

File Level Restore

VMware Data Recovery 1.0

Introducing File Level Restore

VMware Data Recovery is a backup and restore solution that protects entire virtual machines. These backup and restore operations are conducted using a backup appliance which stores the virtual machines to a location called the deduplication store. The virtual machines that are backed up are stored in a form that can be read by Data Recovery, but the contents of these virtual machine backups are not otherwise easily readable. For example, the contents of the virtual machine backups in the deduplication store are not readable by users browsing through files using their operating system. There is no convenient mount point that operating systems can use to read the contents of these backups.

Users may want to restore a version of a single file that was backed up using Data Recovery. Perhaps the file has been deleted or information from a previous version is required. In such a case, users can restore an entire previous version of the virtual machine that contained the file, but this may be cumbersome. Rolling back to previous versions may overwrite the existing virtual machine and even if the restored virtual machine is restored to an alternate location, the process may not be as fast as desired.

File Level Restore (FLR) addresses these issues by providing a way to access individual files within a restore point. This access makes it possible to read copies of files or restore them from within restore points to any other available location. For example, FLR makes it possible to create two copies of a file so the versions could be compared, or FLR could overwrite an existing file with an older version contained in the restore point, effectively reverting to a previous version.

Note that using FLR to access files in restore points only provides a way to read their contents. You cannot use FLR to modify the contents of a restore point.

FLR is an experimental feature that is not fully supported at this time. While every effort has been made to ensure high quality, this release of FLR has not been subjected to the complete testing and review provided to fully supported features.

Installing FLR

FLR is supported for use on virtual machines with the following operating systems:

- Windows XP
- Windows Server 2003
- Windows Vista
- Windows Server 2008

For this release, FLR is not for use on UNIX virtual machines.

To install FLR, copy `vdrFileRestore.exe` to any location on the virtual machine with the files to be restored. All files required for FLR to function as expected are contained within the `vdrFileRestore` executable. For example, if you were going to restore a file on the virtual machine named `MY_VM`, you could start the virtual machine named `MY_VM`, create a directory called `FLR` on the virtual machines `C:\` drive and then copy `vdrFileRestore.exe` to `C:\FLR`. Note that FLR cannot be used to restore files for virtual machines other than the virtual machine on which the executable is present. When you invoke the `vdrFileRestore.exe`, any changes required to use FLR are completed automatically. For more information on changes that occur when `vdrFileRestore.exe` is invoked, see [“Understanding FLR.”](#)

Using FLR

When using FLR, users typically select one of the provided restore points for the current virtual machine and then unmount the restore point when finished. FLR connections must be established using an IP address. FLR does not support using name resolution services such as DNS for establishing connections.

To Access Files on a Restore Point

- 1 Log on to the virtual machine to which you are restoring files.
- 2 Open a command prompt. For example, in a Windows XP virtual machine, click **Start > Run**, enter `cmd`, and click **OK**.
- 3 Use the `vdrFileRestore.exe` to specify the IP address for the Data Recovery backup appliance that manages the restore points that contain the files to be restored. FLR does not work with DNS names, so you must provide an IP address. For example, to see all available restore points on the appliance with the IP address `10.20.20.80`, you would enter:

```
C:\FLR>vdrFileRestore.exe -a 10.20.20.80
```

This command could return output such as follows:

```
0: Restore point
Date: "Sat May 16 12:48:39 2009"
1: Restore point
Date: "Sun May 10 23:48:16 2009"
2: Restore point
Date: "Sat May 09 22:12:06 2009"
Please input restore point to mount from list above
```

- 4 Enter the number for the desired restore point. For example, you might enter 1.

`vdrFileRestore` opens and mounts the disks contained in the selected restore point. An example of returned output could be:

```
Opening disk "TST_XP.vmdk"...
Opening disk "TST_XP_1.vmdk"...
Mounting disk "TST_XP.vmdk"...
Mounting disk "TST_XP_1.vmdk"...
All disks have been mounted, they are...
"\TEST-VM\LOC\host\esxhost006.tst.sample.com\Resources\TST_XP"
"H" <- "TST_XP.vmdk"
"I" <- "TST_XP_1.vmdk"
```

You can now browse the contents of the disks for the selected restore point and copy files to the currently running virtual machine, as desired. The disks are displayed as mapped drives that can be browsed using tools such as Windows Explorer. When you have completed any required tasks with the contents of any mounted restore points, close the connection that `vdrFileRestore` has established with the restore point by entering `unmount` at the command prompt. After issuing this command, all disks are unmounted and closed and `vdrFileRestore.exe` cleans up any remaining files it has created for its own functioning.

You can access the most recent restore point using `vdrFileRestore.exe` using the `--last` option.

To Access Files on the Most Recent Restore Point

- 1 Log on to the virtual machine to which you are restoring files.
- 2 Open a command prompt. For example, in a Windows XP virtual machine, click **Start > Run**, enter `cmd`, and click **OK**.
- 3 Use the `vdrFileRestore.exe` to specify the IP address for the Data Recovery backup appliance that manages the restore points that contain the files to be restored. For example, to access files on the most recent restore points on the appliance with the IP address 10.20.20.80, you would enter:

```
C:\FLR>vdrFileRestore.exe -l -a 10.20.20.80
```

The disks for the most recent restore point for the current virtual machine are opened and mounted. Enter the `unmount` command when finished.

Understanding FLR

When the `vdrFileRestore` executable is invoked from the command line, all files required to complete file level restores are extracted from the executable and placed in the same directory. Similarly, when the `unmount` command is issued, ending the `vdrFileRestore` session, not only are all connections with restore points closed, but all files that were extracted are removed from the system.

When FLR starts, it establishes a connection with the Data Recovery backup appliance. FLR uses the publicly available functionality provided by VMware's Virtual Disk Development Kit (VDDK) to access information about the contents of restore points. FLR determines the unique BIOS identifier for the virtual machine on which its running and then searches for restore points with that same identifier. A list of restore points for the current machine is returned to FLR, and users can determine which restore point to work with.

After a restore point is selected, all applicable disks are displayed as mapped drives. Users can browse the contents of the vmdk disk files for the restore point for the virtual machine. Any files on the disk files for the selected restore point can then be copied to a location of the user's choosing.

After all desired file level restore operations have been completed, exit the tool using the `unmount` option. When the `unmount` option is used, `vdrFileRestore.exe` removes all drive mounts from the virtual machines file system. Finally, all files that were extracted to enable `vdrFileRestore` functionality are removed. Note that if `vdrFileRestore` exits unexpectedly, previously extracted files are not removed. The number and size of files is not significant, so if an unexpected exit occurs, it is not imperative to clean up the files that remain. Upon the next use of the executable, any files that were left behind are used, and when subsequent sessions are ended, these residual files are removed from the system.