

XenServer Pool Replication: Disaster Recovery

Summary

This article describes how to use Citrix XenServer to provide an easy-to-configure Disaster Recovery (DR) environment when using a Network-attached Storage (NAS) or Storage Area Network (SAN) storage solution. This enables organizations to increase the availability of their XenServer environment and restore (virtual) production systems quickly.

Introduction

From an architectural point of view, a XenServer virtual machine (VM) consists of two components: *metadata* describing the virtual machine environment, and the *virtual disk image* (VDI) that is being used by the virtual machine. The VM metadata is stored in a small database on the XenServer host, and the virtual disk images are stored on the configured Storage Repository, which in multiple-host deployments will be a NAS or SAN device.

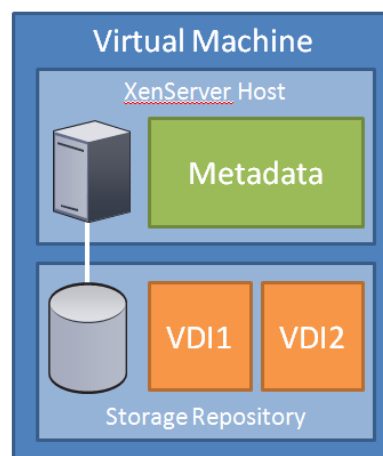


Figure 1: Conceptual overview of Virtual Machine data locations

To provide effective DR, the metadata and the virtual disk images must be replicated from the production environment to a DR environment. This is easily accomplished by exporting the metadata from the production environment, and importing this data into the DR environment.

In XenServer 4.1, the export process creates a lightweight XML file that contains all VM metadata and can be copied from server to server, or opened or edited with a standard viewer. XenServer 5.0 dramatically simplifies the metadata export/import process. In XenServer 5.0, exporting metadata creates a new VDI on the Storage Repository that contains all the information about your virtual machines. Additionally, XenServer 5.0 allows for automated scheduling of metadata exports, ensuring that the most recent VM metadata is available at your DR site.

For both releases, the replication of the virtual disk images is best handled by the storage solution – this will vary from device to device, but any real-time or scheduled replication system will suffice. Examples include NetApp’s SnapMirror technology or DataCore’s SanMelody replication features.

The *Backup VDI* created by the XenServer 5.0 export process can be replicated to the Disaster Recovery site together with the virtual machine VDIs. The following illustrations show the difference between XenServer 4.1 and 5.0:

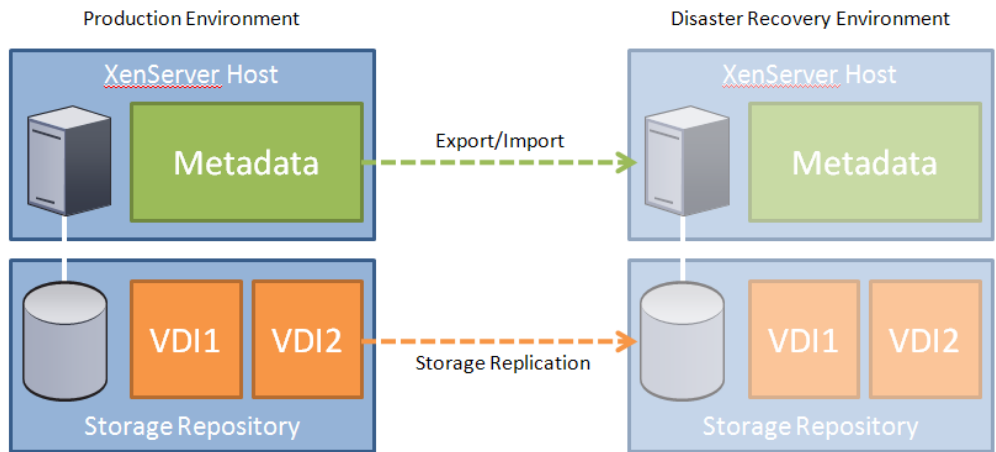


Figure 2: Conceptual overview of XenServer 4.1 disaster recovery

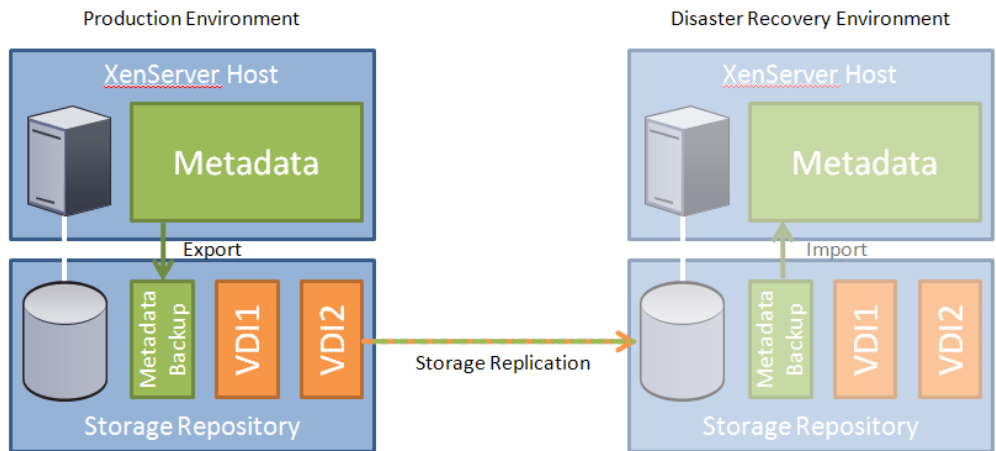


Figure 3: NEW: Conceptual overview of XenServer 5.0 disaster recovery

Understanding VM Metadata

The metadata for a VM contains information about the VM (such as the name, description, and Universally Unique Identifier (UUID)), VM configuration (such as the amount of virtual memory and the number of virtual CPUs), and information about the use of resources on the host or Resource Pool (such as Virtual Networks, Storage Repository, ISO Library, and so on). Most metadata configuration data is written when the VM is created and is updated if you make changes to the VM configuration. This means that it is not always necessary to perform daily exports of all the VM metadata. Adding a metadata export command to your change-control checklist will ensure that this information is available if needed.

XenServer 5.0 Pool Replication

Exporting Metadata

In XenServer, exporting or importing metadata can be done from the new text-based console menu. On the physical console this console menu is loaded by default. To start the console menu through the host console screen in XenCenter, type **xsconsole** from the command line.

To export the VM metadata:

1. Select **Backup, Restore and Update** from the menu.
2. Select **Backup Virtual Machine Metadata**.
3. If prompted, log on with root credentials.
4. Select the Storage Repository where the VMs you want to back up are stored.
5. After the metadata backup is done, verify the successful completion on the summary screen.
6. In XenCenter, on the **Storage** tab of the SR selected in step 3, a new VDI should be created named **Pool Metadata Backup**.

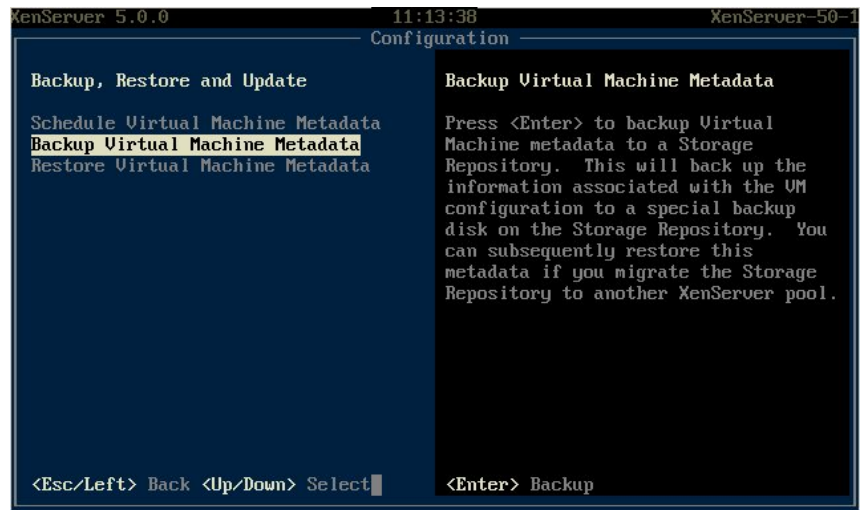


Figure 4: *Backup, Restore and Update* option in the Console Menu

Importing Metadata

A prerequisite of running the import command in your DR environment is that you set up/re-attach the Storage Repository on which the replicated virtual disk images are located. Also make sure that your Virtual Networks are set up correctly by using the same names in the production and DR environment.

After the SR is attached, we are ready to restore the metadata backup. From the console menu:

1. Select **Backup, Restore and Update** from the menu.
2. Select **Restore Virtual Machine Metadata**.
3. If prompted, log on with root credentials.
4. Select the Storage Repository to restore from.
5. Select the Metadata Backup you want to restore.
6. Select if you want to restore only VMs on this SR or all VMs in the pool.
7. After the metadata restore is done, verify the summary screen for errors.
8. Your VMs are now available in XenCenter and can be started at the new site.

```

XenServer 5.0.0                               11:53:17                               root@XenServer-50-1
----- Configuration -----
Bac
Sch
Bac
Res
Metadata Restore Succeeded: efa032e7-34ec-f14e-be66-2d89fb540855
5b831123-01e1-a937-27e4-24cd965d93f0
83932448-81b2-96e7-e2ee-4fcac9bd3f5f
34b8bacf-6a40-ceba-12bf-a801084d0d79
71e6edaf-96a3-6f60-b1ce-d733a1c3d45d
6b34ef9a-ef80-c32f-c641-01fe82b9b46a
b67cbd6d-ca21-7eac-def7-554a7fc59722
Setting SR (990e8ffe-eacd-6467-fe2b-94e5388e5816):
  Name: iSCSI virtual disk storage
  Description: iSCSI SR [192.168.200.6
  (iqn.1992-08.com.netapp:xen-s500)]
Setting VDI (27e7ce54-fa3c-4efb-9504-bed2a7782a3e):
  Name:
  Description:
<Enter> OK <Page Up/Page Down> Scroll
<Esc/Left> Back <Up/Down> Select          <Enter> Backup

```

Figure 5: Restore Summary Screen

For more details on prerequisites and how to work with multiple Storage Repositories refer to the **Full metadata backup and disaster recovery** section in the *XenServer Administrator's Guide*.

Scheduled Metadata Backups

The third option available from the console menu is **Schedule Virtual Machine Metadata**. This option allows you to automate the export of metadata on a daily, weekly, or monthly basis. By default this option is disabled, which would require to do the backup manually, for example as part of a change management procedure.

XenServer 4.1 Pool Replication

Exporting Metadata

Exporting and importing metadata is a simple process. To export, run the **xe vm-export** command from the XenServer Command Line Interface (CLI) with additional parameters.

To export the metadata for a single VM, the command is:

```
#xe vm-export filename=<filename> uuid=<uuid of vm to export>
metadata=true
```

To export the metadata for all VMs within the resource pool, the command is:

```
#xe vm-export filename=<filename> --multiple metadata=true
```

This command generates a numbered list of files called **filename**, **filename2**, **filename3**, and so on, that can be copied and imported to the DR environment.

Once the export process finishes, you can transfer the files from the host on which the export was performed to a location in the DR environment. The metadata export takes only a few seconds for each virtual machine.

Importing Metadata

Importing metadata is slightly different from exporting because XenServer only allows importing of one machine's metadata at a time.

A prerequisite of running the import command in your DR environment is that you setup/re-attach the Storage Repository on which the replicated virtual disk images are located. After the SR is attached, simply import the metadata files. If the Storage Repository is set as the default, the following CLI command can be run from the XenServer host to where the exported files were transferred to:

```
#xe vm-import filename=<filename> metadata=true
```

If the above-described Storage Repository it is not set as the default, you also need to include the UUID of the Storage Repository:

```
#xe vm-import filename=<filename> sr-uuid=<uuid for SR with
replicated VDIs> metadata=true
```

After this, the VMs will be available in the XenCenter console in a halted state in your DR environment; they only need to be started.

Scripting and Automation Opportunities

Using basic Windows or Linux scripting tools, it is possible to automatically import and export your VM metadata, and even automatically copy these XML files between your production and DR sites. You can create scheduled tasks (cron jobs) to automatically export and import this data on a regular basis. Note that **xe** commands can be sent from either the XenServer console or the XenCenter workstation.

Example 1: To import multiple metadata files into a pool:

```
# importscript.sh
#
# Imports multiple numbered VM Metadata files
#
# Usage: ./importsript.sh filename
#
#
echo Importing $1
xe vm-import filename=$1 metadata=true
i=2
while [ -f $1$i ]
do
    echo Importing $1$i
    xe vm-import filename=$1$i metadata=true
    i=`expr $i + 1`
done
```