

Microsoft VSS-Consistent Snapshots for Exchange Servers

***Using FlashDisk VX-3400 Series Disk Arrays
and FlashDisk Global Manager***

Snapshot Technology Streamlines Backup Operations

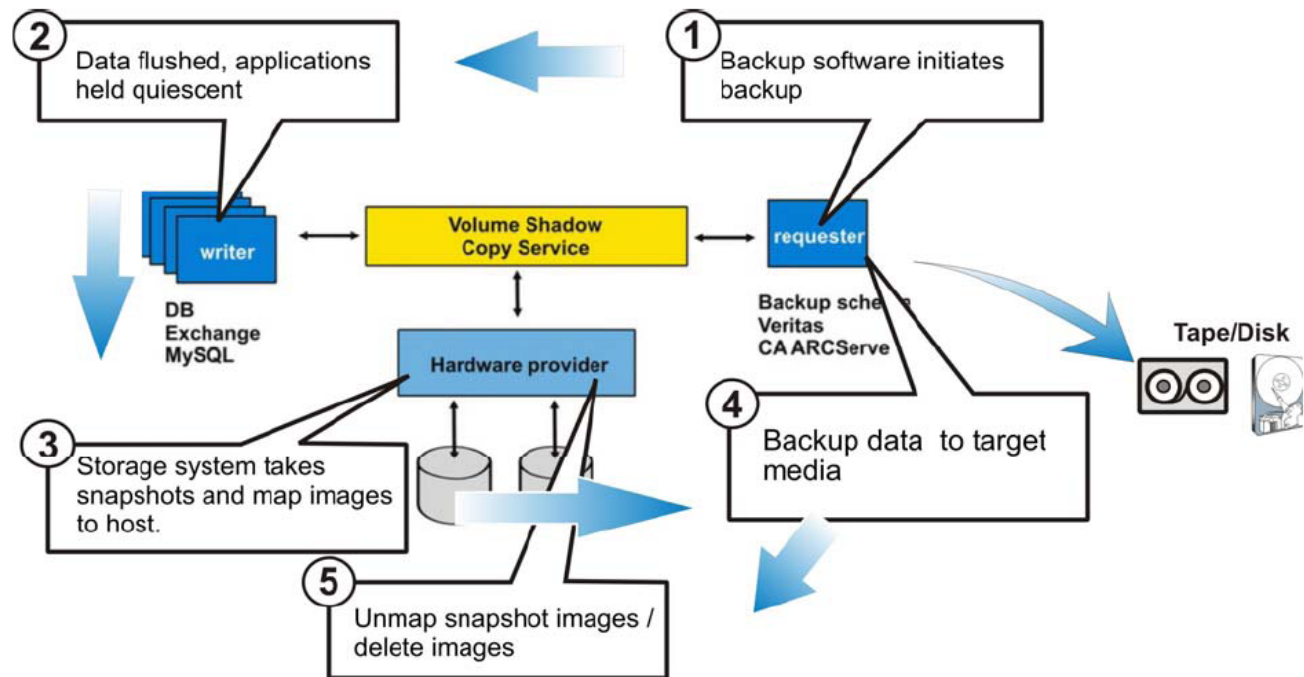
Downtime and loss of data are two of the most intimidating threats to business operation. Besides unpredicted profit loss and restoring efforts, they may even lead to legal issues. To achieve business continuity and data protection, how to do efficient backup and recovery is both a necessary concern and an unavoidable challenge. Before the invention of snapshot technology, traditional backup and recovery operations (full backup/full restore) suffer from some common annoyances, such as the difficulty of backing up running applications, prolonged backup time, lengthy recovery procedures, poor application server performance during backups, and rapidly consumed capacity. Snapshot technology efficiently addresses these problems by enabling the creation of point-in-time copies. These copies keep only data differentials, so they can be created in a few seconds, exert almost no influence on the application server performance, and occupy little disk space. When a snapshot image is taken, host I/O is temporarily held; therefore, these copies are also quite reliable. The impact to the live application is reduced to the few-second suspension of I/O. When a full backup is necessary, the backup server will take over the task of copying the snapshot data to backup media, thus allowing application servers to concentrate on application operations.

Microsoft VSS Solves Compatibility Issues

As illustrated above, snapshots prove to be a great help of streamlining backup operations; however, to make use of its capability requires integrating it with the backup software, the applications, and the storage systems to be backed up. Compatibility issues between vendors are the main problem interfering with the integration. In the past, IT managers solved this problem by using scripts to enable the coordination of the three elements. Finding that scripts are difficult to create and maintain for long-term proper operation, Microsoft built a technology in Windows Server 2003 named Volume Shadow Copy Service (VSS). VSS serves as the architecture on which VSS-compliant backup software, applications and storage hardware can work with one another for efficient backup and restore operations. To make the convenient service available to users, Winchester Systems has made the snapshot functionality of its proprietary storage management software, FlashDisk Global Manager, VSS-compliant. Below we will further illustrate how FlashDisk Global Manager snapshots can be used to do the backup and restore of FlashDisk VX Series arrays by working with Symantec Backup Exec12 through the VSS framework.

VSS Basics

VSS is often represented as a triangle-shaped framework whose three vertices are Requester (backup software), Writer (database application) and Provider (storage hardware).



Backup procedure

1. The requester commands the start of the backup job.
2. The writer flushes data and guarantees the consistency of the dataset to be backed-up.
3. The hardware provider creates a snapshot of the data and maps it to the host where the requester is installed.
4. The requester backs up the snapshot image to the target device.
5. The hardware provider unmaps the snapshot image and deletes the snapshot image.

Application Example of Microsoft Exchange Server Backup

Server and Software Requirements

1. Microsoft Windows Server 2003 x64 (service pack 2)
2. Microsoft Exchange server 2007 (service pack 1)
3. Symantec Backup Exec v11d.7170 or Backup Exec v12.

FlashDisk VX Series Array Configuration

Choose a previously created, snapshot enabled partition of desired capacity to use as the Exchange source volume and map it to the host as a LUN.

The screenshot displays the 'Host LUN Mapping' configuration window for the VX3418R Array. The interface includes a left-hand navigation tree with options like 'Device', 'Information', 'Maintenance', 'Configuration', 'Quick Setup', 'Create Logical Drive', 'Existing Logical Drives', 'Deleted Logical Drives', 'Create Logical Volume', 'Existing Logical Volumes', 'Channel', 'Host LUN Mapping', 'System Settings', 'Storage Services', and 'Agent'. The main area is divided into several sections:

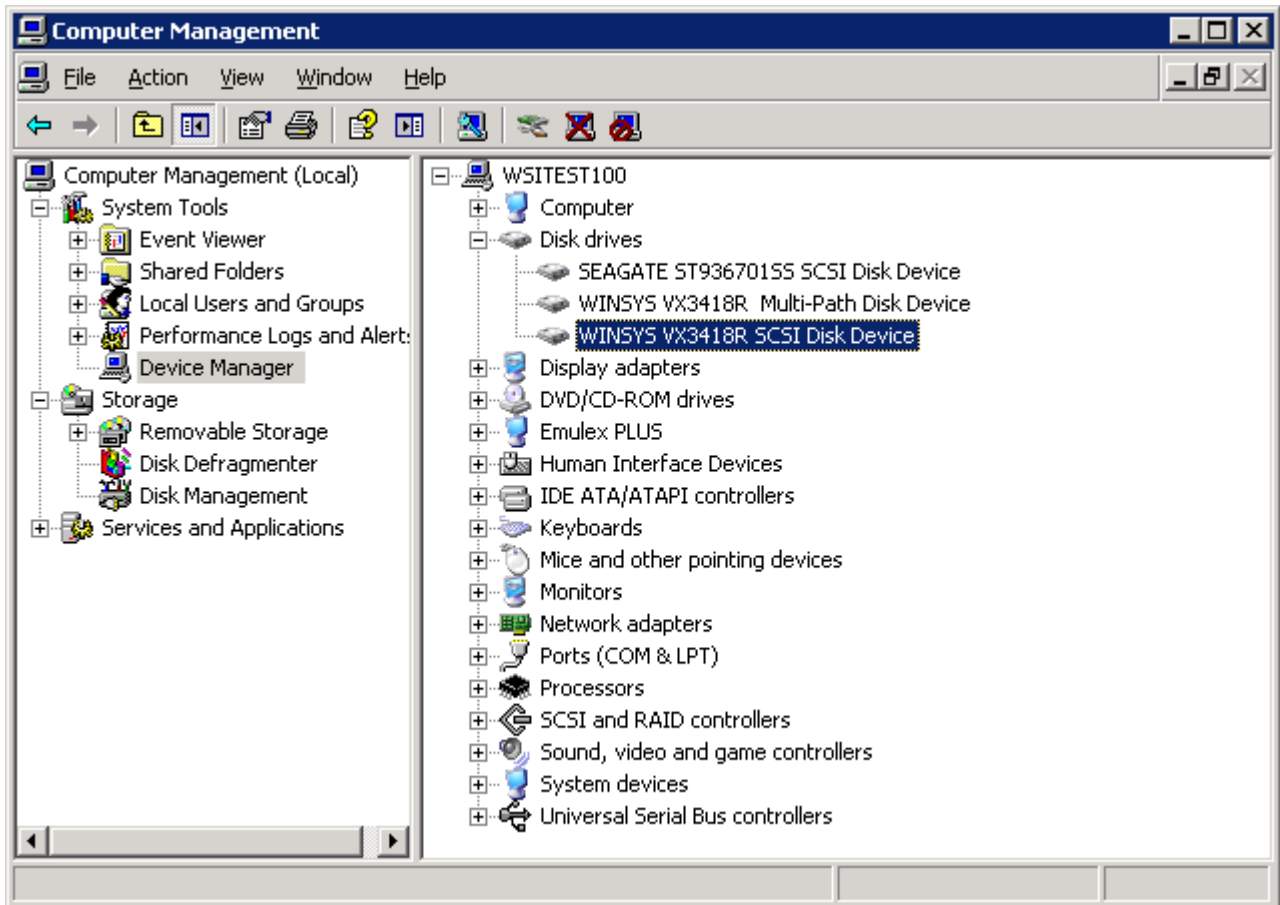
- Host LUN(s)**: A table with columns for Channel ID, SCSI ID, LUN Set, Logical Volume/Snapshot Image ID, Partition, Size, and Extended Lun. One entry is visible: Channel ID 0, SCSI ID 10, LUN Set 0, Logical Volume/Snapshot Image ID 36E73E7A58D48B74, Partition 0, Size 20 GB, and Extended Lun N.
- Extended Lun(s)**: A table with columns for Lun Number, Logic..., Parti..., Snapshot Logical Volum..., Group, Host ID, and Host... (empty).
- WWN Name(s)**: A table with columns for WWN Name and Host ID. One entry is visible: WWN Name 10000000C971A709.
- Logical Volume(s)**: Shows a logical volume named 'Exchange' with a size of 2.45 TB. Below it, a bar chart shows the partition(s) of the logical volume: 'Exchange(ID:36E73E7A58D48B74)'. The bar is divided into segments: 0 (red), 1 (green), 2 (grey), DS (yellow), and Free (yellow). Below the bar, it states: 'Index: 0, Name: Exchange, ID: 0E7FA9132AEDC987, Size: 20 GB Mapped'.

At the bottom of the interface is an event log table:

Index	Severity	Type	Time	Description
862	?	?	2010 Apr 20 23:52:21	DataService NOTICE - VolumeMirror (VP ID:34AFCDD70816160) Async Complete (0 MB Transferred) (slot A)
863	?	?	2010 Apr 20 23:52:21	DataService NOTICE - Image(SI ID:0DCA63503D371DCA) Deleted Complete (slot A)
864	?	?	2010 Apr 20 23:52:24	DataService NOTICE - Image(SI ID:06AC082F3F483242) Deleted Complete (slot A)
865	?	?	2010 Apr 21 00:01:59	DataService NOTICE - Image(SI ID:68CA1553136B439E) Creation Complete (slot A)
866	?	?	2010 Apr 21 00:02:02	DataService NOTICE - Image(SI ID:214FD8663CE95B8) Creation Complete (slot A)
867	?	?	2010 Apr 21 00:02:06	DataService NOTICE - Image(SI ID:68CA1553136B439E) Activated (slot A)
868	?	?	2010 Apr 21 00:02:07	DataService NOTICE - Image(SI ID:214FD8663CE95B8) Activated (slot A)
869	?	?	2010 Apr 21 00:02:08	DataService NOTICE - VolumeMirror (VP ID:34AFCDD70816160) Async Start (slot A)
870	?	?	2010 Apr 21 00:02:08	DataService NOTICE - VolumeMirror (VP ID:34AFCDD70816160) Async Split (slot A)
871	?	?	2010 Apr 21 00:02:16	DataService NOTICE - VolumeMirror (VP ID:34AFCDD70816160) Async Complete (0 MB Transferred) (slot A)
872	?	?	2010 Apr 21 00:02:17	DataService NOTICE - Image(SI ID:68CA1553136B439E) Deleted Complete (slot A)
873	?	?	2010 Apr 21 00:02:19	DataService NOTICE - Image(SI ID:214FD8663CE95B8) Deleted Complete (slot A)

At the bottom right, the controller time is shown as: Controller Time : 2010 Apr 21 12:58 [+00:00]

Scan all the available disks under Windows 2003 Device Manager. A new “WINSYS SCSI Disk Device” should be displayed in the component list window.



Initialize this new WINSYS SCSI device and assign a drive letter (For example, 'G') to the disk in the Disk Management window. Note that the disk should be formatted using the Basic-MBR mode.

Install the Exchange database in the initialized disk.

Indicate the Backup Device

Launch Backup Exec.

Create a backup device to which the backup data can be saved. Click Devices tab. Expand the Devices tree in the lower pane and right-click on Backup-to-Disk Folders. Select New Backup-to-Disk Folder.

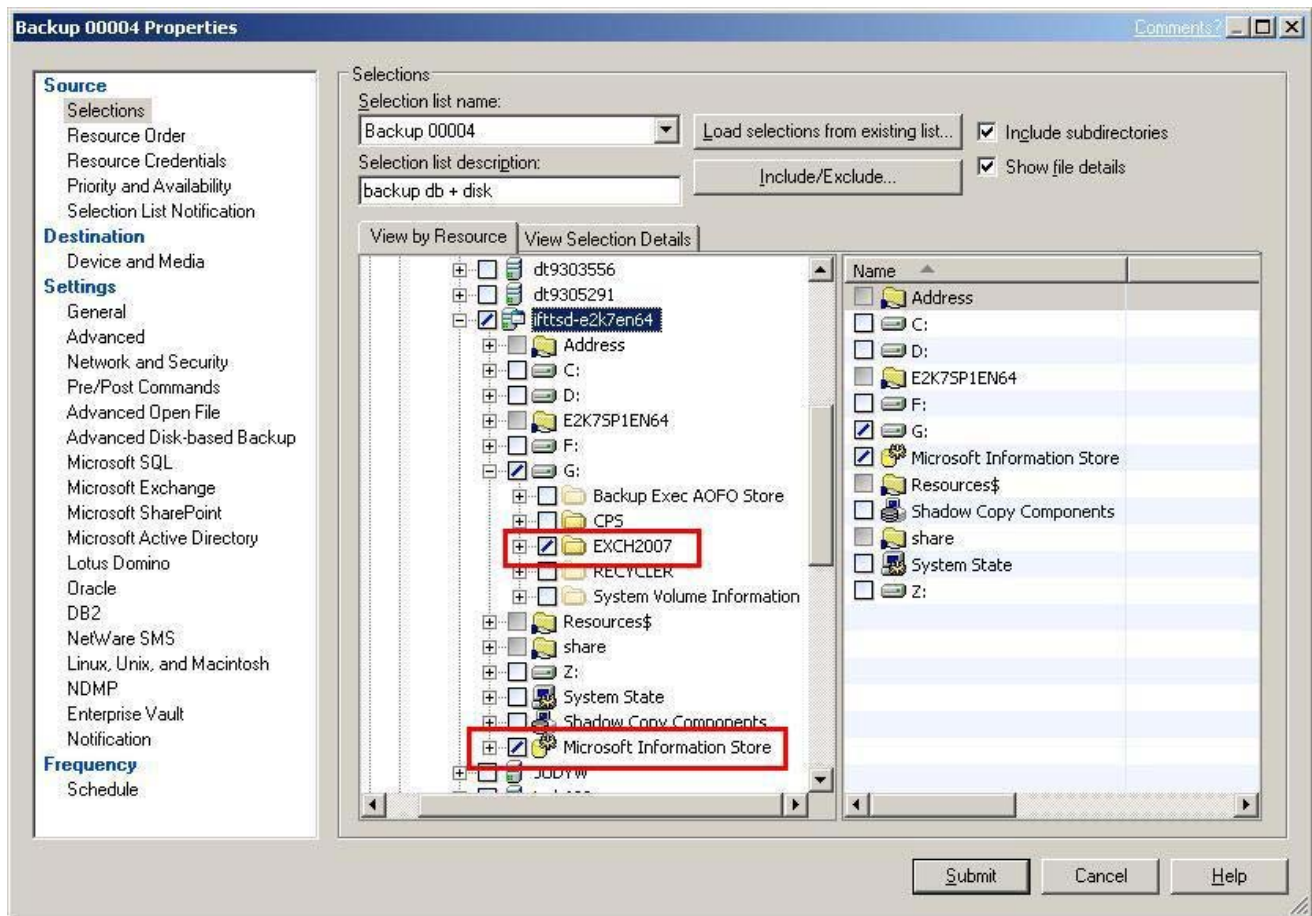


In the pop-up window, indicate the path of the backup device, and then click OK. Now the backup device is ready.

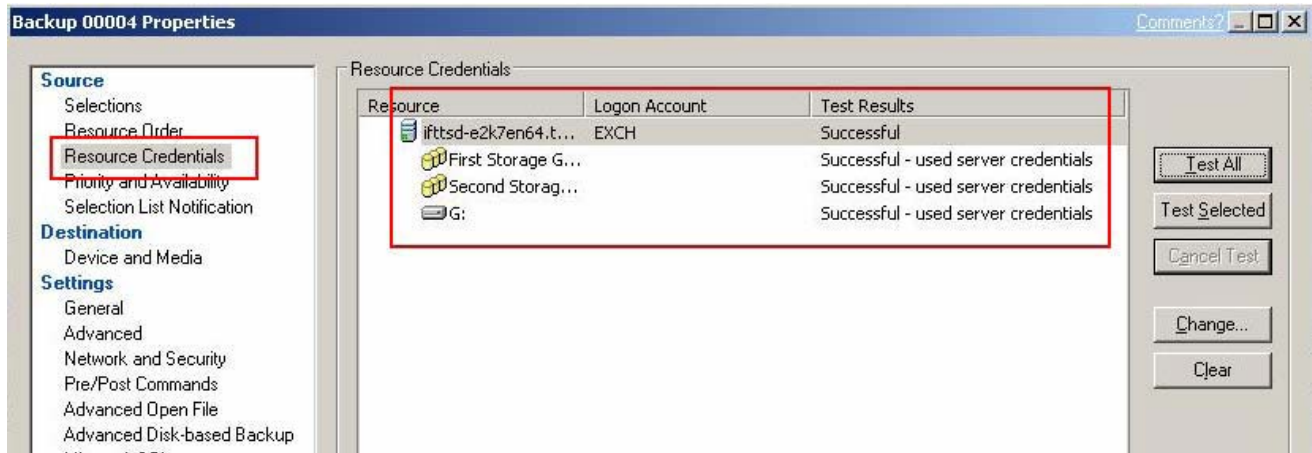
Exchange Server Backup Procedure

Open a New Backup Job in Backup Exec.

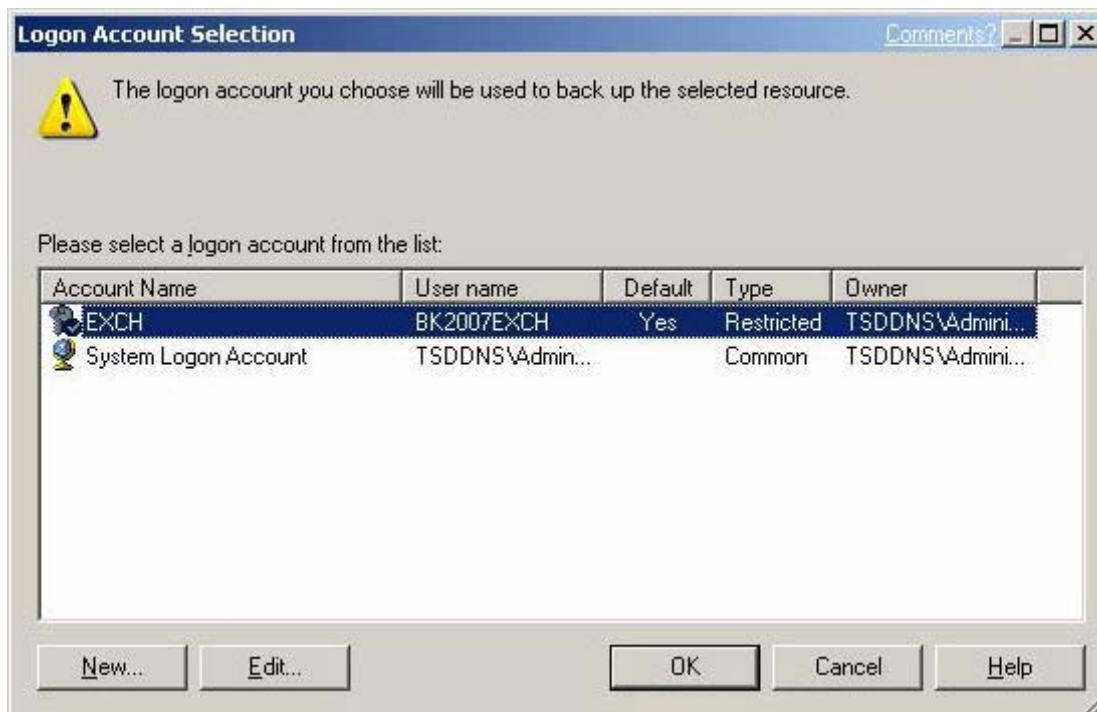
From the left-side tree, click Selections under Source, and then select the source you want to backup in the right-side pane by ticking the checkbox. Note: Select the disk folder where the mail box resides (e.g., the “EXCH2007” folder in disk G), and also the “EXCH” database in Microsoft Information Storage.



Note: Please make sure the backup server has the right to access the Exchange server.

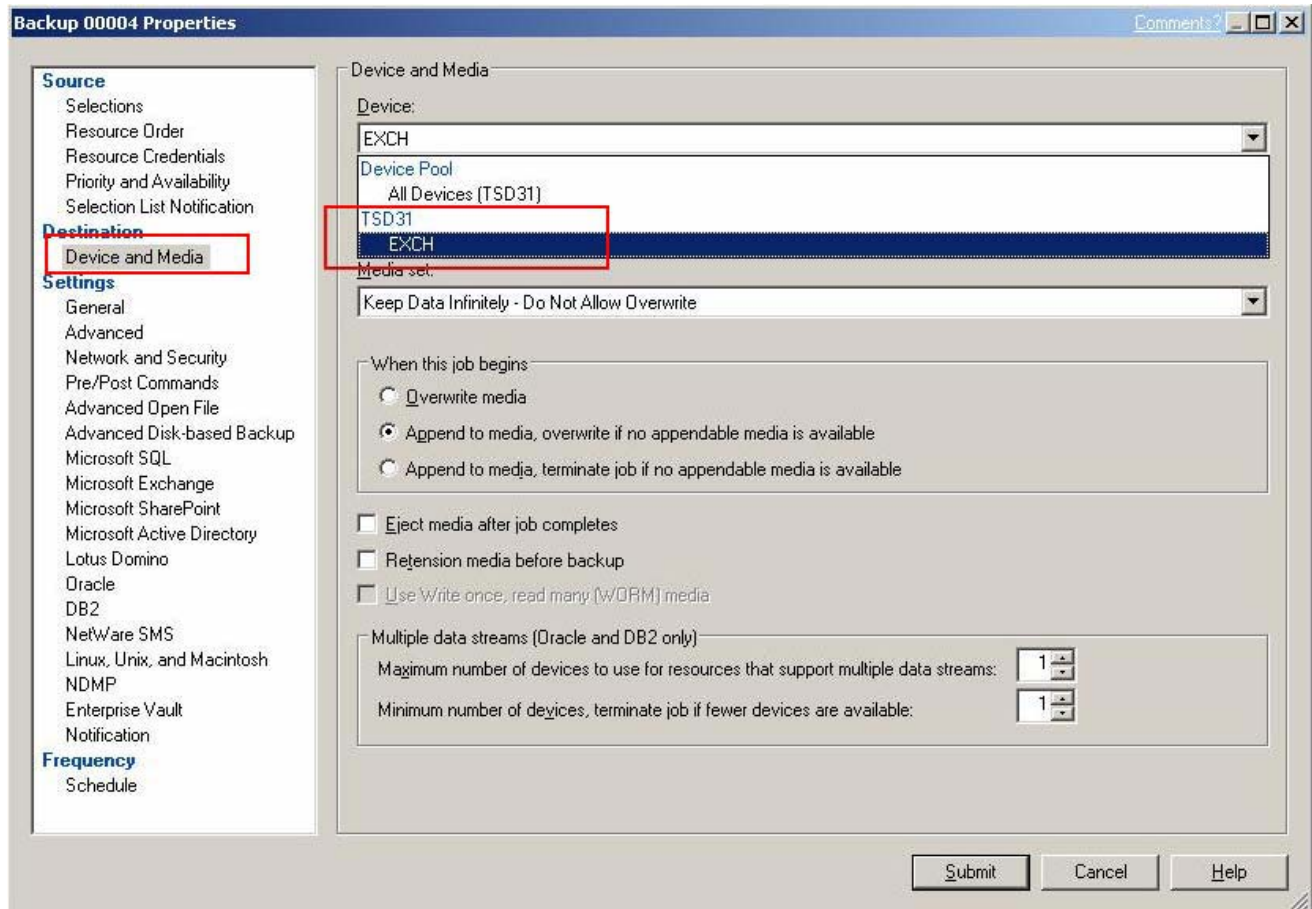


To do this, add an account from Resource Credentials under Source.



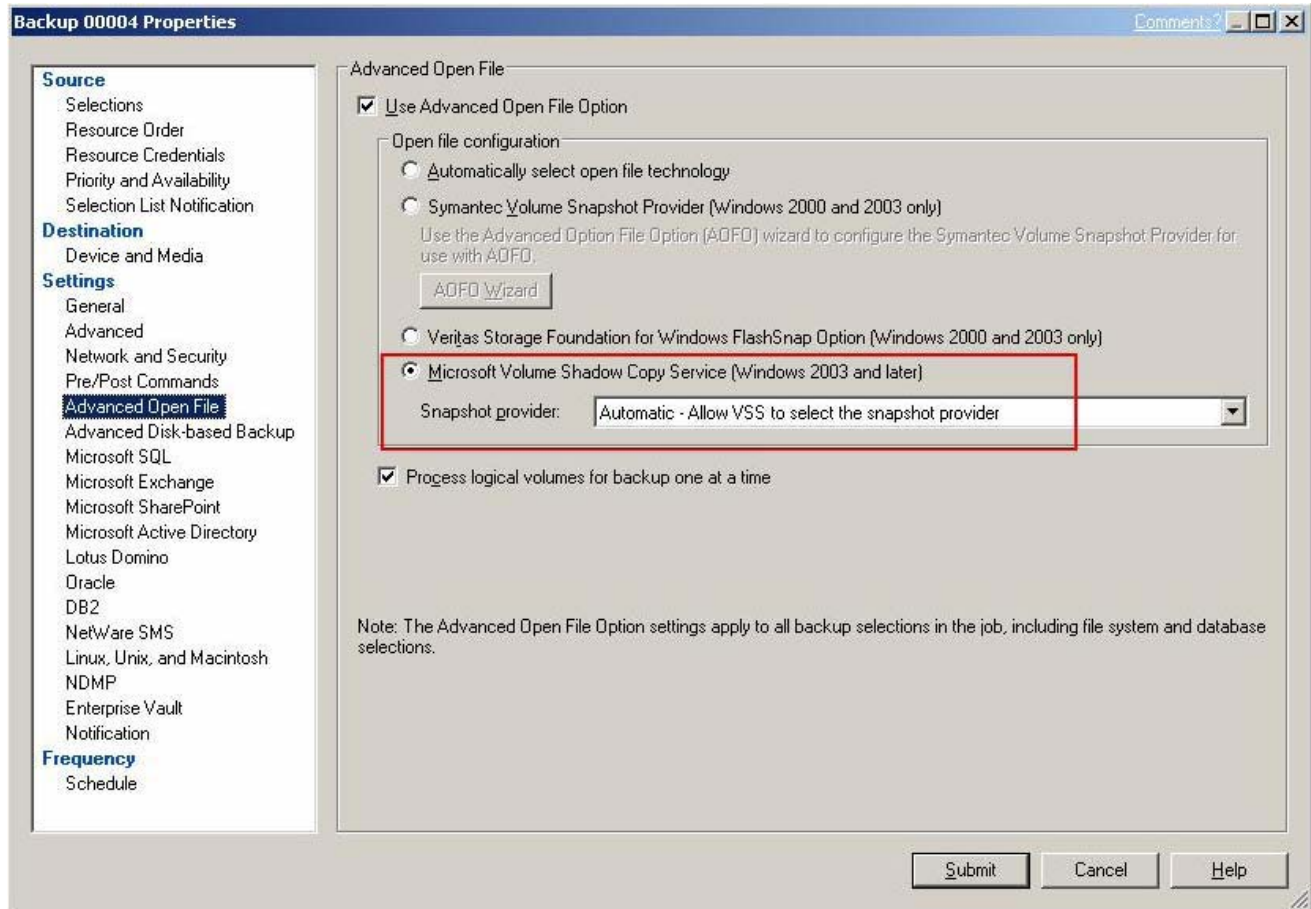
Select a backup device.

Go to Device and Media under Destination; select a backup device as the destination from the pull-down list in the right-side pane. The backup data will be stored in the chosen device. (See the previous section for how to create a backup device.)

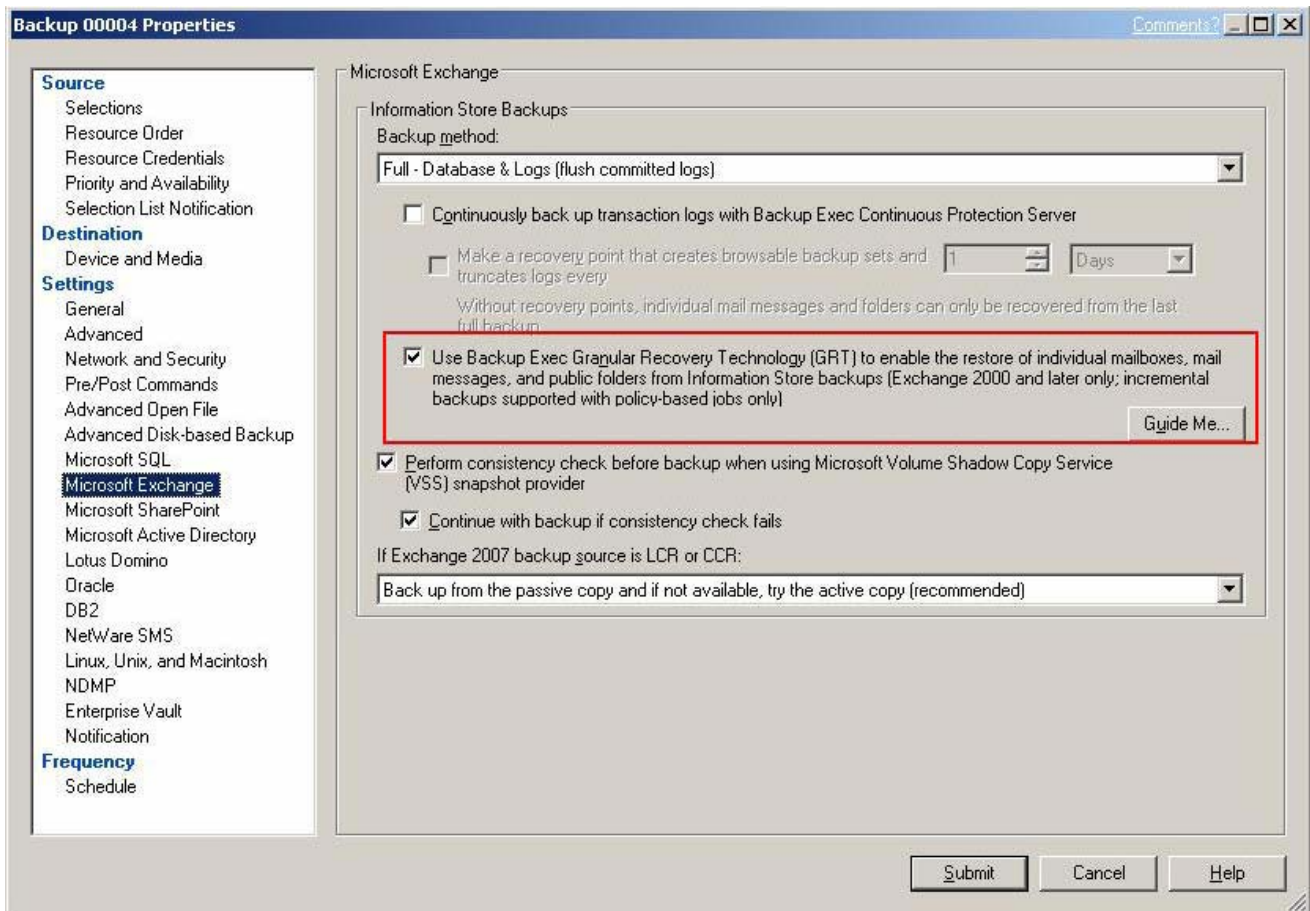


Enable VSS Snapshot Support.

Go to Advanced Open File under Settings. Click Microsoft Volume Shadow Copy and make sure to select Automatic-Allow VSS to select the snapshot provider from the Snapshot provider pull-down list. When finished, click Run Now.



Go to Microsoft Exchange under Settings, and select the check box Use Backup Exec Granular Recovery Technology (GRT) to enable the restore of individual mailboxes, mail messages, and public folders from Information Store backups.



Verify the settings in the job summary window and click OK. A backup job should then initiate immediately.

Check Whether the Snapshot Is Taking Place

After running the backup job using the Backup Exec software, check for the following events in the FlashDisk Global Manager:

A snapshot image should have been taken.

At first, a notification event (Snapshot NOTICE – SI ID:xxxxxx Creation Complete in SS ID:xxxx) will prompt you, indicating that a *Snapshot Image (SI)* has been taken. Meanwhile, a snapshot image will be activated with another notice event (Snapshot NOTICE –SI ID:xxxx).

The screenshot displays the FlashDisk Global Manager interface for a VX3418R Array. The main window is titled "Snapshot Configuration" and contains two tables. Below the tables are radio buttons for "Images in this Snapshot Set", "Images manually created", and "Images created by scheduler". At the bottom, there is an "Event Log List" tab showing two events.

Snapshot Set(s)

LV Name	Partition Name	LV ID	Partition ID	Partition	Current / Max Image	Activated	Description	Mount Status
Exchange	Exchange	36E73E7A58D48B74	0E7FA9132AEDC987	0	1 / 1024	Yes		Mount succeeded,
Exchange	P2	36E73E7A58D48B74	1F32B1FC17F83190	2	0 / 1024	No		Mount succeeded,
Exchange	Exchange_2	36E73E7A58D48B74	42AD0E9A5122F0D0	1	0 / 1024	No		Mount succeeded,

Snapshot Image(s)

Index	Snapshot Image ID	Name	Activation Time	Map LUN	Description
1	1091531A57C487E7		Thu, Apr 22 13:24:51 2010	No	

Event Log List

Index	Severity	Type	Time	Description
878	Information	Snapshot	2010 Apr 21 13:24:51	DataService NOTICE - Image(SI ID:1091531A57C487E7) Activated (slot A)
879	Information	Snapshot	2010 Apr 21 13:24:52	DataService NOTICE - Image(SI ID:700ESC5012786CA3) Creation Complete (slot A)

Controller Time : 2010 Apr 21 13:25 [+00:00]

The snapshot image will then be mapped to an available host LUN, and data will be copied to the device location you previously set on the backup server running Backup Exec.

VX3418R Array (192.168.150.44) WINSYS Demo

File Information Maintenance Command Configuration Storage Services Language Help

VX3418R Array (192.168.150.44)

- Device
 - Information
 - Maintenance
 - Configuration
 - Quick Setup
 - Create Logical Drive
 - Existing Logical Drives
 - Deleted Logical Drives
 - Create Logical Volume
 - Existing Logical Volumes
 - Channel
 - Host LUN Mapping
 - System Settings
 - Storage Services
 - Snapshot
 - Volume Copy Mirror
 - Agent
 - Storage Services Agent
 - Schedules

Host LUN Mapping

Host LUN(s)	Channel ID	SCSI ID	LUN Set	Logical Volume/Snapshot Image ID	Partition	Size	Extended Lun
0	10	0		36E73E7A58D48B74	0	20 GB	N
0	10	1		1091531A57C487E7			N

Extended Lun(s)	Lun Number	Logic...	Parti...	Snapshot Logical Volum...	Group	Host ID	Host...

WWN Name(s)	WWN Name	Host ID
0	WWN Name	10000000C971A709

Logical Volume(s)

Name: Exchange, Size: 2.45 TB

Partition(s) of Logical Volume: Exchange(ID:36E73E7A58D48B74)

0	2	DS	Free
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Index: 0, Name: Exchange, ID: 0E7FA9132AEDC987, Size: 20 GB Mapped

Index	Severity	Type	Time	Description
878	Information	Event	2010 Apr 21 13:24:51	DataService NOTICE - Image(SI ID:1091531A57C487E7) Activated (slot A)
879	Information	Event	2010 Apr 21 13:24:52	DataService NOTICE - Image(SI ID:700E5C5012786CA3) Creation Complete (slot A)

Event Log List Configuration List

Controller Time : 2010 Apr 21 13:27 [+00:00]

After the backup process is completed, the snapshot image will be deleted automatically.
The backup job is completed

VX3418R Array (192.168.150.44) WINSYS Demo

File Information Maintenance Command Configuration Storage Services Language Help

VX3418R Array (192.168.150.44)

- Device
 - Information
 - Maintenance
 - Configuration
 - Storage Services
 - Snapshot**
 - Volume Copy/ Mirror
 - Agent
 - Storage Services Agent
 - Schedules

Snapshot Configuration

Snapshot Set(s)

LV Name	Partition Name	LV ID	Partition ID	Partition	Current / Max. Image	Activated	Description	Mount Status
Exchange	Exchange	36E73E7A58D48674	0E7FA9132AEDC387	0	0 / 1024	No		Mount succeeded,
Exchange	P2	36E73E7A58D48674	1F3281FC17F83190	2	0 / 1024	No		Mount succeeded,
Exchange	Exchange_2	36E73E7A58D48674	42A00E9A5122F0D0	1	0 / 1024	No		Mount succeeded,

Images in this Snapshot Set
 Images manually created
 Images created by scheduler

Snapshot Image(s)

Index	Snapshot Image ID	Name	Activation Time	Map LUN	Description
878			2010 Apr 21 13:24:51		DataService NOTICE - Image(SI ID:1091531A57C487E7) Activated (slot A)
879			2010 Apr 21 13:24:52		DataService NOTICE - Image(SI ID:700E5C5012786CA3) Creation Complete (slot A)
880			2010 Apr 21 13:28:39		DataService NOTICE - Image(SI ID:1091531A57C487E7) Deleted Complete (slot A)

Index	Severity	Type	Time	Description
878	Information	Notice	2010 Apr 21 13:24:51	DataService NOTICE - Image(SI ID:1091531A57C487E7) Activated (slot A)
879	Information	Notice	2010 Apr 21 13:24:52	DataService NOTICE - Image(SI ID:700E5C5012786CA3) Creation Complete (slot A)
880	Information	Notice	2010 Apr 21 13:28:39	DataService NOTICE - Image(SI ID:1091531A57C487E7) Deleted Complete (slot A)

Event Log List Configuration List

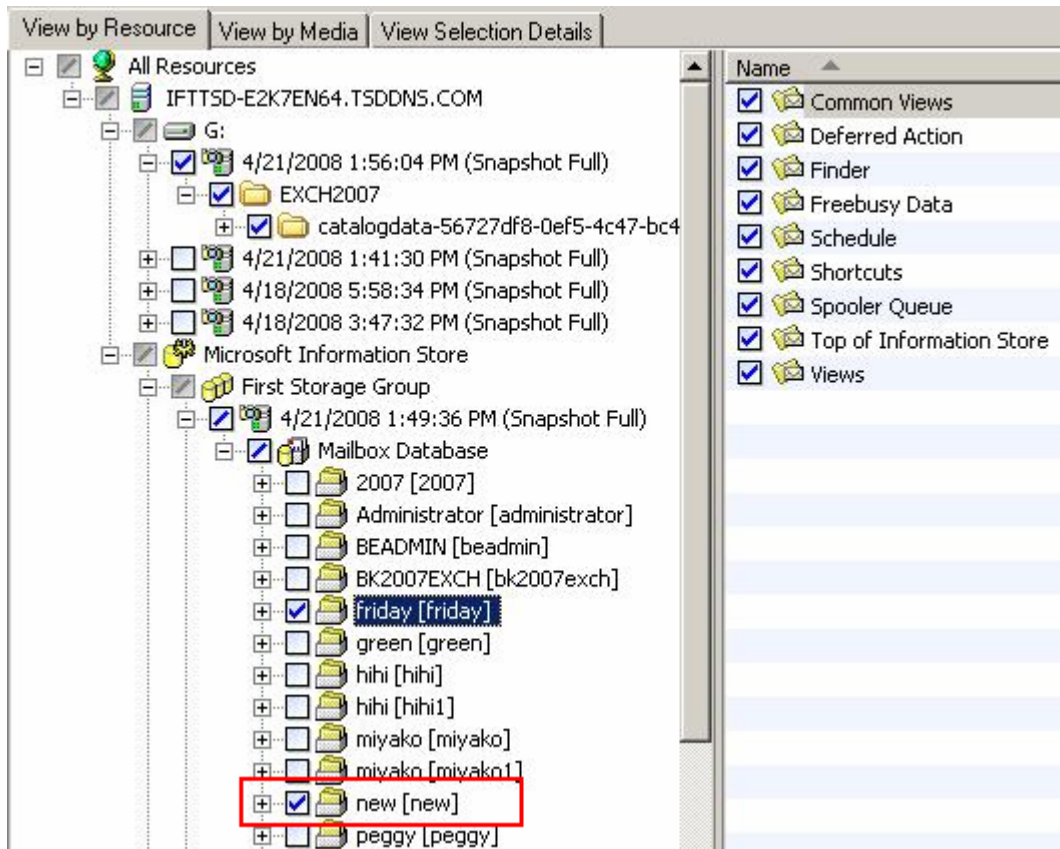
Controller Time : 2010 Apr 21 13:28 (+00:00)

Restore Exchange Data from Backup Target

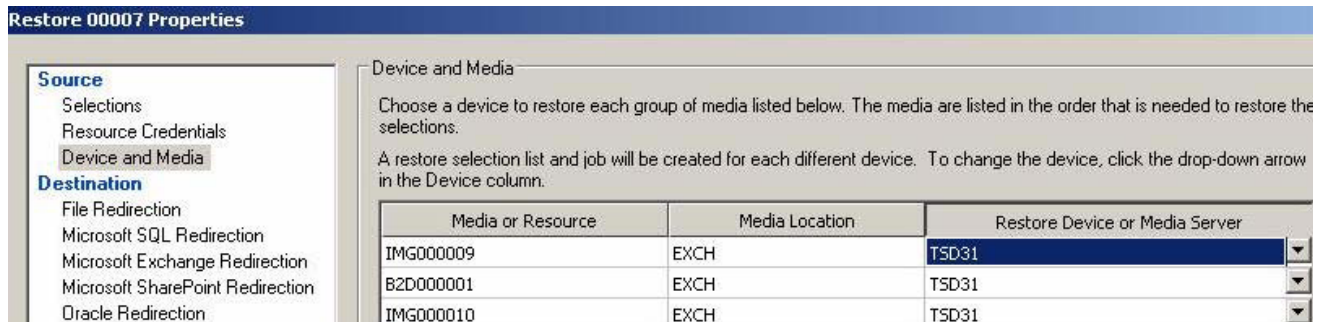
Follow the procedures below to restore an accidentally crashed mailbox or the entire mailbox.

Open a New Restore Job in Backup Exec.

Enter Source -> Selections and select a restore resource. In this case, a crashed mailbox needs to be recovered. You can select individual mailbox restore or the entire mail box for restoring a database. Below is an example of restoring an individual mailbox named “new.”



In Device and Media under Source, select the backup data of the source you want to restore.

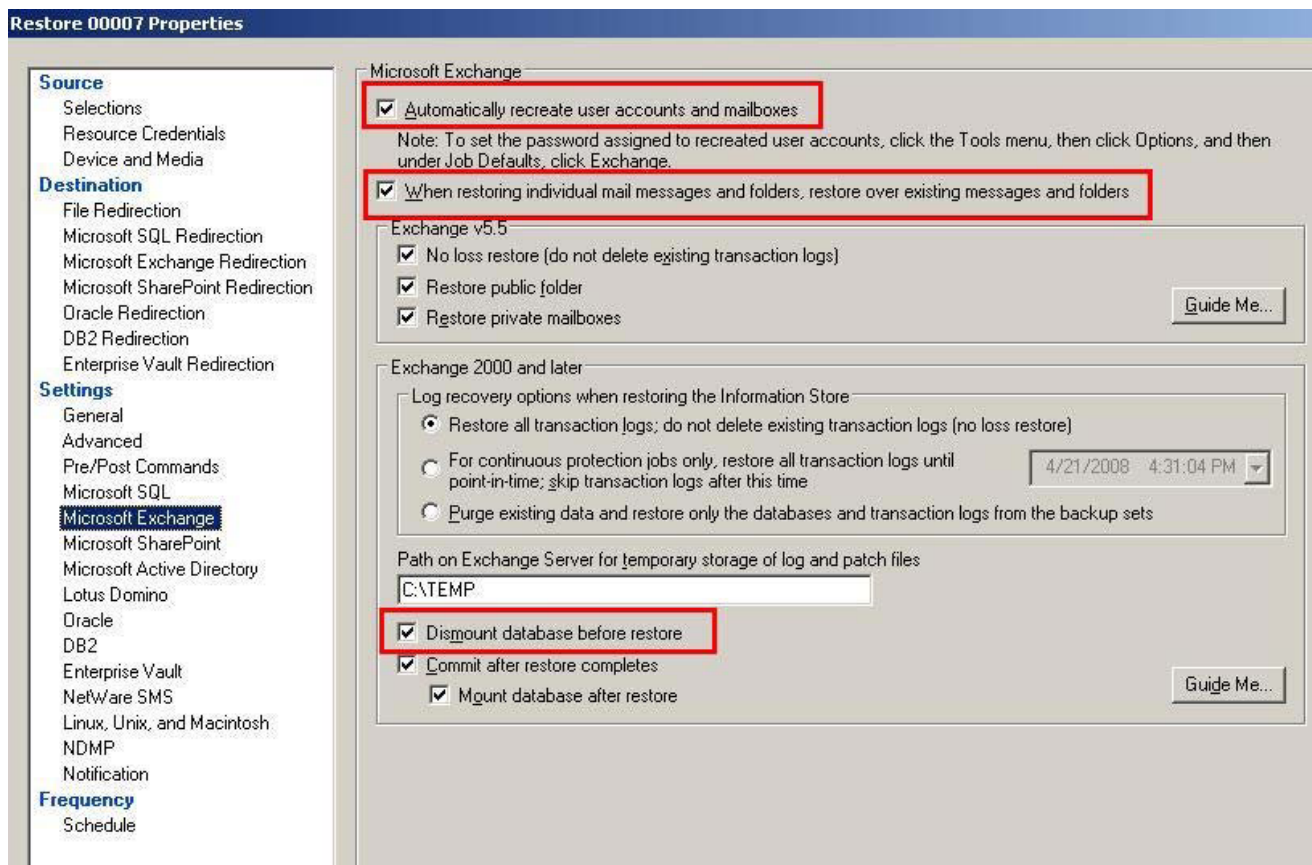


Make sure the following items are selected in Microsoft Exchange under Setting.

-Automatically recreate user accounts and mailboxes.

-When restoring individual mail messages and folders, restore over existing messages and folders.

-Dismount database before restore.



Verify the settings in the job summary and click OK. The mailbox will then be successfully restored. When logging in Exchange server after a successful restore, users will receive a mailbox restore message as shown below.

