

Introduction

Using Macrium Reflect you can backup whole partitions or individual files and folders into a single compressed, mountable archive file. You can use this archive to restore exact images of the partitions on a hard disk so that you can easily upgrade your hard disk or recover your system if it breaks. You can also mount images as a virtual drive in Windows Explorer to easily recover Files and Folders using Copy and Paste.

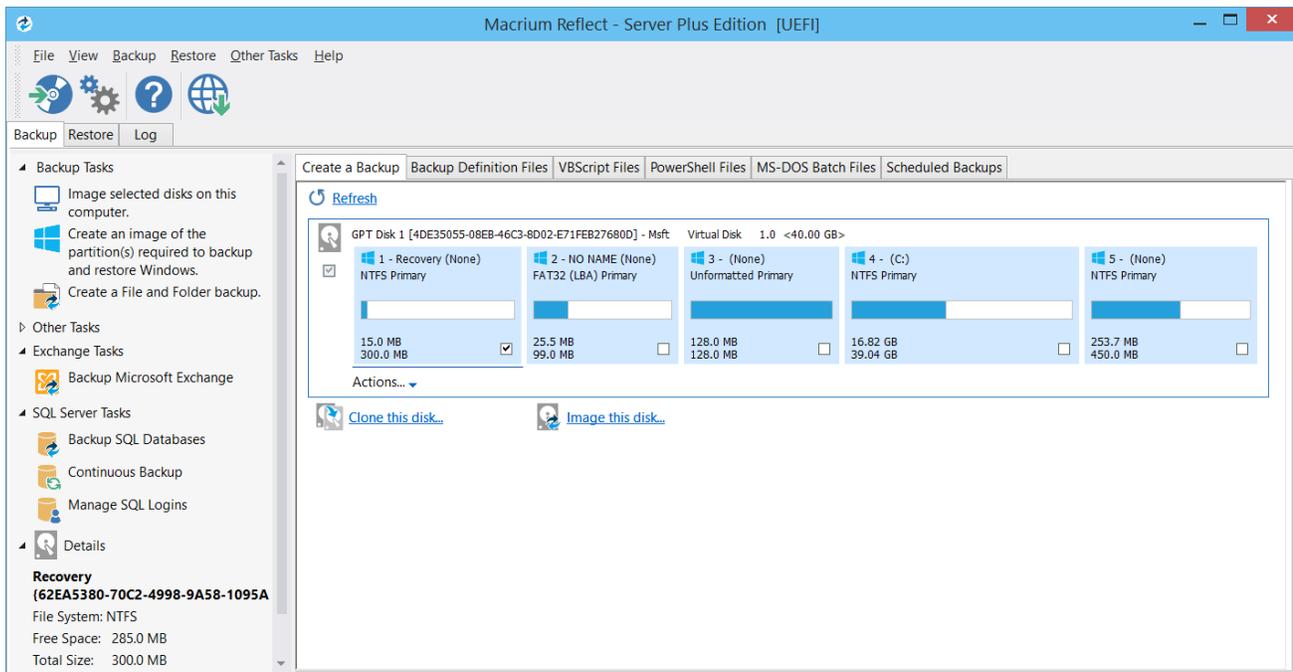
Summary

If you consider yourself non-technical this article should help you to start understanding the terminology, workings and concepts of imaging, backup and Macrium Reflect.

Inside a PC, the operating system, applications and all your files need to be kept somewhere when the power is off. This permanent storage is usually a hard disk drive containing a spinning magnetic platter. The information on the platter is recorded and read by read-heads. So that the read-heads can store and find recorded data, the disk is split into blocks, usually of 512 bytes, which are numbered from the start to the end of the platter.

So that the operating system can use different file systems or provide multiple volumes (like the C: drive, D: drive and recovery area), it partitions these blocks into volumes (sometimes also called partitions). These volumes and their file systems are the first thing you'll see when you start Macrium Reflect.

Figure: Macrium Reflect showing the volumes and file systems on a system disk



More recently, magnetic disk drives have been replaced or augmented by other technologies like Solid-State Drives (SSD). These devices have slightly different restore requirements which Macrium Reflect handles seamlessly using features like SSD Trim support.

Rescue media and Windows PE

If you lose your Windows operating system, you can start your PC using Macrium Reflect rescue media on CD, DVD, or USB stick. This makes creating rescue media the first thing you need to do with Macrium Reflect. It contains a bootable, lightweight version of Windows and a full version of Macrium Reflect.

This lightweight version of Windows is called the Windows Recovery Environment (also known as Windows RE or WinRE) and is supplied with Windows 7 and later operating systems. For Windows XP, Vista and systems without WinRE, Reflect will download the Windows Pre-installation Environment (also known as Windows PE or WinPE) directly from Microsoft.

Disk imaging

Macrium Reflect creates an accurate and reliable Image of a hard disk or the partitions on the disk. In the event of a partial or complete system loss, you can use this image to restore the entire disk, one or more partitions, or even individual files and folders.

During the imaging process, Macrium Reflect copies the contents of entire volumes including a reference to their physical location on the storage device to an image file (.mrimg). You would normally store the image file on local or network drives, or removable drives connected using USB or eSATA.

We strongly recommend that you create an image of your system at regular intervals.

You can read more about how to use Macrium Reflect to image your PC in our KnowledgeBase article [Creating a backup image of your computer, drive or partitions](#).

Macrium Reflect can help you create regular images by scheduling them for you. It can even tidy up after itself - see [Scheduling retention and disk space](#).

Differential and incremental images

Macrium Reflect can create **Full**, **Differential**, and **Incremental** images to optimize backup speed and disk space requirements.

When you image a volume for the first time it is referred to as a **Full** image. A **Full** image file contains all of the data stored in the volume. Macrium Reflect provides two alternative methods of backing up your data after the initial full image has been completed:

1. A **Differential** image that backs up all the data that has changed on the volumes since the last Full image was taken.
2. An **Incremental** image that backs up all the data that has changed on the volumes since the *last* image was taken whether that is a **Full**, an **Incremental** or a **Differential** image.

These methods significantly reduce the amount of disk space and time required to create image files and make it possible to restore your system from intermediate points within the backup chain.

Note: In order to restore a differential image, you must have the original full and the differential image you wish to restore. To restore an incremental image, you must have the original full and all subsequent incremental images in the backup set.

If you want to learn how to create differential or incremental backups using Macrium Reflect, please see [Differential and incremental disk images](#).

To learn more about backup sets, please see [Backup, imaging and cloning](#).

File and folder backups

To create a **File and Folder** backup, select the files and folders you want to backup, apply File and Folder filtering criteria to include and exclude files and/or folders, and Macrium Reflect creates a compressed backup file (.mrbak) that can be restored directly or browsed using Windows Explorer. Storing backups in a single file is beneficial because it can be compressed, encrypted and stored elsewhere with ease.

As you can for images, you can also create **Differential**, and **Incremental** file and folder backups to optimize backup speed and disk space requirements.

File and folder backups are ideal if you only wish to backup specific documents, photos or music, rather than your whole system. More information on how to backup files and folders is in our KnowledgeBase article [Creating a backup image of your computer, drive or partitions](#).

Disk cloning

With Macrium Reflect, you can clone your system disks to enable you to swap failed disks out of your system and get things back up and running again in minutes.

Cloning is often confused with imaging. The process is identical but instead of storing data to a file, it replicates volume contents and disk

structures to an alternative device. When the cloning process is complete, the target disk is identical to the original and contains a duplicate of all volumes, files, operating systems and applications.

Note: Any data on the target disk prior to the cloning process will be erased.

Cloning a disk is particularly useful to upgrade an existing hard disk and in the event of a hard drive failure, you can simply replace the failed disk with a clone and have your system up and running again in minutes. However, cloning a disk is not an efficient way of backing up your data if it changes frequently because the clone will only contain one point in time as there is no 'Backup Chain' history that is available with Disk Images. Also, Disk Images can be compressed and saved to any location.

More information on how to clone your disk is in our KnowledgeBase article [Cloning a disk](#).

Backup Plans and Retention Rules

Macrium Reflect provides multiple **Backup Plan** options to create backup cycles in days, weeks or months that allow you to pick when you want your backup definitions to run and whether they should be Full, Differential or Incremental backups. Scheduled backups can run independently of whether anyone is logged into the computer.

Macrium Reflect provides an easy 3 step approach to editing backup plans for a backup definition:

1. First, optionally select a **Template** from a set that includes implementations of industry best practice like Grandfather, Father, Son (GFS) or Incremental Forever
2. Add, remove or change the schedules as needed for full, differential and incremental backups
3. Finally, define **Retention Rules** for each type of backup. Using the **Retention Rules**, you can retain a specific number of each type of backup or keep them for a number of days or weeks before cleaning up.

Options define whether to apply the retention rules to all the backups in the folder, whether to run the purge before backing up, and let you define a minimum amount of disk space to retain in gigabytes (GB) before automatically deleting the oldest *backup sets* in the destination folder to make space available for new backups.

Note: A backup set consists of a full backup and any Incrementals or Differentials with the same image ID. The image ID is the part underlined in the following example backup file name: 69B5FC3F39E0F9F5-00-00.mrimg

Restoring files and folders

Macrium Reflect restores selected files and their folder structures from File and Folder backup .mrback files. There are a number of ways to restore backups:

1. You can restore individual files, for example, accidentally deleted spreadsheets or lost photos by browsing an Image or File and Folder Backup. This process mounts the image file in Windows Explorer as if it were an extra disk drive. After it is mounted, you can browse and open files and copy the files back onto your active file system whenever you like.
2. You can directly restore the contents of a file and folder backup using the Macrium Reflect file and folder restore feature.

You can find more information in [Restoring a file and folder backup](#) and [Browsing Macrium Reflect images and backups in Windows Explorer](#).

Restoring images

Macrium Reflect restores disks or their partitions exactly as they were when the backup was taken. The restore process also enables you to expand or shrink partitions if the restore target is a new disk and a different size to the original.

If your whole system becomes corrupt, you can load Macrium Reflect and restore your image despite being unable to boot Windows. You can boot from the Macrium Reflect Windows PE rescue media and use Macrium Reflect to find and restore your images

The restore process is documented in the article [Restoring a backup system image from Windows](#).

ReDeploy

From the rescue environment you can launch Macrium **ReDeploy** to adapt the recovered Windows system to its new environment whether that is a virtual machine or a different computer. With Macrium Reflect **ReDeploy**, you can restore an image to a replacement computer or even create

virtual hard drives to virtualize the machine, a technique sometimes called Physical to Virtual or P2V.

Macrium **ReDeploy** is now included in all paid editions of Macrium Reflect. This excludes the Free Edition and 30 day trials.

VBScript, PowerShell and MS-DOS batch file support

Macrium Reflect stores backup definitions as XML files that are loaded using the Reflect command line. This enables powerful batch and scheduling processing using VBScript, PowerShell or MS DOS batch files.

Macrium Reflect includes a VBScript and PowerShell generator that creates template script files for programmable control over your backup cycles and Pre/Post backup events.

Further Reading

- [Minimum System Requirements](#)
- [Feature Comparison Chart](#)
- [Licensing Policy](#)
- [New in Version 7](#)
- [New in 7.1](#)
- [New in Macrium Reflect 7.2](#)
- [Upgrade FAQ](#)
- [Installing Macrium Reflect](#)
- [Installing and updating Macrium Reflect offline](#)
- [Installing a Macrium reflect v6 to v7 Upgrade](#)
- [Macrium Reflect Quick Start](#)
- [Windows Explorer shell integration](#)
- [Reviewing your backup history](#)
- [Removing your License key when Upgrading your PC](#)
- [What is VSS, how does it work and why do we use it?](#)
- [Rapid Delta Clone - RDC](#)
- [Rapid Delta Restore - RDR](#)