VMware Disk Mount User's Guide

Virtual Disk Development Kit 1.2

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Contents

About This Book 5

Using VMware Disk Mount 7
- Limitations on Mounting Virtual Disks 7
- Running VMware Disk Mount on a Windows Host 8
  - Log Files 8
  - Examples Using VMware Disk Mount on a Windows Host 9
    - About the Inventory Path 9
    - Formulating the ESX Inventory Path 10
    - Formulating the VMware vCenter Inventory Path 10
- Running VMware Disk Mount on a Linux Host 11
  - Log File 12
  - Examples Using VMware Disk Mount on a Linux Host 12
    - About the Inventory Path 13
    - Formulating the Inventory Path 13
  - Installing the Fuse Package 13
  - SSL and Crypto Libraries 14

About This Book

This VMware® manual, the *VMware Disk Mount User's Guide,* introduces the `vmware-mount` command-line utility for accessing disk storage in virtual machines.

Revision History

This book is revised with each release of the product or when necessary. A revised version can contain minor or major changes. Table P-1 summarizes the significant changes in each version of this guide.

Table P-1. Revision History

Revision	Description
2010-07-27	Revised for Workstation 7.1 and VDDK 1.2, including Windows 7 support.
2009-05-06	Revised for VDDK 1.1 with Unicode support.
2008-12-29	Workaround for missing 64-bit shared libraries, information on port 902.
2008-09-15	Added information about Windows and Linux log files.
2008-07-17	Corrected information about snapshots, /p option, and Fuse mount procedure.
2008-01-22	New option for inventory path of the virtual machine.
2007-06-07	Updated with support for Linux hosts and remote virtual disks.
2005-04-08	First version of the *VMware Disk Mount User's Guide*.

To view the most current version of this book as well as all VMware API and SDK documentation, go to http://www.vmware.com/support/pubs/sdk_pubs.html.

Intended Audience

This book is intended for anyone who wants to access disks in virtual machines using VMware Disk Mount. Users typically include people who work with multiple operating systems or computing environments, including system administrators, application developers, QA engineers, or specialists who wants to create, manage, and modify virtual disk files from scripts or at the command line.

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Using VMware Disk Mount

VMware Disk Mount is a utility for Windows and Linux hosts that allows you to mount an unused virtual disk as a separate drive or partition without needing to connect to the virtual disk from within its virtual machine. You can mount specific volumes of a virtual disk if the virtual disk is partitioned.

After you mount a virtual disk, you can read from and write to the mounted virtual disk as if it were a separate file system with its own drive letter or mount point on your computer. For example, you could scan the disk for viruses, or restore files from the host system to the powered off virtual machine.

This chapter contains the following sections:

- "Limitations on Mounting Virtual Disks" on page 7.
- "Running VMware Disk Mount on a Windows Host" on page 8.
- "Running VMware Disk Mount on a Linux Host" on page 11.

Limitations on Mounting Virtual Disks

Consider the following when you mount virtual disks:

- You cannot mount virtual disks that are currently in use by a running or suspended virtual machine. You can virtual mount disks from in a powered off virtual machine, or disks that are not are not associated with a virtual machine.
- You can mount and read Windows virtual disks on Windows hosts (with at least one NTFS volume) or Linux virtual disks on Linux hosts. Cross-mounting is restricted as described below.
- You can use Disk Mount with virtual disks created by VMware Workstation 4 or higher, ESX/ESXi 3.x or higher, VMware Fusion, VMware Player, VMware ACE, VMware Server 1 or 2, VMware GSX Server 2.5 or 3.x, and ESX 2.x (preallocated disks only, through VirtualCenter 2.5 or vCenter Server 4).
- You cannot mount a virtual disk if any of its `.vmdk` files are encrypted, compressed, or have read-only permissions. Change these attributes before mounting the virtual disk.
- On Windows hosts, you must mount virtual disks as drive `D:` or greater. You cannot specify a drive letter already in use on the host.
- On Windows hosts, you can mount volumes formatted with FAT (12/16/32) or NTFS only. If the virtual disk has a mix of partitions or volumes where, for example, a partition is unformatted or is formatted with a Linux operating system and another partition is formatted with a Windows operating system, you can mount the Windows partition with Disk Mount.
- If you specify a virtual disk with snapshots, this command locates and mounts the last snapshot. On Windows you can mount previous snapshots read-only. On Linux you cannot mount previous snapshots.

CAUTION When you have a snapshot mounted with `vmware-mount`, do not revert to a previous snapshot using any other VMware interface. Doing so makes it impossible to unmount the partition.

Disk Mount runs from the command line on any version of Windows XP, Windows Server 2003, Windows Server 2008, or Windows 7, as well as any version of Linux that is supported as a host for VMware Workstation.

Disk Mount on Linux requires the Fuse package. See "Installing the Fuse Package" on page 13.

When you are finished using a mounted virtual disk, you should unmount it so the virtual machine can use its virtual disk again.

Running VMware Disk Mount on a Windows Host

To run VMware Disk Mount, open a command prompt on a Windows host. The Disk Mount utility installs in `C:\Program Files\VMware\VMware Virtual Disk Development Kit\bin` by default, which the installer adds to your search path, so you can probably type just **`vmware-mount`** to run the utility.

The Disk Mount command syntax is:

```
vmware-mount [driveletter:] [path-to-vmdk] [options]
```

Use `driveletter:` to specify the drive letter where you want to mount or unmount a virtual disk. Examples in this section use the **`J:`** drive and nearby letters.

The `path-to-vmdk` specifies the location of a virtual disk that you want to mount or query for information, `C:\Documents and Settings\<user>\My Documents\My Virtual Machines\<VMname>\<VMname>.vmdk` for example, where `<VMname>` is the name of a virtual machine.

NOTE VDDK 1.2 has international support so you can specify paths and filenames in Unicode.

With no arguments, `vmware-mount` displays mounted drive mappings, if any. This is similar to the `/L` option.

Possible options are:

Option	Definition
`/v:N`	Mounts volume `N` of a virtual disk. `N` defaults to `1`.
`/d`	Given a drive letter, deletes the mapping to the virtual disk drive volume.
`/f`	Forcibly deletes the mapping to a virtual disk drive volume. Use this option when a technical error or a correctable condition such as open file handles prevents Disk Mount from unmounting the drive. Otherwise stop accessing the volume and use `/d`.
`/p`	Given `path-to-vmdk`, displays the partitions (volumes) on the virtual disk. Local only.
/L	Displays all virtual disks mounted on the host computer. Use without other options.
/m:w	Mounts disk in read and write mode, the default.
/m:n	Mounts disk in non-persistent read-only mode. Allows mounting of snapshot disk.
`/?`	Displays `vmware-mount` usage information.

The options for remote virtual disks are:

Option	Definition
/i:InventoryPath	Specifies inventory path on the VMware vCenter that manages this virtual disk.
`/h:HostName`	Specifies the name or IP address of the ESX host to access the managed virtual disk.
`/u:UserName`	Specifies user name for the ESX host.
`/s:Password`	Specifies the password for the ESX host.
`/P:Port`	Specifies the port number for server connections. Defaults to `902` and is often optional. When connecting to an ESX host or through VMware vCenter, the actual port number comes back from the server. If zero (0), the `/P` specified port number is used instead.

Log Files

On Windows the diagnostic log files for each `<user>` who ran `vmware-mount` are located here:

```
C:\Documents and Settings\<user>\Local Settings\Temp\vmware-<user>-<nnnn>/vmount.log
C:\Documents and Settings\<user>\Local Settings\Temp\vmware-<user>-<nnnn>/vmount-client.log
```

Examples Using VMware Disk Mount on a Windows Host

Following are some examples that illustrate how to use Disk Mount on a Windows host.

To mount a local virtual disk

Assuming shortcut `C:\My Virtual Machines` and virtual machine `WindowsXP`, type this command:

```
vmware-mount J: "C:\My Virtual Machines\WindowsXP\WindowsXP.vmdk"
```

To mount a remote virtual disk

Type a command in this form, where `<VMname>` is the guest OS name, `<inv>` is the inventory path, `<server>` is an ESX/ESXi host or VMware vCenter, `<user>` is a privileged user, and `<password>` is the user's password:

```
vmware-mount K: "[storage1] <VMname>/<VMname>.vmdk" /i:<inv> /h:<server> /u:<user> /s:<password>
```

Here are two examples, connecting to an ESX/ESXi host and through VMware vCenter:

```
vmware-mount K: “[storage1] WinXP/WinXP.vmdk” /i:ha-datacenter/vm/WinXP /h:esx3 /u:root /s:secret
vmware-mount K: “[storage1] WinXP/WinXP.vmdk” /i:Datacenter/vm/WinXP /h:vc2 /u:admin /s:secretv
```

NOTE ESX/ESXi path names are case-sensitive.

To unmount the J: drive, if not in use

Use the `/d` option:

```
vmware-mount J: /d
```

To mount a specific volume from a virtual disk

List the volume partitions, then decide which to mount:

```
vmware-mount "C:\My Virtual Machines\WindowsXP\WindowsXP.vmdk" /p
vmware-mount J: "C:\My Virtual Machines\WindowsXP\WindowsXP.vmdk" /v:2
```

To list the currently mounted virtual disks

Use the `/L` option, with sample output shown below:

```
vmware-mount /L
Currently mounted volumes:
J:\  =>  C:\My Virtual Machines\WindowsXP\WindowsXP.vmdk
K:\  =>  [storage1]WindowsXP2/WindowsXP2.vmdk
```

To unmount a virtual disk so virtual machines can access it again

Using drive letters from the examples above, type:

```
vmware-mount J: /d
vmware-mount K: /d
```

About the Inventory Path

On an ESX/ESXi host with the `/i` option, specify `InventoryPath` as:

```
/i:ha-datacenter/vm/<VMpathname-as-read from-inventory-tree-in-VC-client-UI>
```

On VMware vCenter with the `/i` option, specify `InventoryPath` as:

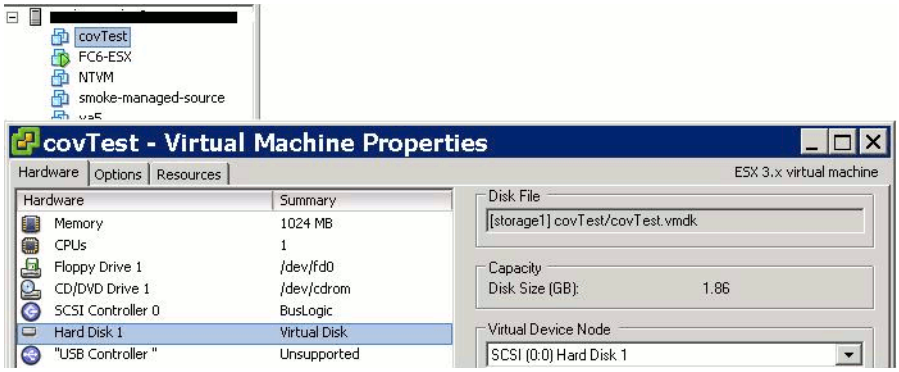
```
/i:<Path-to-datacenter>/vm/<VMpathname-as-read from-inventory-tree-in-VC-client-UI>
```

The path to your datacenter is as read from the tree display in the VMware vCenter UI.

Formulating the ESX Inventory Path

Connect to an ESX/ESXi host, select a virtual machine, in this case `covTest`, and right-click **Edit Settings** or click **Summary > Edit Settings**. A properties dialog box appears for the virtual machine, as shown in Figure 1.

Figure 1. VMware vSphere Client on an ESX/ESXi host



On any ESX/ESXi host, `ha-datacenter` is the datacenter name. You see this in the Managed Object Browser at https://<esx-hostname>/mob/?moid=ha-datacenter. To formulate the inventory path, append `/vm` followed by the virtual machine name as it appears where you selected it in the VMware vSphere Client. To obtain the path to virtual disk, select disk in the hardware summary, and read the **Disk File** text box.

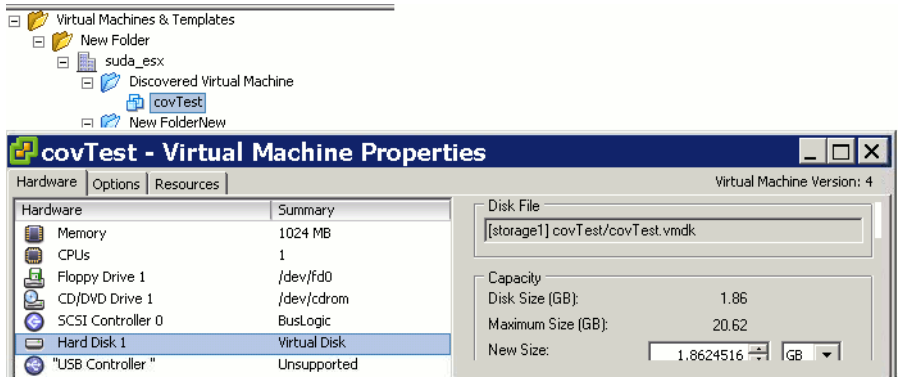
This command mounts the virtual disk file `covTest.vmdk` on Windows drive letter Q:

```
vmware-mount Q: /v:1 /i:"ha-datacenter/vm/covTest" "[storage1] covTest/covTest.vmdk"
             /h:esx35.example.com /u:root /s:secretpw
```

Formulating the VMware vCenter Inventory Path

Connect to a VMware vCenter server, set display mode to **Virtual Machines & Templates**, select a virtual machine, in this case `covTest`, and right-click **Edit Settings** or click **Summary > Edit Settings**. A properties dialog box appears for the virtual machine, as shown in Figure 2.

Figure 2. VMware vSphere Client on a VMware vCenter Server



On VMware vCenter, the datacenter name starts under **Virtual Machines & Templates** and continues until the blue folders. In this case it is `New Folder/suda_esx`. You can rename and reorganize folders, so datacenter names can vary. To formulate the inventory path, append `/vm` to the datacenter name, followed by the virtual machine name as it appears where selected. To obtain the path to virtual disk, select disk in the hardware summary, and read the **Disk File** text box.

This command mounts the virtual disk file `covTest.vmdk` on Windows drive letter Q:

```
vmware-mount Q: /v:1 /i:"New Folder/suda_esx/vm/Discovered Virtual Machine/covTest"
             "[storage1] covTest/covTest.vmdk" /h:vc.example.com /u:Administrator /s:adminpw
```

Running VMware Disk Mount on a Linux Host

To run Disk Mount, open a command terminal on a Linux host. Disk Mount installs in `/usr/bin` by default, so you can type just **`vmware-mount`** to display usage information. Many mount operations require root (`su -`) or superuser (`sudo`) permission.

VMware Disk Mount for Linux offers two modes for mounting disks:

1 You can mount a specific partition of a virtual disk, either local or remote.

   The command syntax for mounting a specific partition is as follows (default `partitionNumber` is `1`):

   ```
   vmware-mount /path/to/disk [partitionNumber] /mount/point
   ```

2 You can mount a flat-file representation of an entire virtual disk.

   The command syntax for mounting a flat-file representation is:

   ```
   vmware-mount -f /path/to/disk /mount/point
   ```

Disk Mount includes a number of other options to use with virtual disks and mount points. The command syntax for most options is either of the following:

```
vmware-mount [option] [/path/to/disk]
vmware-mount [option] [/mount/point]
```

NOTE VDDK 1.2 has international support so you can specify paths and filenames in Unicode.

In the following list of options, `<diskID>` is an identifier of the form `username@hostname:/path/to/disk` for remote disks, or just the `/path/to/disk` for local disks. Options that mount a remote disk also require the `-h`, `-u`, `-F`, and possibly `-v` options. The `-v` option is required when connecting to VMware vCenter.

Option	Definition
<diskID> <mountPoint>	Mounts
`-p <diskID>`	Displays the partitions on a virtual disk.
`-l <diskID>`	Displays all mounted partitions a virtual disk.
`-L`	Displays all virtual disks mounted on the host computer.
`-d <mountPoint>`	Cleanly unmounts this partition, closing disk if it is the last partition.
`-f <diskID> <mountPoint>`	Mounts a flat-file representation of an entire virtual disk at the specified mount point.
`-k <diskID>`	Unmounts all partitions on a virtual disk and closes the virtual disk.
`-K <diskID>`	Forcibly unmounts all partitions on a virtual disk and closes all virtual disks.
`-x`	Unmounts all partitions and closes all virtual disks.
`-X`	Forcibly unmounts all partitions and closes all virtual disks.

The options for remote virtual disks are:

Option	Definition
-v InventoryPath	Specifies inventory path on the VMware vCenter that manages this virtual disk
`-h HostName`	Specifies the name or IP address of the ESX host to access the managed virtual disk.
`-u UserName`	Specifies user name for the ESX host.
`-F PasswordFile`	Specifies the path name to a plain text file containing the password for the ESX host.
`-P Port`	Specifies the port number for server connections. Defaults to `902` and is often optional. When connecting to an ESX host or through VMware vCenter, the actual port number comes back from the server. If zero (0), the `-P` specified port number is used instead.

Log File

On Linux the diagnostic log files for each <user> who ran vmware-mount are located here:

/tmp/vmware-<user>/fuseMount.log

Examples Using VMware Disk Mount on a Linux Host

Following are some examples that illustrate how to use Disk Mount on a Linux host.

To show the partitions on a local virtual disk

Assuming directory /vmware/guest and virtual machine RHEL4, type this command, which produces the following output:

```
vmware-mount -p /vmware/guest/RHEL4/RHEL4.vmdk
Volume  1 :      102 MB, Linux
Volume  2 :    19862 MB, Linux
Volume  3 :      510 MB, Linux swap
```

To mount a partition from a local virtual disk

To mount the second partition from above, type this command:

```
vmware-mount /vmware/guest/RHEL4/RHEL4.vmdk 2 /mnt/rhel4
```

To mount a remote virtual disk

Type a command in this form, where <VMname> is the guest OS name, <inv> is the inventory path, <srv> is an ESX/ESXi host or vCenter, <user> is a privileged user, and <pfile> is a file containing the user's password:

```
vmware-mount -v <inv> -h <srv> -u <user> -F <pfile> "[storage1] <VMname>/<VMname>.vmdk" /mount/pt
```

Here are two examples, connecting to an ESX/ESXi host and through VMware vCenter:

```
vmware-mount -v ha-datacenter/vm/RH5 -h esx3 -u root -F pwf "[storage1] RH5/RH5.vmdk" /mnt/rh5
vmware-mount -v Datacenter/vm/RH5 -h vc2 -u admin -F pwf "[storage1] RH5/RH5.vmdk" /mnt/rh5
```

NOTE ESX/ESXi path names are case-sensitive.

To mount a flat representation of a virtual disk

Use the -f option:

```
vmware-mount -f /vmware/guest/SUSE10/SUSE10.vmdk /mnt/suse10
```

To list the currently mounted virtual disks

Use the -L option, with sample output shown below:

```
vmware-mount -L
Disks with mounted partitions:
/vmware/guest/RHEL4/RHEL4.vmdk   partition2   /mnt/rhel4
root@esx3.example.com:[storage1]RHEL5/RHEL5.vmdk /mnt/rhel5
/vmware/guest/SUSE10/SUSE10.vmdk             /mnt/suse10/flat
```

To unmount a virtual disk so virtual machines can access it again

You can use the -d option and supply a mount point:

```
vmware-mount -d /mnt/rhel4
```

You can also use the -k option and supply a disk ID:

```
vmware-mount -k root@esx3.example.com:[storage1]RHEL5/RHEL5.vmdk
```

You may also use the -x or -X option to unmount, or force-unmount, all partitions.

About the Inventory Path

On an ESX/ESXi host with the `/i` option, specify `InventoryPath` as:

```
/i:ha-datacenter/vm/<VMpathname-as-read from-inventory-tree-in-VC-client-UI>
```

On VMware vCenter with the `/i` option, specify `InventoryPath` as:

```
/i:<Path-to-datacenter>/vm/<VMpathname-as-read from-inventory-tree-in-VC-client-UI>
```

The path to your datacenter is as read from the tree display in the VMware vCenter UI.

Formulating the Inventory Path

For help with the inventory path on ESX/ESXi hosts or with vCenter Server, see "Formulating the ESX Inventory Path" on page 10 or "Formulating the VMware vCenter Inventory Path" on page 10.

Installing the Fuse Package

Fuse (file system in user space) is a loadable kernel module for UNIX operating systems. It allows regular (non-root) users to create and access their own file systems. The file system code runs in user space, while the Fuse module provides a bridge to the actual kernel mount interfaces. Fuse was merged into mainstream Linux in kernel version 2.6.14. For earlier versions of Linux, you might need to install it.

To check if your system has Fuse

Run the `modprobe -l` command:

```
modprobe -l fuse
/lib/modules/2.6.22-14-generic/kernel/fs/fuse/fuse.ko
```

If the second line showing `fuse.ko` appears, stop.

If no output appears, proceed to one of the sections below.

To install Fuse with APT

On Linux systems that use APT installer, obtain the Fuse package as follows:

```
sudo apt-get install fuse-utils
```

Now you can run the `vmware-mount` command as described in this manual.

To install Fuse from the Web

1. Download Fuse software from the http://fuse.sourceforge.net Web site.
2. Unpack the software and change to the unpacked directory:

   ```
   tar -zxf <FusePackage>.tar.gz
   cd <FusePackage>
   ```

3. Configure the makefile for your system and run `make` to compile it:

   ```
   ./configure
   make
   ```

4. As superuser, install the package (this puts it in `/usr/local/lib`):

   ```
   sudo make install
   ```

5. If `/usr/local/lib` is not listed in `/etc/ld.so.conf` or an included file, insert a line for it and run the `ldconfig` command. Alternatively, modify your `LD_LIBRARY_PATH` environment.

   ```
   sudo edit /etc/ld.so.conf
   sudo ldconfig
   ```

6. To mount a remote virtual disk with the `-v` and `-h` options, if `/usr/lib/vmware-vix-disklib/lib64` or `/usr/lib/vmware-vix-disklib/lib32` (depending on remote virtual machine architecture) is not listed in `/etc/ld.so.conf` or an included file, insert a line for it and run the `ldconfig` command, as in the previous step.

7 Run the `modprobe` command to insert Fuse module into the kernel:

```
sudo modprobe fuse
```

Now you can run the `vmware-mount` command as described in this manual.

SSL and Crypto Libraries

On some distributions, especially 64-bit Linux, `vmware-mount` might produce an error saying "failed to load library libcrypto.so.0.9.8 [or] libssl.so.0.9.8... cannot open shared object file."

Fuse mount requires these libraries, but does not install them.

If vmware-mount complains about missing libraries

To avoid this problem, add the location of the missing libraries to your `LD_LIBRARY_PATH` environment, as in this example, and run `vmware-mount` again:

```
export LD_LIBRARY_PATH=${LD_LIBRARY_PATH}:/usr/local/lib:
   /usr/local/lib/vmware/lib/libcrypto.so.0.9.8:/usr/local/lib/vmware/lib/libssl.so.0.9.8
ldd /usr/bin/vmware-mount
vmware-mount
```

The first two lines constitute a single command, so type Enter only after 0.9.8. The `ldd` command is diagnostic, to verify dependencies.