

BackupAssist™ v9

System Protection

User guide

Contents

1. Introduction	2
Licensing	2
Operating system considerations	2
2. Backup considerations.....	3
Exchange VM Detection	3
Restore vs. Recovery	3
Bootable Backup Media	3
3. Data containers.....	4
Advantages of Data containers	4
Data container options	4
Migrating from VHD to VHDX	4
4. BackupAssist settings	5
Backup user identity.....	5
Email server settings	5
Email address list.....	5
5. Creating a System Protection backup	6
6. Restoring from a System Protection backup.....	11
7. System Protection backup management	15
Destination.....	15
Files and applications	16
Scheduling	17
Imaging options	18
8. System Protection backup strategies	19
Last known recovery point	19
Multiple removable media	19
Running a test restore.....	19
Offsite storage of backup media	20
9. System Protection backup report	21

1. Introduction



Windows Server Backup uses drive-imaging technology for data protection. BackupAssist allows you to take advantage of this backup functionality. The result is a feature-rich, reliable and cost-effective data and disaster protection solution.

This user guide explains how to protect your computer using BackupAssist System Protection, including how to create a backup, manage the configurations and restore both data and applications.

Documentation

This user guide provides a comprehensive guide to BackupAssist System Protection and can be used in conjunction with other BackupAssist guides.

- For information on protecting Hyper-V environments, see the [Hyper-V Protection user guide](#)
- For information on the BackupAssist Backup tab, see the [Backup Tab user guide](#).
- For information on the BackupAssist Restore tab, see the [Restore Tab user guide](#)

Licensing

System Protection is a standard feature included with the BackupAssist license, and requires a BackupAssist license once the initial trial period has expired. Please contact your local BackupAssist reseller or distributor for pricing information, or visit www.BackupAssist.com.

For instructions on how to activate / deactivate license keys, visit our [Licensing BackupAssist page](#).

Operating system considerations

System Protection supports image backups on the following operating systems:

- Windows Server 2016 from v9.5 (does not include CSV support)
- Windows Server 2012R2
- Windows Server 2012
- Windows Server 2008R2
- Windows Server 2008
- Windows 10 32-bit / 64-bit
- Windows 8.1 32-bit / 64-bit
- Windows 7 32-bit / 64-bit

For a full list of the platforms supported by BackupAssist, see our [Supported Operating Systems page](#).

Note: System Protection cannot incrementally back up data from a ReFS formatted drive (source). This means a full backup of all selections will take place each time the backup job runs.

2. Backup considerations



Before creating a backup job, it is important to understand what backup and restore options are available. This section provides guidance on some key considerations.

Exchange VM Detection

When backing up a Hyper-V guest with an Exchange Server, enter the authentication information for that guest into the **Exchange VM Detection** tab on the **Selection** screen when you create the job. With these credentials, BackupAssist can detect what guests have an Exchange Server, and list the EDB file available for each guest when you perform a restore using the Exchange Granular Restore console.

The Exchange VM Detection tab will appear when the Hyper-V role is installed and running on the server. If you are backing up multiple Exchange guests, each one should have the same username and password. The Hyper-V process is automated but the restore requires both the *Exchange Granular Add-on* and the *Hyper-V Advanced Add-on* licenses.

Restore vs. Recovery

A restore is the process of accessing a backup and restoring it to the original (or a new) location, if your data is lost, corrupted or if you want an earlier version of that data. A recovery is the process by which a computer is recovered after hardware has been replaced or an operating system failure has occurred, and your computer can no longer start itself. To perform a recovery you need a bootable media to start your computer, and an image backup that the bootable media can use to recover your operating system, data and applications.

System Protection can create the image backup used in the recovery process. It can also create an image backup to protect data and applications so they can be restored onto a functioning computer. These two capabilities make System Protection a powerful and versatile backup solution.

The [Recovery using a System Protection backup](#) section of this user guide, explains how a System Protection image backup is used in the recovery process.

Bootable Backup Media

If you create a System Protection bare-metal backup on an external USB hard disk, the media can be made into a *Bootable Backup Media*. The backup media can be used to boot into a RecoverAssist recovery environment and recover the server, without a separate boot disk.

The backup media will be made bootable the first time the job runs unless you deselect the *Make media bootable with RecoverAssist* tick box on the *Set up destination* step. When creating a backup job, selecting *Prepare* on the *Prepare media* step will generate a *Destination Check Report*. This report will advise if the backup media cannot be made bootable. After you run the backup job, the backup report's *Recovery* section will note if the backup media was made bootable or if the boot information was updated. If the media is not bootable, you will need to run the RecoverAssist builder, to manually make the backup media bootable, or make a separate, standalone RecoverAssist media.

Each time the backup job runs to a bootable media, the following checks will automatically take place:

- If a newer version of RecoverAssist is released, it will be applied to the bootable media.
- If a bootable media is created under a trial version, it will be updated if a license key is purchased.
- If the operating system being backed up changes, the media will be updated to support it.

3. Data containers

A [Data container](#) is an image file that backups can be stored in. It is selected on the backup *Destination* screen and configured in the *Set up destination* screen. You can configure the Data container's size or allow it to use all available space on the destination. The Data container's size will increase as data is added until it reaches the set size or fills the backup destination, if *Use all available space* was selected.

The Data container is created the first time the backup job runs, or if you run a destination check. A destination check is run on the *Set up destination* screen for fixed media, and when portable media is prepared on the *Prepare media* screen. If you set a maximum size, that maximum size cannot be changed once the Data container has been created.

Advantages of Data containers

Maintain Backup history

BackupAssist *System Protection* creates full and incremental image backups. Windows VSS maintains historical information so that each incremental backup can be restored from. On RDX drives and network destinations (e.g. NAS), VSS is not supported so Windows cannot maintain any backup history. This means restores can only be performed from the last backup.

Data containers overcome this Network/RDX destination limitation. The Data container is created on the destination media and each time the backup jobs runs, the Data container is mounted and treated as a local disk. Because the container is seen as a local disk, Windows VSS can maintain historical information of data that changed, and every backup can be restored from.

RDX granular restore

When Windows detects an RDX drive, it will compress the data that is being backed up. This compression means that individual files cannot be restored. By using a Data container, Windows will see the destination as a local drive and not compress the data.

Portable backups

On Windows 2008R2 and later, you can copy a backup image to another device, but only the last backup can be restored because you cannot copy the shadow copy (VSS snapshot). If the backup is in a Data container, the snapshot can be moved and all backups can be restored from.

Data container options

Windows Server 2008 - 2TB limit

- Uses VHD Data containers.

Windows Server 2016, 2012 R1/R2 and Window 8/8.1 - up to 64TB

- Uses VHD for Data containers 2TB and smaller (Required by default for [Linux-based NAS](#) devices).
- Uses VHDX for Data containers larger than 2TB.

Migrating from VHD to VHDX

If there is no VHD Data container at the backup destination, a Windows Server 2012 backup job will create a VHDX Data container when a backup job runs. You can therefore change from VHD to VHDX by archiving and removing the existing VHD Data container, and allowing the backup job to create a VHDX container when it runs next. The backup job must of course be configured to create a 2TB or larger Data container. Alternatively, you can convert the VHD to VHDX.

Microsoft provides instructions on converting VHD to VHDX using [Hyper-V Manager](#) and [PowerShell](#).

4. BackupAssist settings



When creating a backup job, there are some global settings that should be configured in BackupAssist. If they are not configured, you will be prompted to complete them during the creation of your first backup. It is recommended that this is done in advance.

BackupAssist's settings can be entered and modified using the selections available in the **Settings** tab. Clicking on the *Settings* tab will display the selections as icons. Four of these are used when creating new a backup job and each one is described below:

Backup user identity

Backup jobs require an administrator account with read access to the data source, and full read-write access to the backup's destination. It is recommended that a dedicated backup account is created for this purpose. The account's details are entered here and your backup jobs will be launched using these credentials. The account's permissions will be validated both when the backup user identity is entered and when the job is executed. If no account is specified or the account has insufficient permissions, the backup job will fail and note the error in the backup report.

A video explaining the creation of a backup user identity can be found on our, [Videos Webpage](#).

Email server settings

This menu item is used to enter the details of the SMTP server used by BackupAssist to send email notifications. The SMTP server must be configured if you want to have an email *Notifications* step enabled when you create a backup job.

Email address list

This menu item is used to define and store the email addresses of potential notification recipients. The list will be used to populate the recipient selection screen when configuring an email notification for a backup job. Any email addresses entered during the creation of a new notification are automatically added to the *Email address list*.

Network paths

This option allows you to enter access credentials for networks, domains and drives that the default account does not have access to. Enter or browse to the location and add it to the *Path list*. The *Edit* option will allow you to enter an authentication account, specifically for that path. When you create a backup job to a remote location, that location will be automatically added here.

Windows Settings - Enable image tracking

System Protection creates a full backup the first time it runs. Subsequent backups are incremental. To create an incremental backup, BackupAssist scans and compares the data to be backed up and the data in the destination image to see what data changed. The process can take a long time, but when **Enable image tracking** is selected, System Protection backups record the changes to the data using a virtual snapshot. This means the backup job only needs to look at the snapshot to see what data changed. The result is significantly faster backups. *Enable image tracking* is enabled by default under the **Incremental backup tracking for System Protection** section, in the *Windows Setting* screen.

To learn more, visit our article on making [faster incremental image backups](#).

5. Creating a System Protection backup



The following instructions describe how to create a backup job using BackupAssist System Protection.

Launch BackupAssist and follow the steps outlined below:

1. Select the **Backup** tab
2. Select **Create a new backup Job**
3. Select **System Protection**

If this is the first time you have created a backup job, you will be asked to provide a *Backup user identity* if one has not been defined.

4. Selections

The selections screen is used to select the data and applications that you would like to back up. Any VSS applications detected here will be displayed as application directories.

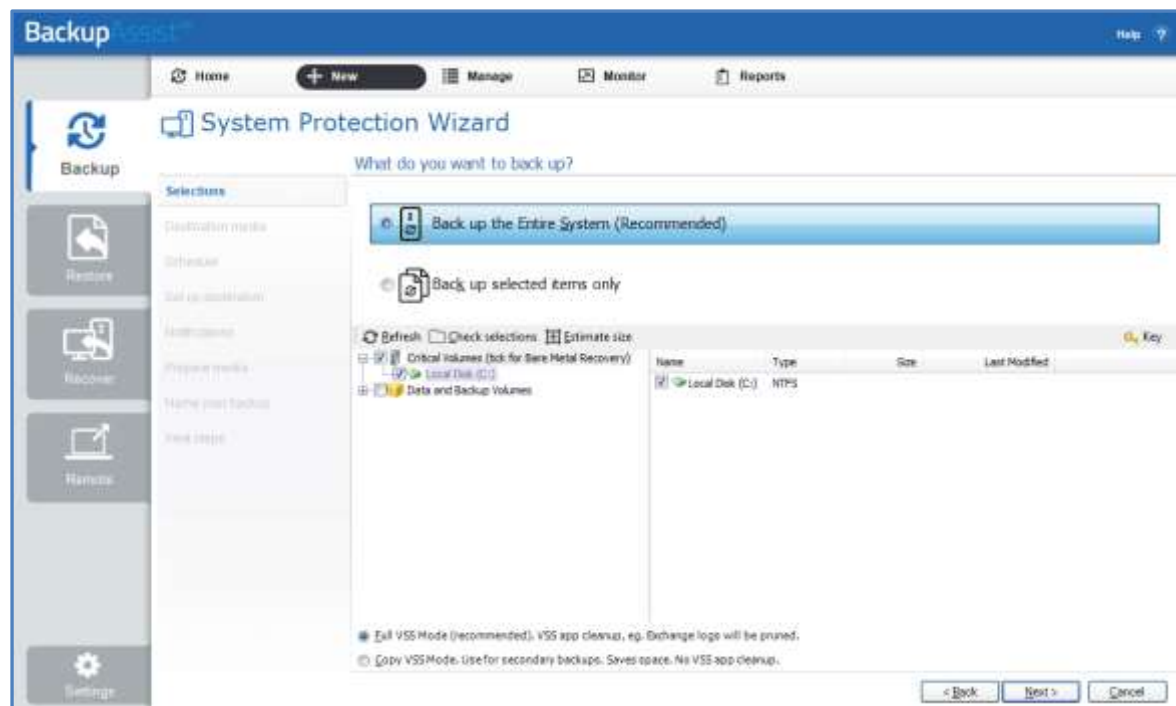


Figure 1: System Protection backup – data selection screen

There are two selections to choose from:

- **Back up the Entire System.** This option will create an image of your system that can be used to perform a full *recovery* of your computer. The Critical Volumes are selected by default and include *bare-metal* recovery data.
Back up selected items only. This option is used if you only want to create a backup of files, folders and applications. The option will allow you to deselect *Critical Volume's* (bare-metal) and select specific VSS applications and drives.

You can select specific data within a drive (e.g. C:) if the backup is to a *Removable* disk. To do this, modify the backup job after you save it using the *Manage* menu on the *Backup* tab.

Critical Volumes is required for a bare-metal backup. The backup can be used with a bootable recovery media to recover your computer, after hardware has been replaced or an operating system failure has occurred and your computer can no longer start itself.

5. Destination media

The destination screen is used to select the type of media that you want to back your data up to. This step's name will change to the media type selected, when you click next.

Select a device for your backup destination, and click **Next**.

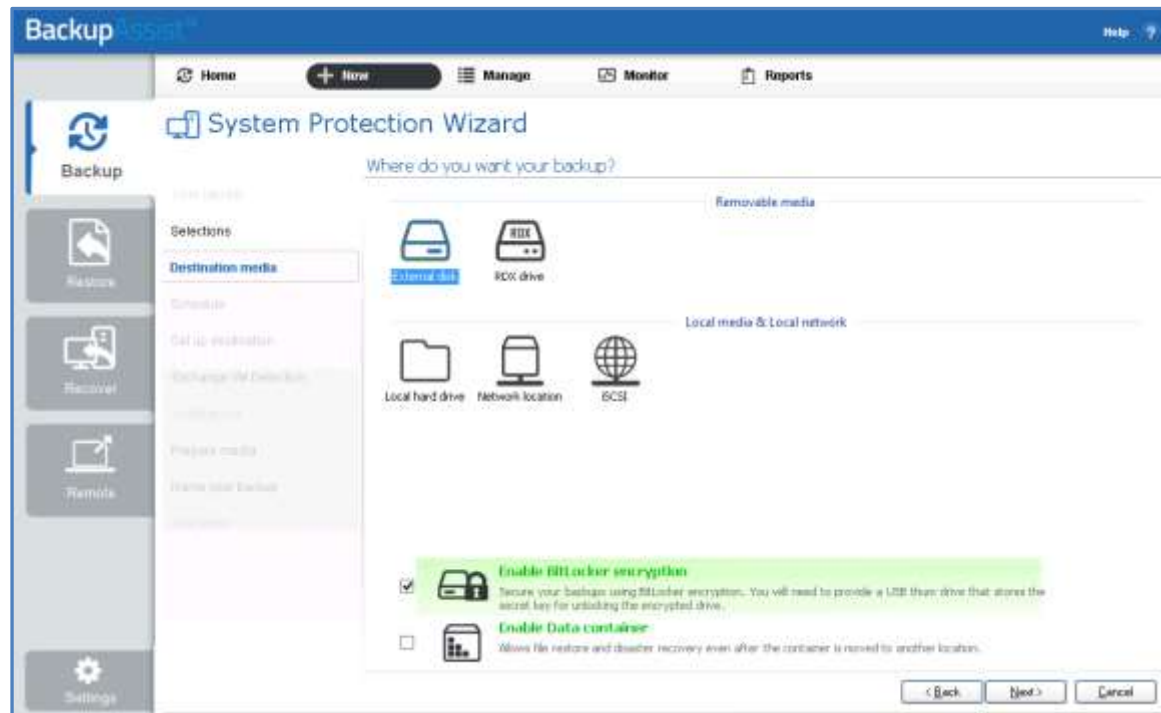


Figure 2: System Protection – Destination media

Enable BitLocker encryption

This option is available for Windows servers that have BitLocker installed. BitLocker can be used to encrypt *External disk* and *RDX drive* backup destinations. This protects the drives from unauthorized access. When enabled, BitLocker will encrypt and lock each drive, and assign an encryption key which can be used to unlock and access the drive.

- A USB flash drive containing the encryption key must be connected to the server running BackupAssist, to allow BackupAssist to access the drive when you backup or restore data.
- The encrypted drive will be assigned a password that can be manually entered to unlock an encrypted drive when you want to restore data or perform a recovery using RecoverAssist.

To learn more, including how to install BitLocker, see our [BitLocker resource page](#)

Enable Data container

This option is available for the following destinations: *RDX drive*, *Local hard drive*, *Network location* and *External disk*. A Data container is a file that the backups will be stored inside of. The Data container is created on the destination media and each time the backup jobs runs, the container is mounted and treated as a local disk. On Windows 2008R2 and later - backups on RDX drives cannot be used to restore individual files unless Data containers are used.

To learn more, see the [Data container resource page](#).

6. Schedule

This screen is used to select when you would like a backup job to run and how long you would like the backup to be retained for. A selection of pre-configured schemes, will be displayed.

- The schemes available will depend on the type of destination media selected in step 4.
- Clicking on a scheme will display information about the schedule used.
- The schedule can be customized after the backup job has been created.

Select an appropriate scheme, and click **Next**.

To learn more about scheduling options and customizations, see the [Backup tab user guide](#).

7. Set up destination

This screen is used to configure the media selected in step 4. The options presented will change with the type of media selected.

Configure your backup destination, and click **Next**.

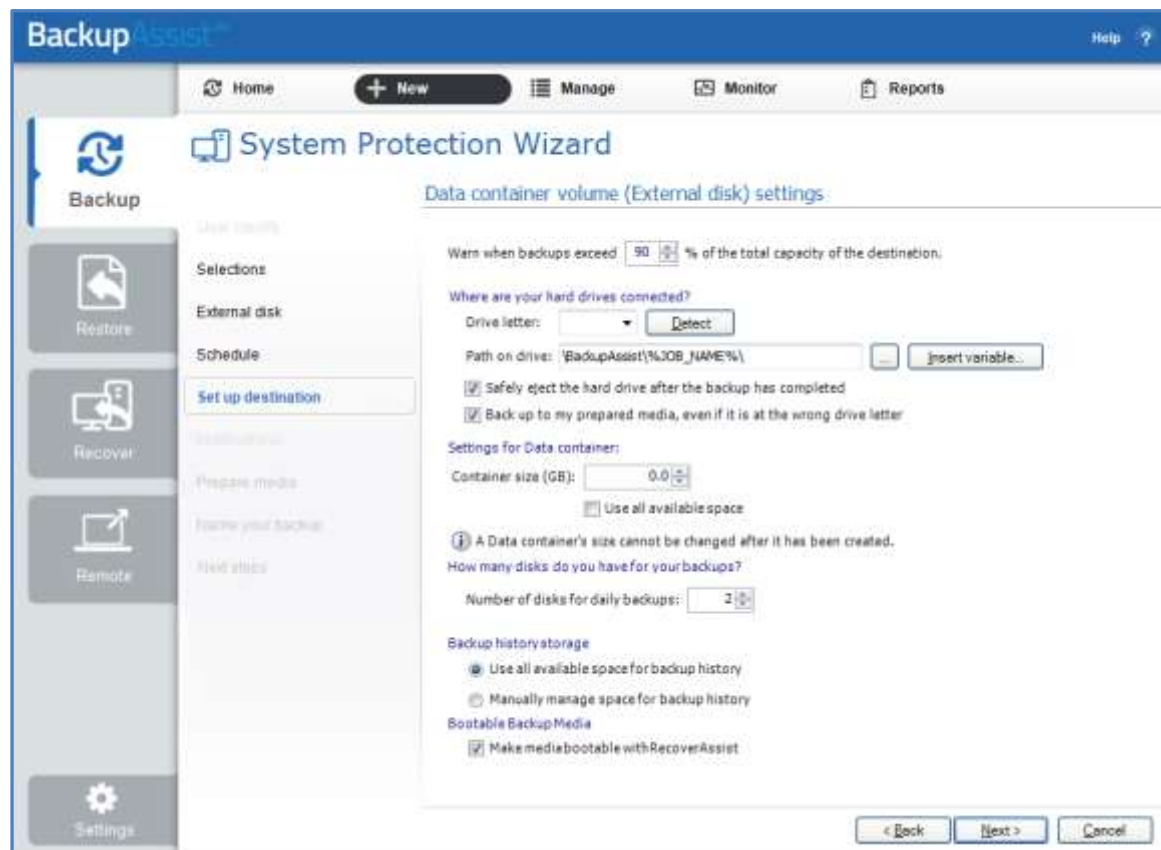


Figure 3: BackupAssist System Protection – Set up destination screen

BitLocker encryption

To encryption the backup destination, you will need to provide:

- A drive letter of the USB drive used to store the encryption key. An encryption key is saved for each encrypted drive, and is used to unlock the drive when you backup and restore data.
- A password that will allow you to manually access any drive encrypted by this job when you perform a restore or a recovery. This password is saved in the backup job.

Data containers

The container size and location is set using this screen.

- For an *RDX* or *External disk* destination, *Use all available space* will be selected by default. It is important to review this setting to ensure it is appropriate.
- For a *Local hard drive* and *Network location*, set the size manually by using the field provided, or select the *Use all available space* option.
- The size of a Data container cannot be changed once the backup job has run.
- Selecting *Use all available space* will allow the Data container to grow into the available space.

Bare Metal Bootable Backups

If you are doing a bare-metal backup to an external hard disk, a *Bootable Backup Media* option will be displayed and selected by default. This feature allows your backup media to boot into a RecoverAssist recovery environment and recover the server, without a separate boot disk.

Destination check report

If you are using a *Local media & Local network* destination, a *Check destination* button will be available to check your backup destination for possible problems. After the checks have been completed, the results can be viewed by selecting the *Report* link. If you are using *Removable media* destinations, these checks are performed when you select *Prepare* on the *Prepare Media* step.

8. Notifications

Once a backup job has completed, BackupAssist can send an email to inform selected recipients of the result. This email notification can be enabled during the creation of a backup job, if the mail server has been configured. To learn more, see the [Backup tab user guide](#).

To enable email notifications:

- a. Select, **Add an email report notification**.
- b. Enter recipients into the **Send reports to this email address** field.
- c. Enter recipients into the **Also send reports to this email address** field. You can then select the condition under which the email should be sent, using the drop-down box.

9. Prepare media

If you selected a portable media device as your backup destination, you will be given the option to prepare and label the media. The label allows BackupAssist to recognize the media and ensure that the correct media is being used on the correct day.

For example, if you put an RDX drive in on Tuesday but it was labelled Wednesday, BackupAssist will warn you that the incorrect media has been detected.

BackupAssist will display a list of media based on the backup schedule you selected, and the *Number of disks for daily backups*, selected on the *Set up destination* screen.

To prepare the media and enable media tracking:

- a. Select, *Let BackupAssist keep track of your media*.
- b. Select what you want BackupAssist to do if an incorrect or unrecognized media is inserted.
- d. Enter the label you want added to each media in the text field provided. Default label names are provided, based on your backup schedule.
- e. Select *Prepare* for each media device. Prepare will be selectable when the media is attached.

If you selected **BitLocker encryption**, use the *prepare* media button to indicate what drives to encrypt. The encryption process will be initiated by the final backup job creation step.

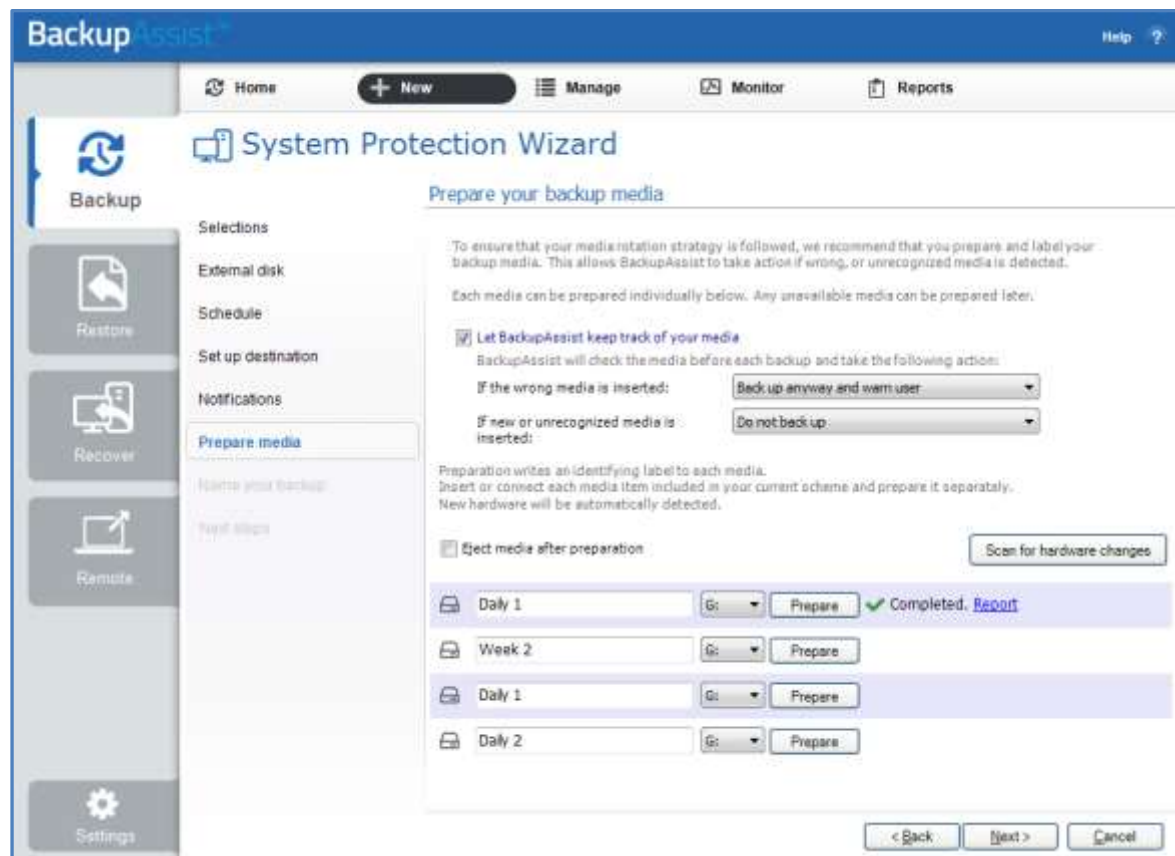


Figure 4: System Protection – Prepare media selections

Destination Check Report

Selecting *Prepare* will generate a *Destination Check Report*. The report will advise if any problems were detected with the media. If *Make media bootable with RecoverAssist* was selected in the *Set up destination* screen, the report will also advise if the media can or cannot be made bootable.

10. Name your backup

Provide a name for your backup job, and click **Finish**.

11. Next Steps

If you selected *BitLocker encryption*, the encryption can process will begin. When you select **Finish**, the BitLocker encryption tool will open and encrypt the prepared drives. If an unencrypted drive is used for a BitLocker backup job, the job will fail.

To learn about the BitLocker encryption tool, see our [BitLocker resource page](#)

► Your System Protection backup job has now been created.

Important: Once the *backup* has been created, it should be checked. You can check the backup by performing a manual test restore, or using the [Backup Verification feature](#).

Backup verification is an automated process for testing backups. A manual restore is the only way to fully test a backup, and regular manual restores should be part of any backup solution

6. Restoring from a System Protection backup



The Restore tab displays the restore options available. This section provides instructions on how to use the *Local and Network Files* restore option, which is used to restore files and folders and VSS applications that do not have their own specific restore option.

The other restore options are documented in technology specific guides, as follows:

- For *Hyper-V Host File* and *Hyper-V Granular* restore, see the [Hyper-V Protection guide](#).
- For *SQL Server* and *SQL Point-in-Time* restores, see the [SQL Protection guide](#)
- For *Exchange Server* and *Exchange Granular* restores, see the [Exchange Protection guide](#)

To restore data from a **System Protection** backup, follow these steps:

1. Select the Restore tab

The *Restore tab* has a *Home page* and a *Tools page*. The *Home page* is the default page and the recommended starting point for performing a restore. The *Tools page* should only be used by experienced administrators or users being assisted by technical support.

2. Select Local and Network Files

This will display the volumes backed up by this installation of BackupAssist. It can also show backups from other machines added using the *Discover Backups* button, which is explained below.

Expand a volume to display all of the backups available for that volume. There are tabs above each volume's backup list to help locate the required backup.

- The *Last 7 days* and *Last 30 days* tabs can be used to display the backups within those ranges.
- The *Custom* tab allows you to select a specific date range and display backups for that period.

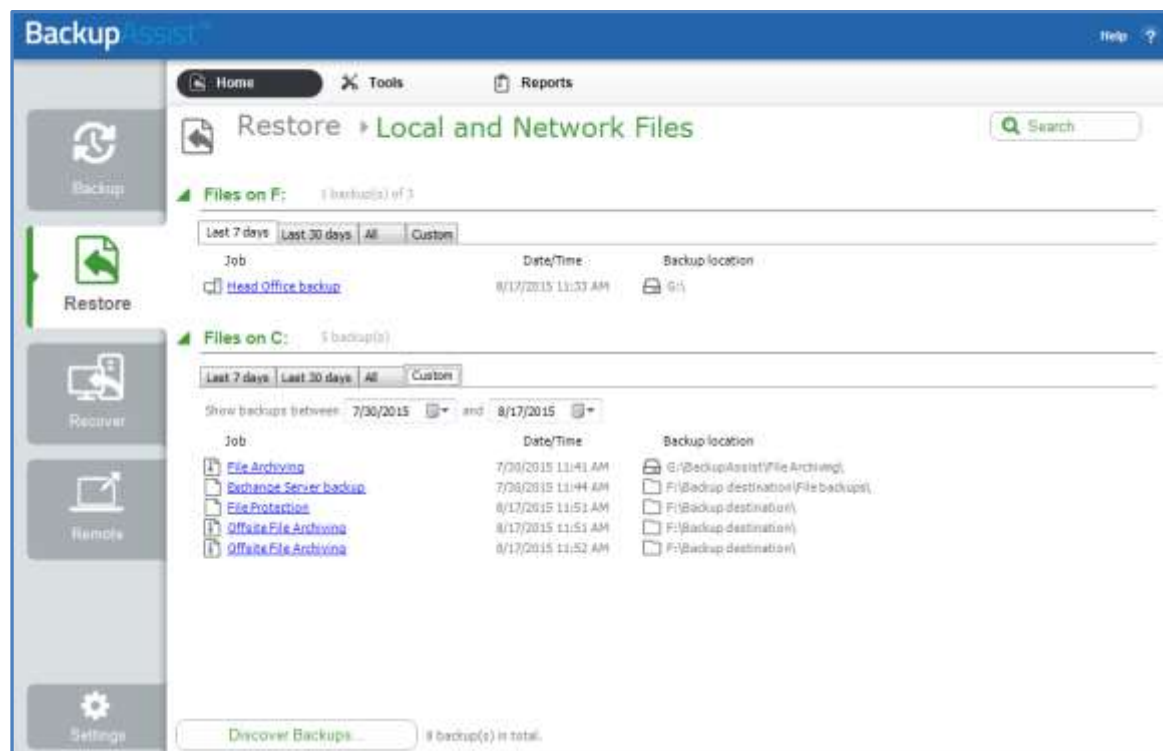


Figure 5: Restore tab – backup selection

The **Search** button allows you to locate files to restore across multiple backups. When you select Search, the Restore console will display the Search page.

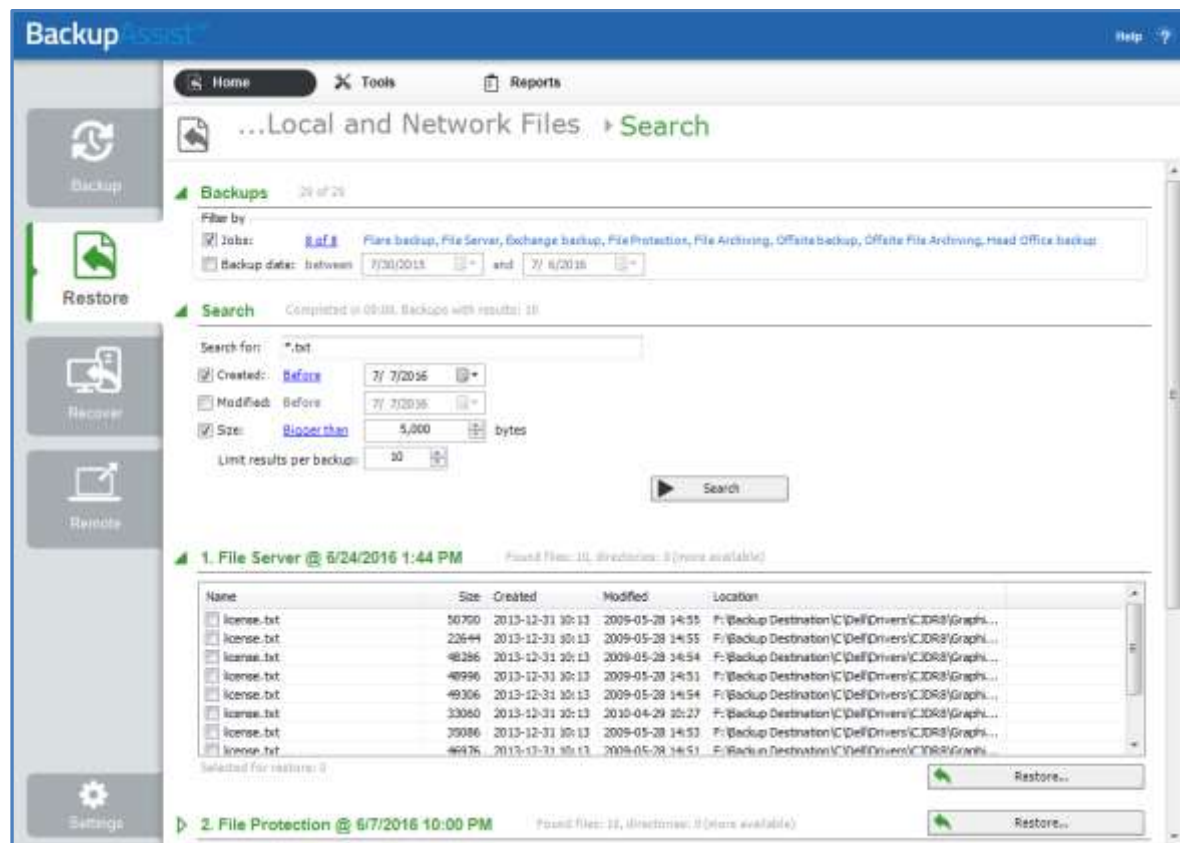


Figure 6: Restore Tab – Search page

- The **Backups** section allows you to use the **Jobs** Filter, to limit the search to specific backup jobs. You can also use the **Backup Date** filter search within a specified date range.
- The **Search** section is used to enter a search term associated with the name of the file you want to find. The **Search for** field will take the string provided and search for occurrences of that string within a file or directory name. The results of the search are displayed by backup.

To refine the search, use the **Created**, **Modified** and **Size** options. Ticking any of these options will activate a drop down list of variables to select from. For **Created** and **Modified**, you can select a date using the Calendar selection fields. For **Size**, you can select the file size in bytes.

The **Discover Backups** button allows you to browse for backup catalogs created by deleted jobs and other servers. Selecting those backups will add them to the list of available backups.

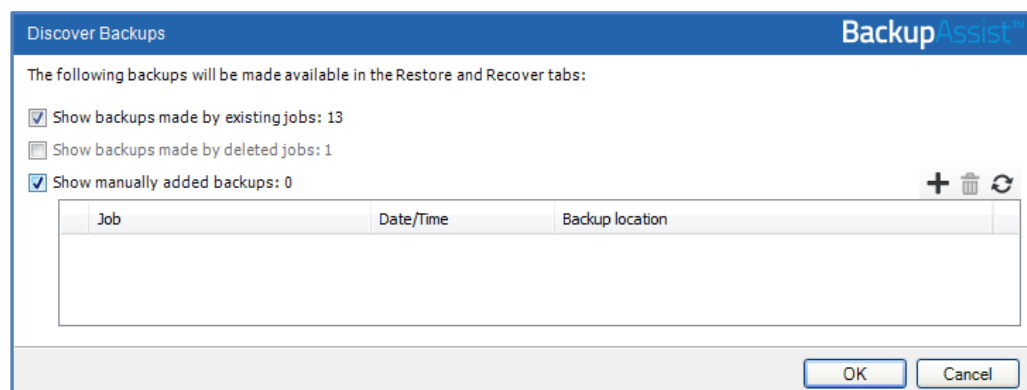


Figure 7: Discover Backups

3. Select the backup that you want to restore from

Clicking on a backup's name will open the *Integrated Restore Console (IRC)*. The *Integrated Restore Console* is used to select the data to be restored, where to restore it to and the restore conditions.

4. Select the files, folders or applications that you want to restore

- Use the left pane to locate and select the data that you want to restore.
- The right pane will display the contents of the folder selected in the left pane.

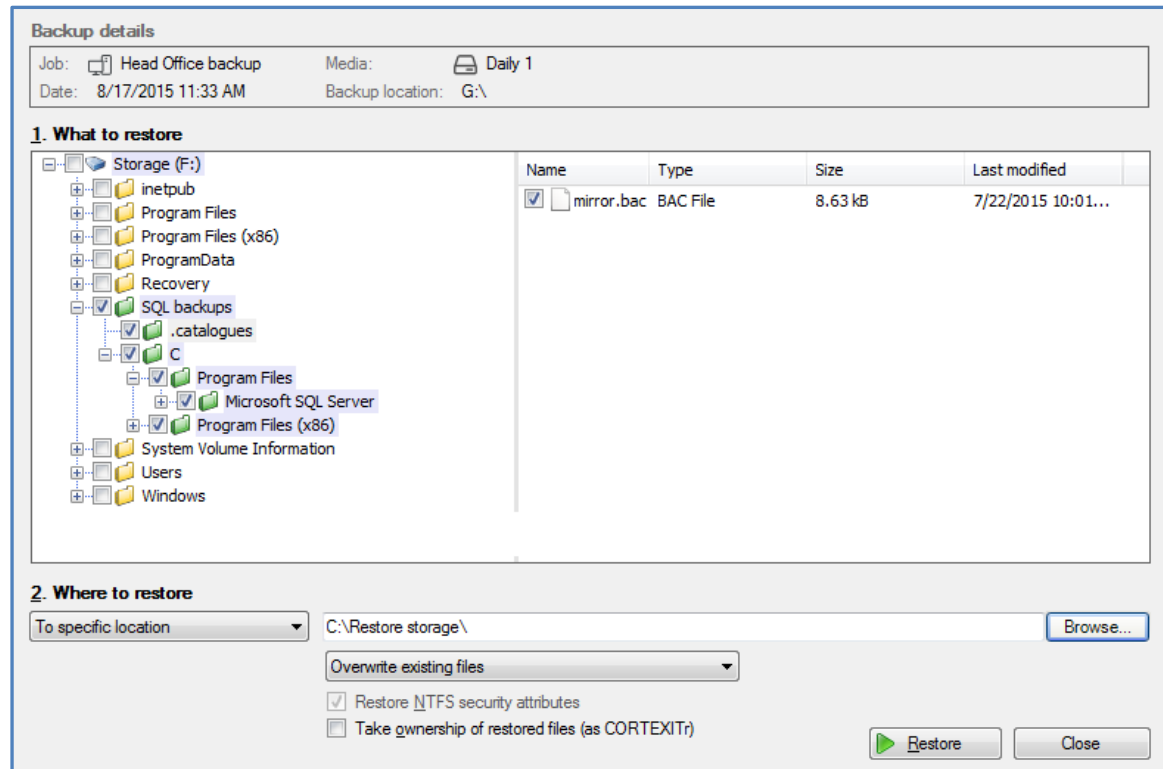


Figure 8: Integrated Restore Console

5. Select Where to restore the data to

Follow these steps to select the restore destination and restore options:

- Under *Where to restore* select *To original location* or *To Specific location*.
- Use the *Browse* button to locate and select the restore destination.
- Use the drop down box to set the overwrite rules. The overwrite rules will apply if the files being restored encounter files with the same name in the restore destination.

You can select:

- *Overwrite existing files* - The restored files will overwrite files in the restore destination.
- *Do not overwrite existing files* – The restored files will not overwrite files in the restore destination. This means the files will not be restored.
- *Only overwrite older files* - If a source file has changed since the backup was made it will not be overwritten.

d) Review the *Restore NTFS security attributes* option

If you select this option, the NTFS security attributes the file had when it was backed up will be retained when the file is restored. The NTFS security attributes can be viewed in the Security tab on the file's Properties

e) Review the *Take ownership of restored files* option

Selecting the *Take ownership of restored files* tick box will give the current user ownership of the restored files. The user is shown to the right of the text box description.

6. Select Restore

When you select the *Restore* button, the restore process will begin. The *Integrated Restore Console* will display information about the restore job and provide status updates as the job runs.

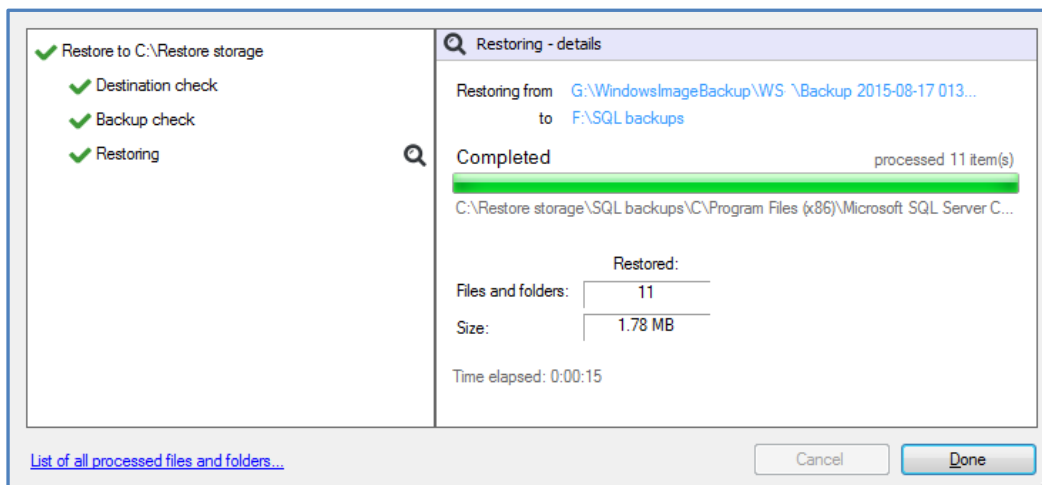


Figure 9: Integrated Restore console – restore monitor

Selecting *List all processed files and folders ...* will open notepad and display a list of the files restored, including their full path.

BitLocker Encrypted backups

If your backup is encrypted, you will be prompted for the encryption password when the restore job accesses the backup. It is important that you keep a copy of your password in a safe place, as we cannot assist you with opening password-encrypted files if your password is lost or forgotten.

You can also use the encryption key to unlock an encrypted drive, by connecting the USB flash drive. BackupAssist will use the key to unlock the drive you are restoring from. You will not be prompted to do anything other than the normal restore steps.

7. Select Done

Once the restore has finished, selecting *Done* will return you to the main UI.

► Your System Protection restore has now been completed.

Helpful hint: BackupAssist automatically mounts Data containers when backups and restores are performed. However, there may be times when you want to do this manually. For example, if you want to check what is inside a Data container or have it available for another task. To manually mount a Data container, please refer to the steps outlined in our [blog article](#).

7. System Protection backup management



Once you have created a backup job, you can modify the settings and access advanced configuration options using the *Manage* menu.

To access the backup management screen:

1. Select the BackupAssist, **Backup tab**.
2. Select **Manage** from the top menu. A list of all backup jobs will be displayed.
3. Select the backup job you want to modify, and select **Edit**.
4. Select the required configuration item on the left. Key configurations are described below.

Destination

Backup storage options

This option is used to determine how space is allocated for shadow storage on a removable backup destination. Shadow storage is used by VSS to store historical backup data from previous backup jobs.

There are two options available:

- **Use all available space for backup history**

With this option, BackupAssist makes all free space on the backup destination available for storing historical backups. The exact amount of the space used changes with time, depending on the amount of space used by the latest backup and other data.

- **Manually manage space for backup history**

With this option, Windows is used to determine the shadow storage size. You can allow Windows to automatically determine the size, or manually manage the size yourself using either the Windows Server settings or the vssadmin tool.

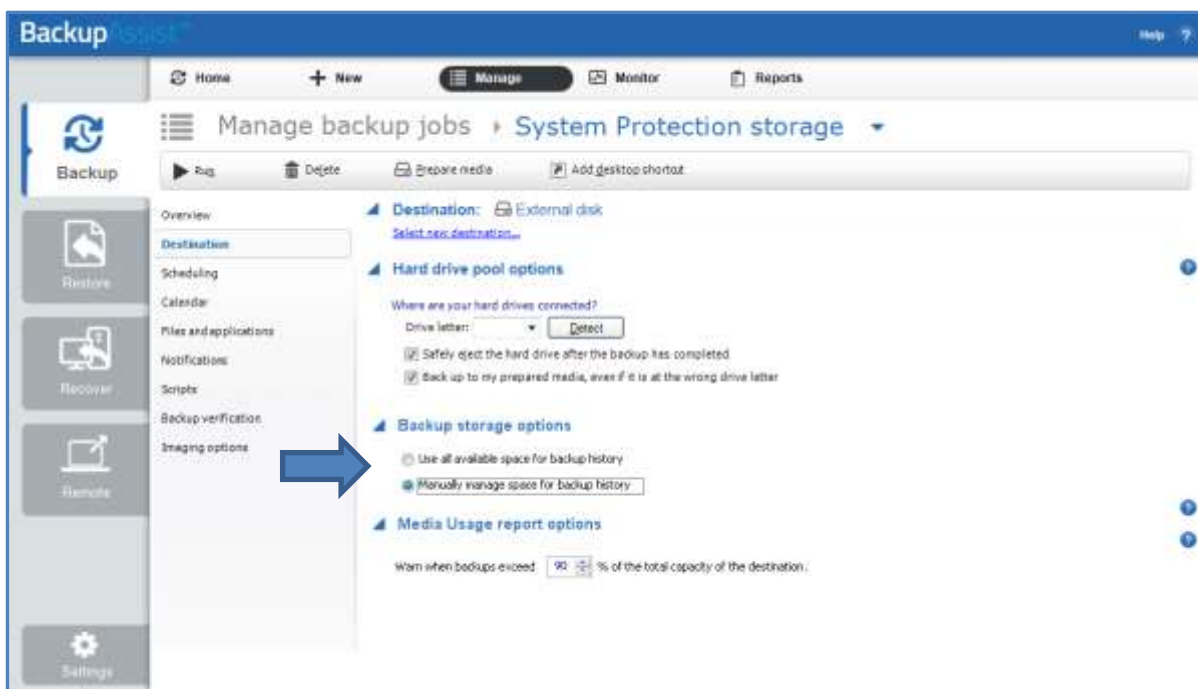


Figure 10: Imaging options - Backup storage options

To set the size using the Windows Server settings:

- For Windows Server 2008, right click the drive and select Configure Shadow Copies
- For Windows Server 2012 and later, open the drive's properties, select the *Shadow Copies* tab and access the *Settings*.

To set the size using the vssadmin tool:

- You can view the amount of space reserved for the shadow copy storage by running the command **vssadmin list shadowstorage** at an elevated command prompt.
- You can change the amount of disk space allocated to the shadow copy storage in GB or as a percentage of the disk, using the following commands:

```
vssadmin Resize ShadowStorage /For=X: /On=X: /Maxsize=XX%
vssadmin Resize ShadowStorage /For=X: /On=X: /Maxsize=XXGB
```

This will resize the limit to **XX** size for drive **X**:

The use all available space for backup history option is equivalent to "vssadmin Resize ShadowStorage /For=X: /On=X: /Maxsize=UNBOUNDED".

To see more VSS admin commands, please refer to this [Microsoft VSS admin resource](#).

For guidance on what the size should be, see our article on [Image backup destinations](#).

Data container options

You can modify the size settings of a Data container, if the container does not exist. For example, if the backup job has not been run or if the container has been manually deleted.

To modify the size select **Destination** and go down to **Data container options**:

- *Container size (GB)*: Use the up and down arrows to set the size of the Data container.
- *Use all available space*: Tick this box and all available space on the destination device will be used by the Data container, up to 2TB.

Files and applications

A new *System Protection* backup job will back up an entire disk or application. However, under the *Files and applications* menu item, you can modify your backup job by selecting specific files and folders, or individual components within a VSS application.

The Volume Shadow Copy Service (VSS) is a Microsoft Service that creates a copy of an application's data (e.g. Exchange and SQL) so the data can be backed up without interfering with the application. BackupAssist will automatically detect *locally* running VSS applications and list them for selection during the **Destination** step of the backup job creation.

If your backup job contains a Hyper-V guest with an Exchange Server, the authentication information for the guest should be entered into the **Exchange VM Detection** tab. With these credentials, BackupAssist can detect what guests have an Exchange Server, and list the EDB file available for each guest when you perform a restore using the Exchange Granular Restore console.

Hyper-V process is automated but the restore requires both the *Exchange Granular Add-on* and the *Hyper-V Advanced Add-on* licenses.

Scheduling

Selecting **Scheduling** will display the **Scheduling options**. You can use this screen to change the following settings for your scheme's daily backups: the time the backups run, how many times a day the backups run and the days of the week each backup runs on.

If you selected a scheme with archive backups (e.g. weekly, monthly), you can also specify when each archive backup will run. The current scheme is shown, along with two pop-up menus: *Select a new schedule* and *Customize schedule*.

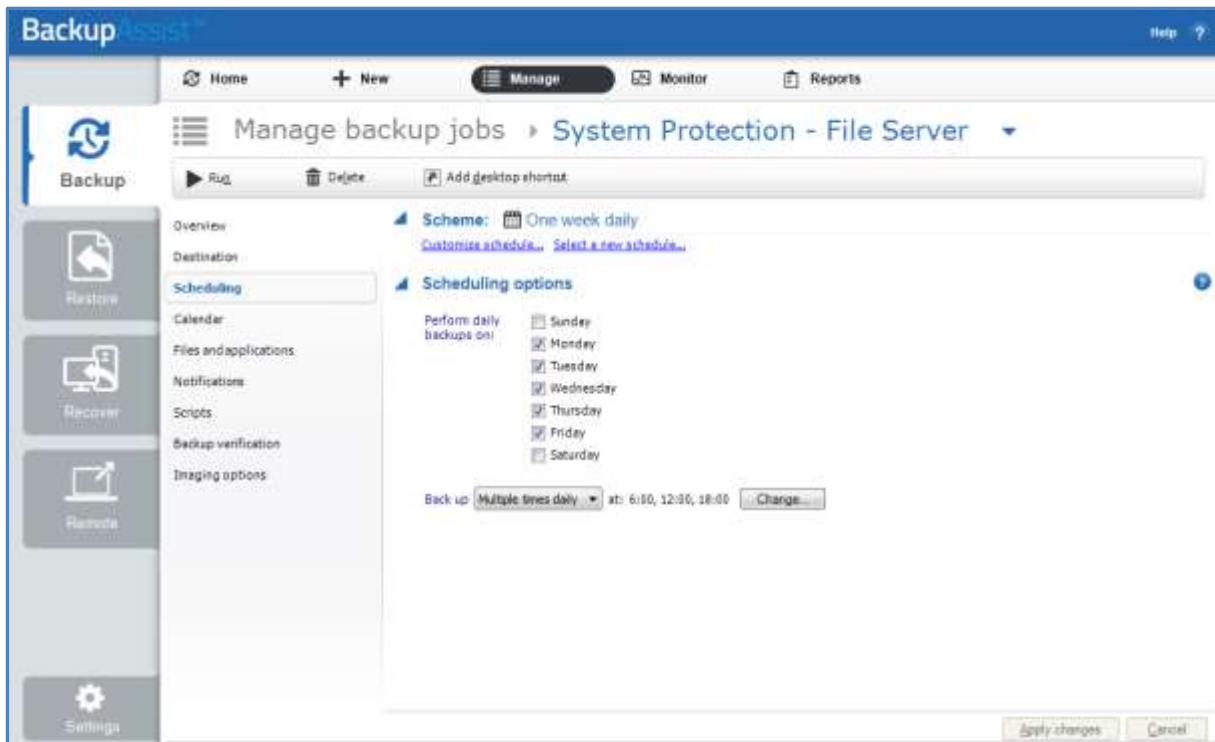


Figure 11: Manage Scheduling

Select a new Schedule: This will display the pre-configured backup schemes that you chose from during the creation of your backup job. The selections available will depend on the type of destination media you have selected. You can select a different scheme using this option.

Customize schedule: This selection can be used to modify each scheduled backup within your current scheme. The customizations available will depend on the type of backup media used.

The *Method* selection can only be *Automatic*. This is because when a System Protection backup job runs, it scans the data, identifies what has changed and updates the backup image (VHD file) with the data changes. This means you have a full image backup that is updated incrementally. In some circumstances (a new destination or a change to the backup job) a full backup will still be performed.

Selecting the *Incremental Windows Image Backups* option on the *Settings* tab (under *Windows settings*) makes Windows flag any data that changes, so that when the System Protection job is run, it does not need to scan the data selection to know what has changed. This makes the backup a lot quicker, but there is a performance overhead between backups due to Windows keeping track of the changed data. In some circumstances (a change the job's settings or destination) a full scan may be required.

Imaging options

Imaging options provides configurations that can be applied to an existing System Protection backup.

VSS backup mode

The VSS Full / Copy options allow you to set how VSS views the backup. A full backup is recommended as it allows VSS to prune logs that would otherwise grow and consume disk space.

Shadow Copy Protection Mode (SPM) is a solution for backup jobs that are losing backup history.

In rare instances, VSS can delete backup history when the backup job is having trouble writing to the backup destination. This can occur in backups that use low performance (iSCSI / NAS with Data container) destinations. SPM allows a failed write by the backup job to be retried. If the retry does not work, the backup job will stop and report a failed backup job. No backup history will be lost.

Shadow Copy Protection Mode should only be used if you are experiencing backup history loss.

- If you are unsure if you have lost history, try a test restore from your oldest available backup.
- If you are using iSCSI / NAS with a Data container, try to resolve the problem by improving the performance of your network or backup destination, and use SPM if the problem persists.

There are two space management options with Shadow Copy Protection Mode:

- The GB selection is used to reserve space for SPM for storage management purposes.
- The storage space percentage bar, allows you to specify the amount of space reserved for historical backups. As the full backup grows, historical backups are deleted to make room. However, you can specify a % of protected space within which the historical backups cannot be deleted. These will be the most recent historical backups, and the backup job will report that the destination is full, rather than write over them.

The full backup can use the reserved space, if the space is not being used by historical backups. For example, if 12.5 % is reserved on a 1TB drive, then 125GM will be reserved for historical backups. If the historical backups are only using 100GB, then the full backup can use 25GB of that reserved space.

BackupAssist manages the space at the backup destination for System Protection backups.

- If you are using Shadow Copy Protection Mode, you can set the percentage of protected storage space for the backup history.
- If you are not using Shadow Copy Protection Mode, the percentage of protected storage space is not managed by SPM so the bar will be set to BackupAssist's default of 12.5%

Quick Catalogue

Selecting this option means the cataloging phase is done without mounting the VHD file. That means the catalogue does not contain details of the files and folders that were backed up, it only contains the other metadata associated with the backup, such as backup destination, VSS metadata and VSS snapshot ID. Because the quick catalogue does not contain an index of files and folders, you cannot search for a specific file or folder in the restore console. The restore console does allow you to browse the files and folders in the backup, however it does this by mounting the backup VHD rather than using the data in the catalogue. This means that the backup must be available.

8. System Protection backup strategies

A good backup strategy is important to protect your company in every recovery scenario. There are five critical points to consider when setting up a backup strategy. Each point is described below.

Last known recovery point

One very important factor to consider is that your backups should provide you with a **last known good point** for recovery. Consider the following story.

A hacker has found and exploited a security vulnerability in the operating system, modified some system settings and uploaded a back-door for future access. The entire system is now compromised and the system has been infested with malware and Trojans. The actions taken by the hacker are unknown, and there is no easy way to know what changes were made.

Some malware / virus infections may go undetected for several days. If the infection happened 3 days ago, and the only backup available is last night's backup, then the backup is effectively useless. However, if there is a backup from 3 days ago (just before the infection) then the server can be restored to the *last known good point*.

It is not always possible to know when your *last known good point* is – so for this reason it is important to have a variety of backups from different points in time. That means you need more than one backup medium (i.e. more than one disk to store your backups). These disks are then commonly divided into different sets - one set of backup media (in this case, disk) for daily backups, and another set of backup media for weekly backups. BackupAssist also gives you the option of having monthly and yearly backup disks for additional security.

Multiple removable media

When using a backup destination such as USB hard drives or RDX drives, it is recommended that multiple disks/cartridges are used as part of the rotation strategy. Due to the nature of Windows Imaging backups, the number of different points in history that we can restore from is correlated to the number of devices used for the backups.

Backup Device	Recommended Number of Disks/Cartridges
USB Hard-drive	3 to 5 or more
RDX drive	5 or more

Running a test restore

In addition to running backups successfully, the integrity of backups should be checked, on average, once a month to ensure that they are restorable. By frequently running a test restore, you will be able to confirm that the backups can be used in a real restore scenario. Test restores also give you practice in the restoration process so that you are aware of the steps and what is required.

Offsite storage of backup media

In order to protect your company data from physical events like natural disasters or theft of hardware, backups should be taken offsite and kept in a secure location. Although it is important to keep some backups on-site to be able to restore data quickly, it is equally important to keep at least one backup a week off-site.

Keeping backups off-site enables users to restore their servers in the event of any such disasters. The convenience of being able to restore data immediately from on-site storage of backups should not deter users from also storing backups off-site.

A hurricane has gone through the city's business district and destroyed everything in its path. Your company has been severely affected - all office equipment such as servers, personal computers, and lap-tops has been destroyed beyond salvage. The IT department implemented a backup strategy earlier in the year covering all the computers on the network. Unfortunately, all the backups were stored in a safe on-site and were also destroyed in the hurricane.

We suggest that you store the daily backups on-site and the weekly backups off-site. (BackupAssist can even help you manage off-site backups using the Internet. For more information, visit our online product page: http://www.backupassist.com/BackupAssist/tour_Rsync.html)

Imaging backup scenarios

Imaging daily

When running a Windows Imaging backup daily to a removable device, a good strategy would be to use 5 disks – for example, 2 for daily backups and 3 for weekly backups. The two *daily* disks can be rotated across the daily backups (i.e. Monday and Wednesday's backup goes to Daily 1 and Tuesday and Thursday's backup goes to Daily 2). The three *weekly* disks can be swapped across the three weeks and the most recent weekly backup can be stored off-site. With multiple disks for the backups, you have a variety of restore points from which to choose. It is possible to alter this strategy – for example, 3 daily backup disks and 2 weekly disks, or 3 daily disks, 1 weekly disk and 1 monthly disk.

Imaging weekly

If there are constraints (excessive amounts of data, limited physical access to the server or procedural constraints) that make it impossible to image your system daily, it is still possible to have an effective backup system in place by running a Windows Imaging backup on a weekly basis.

For example, this scenario will still enable you to recover a system in the event of a disaster:

- Perform the drive imaging backups on a weekly basis (with 3 or more drives to enable media swapping).
- Use a different backup technology, such as a BackupAssist File Protection, to back up your applications and data on a *daily* basis.

In the event of a disaster, you can restore your system to the last image and then “roll forward” your data and applications from your daily backup.

9. System Protection backup report

The reporting capabilities of BackupAssist greatly enhance the reliability and accuracy of backup jobs.

Below are some key sections of the backup report:

Errors / Warnings Summary

Shows the status of the backup, plus a list of any warnings or errors. This is displayed at the top of the report so you can see any important messages quickly.

Destination Check

Shows any problems encountered with the backup's destination, such as incorrect backup media being detected (due to human error in the media rotation process) or if no media is detected at all.

Recovery Options

This section explains the BIOS, EFI and Hyper-V guest recovery options available for each System Protection backup.

Backups (Restore points)

This new section will list all of the backups you have on the backup destination. This will make it easy to see what restore options are available, and how far back you can restore from.

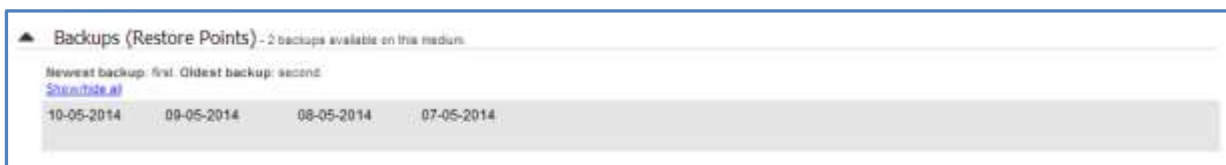


Figure 12: System Protection report - NEW Backup (Restore points)

Media usage

This section breaks down the space available at the backup destination for both the disk space and shadow storage. Shadow storage is used by VSS to store historical backup data from previous backup jobs. The example below shows the media usage report section for a Data container.

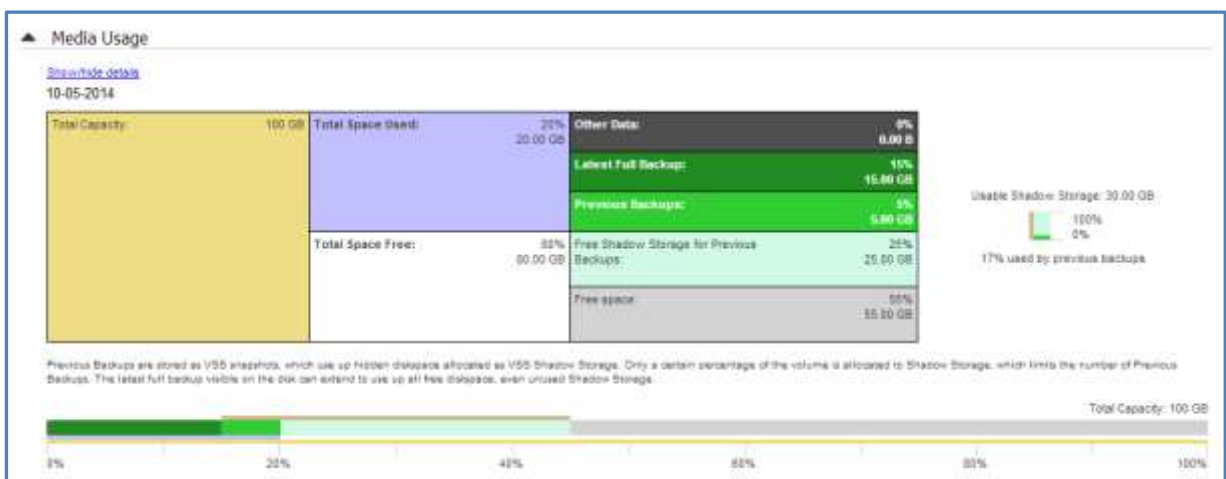


Figure 13: System Protection report – Media usage section

Total Capacity of the backup destination is shown on the left. The usage graph breaks this amount down into **Used** and **Free** space, and then into more detailed allocations, such as shadow storage.