natively and within a virtual machine. What level of performance do you expect to see in a virtual machine? As in step a above, make sure that the native and virtual machine environments are as similar as possible.
- The native machine and the machine running ESX Server should be identical. If this is not possible, then state the hardware configurations (see step 1) used for both the virtual machine and native experiments. This includes the amount of memory used in the virtual machine and, for native experiments, the number of CPUs and VCPUs, networking configuration and storage.
 - All software installed in the virtual machine is the same as the native machine, with the exact same versions of that software.
 - All tuning, configuration, and so forth applied to the native application were also applied to the application in the virtual machine.
- c. If the problem is high CPU utilization, state the observed CPU utilization and its source (MUI, `esxtop`, or `vmkusage`). State what the virtual machine is doing at the time the high CPU utilization is observed. Run `top` for Linux guests or task manager (with processes sorted by CPU utilization) for Windows guests in the guest to see which processes appear to be taking up most of the CPU. It's helpful if you take a screenshot and send it to VMware technical support.
8. Describe any other problems you are currently experiencing. Sometimes correctness or configuration problems may have an impact on performance.
9. Run the scripts described below to collect statistics data while the system is exhibiting the performance problem:

Note: For ESX 2.0.x and ESX 2.1.x, run `esxtop` in interactive mode and set up the fields for the resources you want to monitor before running `esxtop` in batch mode. Also, maximize the terminal screen when running `esxtop` in batch mode so that it captures all the information (batch mode captures only what appears on the screen). See the Technical Troubleshooting Note, [Using esxtop to Troubleshoot performance Problems](#), for more information on setting up `esxtop`.

ESX 2.0.x:

- a. Run `vm-support`.
- b. Run `esxtop`. The `esxtop` utility must be downloaded from VMware's Web site (see Knowledge Base article 1078 for information on how to download it). Make sure to untar the package on the console and not under Windows. Run `esxtop` in batch mode for at least 15 minutes:

Edit `/usr/bin/esxtop` and replace the line

```
exec /usr/lib/vmware/bin/esxtop-bin
```

with the line

```
exec /usr/lib/vmware/bin/esxtop-bin $*
```

Run `esxtop -b > logfile`.



- c. For single virtual machine performance problems, *collect vmmstats at the same time as esxtop is running* (during the period when the performance problems is happening). Note that `vmmstats` is not distributed with ESX Server and must be sent to the customer (see links at the bottom of the page). Just use the defaults in `vmmstats.pl`; for example, run `vmmstats.pl -w worldid`, where *worldid* is the world ID of the virtual machine that has the performance problem. This writes the data to a log file called *worldid.log*.
- d. After `esxtop/vmmstats` data collection is complete, run `vm-support` one more time.

ESX 2.1.x:

- a. Run `vm-support`.
- b. Run `esxtop`. For ESX 2.1 and later, `esxtop` is installed by default. Run `esxtop` in batch mode for at least 15 minutes:

```
esxtop -b > logfile
```
- c. For single virtual machine performance problems, *collect vmmstats at the same time as esxtop is running* (during the period when the performance problems is happening). Note that `vmmstats` is not distributed with ESX Server 2.1.x and must be sent to customers. Just use the defaults in `vmmstats.pl`; for example, run `vmmstats.pl -w worldid`, where *worldid* is the world ID of the virtual machine that has the performance problem. This writes the data to a log file called *worldid.log*.
- d. After `esxtop/vmmstats` data collection is complete, run `vm-support` one more time.

ESX 2.5.x:

- a. Run `vm-support` in snapshot mode:

```
vm-support -s -i10 -d<secs>
```

The `-s` option tells `vm-support` to take periodic snapshots of performance data. The `-i10` option tells it to use an interval of ten seconds between snapshots (VMware recommends an interval of ten seconds), and the `-d<secs>` is the total duration for collecting performance snapshots (the default is 300 seconds). See the `vm-support` man page for details.
10. If VMware technical support still can't determine the cause of the performance problem, you may be asked to send VMware technical support your virtual machine, if that is feasible, so the problem can be reproduced in-house.