

DocAve® 6 VM Backup & Restore

User Guide



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What's New in this Guide

- General improvements for enhanced functionality.

About DocAve VM Backup & Restore

DocAve VM Backup & Restore ensures resiliency of service in the event of a disaster and provides methods for recovering the entire VM backup data or select VM file backup data.

VM Backup & Restore offers full and incremental backup capabilities for VMs on the ESX/ESXi and vCenter host servers and full backup capability for VMs on the Hyper-V host servers. VM Backup & Restore also enables users to build backup plans and schedules that focus on frequent backup of high priority VMs, which improve backup operations and storage efficiency.

***Note:** If you want to back up and restore VMware VMs, you must manually deploy the files in the **VDDK** folder. For more details, refer to [Appendix B: Deploying Files in the VDDK Folder for Backing up and Restoring VMware VMs](#).

Submitting Documentation Feedback to AvePoint

AvePoint encourages customers to provide feedback regarding our product documentation. You can [Submit Your Feedback](#) on our website.

Before You Begin

Refer to the following sections for system and VM requirements that must be in place prior to installing and using VM Backup & Restore.

AvePoint's Testing Policy and Environment Support

Supported Software Environments

AvePoint is committed to testing against all major versions and service packs of SharePoint as well as the latest versions of Windows Server and SQL Server, as Microsoft announces support and compatibility.

***Note:** AvePoint does not recommend or support installing DocAve on client operating systems.

Supported Hardware

AvePoint is committed to maintaining a hardware agnostic platform to ensure that DocAve operates on common Windows file sharing and virtualization platforms. To ensure that DocAve is hardware agnostic, AvePoint tests hardware that is intended to support SharePoint and DocAve infrastructure, storage targets, and hardware-based backup and recovery solutions, as supported by AvePoint's partnerships. AvePoint directly integrates with the following platforms: any Net Share, FTP, Amazon S3, AT&T Synaptic, Box, Caringo Storage, Cleversafe, DELL DX Storage, Dropbox, EMC Atmos, EMC Centera, Google Drive, HDS Hitachi Content Platform, IBM Spectrum Scale Object, IBM Storwize Family, Microsoft Azure Storage, NetApp Data ONTAP, NFS, OneDrive, Rackspace Cloud Files, and TSM.

All other hardware platforms that support UNC addressable storage devices are supported.

***Note:** AvePoint has ended the test and development for Caringo Storage and DELL DX Storage in DocAve since DocAve 6 SP7 CU1, as the providers of these two platforms have stopped the platform maintenance.

***Note:** Due to changes in the IBM Tivoli Storage Manager API, DocAve 6 Service Pack 6 and later versions require that TSM Client version 7.1.2 is installed on the Control Service and Media Service servers.

***Note:** Most of the hardware partnerships referenced in this guide are intended to make use of advanced functionality (such as snapshot mirroring, BLOB snapshots, indexing, long-term storage, WORM storage, etc.), and are not indications that any changes to the product are required for basic support. In most cases, hardware can be supported with no change to the product.

Supported Backup and Recovery

DocAve supports BLOB backup storage according to the list of hardware platforms above. BLOB snapshot function, however, is currently only supported on OEM versions and NetApp hardware.

DocAve supports SQL content and Application database backups via the SharePoint Volume Shadow Copy Service (VSS) on all Windows and SQL server platforms listed above. DocAve also supports snapshot-based SharePoint VSS on all hardware listed above where the hardware partner has certified support with Microsoft.

DocAve supports application and configuration server backups for all the supported software environments listed above. DocAve 6 SP5 or later supports VM backup via Hyper-V/VMWare for the following operating systems: Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, and Microsoft Hyper-V Server 2012 R2.

Configuration

In order to use VM Backup & Restore, the DocAve 6 must be installed and configured properly.

Agents

DocAve Agents are responsible for running DocAve jobs and interacting with the VMs. To back up and restore the VM on different types of host servers, ensure that the DocAve Agents are properly installed as follows.

ESX/ESXi and vCenter Agent Installation

For ESX/ESXi and vCenter hosts, the DocAve Agent must be installed in a separate server that can communicate with the ESX/ESXi or vCenter through a Web service. AvePoint recommends that the DocAve Agent is not installed on the server intended to be backed up in order to prevent an interruption of Agent services while the backup occurs.

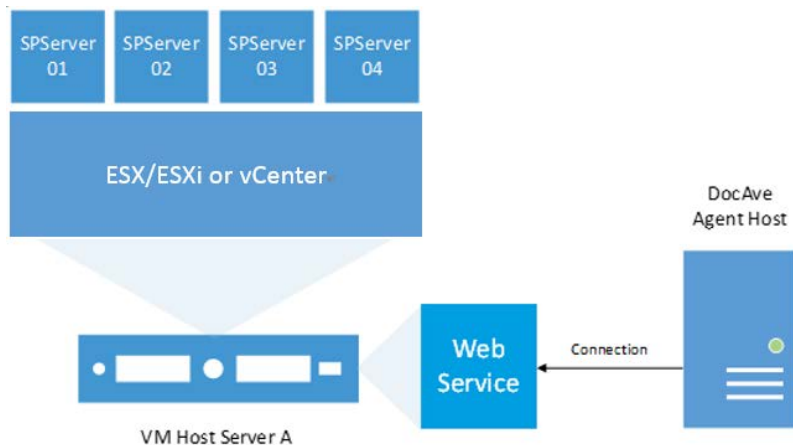


Figure 1: ESX/ESXi and vCenter Agent installation.

Hyper-V Agent Installation

For Hyper-V hosts, the DocAve Agent must be installed on the VM Host Server B as a local Agent. The DocAve Manager can be installed at any server, as long as the Manager server can connect the Agent server. If you have other Hyper-V VM host server, the VM Agent needs to be installed at the specific Hyper-V VM host server. For VMs on Hyper-V host server that is in the failover cluster, DocAve Agent must be installed on each node of the failover cluster.

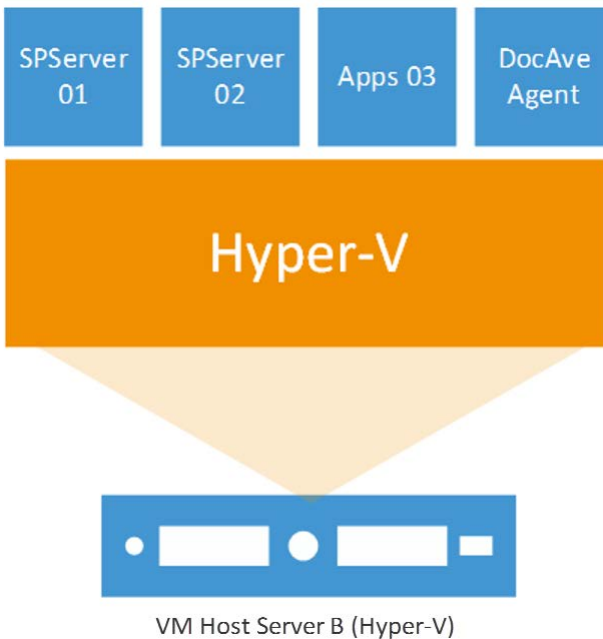


Figure 2: Hyper-V Agent installation.

For instructions on installing the DocAve Platform, DocAve Manager, and DocAve Agents, refer to the [DocAve 6 Installation Guide](#).

Required Permissions

Refer to the section below for the required permissions to use VM Backup and Restore.

Required Permissions for Hyper-V VM

To back up and restore the VMs on the Hyper-V host server, ensure the Agent account has the following permissions:

1. Local System Permission:
 - A member of the local **Administrators** group
2. Hyper-V VM Permission:
 - Full Control to the folders where the specific VMs are stored
 - Full Control to all of the VMs virtual hard disks

***Note:** If the VMs or the virtual hard disks are stored in a shared folder, the following permissions are required:

- **Read/Write** permission to the shared folder must be granted to the Agent account.
- **Full Control** permission to the shared folder must be granted to the user account of the Hyper-V host server.

Required Permissions for ESX/ESXi or vCenter VM

To back up and restore the VMs on the ESX/ESXi or vCenter host server, the Agent account and the user in the applied host profile must have the following permissions:

1. Local System Permissions for Agent Account
 - A member of the local **Administrators** group
2. ESX/ESXi or vCenter VMs Permissions for the User in the Applied Host Profile
 - Administrator role to the ESX/ESXi or vCenter VMs

***Note:** If the user does not have the Administrator role to the ESX/ESXi or vCenter VMs, ensure that this user is assigned by a role with at least the privileges in the following table enabled:

Privileges	
Datastore	Allocate space
	Browse datastore
	Low level file operations
	Remove file
Folder	Create folder
Resource	Assign vApp to resource pool
	Assign virtual machine to resource pool
	Create resource pool
vApp	Add virtual machine
	Assign resource pool
	Assign vApp
	Create

Privileges			
	vApp application configuration		
	vApp instance configuration		
Network	Assign network		
Virtual machine	Configuration		
	Interaction	Answer question	
		Configure CD media	
		Configure floppy media	
		Device connection	
		Power On	
		Power Off	
	Inventory	Create new	
		Register	
		Remove	
		Unregister	
	Snapshot management	Create snapshot	
		Remove Snapshot	
	Provisioning	Allow disk access	
		Allow read-only disk access	
		Allow virtual machine download	
	Guest Operations	Guest Operation Modifications	
		Guest Operation Program Execute	
		Guest Operation Queries	
	Permission	Modify permissions	

Privileges		
	Modify role	
Alarms	Create Alarm	
	Disable alarm action	
Host	Inventory	Modify cluster
Datastore cluster	Configure a datastore cluster	
Global	DisableMethods	
	EnableMethods	
	License	

***Note:** If the user does not have the Administrator role to the ESX/ESXi or vCenter VMs, to restore the **Security** settings in the backed up VMs, except the privileges above-mentioned, this user must have all of the privileges that are enabled to all of the users to be restored.

Supported Operating System for Hyper-V Host Server

VM Backup and Restore supports the following English-language operating system editions for the Hyper-V host server:

- Windows Server 2008 R2
- Windows server 2012
- Windows Server 2012 R2
- Microsoft Hyper-V Server 2012 R2
- Windows Server 2016

***Note:** The following elements are not supported when backing up VMs in Hyper-V Failover Cluster:

- The shared disk VHDX files of the VMs hosted on Hyper-V host server with **Windows Server 2012 R2** operating system.
- The shared disk VHD Set files of the VMs hosted on Hyper-V host server with **Windows Server 2016** operating system.

***Note:** If the operating system of your Hyper-V host server is **Windows Server 2008 R2** or **Windows server 2012**, in order to ensure that the VMs on this host server keep functioning properly during the backup process, the following must be in place:

- The **Backup (volume snapshot)** service is offered to these Hyper-V VMs.
- The operating system for these Hyper-V VMs supports VSS snapshot.
- The **Hyper-V Volume Shadow Copy Requestor** service in these VMs is running during the backup process.

Supported ESXi Host Server Versions

VM Backup and Restore supports the following ESXi host server versions:

- VMware ESXi 5.0
- VMware ESXi 5.5
- VMware ESXi 6.0

Supported vCenter Host Server Versions

VM Backup and Restore supports the following vCenter host server versions:

- VMware vCenter server 5.5
- VMware vCenter server 6.0

Health Analyzer

AvePoint recommends using Health Analyzer to check the prerequisites required to correctly use DocAve Platform Backup and Restore.

***Note:** Only the users in the DocAve **Administrators** group can use Health Analyzer.

For more information about Health Analyzer, refer to the [DocAve 6 Installation Guide](#).

Getting Started

Refer to the sections below for important information on getting started with VM Backup & Restore.

Launching VM Backup & Restore

To launch VM Backup & Restore and access its functionality, complete the following steps:

1. Log in to DocAve. If you are already in the software, click the **DocAve** tab.
2. From the **DocAve** tab, click **Data Protection** to view the **Data Protection** modules.
3. Click **VM Backup & Restore** to launch this module.

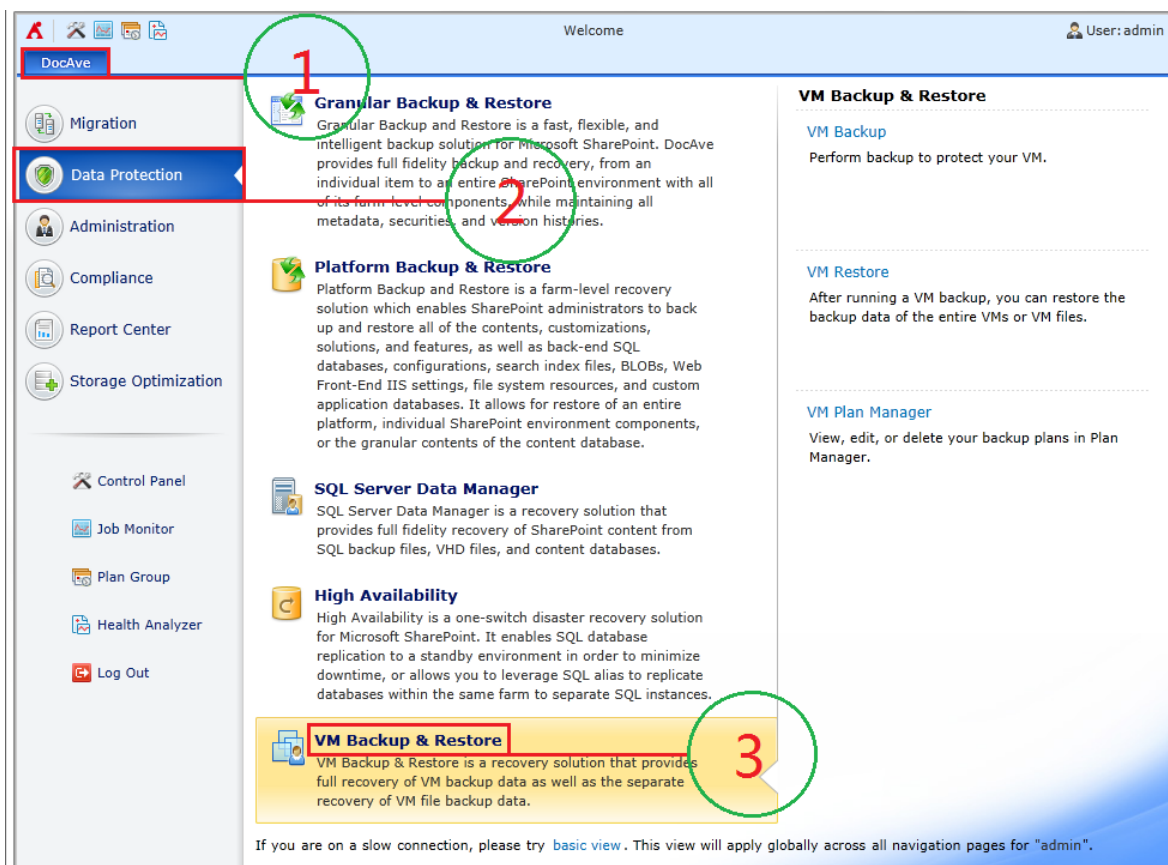


Figure 3: VM Backup & Restore user interface.

Navigating DocAve

DocAve mimics the look and feel of many Windows products, making for an intuitive and familiar working environment. While there are many windows, pop-up displays, and messages within DocAve products, they share similar features and are navigated in the same ways.

Below is a sample window in DocAve. It features a familiar, dynamic ribbon, and a searchable, content list view.

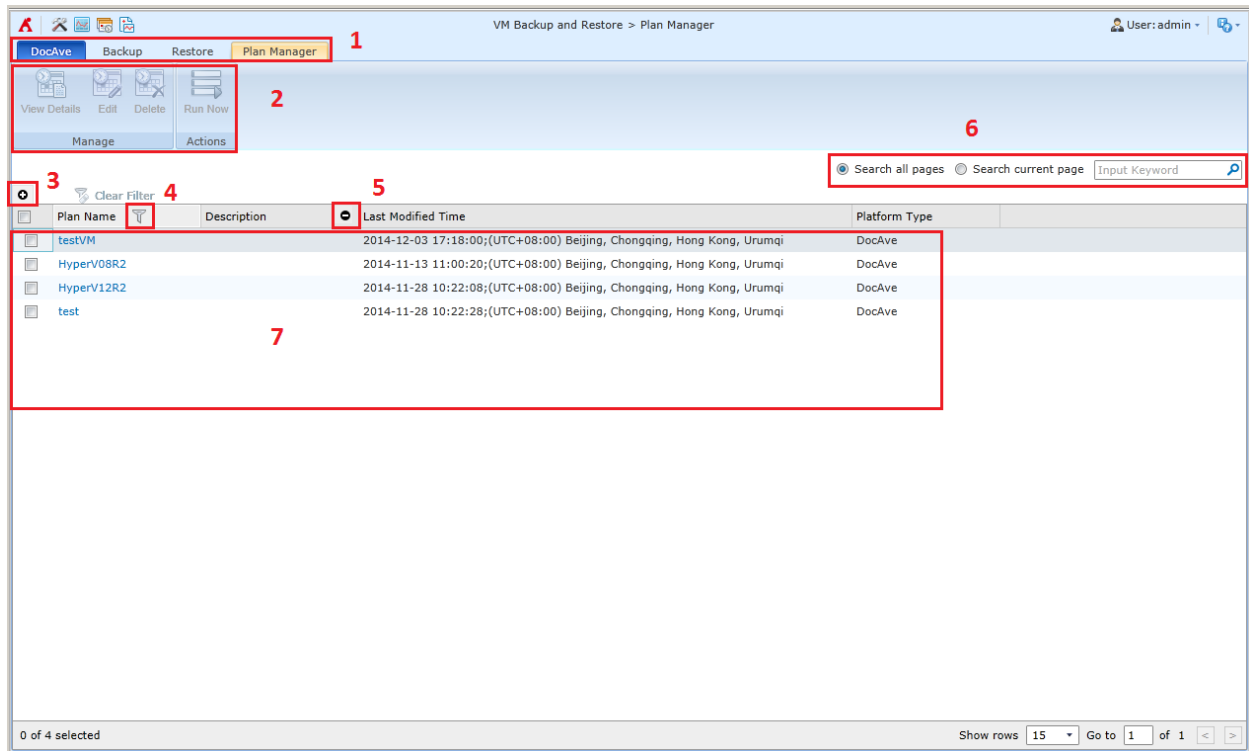


Figure 4: Navigating DocAve.

1. Ribbon Tabs— Allows users to navigate to the DocAve Welcome page and within the active module.
2. Ribbon Panes – Allows users to access the functionality of the active DocAve module.
3. Manage columns (⊕) – Allows users to manage which columns are displayed in the list. Click the manage columns (⊕) button, and then select the checkbox next to the column name in the drop-down list.
4. Filter the column (🔍) – Allows users to filter the information in the List View. Click the filter the column (🔍) button next to the column and then select the checkbox next to the column name.
5. Hide the column (⊖) – Allows users to hide the selected column.
6. **Search** – Allows users to search the List View pane for a keyword or phrase. You can select **Search all pages** or **Search current page** to define the search scope.
***Note:** The search function is not case sensitive.
7. Management Pane – Displays the actionable content of the DocAve module.

User Interface Overview

The VM Backup & Restore interface launches with the **Backup** tab active. This tab displays the dashboard and allows for quick access to a list of the VM Backup & Restore features.

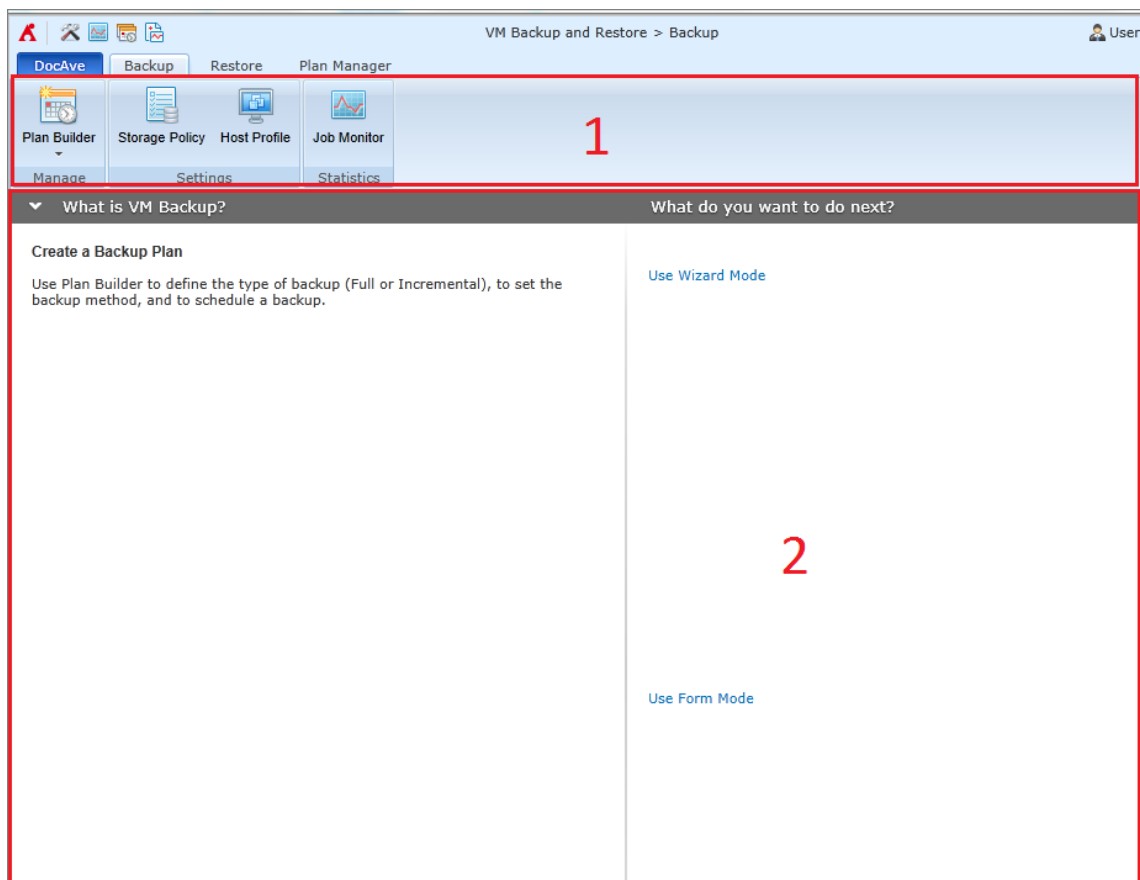


Figure 5: VM Backup & Restore user interface.

1. The **ribbon** shows the available actions for VM Backup & Restore.
2. The **workspace** shows explanations for the content of VM Backup & Restore that are used during the configuration of actions performed in DocAve products.

Configuring Host Profile

The host profile provides the connection to the host server for backing up and restoring VM data managed by this host server. In order to perform a backup or restore job to the VMs managed by the ESX/ESXi, vCenter, Hyper-V, or Hyper-V Cluster host using VM Backup and Restore, you need to first configure one or more host profiles of the corresponding host type.

For instruction on configuring a host profile, refer to the [DocAve 6 Control Panel Reference Guide](#).

Configuring Devices and Setting Up Storage Policies

In order to perform a backup job using VM Backup & Restore, it is necessary to first configure one or more physical devices and then set up a storage policy.

When performing a backup job, VM Backup & Restore can write to Net Share or IBM Storwize Family.

***Note:** To perform successful VM Backup and VM Restore, the physical device cannot be created in the VMs you are about to back up and restore.

***Note:** VM Backup and Restore only supports the storage policies with a concurrent storage device configured.

In addition, DocAve has the ability to treat multiple storage devices as a single logical unit when saving backup data. This feature is especially useful for very large backup plans, because many small devices can be combined. A logical device must be defined before creating a backup plan.

For instructions on defining devices and setting up storage policies, refer to the [DocAve 6 Control Panel Reference Guide](#).

***Note:** The performance of the restore job that restores the backup data stored in the Concurrent storage device will be more efficient.

Performing a Backup

You can use the Plan Builder to create a plan for performing a VM backup. There are two methods you can select for Plan Builder to create a plan:

- [Using Wizard Mode](#)
- [Using Form Mode](#)

Overview of Backup Types

When configuring a backup plan, there are two backup types you can select to perform a backup job: **Full** and **Incremental**.

The **Full** option backs up all of the selected data each time a backup is performed. This option requires the most storage space because, depending upon the size of your VM server, each backup file can be large. Unlike incremental backup, all full backup files are independent of one another and do not have any dependencies on other back up data files, however, because each of the backups is comprehensive, full backup jobs take the longest time to complete.

The **Incremental** option backs up only the data that has been updated since the last backup, drastically reducing the size of the backup files created. Incremental backups also reduce execution time, allowing for shorter backup windows. It is important to note, however, that in order to recover all of the most recent VM data from an incremental backup, all of the backup files must be available. Each incremental backup file is an important piece of the whole VM server backup. If one of these files is not available, the full VM server backup cannot be restored.

For example, the following three cylinders represent three backups and they are performed in this order – Full Backup, Incremental Backup, Incremental Backup:

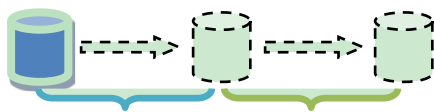


Figure 6: One Full backup followed by two Incremental backups.

1. The first Incremental Backup backs up the newly-added data in the blue period.
2. The second Incremental Backup backs up the newly-added data in the green period.

***Note:** The Hyper-V VMs does not support Incremental backup. If you select the Incremental backup, you can choose whether or not to perform a Full backup for the Hyper-V VMs in the selected scope.

Using Wizard Mode

To configure a plan using Wizard Mode, complete the following steps:

***Note:** A red asterisk (*) marked next to a field in the DocAve GUI indicates a mandatory field.

1. **Plan Name** – Enter a **Plan Name** and an optional **Description**. Click **Next**. The **Add VMs** page appears.
2. **Add VMs** – Add VMs to the backup list for the backup plan. Click **Add**. In the pop-up **Add VMs to the Backup List** interface, configure the following settings:

- a. **Host Profile** – Select a host profile. The VMs managed by the host selected in the host profile will be loaded as the backup scope.

***Note:** When backing up VMs on the Hyper-V host server that is in Failover Cluster, select Hyper-V Cluster type as the host profile.


***Note:** When backing up VMs on the Hyper-V host server and the snapshots are not successfully created, the backup job will fail.

***Note:** When backing up VMs on the Hyper-V host server, the VHD and VHDX files that are stored in the root path of a device will be not be successfully snapshotted. To successfully back up the selected VMs, please do not choose root path to store VHD and VHDX files.

- b. **Agent** – Select an Agent for connecting to the host server in the selected host profile and executing the backup job.

***Note:** If the VM host type of the selected host profile is Hyper-V, the Agent selected for this host profile will be retrieved automatically. The **Select an Agent** field will be disabled.

***Note:** If you select Hyper-V Cluster as the host profile for backing up VMs on the Hyper-V host server that is in Failover Cluster, the selected Agent must be in the cluster that is specified in the selected host profile.

- c. **VM Selection** – Select one or more VMs in the loaded tree. Expand the loaded VM tree and then select the VMs you want to back up. After expanding the tree, use the **Search** text box and then click the magnifying glass () button to find specific VMs.

***Note:** When you hover the mouse over one of the VMs, the information about the VM operating system and memory will appear. For a Hyper-V VM that has a Windows operating system installed, the VM that is powered-on with VM setting

Integration Services > Data Exchange selected will display the specific information of the operating system.

***Note:** For the VMs on ESX/ESXi or vCenter host servers, DocAve does not support backing up the VM whose configuration file name or VM disk file name contains # { }.

***Note:** When selecting VMs on the Hyper-V host server that is in the failover cluster to back up, the tree can only be expanded to Roles of Virtual Machine type and Other type.

***Note:** If the VMs on the ESX/ESXi or vCenter host server have configured **SCSI Bus Sharing** in the **Virtual Machine Properties > SCSI Controller** with **Virtual** option or **Physical** option selected, these VMs cannot be snapshotted and backed up.

Click **Add** to add the selected VMs to the backup list and go back to the **Add VMs** interface. Click **Next** when you are finished. The **Settings** interface appears.

3. **Settings** – Configure the following settings:

- **Storage Policy** – Select the storage policy for the backup data in the **Select a storage policy** drop-down list or create a new storage policy by clicking the **New Storage Policy** link in the **Select a storage policy** drop-down list.

***Note:** Only the storage policies with a concurrent storage device configured are supported and can be loaded in the **Select a storage policy** drop-down list. You can view the physical device that contains the backup data in the **Job Details** of backup job.


A storage policy is used to configure a set of rules for storing backed up data. It also supports configuring the retention rule to prune the data backed up by VM Backup and Restore and delete or move the pruned backup data.

***Note:** The retention rule will not occur if **Differential backup** is configured as the retention trigger: **Differential backup** is not supported by VM Backup and Restore.

For more information on working with storage policies, refer to the [DocAve 6 Control Panel Reference Guide](#).

- **Notification** – Select the e-mail notification profile for sending e-mails. For more information on working with notification policies, refer to the [DocAve 6 Control Panel Reference Guide](#).

Click **Next** when you are finished. The **Schedule** interface appears.

4. **Schedule Selection** – Select a scheduling option.
 - **No Schedule** – Select this option to make the job not run on a particular schedule.
 - **Configure the schedule myself** – Select this option to configure a customized schedule, and run the backup job by that schedule. Click **Add Schedule** to set up a schedule. The **Add Schedule** window appears. For more information about adding a schedule, refer to [Backup Schedule](#). After configuring the schedule for the backup job, click **Calendar View** to view the scheduled jobs by **Day**, **Week**, or **Month**. Multiple schedules can be added and displayed in the **Summary** table. Click the delete () button to delete a schedule.

Click **Next** after you are finished. The **Overview** interface appears.

5. **Overview** – Review and edit the plan selections. To make changes, click **Edit** to the right of the row. This links to the corresponding setting page, allowing you to edit the configuration.
6. On the lower-right section of the screen, or on the ribbon, click **Finish** to save the configuration of the plan without running it or **Finish and Run Now** to save the configuration and then run the saved plan immediately. The backup plan is now listed in Plan Manager.

Backup Schedule

Configure the following settings to add a new backup schedule.

1. **Options** – Select a backup type from the drop-down list. For more information, refer to the [Overview of Backup Types](#) section.
 - **Full Backup** – A full backup of the selected source.
 - **Incremental Backup** – A partial backup; backs up only the data that has been added since the last backup (whether it's full or incremental).

***Note:** For best results when conducting high frequency backups, it is recommended that you use incremental backups. Incremental backups save time and storage space by backing up only the differences between incremental backups or an incremental backup and a full backup, instead of backing up the entire source location.

***Note:** The Hyper-V VMs does not support incremental backup. If you select the incremental backup, you can choose whether or not to perform a Full backup for the Hyper-V VMs in the selected scope.

2. **Backup Hyper-V VMs** – Choose whether or not to perform a Full back for the Hyper-V VMs in the selected scope. Select **Yes** to perform a Full backup on the Hyper-V VMs; select **No** to skip the backup of the Hyper-V VMs. This field only appears when the backup type you selected is **Incremental Backup**.
3. **Type** – Select the interval at which the backup occurs: **By hour**, **By day**, **By week**, or **By month**.
4. **Schedule Settings** – Set up the frequency for the scheduled backup job. If you select the type as **By hour**, **By week**, or **By month**, you will have the option to check the **Advanced** checkbox to configure more settings for the frequency. For more information, see the [Advanced Predefined Scheme Settings](#) section below.
5. **Range of Recurrence** – Choose one of the following options to configure when to start and stop running the recurring schedule:
 - **No end date** – The job is run on the schedule indefinitely.
 - **End after ... occurrences** – The job stops running after the entered amount of occurrences.
 - **End by** – The job stops repeating on schedule on the date you select.

Advanced Predefined Scheme Settings

The following advanced settings are available for configuring a predefined scheme:

By Hour

- **Specify production time: From ... to ...** – Run the backup job on the selected production time.
- **Select time below** – Select the time you want to run the backup job. To add several run job times, click **Add**.

By Week

Run every ... weeks; On ... – Select which days of the week to run the plan on, and enter after how many weeks for it to recur.

By Month

- **On day ... of ...** – Select the day and the month to run the backup job. For example, set this option as **On day 3 of January**, and the backup is run on 3rd January.
- **Day ... of every ...months** – Select the day and the month interval to run the backup job. For example, set this option as **Day 3 of every 2 months**, which means the backup job will run on the 3rd of this month, and on the 3rd of the month after next month, until the configured end date.

- **The of every ... months** – Select the time and the interval for the backup job. For example, set this option as **The First Monday of every 2 months**, which means the backup job will run on the first Monday of this months and on the first Monday of the month after next month, until the configured end date.
- **The of ...** – Select the day and the month for the backup job. For example, set this option as **The First Monday of January**, and the backup is run on the first Monday of January.

Using Form Mode

Form Mode is intended for advanced users only. To configure a plan using Form Mode, complete the following steps:

***Note:** A red asterisk (*) marked next to a field in the DocAve GUI indicates a mandatory field.

1. **Plan Name** – Enter a **Plan Name** and optional **Description**.
2. **Add VMs to the Backup List** – Add VMs to the backup list for the backup plan. Click **Add** in the **Create a New Plan** interface, the **Add VMs to the Backup List** interface appears. Configure the following settings:

- a. **Host Profile** – Select a host profile. The VMs managed by the host selected in the host profile will be loaded as the backup scope.

***Note:** When backing up VMs on the Hyper-V host server that is in Failover Cluster, select Hyper-V Cluster type as the host profile.


***Note:** When backing up VMs on the Hyper-V host server and the snapshots are not successfully created, the backup job will fail.

***Note:** When backing up VMs on the Hyper-V host server, the VHD and VHDX files that are stored in the root path of a device will be not be successfully snapshotted. To successfully back up the selected VMs, please do not choose root path to store VHD and VHDX files.

- b. **Agent** – Select an Agent for connecting to the host server in the selected host profile and executing a backup job.

***Note:** If the VM host type of the selected host profile is Hyper-V, the Agent selected for this host profile will be retrieved automatically. The **Select an Agent** field will be disable.

***Note:** If you select Hyper-V Cluster as the host profile for backing up VMs on the Hyper-V host server that is in Failover Cluster, the selected Agent must be in the cluster that is specified in the selected host profile.

- c. **VM Selection** – Select one or more VMs in the loaded tree. Expand the loaded VM tree, and then select the VMs you want to back up. After expanding the tree, use the **Search** text box and then click the magnifying glass () button to find specific VMs.

***Note:** When you hover the mouse over one of these VMs, the information about the VM operating system and memory will appear. For a Hyper-V VM that has a Windows operating system installed, the VM that is powered-on with VM setting **Integration Services > Data Exchange** selected will display the specific information of the operating system.

***Note:** For the VMs on ESX/ESXi or vCenter host servers, DocAve does not support backing up the VM whose configuration file name or VM disk file name contains # { }.

***Note:** When selecting VMs on the Hyper-V host server that is in the failover cluster to back up, the tree can only be expanded to Roles of Virtual Machine and Other type.

***Note:** If the VMs on the ESX/ESXi or vCenter host server have configured **SCSI Bus Sharing** in the **Virtual Machine Properties > SCSI Controller** with **Virtual** option or **Physical** option selected, these VMs cannot be snapshotted and backed up.

- d. Click **Add** to add the selected VMs to the backup list.


3. **Storage Policy** – Select the storage policy for the backup data in the **Select a storage policy** drop-down list or create a new storage policy by clicking the **New Storage Policy** link in the **Select a storage policy** drop-down list.

***Note:** Only the storage policies with a concurrent storage device configured are supported and can be loaded in the **Select a storage policy** drop-down list.

A storage policy is used to configure a set of rules for storing backed up data. It also supports configuring the retention rule to prune the data backed up by VM Backup and Restore and delete or move the pruned backup data.

***Note:** The retention rule will not occur if **Differential backup** is configured as the retention trigger: **Differential** backup is not supported by VM Backup and Restore.

For more information on working with storage policies, refer to the [DocAve 6 Control Panel Reference Guide](#).

4. **Schedule** – Select a scheduling option.
 - **No Schedule** – Select this option to configure the job to not run on a schedule (the job must be manually initiated).
 - **Configure the schedule myself** – Select this option to configure a customized schedule, and run the backup job by schedule. Click **Add Schedule** to set up a schedule. The **Add Schedule** window appears. For more information about adding a schedule, refer to [Backup Schedule](#). After configuring the schedule for the backup job, click **Calendar View** to view the scheduled jobs by **Day**, **Week**, or **Month**. Multiple schedules can be added and displayed in the **Summary** table. Click the delete () button to delete a schedule.
5. **Notification** – Select the e-mail notification profile for sending e-mails. For more information on working with notification policies, refer to the [DocAve 6 Control Panel Reference Guide](#).
6. On the lower-right section of the screen, or on the ribbon, click **Save** to save the configuration of the plan without running it or **Save and Run Now** to save the configuration and then run the saved plan immediately. The backup plan is now listed in Plan Manager.

Configuring VMConfiguration.xml File

You can make the following custom configuration by editing the **VMConfiguration.xml** file.

Go to the machine with the DocAve Agent installed and open the ...*AvePoint*\DocAve\Agent\data\VM directory to find the **VMConfiguration.xml** file.

Configuring Provider in Configuration File

This is used for VMs on the Hyper-V host server. Edit the **VMConfiguration.xml** file to configure a provider for making a snapshot of the disk:

1. Open the **VMConfiguration.xml** file with notepad.
2. Modify the default information of `<ConfigProvider></ConfigProvider>` node:
 - In the **PreferProvider Path = ""** attribute, enter the value of the disk to be snapshotted;
 - In the **ProviderId = ""** attribute, enter the value of the specified provider.

***Note:** You can also add **PreferProvider Path = ""** and **ProviderId = ""** attributes in the `<ConfigProvider></ConfigProvider>` node for entering values of the provider used for snapshotting the disk.

Configuring the Maximum Size of Backed up Data Block

Edit the maximum size of the entire backed up data block to be transferred to the destination in the **VMConfiguration.xml** file:

1. Open the file with Notepad and find the **<Transfer> </Transfer>** node.
2. Enter the desired value of the **<Data MaxBlockSize="" />** attribute, and the unit of size is MB.

***Note:** The maximum limit of the data block size is 2 GB, so the maximum value of this attribute is 2047.

Backing Up a VMDK File with VDDK Multiple Threads

Backing up a VMDK file through VDDK multiple threads will improve performance of VM Backup.

1. Open the file with Notepad, and find the **<Backup> </Backup>** sub node under the **<VMware> </VMware>** node.

2. Find the following attributes:

```
<VDDK MultipleThreadEnabled="true" MaxThreadCount="3"  
AdvancedTransportEnabled="true" TransportModes="" />
```

3. Enter values of the attributes refer to the instructions below:

- **VDDK MultipleThreadEnabled** – Enter **"true"** or **"false"** as the value to define whether or not to enable VDDK multiple threads. The default value is **true**.
- **MaxThreadCount** – Enter an integer between one and five as the value to define how many threads will run. The default value is three. However, the maximum value depends on your environment. You can perform VM Backup with multiple threads to test which value will get to the best performance.
- **AdvancedTransportEnabled** – This attribute is used to define advanced transport modes. It is recommended to enter **"true"** as the value for supporting SAN (Storage Area Network). Entering **"false"** will compulsorily use the NBD transport method (the method with least performance).
- **TransportModes** – This attribute will take effect if the value of the attribute **AdvancedTransportEnabled** is **true**. It is recommended to leave empty value for this attribute, and the VDDK will choose the best transport method from the order of: SAN Transport, HotAdd Transport, and NBD Transport. For details on the transport methods, refer to [Virtual Disk Programming Guide](#) on page 23. You can also set the transport methods as the value of the **TransportModes** attribute, and use ":" to separate them. For example, **TransportModes="san:hotadd"**. The VDDK will choose the best transport

method from the values you set. To use the SAN Transport or HotAdd Transport method, note the following conditions:

- SAN Transport – The Agent used to execute backup must be a physical machine that can access the datastore where the backed up VM disks reside.
- HotAdd Transport – This method is available when the Agent used to execute backup and the backed up VM must be on the same host server, or the backed up VM and the host server that the Agent used to execute backup are in the same datacenter, and they use the same datastore.

Configuring Backup Option for Backing Up VMs with Independent Disks

This is used for VMs on ESX/ESXi and vCenter host server. If there are independent disks on VMs, you can configure backup option through editing **VMConfiguration.xml** file:

1. Open the file with Notepad, and find the **<Backup></Backup>** sub node under the **<VMware></VMware>** node.
2. Find the attribute **IndependentDiskBackupOption**, and refer to the section below for definitions of the values:
 - **0** – The default value is **0**, and the VMs with independent disks will fail to be backed up. After the backup job is finished, you can view details of the independent disks in **Job Details > Virtual Machine Details**.
 - **1** – Modifying the value to **1** and entering **false** as the value of the **AdvancedTransportEnabled** attribute will back up the independent disks. If there are independent disks and persistent disks on the VM, turn off the VM before performing the VM Backup. Otherwise, the backup may fail due to the disks used by the running VM. Note that when performing an **Incremental Backup** for a backed up VM with independent disks, the independent disks will be fully backed up.
***Note:** VM Backup and VM Restore support backing up and restoring the data added to the independent disk before the disk is configured as **Nonpersistent** independent disk.
 - **2** – Modifying the value to **2** will skip backing up the independent disks, and the skipped disks will not be restored.

Unsupported Elements to Be Backed Up

The followings elements are not supported to be backed up by VM Backup and Restore:

- Unsupported VMs:
 - ESX/ESXi or vCenter VMs using the Raw Device Mappings disks

- ESX/ESXi VMs with Fault Tolerance turned on in vCenter host cluster
- VMs with the same name stored on the datastore in the vCenter datastore cluster
- Hyper-V VMs using any Pass-through disks
- Unsupported elements that are associated with VMs:
 - LUNs that are mapped to the Hyper-V VMs, Hyper-V Failover Cluster VMs, ESX/ESXi or vCenter VMs

Managing Plans

After launching the **VM Backup and Restore** interface, click **Plan Manager** next to the **Restore** tab. In the Plan Manager interface, all of the created plans are displayed in the main display pane.

In this interface, you can change the number of plans displayed per page. To change the number of the plans displayed per page, select the desired number from the **Show rows** drop-down menu in the lower right-hand corner. To sort the plans, click the column heading such as **Plan Name**, **Description**, **Plan Group**, **Farm**, **Last Modified Time** and **Platform Type**.

Perform the following actions in the **Plan Manager** interface:

- **View Details** – Select a plan and click **View Details**. The backup scope and the plan settings are displayed on the **View Details** interface. When you want to change the nodes you selected or want to modify the backup settings, click **Edit** on the ribbon.
- **Edit** – Select a plan and click **Edit** on the ribbon to change the configurations for the selected plan. You can change the nodes you selected and modify the VM Backup plan settings.

***Note:** If the host type of the host profile in the plan you are about to edit is ESX/ESXi and the ESX/ESXi VMs selected in this plan are currently managed by the vCenter host server, update the specific host profile by changing the host server type from ESX/ESXi to vCenter first. For instruction about how to edit the created host profile, refer to the [DocAve 6 Control Panel Reference Guide](#).

After editing the selected plan, on the lower-right section of the screen or on the ribbon, click:

- **Save** to save the configuration of the plan without running it.
- **Save As** to save the configuration for another plan.
- **Save and Run Now** to save the configuration and then run the saved plan immediately.

- **Delete** – Select the plans that you want to delete and click **Delete** on the ribbon. A confirmation window will pop up and ask whether you are sure that you want to proceed with the deletion. Click **OK** to delete the selected plans, or click **Cancel** to return to the **Plan Manager** interface without deleting the selected plans.
- **Run Now** – Click **Run Now** to go to the **Run Now** interface. For more information of the settings on **Run Now** interface, see [Configuring Run Now Interface](#).

Configuring Run Now Interface

In the **Run Now** interface, configure the backup job settings.

- **Option** – Select a backup type from the drop-down list. For more information, see [Overview of Backup Types](#).
 - **Full Backup** – A full backup of the selected source.
 - **Incremental Backup** – A partial backup; backs up only the content that has been updated since the last backup, whether it's Full or Incremental.

***Note:** The Hyper-V VMs does not support incremental backup. If you select the incremental backup, you can choose whether to perform a full backup for the Hyper-V VMs in the selected scope.

***Note:** For best results when conducting high frequency backups, it is recommended to use incremental backups. Incremental backups save time and storage space by backing up only the differences between incremental backups or an incremental backup and a full backup, instead of backing up the entire source location. **Backup Hyper-V VMs** – Choose whether to perform a full back for the Hyper-V VMs in the selected scope. Select **Yes** to perform a full backup on the Hyper-V VMs; select **No** to skip the backup of the Hyper-V VMs. This field only appears when the backup type you selected is **Incremental Backup**.

Performing a Restore

A VM restore can be performed both on the VM data backed up using DocAve's VM Backup and Restore and Platform Backup and Restore. VM Restore can perform a full recovery solution as well as a targeted recovery solution using the following restore modules:

- [Restoring VM](#)
- [Restoring File](#)

Restoring VM

A VM restore job provides a full recovery solution for restoring the entire backup data of the backed up VMs. The two restore types are:

- **In place restore** – Restore the selected VM backup data to its original host server.
- **Out of place restore** – Restore the selected VM backup data to another host server.



***Note:** Securities of the VMs on ESX/ESXi or vCenter host server cannot be restored by out of place restore.

Selecting Backup Data to Restore

Two restore methods are provided for selecting the backed-up data: **Time-based restore** and **Object-based restore**. Use **Time-based restore** to select a backup job on the calendar, and then select objects to restore the backed-up data. Use **Object-based restore** to restore the backed-up data by selecting the specific object and selecting which backup job to restore it from. Refer to the sections below for details.

Time-Based Restore

The **Time-based restore** is designed to find the backed-up jobs first, and then select the objects to restore the backed-up data. Complete the following steps to configure a time-based restore:

1. On the **Restore** tab in VM Backup and Restore, click **Restore** on the ribbon. The **Restore** interface appears. Click **Restore VM** in the **Manage** group and the **Restore Method** interface appears.
2. **Restore Method** – Select the **Time-based restore** option, and then click **Next**. The **Job Selection** interface appears.
3. **Job Selection** – The jobs completed within the 7 days are available in the calendar. Click **Day**, **Week**, or **Month** in the top-right corner of the calendar to change the view to see all available jobs. Click the **Previous** () or **Next** () button on the top-left of the calendar to move backward or forward. Select the backup job that you want to restore.

You can also configure settings in the **Set Filter** field to limit the scope of the backup job.

- **Filter by Job** – Filter the backup job by job information. You can filter the backup data in the **Filter by Job** area by backup job module and backup type of the backup job by selecting corresponding checkbox in the drop-down list. By default, **VM Backup Jobs** and **All Types** are selected.
- **Filter by Plan** – Filter the backup job by plan information. You can filter the backup data in the **Filter by Plan** area by plan name by selecting corresponding checkbox in the **Plan Name** drop-down list. By default, **All Plans** is selected.
- **Filter by Time Range** – Filter the backup data by job completed time range. The **All jobs** selection lists all backup jobs whenever the job completed, while **Backup Jobs start within** filters the backup jobs which are completed in the specified time range. By default, **Backup jobs start within Last 7 Days** is selected.

After you finish configuring the **Set Filter** drop-down lists, click **Filter**. All the backup jobs that meet the filter rules are listed in the calendar. Click **Reset**, and then the jobs with all backup types that have been started within the last 7 days are available in the calendar.

When you are finished, click **Next**. The **Data Selection** page appears.

4. **Data Selection** – Select the backed up data to be restored. Expand the loaded VM backup data tree and select the VMs to restore. Click **Next** when you are finished and the **Restore Type** interface appears.

***Note:** For the backed up VMs managed by the ESX/ESXi or vCenter host server, you can configure to restore the **Security** settings by selecting the applicable checkboxes next to the following backup levels in the tree: Host, Resource Pool, vApp, and VM.

***Note:** For the backed up VMs managed by the vCenter host server, DocAve supports restoring the Alarms (for monitoring VMs) defined to the host server, the Resource Pools, and the VMs when performing an in place restore. Note that the Alarms defined to the VMs will only be restored when the backed up VMs do not exist in the source and there are no Alarms with the same name in the source, or when you select **Overwrite** as the conflict resolution for an in place restore. When performing an out-of-place restore, DocAve only supports restoring the Alarms defined to the VMs. If the Alarms that are defined to the backed up VMs are enabled, the Alarms of the restored VMs are still enabled.

***Note:** To successfully perform a VM Restore for the ESX/ESXi VMs backed up from a plan that employs the ESX/ESXi type host profile, if these VMs are currently managed by the vCenter host server, they must be backed up again. Before you try to back up these

VMs again, edit the applied host profile to change the host profile type from ESX/ESXi to vCenter first, and then reselect these VMs on the loaded VM tree by editing the corresponding backup plan. For more information about editing the VM backup plan and host profile, refer to [Managing Plans](#) and the

[DocAve 6 Control Panel Reference Guide](#). When finished, click **Next**. The **Restore Type** page appears. Refer to [Restore Type](#) to proceed.

Object-Based Restore

The **Object-based restore** is designed to first locate the specific VM object, and then select which backup job to restore it from. Complete the following steps to configure an object-based restore:

1. On the **Restore** tab in VM Backup and Restore, click **Restore** on the ribbon. The **Restore** interface appears. Click **Restore VM** in the **Manage** group and the **Restore Method** interface appears.
2. **Restore Method** – Select the **Object-based restore** button, and then click **Next**. The **Object Search** interface appears.
3. **Object Search** – Complete the following configurations:
 - **Backup Job Module** – Select a backup job module from the **Backup Job Module** drop-down list. The following backup job modules are supported: VM Back jobs and Platform Backup jobs.
 - **Backup Time Range** – Select the backup time range to limit the search scope from the **Backup jobs within** drop-down list. You can select the backup jobs performed within the current week, the last week, the current month, the last month, or the customized time range.
 - **Search Filter** – Configure the filter conditions to limit the scope of the backup jobs, if necessary. Select an object level from the drop-down list before the **Add Criteria** button. Click **Add Criteria** to add a condition rule. Select **Contains** to find the objects that contains the entered condition, or select **Does Not Contain** to find the object that does not contains the entered condition, or select **Equals** to find the object that equals to the entered condition, and then enter the required information in the following text box.

***Note:** Depending on the filters you enter, you can change the logical relationships between the filter rules. There are currently two logical relationships: **And** and **Or**. By default, the logic is set to **And**. The **And** logical relationship means that the content which meets all the rules will be filtered and included in the result. The **Or** logic means that the content which meets any one of the rules will be filtered and included in the result.

Click **Next** when you are finished. The **Data Selection** interface appears.

4. **Data Selection** – Select the backed up VM you are about to restore and click the **Load the Coexisting Backup Jobs** button. The backup jobs about the selected VMs are loaded on the right pane. Select a backup job from the loaded backup job list. You can also perform the following actions:
 - After finding the object and the backed-up data you want to restore, you can change to the time-based restore mode by clicking the job ID. A tab named by the job ID appears next to the **Backup Data** tab. Refer to the Backup Data instructions in step 4 of the [Time-Based Restore](#) section to continue.
 - For the backed up VMs managed by the ESX/ESXi or vCenter host server, you can configure to also restore the **Security** settings by selecting the applicable checkboxes next to the following backup levels in the tree: Host, Resource Pool, vApp, and VM.

***Note:** For the backed up VMs managed by vCenter host server, DocAve supports restoring the Alarms defined to the host server, the Resource Pools, and the VMs when performing an in place restore. Note that the Alarms defined to the VMs will only be restored when the backed up VMs do not exist in the source, or when you select **Overwrite** as the conflict resolution for an in place restore. When performing an out-of-place restore, DocAve only supports restoring the Alarms defined to the VMs. If the Alarms that are defined to the backed up VMs are enabled, the Alarms of the restored VMs are still enabled.

***Note:** To successfully perform a VM Restore for the ESX/ESXi VMs backed up from a plan that employs the ESX/ESXi type host profile, if these VMs are currently managed by the vCenter host server, they must be backed up again. Before you try to back up these VMs again, edit the applied host profile to change the host profile type from ESX/ESXi to vCenter first, and then reselect these VMs on the loaded VM tree by editing the corresponding backup plan. For more information about editing the VM backup plan and host profile, refer to [Managing Plans](#) and the [DocAve 6 Control Panel Reference Guide](#).

When finished, click **Next**. The **Restore Type** page appears. Refer to [Restore Type](#) to proceed.

Restore Type

[In Place Restore](#) is designed to restore the selected VM backup data to its original host server. [Out of Place Restore](#) is used to restore the data to another host server.

In Place Restore

To use an in place restore to restore the VM back-up data to its original location, complete the following steps.

***Note:** When restoring ESX/ESXi VMs in the vCenter host cluster, please pay attention to the following conditions:

- If the original host in the cluster is not available and there is another host having all of the datastores used by the VM, the VM will be restored to this host in the cluster.
- If the vCenter host cluster has configured the VM-Host Affinity rules between VM DRS (Distributed Resource Scheduler) group and host DRS group, DocAve uses the names of the VM DRS group to check if the VM DRS group where the backed up VM resides still exists. If the VM DRS group still exists, the VM will be restored to this VM DRS group and the rule will take effect on the restored VM. If the VM DRS group does not exist, skip restoring the VM to the VM DRS group and the rule will not take effect on the restored VM.

***Note:** When restoring VMs stored on the datastores that are in the vCenter datastore cluster, please pay attention to the following conditions:

- Does not support backing up and restoring the VMs with the same name stored in the same datastore cluster.
 - Support restoring datastore rules of **VMDK anti-affinity** and **VMDK affinity** for virtual disks; does not support restoring datastore rules of **VM anti-affinity** or **VM affinity** for VMs.
1. **Restore Type** – After configuring the restore as described in the previous [Time-Based Restore](#) or [Object-Based Restore](#) sections, configure the following settings:
 - **Restore Type** – Select the **In place restore** option button.
 - **Agent Selection** – Select an Agent to execute the restore job. By default, the Agent specified in the host profile selected for the backup plan is selected.

***Note:** If the VM you are about to restore resides in the Hyper-V host server, the Agent drop-down list will be greyed out and you can only use the default Agent to execute the restore job.

***Note:** When restoring VMs in the Hyper-V Failover Cluster, the Agent must be in the cluster that is specified in the Hyper-V Cluster host profile.
 2. **Restore Settings** – Configure the following settings for the restore.
 - **VM Conflict Resolution** – Define the VM conflict resolution behavior.

For the ESX/ESXi VMs, vCenter VMs, and ESX/ESXi VMs in vCenter host cluster, if the VM configuration file of the source VM is under the same full path as an existing VM configuration file in the destination, it is considered a conflict.

For the VMs stored on the datastores that are in a vCenter datastore cluster, if there is a VM whose name is the same as the backed up VM in the datastore cluster, it is considered as a conflict.

For the Hyper-V VMs, if the GUID of the source VM is the same as that of a VM in the destination, it is considered a conflict.

- **Skip** – Do not restore the source conflicting VM, and keep the destination VM intact.
- **Replace Virtual Disk Only** – Delete the data in the virtual disks of the conflicting destination VM and then restore the data in the virtual disks of the backed up VM to the destination, without the VM configurations.
***Note: Replace Virtual Disk Only** option is unavailable for the VMs managed by the Hyper-V host. If you set the VM conflict resolution to **Replace Virtual Disk Only** when restoring the VM on the Hyper-V host, the conflicting VM will be deleted, and the backup data of the VM will be restored.
- **Overwrite** – Delete the conflicting VM in the destination, and restore the backed up VM.
- **Hyper-V Parent Disk Conflict Resolution** – Define the Hyper-V parent disk conflict resolution behavior. If the Hyper-V parent disk in the source is under the same full path as an existing Hyper-V parent in the target, it is considered a conflict.
 - **Skip** – Do not restore the source conflicting Hyper-V parent disk.
 - **Overwrite** – Deletes the target Hyper-V parent disk, and restore the backed up parent disk.

***Note:** This setting is only valid for the recovery of VM files on the Hyper-V host.

- **Power on the VMs After Restore** – Before the restore job is executed, DocAve will power off the target VMs. Choose whether to or not to automatically power on these VMs after the restore job is finished.
- **Notification** – Configure the email **Notification** settings. Select a notification profile from the **Select a profile** drop-down list. You can also choose to create a new e-mail notification profile by clicking the **New Notification Profile** link. Click **View** to view the detailed configuration of the selected notification profile.

Click **Next** when you are finished. The **Schedule** interface page appears.

3. **Schedule** – Configure the schedule to set the time to restore the content:
 - **Schedule Selection** – Choose **Restore immediately after wizard finishes** to run the plan immediately, or choose **Configure the schedule myself** to configure a customized schedule.
 - **Description** –Enter an optional description of the restore plan in the text box.

Click **Next** to proceed to the **Overview** interface.

4. **Overview** – Review and edit plan selections. To make changes, click **Edit** in the middle of a heading row under the **Settings** tab. This links to the corresponding setting page, allowing you to edit the configuration. In the **Preview** tab, you can view the restore action and the expected VM tree after the restoration. Click **Edit** to go to the **Data Selection** interface to change the restore action.
5. Click **Finish** to save the configuration. If the restore job does not have a schedule, the **Finish** will run job immediately. If the restore job is set to run on a schedule, **Finish** saves the job's configuration without running it.

Out of Place Restore

Out of place restore will restore the VM backed up data to another location. The following are the supported and unsupported conditions:

- For Hyper-V host server, the version of the destination operating system must be no earlier than the source.

***Note:** Support out-of-place restoring a VM with configuration version 5.0 that is backed up on a host server running Windows Server 2016 to a Hyper-V Cluster with nodes running Windows Server 2012 R2. However, the new Hyper-V features on Windows Server 2016 node are not supported in Windows Server 2012 R2 cluster. For more details, refer to [What's new in Hyper-V on Windows Server 2016](#).
- For ESX/ESXi and vCenter host server, the version of the destination host server must be no earlier than the source. The following situations are supported for out-of-place restoring VMs on ESX/ESXi and vCenter host servers:
 - Restore from ESX/ESXi host server to vCenter host server.
 - Restore from vCenter host server to ESX/ESXi host server.
- For VMs stored on the datastore in vCenter datastore cluster, do not support restoring datastore rules of VM or VMDK.
- Does not support out-of-place restoring VMs across Hyper-V host server and ESX/ESXi or vCenter host server.

To use an out of place restore, complete the following steps:

1. **Restore Type** – After configuring the restore as described in the [Time-Based Restore](#) or [Object-Based Restore](#) sections, select the **Out of place restore** option.
2. **VM Configuration** – Click **Edit** in the **Details** column to configure the destination settings for the selected VM restore.
 - **VM Name** – Enter the destination VM name.
 - **Guest Operation System Version** – View the version of the guest operating system.
 - ***Note:** This setting is only valid for the destination host server that is ESX/ESXi or vCenter host type.
 - **Host Profile** – Select a host profile for the destination host server, or click **New Host Profile** to create a host profile for the destination host server. For instruction about how to create host profile, refer to [DocAve 6 Control Panel Reference Guide](#).
 - ***Note:** If the host type of the host profile is ESX/ESXi, and the ESX/ESXi host is currently being managed by the vCenter server, update the specific host profile by changing the host server type from ESX/ESXi to vCenter.
 - ***Note:** Support out-of-place restore for VMs on Hyper-V host servers that are in Failover Cluster. If the selected host profile is a Hyper-V Cluster type, then the **Role** field appears.
 - **Agent** – Select an Agent for connecting to the destination host server in the selected host profile and executing the restore job.
 - ***Note:** If the VM you are about to restore resides in the Hyper-V host server, the Agent drop-down list will be unavailable and you can only use the default Agent to execute the restore job. If you are about to restore the VM to a Hyper-V Failover Cluster, the Agent is able to be selected from the drop-down list after selecting a Hyper-V Cluster type host profile. The Agent must be in the cluster that is specified in the selected host profile.
 - ***Note:** If you are about to restore the VMs on ESX/ESXi or vCenter host server to the same host at the same time, we recommend you use one Agent to perform the restore in order to improve the job performance.

When you finish selecting the Agent for Hyper-V host server, refer to [Hyper-V](#) to proceed. If you're using an ESX/ESXi or vCenter host server, refer to [ESX/ESXi and vCenter](#) to proceed.

Hyper-V

After finishing the Agent selection, configure the following settings for the Hyper-V VM:

- **Role** – Enter the name of a role to organize the restored VM. By default, the name is the same as the VM name. The role can be an existing one in the destination cluster, or you can create a new one.

***Note:** This setting is for out-of-place restores for a Hyper-V Failover Cluster VM. The setting will only appear when you select a Hyper-V Cluster type host profile.

***Note:** If the disks, which are used to store the VM data, have a binding role in the destination, the VM will be restored to the role.
- **Destination VM Location** – This text box displays the default destination VM location path automatically after the host profile selection, and you can also customize it according to your situation.
- **Virtual Hard Disk Location** – Configure the virtual hard disk file mapping. The default destination file path is filled into the text box automatically after the host profile selection, and you can also choose to customize it according to your situation. If the file mapping configuration table is hidden, click **Details** to view the location details.

***Note:** When building an out-of-place restore plan for restoring the VMs on the Hyper-V host server that is in Failover Cluster, please pay attention to the following known issue:
 - i. Disk 1 and Disk 2 are two shared disks on the same host in the destination cluster, and they are in different roles.
 - ii. In the Restore VM wizard, select Disk 1 of Role 1 as the destination VM location; select Disk 2 of Role 2 as the virtual hard disk file location.
 - iii. After successfully restoring the VM, the VM won't be added to the cluster.

Root Cause: The VM is binding with the shared disks, if we force to move the VM to Role 1 in the destination cluster, the binding Disk 2 will be moved to Role 2, causing the disappearance of VMs in Role 2.

Workaround: Make sure that the shared disks are in the same role if you are about to restore and add the VM to the destination cluster.
- **Network Adapter** – Select the virtual switch from the drop-down list. If you choose to enable VLAN, enter an ID value.

***Note:** When performing a VM restore job, please do not make any change about the related network adapters in Virtual Switch Manager of Hyper-V Manager.

***Note:** If a VM hosted on Hyper-V 2008 R2, Hyper-V 2012 R2, or Hyper-V 2016 server has **Static** MAC address configured, the VM's MAC address will become **Dynamic** after being out-of-place restored to the destination.

When finished the settings above for the Hyper-V VM, click **Validation test** to validate the configured information. If test is successful, click **Save** to save the configuration.

When you are finished, click **Next**. The **Restore Settings** page appears. Refer to the [Restore Settings](#) to proceed.

ESX/ESXi and vCenter




After finishing the Agent selection, configure the following settings for ESX/ESXi and vCenter VM:

- **Destination VM Location** – Click the VM host server node to expand the tree to display all the VMs on the host server. Select the node of the destination host server where you want the restored VM to reside.
- **Host Selection** – Select a host that is in the selected vCenter host cluster, as the destination host where to restore the VM.


***Note:** This field appears when you choose a vCenter host cluster as the destination VM location.

- **Inventory Location** – After selecting the destination VM location, the **Inventory Location** section appears. Click the **Datacenter** node to expand the tree to display all the VM folders, and select the folder that you want to contain the restored VM.

***Note:** This field only appears when the selected host profile is **vCenter** type. When a vApp is selected as the resource pool, the target folder will be ignored.

- **Datastore Information** – View the information of the datastore in the destination, and click **Refresh** to retrieve the latest datastore information. You can also view more information by clicking the Manage columns (), and select **Capacity**, **Provisioned Space**, and **Type** from the drop-down list. You can click the page turning button ( ) to turn the page. The **Free Space** column shows the free space in the datastore, and **Require Space for Restore** column shows the require space in destination datastore for the restore job.

- **Storage Configuration** – Select the object by selecting the corresponding checkbox, and then select a destination storage for each of the virtual machine

files in the list. The batch settings of datastore is supported. You can select all of the objects by selecting the checkbox next to the **Object**, and click the batch settings button () , the **Datastore Batch Settings** page appears.

***Note:** After selecting the datastore, the values in **Require Space for Restore** column will be updated.

- **Storage DRS Settings** – When restoring the VM to a datastore cluster, choose whether or not to disable Storage DRS. By default this option is unchecked. If you choose to disable Storage DRS for this VM, the Automation Level of restored VM's Storage DRS rule will be set as Disable. If this option is selected, the Automation Level will be set as Default.

***Note:** This field appears after you select a datastore that is in datastore cluster.

- **Network Configuration** – Configure the network settings for the destination VM by selecting the network label from the drop-down list. The adapter type must be the same as the source, and cannot be changed.

When you finish the settings for the ESX/ESXi or vCenter VM, click **Validation test** to validate the configured information. If the test is successful, click **Save** to save the configuration.

When you are finished, click **Next**. The **Restore Settings** page appears, then refer to [Restore Settings](#) to proceed.

1. **Restore Settings** – Configure the following settings for the restore.

- **VM Conflict Resolution** – Define the VM conflict resolution behavior. For the ESX/ESXi or vCenter VMs, if the VM configuration file of the source VM is under the same full path as an existing VM configuration file in the target, it is considered a conflict. For the VMs to be restored to the datastore that is in the destination vCenter datastore cluster, if there is a VM whose name is the same as the backed up VM in the datastore cluster, it is considered as a conflict. For the Hyper-V VMs, if the GUID of the source VM is the same as that of a VM in the target, it is considered a conflict.
 - **Skip** – Do not restore the source conflicting VM, and keep the destination VM intact.
 - **Overwrite** – Delete the conflicting VM in the destination and restore the backed up VM.
- **Power on the VMs After Restore** – Before the restore job is executed, DocAve will power off the target VMs. Choose whether or not to automatically power on these VMs after the restore job is finished.

- **Notification** – Select the e-mail notification profile for sending e-mails. For more information on working with notification policies, refer to the [DocAve 6 Control Panel Reference Guide](#).

Click **Next** when you are finished. The **Schedule** interface page appears.

2. **Schedule** – Configure the schedule to set the time to restore the content:
 - **Schedule Selection** – Choose **Restore immediately after wizard finishes** to run the plan immediately, or choose **Configure the schedule myself** to configure a customized schedule.
 - **Description** – Enter an optional description of the restore plan in the text box.



Click **Next** to proceed to the **Overview** interface.

3. **Overview** – Review and edit plan selections. To make changes, click **Edit** in the middle of a heading row under the **Settings** tab. This links to the corresponding setting page, allowing you to edit the configuration. In the **Preview** tab, you can view the restore action and the expected VM tree after the restoration
4. Click **Finish** to save the configuration. If the restore job does not have a schedule, **Finish** runs the job immediately. If the restore job is set to run on a schedule, **Finish** saves the job's configuration without running it.

Restoring Files

Restore Files provides a recovery solution for restoring VM files separately. DocAve supports restoring files for the VMs that are in the Hyper-V host server, Hyper-V Failover Cluster, ESX/ESXi or vCenter host server, vCenter Host Cluster, and vCenter Datastore Cluster.

Complete the following steps to configure a time-based restore:

1. On the **Restore** tab in VM Backup and Restore, click **Restore** on the ribbon. The **Restore** interface appears. Click **Restore file**. The restore wizard appears.
2. **Job Selection** – The jobs with all backup types that have been completed within the last 7 days are available in the calendar. Click **Day**, **Week**, or **Month** in the top-right corner of the calendar to change the view to see all available jobs. Click the Previous Month () and Next Month () button beside the date on the top-left of the calendar to move forward or backward. Select the backup job that you want to restore. You can also configure settings in the **Set Filter** field to limit the **scope** of the backup job.
 - **Filter by Job** – Filter the backup job by job information. You can filter the backup data in the **Filter by Job** area by backup job module and backup type of the backup job by selecting corresponding checkbox in the drop-down list. By default, **VM Backup Jobs** and **All Types** are selected.

- **Filter by Plan** – Filter the backup job by plan information. You can filter the backup data in the **Filter by Plan** area by plan name by selecting corresponding checkbox in the **Plan Name** drop-down list. By default, **All Plans** is displayed.
- **Filter by Time Range** – Filter the backup data by job completed time range. The **All jobs** selection lists all backup jobs whenever the job completed, while **Jobs start within** filters the backup jobs which are completed in the specified time range. By default, **Backup jobs start within Last 7 Days** is selected.

After you finish configuring the **Set Filter** drop-down lists, click **Filter**. All the backup jobs that meet the filter rules are listed in the calendar. Click **Reset**, and then the jobs with all backup types that have been started within this week are available in the calendar.

When you are finished, click **Next**. The **Data Selection** page appears.

3. **Data Selection** – Select an Agent from the **Select an Agent to load the backed up VM data** drop-down list to load the backup data. Expand the loaded backup data tree and then select the file level nodes to restore.

***Note:** If a disk on the backed up VM is mounted in a folder on the loaded backup data tree, the file structure under the folder is not supported to be loaded. You can load the file structure from the mounted disk that is on the loaded backup data tree.

***Note:** If the backed up VM run on VHDX or VHD Set disk, the Agent you select to browse the backed up VM data cannot be the server with operating system of Windows Server 2008.

***Note:** If the VM files you are about to restore are from the Hyper-V VM, ensure that the version of the operating system on the server where the selected Agent resides is equal or higher than that of the server where the Agent selected in the corresponding backup plan resides. If the specific Hyper-V VM is associated with the Hyper-V parent disk or has been snapshotted before it was backed up and the snapshot file still exists in the Hyper-V host server, additionally, the Hyper-V role must be properly installed on the server where the selected Agent resides.

Click **Next** when you are finished. The **Destination Settings** interface appears.

4. **Destination Settings** – Configure the destination settings for the restore:
 - **Restore Type** – Configure how the content should be restored.

***Note:** The **In Place** and the **Restore to a VM Location** restore types do not support restoring files for the Generation 2 VMs on the Hyper-V host server. You

can choose the **Restore to a UNC path** restore type to restore files for the Generation 2 VMs on the Hyper-V host server.

- **In Place** – Restores the data to its original VMs.
 - **Agent** – Select an Agent to execute the restore job.
 - ***Note:** While restoring the files of the VMs in the Hyper-V Failover Cluster, the selected Agent must be in the cluster specified in the Hyper-V Cluster host profile that is selected for the VM backup.
 - ***Note:** If the files you are about to restore are from the Hyper-V VM, which is created on a parent disk, or the snapshot file generated before the backup still exists in the Hyper-V host server, the select Agent must reside on the server with the Hyper-V role installed.
- **Restore to a VM Location** – Allows you to restore the data to a selected VM location. If you select this restore type, the **Scope Selection** field appears.
 - **Scope Selection** – Select a host profile and an Agent to perform the restore.
 - ***Note:** The default Agent is the one specified in the selected host profile.
 - ***Note:** If the backed up Hyper-V VM runs on a VHDX or VHD Set disk, the selected Agent cannot be the server with Windows Server 2008 operating system installed.
 - ***Note:** While restoring the files of the VMs in the Hyper-V Failover Cluster, the selected Agent must be in the cluster specified in the Hyper-V Cluster host profile that is selected for the VM backup.
 - **Destination VM Location** – Select a VM location to restore the VM backup data.

***Note:** The Hyper-V host servers only display VMs that are powered-off or in **Saved** status, and the ESX/ESXi and vCenter host servers only display powered-on VMs with VMware Tools.

***Note:** If the file will be restored to a ESX/ESXi or vCenter host server, the destination VMs whose statuses of the VMware Tools are **running (out-of-data)** cannot be loaded.

If the file will be restored to an ESX/ESXi or vCenter host server, the credentials to connect to the specified VM will be configured. The pop-up window for configuring **Credentials** appears after you select the Agent for an in-place restore, or the destination VM location for the file is selected. Enter the **Username** (Example: Administrator, or domain\username) and **Password** to specify a user that can log into the specified VM or UNC path where you are about to restore the backed up VM files.

***Note:** Make sure that the specified user is a member of the local **Administrators** group in the destination, and the specified user has Full Control permission to the destination folder where you want to restore the VM files.

Click **Save** to test the configured information and save it.

- **Restore to a UNC path** – Allows you to restore the data to an entered UNC path.
 - **Agent** – Select an Agent to execute the restore job.
 - *Note:** If the backed up VM runs on VHDX disk, the Agent you select to execute the restore job cannot be the server with operating system of Windows Server 2008.
 - *Note:** If the VM files you are about to restore are from the Hyper-V VM, ensure that the version of the operating system on the server where the selected Agent resides is equal or higher than that of the server where the Agent selected in the corresponding backup plan resides. If the specific Hyper-V VM is associated with the Hyper-V parent disk or has been snapshotted before it was backed up and the snapshot file still exists in the Hyper-V host

server, additionally, the Hyper-V role must be properly installed on the server where the selected Agent resides.

- **Path** – Enter the **UNC Path** to restore the selected backed up VM files and then select a managed account profile. Click **Validation Test** to validate the configured information.

***Note:** The user in the selected managed account profile must be a member of the local **Administrators** group.

***Note:** When restoring multiple files to an ESX/ESXi or a vCenter host server via one VM Restore job, please pay attention to this known issue: After the restore job is finished, some of the files failed to be restored, and the related error message displays: The operation is not allowed in the current state. If the error occurs when performing the VM Restore job, use the following workaround:

- a. Go to the server where the selected Agent resides, and open the ...*AvePoint\DocAve\Agent\data\VM* directory to find the **VMConfiguration.xml** file.
- b. Open the file with the Notepad.
- c. Find the **<FileRestore></FileRestore>** node, and find the **MaxWorkThreadsCount=""** attribute. Change the value of the **MaxWorkThreadsCount** attribute to **1**.

Click **Next** when you are finished. The **Restore Settings** interface appears.

5. **Restore Settings** – Configure the following settings for the restore.

- **File Conflict Resolution** – Define the VM file conflict resolution behavior. When the file name and file type of a source file are same as that of an existing file in the target, it is considered as a conflict.
 - **Skip** ignores the selected backed up VM file.
 - **Overwrite** deletes the existing VM files in the target and restore the source files to the target.
- **Job Report** – Select the job report type. Select **Simplified** to get a list containing the report for the folder level objects restored to the destination, or select **Detailed** to get a full list of all folder and file level objects restored to the destination at the cost of performance.
- **Notification** – Select the e-mail notification profile for sending e-mails. For more information on working with notification policies, refer to the [DocAve 6 Control Panel Reference Guide](#).

Click **Next** when you are finished. The **Schedule** interface appears.

6. **Schedule** – Configure the schedule to set the time to restore the content:
 - **Schedule Selection** – Choose **Restore immediately after wizard finishes** to run the plan immediately, or choose **Configure the schedule myself** to configure a customized schedule
 - **Description** – Optionally enter a description of the restore plan in the text box.

Click **Next** to proceed to the **Overview** page.

7. **Overview** – Review and edit plan selections. To make changes, click **Edit** in the middle of a heading row under the **Settings** tab. This links to the corresponding setting page, allowing you to edit the configuration. For **Restore to VM Location**, in the **Preview** tab, you can view the restore action and the expected VM tree after the restoration, and click **Edit** to go to the **Destination Settings** interface to change the restore action.
8. Click **Finish** to save the job's configuration. If the restore job does not have a schedule, **Finish** runs the job immediately. If the restore job is set to run on a schedule, **Finish** saves the restore job's configuration without running it.

Appendix A: Advanced Settings in the Configuration File

This section provides the introduction of the **VMConfiguration.xml** file.

Go to the machine with the DocAve Agent installed and open the ...\\AvePoint\\DocAve\\Agent\\data\\VM directory to find the **VMConfiguration.xml** file.

Refer to the sections below for details on the **VMConfiguration.xml** file.

ESX/ESXi and vCenter

Open the **VMConfiguration.xml** file with Notepad, and find the `<VMware></VMware>` child node under the `<VMConfiguration></VMConfiguration>` node. Refer to the instructions below to configure the `<VMware></VMware>` child node for backing up and restoring VMs hosted on ESX/ESXi and vCenter host servers.

- **<WebService RequestTimeout="1800000" ProtocolPorts="https:443;http:80"/>** – The **RequestTimeout** attribute in this node is used to define the session timeout of calling VMware Web Service API; the default value is 1800000, and the unit is millisecond. The **ProtocolPorts** attribute is used to divide different protocol ports, and the value should be the same as the value of the **<add key = "protocolports" value = "https:443;http:80"/>** in the **VpxClient.exe.config** file that is in the ...\\VMware\\Infrastructure\\Virtual Infrastructure Client\\Lanucher directory.
- **<AnswerVM UseDefaultValue="true"/>** – The **UseDefaultValue** attribute is used to define whether or not to let the DocAve choose the default value as an answer when turning on the out-of-place restored VM. If change the value to **false**, the DocAve will not choose the answer automatically and the turning on VM process will be session timeout.
- **<Permission ReplaceRestore="false"/>** – This node takes effect when you choose to restore the security settings in the backed up VMs and there are same users in the destination. The default value of the **ReplaceRestore** attribute is **false**, and the backed up security settings will be merged to the existing same user in the destination. If set the value of the **ReplaceRestore** attribute to **true**, the permissions of the same users in the destination will be replaced with the backed up security settings.
- **<Restore UseLargestDatastore="false"/>** – This node defines whether or not to create the VM disk with the largest datastore when performing a VM Restore, and the default value is **false**. AvePoint recommends you not changing this value to **true**, because the disk and the configuration file of the VM may be in different datastores if you set the value of the **UseLargestDatastore** attribute to **true**.

Hyper-V

Open the **VMConfiguration.xml** file with Notepad, and find the **<HyperV></HyperV>** child node under the **<VMConfiguration></VMConfiguration>** node. Refer to the instructions below to configure the **<HyperV></HyperV>** child node for backing up and restoring VMs hosted on Hyper-V host servers.

- **<Backup ForceBackup="false"/>** – When backing up the VMs (running Windows Server 2012 R2 operating system) hosted on Windows Server 2008 R2 Hyper-V host server, the VM state may change to **Saved** from **Running**. The **ForceBackup** attribute defines whether or not to force to back up these VMs. The default value is **false**, and you can change it to **true** if necessary.
- **<Restore DeleteFailedVMFiles="true" RemoveSavedstate="false" NewVMId="true"/>** – Refer to the instructions below to modify the **DeleteFailedVMFiles**, the **RemoveSavedstate**, and the **NewVMId** attributes:
 - **DeleteFailedVMFiles** – This attribute defines whether or not to delete the restored VM files when the VM fails to be restored. The default value is **true**, and you can change it to **false** if necessary.
 - **RemoveSavedstate** – This attribute defines whether or not to remove the **Saved** state when restoring VMs backed up in **Saved** state. The default value **false** means that the VMs will be restored in **Saved** state, and you can change it to **true** if necessary.
 - **NewVMId** – This attribute defines whether or not to create a new VM ID when out-of-place restoring a VM. The default value is **true**, and you can change it to **false** if necessary.

Restore File

Open the **VMConfiguration.xml** file with Notepad, and find the **<FileRestore></FileRestore>** child node under the **<VMConfiguration></VMConfiguration>** node. Refer to the instructions below to configure the **<FileRestore></FileRestore>** child node for restoring VMs at file level.

- **<MountFolder Path=""/>** – The **Path** attribute defines the path of the InstaMount folder when restoring VMs at file level. The default value is empty, and the temporary buffer path configured in **Agent Monitor** is the default path. The value of the **Path** attribute is editable.
- **<InstaMount DataBufferSize="1048576" PrefetchDataLength="104857600" PrefetchDataOffset="0"/>** – This child node defines InstaMount configurations. The values of these attributes are editable. Refer to the instructions below to configure the **PrefetchDataOffset**, the **PrefetchDataLength**, and the **DataBufferSize** attributes:

- **PrefetchDataOffset** – The **PrefetchDataOffset** attribute defines the starting position of prefetching data from the media when using InstaMount. The default value of the **PrefetchDataOffset** attribute is **0**, and the unit of the value is byte.
- **PrefetchDataLength** – The **PrefetchDataLength** attribute defines the length of prefetching data from the media when using InstaMount. The default value of the **PrefetchDataLength** attribute is **104857600** (100 MB), and the unit of the value is byte.
- **DataBufferSize** – The **DataBufferSize** attribute defines the size of transferring data from the media each time. The default value is **1048576** (1 MB), and the unit of the value is byte. The maximum value of the **DataBufferSize** attribute is **4194304** (4 MB).

Appendix B: Deploying Files in the VDDK Folder for Backing up and Restoring VMware VMs

To back up and restore VMware VMs, before running the jobs, complete the steps below to deploy the files in the **VDDK** folder on all DocAve Agents that executes backup and restore jobs for VMware VMs:

1. Download **VMware vSphere Virtual Disk Development Kit 6.5b** from [VMware Official site](#).
2. Extract the downloaded **VMware-vix-disklib-6.5.0-5136645.x86_64.zip** file.
3. Go to the `...VMware-vix-disklib-6.5.0-5136645.x86_64\bin` directory, and copy all of the files within the **bin** folder, except for the **vstor2install.bat** and **vstor2uninstall.bat** files.

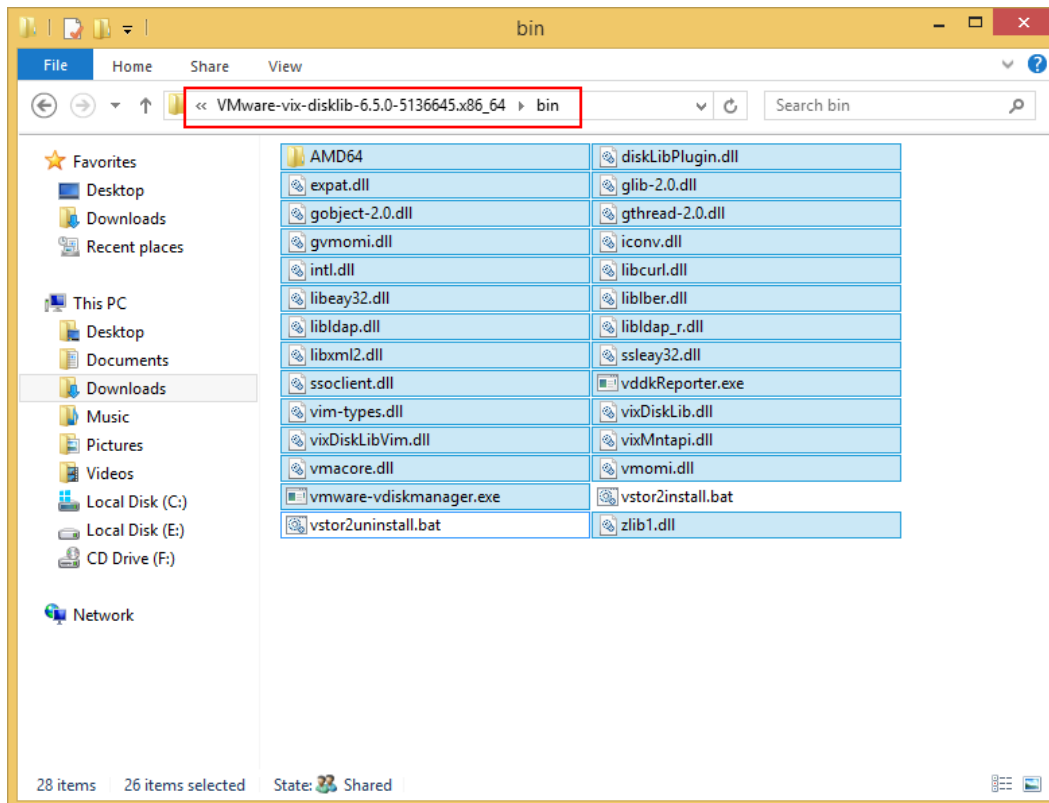


Figure 7: Copying the required files.

4. On a DocAve Agent server, go to the ... \AvePoint\DocAve6\Agent\bin\VDDK\x64\bin directory, and paste the files that you copied in the step 3.

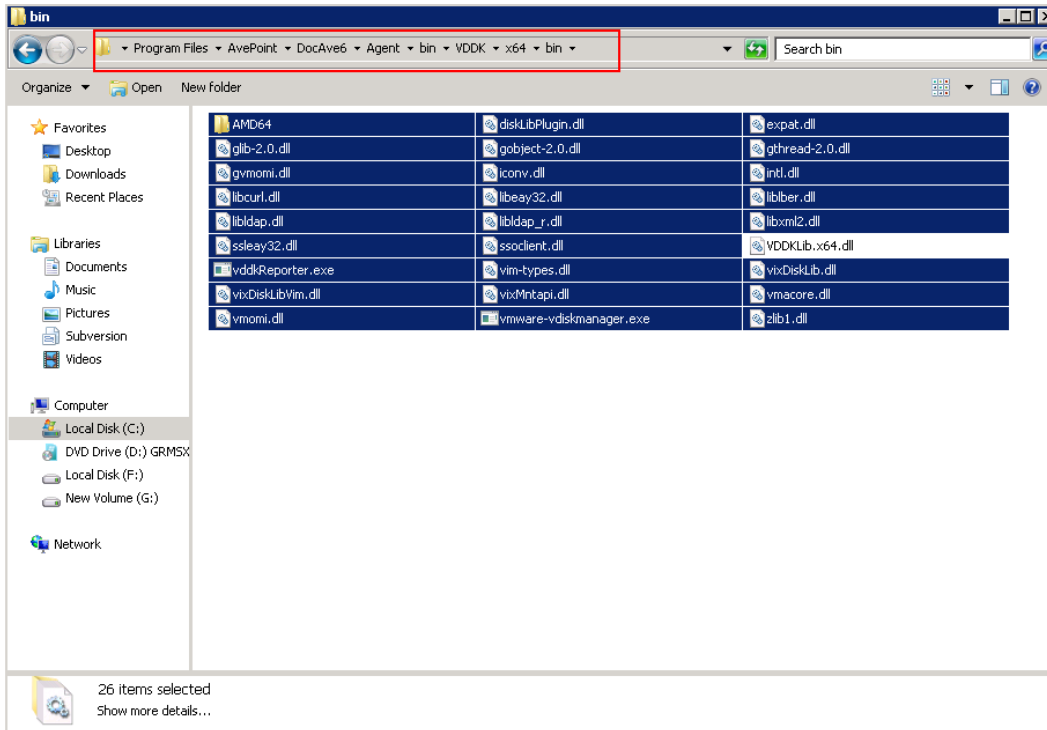


Figure 8: Pasting the copied files to a DocAve Agent server.

5. Repeat the step 4 on all of the DocAve Agent servers that execute backup and restore jobs for VMware VMs.

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