VMware Tools Configuration Utility User's Guide

VMware Fusion 3.0
VMware ACE 2.6
VMware Workstation 7.0
VMware Player 3.0

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About This Book

The *VMware Tools Configuration Utility User's Guide* provides an introduction to using the VMware® Tools command-line utility to configure VMware Tools. VMware Tools is a suite of utilities that enhances the performance of a virtual machine.

Intended Audience

This book is intended for anyone who configures VMware Tools. Users typically include administrators and others who want to automate configuration of VMware Tools by writing their own scripts.

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Using the VMware Tools Configuration Utility

The VMware Tools configuration utility is a command-line interface you can use in the guest operating system to modify VMware Tools settings, shrink virtual disks, and connect and disconnect virtual devices.

The VMware Tools configuration utility provides a command-line interface for functionality that was previously available only in the VMware Tools control panel. This program is called `VMwareToolboxCmd.exe` in Windows guests, `vmware-tools-cli` in Mac guests, and `vmware-toolbox-cmd` in Linux, FreeBSD, and Solaris guests. Use its `help` command to display complete usage information and syntax.

The VMware Tools configuration utility is included in the following VMware products for this release:

- VMware Workstation 7.0 and later
- VMware Fusion 3.0 and later
- VMware Player 3.0 and later
- VMware ACE 2.6 and later

You can use this utility in the guest operating system to perform several tasks.

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- Retrieve Status Information About the Virtual Machine on page 17

  You can display information about host time and CPU speed.

Configure Time Synchronization Between Guest and Host

When you turn on periodic time synchronization, VMware Tools sets the time of the guest operating system to be the same as the time of the host. After that, VMware Tools checks once every minute to determine whether the clocks on the guest and host still match. If not, the clock on the guest is synchronized to match the clock on the host.

If the clock on the guest falls behind the clock on the host, VMware Tools moves the clock on the guest forward to match the clock on the host. If the clock on the guest is ahead of that on the host, VMware Tools causes the clock on the guest to run more slowly until the clocks are synchronized.

Native time synchronization software, such as Network Time Protocol (NTP) for Linux and the Mac, or Microsoft Windows Time Service (Win32Time) for Windows, is typically more accurate than VMware Tools periodic time synchronization and is therefore preferred. Use only one form of periodic time synchronization in your guests. If you are using native time synchronization software, turn off VMware Tools periodic time synchronization, but do not disable VMware Tools time synchronization completely.

Regardless of whether you turn on VMware Tools periodic time synchronization, time synchronization occurs when the VMware Tools daemon is started (such as during a reboot or power on operation), when resuming a virtual machine from a suspend operation, after reverting to a snapshot, and after shrinking a disk. When the operating system starts or reboots, and when you first turn on periodic time synchronization, synchronization can be either forward or backward in time. For other events, synchronization is forward in time. To disable time synchronization completely, you must edit the configuration file (`.vmx` file) of the virtual machine and set several synchronization properties to FALSE.

NOTE Mac guests use NTP and do not become out of sync with the host. For Mac guests, there is no need to turn on VMware Tools time synchronization.

Prerequisites

Disable other periodic time synchronization mechanisms. For example, some guests might have NTP or Win32Time clock synchronization turned on by default.

If you plan to script the commands used in this procedure and need to know what the exit codes are, see "Exit Codes," on page 18.

Procedure

1 Open a command prompt or terminal in the guest.

2 Change to the VMware Tools installation directory.

Guest	Default Path
Windows	`C:\Program Files\VMware\VMware Tools`
Linux and Solaris	`/usr/sbin`
FreeBSD	`/usr/local/sbin`

3 Enter the command to determine whether time synchronization is enabled.

```
<utility-name> timesync status
```

For <*utility-name*> use the guest-specific program name.

Guest	Program Name
Windows	`VMwareToolboxCmd.exe`
Linux, Solaris, and FreeBSD	`vmware-toolbox-cmd`

4 Enter the command to enable or disable periodic time synchronization.

```
<utility-name> timesync <subcommand>
```

For <*subcommand*>, use `enable` or `disable`.

After you complete this procedure, the VMware Tools service enables or disables periodic time synchronization, as you specified. For information about the additional functionality this service performs, see "VMware Tools Service," on page 10.

Disabling periodic time synchronization does not disable all VMware Tools time synchronization. To configure the virtual machine so that its time never synchronizes with the host, see "Disable Time Synchronization Completely," on page 9.

Disable Time Synchronization Completely

If you want to keep a fictitious time in a virtual machine, so that the clock in the guest is never synchronized with that on the host, you must disable time synchronization completely.

A virtual machine occasionally synchronizes time with the host even if you do not turn on periodic time synchronization. To completely disable time synchronization, you must set some properties in the virtual machine configuration file.

Prerequisites

Power off the virtual machine.

Procedure

1 Open the configuration (`.vmx`) file of the virtual machine with a text editor.

2 Add lines for the time synchronization properties and set the properties to FALSE.

```
tools.syncTime = "FALSE"

time.synchronize.continue = "FALSE"

time.synchronize.restore = "FALSE"

time.synchronize.resume.disk = "FALSE"

time.synchronize.shrink = "FALSE"

time.synchronize.tools.startup = "FALSE"
```

3 Save and close the file.

VMware Tools Service

The VMware Tools service starts when the guest operating system boots. The service passes information between host and guest.

This program, which runs in the background, is called `vmtoolsd.exe` in Windows guests, `vmware-tools-daemon` in Mac guests, and `vmtoolsd` in Linux, FreeBSD, Solaris guests. The VMware Tools service performs the following tasks:

- Passes messages from the host to the guest operating system.
- Runs scripts that help automate guest operating system operations. The scripts run when the power state of the virtual machine changes.
- Synchronizes the time in the guest operating system with the time on the host.
- In Windows guests, allows the pointer to move freely between the guest and host.
- In Windows guests, fits the screen resolution of the guest to the screen resolution of the host.
- In Windows guests, helps create the quiesced snapshots used by certain backup applications. This feature applies to ESX/ESXi and VMware Server.
- In Linux, Solaris, and FreeBSD guests, executes commands in the virtual machine when you shut down or restart the guest operating system.
- Is one of the processes that sends a heartbeat to the VMware product to indicate that the guest operating system is running. When the virtual machine runs under ESX/ESXi, or VMware Server, a gauge for this heartbeat appears in the management interface.
- Provides support for guest-bound calls created with the VMware VIX API.

NOTE In Mac guests, the VMware Tools service only fits the screen resolution of the guest to the screen resolution of the host.

Connect or Disconnect a Virtual Device

You can connect and disconnect removable devices such as floppy drives, DVD/CD-ROM drives, ISO images, USB devices, sound adapters, and network adapters.

IMPORTANT Note the following restrictions for connecting devices:

- Some devices cannot be shared between the host and guest or between two guests. For example, only one virtual machine or the host can access the floppy drive at any one time.
- The controls for connecting and disconnecting devices might not be available, depending on whether your system administrator has enabled them.
- Audio devices are not supported for virtual machines on ESX/ESXi servers.

Prerequisites

If you plan to script the commands used in this procedure and need to know what the exit codes are, see "Exit Codes," on page 18.

Procedure

1 Open a command prompt or terminal on the guest.

2 Change to the VMware Tools installation directory.

Guest	Default Path
Windows	`C:\Program Files\VMware\VMware Tools`
Linux and Solaris	`/usr/sbin`
FreeBSD	`/usr/local/sbin`
Mac	`'/Library/Application Support/VMware Tools'`

3 Enter the command to list available devices.

<utility-name> **`device list`**

For <*utility-name*> use the guest-specific program name.

Guest	Program Name
Windows	`VMwareToolboxCmd.exe`
Linux, Solaris, and FreeBSD	`vmware-toolbox-cmd`
Mac	`vmware-tools-cli`

4 (Optional) Enter the command to determine whether a device is connected.

<utility-name> **`device status`** ***<device-name>***

For <*device-name*>, use one of the names displayed when you used the `list` subcommand.

5 Enter the command to connect or disconnect the device.

<utility-name> **`device`** ***<device-name>*** ***<subcommand>***

Variable	Valid Value
<device-name>	Use one of the names displayed when you used the `list` subcommand.
<subcommand>	Use `enable` or `disable`.

After you complete this procedure, the device is connected or disconnected, as you specified. For more information about the VMware Tools drivers used for device functionality, see "VMware Tools Device Drivers," on page 11.

VMware Tools Device Drivers

Device drivers smooth mouse operations, make VMware features such as folder sharing available, and improve sound, graphics, and networking performance. If you do a custom VMware Tools installation or reinstallation, you can choose which drivers to install.

Which drivers are installed when you install VMware Tools also depends on the guest operating system and the VMware product. The following device drivers are included with VMware Tools:

SVGA driver This virtual driver enables 32-bit displays, high display resolution, and significantly faster graphics performance. When you install VMware Tools, a virtual SVGA driver replaces the default VGA driver, which allows for only 640 X 480 resolution and 16-color graphics.

	On Windows guests whose operating system is Windows Vista or later, the VMware SVGA 3D (Microsoft - WDDM) driver is installed. It provides the same base functionality as the SVGA driver, and it adds Windows Aero support.
SCSI driver	When you create a virtual machine, if you specify that you want the virtual machine to use a BusLogic adapter, the guest operating system uses the SCSI driver that VMware Tools provides. Some recent guest operating systems, however, contain LSI or LSI SAS drivers. For example, Windows Server 2008 defaults to LSI SAS, which provides the best performance for that operating system. In this case, the LSI Logic SAS driver provided by the operating system is used.
Paravirtual SCSI driver	This driver is for PVSCSI adapters, which enhance the performance of some virtualized applications.
VMXNet NIC drivers	The `vmxnet` and `vmxnet3` networking drivers improve network performance. Which driver is used depends on how you configure device settings for the virtual machine. Search the VMware Knowledge Base for information on which guest operating systems support these drivers. When you install VMware Tools, a VMXNet NIC driver replaces the default `vlance` driver.
Mouse driver	The virtual mouse driver improves mouse performance. This driver is required if you use some third-party tools such as Microsoft Terminal Services.
Audio driver	This sound driver is required for all 64-bit Windows guests and 32-bit Windows Server 2003, Windows Server 2008, and Windows Vista guests if you use the virtual machine with VMware Server, Workstation, or Fusion.
Kernel module for sharing folders	The host-guest file system module, called `hgfs.sys` on Windows guests and `vmhgfs` on Linux and Solaris, is required to use the virtual machine with Workstation or Fusion and share folders between hosts and guests.
Memory control driver	This driver is available and recommended if you use VMware ESX/ESXi. Excluding this driver hinders the memory management capabilities of the virtual machine on an ESX/ESXi host.
Modules and drivers that support making automatic backups	If the guest operating system is Windows Vista, Windows Server 2003, or Windows Server 2008, a Volume Shadow Copy Services (VSS) module is installed. For other, older Windows operating systems, the Filesystem Sync driver is installed. These modules enable backup applications to create application-consistent snapshots. During the snapshotting process, certain processes are paused and virtual machine disks are quiesced.
VMCI and VMCI Sockets drivers	The Virtual Machine Communication Interface driver allows fast and efficient communication between virtual machines. Developers can write client-server applications to the VMCI Sock (`vsock`) interface to make use of the VMCI virtual device.

Shrink a Virtual Disk

Shrinking a virtual disk reclaims unused space in the virtual disk and reduces the amount of space the virtual disk occupies on the host.

Shrinking a disk is a two-step process. In the preparation step, VMware Tools reclaims all unused portions of disk partitions (such as deleted files) and prepares them for shrinking. This step takes place in the guest operating system.

In the shrink step, the VMware application reduces the size of the disk based on the disk space reclaimed during the preparation step. If the disk has empty space, this process reduces the amount of space the virtual disk occupies on the host drive. The shrink step takes place outside the virtual machine.

IMPORTANT Shrinking disks is not allowed under the following circumstances:

- The virtual machine is hosted on an ESX/ESXi server. ESX/ESXi Server can shrink the size of a virtual disk only when a virtual machine is exported. The space occupied by the virtual disk on the ESX/ESXi server, however, does not change.
- The virtual machine has a Mac guest operating system.
- You preallocated all the disk space to the virtual disk when you created it.
- The virtual machine contains a snapshot.
- The virtual machine is a linked clone or the parent of a linked clone.
- The virtual disk is an independent disk in nonpersistent mode.
- The file system is a journaling file system, such as an `ext4`, `xfs`, or `jfs` file system.

Prerequisites

Perform the following tasks:

- On Linux, Solaris, and FreeBSD guests, run VMware Tools as the root user to shrink virtual disks. If you shrink the virtual disk as a nonroot user, you cannot prepare to shrink the parts of the virtual disk that require root-level permissions.
- On Windows guests, you must be logged in as a user with Administrator privileges to shrink virtual disks.
- Verify that the host has free disk space equal to the size of the virtual disk you plan to shrink.
- If you plan to script the commands used in this procedure and need to know what the exit codes are, see "Exit Codes," on page 18.

Procedure

1 Open a command prompt or terminal in the guest.

2 Change to the VMware Tools installation directory.

Guest	Description
Windows	`C:\Program Files\VMware\VMware Tools`
Linux and Solaris	`/usr/sbin`
FreeBSD	`/usr/local/sbin`

3 Enter the command to list available mount points.

```
<utility-name> disk list
```

For <*utility-name*> use the guest-specific program name.

Guest	Program Name
Windows	`VMwareToolboxCmd.exe`
Linux, Solaris, and FreeBSD	`vmware-toolbox-cmd`

4 Enter the command to shrink the disk at a specified mount point.

```
<utility-name> disk <mount-point>
```

For <*mount-point*>, use one of the mount points displayed when you used the `list` subcommand.

Use Custom VMware Tools Scripts

You can use scripts to automate guest operating system operations when you change the power state of a virtual machine. You can also edit default scripts or associate custom scripts with power operations.

On most guest operating systems, if VMware Tools is installed, you can configure settings so that one or more scripts run when the power state changes. For example, when you power off a virtual machine, by default the `poweroff-vm-default` script runs if the virtual machine is set to shut down the guest rather than abruptly power off.

Scripts are run by the VMware Tools service, or daemon (`vmtoolsd`). Because `vmtoolsd` is run as root on Linux, Solaris, and FreeBSD and as System on Windows, the scripts are run in a separate session from the session of the logged-in user. The VMware Tools daemon has no knowledge of desktop sessions, which means that it cannot display graphical applications. Do not attempt to use custom scripts to display graphical applications.

IMPORTANT This utility cannot run scripts on Windows NT, Me, Windows 98, or Windows 95 guest operating systems. Scripts are not available on Mac guests.

Prerequisites

Perform one or more of the following tasks, as necessary:

- To familiarize yourself with the default scripts, see "Default VMware Tools Scripts," on page 15.
- On Linux, Solaris, and FreeBSD guests, to test, edit, or disable the running of a script, log in as root.
- On Linux, Solaris, and FreeBSD guests, to edit a script, make sure `xterm` and `vi` are installed in the guest and are in your PATH, or specify which editor to use by setting the EDITOR environment variable.
- If you plan to script the commands used in this procedure and need to know what the exit codes are, see "Exit Codes," on page 18.

Procedure

1 Examine the contents of the default scripts to determine whether you want to create a custom script by making changes and saving the edited scripts in a new location.

Guest	Path
Windows	`Program Files\VMware\VMware Tools`
Linux Solaris, and FreeBSD	`/etc/vmware-tools`

2 Write new scripts or modify default scripts and save them with new names.

Guest	Action
Windows guests	If you write a new script, create the script as a batch file.
Linux, Solaris, and FreeBSD guests	Create the script in any executable format, such as a shell or Perl script.

3 Open a command prompt or terminal in the guest.

4 Change to the VMware Tools installation directory.

Guest	Default Path
Windows	`C:\Program Files\VMware\VMware Tools`
Linux and Solaris	`/usr/sbin`
FreeBSD	`/usr/local/sbin`

5 Enter the command to enable the script.

```
<utility-name> script <script-name> enable
```

Variable	Valid Value
<*utility-name*> (On Windows guests)	`VMwareToolboxCmd.exe`
<*utility-name*> (On Linux, Solaris, and FreeBSD guests)	`vmware-toolbox-cmd`
<*script-name*>	Use `power`, `resume`, `suspend`, or `shutdown`.

6 Enter the command to use the custom script you created.

```
<utility-name> script <script-name> set <script-path>
```

For <*script-path*>, use the full path to the file, such as, `"C:\Temp\poweron-my-vm.bat"`.

7 Enter the command to verify that the custom script you specified is now being used.

```
<utility-name> script <script-name> current
```

After you complete this procedure, the VMware Tools service runs the script whenever the specified power operation occurs. For information about the additional functionality this service performs, see "VMware Tools Service," on page 10.

Default VMware Tools Scripts

One or more default scripts for each power state are included in VMware Tools.

What the default scripts do depends in part on the guest operating system:

- On most Microsoft Windows guests, the default script that runs when you suspend a virtual machine releases the IP address of the virtual machine. The default script that runs when you resume a virtual machine renews the IP address of the virtual machine. This affects only virtual machines configured to use DHCP.

  In Windows guests, the default scripts are located in the `Program Files\VMware\VMware Tools` folder.

  IMPORTANT This utility cannot run scripts on Windows NT, Me, Windows 98, or Windows 95 guest operating systems.

- On most Linux, Solaris, and FreeBSD guests, the default script that runs when you suspend a virtual machine stops networking for the virtual machine. The default script that runs when you resume a virtual machine starts networking for the virtual machine. Scripts cannot be run on NetWare guests.

  On Linux, Solaris, and FreeBSD guests, the default scripts are located in the `/etc/vmware-tools` directory.

Table 1. Default VMware Tools Scripts

Script Name	Description
`poweroff-vm-default`	If you configured the power-off operation to shut down the guest, this script runs when the virtual machine is being powered off. If you configured the reset operation to restart the guest, this script runs when the virtual machine is being reset. This script has no effect on networking for the virtual machine.
`poweron-vm-default`	If you configured the power-on operation to start the guest, this script runs when the virtual machine is being powered on rather than resumed. If you configured the reset operation to restart the guest, this script runs after virtual machine restarts. This script has no effect on networking for the virtual machine.
`resume-vm-default`	If you configured the power-on operation to start the guest or configured the reset operation to restart the guest, this script runs when the virtual machine is resumed after it was suspended. On Windows guests, if the virtual machine is configured to use DHCP, this script renews the IP address of the virtual machine. On Linux, Solaris, and FreeBSD guests, this script starts networking for the virtual machine.
`suspend-vm-default`	If you configured the suspend operation to suspend the guest, this script runs when the virtual machine is being suspended. On Windows guests, if the virtual machine is configured to use DHCP, this script releases the IP address of the virtual machine. On Linux, Solaris, and FreeBSD , this script stops networking for the virtual machine.

Disable a VMware Tools Script

Default scripts for suspending and resuming a virtual machine are written to work together. If you disable the script for one of these actions, you must disable the script for the other action as well.

IMPORTANT This utility cannot run scripts in Windows 95, 98, Me, and NT guest operating systems.

Prerequisites

On Linux, Solaris, and FreeBSD guests, to test, edit, or disable the running of a script, log in as root.

Procedure

1 Open a command prompt or terminal in the guest.

2 Change to the VMware Tools installation directory.

Guest	Default Path
Windows	`C:\Program Files\VMware\VMware Tools`
Linux and Solaris	`/usr/sbin`
FreeBSD	`/usr/local/sbin`

3 Enter the command to disable the script.

<utility-name> **script** ***<script-name>*** **disable**

Variable	Valid Value
<utility-name> **(On Windows guests)**	`VMwareToolboxCmd.exe`
<utility-name> **(On Linux, Solaris, and FreeBSD guests)**	`vmware-toolbox-cmd`
<script-name>	Use `power`, `resume`, `suspend`, or `shutdown`.

What to do next

If you disabled the script for suspending a virtual machine, repeat this procedure to disable the script for resuming, or if you disabled the script for resuming, also disable the script for suspending.

Retrieve Status Information About the Virtual Machine

You can display information about host time and CPU speed.

Prerequisites

If you plan to script the commands used in this procedure and need to know what the exit codes are, see "Exit Codes," on page 18.

Procedure

1 Open a command prompt or terminal on the guest.

2 Change to the VMware Tools installation directory.

Guest	Default Path
Windows	`C:\Program Files\VMware\VMware Tools`
Linux and Solaris	`/usr/sbin`
FreeBSD	`/usr/local/sbin`
Mac	`'/Library/Application Support/VMware Tools'`

3 Enter the command to display the desired status information.

<utility-name> **stat** ***<subcommand>***

Variable	Valid Value
<utility-name> **(On Windows guests)**	`VMwareToolboxCmd.exe`
<utility-name> **(On Linux, Solaris, and FreeBSD guests)**	`vmware-toolbox-cmd`

Variable	Valid Value
<*utility-name*> (On Mac guests)	`vmware-tools-cli`
<*subcommand*>	Use `hosttime` or `speed`.

Exit Codes

You might use exits codes if you want to integrate the VMware Tools configuration utility commands with a scripting tool.

Table 2. Exit Codes

Code Number	Applicable Command	Description
0	All commands	The command was successful.
1	All commands	Always indicates that an error occurred. For the `shrink` command, 1 means that although shrinking is enabled, the shrink command cannot be carried out.
64	All commands	The command-line argument is not valid.
66	`script`	The file name does not exist.
69	`device` and `stat`	For the `device` command, 69 means the specified device does not exist. Use the `list` subcommand to display valid names of devices. For the `stat` command, 69 means the program could not communicate with the host (EX_UNAVAILABLE).
75	`stat`	The host does not support the query (EX_TEMPFAIL).
77	All commands	Permission errors.

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