

Using CommVault Galaxy with the HP StorageWorks All-in-One Storage System (AiO)

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Introduction

Although the HP StorageWorks All-in-One (AiO) storage system includes integrated HP Data Protector Express, some users may have standardized on other backup software. With AiO release 1.3 and beyond, it is possible to use pre- and post-scripts generated by AiO with other backup software such as CommVault Galaxy to protect data hosted on iSCSI virtual disks on the AiO system.

Any backup software product may be easily used to backup system state, system files, and user data stored directly in files and folders on the AiO system. However, the AiO system may also act as an iSCSI target for application data such as Microsoft Exchange Storage Groups and SQL Server databases. This data is migrated to the AiO system and is stored by the Microsoft iSCSI Software Target in Virtual Hard Disk (.vhd) files. It is not recommended that these files be backed up directly. The .vhd file will be the size of the virtual drive, which will likely be much larger than the actual size used by the files it contains. Furthermore, the application (for example, Microsoft Exchange) would not be involved in the back up, so databases will not be quiesced.

There are three ways to protect the data in these .vhd files:

- Install backup software on the application server and back up the data from the application server as if it were residing on a local drive.
- Back up directly from the AiO using the intelligent integration we have designed into the system.
- Use the pre- and post-script mechanism described in this paper to extend this direct backup model to other backup applications.

Intelligent back up of iSCSI data directly from the AiO

The All-in-One Storage Manager (ASM) enables direct back up of the iSCSI .vhd file from the AiO by generating pre- and post-scripts for each application instance that has been migrated to the AiO system. The scripts issue commands supported by an ASM command line interface. The pre-script creates application aware snapshots of iSCSI volumes, and then mounts those snapshots as read-only local volumes on the AiO system, allowing backup software to access the files contained in the .vhd file. The create snapshot command is executed remotely using the ASM Agent on the application server (for example, the Exchange Server), so the application's VSS Writer becomes involved and freezes any data stores and transaction logs for the few seconds that it takes to snapshot each of the involved iSCSI volumes. The resulting snapshot set, containing a snapshot for each involved volume, is then available on the AiO system. After the backup job runs, the post-script issues a command to unmount the local volume(s) and delete the snapshot set.

For a restore job that overwrites the original location, the process is similar. The pre-script will unmount the iSCSI virtual disks from the application server. The pre-script will then mount the virtual disks locally as writable volumes on the AiO system on the same mount point that was used for backups. When the restore job runs, it will overwrite the files in the virtual disks. The post-script then remounts the virtual disks on the application server. A restore job may also be created to write to an alternate location and, in this case, pre- and post-scripts are not needed.

Note

Backing up iSCSI virtual disks directly from the AiO using the process described above has the benefit of significantly reducing backup windows and impact on the application server; however, it does backup data at the volume level. If your data protection strategy calls for more granular recovery (for example, individual Exchange mailboxes) you may choose to accept a larger backup window and backup from your application server using application backup agents.

Extending AiO intelligent back up to CommVault Galaxy

When you use the All-in-One Storage Manager (ASM) wizards to configure data protection using the pre-installed Data Protector Express software, all of this work is done for you. You can use other backup software products if they support the concept of a pre- and post-script. Using these products, you manually configure the back up and restore jobs, specifying the pre- and post-scripts that ASM generates. The following describes this process using CommVault Galaxy 7.0.

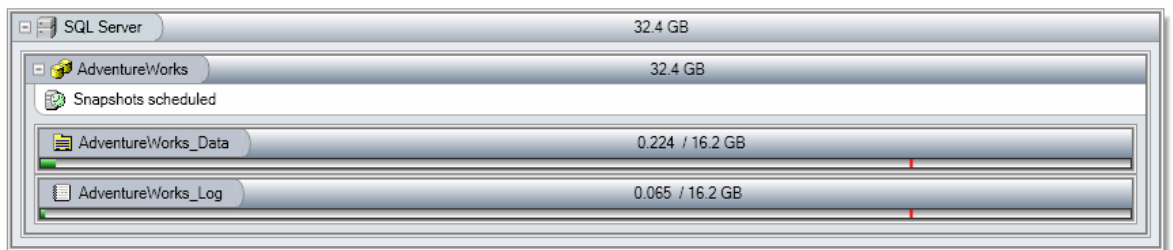
For other backup products that have not been tested, it is very likely that the same scripts will work, or you may even modify the generated scripts slightly to achieve the desired result.

To integrate the AiO into an existing CommCell and enable back up and recovery of AiO data, install the CommVault iDataAgent for Windows File System on the AiO. Another common configuration is to use the AiO as a backup server in the CommCell, using the AiO storage for disk-based backup. (CommVault refers to this as a magnetic library.) In addition, a tape library or other backup device could be attached to the AiO. To use the AiO as a backup server, install the CommVault Media Agent on the AiO.

Preparing for backup

When using the ASM wizards to migrate application data such as Exchange, SQL Server, or a user-defined application to the AiO, do not select any Data Protection (except snapshots, if desired) because you will manually create your own backup jobs later. When the migration is complete, the application appears in the application view of the All-in-One Storage Manager, as shown below:

Figure 1. Application view of AiO



A directory also appears with the same name as the application under `C:\backup`, for example, `C:\backup\AdventureWorks`.

Note

HP recommends that you maintain unique names for the applications migrated to the AiO system. However, it is possible for multiple applications of the same name to be hosted on the AiO system. In this case, the second and subsequent applications of the same name will be given a unique name for back up purposes. This consists of the application name with a unique number appended. For example, the directory described above might be:

```
C:\backup\AdventureWorks 15645854
```

When the application data was migrated, ASM also created backup and restore pre- and post-scripts for the application instance. These scripts are located on the AiO system, at:

```
C:\Program Files\HP\DPxScripting\work
```

As an example, for the AdventureWorks SQL Server database that was migrated to the AiO, the directory contains pre- and post-scripts to use for backup;

- AdventureWorks_prescript.bat
- AdventureWorks_postscript.bat

The directory also contains pre- and post-scripts to use for restore;

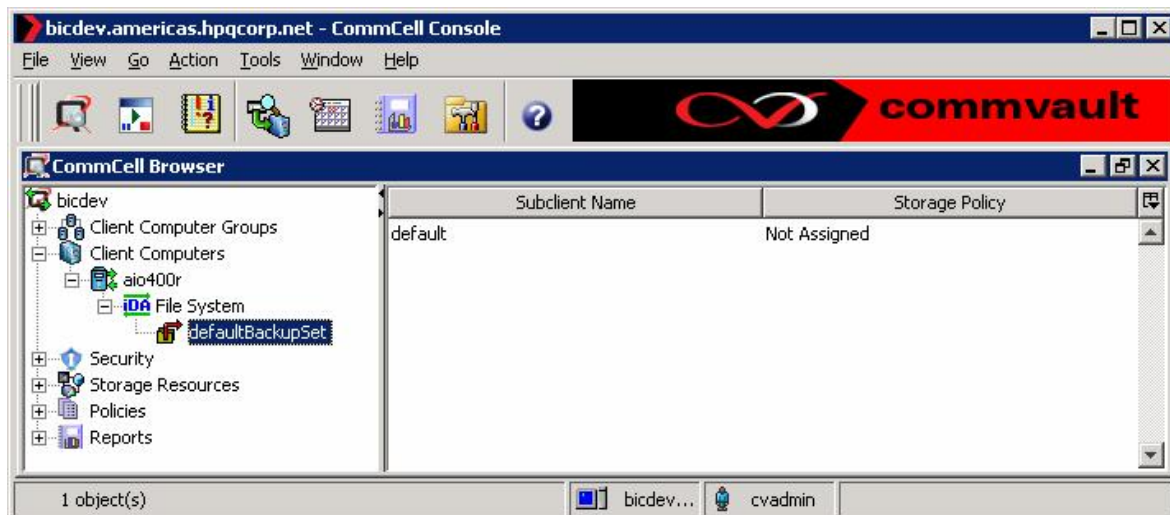
- AdventureWorks_prescript_restore.bat
- AdventureWorks_postscript_restore.bat

When a backup session runs, the ASM pre-script coordinates with the application (for example, SQL Server or Exchange) to take snapshots of the appropriate iSCSI virtual disks. These snapshots are then mounted locally as NTFS volumes on the AiO under the predefined mount point (for example, C:\Backup\AdventureWorks).

Creating a backup set subclient

After you install the CommVault iDataAgent for Windows File System on the AiO, the AiO system appears as a client computer in the ComCell browser. As shown below, a default backup set is created for the AiO and that backup set contains a default subclient.

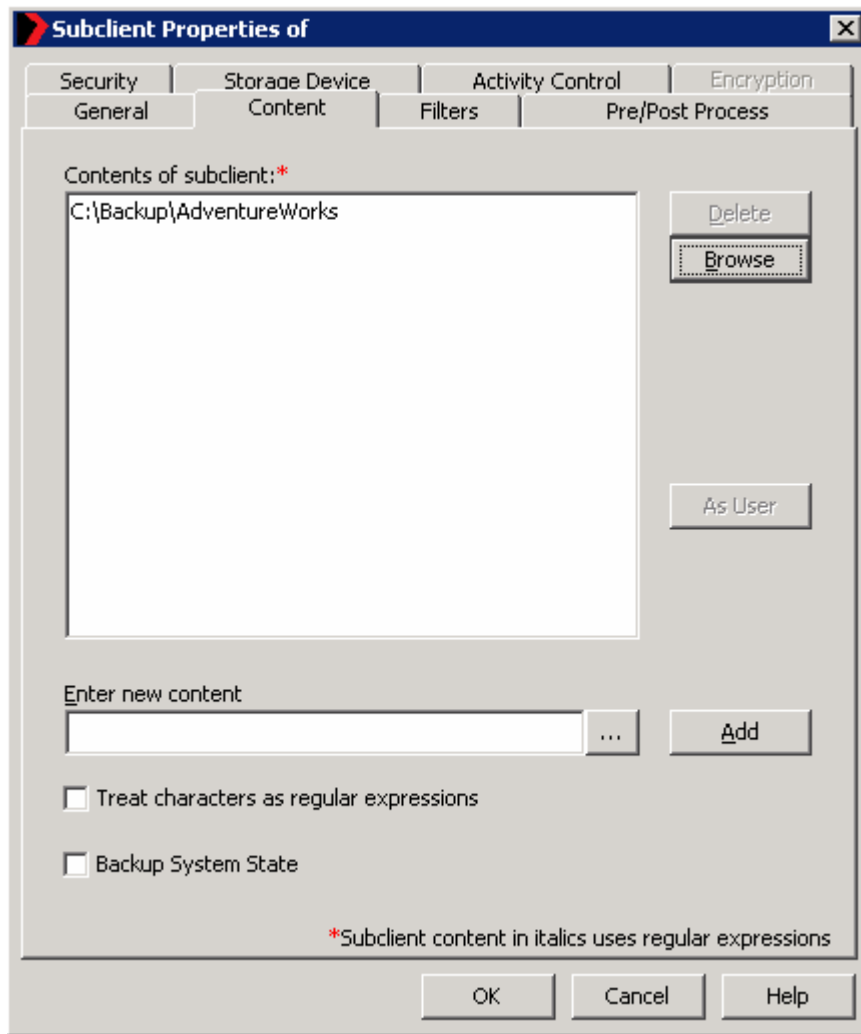
Figure 2. Default backup set with a default subclient



The default subclient acts as a catch-all backup specification and is sufficient for protecting all the data on the client computer if there are no special requirements. However, there are some special backup requirements for AiO data hosted on iSCSI virtual disks. We must create an additional user-defined subclient for each application instance (for example, an Exchange Storage Group or SQL Server database) hosted on the AiO.

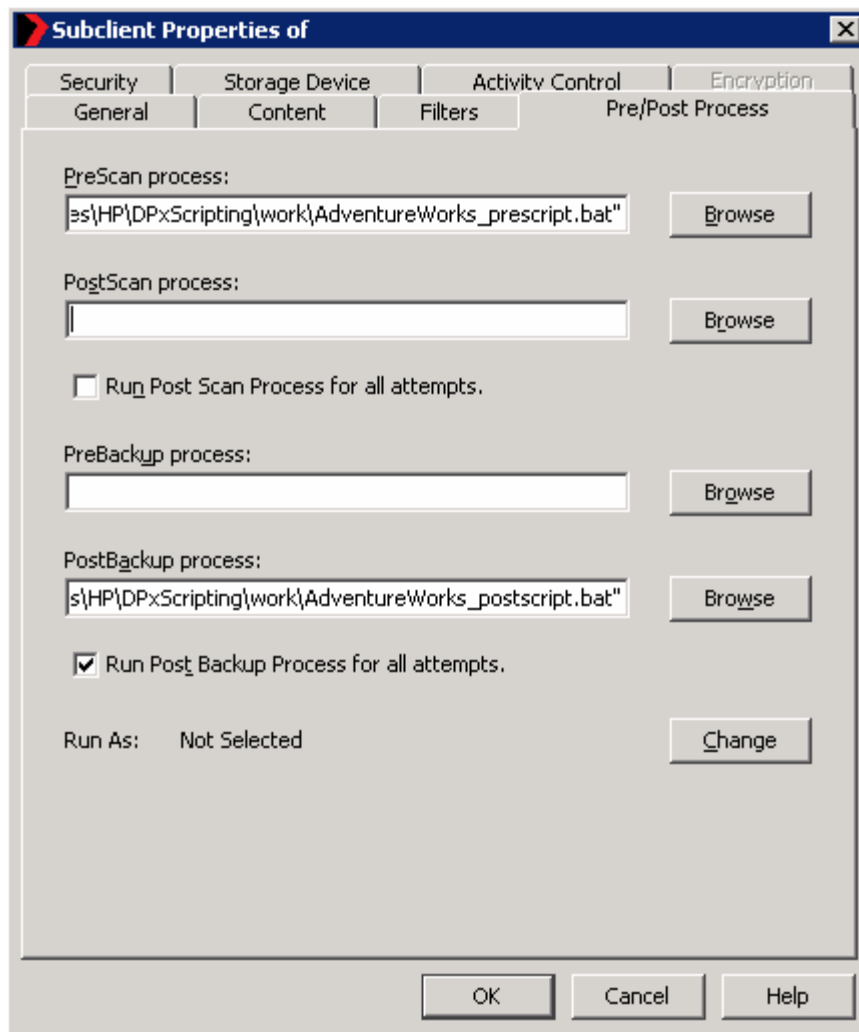
To create a CommVault Galaxy subclient:

1. Right-click the defaultBackupSet node shown above and select **All Tasks -> New Subclient**.
2. On the **General** tab, enter a Subclient name. In this example the subclient name is AdventureWorks, because it is used to back up the AdventureWorks database.
3. On the **Storage Device** tab, select a Data Storage Policy.
4. On the **Content** tab, browse to or enter the path C:\Backup\



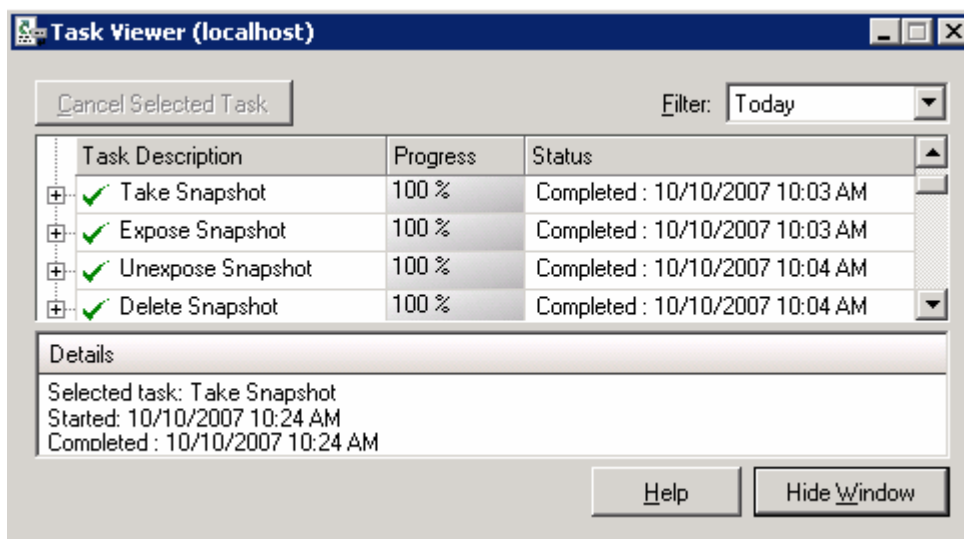
5. On the **Pre/Post Process** tab, browse to or enter the path to the pre- and post-scripts for backup that were generated by ASM on the AiO. The scripts are located at `C:\Program Files\HP\DPxScripting\work`

Note that the pre-script must be specified in the text box for the PreScan process. This ensures that the snapshots are mounted and the files are visible before CommVault Galaxy starts its scan of the files. The post-script must be specified in the text box for the Post Backup process. This ensures that the snapshots are unmounted and deleted after Galaxy completes the backup. Because we want this cleanup to occur regardless of the outcome of the backup, check the box for **Run Post Backup Process for all attempts**. Place double quotes around the path to each script or the backup will fail with a file not found on client error. Finally, note that the **Run As:** setting has a default value of **Not Selected**. You will need to click the **Change** button and define the user that the pre- and post- scripts will run as on the AiO; either local system, or some other user for which you will supply credentials.



- Click **OK** to save the new subclient. At the prompt, choose to either schedule the job or leave it unscheduled.

When a backup session runs, either as scheduled or interactively, the pre-script takes snapshots of the iSCSI volumes and mounts the snapshots as read-only volumes at the predetermined mount points. CommVault Galaxy backs up the exposed files, and the post-script then unmounts the volumes and deletes the snapshots. The tasks initiated by the pre- and post-scripts appear in the ASM task viewer on the AiO as shown below.



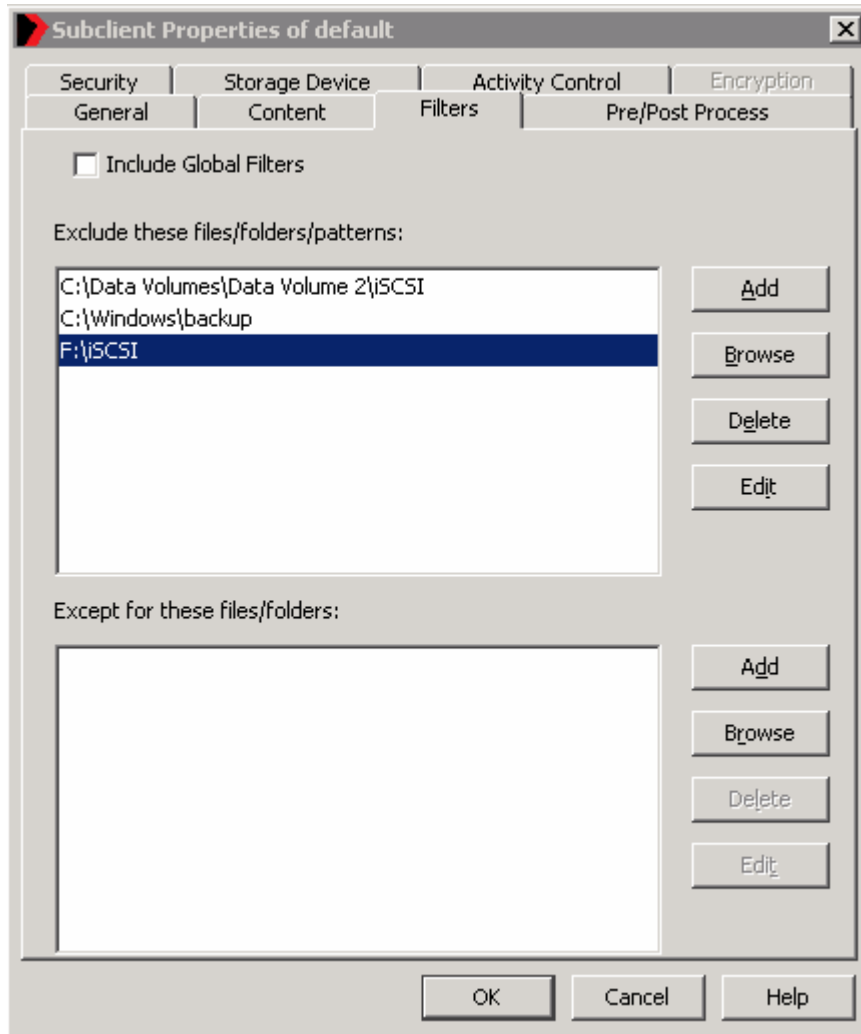
Filtering Files from the Default Subclient

The previous section discussed creating one or more user-defined subclients to back up application data hosted in iSCSI virtual disks on the AiO. The remainder of the AiO system (that is, the system disk and system state) are backed up by the default subclient created by CommVault Galaxy. This subclient acts as a catch-all to back up any data not handled by other subclients. Regardless of whether you use this default subclient or create a custom subclient of your own to backup the remainder of the AiO system, certain files on the AiO do not need to be, or should not be, backed up. To filter these from the default subclient:

1. Right-click the **default** subclient as shown and select **Properties**.



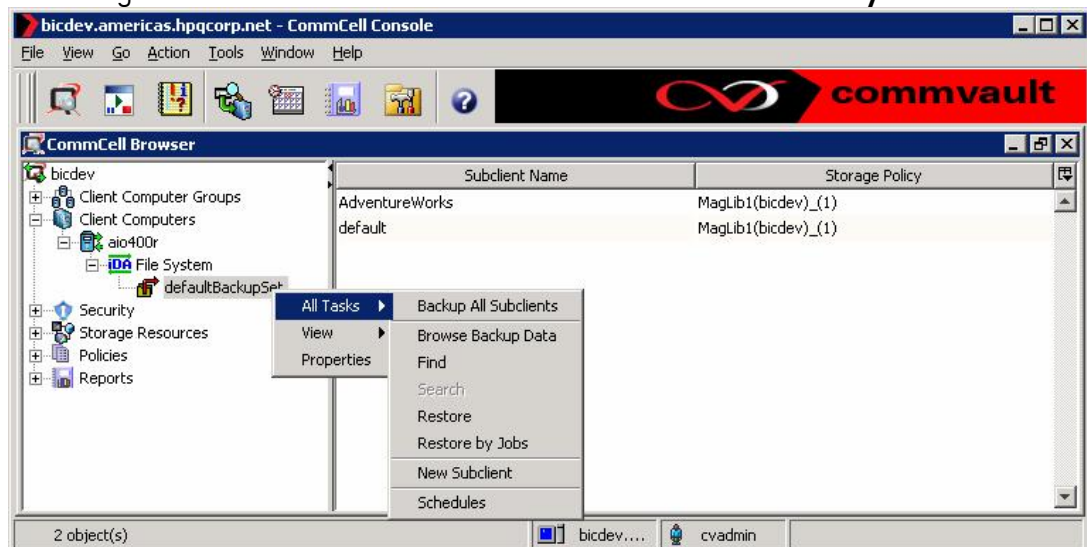
2. On the **Filters** tab, browse to or type the paths that should be excluded from the backup. Do not back up the iSCSI virtual disks (.vhd files) directly. These are located in a folder named iSCSI on the volumes created and mounted by ASM. ASM created volumes are typically at mount points under C:\Data Volumes, but may be mounted at a drive letter. In the example below, we have identified and are excluding iSCSI virtual disks from two different places. Another path that you may wish to exclude is C:\Windows\backup. This is a mounted volume (that is, the volume labeled Don't Erase) that includes a Symantec ghost image used by the AiO System Recovery DVD when restoring the system to factory condition. If the Recovery DVD finds the ghost image, it significantly speeds up the recovery, but even if the image is not found, it is replaced by the recovery process. Thus there is no need to backup this data which may be close to 3 GB in size.



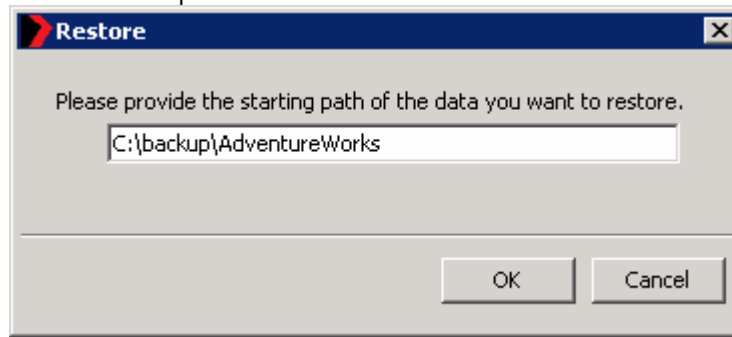
Restoring Data

To restore application data that was backed up from iSCSI virtual disks:

1. In the CommCell browser, select the backup set containing the appropriate subclient as shown below. Right-click and select **All Tasks** and then either **Restore** or **Restore by Jobs**.

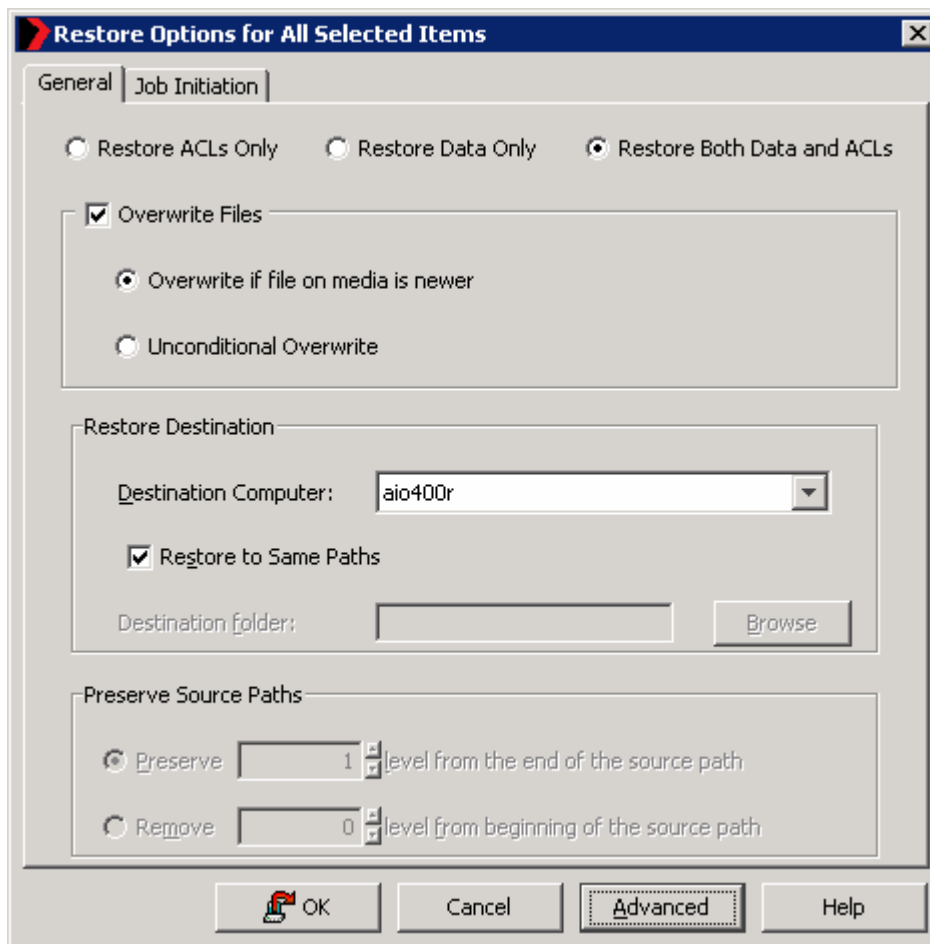


- If you choose **Restore**, enter the path to the mount point from which the iSCSI data was backed up, as in the example shown below.

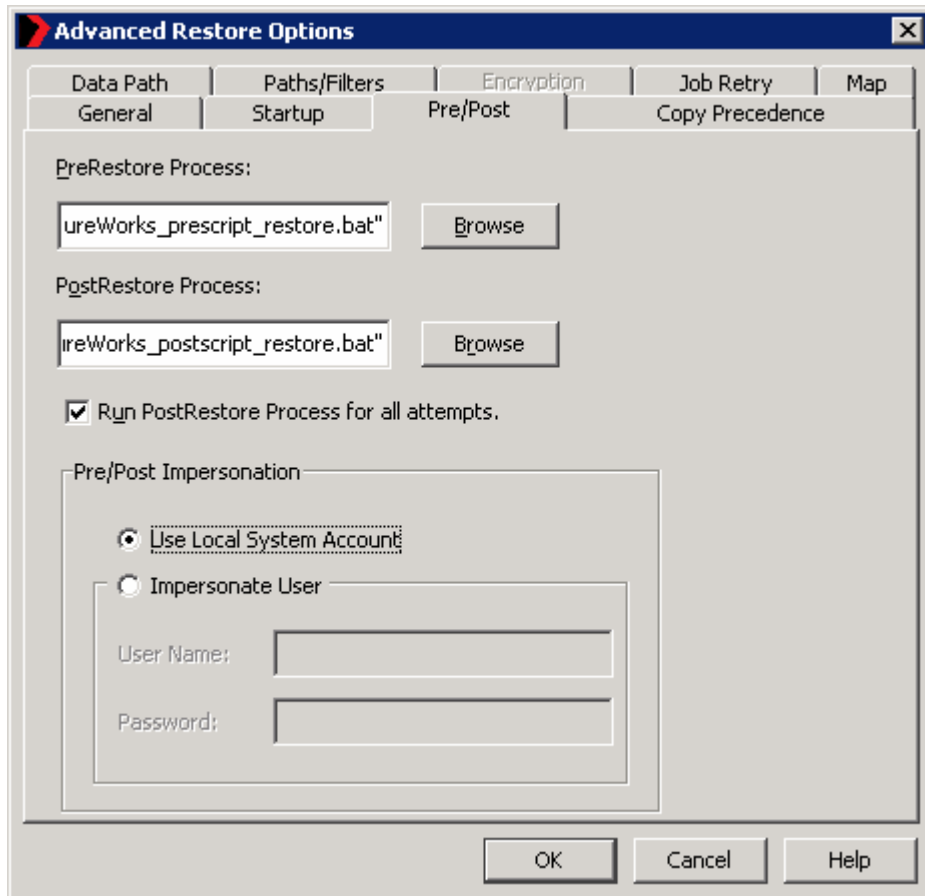


If you choose **Restore by Jobs**, choose from a list of backup jobs that were run in the past. Choose the job that used the appropriate subclient (for example, AdventureWorks).

- Regardless of the method chosen a **Restore Options** dialog appears. Note that by default, the **Restore to Same Paths** option is checked. If this is the type of restore you wish (that is, application data restored directly to the same path used by the application), specify pre- and post- restore scripts as described in step 4. However if you just want to restore the data to an alternate location uncheck this option and specify the alternate path. No pre- and post-scripts are needed for restore. In this case, skip to step 5.



- Click the **Advanced** button, and navigate to the **Pre/Post** tab. Browse to and select the appropriate restore scripts at C:\Program Files\HP\DPxScripting\work. Surround the paths to these restore scripts in double quotes. Check the box for **Run Post/Restore Process for all attempts**. Choose an account under which the post scripts will run on the AiO. Click **OK**.

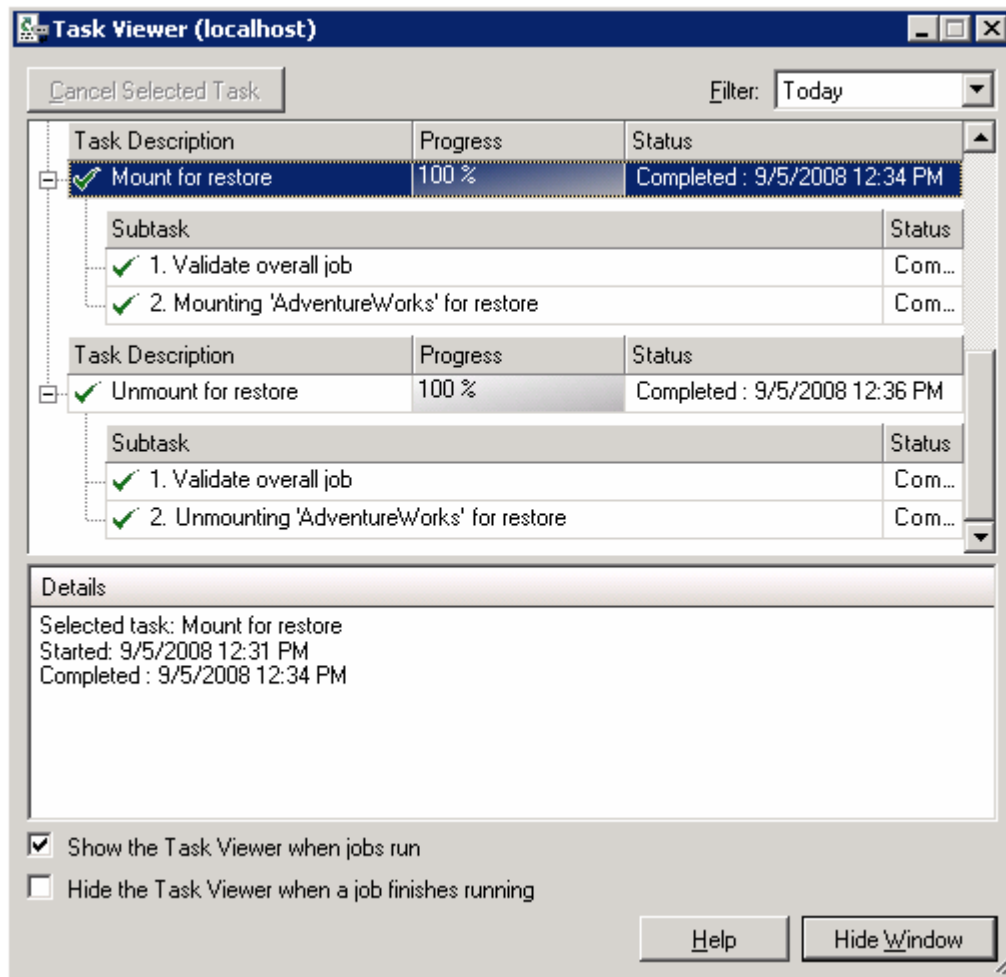


WARNING:

Before running a restore job that restores files to their original location, bring the respective applications offline. For a Microsoft Exchange Storage Group, this means bringing the mail stores and any public stores offline. For a SQL Server database, it means detaching the database. For any user-defined applications, make sure the application is ready for files to be restored.

By default, the restore starts immediately, but you may also schedule it for a later time on the **Job Initiation** tab.

The pre-script launches a “Mount for restore” job that appears in the All-in-One Storage Manager **Task Viewer** as shown below. When CommVault Galaxy finishes restoring the files, the post-script launches an “Unmount for restore” job.



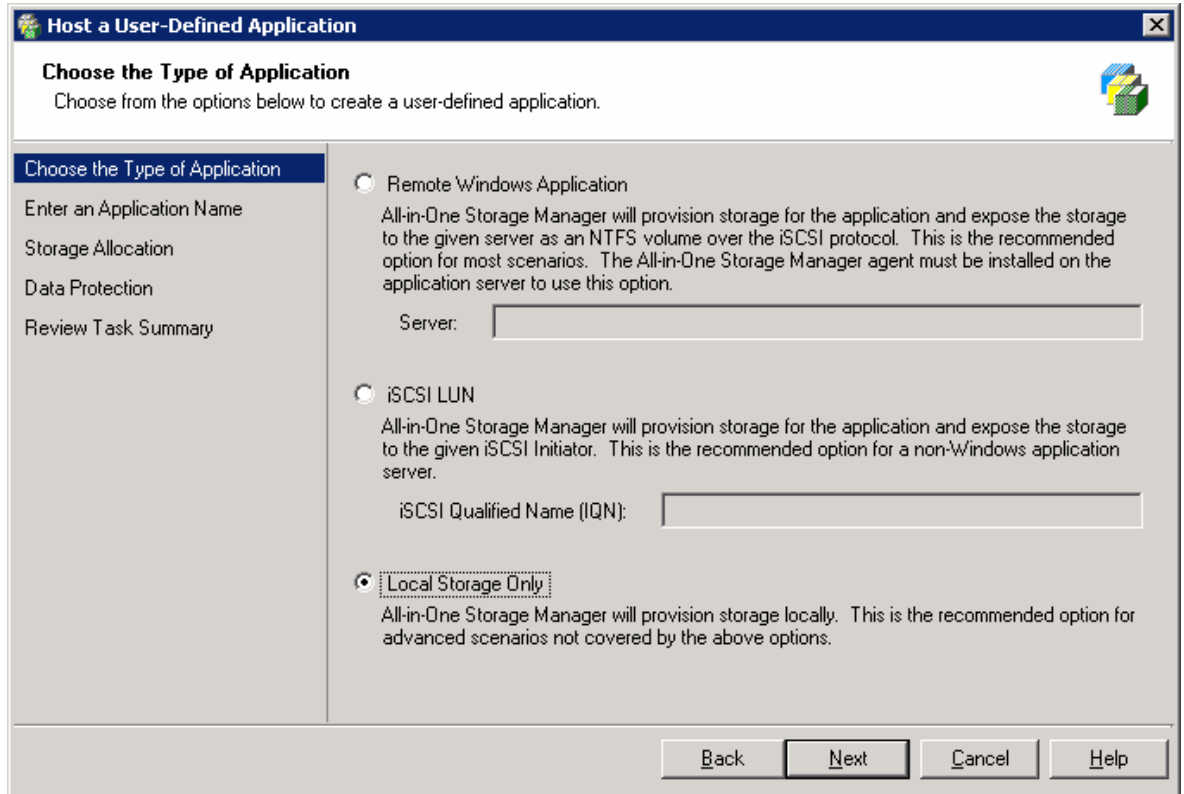
You can now restart the application (for example, bring Exchange mail stores online, attach SQL Server databases, and so on).

Creating a CommVault Magnetic Library on the AiO

CommVault Galaxy allows for the creation and use of “magnetic libraries” or virtual libraries. This allows backups to be made to one or more paths (i.e. disk to disk backup) rather than to tape. To use AiO storage as a magnetic library, install the CommVault Galaxy MediaAgent on the AiO.

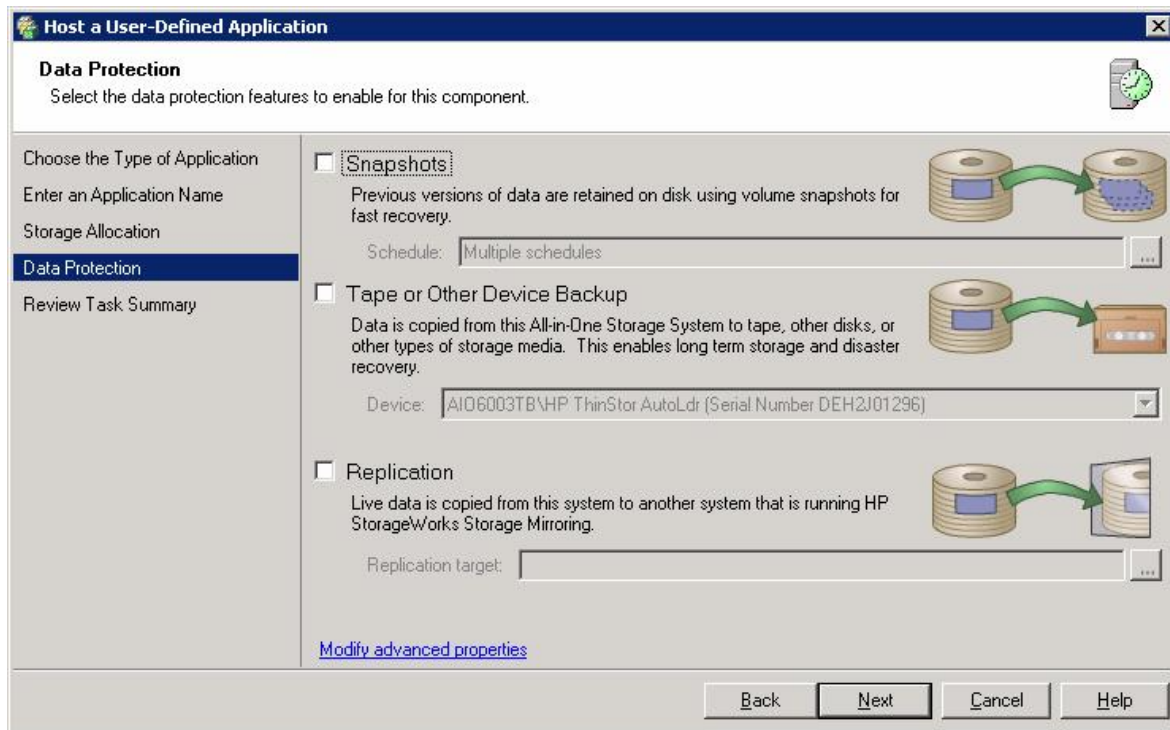
You can use All-in-One Storage Manager to provision storage on the AiO that will be used for a magnetic library. ASM provides a “Create a Virtual Library...” wizard, but this is used to provision storage for and create a Virtual Library Device in the integrated *HP Data Protector Express* software. To create storage for a CommVault magnetic library, use the **Host a User-Defined Application** wizard. After launching the wizard, choose the **Local Storage Only** option as shown below.

Figure 3. Host a User-Defined Application wizard



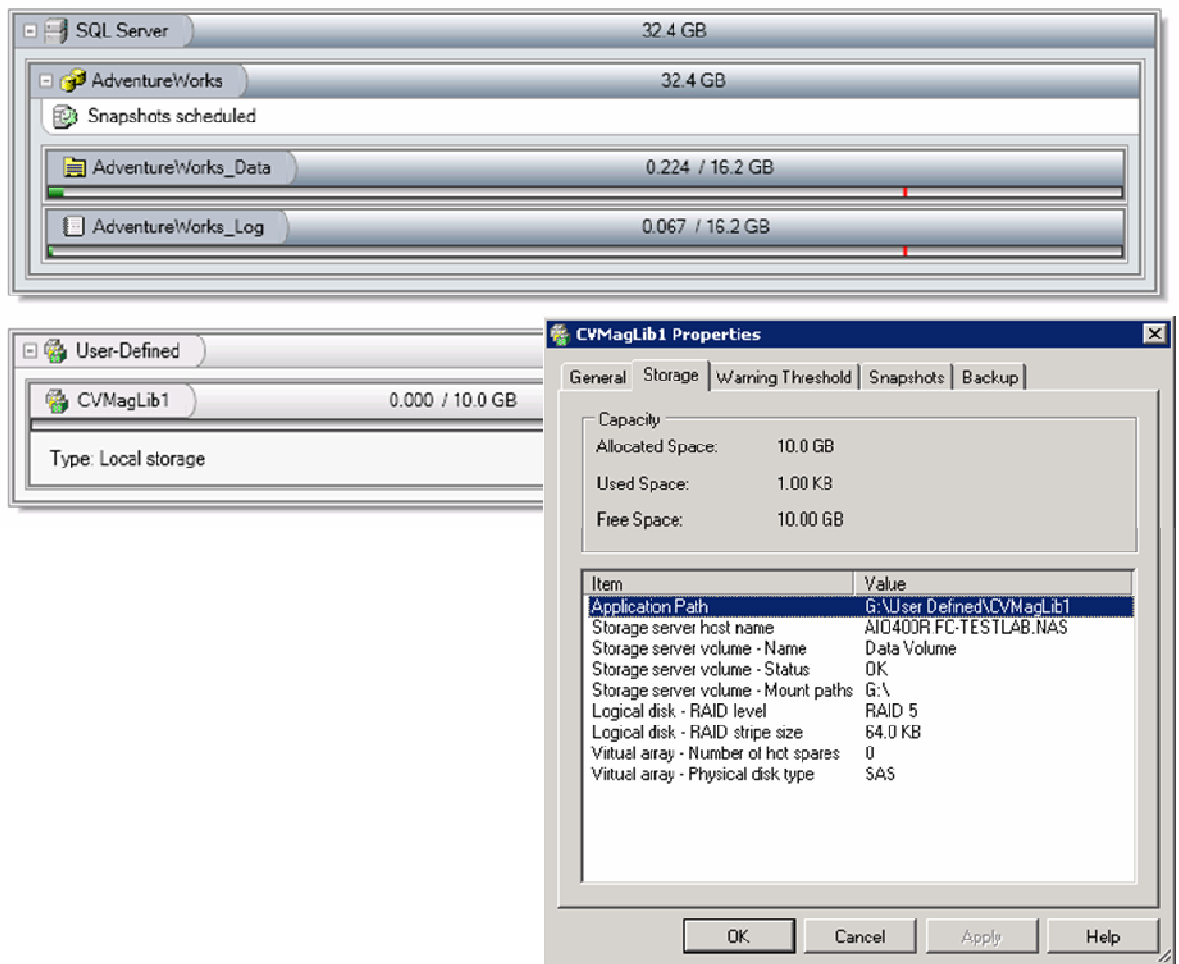
Continue through the wizard, choosing settings such as capacity and RAID level for the storage you want to provision. On the **Data Protection** page of the wizard (shown below) you probably do not want to configure any data protection for your magnetic library, although you can schedule periodic snapshots of the library or even replicate it to another system. Note that the **Tape or Other Device Backup** option is used to create backup jobs with the integrated Data Protector Express. Presumably you are using CommVault Galaxy rather than Data Protector Express, so avoid this option.

Figure 4. Host a User-Defined Application wizard – data protection



When you complete the wizard, All-in-One Storage Manager provisions storage according to your specifications and shows the storage graphically (as in the CVMagLib1 library shown below). You will need to know the path to this storage to finish creating your magnetic library in CommVault Galaxy. Right-click the representation of your file library and select **Properties**. The **Storage** tab of the **Properties** dialog shows the path in the **Application Path** field.

Figure 5. Locating the storage path for the magnetic library



Now that you have storage and a pathname for the magnetic library, you may create the library in CommVault Galaxy. From the CommCell browser, select **Tools->Control Panel**, and double-click **Library and Drive Configuration**.

Although it is not necessary to use All-in-One Storage Manager to provision storage for your magnetic library, doing so ensures that the storage may be easily monitored and grown, if needed. To allocate more space for the library in the future, right-click it in **All-in-One Storage Manager** and select **Allocate Space**.

Summary

While the AiO includes integrated HP Data Protector Express, HP recognizes that some users may have standardized on other backup software. This paper has described how CommVault Galaxy may be used, while still benefiting from key AiO features such as application-aware VSS snapshots and manipulation of the iSCSI volumes.

For more information

- For more information about HP StorageWorks All-in-One Storage Systems, see <http://www.hp.com/go/AiOStorage>.
- For more information about HP Data Protector Express, see <http://www.hp.com/go/dataprotectorexpress>.

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