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ServerSafe Remote Backup and VMWare Servers

Backup of ESX and GSX Servers

It is now possible to backup a virtual machine from the "host" side. This unique solution offers the advantage of an "image" backup, combined with the advantages of the ServerSafe backup solution.

NetMass
8/14/2007

Backup of VMWare (host-side backup)

Creation Date: October 25, 2005

Revision Date: January 18, 2007

Product: DS-Client

Introduction

The DS-Client normally performs backup of virtual machines from the "guest" side, treating them like any other Windows or Linux computer. However, it is possible to backup a virtual machine from the "host" side. This unique solution offers the advantage of an "image" backup, combined with the advantages of the ServerSafe Backup solution (e.g. incremental backup, common file elimination, off-site backup, etc.). Host-level backup and restore of a virtual machine refers to a backup of the files that make up the virtual machine (the guest OS is not involved in the backup and restore operation).

ServerSafe Backup supports host-level backup and restore of:

- VMWare ESX Server 2.5.x and 3.x virtual machines running any operating system. (See "Backup of VMWare (ESX Server host-side backup) on page 330.)
- VMWare GSX Server 3.1.x virtual machines running any operating system.(See Backup of VMWare (GSX Server host-side backup) on page 332.)

Advantages

- Incremental backup: The initial backup operation saves all the files that make up the virtual machine. Subsequent backups are incremental backups on both the file level (only new or changed files are backed up) and on the block level (only changed or new blocks of data are backed up).
- Agentless architecture: There is no need to install software agents on the ESX/GSX server, or the virtual machines.
- The virtual machines can run any operating system supported by VMWare.
- Their operating systems are not involved in the backup or restore operations.
- Virtual machines can be running, or they can be turned off during the backup operation.
- Multiple generations of virtual machines: Asigra software can be configured to backup multiple generations of a virtual machine.
- Common files elimination: Only one instance of identical files is stored at the remote backup location.
- Compression and encryption of backed up data.

Backup of VMWare (ESX Server host-side backup)

Backup requirements

The VMWare ESX Server (2.5.1 or 3.x) must be configured for the host-side backup and restore.

Step 1. Update Perl

Backup of VMWare virtual disks of a size greater than 2GB is not possible if Perl (which is installed on the ESX server 2.5.1 and 3.x) is not compatible with large files. To check the compatibility, run the following command on the ESX server:

```
perl -V
```

Check the output for the “uselargefiles” variable. If this variable is undefined, you must update Perl to the version 5.8.1 or higher. In order to do this, go to the web site www.activestate.com and download the latest release. Next, run the following commands:

```
rpm -ivh updatefile.rpm
```

```
/opt/updatefile/bin/perl
```

```
mv /usr/bin/perl /usr/bin/perl.old
```

```
ln -s /opt/updatefile/bin/perl /usr/bin
```

Note: in the above examples, replace updatefile with the name of the downloaded file, e.g. ActivePerl-5.8.7.813-i686-linux-22.17-gcc-148120.

Step 2. Configure the vmware-cmd file

After the Perl upgrade, the vmware-cmd command may no longer work since it is not compatible with the new Perl. You will, however, need this command in order to register restored virtual machines. To fix this problem, go to the /usr/bin/ directory and edit the vmware-cmd file as well as the vmware*.pl files in this directory; change the first line in each file to refer to the old Perl installation (replace “#!/usr/bin/perl” with “#!/usr/bin/perl.old”). Run vmware-cmd without parameters to verify that it works.

How to make an ESX host-side backup set

Follow these steps in order to make a host-side backup of a Virtual Machine:

1. Using a Linux DS-Client, create a file-system backup set containing the configuration file (*.vmx), log files (*.log) and the nvram file.

In ESX server 2.5.1: These files are located in a subdirectory of /root/vmware.

In ESX server 3.x: These files are located in the same location as the virtual disk file, which is located in a subdirectory of /vmfs

The virtual disk (or disks): They are located in a subdirectory of /vmfs.

2. Make sure one of the following is true:

- The virtual machine being backed up is turned off, or
- The virtual disks are in the undoable mode, or
- The virtual disks are in the nonpersistent mode, or
- The virtual disks are in the append mode

3. When creating the backup set, make sure that the "Backup ACL" option is turned on (you can find this option in the backup items options).

Note 1: if a virtual disk is in the persistent mode, the backup operation will not be successful.

Note 2: if you fail to backup ACL, you will have to manually restore the attributes of the .vmx file in order to start the restored virtual machine.

Note 3: if the ESX server does not allow remote logon of the administrative user account necessary to perform backup/restore, you can create a host-side backup set that connects with a regular user account, and then uses the "sudo" option (Backup Set Properties > Connection Options).

How to backup an ESX host-side backup set

1. Run the backup set as you normally would.

2. When finished, check the DS-Client event log for errors. Make sure all the Virtual Machine files were backed up without errors.

How to restore an ESX host-side backup set

1. Restore the files that make up the virtual machine.
2. If your Virtual Machine is still registered (this can happen if your virtual disks were destroyed, but the Virtual Machine registration was not removed), you do not have to perform this step. However, if your Virtual Machine is no longer registered (and as a result, it does not appear in the VMWare status monitor), you must register it running the following command on the ESX server:

```
vmware-cmd -s register "path-to-vmx-file"
```

Note: in the above command line, replace path-to-vmx-file with your path to the vmx file, e.g.:

```
vmware-cmd -s register "/root/vmware/suzelinux/suzelinux.vmx"
```

Disaster Restore of an ESX server

Bare Metal Restore of the ESX 2.5.1 or 3.x Server running on RedHat Linux is not supported. If you have lost your server in a disaster, follow these steps:

1. Install the VMWare ESX Server from you installation CD on a new computer.
2. Configure the ESX server for host-side backup and restore as described above.
3. Restore the Virtual Machine files (directories /root/vmware and /vmfs).
4. Register the restored Virtual Machines using the vmware-cmd command.
5. If you installed the ESX server on a different hardware, you may want to fine-tune the Virtual Machines (e.g. if the new hardware has a different amount of RAM, you may want to assign a different amount of RAM to each virtual machine etc.).
6. Start the Virtual Machines.

Backup of VMWare (GSX Server host-side backup)

Backup and Restore support

In the simplest case, you can backup the directory of the VMWare machine as a normal file system backup set. This approach, however, is only possible if the virtual machine is not running. If the VMWare machine to backup is running, you may encounter unpredictable results. Therefore, you should suspend the virtual machine before the backup operation, perform the (incremental) backup operation, and then resume the virtual machine. If your GSX server virtual machine must be running during the backup operation, you cannot suspend it. You can, however, use another solution: Change the mode of the virtual disk to nonpersistent. The following examples demonstrate the suspend method.

Configure batch files to suspend and resume a Virtual Machine

To automatically suspend and resume a VMWare machine, you can use the DS-Client's Pre/Post feature. The following sample batch files: "suspend.bat" and "resume.bat" demonstrate this solution. The "suspend.bat" file uses a sample script provided by the VMWare Scripting API. The script "suspend.pl" is normally located in "C:\Program Files\VMware\VMware VmPerl Scripting API\SampleScripts".

These are the contents of the "suspend.bat" file:

c:

```
cd "\Program Files\VMware\VMware VmPerl Scripting API"
```

```
perl samplescripts\suspend.pl "C:\Virtual Machines\Windows 2000 Advanced Server\win2000AdvServ.vmx"
```

Note: You must modify the above according to your path and configuration file name. VMWare did not provide a sample script to resume a suspended virtual machine. A "resume.pl" script can be created by modifying the following lines of the "suspend.pl" script:

```
if ($curState == VM_EXECUTION_STATE_ON) {  
    print "Can only start a Virtual Machine which is not running.\n";  
} else {  
    # Resumes the suspended Virtual Machine.  
    if (!$vm->start()) {  
        my ($errorNumber, $errorString) = $vm->get_last_error();  
        print "Could not resume: Error $errorNumber: $errorString\n";  
    }  
}
```

Once you have modified the script, create the "resume.bat" file:

c:

```
cd "\Program Files\VMware\VMware VmPerl Scripting API"
```

```
perl samplescripts\resume.pl "C:\Virtual Machines\Windows 2000 Advanced Server\win2000AdvServ.vmx"
```

How to make a GSX host-side backup set

Create a backup set that performs the following steps:

1. Use the "suspend.bat" file as the Pre-command: "C:\Program Files\VMware\VMware VmPerl Scripting API\SampleScripts\suspend.bat" (Use the "Delay backup" checkbox to make sure the Virtual Machine is suspended when the backup starts.)
2. Backup the virtual machine files as a file system backup set.
3. Use the "resume.bat" file as the Post-command: "C:\Program Files\VMware\VMware VmPerl Scripting API\SampleScripts\resume.bat"