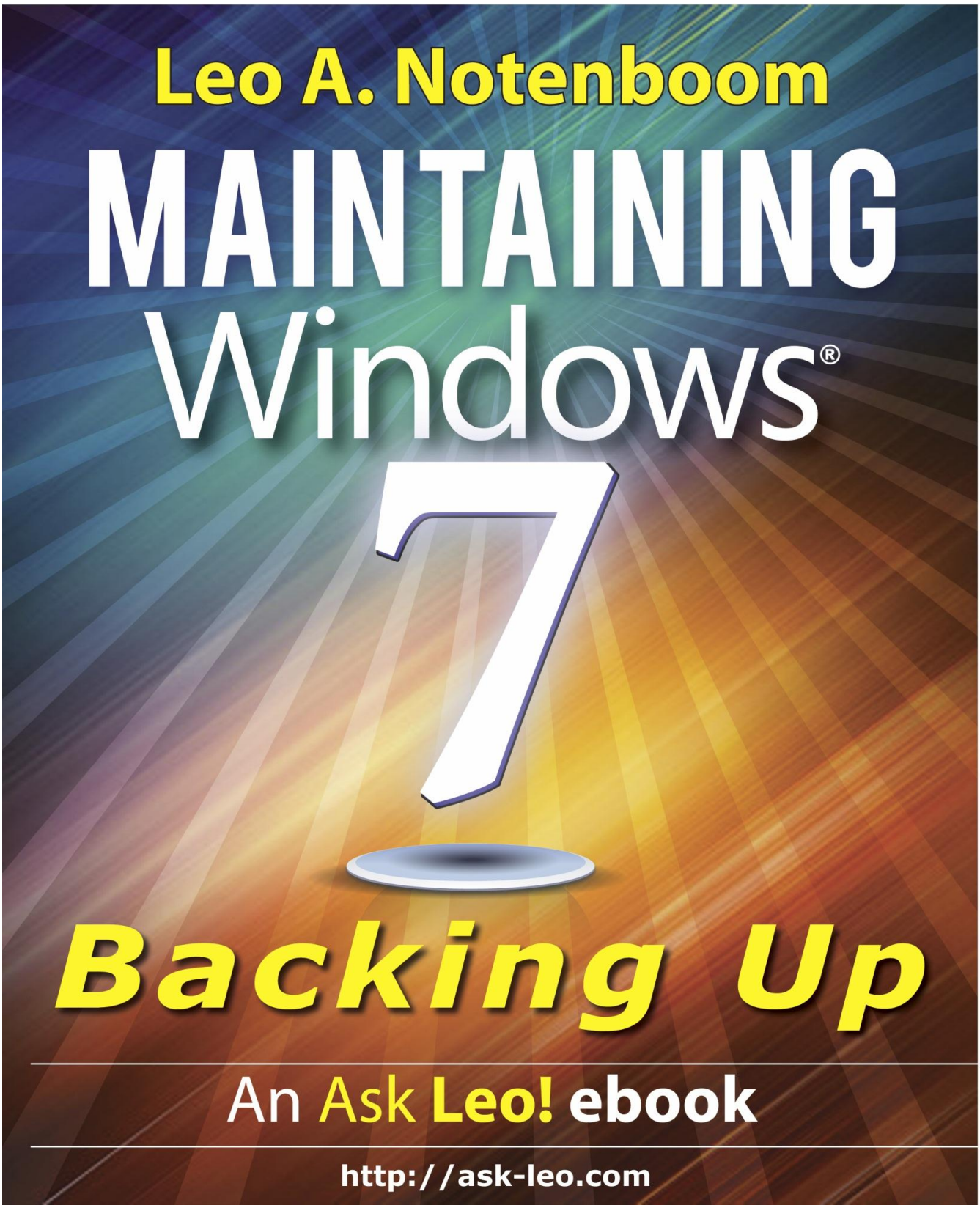
Leo A. Notenboom
MAINTAINING
Windows®
7
Backing Up
An Ask Leo! ebook
http://ask-leo.com

Maintaining Windows 7
Backing Up

by

Leo A. Notenboom

An Ask Leo!® ebook

ISBN: 978-1-937018-05-4

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The Ask Leo! Manifesto

Computers are too hard to use.

Too often the promise of unlimited *possibility* becomes what seems like only limitless *frustration*.

Computers are incredibly powerful devices that open up worlds of possibilities like never before. Add the internet and the opportunity for communication, information exchange and community building is phenomenal - truly amazing, and on a global scale like never before.

I'm Leo Notenboom and I have a deep desire to make computers and technology more accessible to the average person - a desire to replace the *frustration* that you probably feel too often with the sense of **amazement and wonder** I feel every day.

That is why Ask Leo! exists.

I hope I can help you.

Leo A. Notenboom
http://ask-leo.com

Before We Begin

What We'll Cover

This volume of Maintaining Windows 7 is all about backing up.

Though the concepts apply to just about any version of Windows, the examples I'll be using throughout focus on Windows 7 specifically.

If you're about to embark on a process of cleaning up your machine, including making changes that will involve deleting files and programs, altering random configuration settings, and who knows what else, the absolute best thing to do before you start will be to save what you have now, before you begin – just in case.

Thereafter you'll be able to use the backups that you've set up here to keep your data safe from malware, hardware failure and even accidental deletion.

As I've said before, having an up-to-date backup is nothing short of silver bullet when it comes to computing. Nothing can save you from more different types of disasters.

I'll be giving you step-by-step examples of how to backup, schedule automatic backups, test your backups, prepare for recovery, and if need be - perform either full system or specific file recovery.

I'll show you using two different backup solutions:

- **Windows Backup** - the backup program that comes with Windows 7. While it's not my favorite, it's on your machine now, it's free and it meets the minimum requirements for being able to backup your machine.
- **Macrium Reflect** - Reflect is a full-featured backup program that I use personally and recommend you seriously consider. While there is a free version I believe that backing up is so critically important that it's worth investing a few dollars in this program's premium version for the additional features it provides.

Be Sure To Register You Book!

Your purchase of this book entitles you to several additional bonuses, including a collection of companion videos that walk through many of the topics that are discussed as well as updates, errata, and Q&A.

You'll find the information that you need to register near the end of the book.

Important: Throughout the book, you'll see this icon:


Video

On devices that support internet browsing, click the Video link below each icon to go to the companion video for that section. (Clicking on the icon itself may simply display a bigger icon.)

If your device doesn't support internet browsing, don't worry. When you register your book you'll be taken to a table of contents page that will list all available videos and you can access them there.

These videos are available only to registered book owners and are completely FREE once you register.

My Example Machine

Unless I indicate otherwise, the concepts, programs, steps, and tips in this book should apply to pretty much any machine running pretty much any version of Windows 7.

However, I figured you might like a peek into what I'm using and what it is you'll be seeing in all my examples.

My desktop machine is a 2.66 gigahertz, 64-bit quad processor with eight gigabytes of RAM and something like two terabytes of hard disk space and three 27" monitors.

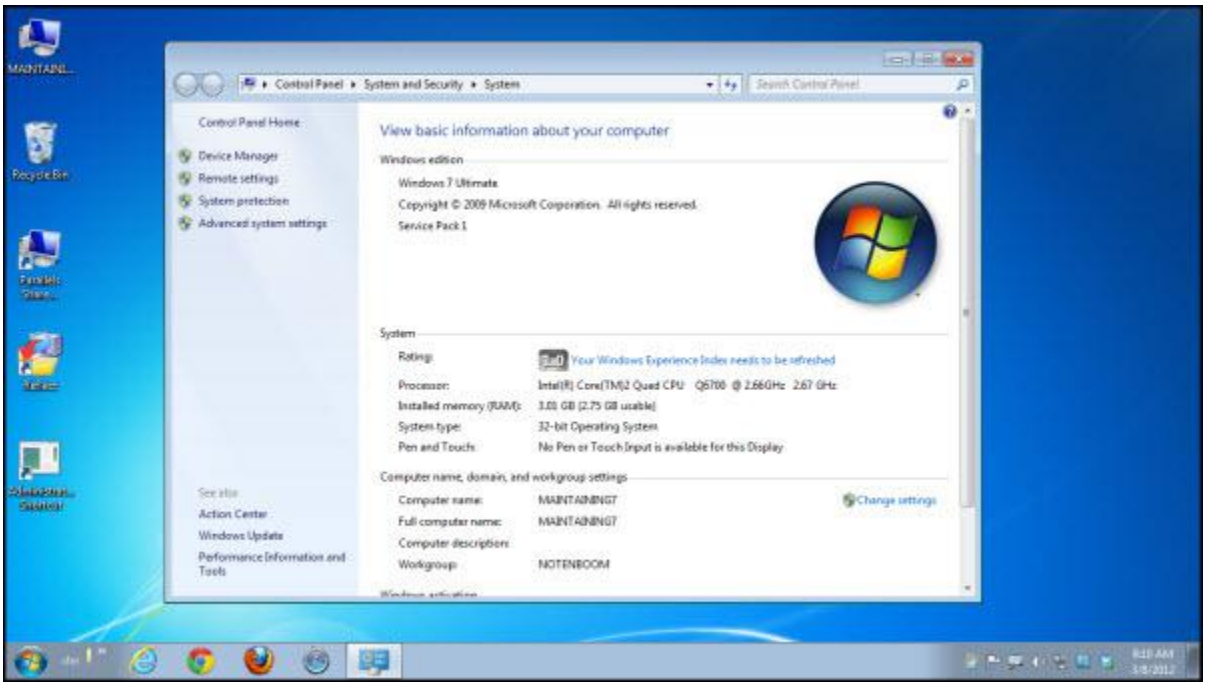
That's *not* the machine that you'll be seeing here.

On that machine, I run software called Parallels Workstation. That software allows me to create a *virtual* machine – a complete machine-within-a-machine or "machine in a window," if you like:

It's a virtual machine, or VM, that I'll be using here for several reasons: it's easy to reset to an initial known state, it'll be configured to be more like your machine and less like mine, and it won't have all of the stuff on it that my machine does that might distract from what I'm trying to present. And it'll have a more manageable screen size.

If interested, you can learn a little more about Virtual Machines in Virtual Machines - What Are They?, a video segment from one of my webinars where I give a brief overview of what I think is a pretty darned cool technology.

The VM is configured a little differently than my desktop. It's configured to use only two of the 2.66 Ghz processors, three gigabytes of RAM and runs the 32-bit version of Windows 7 Ultimate. It has two hard disks, each 30 gigabytes in size, and it has a single display at 1280x720 resolution.



Choosing a Backup Strategy

As I've said before, backing up is perhaps the single most important thing you can do – not only to maintain your computer, but quite frankly to save your behind in case of the inevitable, unexpected failure.

In this volume, I'm going to show you how to create what's called an image backup of your machine. I'll show you what you need to do should you ever need to use that image. Then, we'll move on to setting up

regularly scheduled backups, as well as how you can easily restore just a single file or a few files from your backup.

Our foundation will be the image backup, which is nothing less than a copy of *everything* on your hard disk. It'll include Windows, all installed programs, all of your data files ... it'll even include all of the temporary and cache files that Windows or applications may have created that are on the disk at the time that you take the backup.

Like I said, everything.

The reason is very simple. If anything ever goes wrong – say we delete something that we shouldn't have and render Windows completely unbootable – we can restore the contents of that image backup to our machine and be right back where we started at the time that backup was taken.

In other words, it's our safety net. A snapshot of the machine that allows us to say, "No matter what we do, it can't get any worse than this." 

Once we have that image backup under out belt we need to step back and talk a little bit about how we want to approach this whole backup thing.

•

There's no such thing as too many backups.

However, there is such a thing as having the wrong backup.

What's the wrong backup? A backup that, when you need it, doesn't contain whatever it is that you're trying to recover.

That's pretty close to being just as good as no backup at all.

That's why, before we go much further, we need to plan ahead and develop a *strategy* around backing up. That way, we can know with reasonable certainty that what we need will be there when we need it.

Let's start by looking closely at what you have that potentially needs backing up.

A Backup Inventory: Your Data

We'll start with the most obvious: your data.

The problem here is that the phrase "your data" is *extremely* ambiguous. It can mean many different things to different people. Most commonly, when people hear "your data," they think of things like:

- Email
- Documents
- Books
- Photos
- Music
- Videos

- ... and many more things that vary from person to person

One of the interesting changes that we've experienced in recent years is that for any or all of those, "your data" could be on your PC, on your phone, or in "the cloud" out on the internet as part of some online service.

And yet, that doesn't change one simple fact:

If it's only in one place, it's not backed up.

One thing that computers are great at is making copies.

But if you don't have a copy ... anywhere ... then you're not backed up.

A Backup Inventory: Your System

In addition to all of your data, you have a serious investment in something else as well, and that's your *system*. What that means is:

- Windows itself
- All of the programs installed in Windows
- All of the settings and customizations in all of those programs as well as Windows itself
- All of the data by-products, such as history, bookmarks, indexes, and more associated with many of the programs, as well as again, Windows itself

As we'll see, many backup approaches and solutions focus on saving your data without giving much thought to that list.

A list of things that, to put it bluntly, you'll really miss once it's gone.

Yes, unlike your data, most of the items on this list can be reconstructed: Windows and programs can be reinstalled, settings and customizations reset, and so on.

But it's often a very large and time-consuming pain in the you-know-where. Particularly when an appropriate backup strategy can, for the most part, make that pain go away.

A Recommended Backup Strategy

I'll discuss some alternatives shortly, but I want to dive right in and tell you exactly what I think most people should do.

Heck, it's basically what I do.

Here's the short version:

- Get an external hard drive. Ideally, it's one that is *at least* twice as big as the amount of data that you plan to back up – ideally much more. Compared to data loss, they're incredibly inexpensive insurance.

- Get a good, full-featured backup program. Throughout this book, I'm using Macrium Reflect because I feel that it meets that qualification. The version that I'm using is not free, but once again, compared to data loss, it's incredibly inexpensive insurance.
- Perform a periodic "full" image backup which, by definition, will include both your data and your system. I'll suggest doing this monthly.
- Perform frequent "incremental" image backups of both your data and your system. These backups build on the full and intervening incremental backups to capture only what has changed since the last backup was performed. The result is that you have an up-to-date backup of everything – system and data. I'll suggest doing this nightly.
- Consider performing even more frequent saves and copies of work in progress, potentially using a tool like Dropbox.

This blend of backup types represents a compromise between disk space, speed, and backup completeness.

You could take a complete full backup image every day. Not only would that take some time, it would also fill up your backup media fairly quickly. You'd probably only end up keeping the last day or two worth of backups. While certainly better than no backup at all, it's really unnecessary.

Besides being quicker to perform, incremental backups are smaller. By keeping all of the preceding incremental backups all the way to the most recent full backup, you can keep many days worth of backups. I keep a month's worth which means that I can restore my machine to the state that it was in on any of the preceding 30 days. It also means that I can restore any file that was backed up on any of those 30 days as well.

With the advent of tools like DropBox, more-or-less constant backup is actually a reality for documents that you're actively working on. Dropbox is primarily a data-sharing and collaboration tool, but even when used with only one computer – yours – it automatically backs up files in your Dropbox folder to the DropBox servers as the files change.

I also say "consider performing even more frequent saves *and copies*" because one of the more common forms of data loss is the unexpected crash in the middle of creating a document or the unexpected deletion of a file that you didn't really mean to delete. Similarly, copying your precious pictures to a second location as soon as you possibly can reduces the risk of losing them all when you lose your phone or camera.

As I said earlier:

If it's only in one place, it's not backed up.

Lost phones and cameras are an all-too-common source of data loss simply because they're the only place that photos exist until copied.

Data-only Backup Strategies

My preferred strategy is to backup *everything*. That means both your system and your data are backed up.

There's another approach that is not quite as all-encompassing and it often takes less time and disk storage.

Back up only your data.

Doing this makes the explicit assumption that if something go horribly wrong and your computer system or hard disk fails, the first step to reconstructing your world will be to reinstall Windows and all applications from scratch and then proceed to duplicate the configuration that you had before. Then, somewhere along the way, you can restore your data from its backup.

There are two problems with this approach:

- When the time comes, you'll need to reinstall Windows and all your applications and then duplicate the configuration that you had before. This can be a daunting and time-consuming task.
- You'll be relying on having correctly identified what it is on your computer that constitutes "your data." A file or folder outside of that definition will not be backed up; it will be lost should the worst occur.

Both problems are surmountable. Reinstalling may be an "acceptable risk" as long as data that could otherwise not be recovered – meaning your data – is backed up. And of course, you could have a very clear definition of what constitutes "your data," being careful perhaps to only place files somewhere within My Documents and the like.

While it's not my choice, backing up only your data is a choice that many people make.

You can do it with the very same tools.

Backing up to "The Cloud"

As internet speeds have increased over time, backing up using an online backup service has become more and more appealing. Without needing to purchase anything but the online service, your files are not only backed up to the service's servers, but they are often made available to you via their website, whether you're at your computer or not.

Install the right software and magically, you're backed up.

Or are you?

By-and-large, online backups are data only; they do not back up your entire system.

As long as that's acceptable. Perhaps you're prepared to perform data-only backups as I described in the previous section. Then online backups can be a fantastic alternative.

But I prefer to think of them as additions to a more traditional and complete backup strategy, rather than alternatives.

The Rule of Three

There's a rule of thumb that I keep hearing relating to backups. It goes like this:

- At least *three* copies of everything
- ... on at least two different types of media
- ... in at least two difference locations

The difference between one copy and two is the difference between not being backed up at all and at least having *something* to protect you.

The "Rule of Three" expands on that to factor in two additional considerations:

- Media can fail. Hard drives die, flash drives wear out, CDs and DVDs deteriorate over time. Copying your data to an additional media *type* immediately increases the probability that it'll be there when you need it, even if that's years from now.
- Put bluntly, your house – or wherever it is you keep your computer and backups – could burn down, taking your computer and all of your backups with it. Having a copy of at least your data in some kind of storage somewhere else – *anywhere else* – protects you from that possibility. And it's a perfect role for the cloud because by definition, anything that you store in an online service is protected, no matter what happens to your computer and its backups.

Backups - You Just Can't Have Too Many

As you proceed through the rest of Maintaining Windows 7, I encourage you to take updated system image backups periodically – particularly after making major changes to your system and confirmed that everything is working as you want it.

If you take an image backup at that point in time, then if something goes wrong later, you don't have to restore all the way to the beginning to do all that work over again. You can restore to the image backup taken immediately after each successful stage in your work.

Just ... keep them all, for a while, just in case.

Steps later in this book will automate the process and set up daily backups. Once those are running, those periodic system images might not be quite as important, but still, I find that it's often very useful to take full image backups at significant points in time – times just before you're going to make a significant change, just to make it easy to revert to the state that your machine was in at that time.

Backing Up with Macrium Reflect

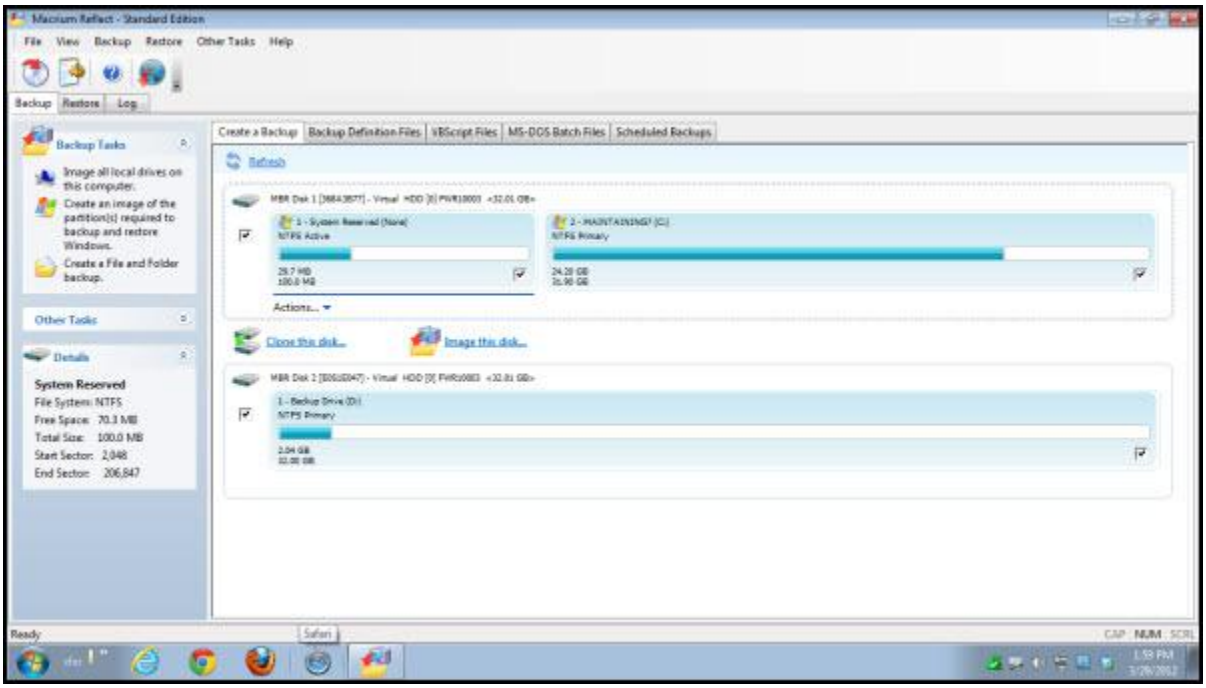
Macrium Reflect is a commercial product with both a free and paid version. The steps that we're about to take to create and restore complete image backups can be performed in either version. Later, when we talk about scheduling backups and performing what are called "incremental backups," the paid version is what we'll use.

I use Reflect myself and prefer it over Windows backup for its power, flexibility, and more unified approach to backing up. Unlike Windows Backup, everything that we'll do in Reflect builds on the techniques used to create the very image backups that we're starting with.

Creating Image Backups

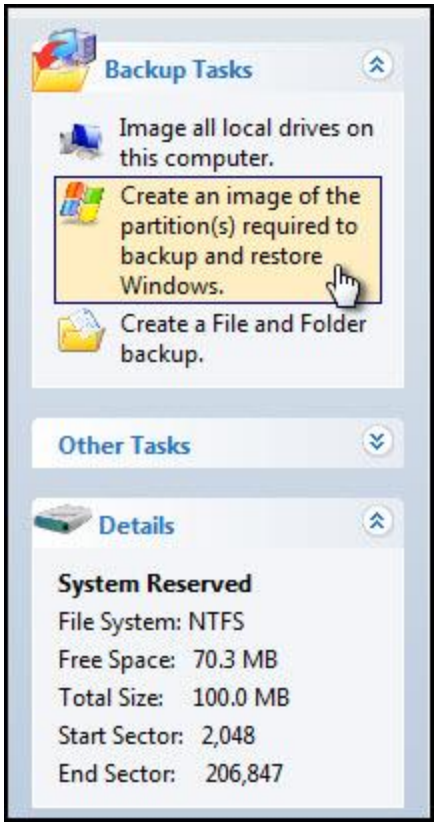
Video

After you've download and installed Reflect, run it.

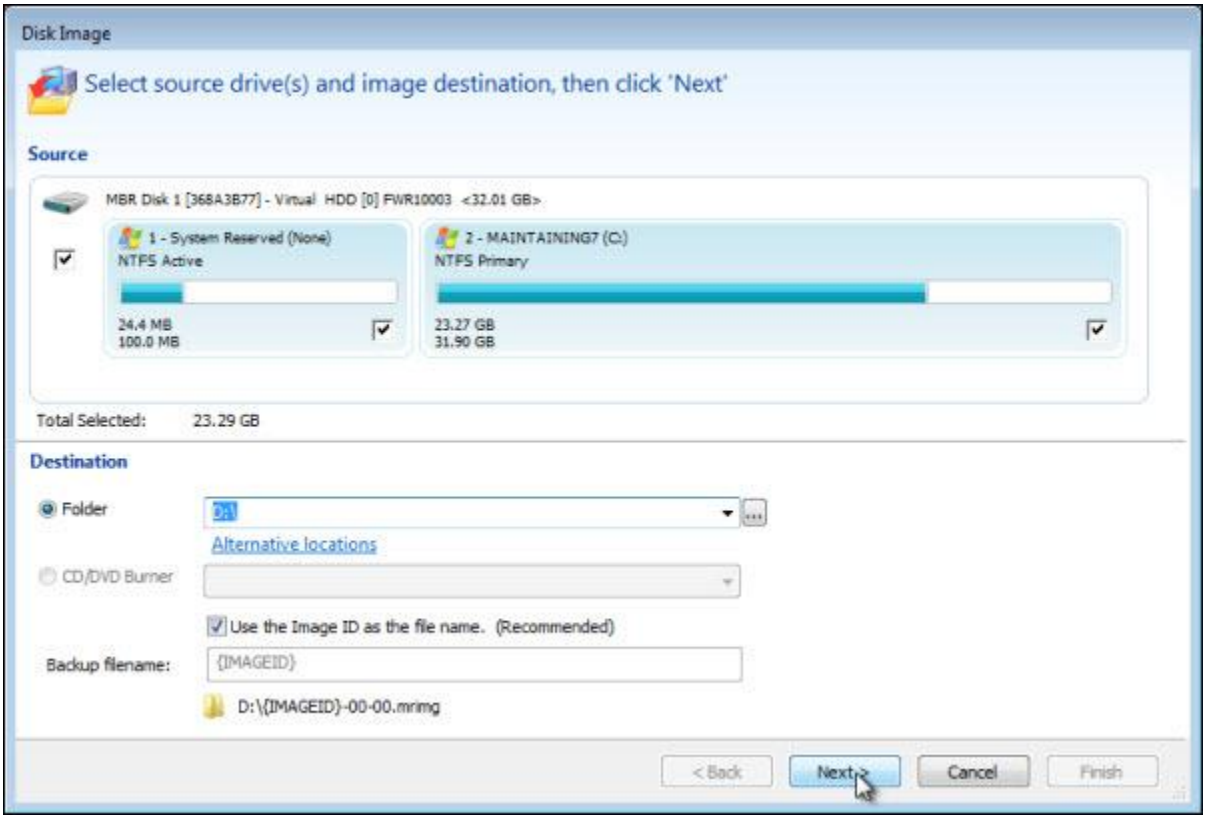


On its main screen, you'll see a list of the drives on your system and the partitions that they contain.

On our example machine, we can see two drives. On the first drive, we see two partitions: the Windows 7 System Reserved partition, and the actual partition containing the C: drive.



On the left is a short list of common **Backup Tasks**. Click **Create an image of the partition(s) required to backup and restore Windows**.



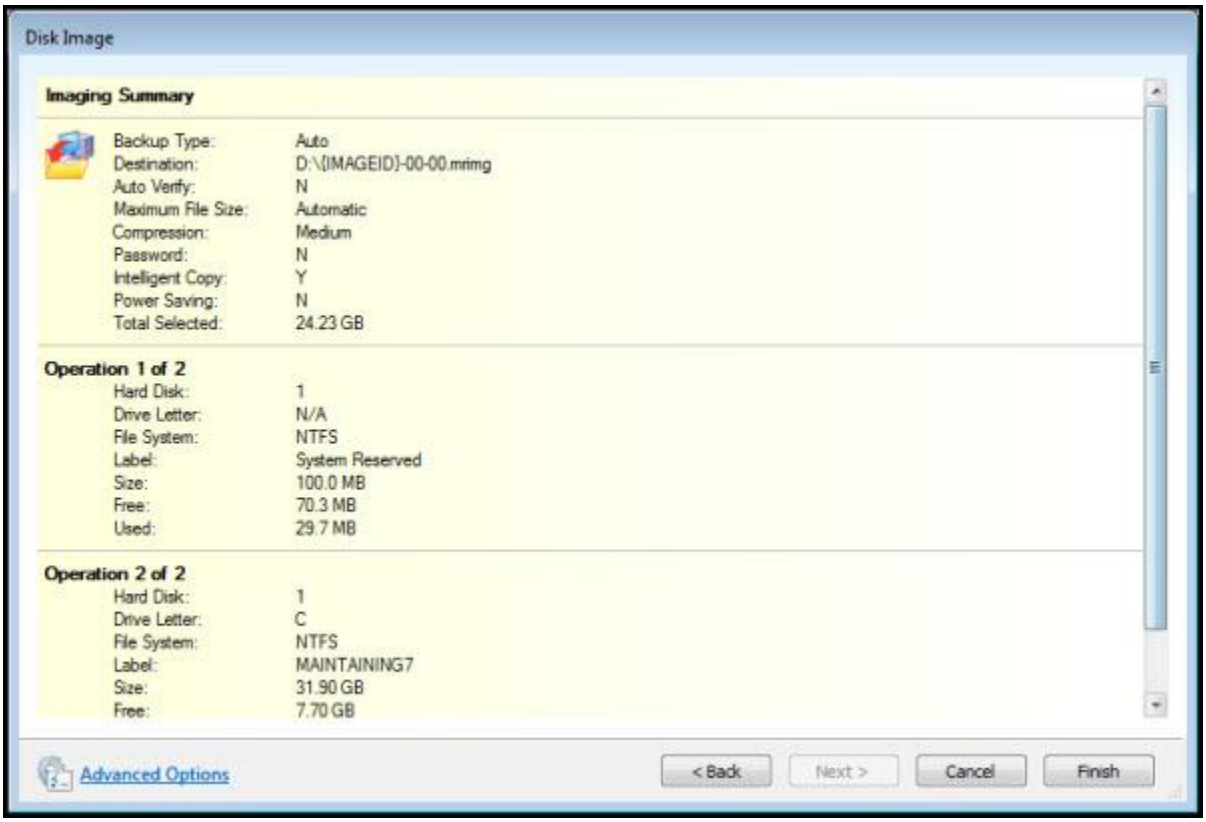
The first step is to select what is to be backed up and where to place the backup.

In the upper half of the dialog, Reflect has automatically selected the entire first disk containing the Master Boot Record (MBR), the System Reserved partition, and the C: partition as the source or what it is we'll be backing up.

In the lower half, Reflect has automatically selected the root of the D: drive as the location to which the backup images will be written. Of course, you can select a different location: a different drive, folder, network location, whatever you prefer. It's important that the destination that you select has enough room to hold the backup.

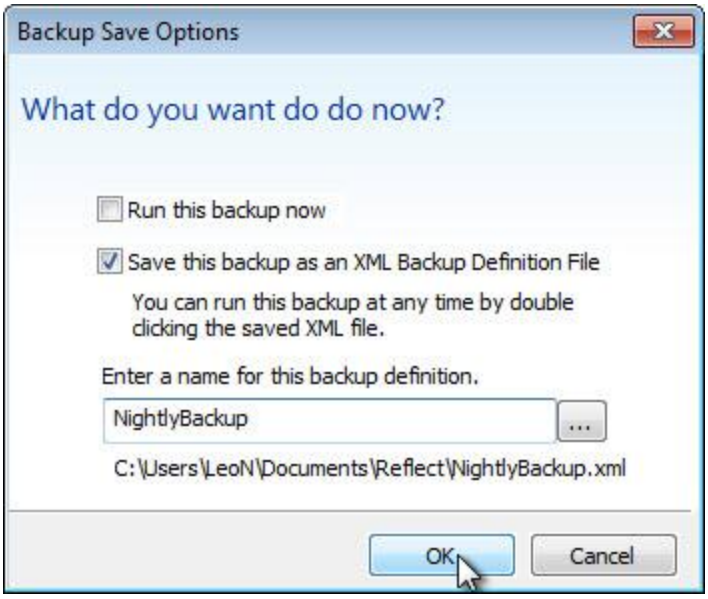
Reflect also defaults the filename for the backup to be its own Image ID. You can leave this as is, or if you like, you can give your backup a more easy-to-identify name. For this example, we'll leave it alone.

Click **Next** to move on.



Reflect now presents a final summary of all of the backup operation to be performed.

Click **Finish** to move on.

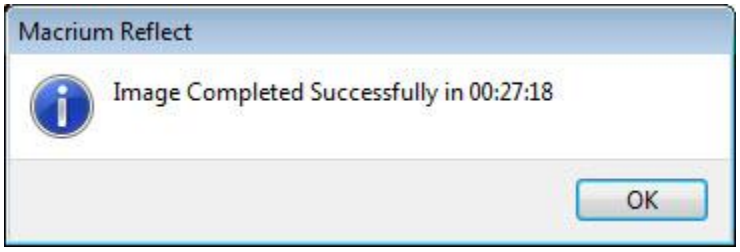


Run this backup now means exactly what it implies – the backup will be created.

Save this backup as an XML Backup Definition File saves the options that we've selected while setting up this backup into a file that can be used later. For now, you can create it or not. Later, when we're scheduling automated backups, creating this file will be required.

Click **OK** and the backup begins.

The length of time that the backup will take depends on many factors: most importantly, the speed of your disks and the amount of data to be backed up. A backup can take anywhere from a few minutes to several hours.



Once complete, you can close Reflect.

Open up Windows Explorer on the destination that you had selected and you should find a ".mrimg" file:

"Mrimg" stands for Macrium Reflect IMaGe.

Save this file somewhere safe; it's your safety net should something go wrong.

Preparing for Recovery

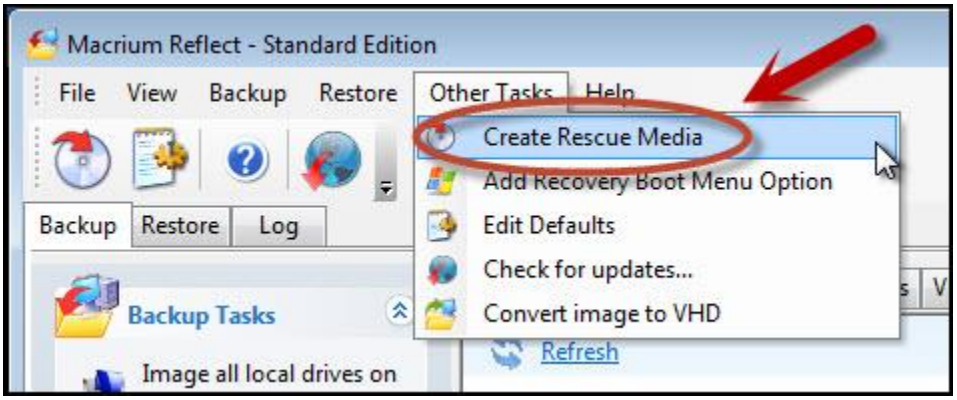
Video

To restore an image to the system drive, you'll need to boot your computer from something *other than* the system drive.

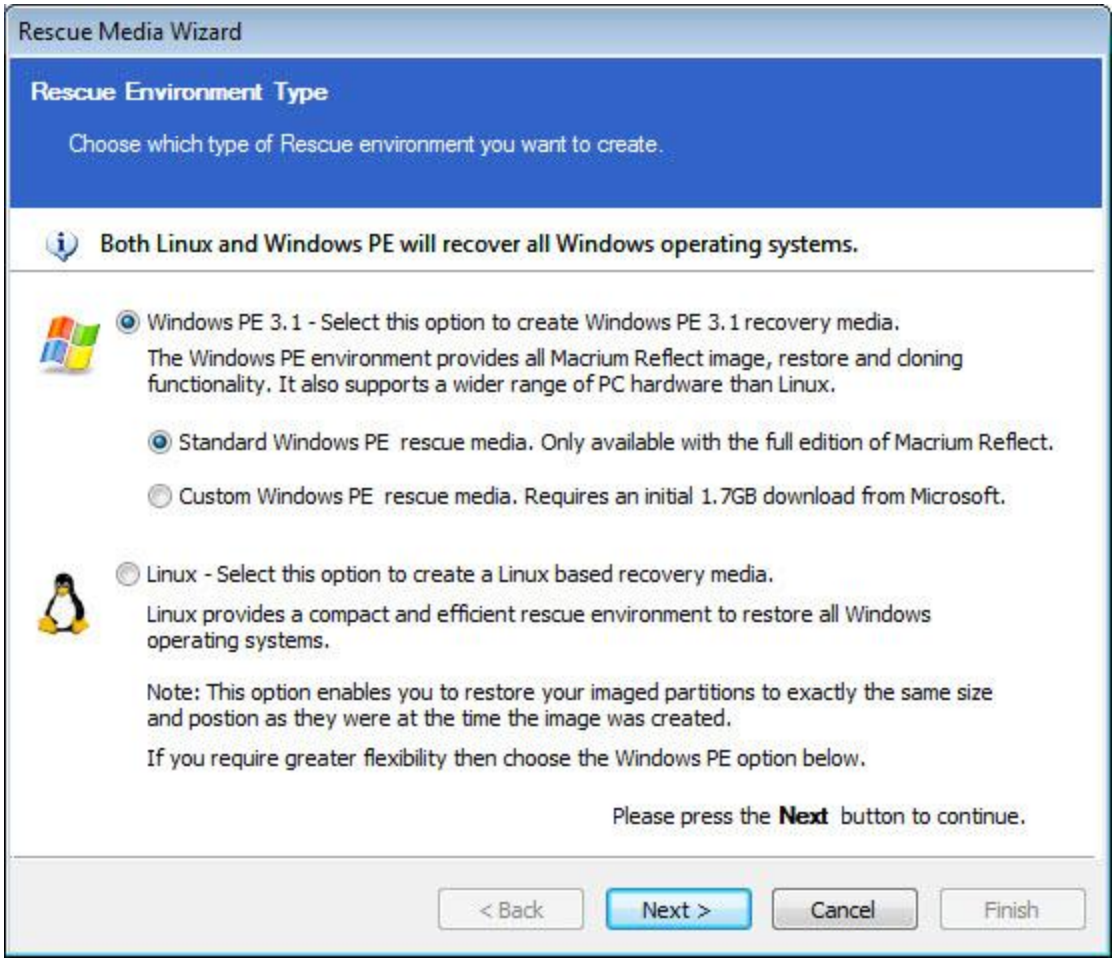
Backup programs that support this type of complete restoration typically include the ability to create rescue or repair media for just such an occasion.

You'll want to create these discs before you need them.

Macrium Reflect includes the ability to create Rescue Media directly from the program.



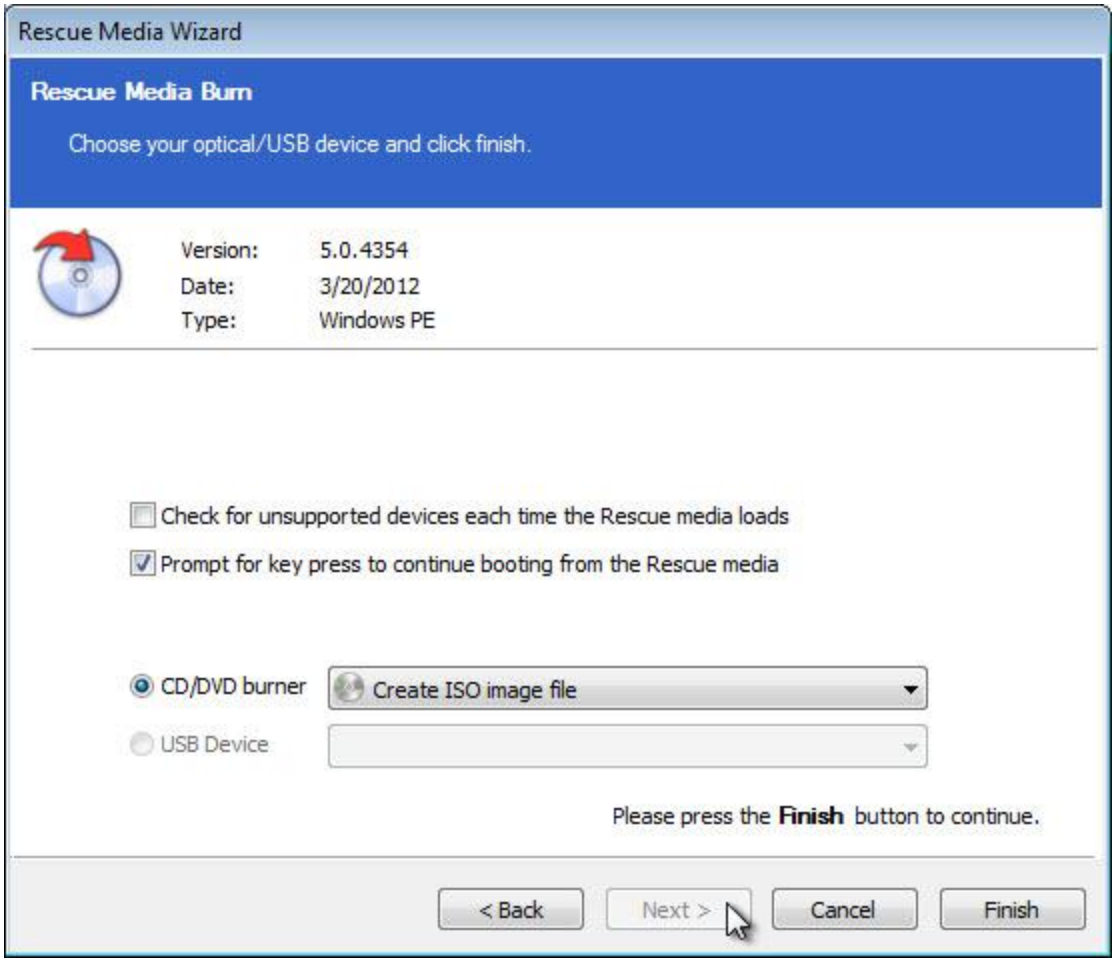
On the **Other Tasks** menu, click **Create Rescue Media**.



There are three types of rescue media disks that Macrium Reflect can create:

- **Standard Windows PE** (Pre-installed Environment) – This is only available if you've actually purchased Macrium Reflect. If it's available to you, it's what I recommend.
- **Custom Windows PE** – This rescue disc requires a very large download from Microsoft (1.7 *gigabytes* – and no, I don't know why). I recommend it only for the free version of Reflect, and then only if the Linux rescue media doesn't work for you for some reason.
- **Linux** – Linux-based recovery media is the smallest and perhaps the quickest to create. I recommend it as the rescue media to start with if you're using the free version of Reflect.

The Windows version will offer you an opportunity to choose alternate drivers. In most cases, you can simply accept the defaults and click **Next**.



Finally, you can either create your rescue media as an ISO file that you can burn to physical media later or have Reflect burn the rescue media directly.

Regardless of which rescue media that you create, be sure to keep it safe somewhere for the time when you eventually might need it.

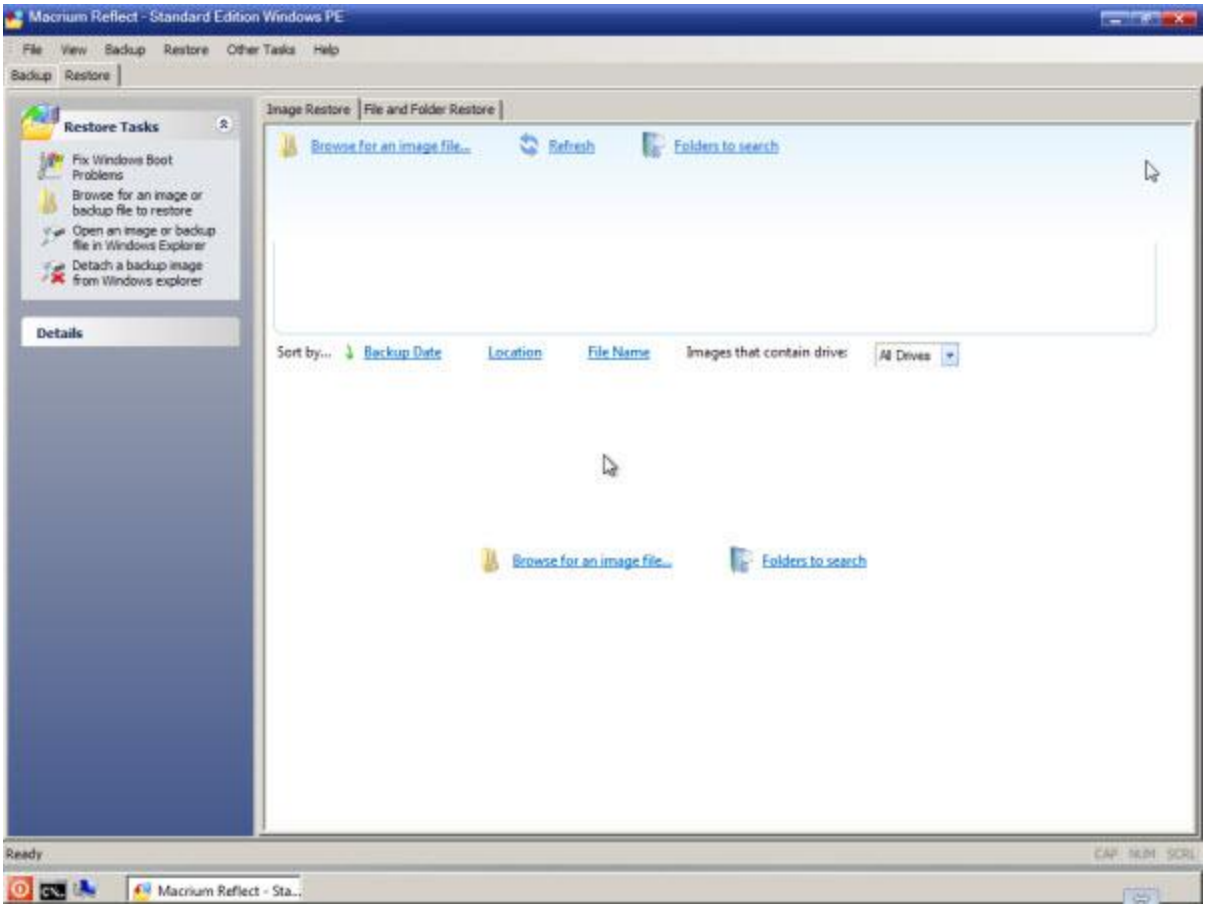
Restoring from a Backup Image


Video

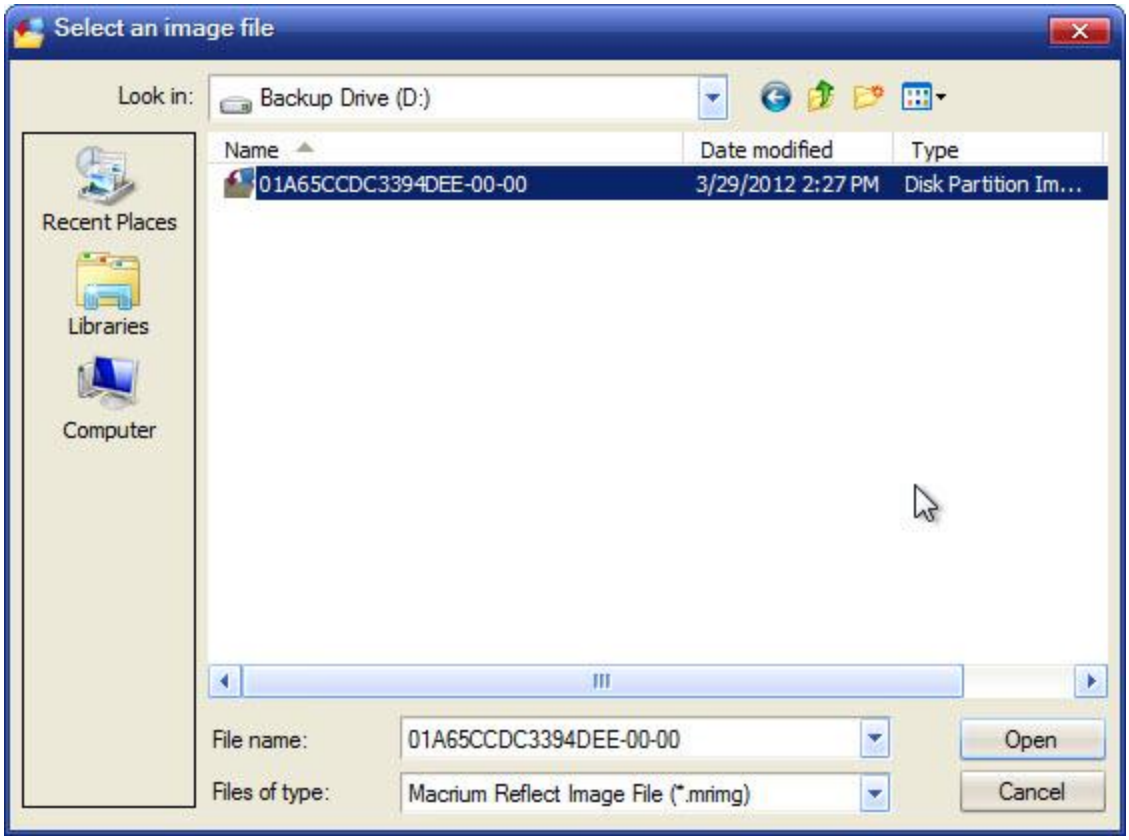
To restore an image using Macrium Reflect, we begin with the rescue media that we created above.

Boot your computer from that rescue media.

Instead of loading Windows normally, booting from the rescue media will run a copy of Macrium Reflect.

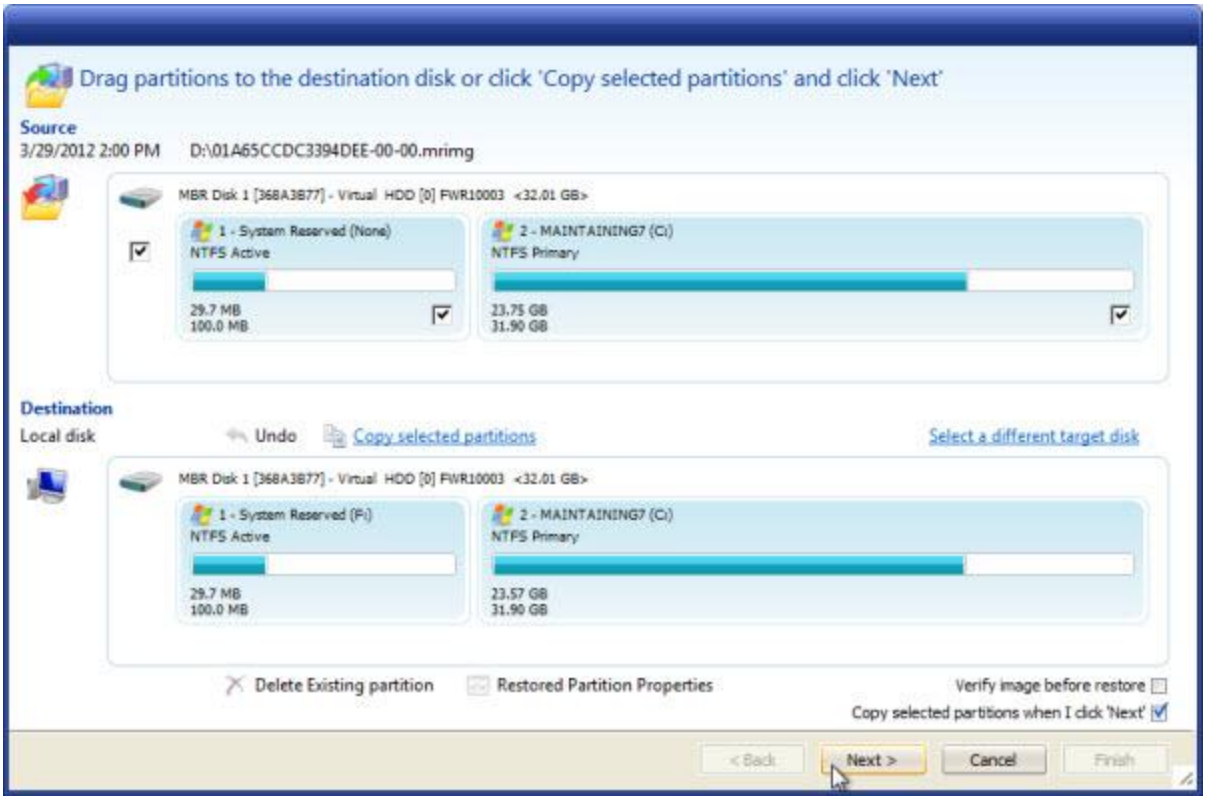


Click **Browse for an image file...** and use the resulting dialog box to locate the image file that you wish to restore to your computer. This is probably on your external hard drive.



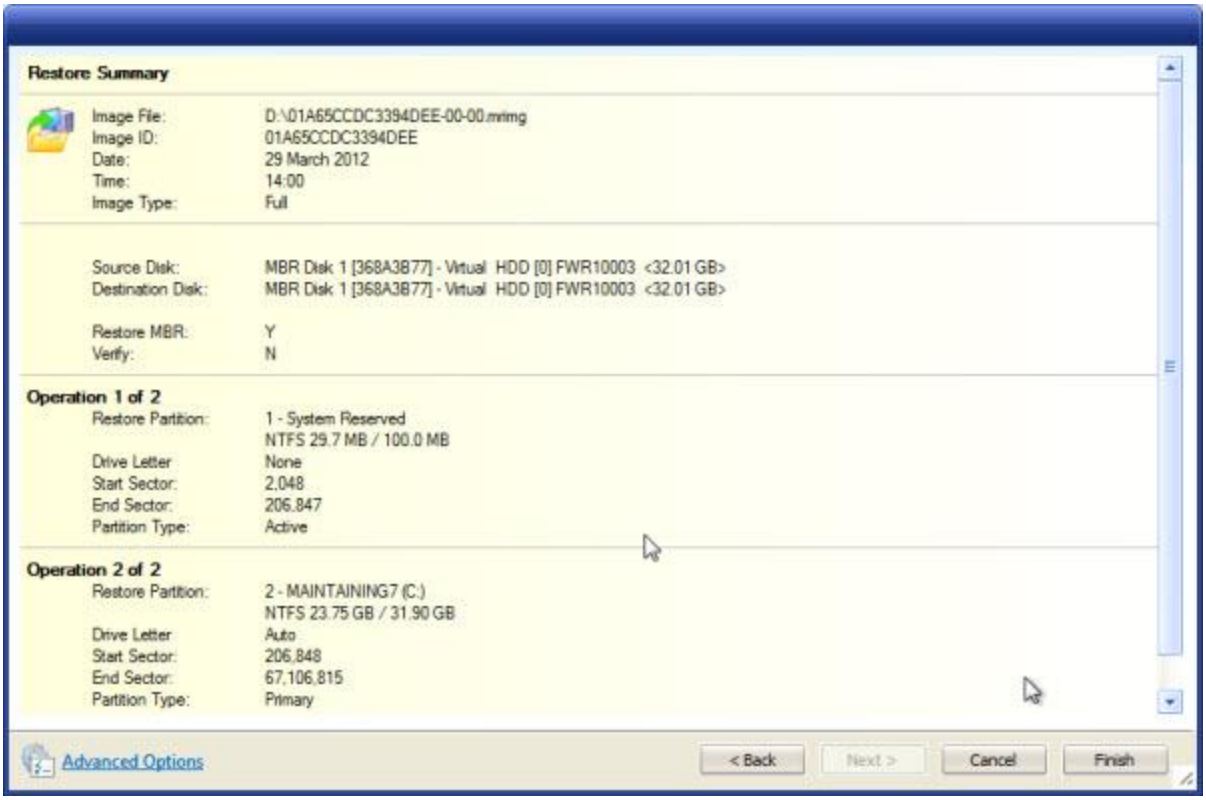
Reflect then shows that in its interface:

Click **Restore Image**.

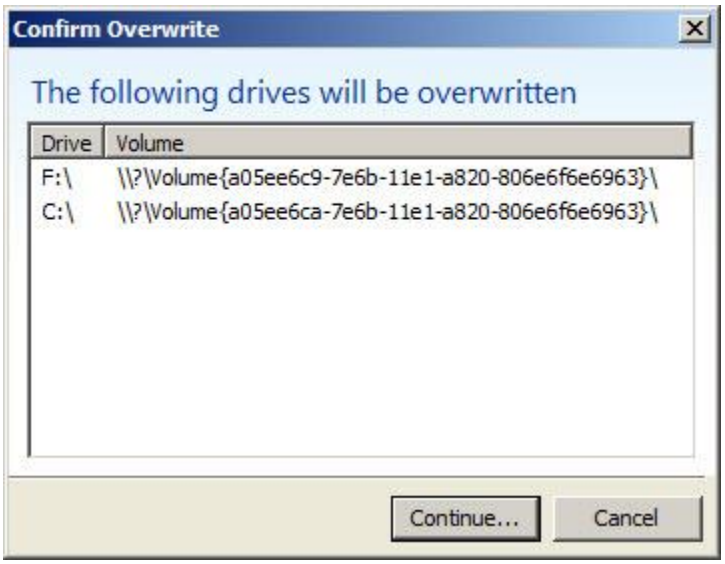


The resulting dialog has the contents of the backup image that we've selected at the top: as you can see, there are two partitions. At the bottom, the partitions are found on the machine's actual disk. Because this was a backup of that machine, the partitions correspond exactly.

By default, all that you need do is click **Next**. Other options are available if you want to rearrange partitions or only restore one of the partitions. For our purposes here, we're simply restoring an image of our machine back to the way that it was at the time of the backup.



Click **Finish** and you'll see a final confirmation:



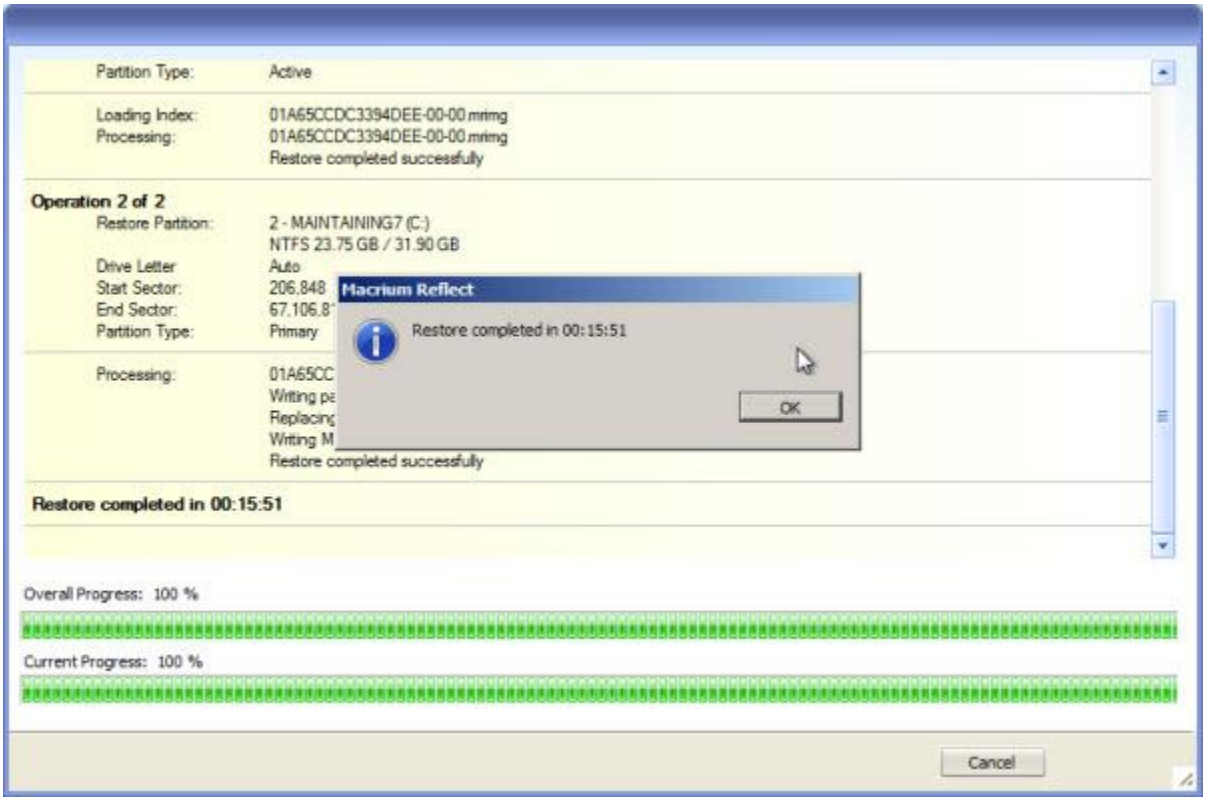
By definition, an image restore operation means that you want to:

- **Erase** *everything* that is currently on the hard disk.
- **Restore** everything that was on the hard disk at the time that the backup image was created.

Because of that first step – the "erase everything" – the backup program needs to make sure that this is exactly what you want to do.

As it is, click **Continue...**

The restore begins.



The amount of time that the restore takes to complete depends on the speed of your machine, the speed of your hard disks, the speed of the connection to those hard disks, and the amount of data being restored. So, a restore operation can take anywhere from several minutes to a few hours.

Click **OK** and **Close** and you'll get a final confirmation from Reflect:

Click **Yes**, remove the rescue media from the CD drive, and you're done.

Your machine should reboot into Windows as it was at the time the backup image was created.

Automated Periodic Backups


Video

Regardless of whether you're spending time actively cleaning up your machine or just using it, backups – most specifically *automated* backups – are one of the single most important things that you can do to protect yourself from almost anything that might happen to your machine or your data.

Reflect includes a powerful scheduling mechanism that allows us to set up periodic backups to meet almost any need.

Setting up automated backups with Reflect is a two-step process:

- Define *what* it is we want to happen (the backup details)
- Configure *when* we want it to happen (the backup schedule)

Before we start, though, it might be useful to review exactly what we're going to set up.

It might seem like simply backing up the entire computer every night and just having that available would be a pretty good way to go. Just instruct the backup software to take an image every night, overwriting the previous image, and you're done.

And I will say that's better than nothing.

But not nearly as good as it could be.

The problem is this technique assumes that you'll never need anything older than yesterday's machine and last night's backup.

For example, if your machine is infected by malware and you don't clean it up on the same day that the infection occurs, then that night, the backup happens, backing up the infection and overwriting the un-infected backup of the previous day.

Not good. This is too easy to have happen and it's not good when it does.

What we'll do instead is this:

- Take a full image backup every so often (I'll talk about how often below when we set this up)
- Take an *incremental* backup, backing up only those files that changed since the last backup, every night

Used in combination, the periodic full backup and daily incremental backups allow you to restore your machine to the state that it was in on any of the days when a backup was taken *and* can allow you to restore a file as it was on any of those days as well.

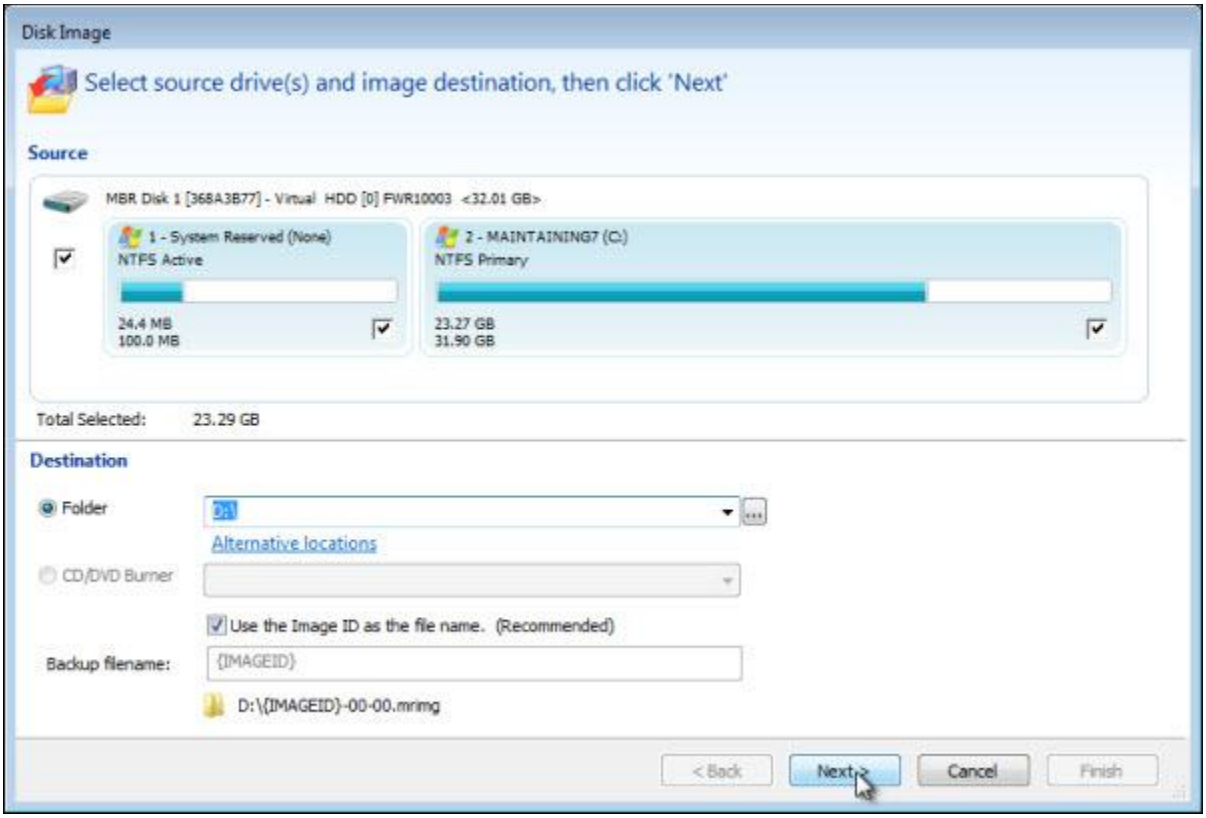
So if you didn't discover the malware for three days, you can simply go back to the backup taken four days ago and restore that uninfected image.

We use incremental backups to backup only the changes made since the previous backup to save space. We could take a full image backup each night, but that would consume significantly more space on our backup drive.

And speaking of space, as we define the details of the backup, we'll also tell Reflect when it can automatically delete backups that we no longer need to keep our backups from accumulating forever.

Defining the Backup Details

We start as we did with image backups earlier. Start Reflect and click **Create an image of the partition(s) required to backup and restore Windows**.



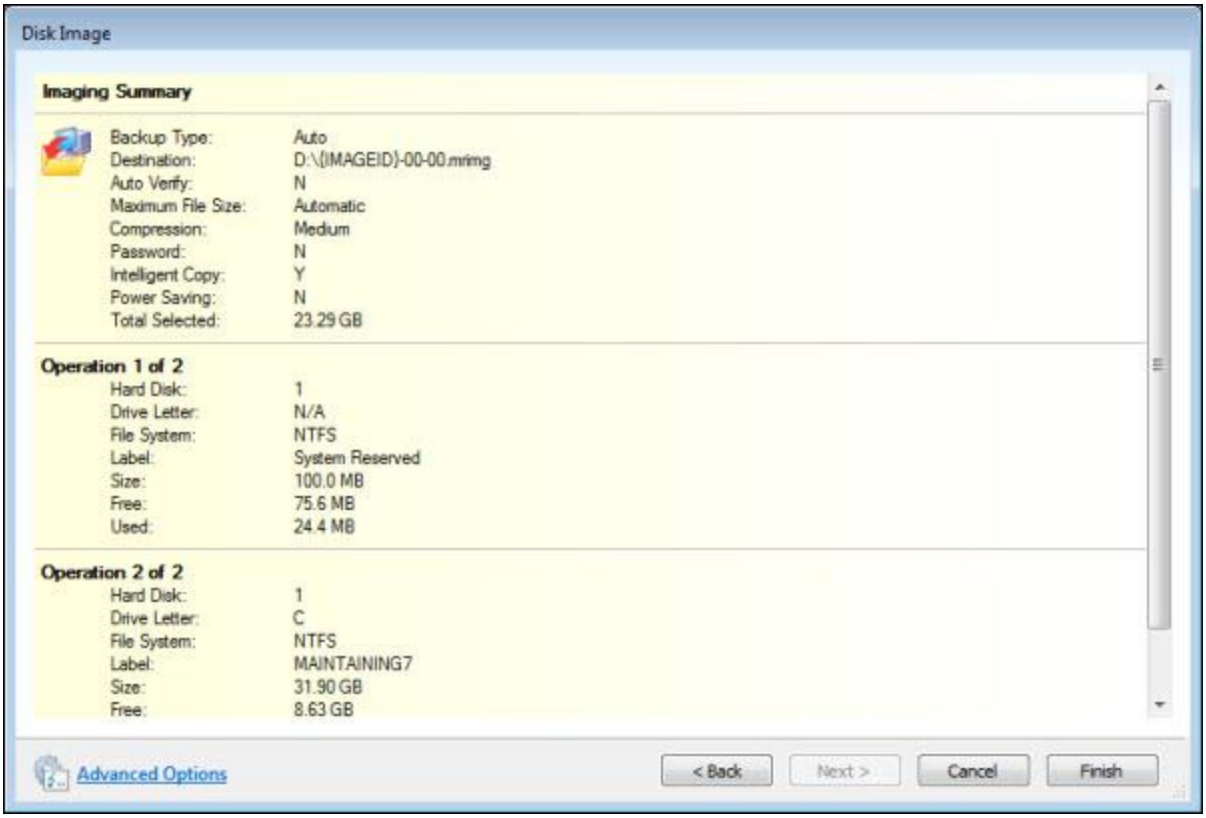
Once again, we select what is to be backed up and where to place the backup.

In the upper half of the dialog, Reflect has automatically selected the entire first disk containing the Master Boot Record (MBR), the System Reserved partition, and the C: partition as the source, or what it is that we'll be backing up.

In the lower half, Reflect has automatically selected the root of the D: drive – our backup drive – as the location to which the backup images will be written. Make sure to select your backup drive as the destination for your backups.

It also selects a default for the backup filename to be its own "Image ID." You can change that to be something more meaningful to you if you like, but we're going to leave it alone here.

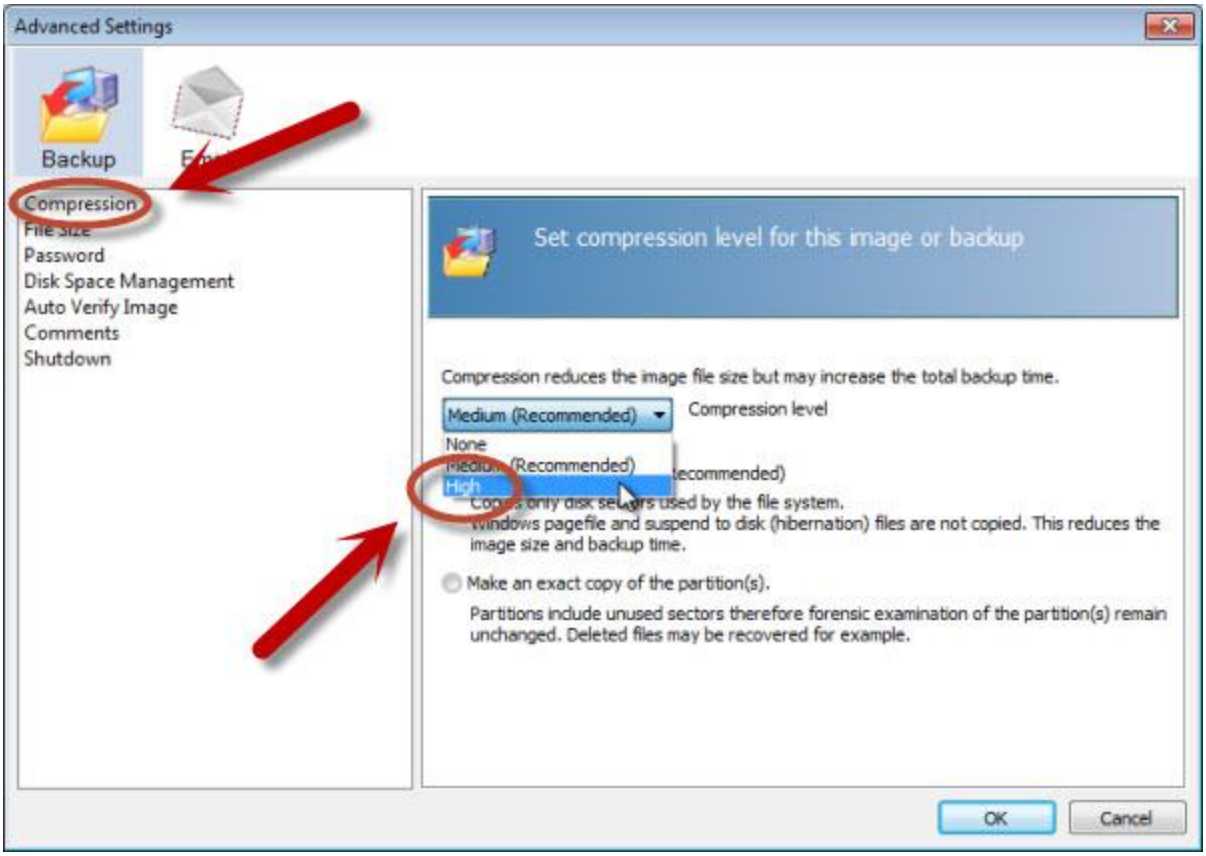
Click **Next** to move on.



Reflect now presents a final summary of all the backup operation to be performed.

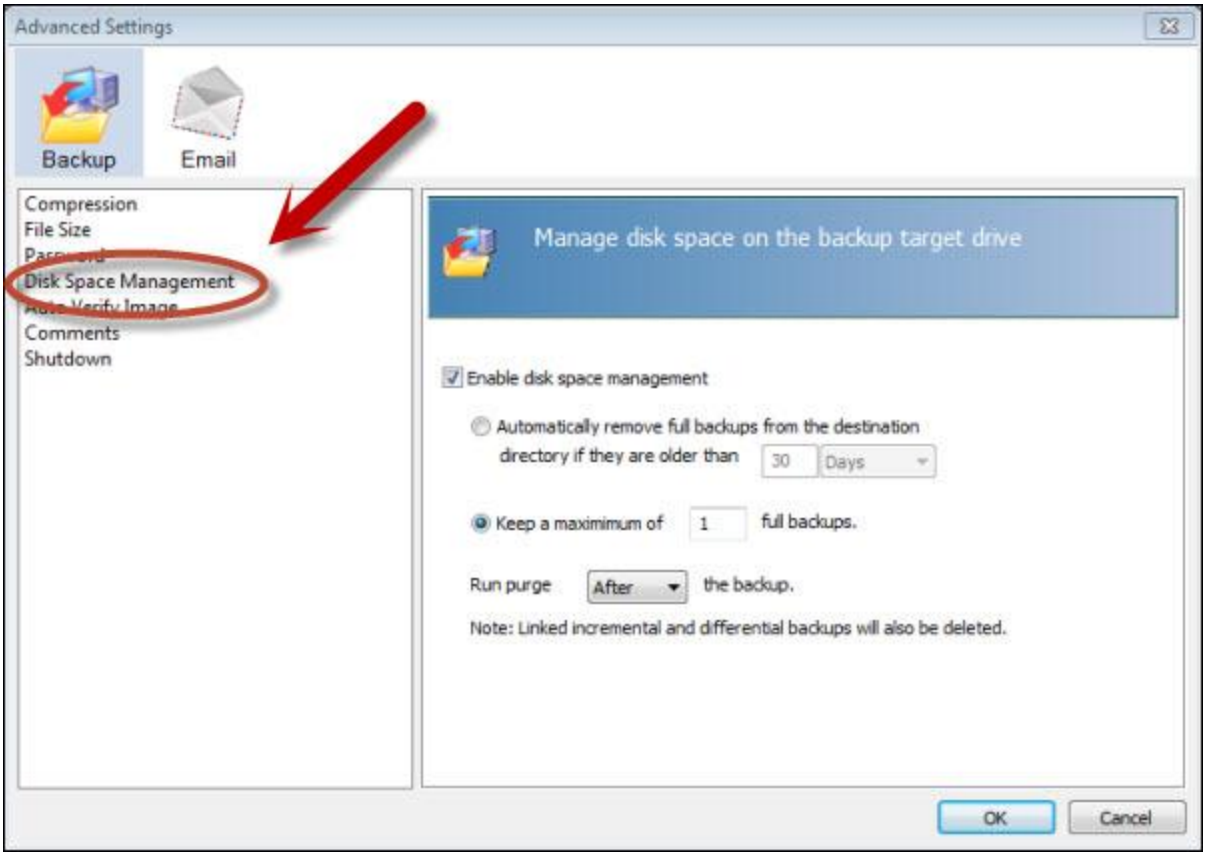
Except that it's not so final. We're also going to click **Advanced Options** in the lower left to set a few additional parameters.

The first that we'll modify is compression:



For periodic backups, particularly since they can accumulate over time, I recommend selecting **High** or maximum compression to make the resulting backup files as small as possible. The "cost" is that the backup may take a little longer to perform and the CPU might be in somewhat higher use as the backup happens.

I did say backups can accumulate over time, so our next setting controls how Reflect will deal with that automatically for us:



First, however, we need to clarify a concept.

Note that the Reflect dialog includes the phrase, "Note: Linked incremental and differential backups will also be deleted."

A full backup is exactly that: a complete backup of everything.

An incremental backup compares the state of your files to what was in the immediately preceding backup and backs up only those files that have changed.

(Differential backups only compare to the full backup and backup all files that changed since the full backup, not just the previous days backup. It's the flexibility/space tradeoff that I'm not going to cover here. I mention it only because it's in Reflect's message.)

Each successive incremental backup includes only those files that changed since the previous backup, be it full or incremental.

Restoration begins by starting with the full backup and then applying each successive incremental backup in turn until you've either run out of incrementals (you're restored to the most recent) or you've reached the incremental that has the date that you wanted to restore to (you've restored to a specific date prior to the most recent).

An incremental backup is useless on its own. To be useful, you need the full backup that started the sequence and all of the incremental backups that were built based on that full backup in order to restore to the most recent.

I'm going to refer to that – a full backup and all the incremental backups that were created based on it – as a backup set.

When Reflect cleans up backups according to our configuration, it deletes the entire backup set – or as they put it, the full backup and any "Linked incremental and differential backups" since those linked incremental backups are useless without the full backup they were built on.

•

The configuration that I've chosen in the example above will be used like this:

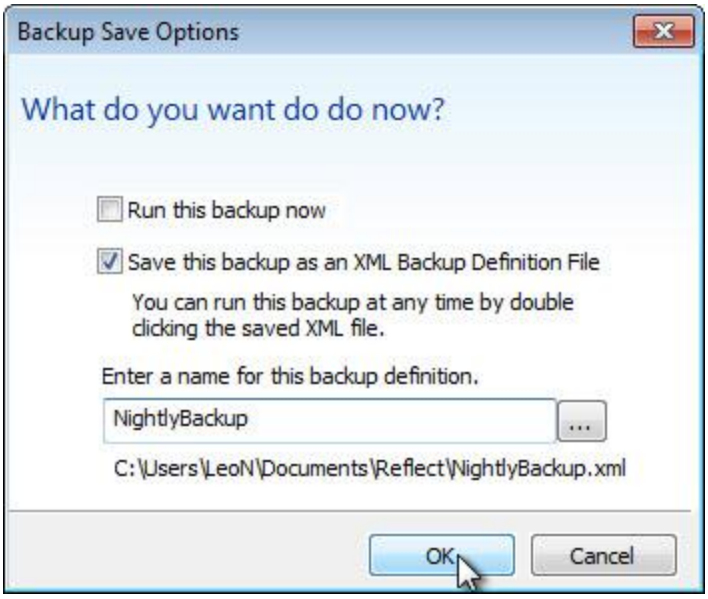
- Reflect creates a full backup image.
- I've specified that a purge should run after creating the current backup, so Reflect now evaluates the disk space management options. We've specified to keep one full backup, and there are no prior backup sets to keep at all, so there's nothing to delete.
- Reflect creates some number of daily incremental images that build on that full image and become part of that backup set.
- Eventually, according to the schedule we'll set up, Reflect creates a new, full backup image.
- After that backup is completed successfully Reflect evaluates the disk space management options again. We've specified to keep one full backup and there are now two: the previous backup and the new backup just created. The oldest backup set is deleted.
- Reflect creates some number of daily incremental images that build on that most recent full image and become part of this backup set.
- Once again, according to the schedule we set up, Reflect creates another backup image.
- After that backup is completed successfully Reflect again evaluates the disk space management options. We've specified to keep one full backup and there are now two: the previous backup and the new backup just created. The oldest backup set is deleted.

This technique makes sure that as long as you have space for (roughly) one backup set (full backup plus incrementals) and one full backup image, then Reflect will manage freeing up disk space to make sure you don't run out by deleting older backup sets.

Depending on your disk space situation, you can elect to keep more than one prior backup set or to have the purge run *before* the new backup is created to free up space earlier. (Doing so only after the creation of a new backup is successful, as I've elected to specify here, avoids the situation where the old backup is deleted and the new backup fails for some reason, leaving you with perhaps less than you expected or wanted.)

Click **OK** to move on.

Reflect will present the summary page again where you can click **Finish** to complete this part of our configuration.



Uncheck **Run this backup now** – we're just configuring things for the moment.

We do want to save this backup as an XML Backup Definition File. This basically saves all of the choices that we've made so far so that they can be used in the next step.

If you like, you can enter a more descriptive name for the backup configuration – you can see that I've elected to call mine *NightlyBackup*.

Click **OK** and the first part is complete: we've specified the backup details – the *what* it is that we want to have happen.

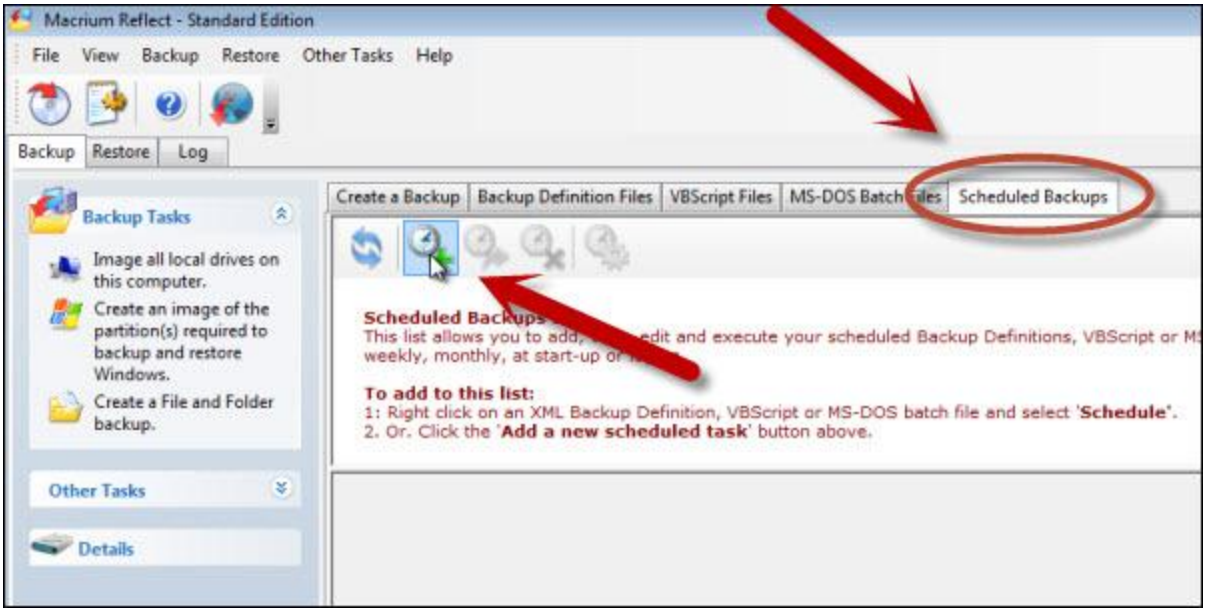
Defining the Backup Schedule

Setting up an automated backup on a schedule boils down to simply telling Reflect when to run the backup definition that we just created.

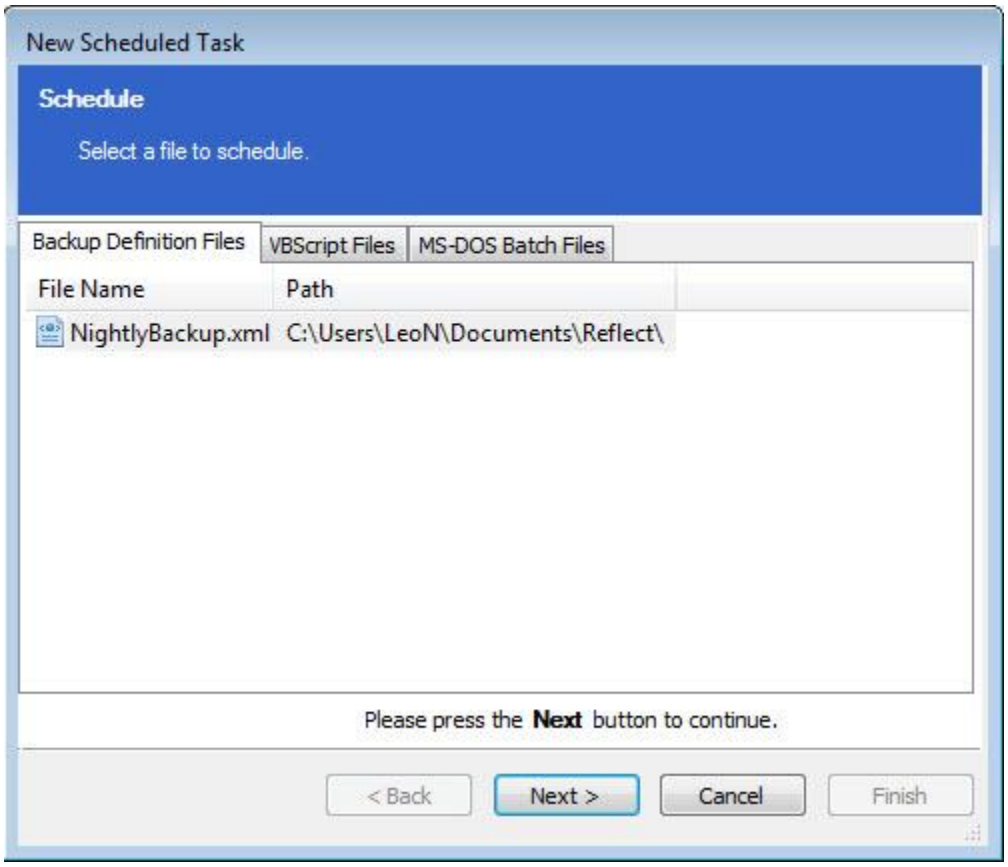
We'll actually define two separate automated jobs:

- A monthly full backup
- A nightly incremental backup

I've chosen monthly as my "Every so often" combined with my "Always save one" full backup that we defined earlier. That means that at any point in time, I can restore a file or my entire computer to the state that it was in on any of the last 30 days. (Perhaps as much as the last 60 days, depending on when I need the backup.)

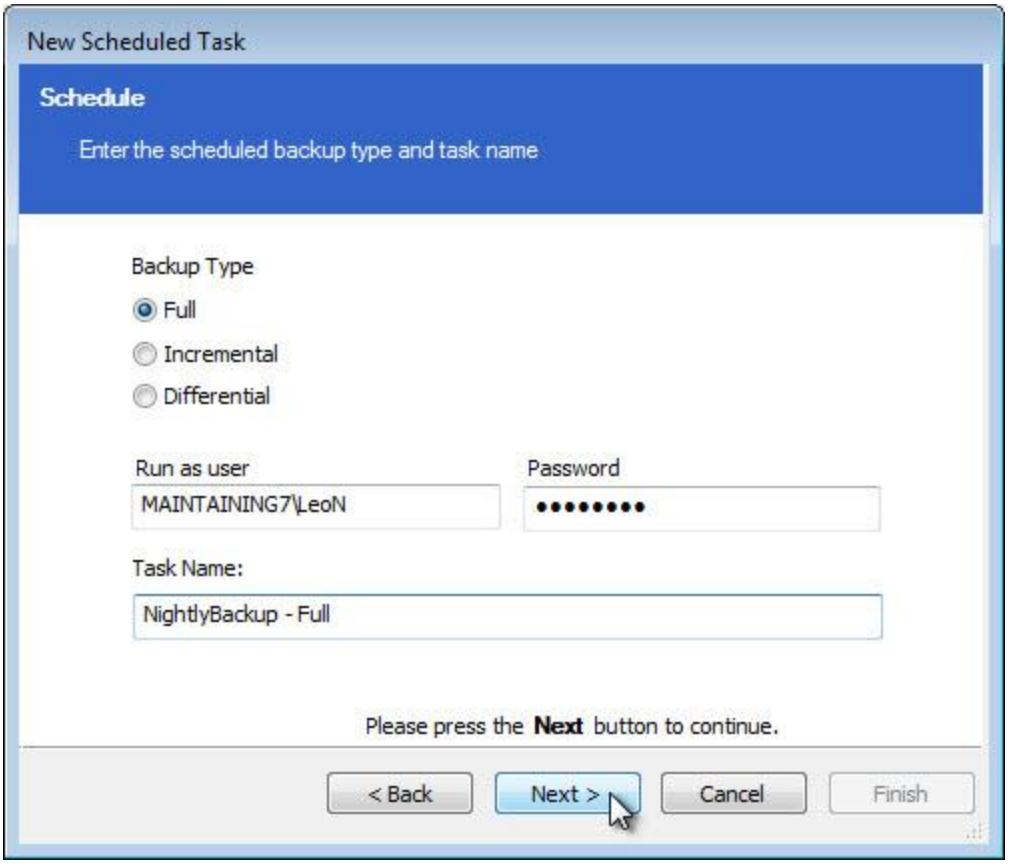


Click the **Scheduled Backups** tab and then click the **Add** icon with the green plus sign.



Click the backup definition that we created in the previous step – this is the backup that we'll want to have happen automatically.

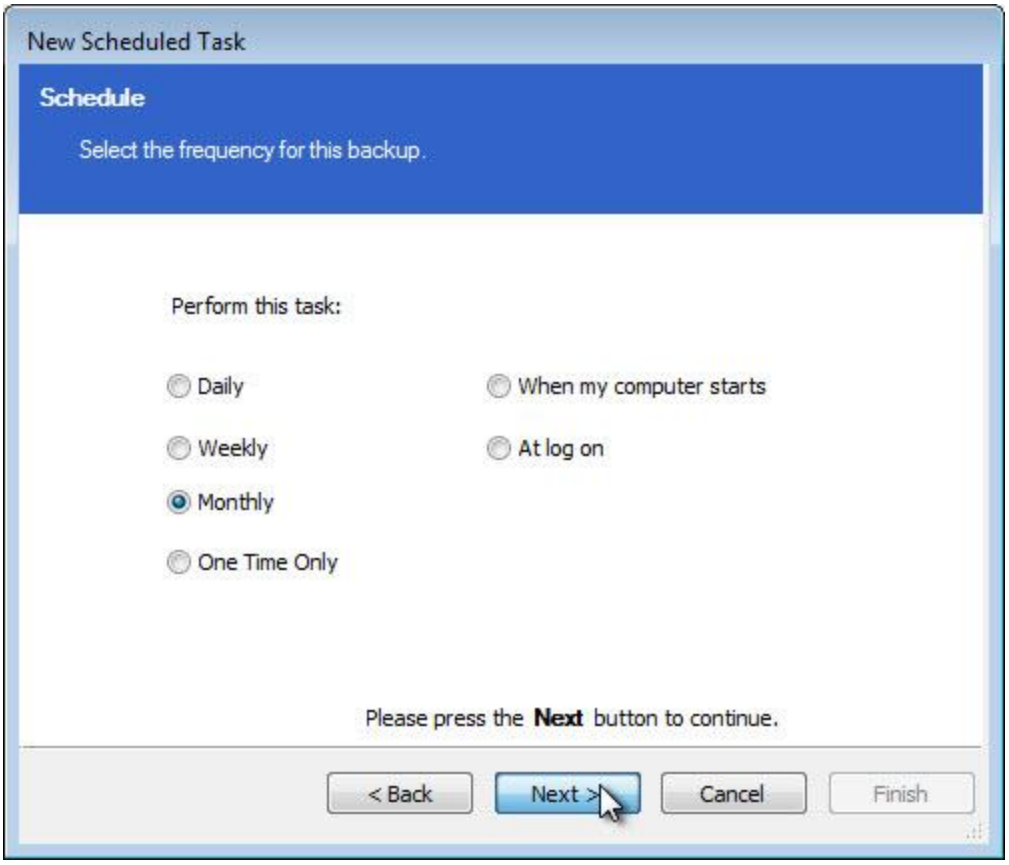
Click **Next**.



Select **Full** as the backup type. This job will create a full system image backup when it runs.

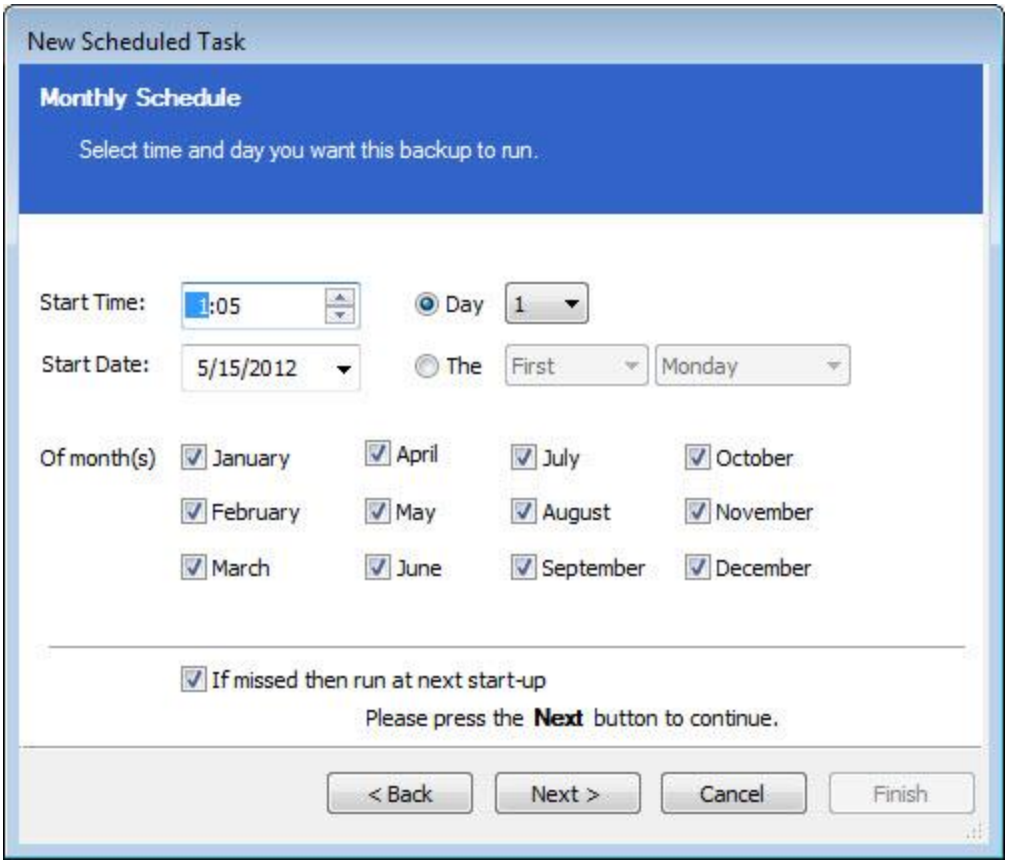
Update the name of the task to be somewhat meaningful. I've simply added **Full** to the name to indicate that this is the full backup job.

Click **Next**.



For a monthly full backup, select **Monthly**.

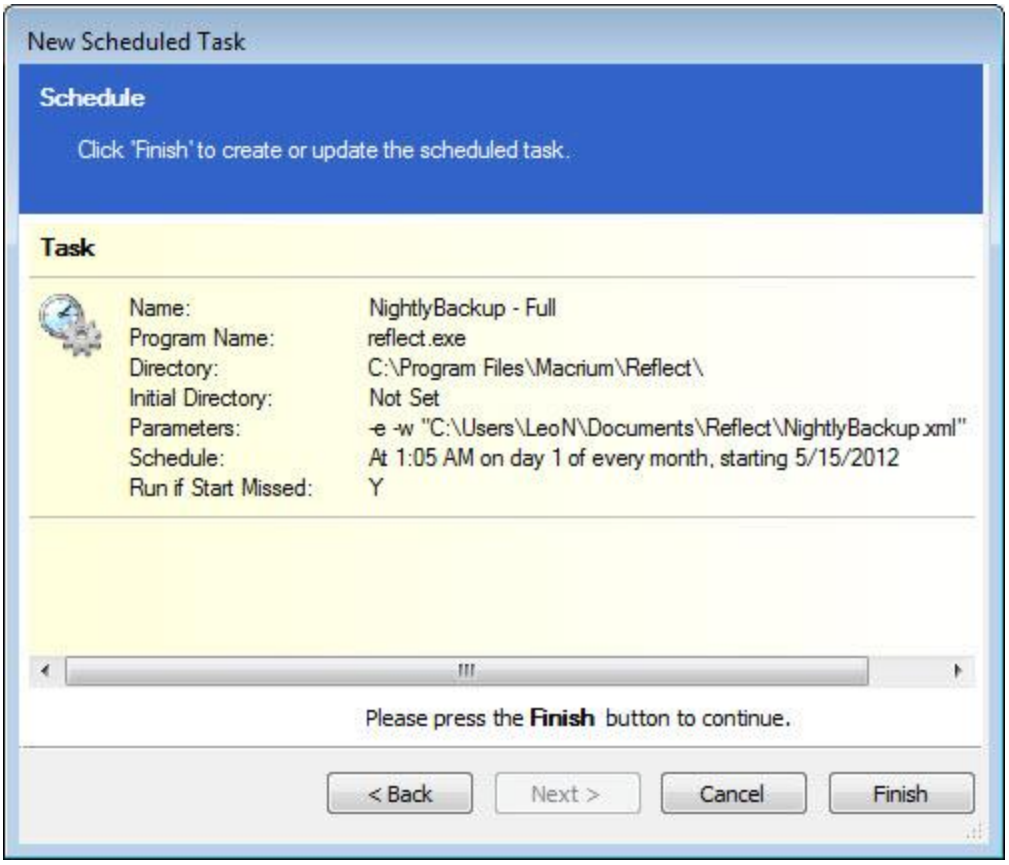
Click **Next**.



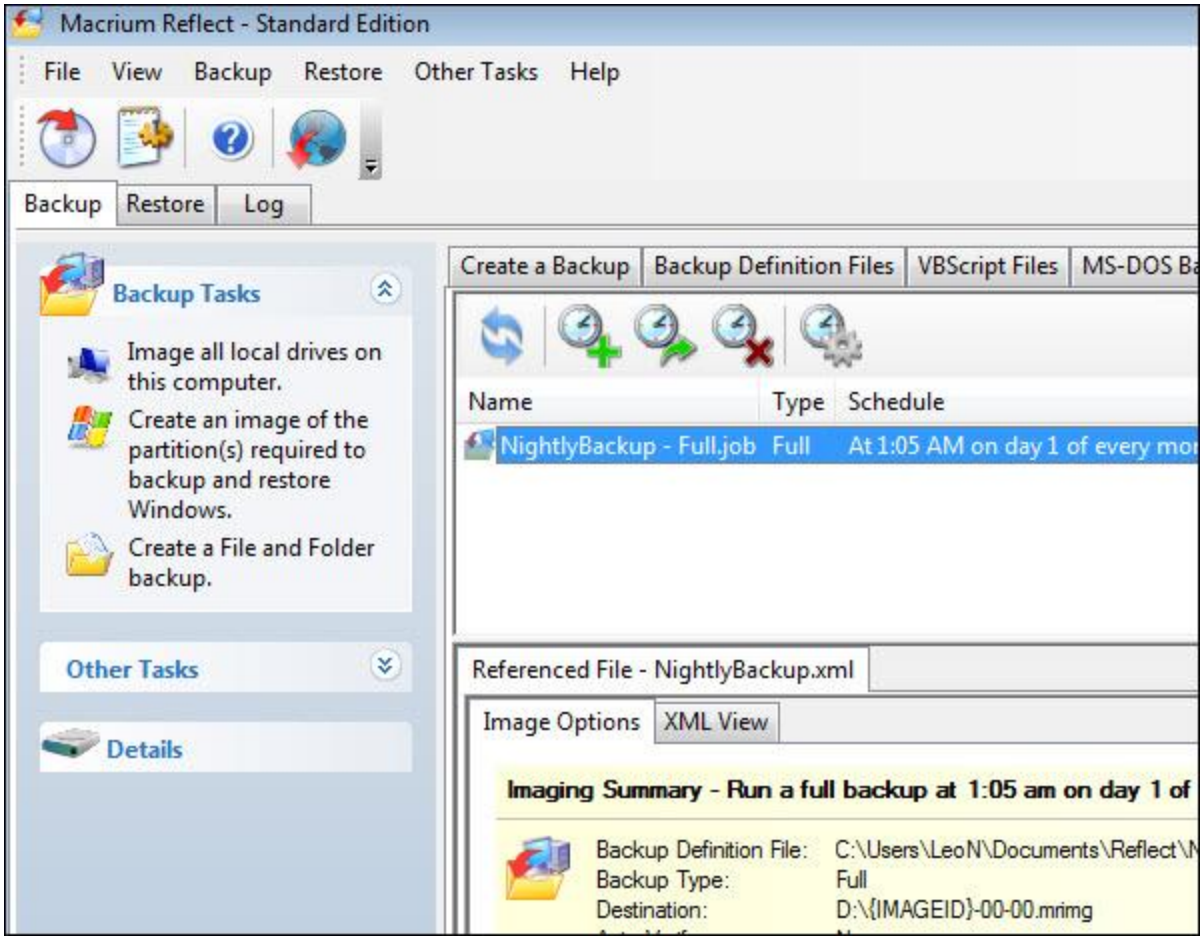
Reflect is pretty flexible, but our needs are simple. I've selected that the full backup should happen at 1:05 AM on the first of every month.

You can also select **If missed then run at next startup**. I typically recommend that you leave this checked for something as important as a full backup with a long time before it's scheduled to be run again.

Click **Next**.



Finally, we're presented with a summary of what we've configured. If it all looks good, click **Finish**.

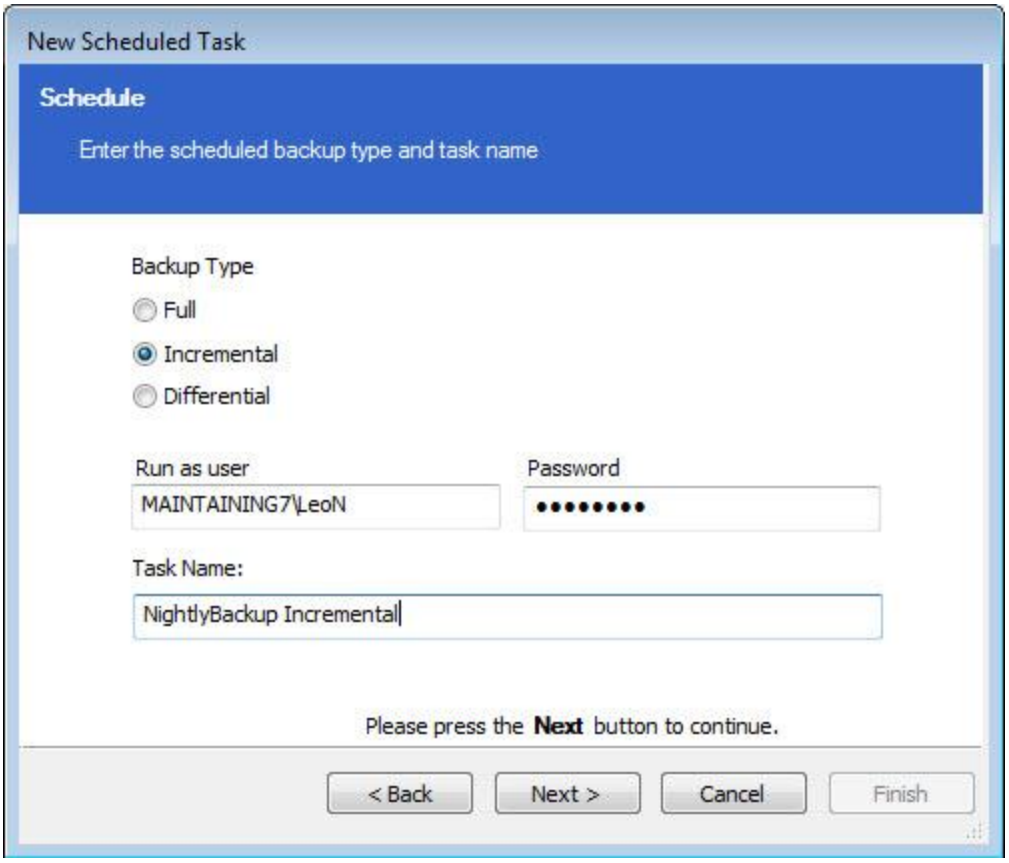


Reflect returns to the scheduled job window and shows the newly added *NightlyBackup - Full.job*, ready to go.

Now, we repeat the entire process for our daily incremental backup.

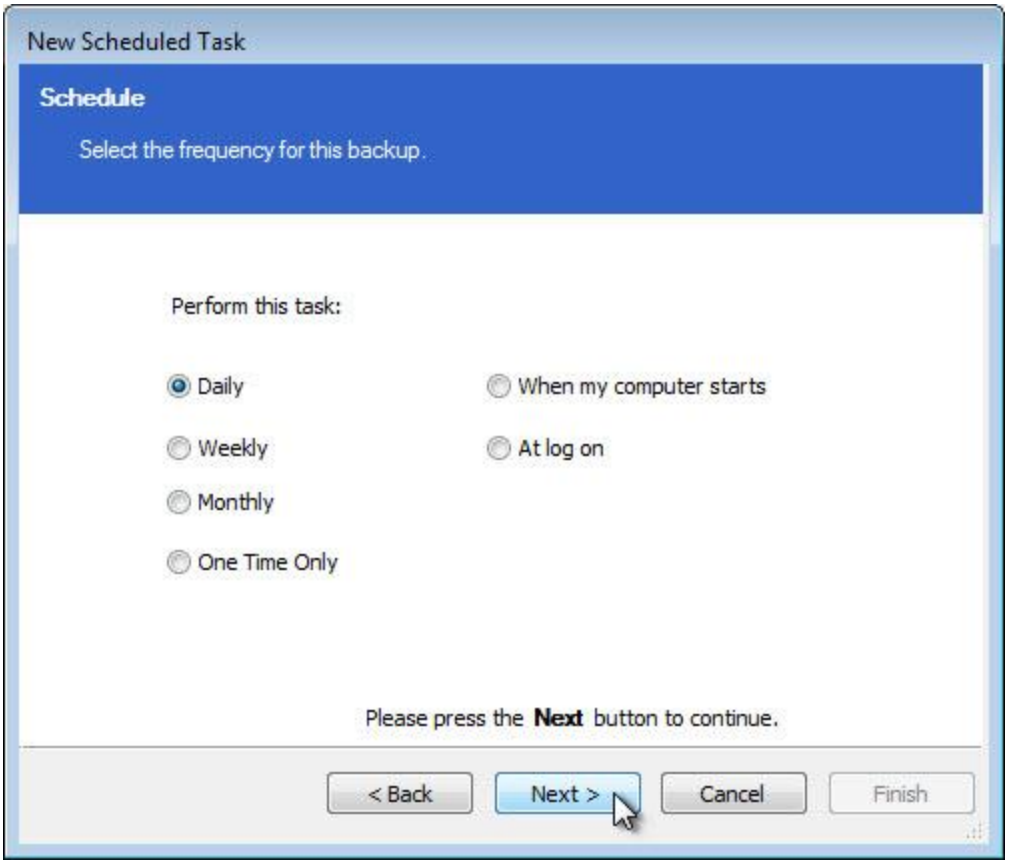
Click the **Add** icon with the green plus sign.

In the next dialog, click the same backup definition that you used for the full backup and click **Next**.



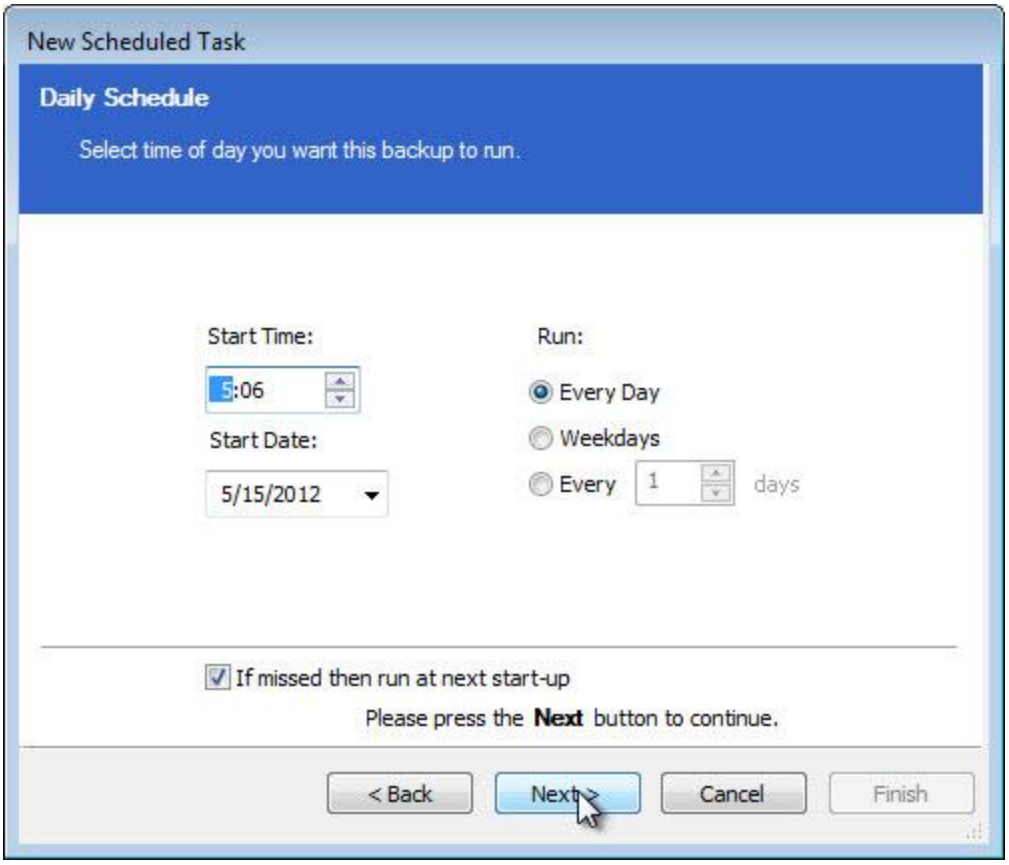
This time, select **Incremental** as the **Backup Type** and change the **Task Name** field to include something descriptive; perhaps you might even want to name it *Incremental*, as shown above.

Click **Next**.



Choose **Daily** as the backup frequency.

Click **Next**.



Here, you can see that I've selected 5:06 AM.

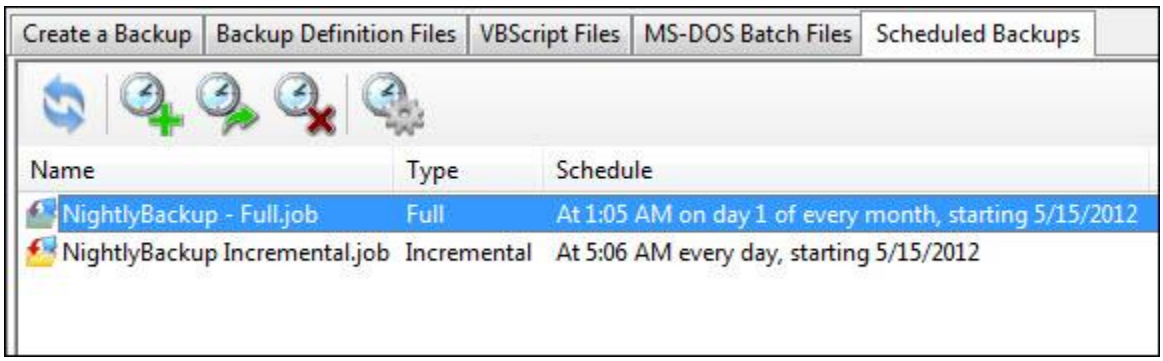
We scheduled the full backup to run once a month at 1AM. This incremental backup will run every day, including the day that the full backup runs. You should choose a start that allows sufficient time for the prior backup operation to complete. In my example here, four hours is plenty of time for the monthly backup to complete. Your times may be different.

Once again, you can also select **If missed then run at next startup**. On an incremental backup that happens daily, this is less important, but I'd still recommend it.

Click **Next**.

Click **Finish** on the summary screen if everything looks right.

You're done!



Macrium Reflect will now automatically create full backups once a month and incremental backups daily. It will also automatically delete backup sets except for the one immediately prior to the backup set currently being created.

If you need to make a change, you can right-click on those jobs listed in the scheduler and click **Edit**.

If you like at this point, you can kick-start the whole process by running the full backup job right now. Just right-click on it and click **Run Now**. Reflect will immediately begin running that backup job and create a full backup of your machine.

Restoring From Periodic Backups


Video

All's going well. You have periodic backups – system images or file backups.

Then one day, it happens.

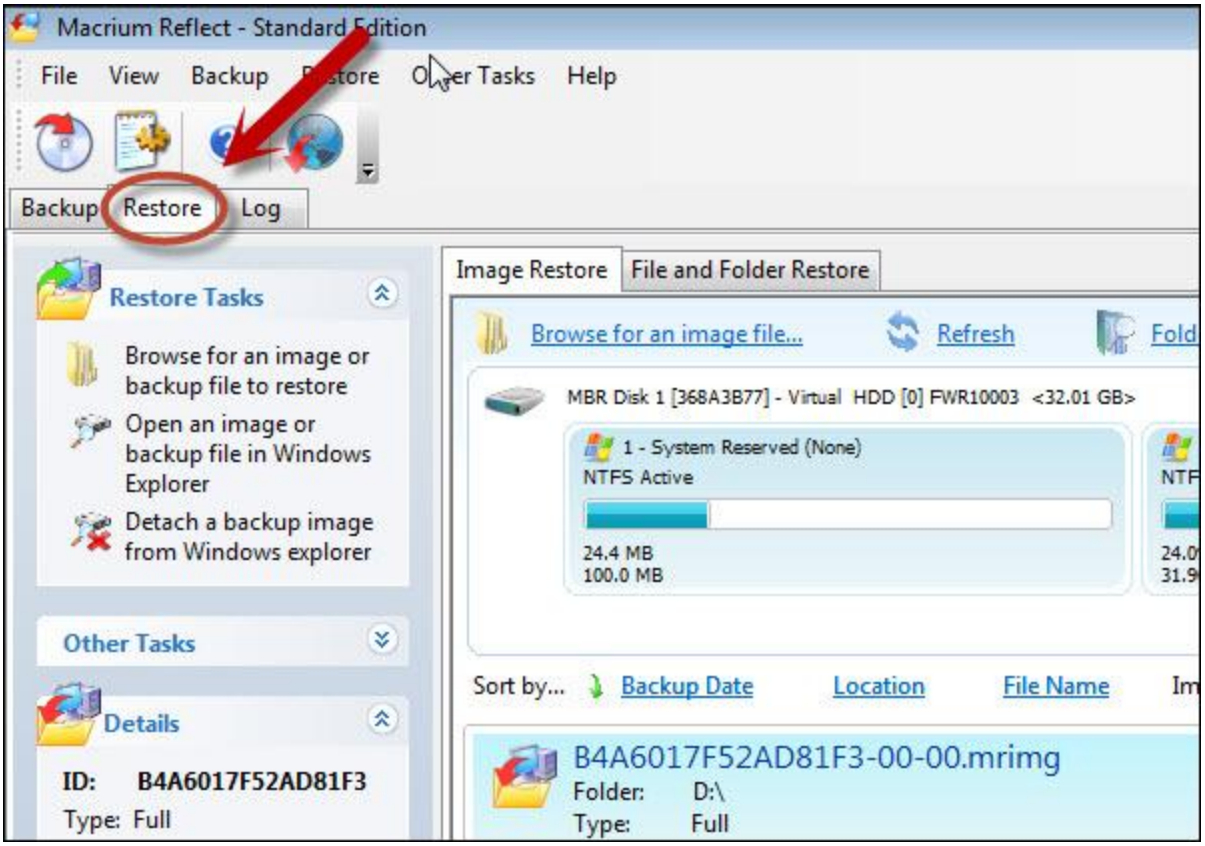
You accidentally delete, misplace, or otherwise lose an important file.

Fortunately, you know that the file that you need is on one of your backups – all you need to do is go retrieve it.

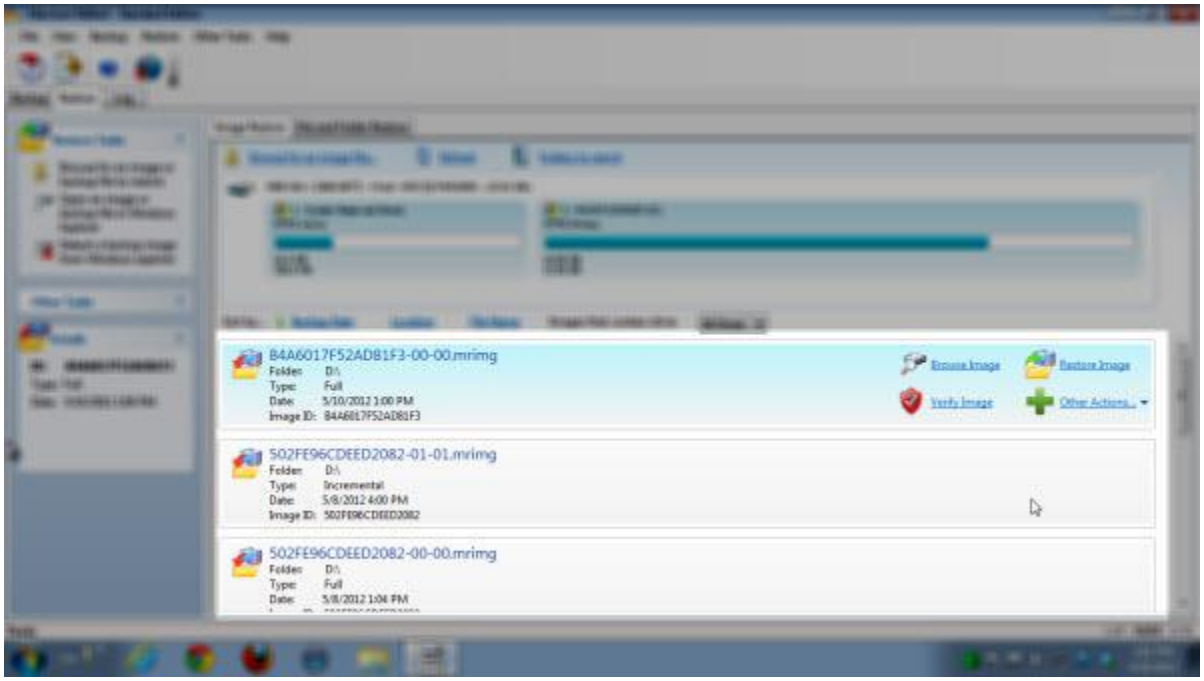
Regardless of the method or tool that you've used, there's no need to restore the entire backup just to restore a single file or even a large number of files.

Restoring individual files using Macrium Reflect is extremely similar to the process used to restore individual files from a Windows System Image, except that you don't have to go hunting for the files.

Open Reflect and click the **Restore** tab:



Reflect will display the most recent backup images (both full and incremental) in the lower-right pane:

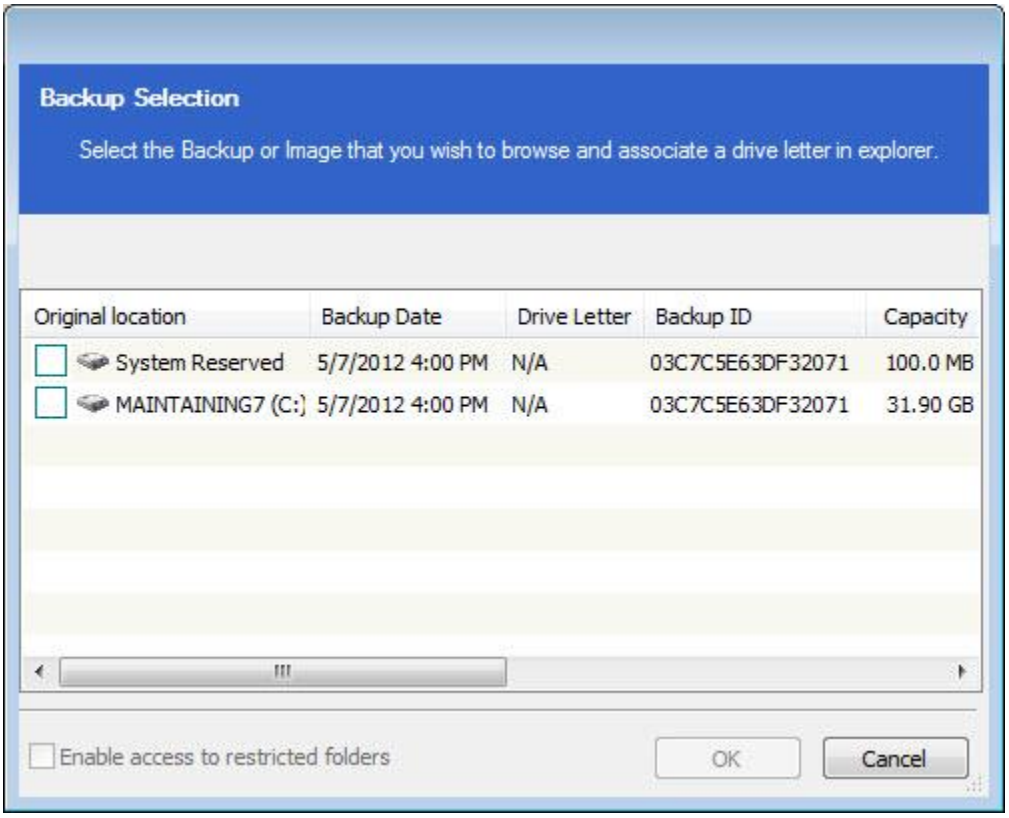


These are the backups that Reflect "knows about" because these are the backups that it's been creating. If you have a different backup image or want to restore from an image that you have archived elsewhere, you can use **Browse for an image or backup file to restore** in the left side Restore Tasks pane. Once you locate the image or set of full and incremental images that you want to restore from, Reflect will once again fill the lower right pane with the information from those files.

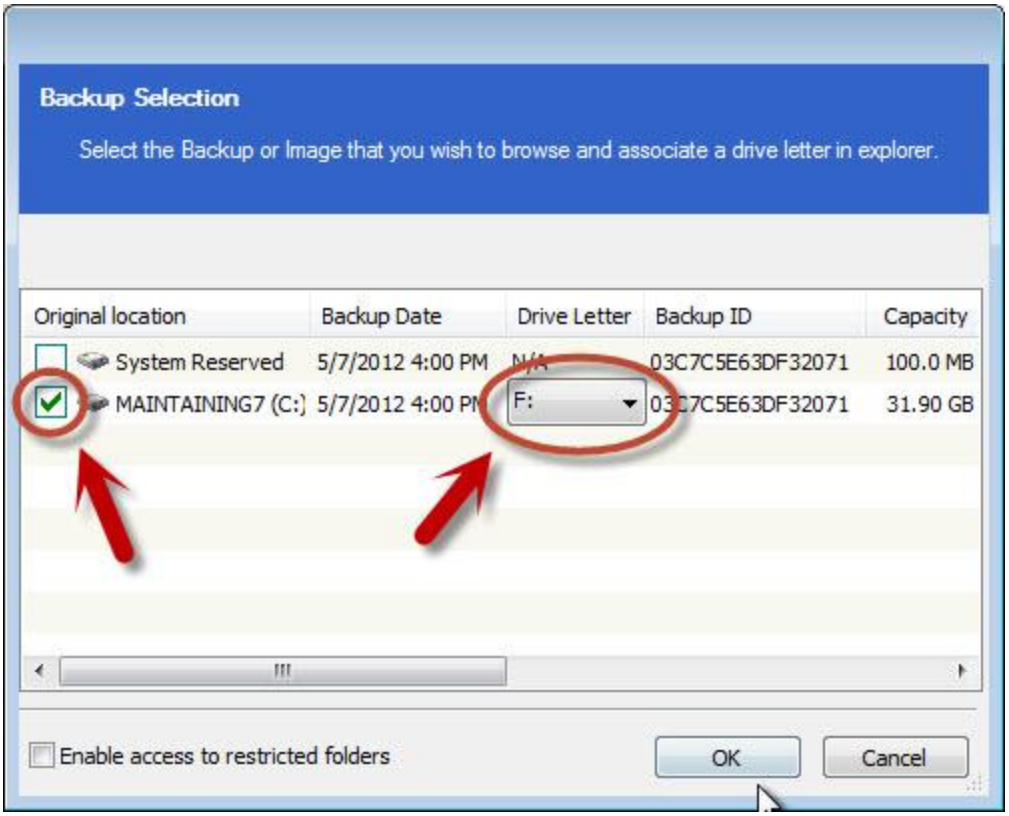
Scroll down to the image that you want to restore from. Often that would be the most recent image, but depending on your reasons for restoring, you might want to select a backup image from an earlier date. Simply note the dates of each backup and click the backup image that you wish to use.

Now, click the **Browse Image** link in the right portion of the information about that image.

If your backup included multiple partitions, as ours did, then you may be presented with a dialog asking you to select which partition it is that you wish to browse.



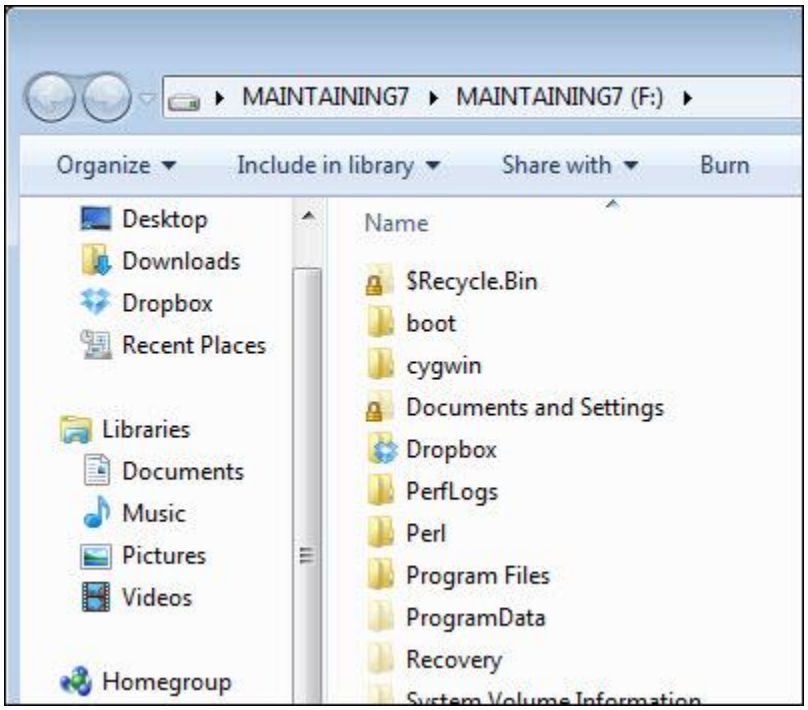
Here, you can see the System Reserved partition and the original C: partition included in the backup. Check the box in front of the partition you wish to browse:



You'll see that an option to select a drive letter for that partition becomes available. Typically, the default selection is fine, but you can change it if you like.

The drive letter is used in the next step.

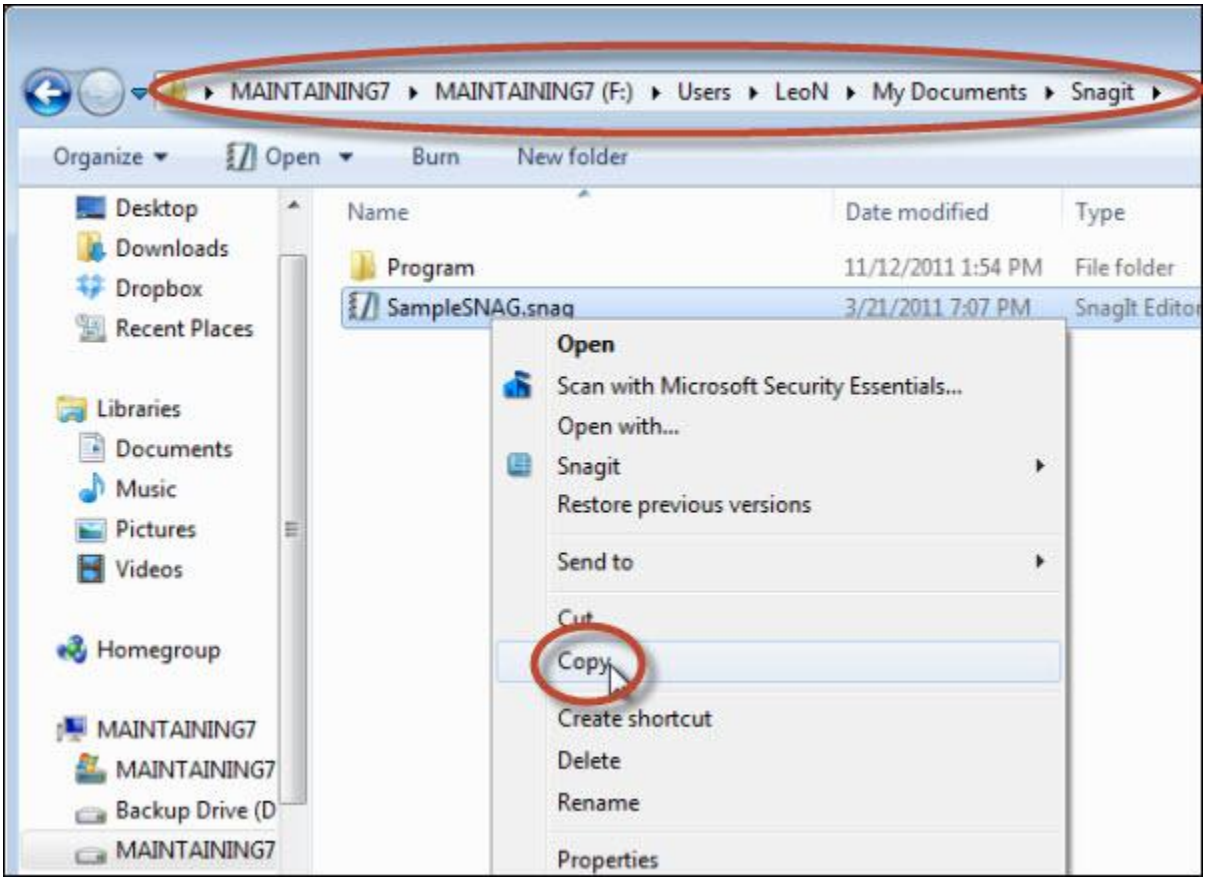
Click **OK**.



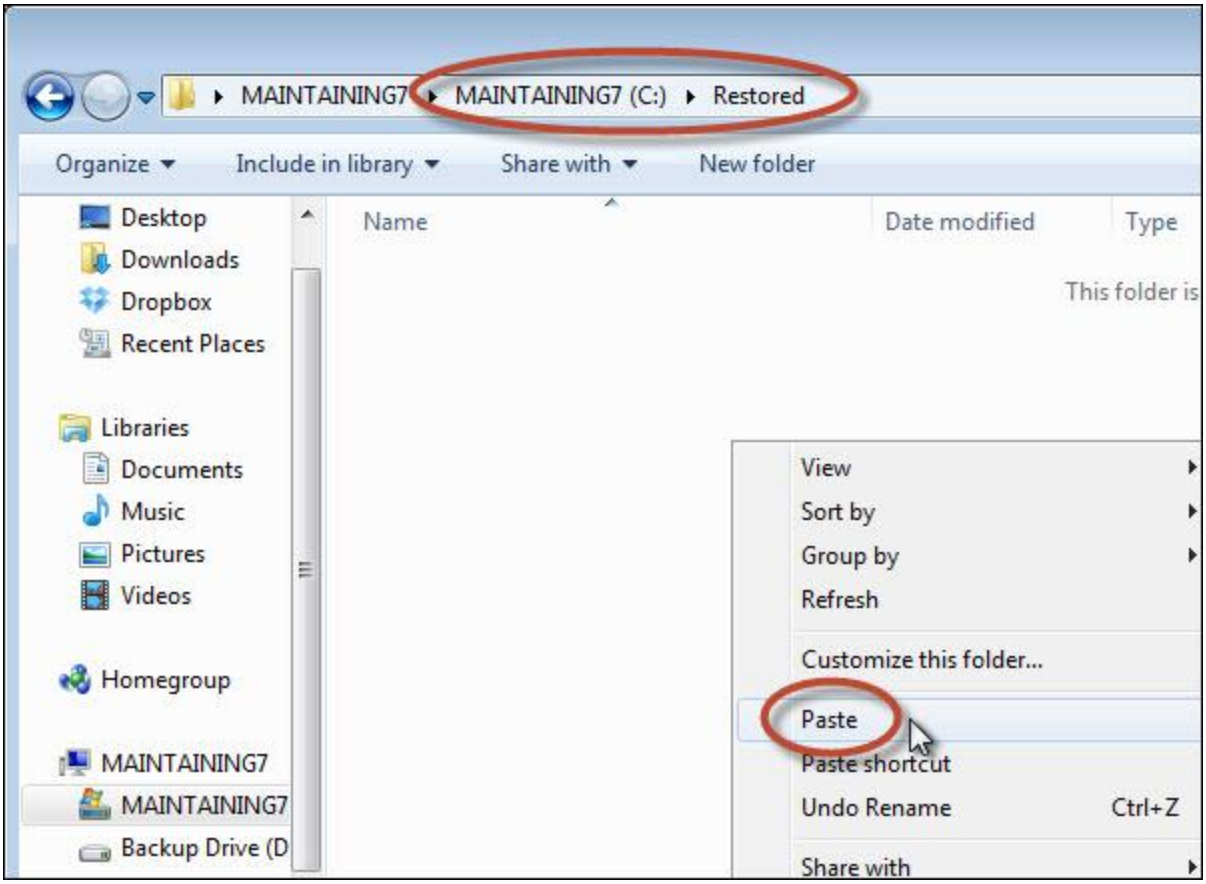
Reflect now mounts the backup image and makes it appear as a virtual drive – drive F: in this case. This virtual drive contains all of the files in the backup as they were at the time when the backup was taken.

From here, it's just a matter of using whatever Windows commands you're comfortable with to locate and copy the file that you're attempting to restore.

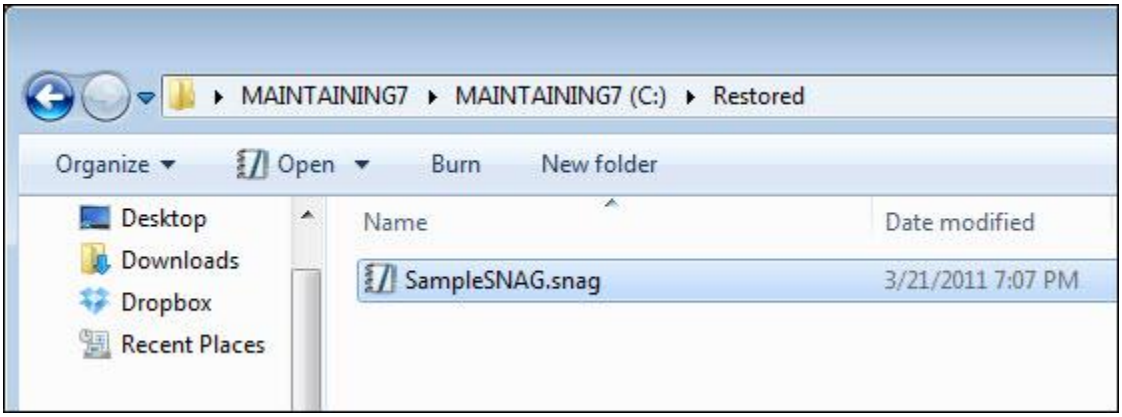
I'll navigate to F:\Users\LeoN\My Documents\Snagit – the folder in the backup (mounted as virtual drive F:) that contains the file I want to recover – right-click the file and click **Copy**:



Then, I'll navigate to a new folder that I created on my C: drive – C:\Restored – right-click again and click **Paste** to copy the file to that location:

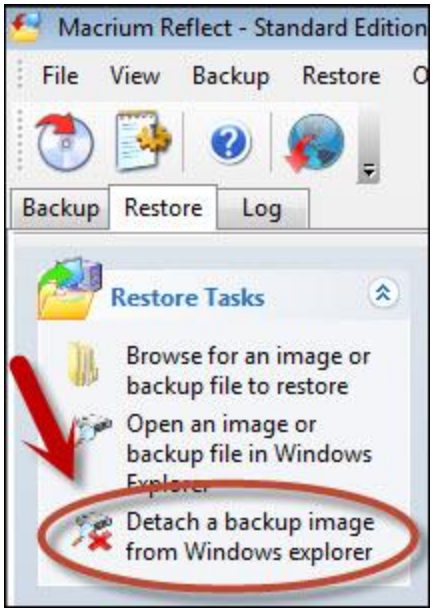


The result? A restored file:

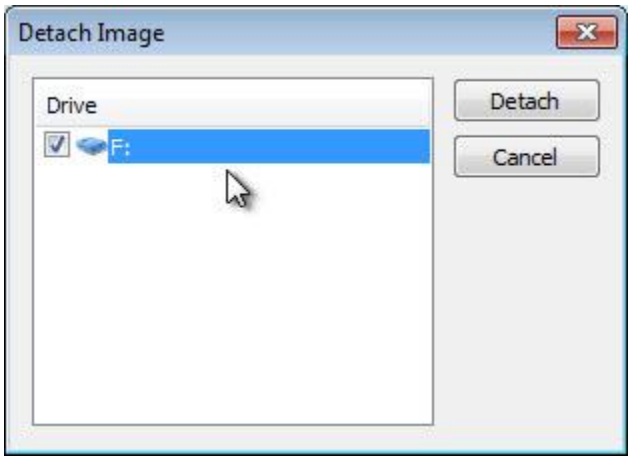


Finally, when you're done recovering files from that backup image, make sure to unmount it.

In Reflect's Restore Tasks pane:



Click the **Details a backup image from Windows explorer**. You'll then be presented with this dialog:



Check the drive that you want to detach (it might be the only one, as you can see here) and click **Detach**.

•

As I mentioned, you can use any standard Windows file copying technique that you like to restore or recover files from a mounted backup image. That's actually the beauty of Reflect (and, to be fair, the .vhd approach used by Windows Backup), allowing you to simple mount the image as a virtual drive. Once mounted, al most any Windows program will work. I could have just as easily used the Windows Command Prompt to copy the file, for example.

It might be tempting to simply open the file in place – say with your word processing program, image viewer, or whatever it is that normally works on the file you're recovering. I don't recommend doing that – you run the risk of attempting to *modify* your backup, which you simply should not do. Modifying a backup in any way means that it's no longer an accurate backup reflecting files *as of the date it was taken*.

Rather, copy the file or files from the backup to your local hard drive, as I did above. You can copy them to a new location (also as I did above) or you can copy them back to their original location or somewhere else entirely – that's up to you.

But as you can see, diving into your backup to recover that accidentally deleted file is pretty easy in Macrium Reflect.

Testing Your Backups


Video

The single most common concern about backups that I heard from my newsletter readers when I asked was very simple: they were concerned that the backup that they had so painstakingly created would fail when it was needed.

It's a valid concern.

When it comes to full system image backups, the only true test is a complete restore. The problem, of course, is that a restore overwrites whatever's on the machine. If you've got a working machine and want to test your backup by restoring, if that fails, you no longer have a working machine.

Not exactly what we're looking to backups to do.

In this section, I'm going to look at how to stack the deck in favor of success. While we can't perform the ultimate test of a complete restore, there are a few things that we can and should do after backups have been created to make sure that they'll be there for us when the time comes.

The tests that we'll perform boil down to this:

- Confirm that the rescue media boots and can access your backups
- Confirm that a system image contains the files that you care about and that you can restore individual files

In both cases, the process will look very similar to an actual restore or recovery, as we've performed above.

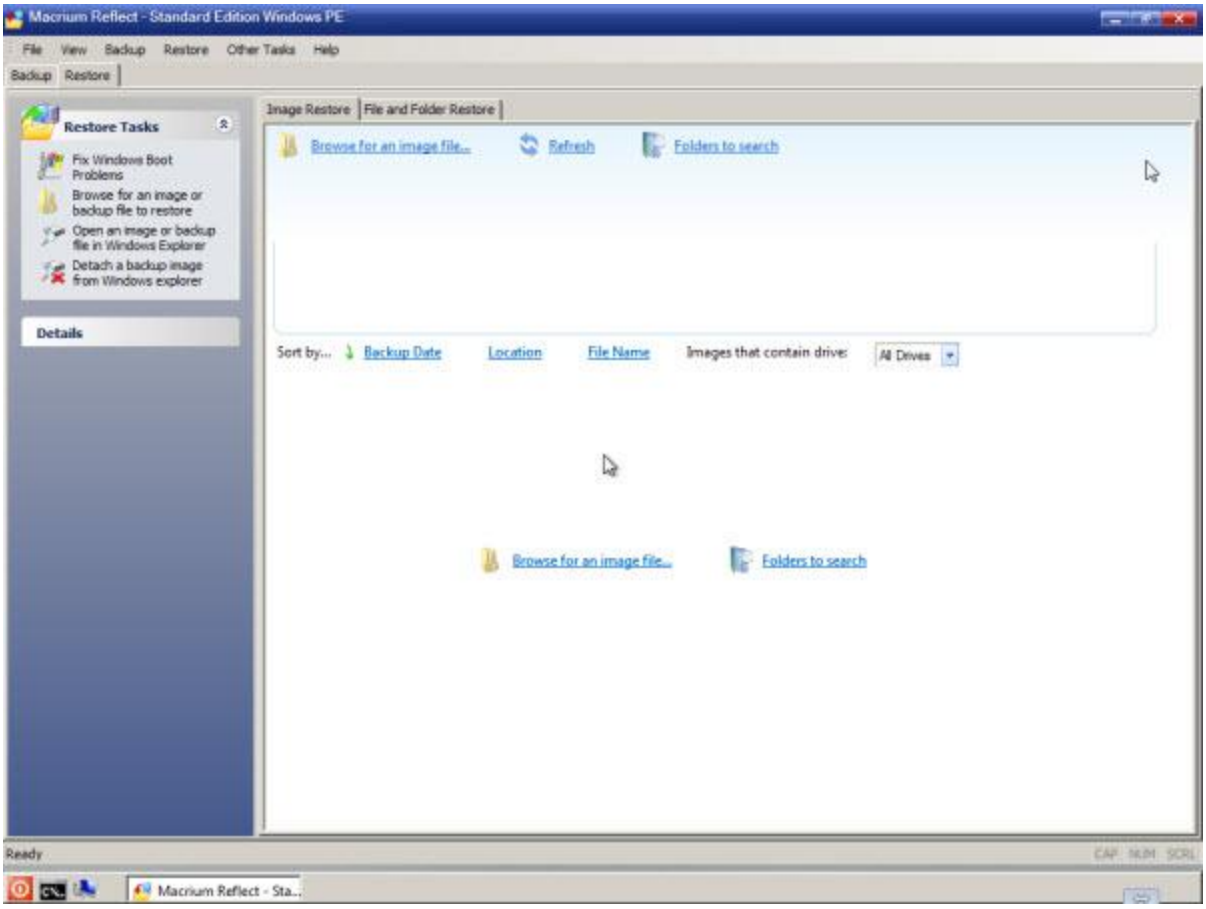
With those tests succeeding, you can feel pretty confident that your backup is what you need it to be. Most importantly, even if a complete restore operation still fails for some reason when needed at a later date, you'll have confirmed that the backups taken do at least contain your precious data.

Test 1: Using rescue media to access the backup

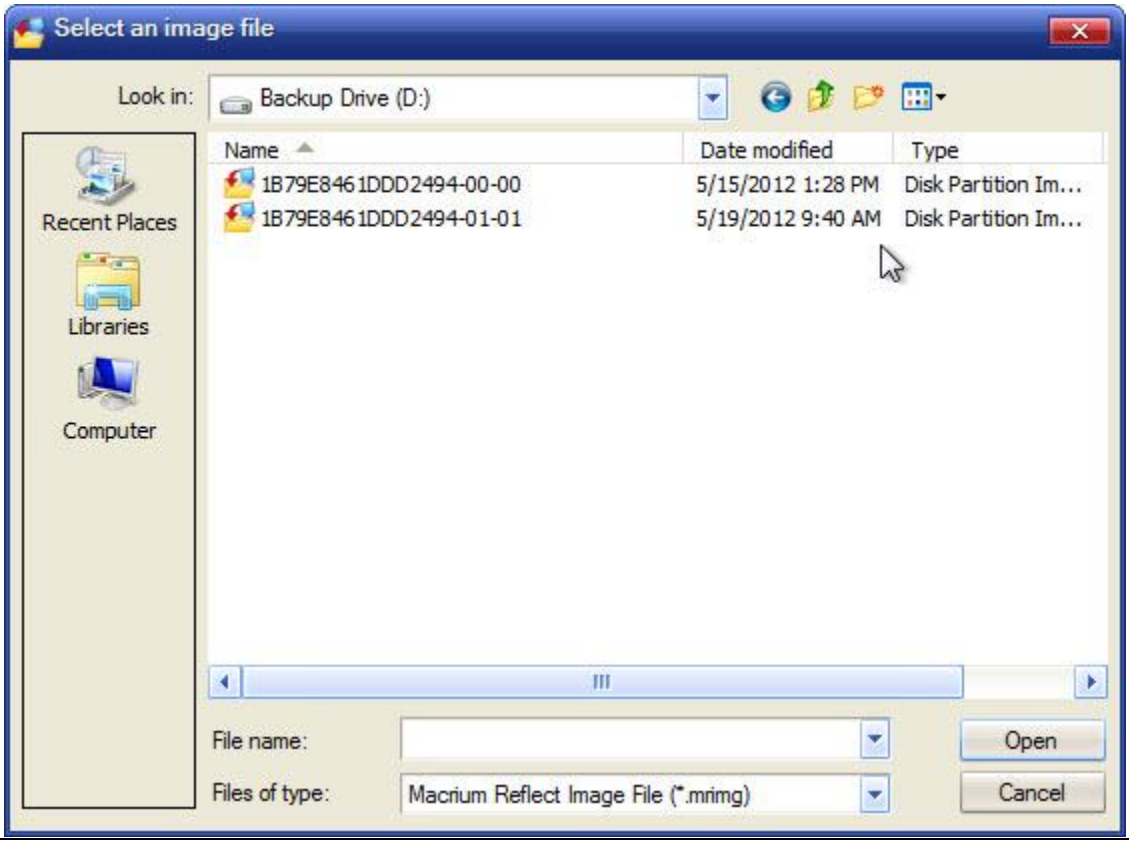
The first step is to simply boot from the rescue media disc that you created earlier.

This example uses the Windows PE-based rescue media.

The rescue media will automatically launch a copy of Macrium Reflect with the Restore Tasks tab selected.



Click **Browse for an image file...**, and locate your backup drive.



If you cannot locate your backup image or perhaps your entire backup drive at this point, then this test has failed.

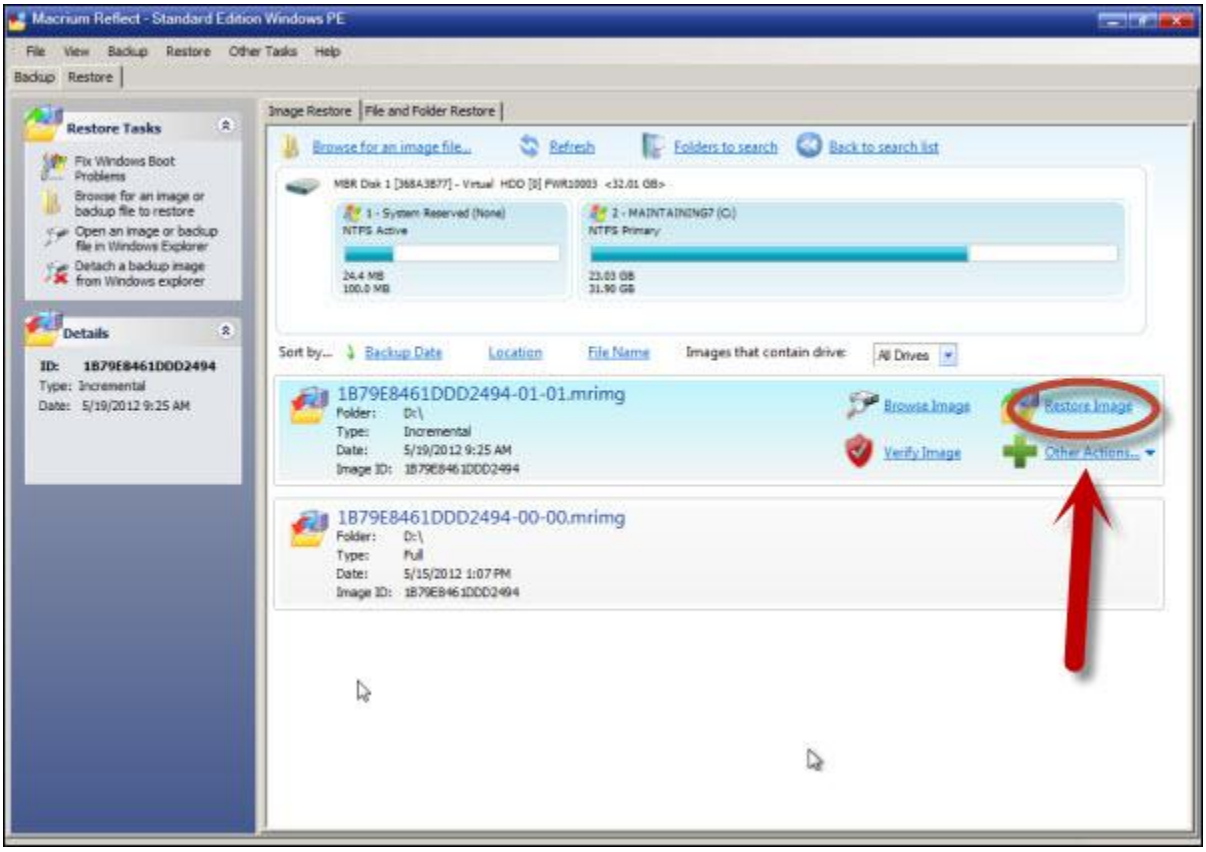
Particularly with external drives, this is the most common failure as occasionally not all rescue media have support for all external devices.

If this happens, there are a few things to try next:

- Try the "other" type of rescue media. If you burned and are using a Windows PE-based rescue disk, try the Linux-based equivalent. If you're using the Linux version, try the Windows alternative.
- Make sure that Reflect is up-to-date and burn a new copy of your rescue media. The rescue media is regularly updated with Macrium Reflect and support for additional external media may have been added.
- Check with the Reflect support forums for further assistance.

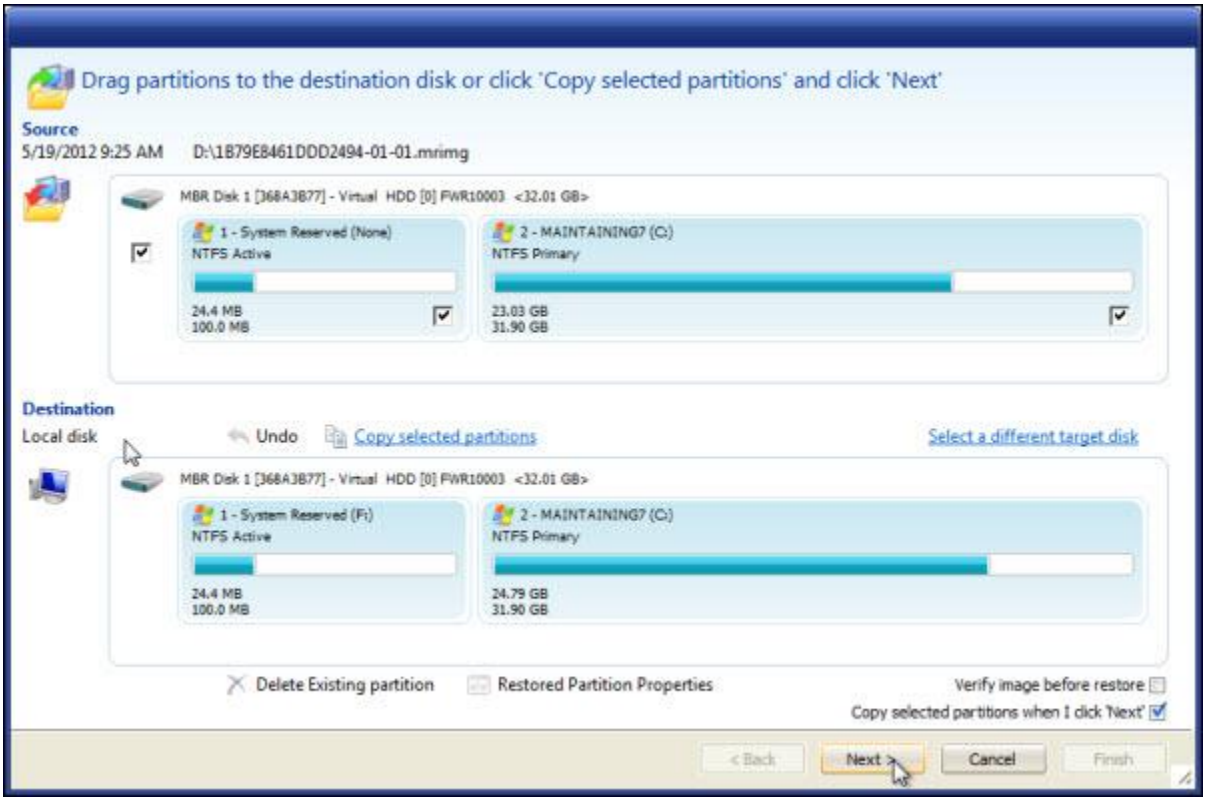
Once you do successfully, locate your backup images, note the filenames: a string of letters and numbers (the Reflect-assigned backup ID) followed by -00-00 and -01-01. The 00 is the initial full system image and the 01 (or 02, 03, and so on) is the subsequently created incremental backup based on that full system image.

Click the most recent incremental backup and click **Open**.



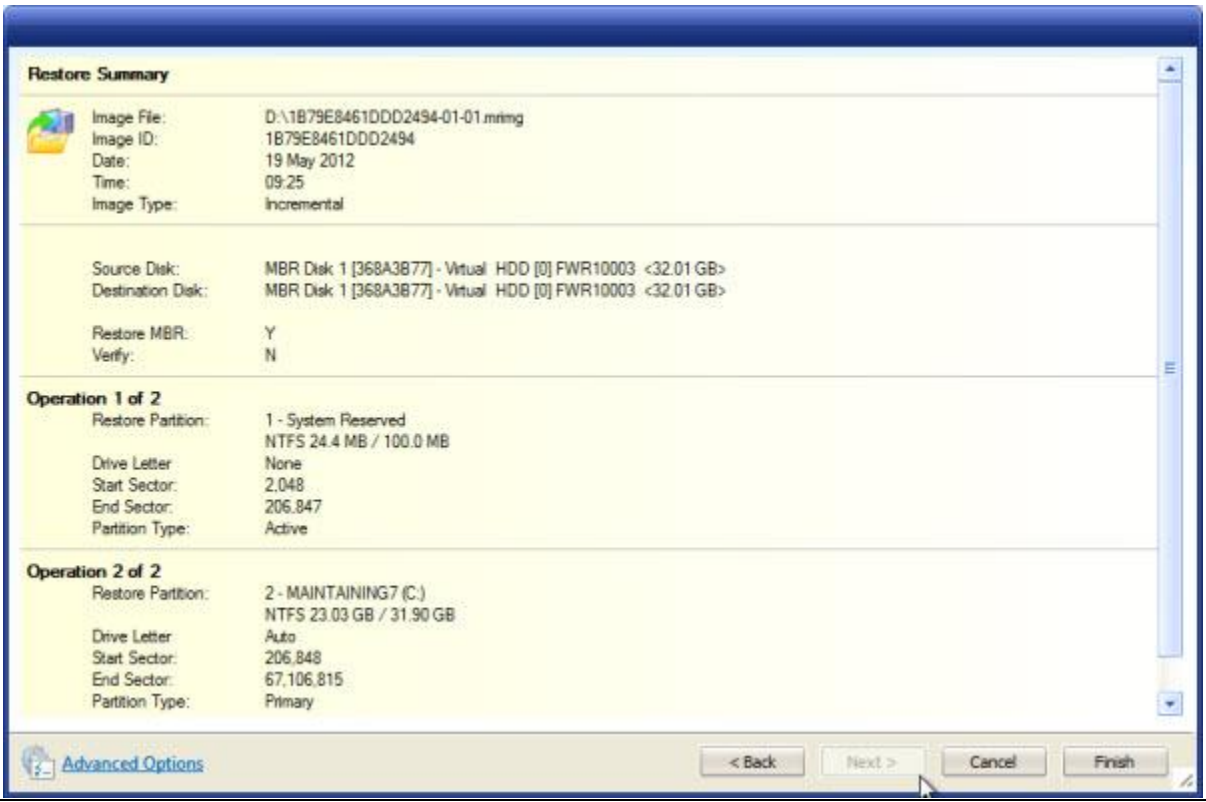
Reflect displays the partitions contained in the backup in the upper pane and the sequence of backups on which this incremental backup depends in the lower, with the incremental backup that we selected on top.

Click **Restore Image**.



Reflect displays the source and destination for a possible restore.

Click **Next**.



>> DO NOT CLICK FINISH! <<

This summary screen reviews what Reflect would restore. If you've reached this point, then you're very likely to be able to perform a successful restore if you ever need to do it.

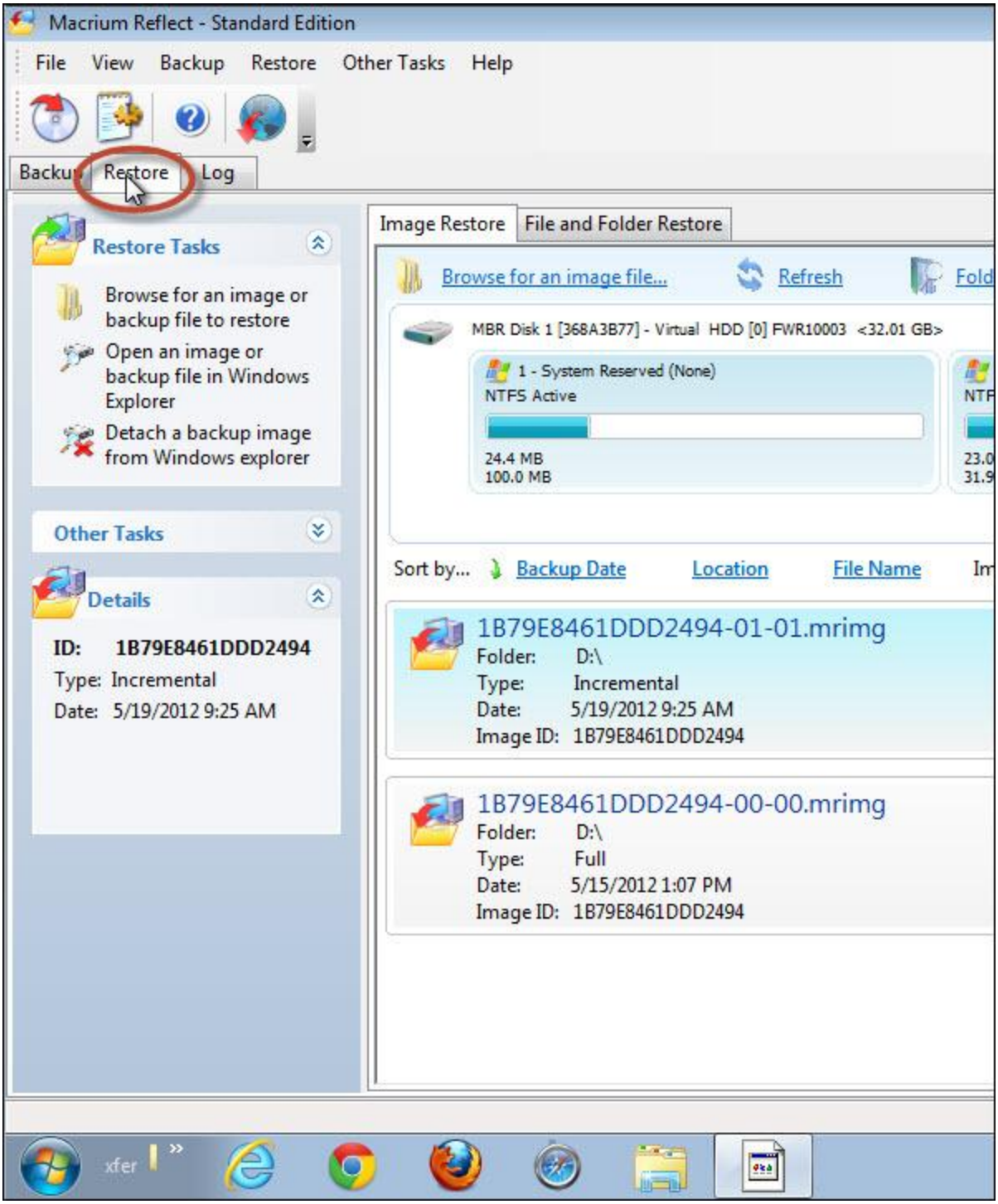
Do not click Finish. Rather, click **Cancel**.

If you like, you can click **Browse Image** to use the rescue disc to review the contents of your backup images. We'll instead do that in the next section from within Windows.

Remove the rescue disc from the drive and exit Reflect. Your system should reboot into Windows.

Test 2: Access the backup image from within Windows

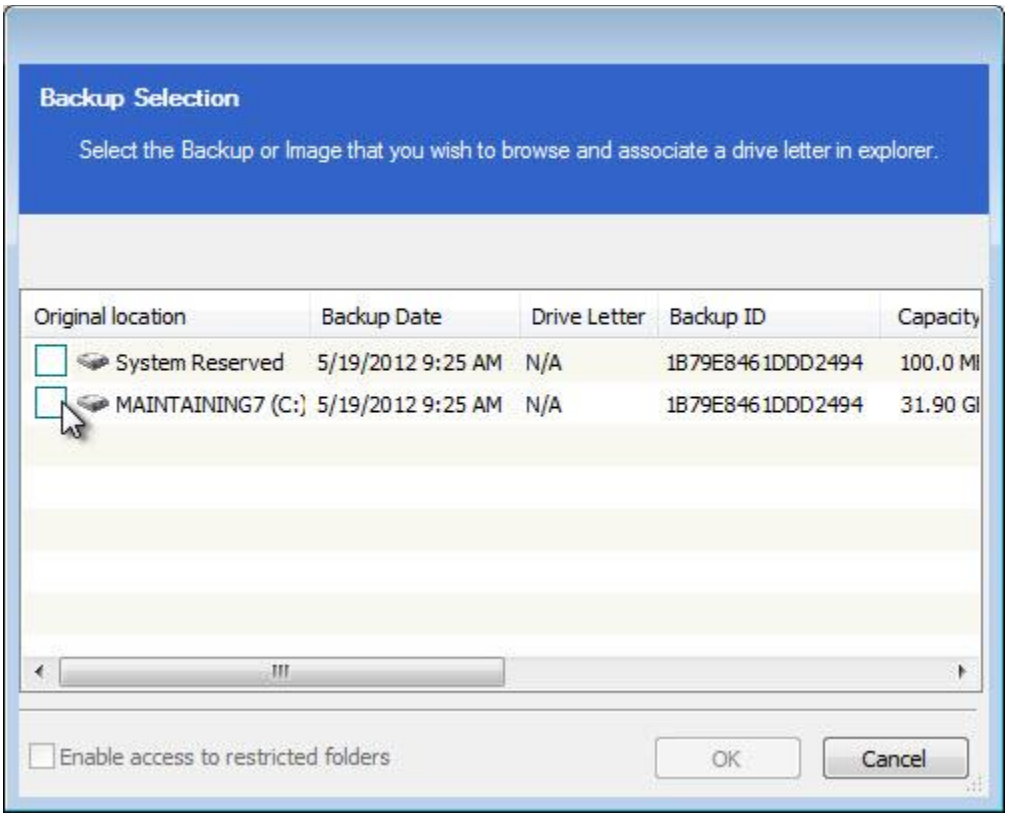
Run Macrium Reflect and click the Restore tab once it's running:



Reflect should list the most recent backup images in the lower-right pane, much like browsing with the rescue media did. (You can use "Browse for an image file..." to locate other images, if you like.)

In the image list, click **Browse Image** in the most recent:

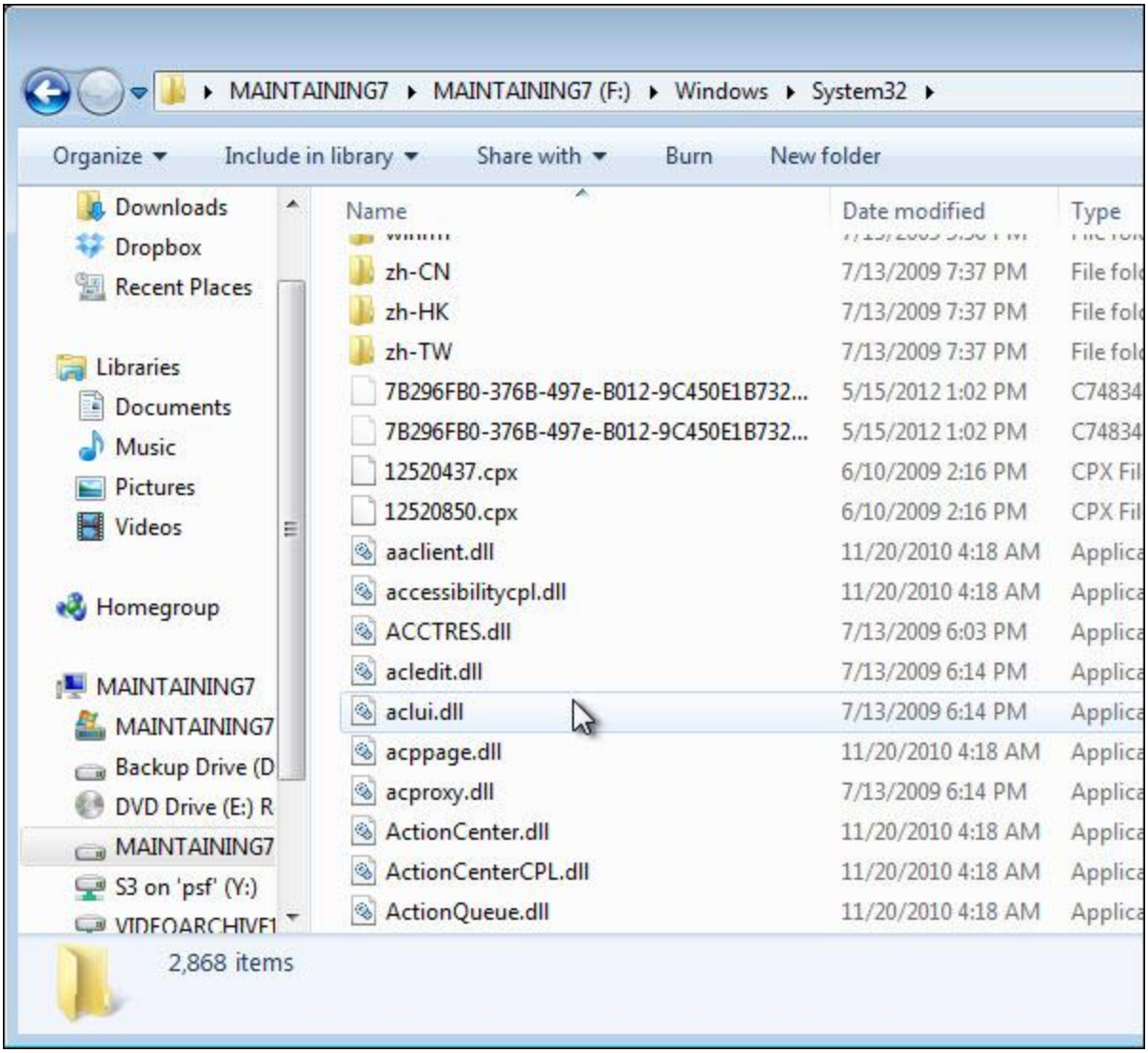
Because our backup image contains more than one partition, Reflect asks you to choose which one to mount:



Select the one that corresponds to your system drive (C: in most cases) and click **OK**.

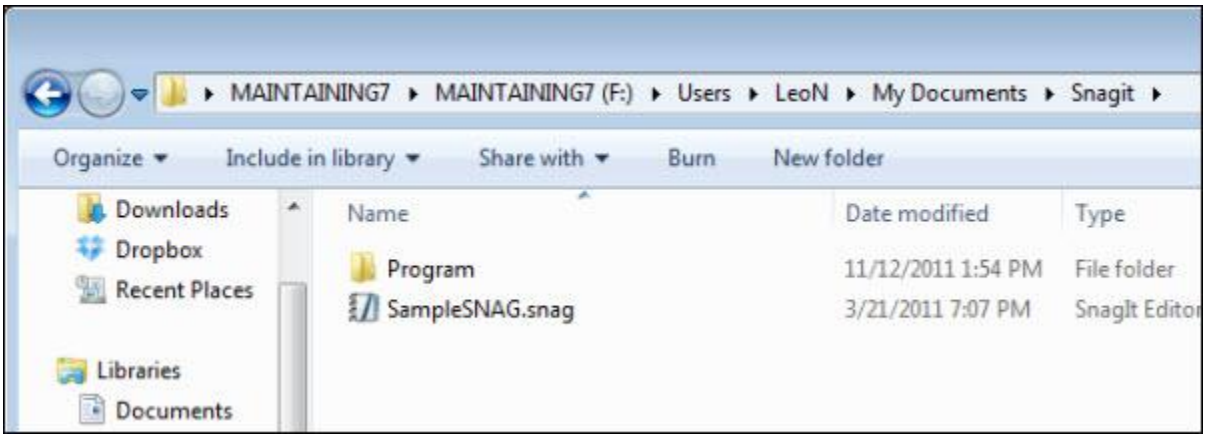
Reflect assigns the image a drive letter (F: in our example) and then opens Windows Explorer on the mounted image.

Make sure that Windows itself is included in the image; use Windows Explorer to browse Windows\System32 in the backup image:



That Windows\System32 is present and full of files is a reasonable indicator that Windows itself has been included in your image backup.

Now, navigate to a file or folder of your own, perhaps your own My Documents folder where you can confirm that the files that you've created are included in the backup as well.



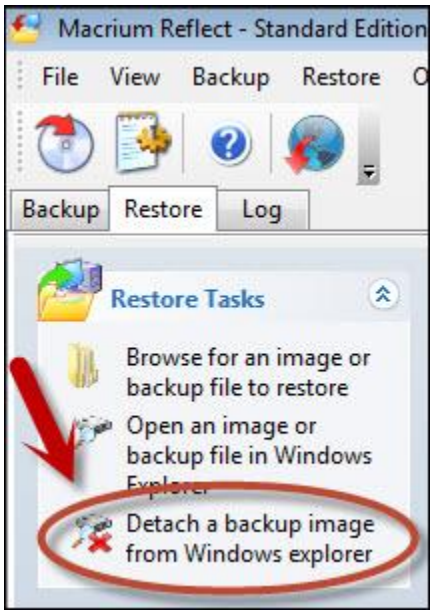
Here, I've browsed to my own My Documents folder where I can see that a folder and data file that I expect is present.

You should do this for a few of your own data files that you expect to back up. They don't have to be in My Documents – it doesn't really matter where they are – but take a few moments to browse around the backup image to locate the files that you care about.

If you can find them, then you can feel confident that they're not only successfully backed up, but that you can restore them – either as part of restoring the entire system image or by extracting them from the system image individually.

If you can't find them, then it's time to review the settings that created this backup. Is it backing up the right disk? Are you examining the backup that you think you are? Did the files that you're looking for exist at the time the backup was taken?

If you're not finding what you're looking for, then it's important to understand why and from that, understand what you might need to do to make sure your backups contain what you expect in the future.



Once you're done browsing around, be sure to detach the backup image.

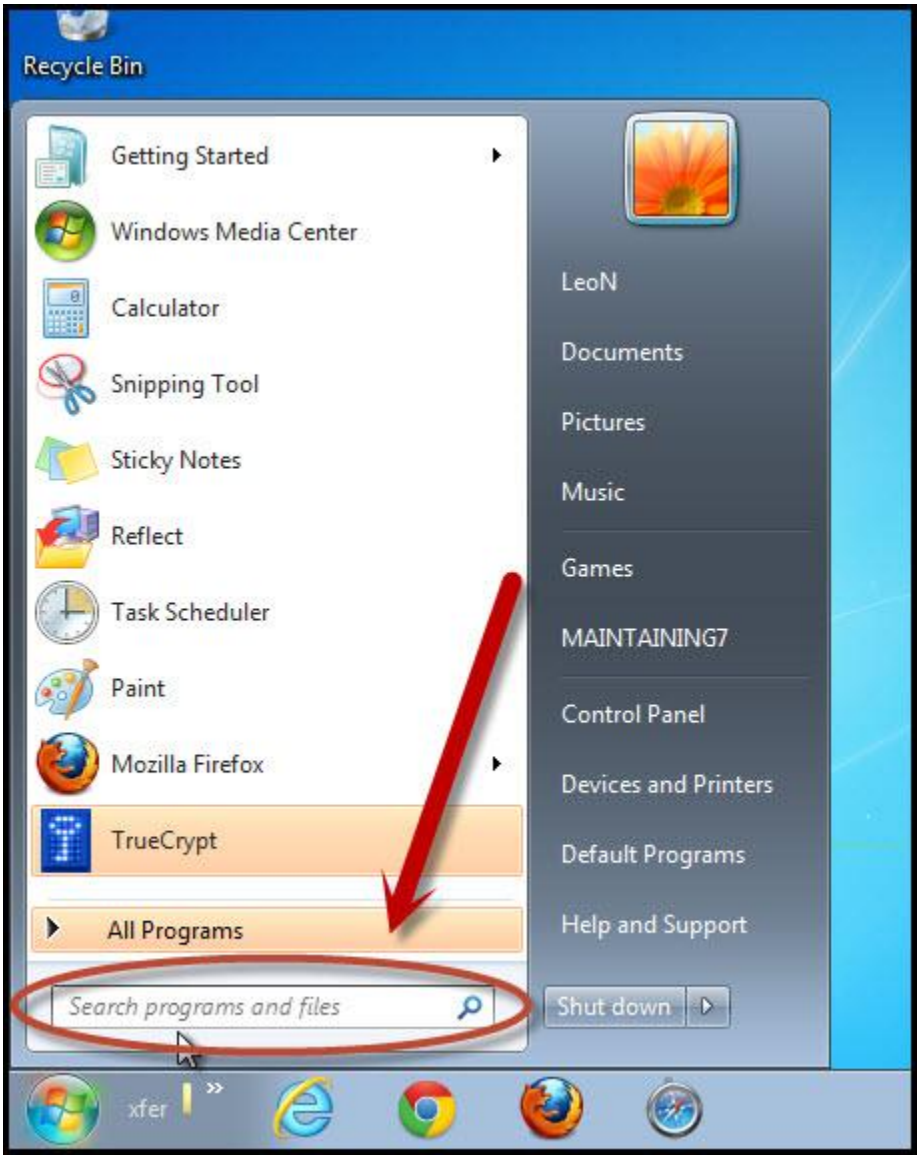
Backing Up with Windows Backup

Unlike its predecessors Windows 7 includes a backup program that finally meets what I'd consider the bare minimum in terms of features and usability to actually serve as a reasonable backup utility.

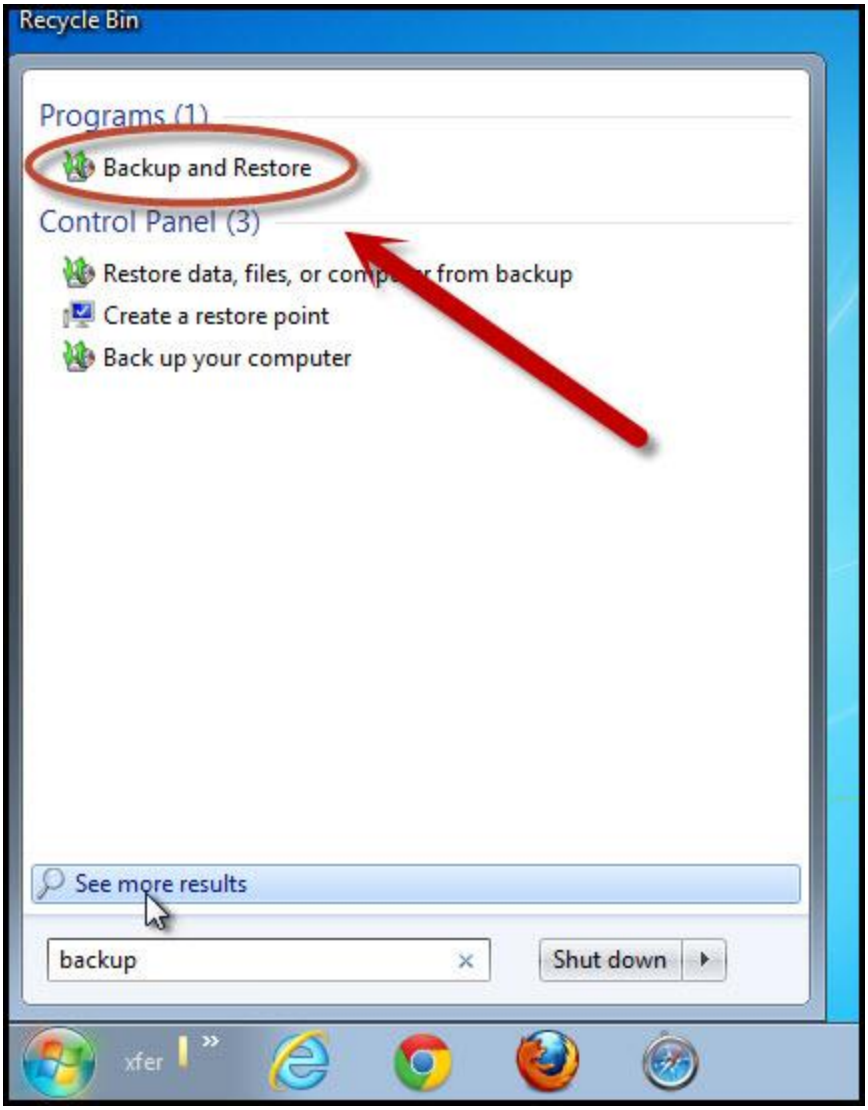
I do emphasis that it is the *bare* minimum. As we'll see some of the things we want to do aren't really handled cleanly in Windows Backup, and the program often makes it difficult to understand exactly what it's doing - something I find worrisome for a backup program.

However, it's free, and if for whatever reason you elect not to use a more full-featured backup program (which, in all honesty, I would prefer you do), then using Windows Backup can be viable, and is most definitely better than having no backup at all.

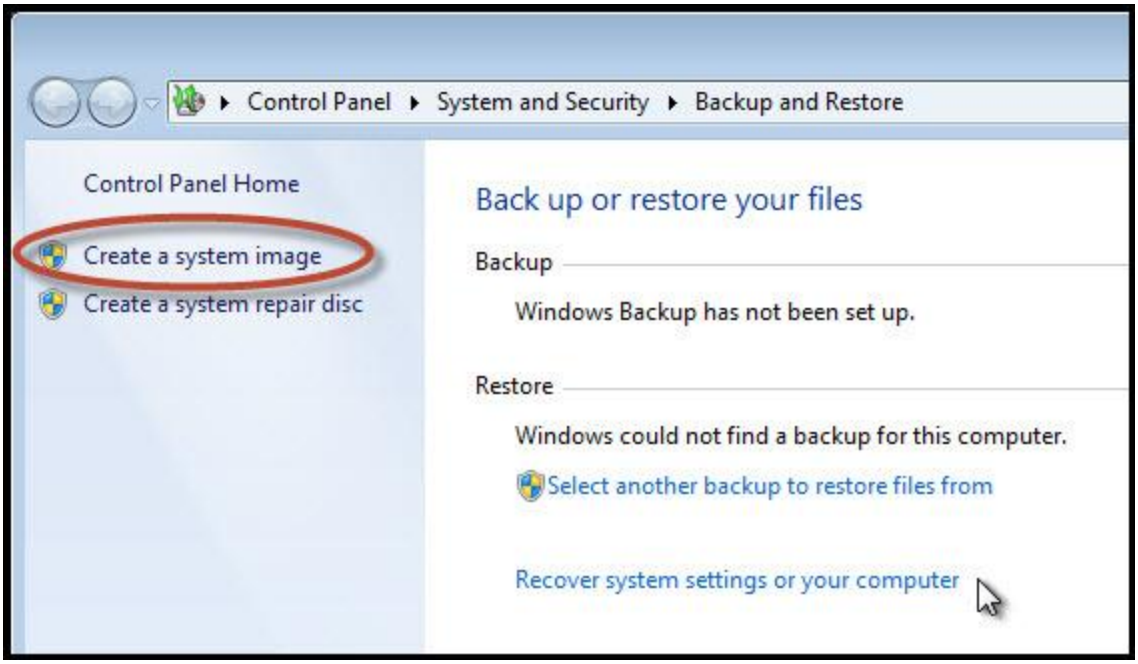
Video



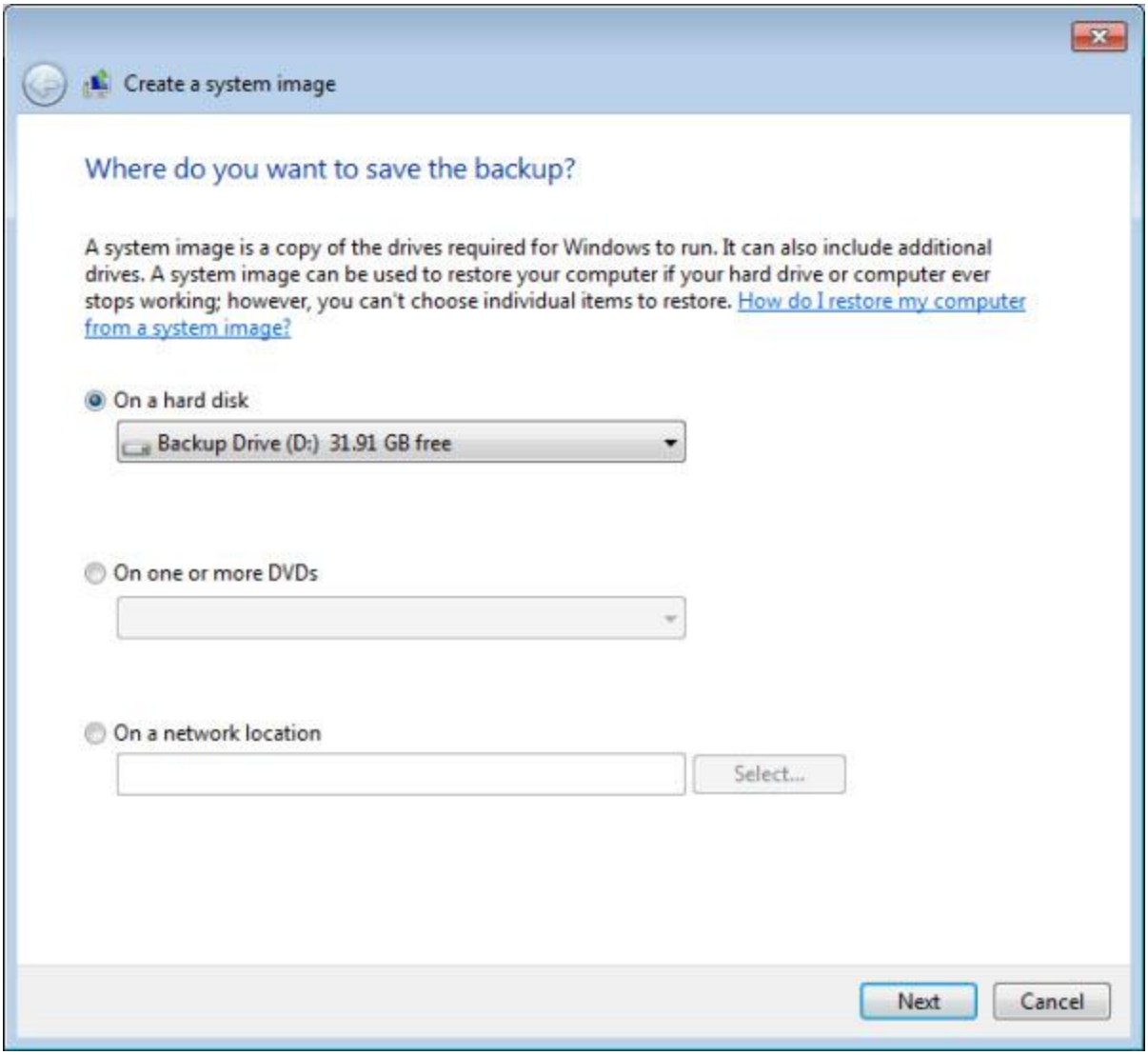
The easiest way to start the Windows Backup program is to click the **Start** button in the Task Bar and click the Search programs and files box.



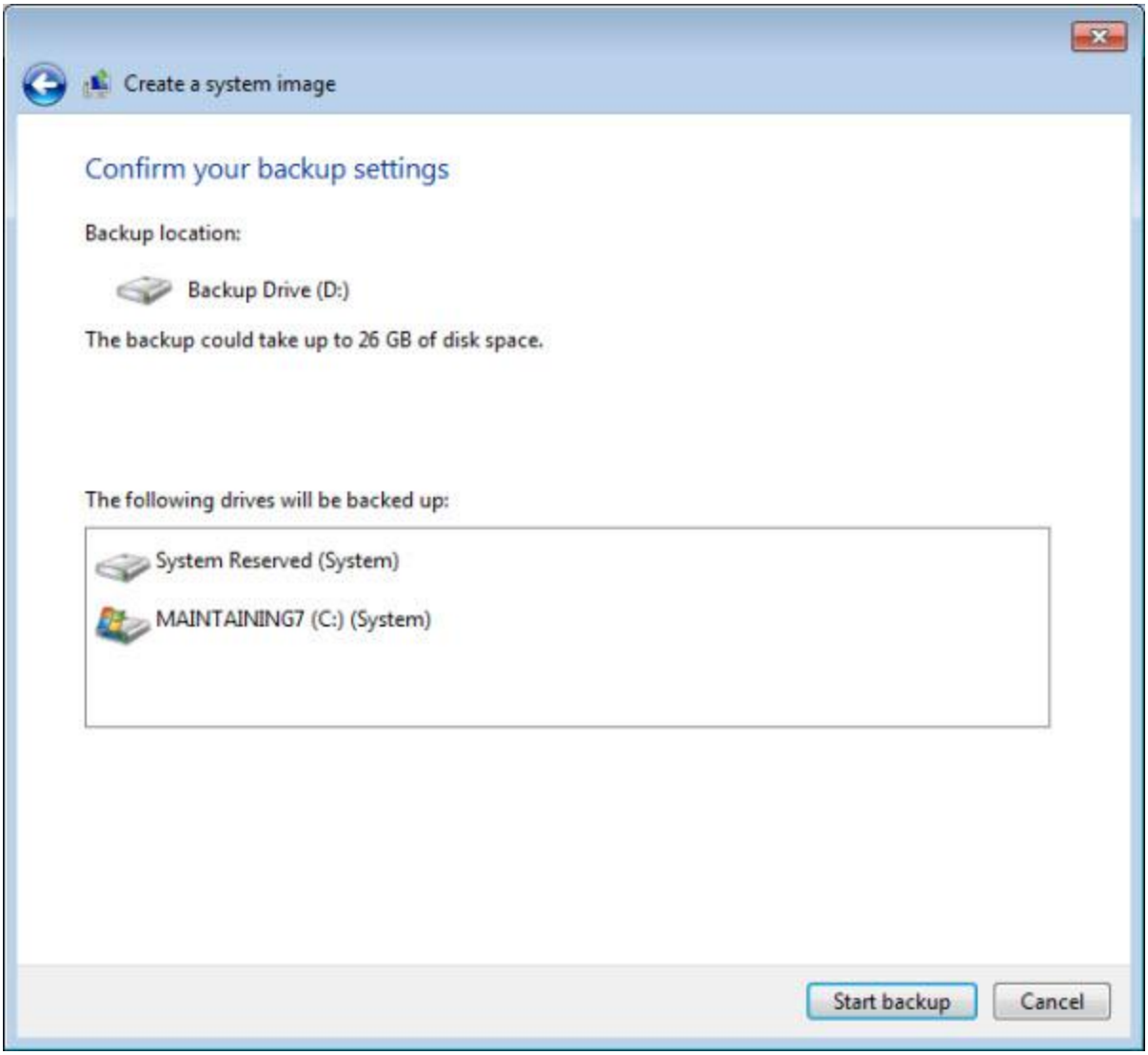
Type in the word "backup" and a number of options appear. Click **Backup and Restore**.



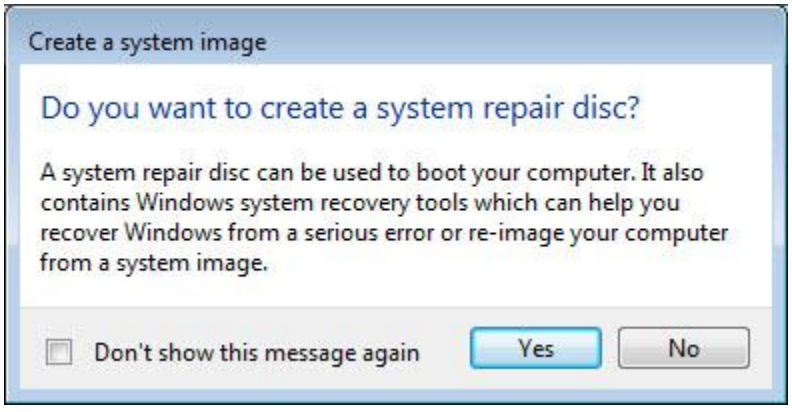
In the Windows Backup and Restore application, click **Create a system image**.



Choose the destination for your backup. In this example, I'll choose the backup drive attached to this computer.



On the following page, confirm the backup settings and click **Start Backup**.



After the backup has completed, you'll be asked if you want to create a repair disc. This is the disc that you would boot from if you ever need to restore your machine.

If you have your original Windows installation disc available, you can safely bypass this step or do it later. The repair tools are available on the Windows installation disc.

If you do not have your original installation media and you do have a CD burner, then click **Yes** and follow the steps to burn a bootable System Repair CD.

Your System Image Backup using the Windows Backup utility is complete.

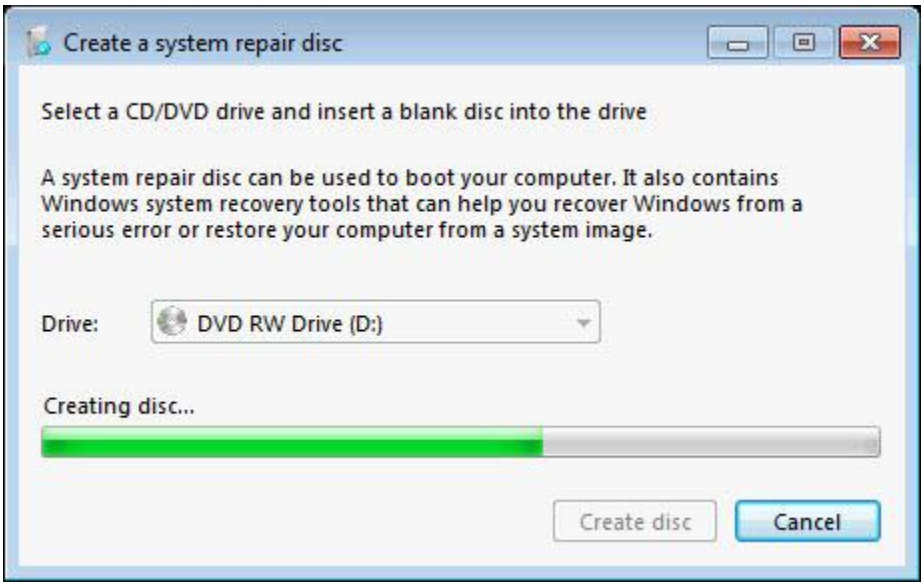
Preparing for Recovery

To restore an image to the system drive, you'll need to boot your computer from something *other than* the system drive.

If you have your original Windows 7 installation media (typically, this is the DVD that was used to install Windows 7 in the first place), you're actually done. The tools that you need to restore your image backup are there.

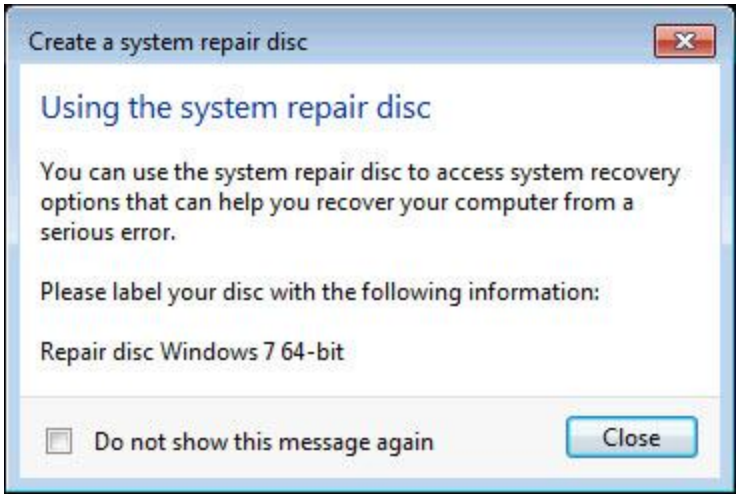
If you don't have such a disc, you'll need a **System Repair Disc**.

Click the **Start** button and type "repair" into the search box. One of the options at the top will be **Create a System Repair Disc**. Click that.



In the resulting dialog, chose the disk drive that has your DVD or CD writer, insert blank media into that drive, and click **Create disc**.

When complete, Windows will display this reminder about using the system repair disc:



Restoring from a Backup Image


Video

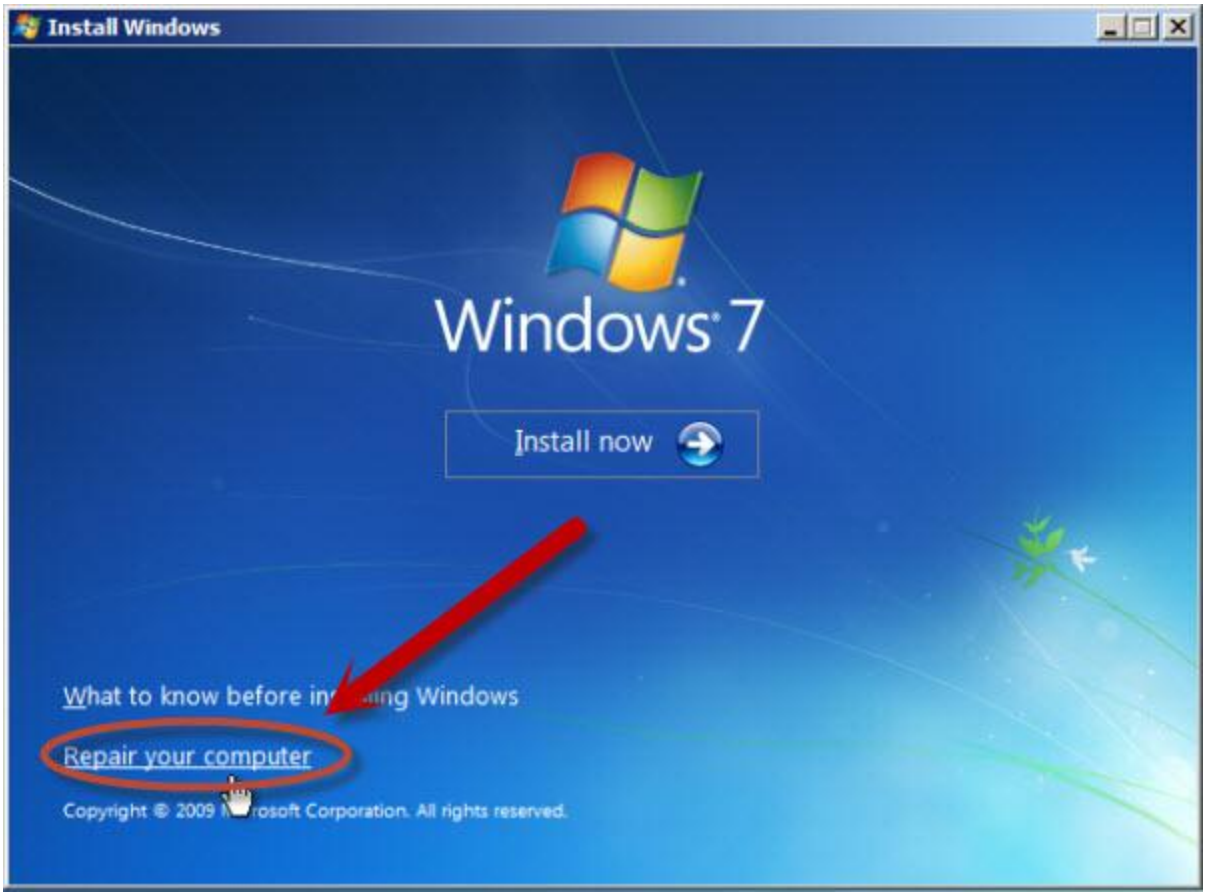
It happened. Something went wrong. You system no longer boots, or something's changed as a result of the cleanup process that you don't understand how to undo.

It's time for the ultimate Undo: restoring your machine to a backup image taken earlier when the machine was working properly.

Boot from your original Windows 7 installation disc. This is not the system recovery disk as provided by your manufacturer, but something clearly labeled as Windows 7 for re-installation.


Install Windows
Windows 7
Language to install: English
Time and currency format: English (United States)
Keyboard or input method: US
Enter your language and other preferences and click "Next" to continue.
Copyright © 2009 Microsoft Corporation. All rights reserved.
Next

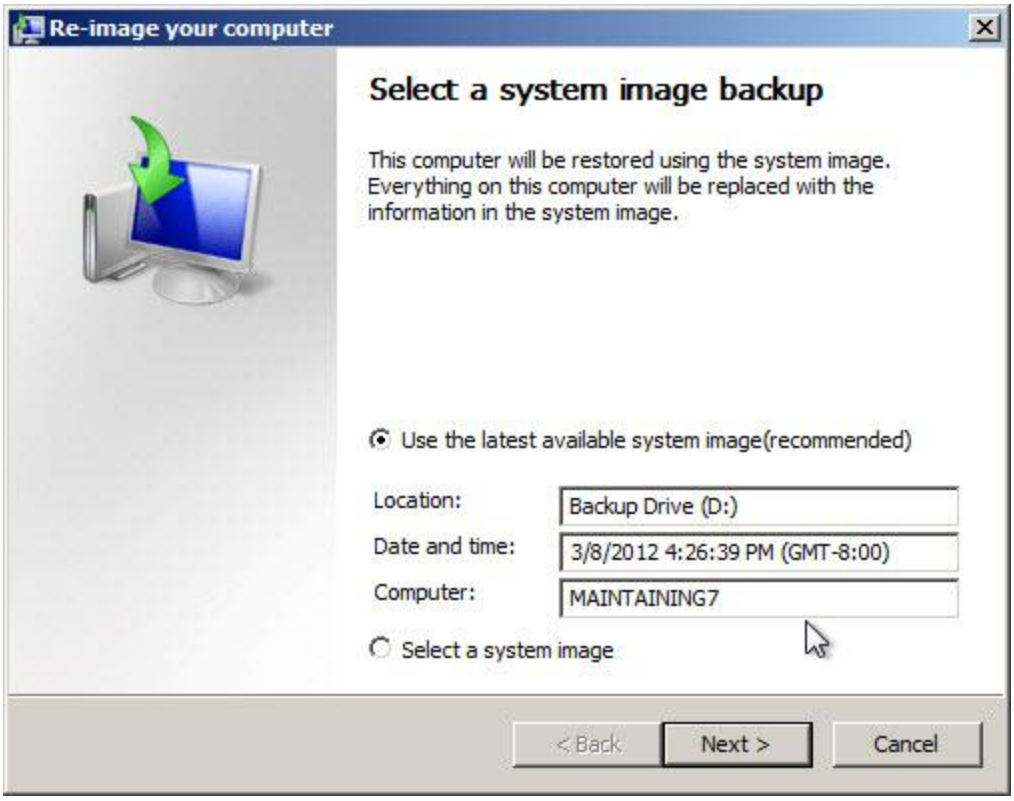
Click **Next**.



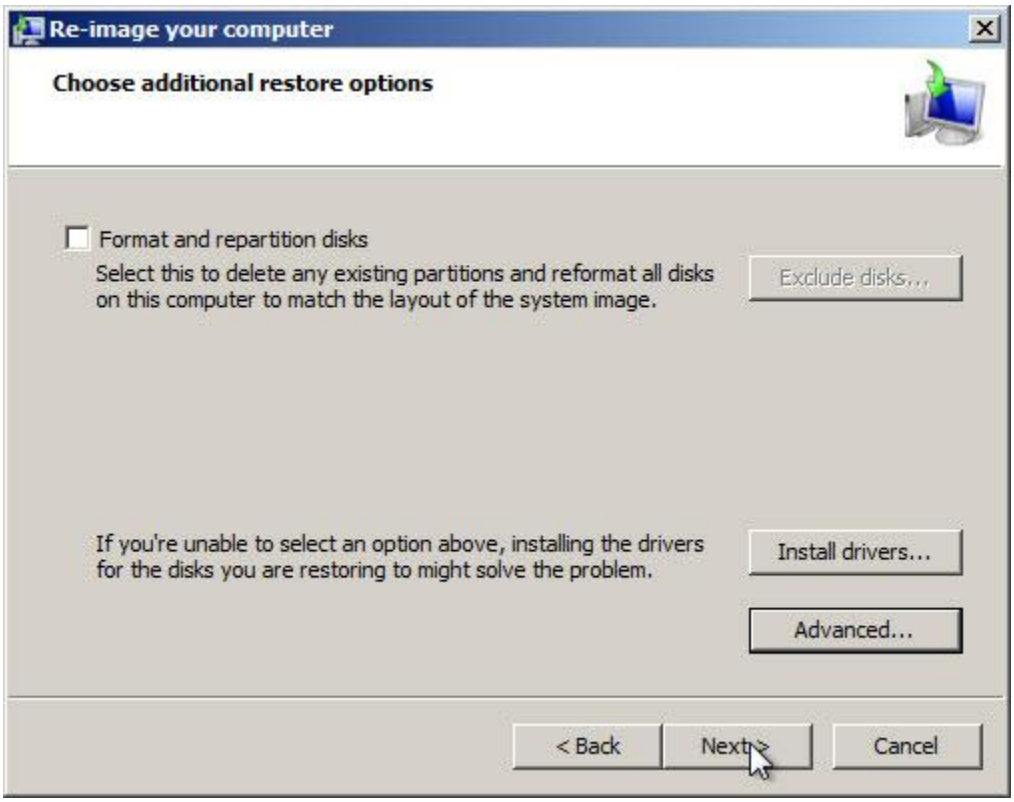
Do NOT click the **Install now** button, but instead click **Repair your computer**.

Windows setup will examine your system for a moment, looking for existing installations of Windows 7.

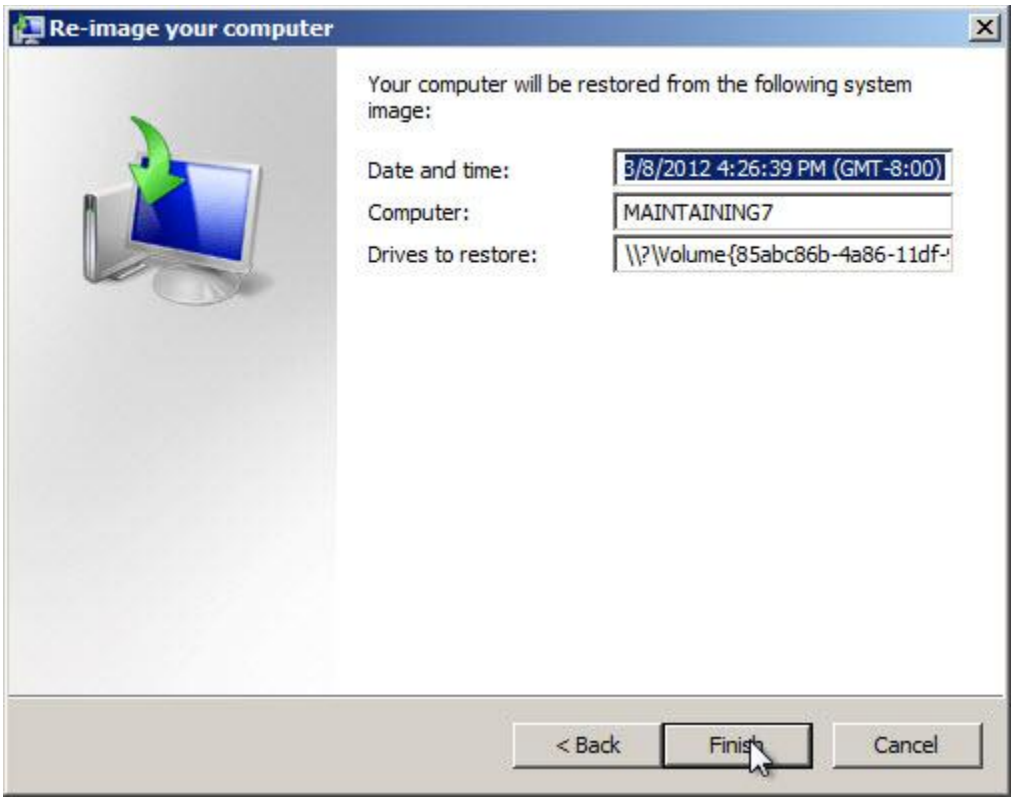
When the scan is complete, you'll be presented with the dialog above. Select **Restore your computer using a system image...** and click **Next**.



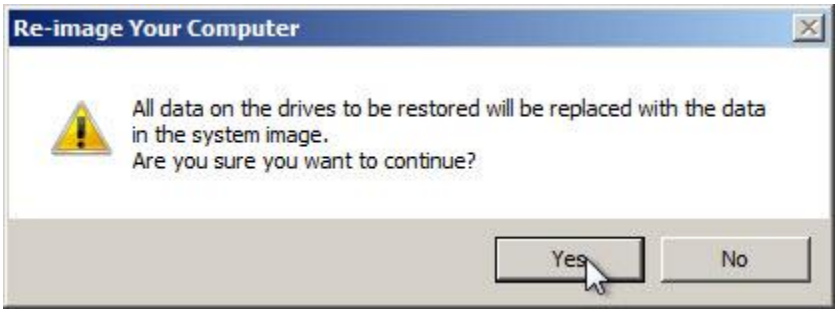
Typically, the appropriate response is the most recent image backup that the restore program can find. Unless you have more than one backup image and know which one you specifically want, leave "Use the latest" selected and click **Next**.



The next page of options should typically be left alone for simple restores, such as the one we're doing. Click **Next**.



On this confirmation screen, click **Finish**.



This final confirm simply points out that the contents of the hard disk will be completely replaced. Put another way, *everything currently on the hard disk will be erased* and replaced with the contents from the backup image. Because the image is a backup of the entire hard disk from an earlier time, that's exactly what we want.

Click **Yes**.

The restore begins.

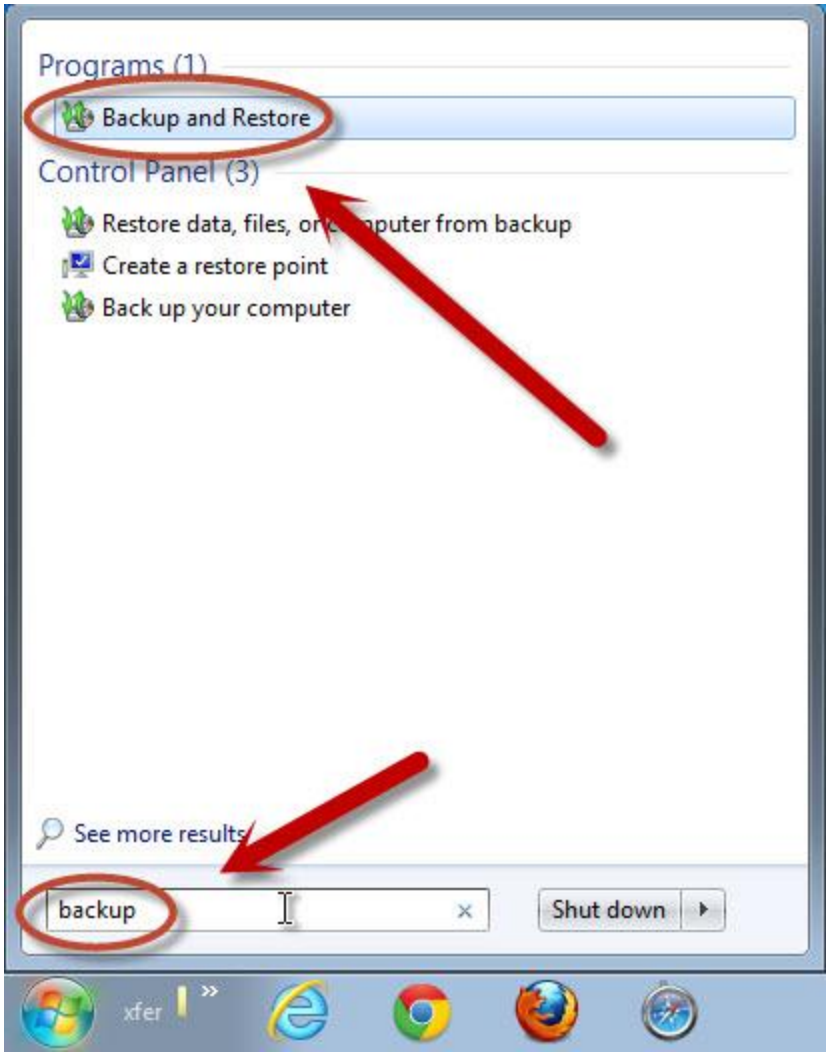
After it all finishes, Windows reboots into the restored operating system, as it was on the day that the backup was taken.

Automated Periodic Backups

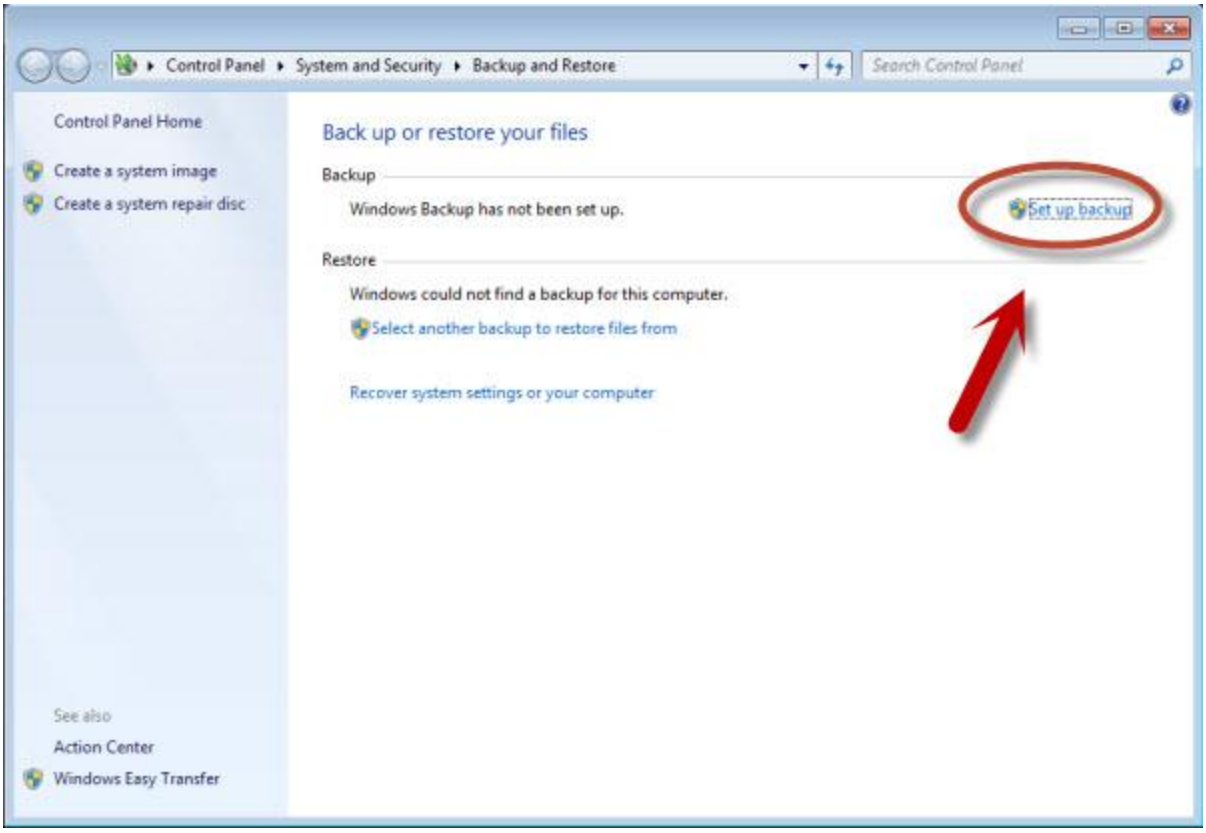

Video

Regardless of whether you're spending time actively cleaning up your machine or just using it, backups – most specifically *automated* backups – are one of the single most important things that you can do to protect yourself from almost anything that might happen to your machine or your data.

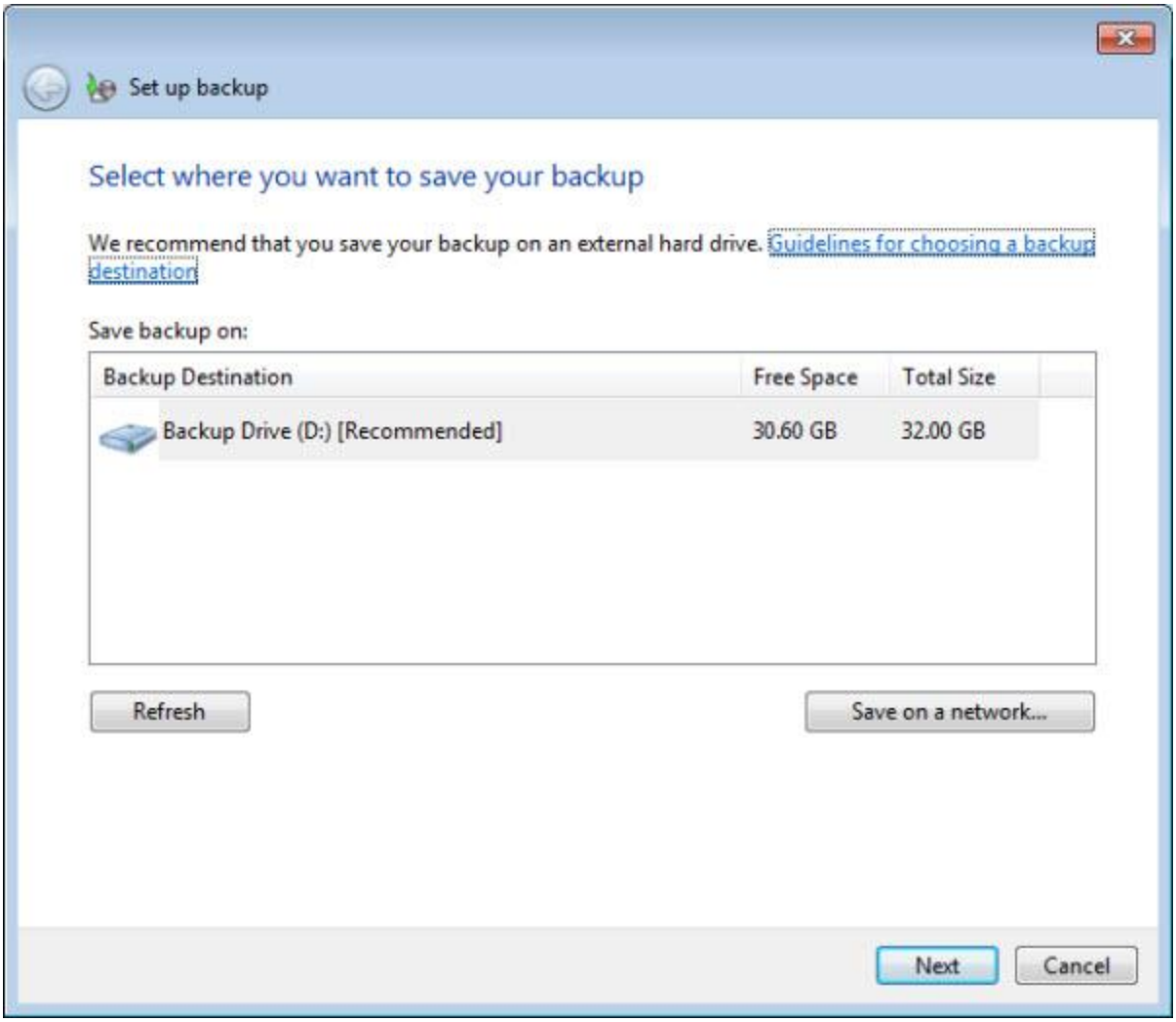
To make backups happen automatically using Windows own built-in backup utility, we start by running it.



Click the **Start** menu and begin typing the word "backup" into the search box. Eventually, **Backup and Restore** will appear under Programs. Click that.

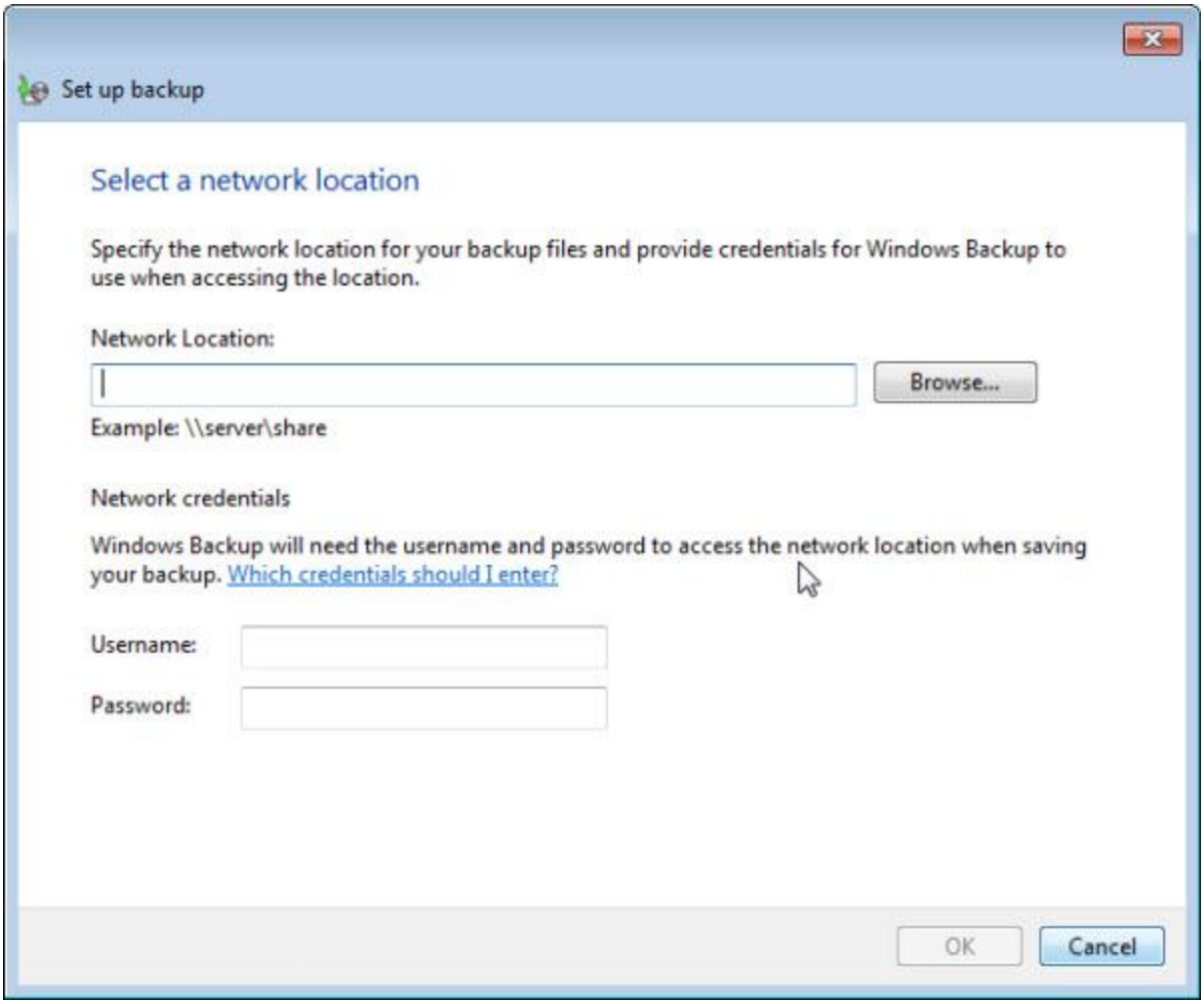


Click the **Set up backup** link.



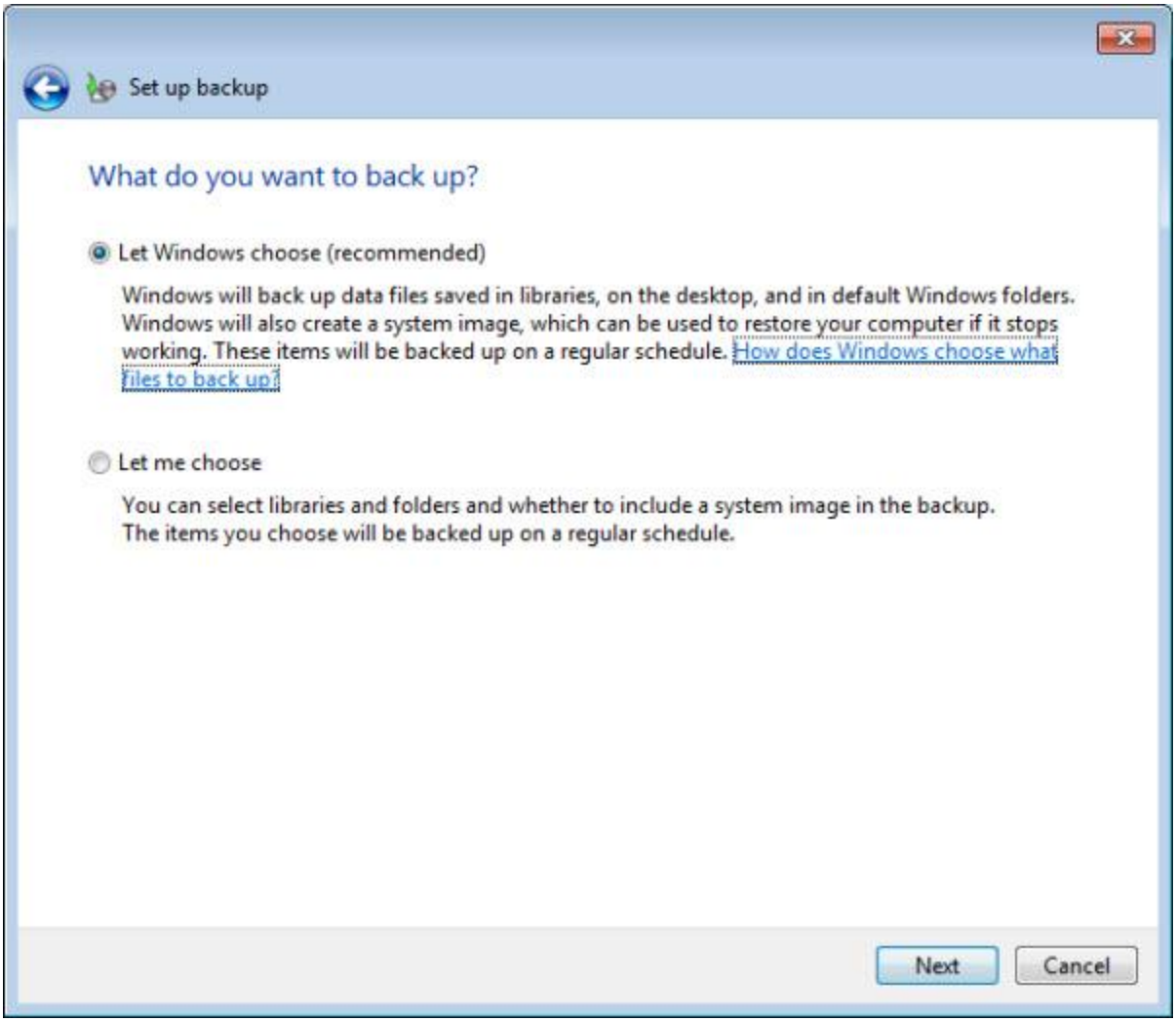
The first thing that you'll need to do is tell Windows Backup where to back up your data. In the example above, Windows Backup is recommending the attached backup D: drive. Typically, if you have an external hard disk, it should appear on the list and you would select it.

Alternately, you can elect to save on a network share; click **Save on a network...** if that's the case.



Perhaps you have another machine that has made a portion of its hard drive available. Or perhaps you have a Network Attached Storage (NAS) device for this purpose. You can select the network location to which backups are to be saved here. Click **OK** when done.

After selecting the destination drive, click **Next**.

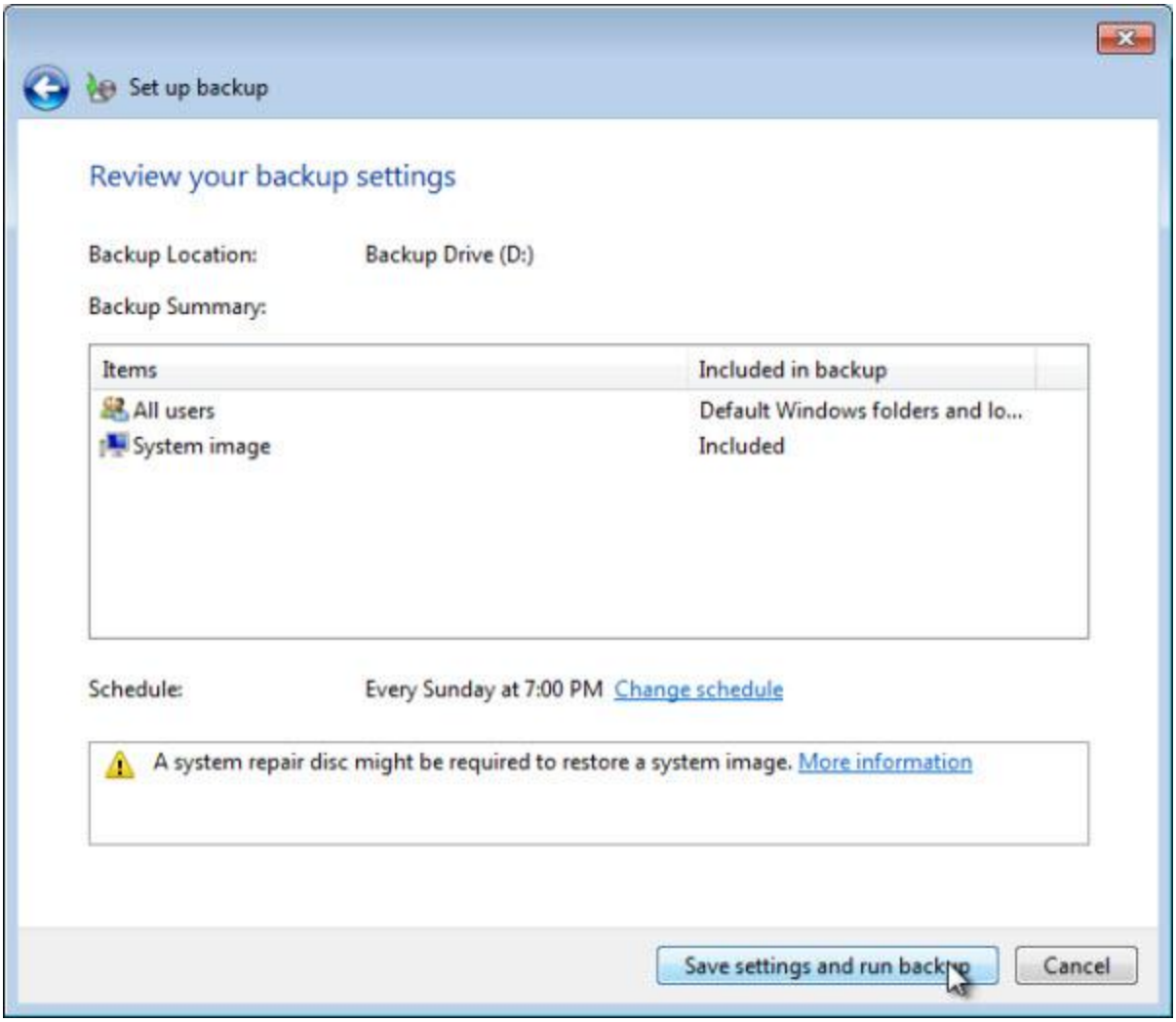


Next, you'll need to tell Windows exactly what it is that you want backed up. Windows Backup offers you two choices:

- **Let Windows choose**. Selecting this option will include local Libraries and the Default Windows folders created for each user. These include AppData, Contacts, Desktop, Downloads, Favorites, Links, Saved Games, and Searches. In addition, if the backup being backed-up *to* is NTFS and has enough room, Windows Backup will also create a system image, which will include Windows itself and all of the installed programs.
- **Let me choose**. This option allows you to specify what should be backed up. Note, however, that anything in a folder that contains files that Windows needs to run, such as C:\Windows, and installed program files will **not** be backed up *even if they are in a selected folder*.

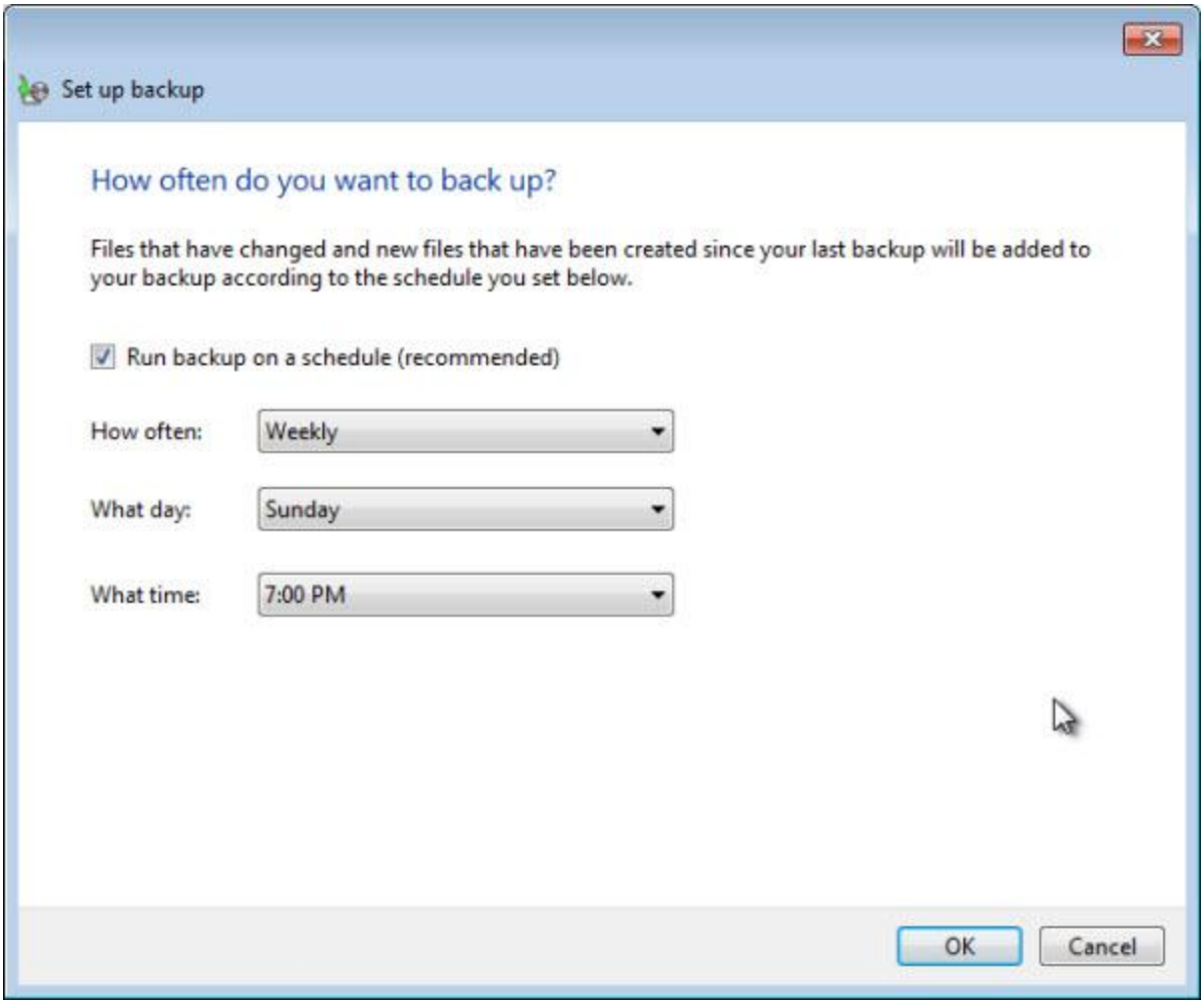
When using Windows backup, I strongly encourage you to not only use the first option, but to also make sure that your backup device is formatted using NTFS and that it has sufficient space for a complete system image.

After making your selection, click **Next**.



This screen reviews your selections so far and also indicates the schedule that Windows Backup defaults to – in this case, once a week at 7PM every Sunday.

Click **Change Schedule** to set your own schedule.



Your options are **Daily**, **Weekly**, and **Monthly**. For weekly, you can select the day of the week; for monthly, you can select the day of the month. In all cases, you can select the time of day that you want the backup to begin.

Exactly how often you'll want to backup depends heavily on how you use your computer and how costly a time-period's worth of data loss would be.

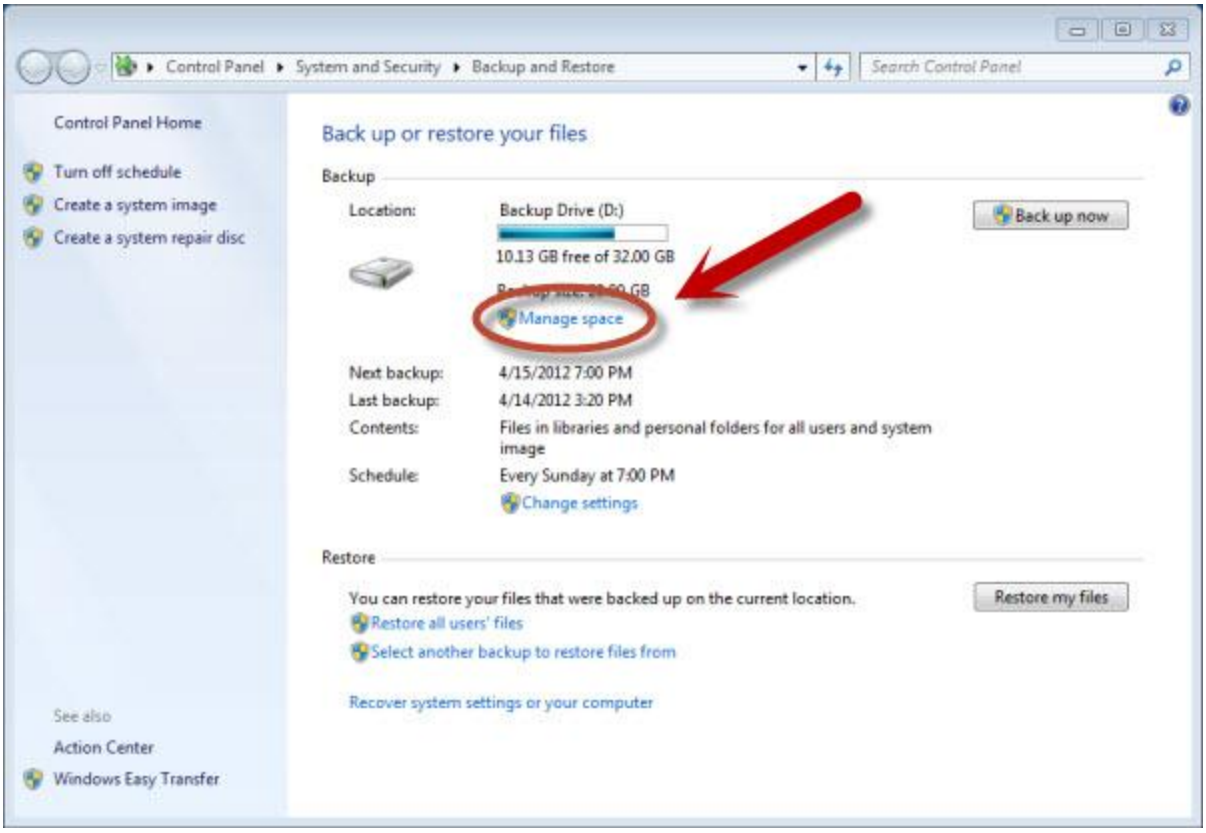
For example, if your hard disk died on the day before your scheduled monthly backup, you could lose a month's worth of information that hadn't yet been backed up. If that sends shivers down your spine, then perhaps a more frequent backup schedule might be in order.

If you're a heavy computer user, perhaps a daily backup is the right choice.

In either case, you'll want to make sure that your backup drive has sufficient free space to hold your backups.

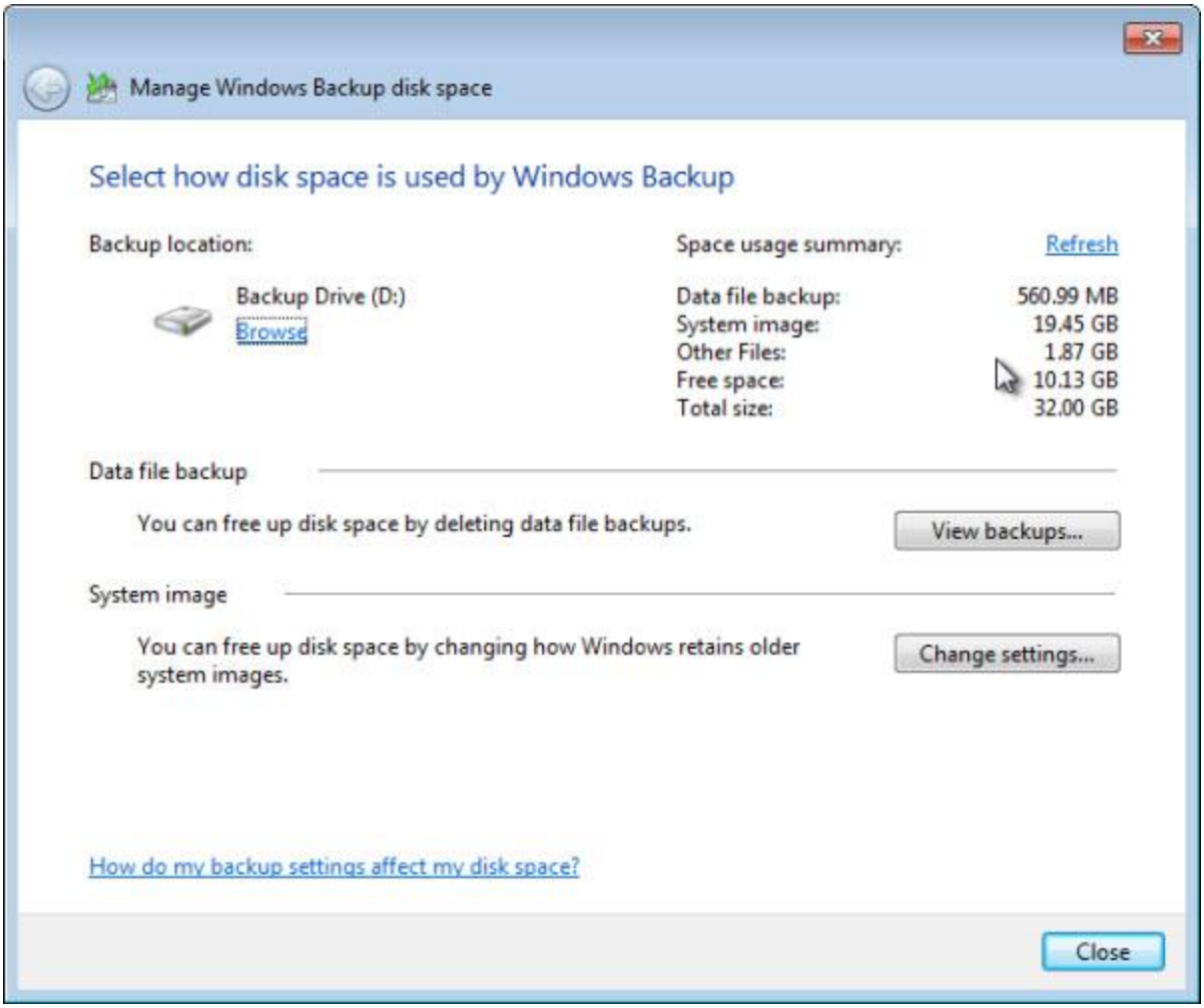
Once you've decided on your backup schedule, set it and click **OK**.

Now, click **Save settings and run backup**. This will both run a backup immediately as well as schedule backups to happen automatically in the future.



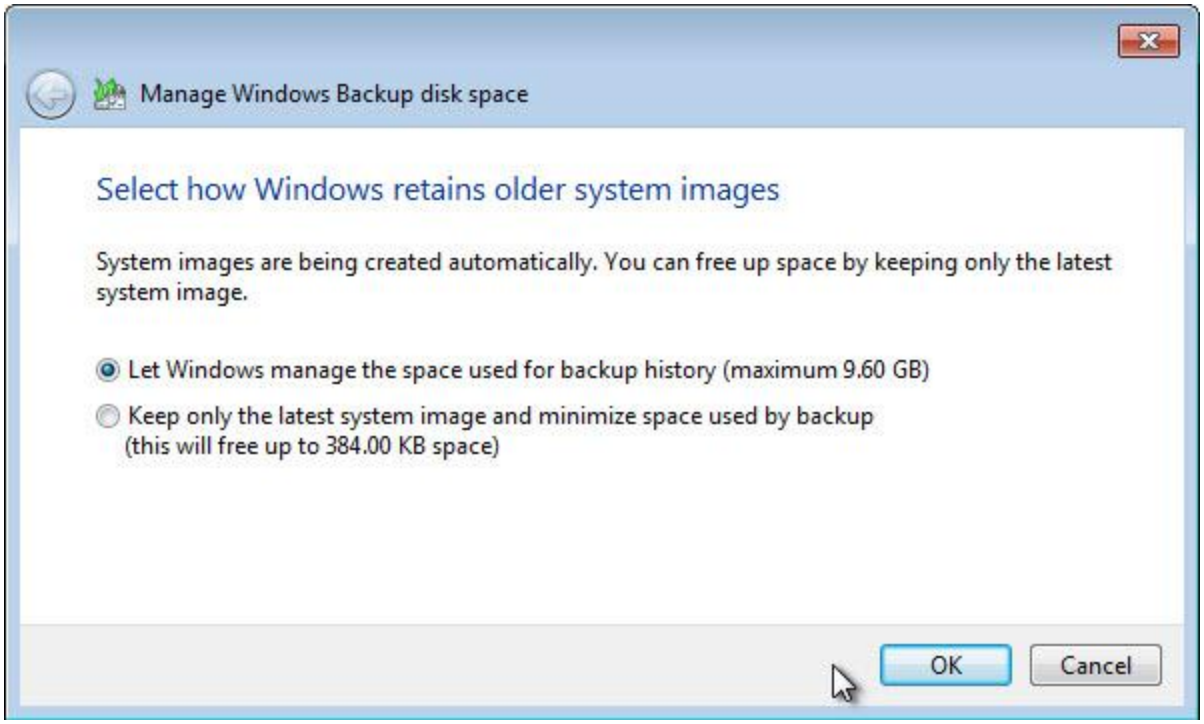
Once the backup has been completed, you'll be returned to the Backup and Restore page. This time, there'll be a summary of your backup drive and a link to manage how space on that drive is used.

Click **Manage space**.



This summary shows more detail about how space is being used on the backup drive.

System Images are typically the largest users of disk space, so click **Change Settings...** to manage how Windows deals with them.



Depending on the amount of available space on your backup drive, you can elect to simply let Windows keep track of as many system images as it can, or you can tell it to keep only the latest.

If you're tight on space, keeping only the most recent is a reasonable choice. Otherwise, let Windows do what it can.

Click **OK** after you've made your choice.

As you can see, you can also manage individual data file backups. Note that you cannot delete specific files, but rather the entire data file backup that was taken on a particular day.

Click **Close** when you're done managing Windows Backup disk space.

At any time, you can come back to Backup and Restore to change the backup settings or schedule.

Restoring From Periodic Backups


Video

All's going well. You have periodic backups – system images or file backups.

Then one day, it happens.

You accidentally delete, misplace, or otherwise lose an important file.

Fortunately, you know that the file that you need is on one of your backups – all you need to do is go retrieve it.

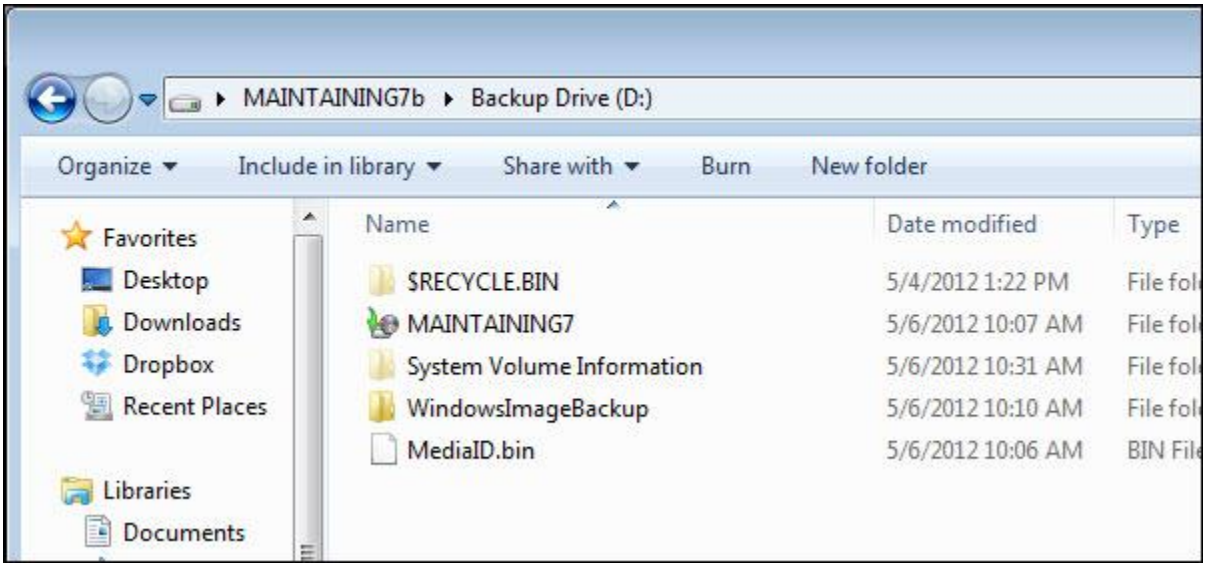
Regardless of the method or tool that you've used, there's no need to restore the entire backup just to restore a single file or even a large number of files.

As we've seen earlier, the Windows backup actually performs two different kinds of backups: file backups and system images.

How you recover the individual file from each is different.

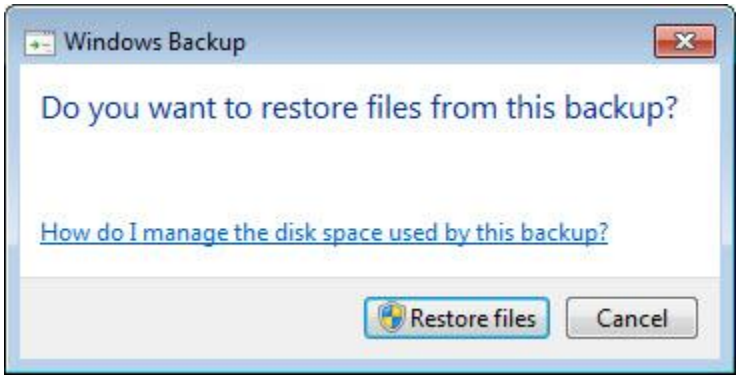
Windows Backup – Restoring From File Backups

Start by opening up Windows Explorer on the drive containing your backups.

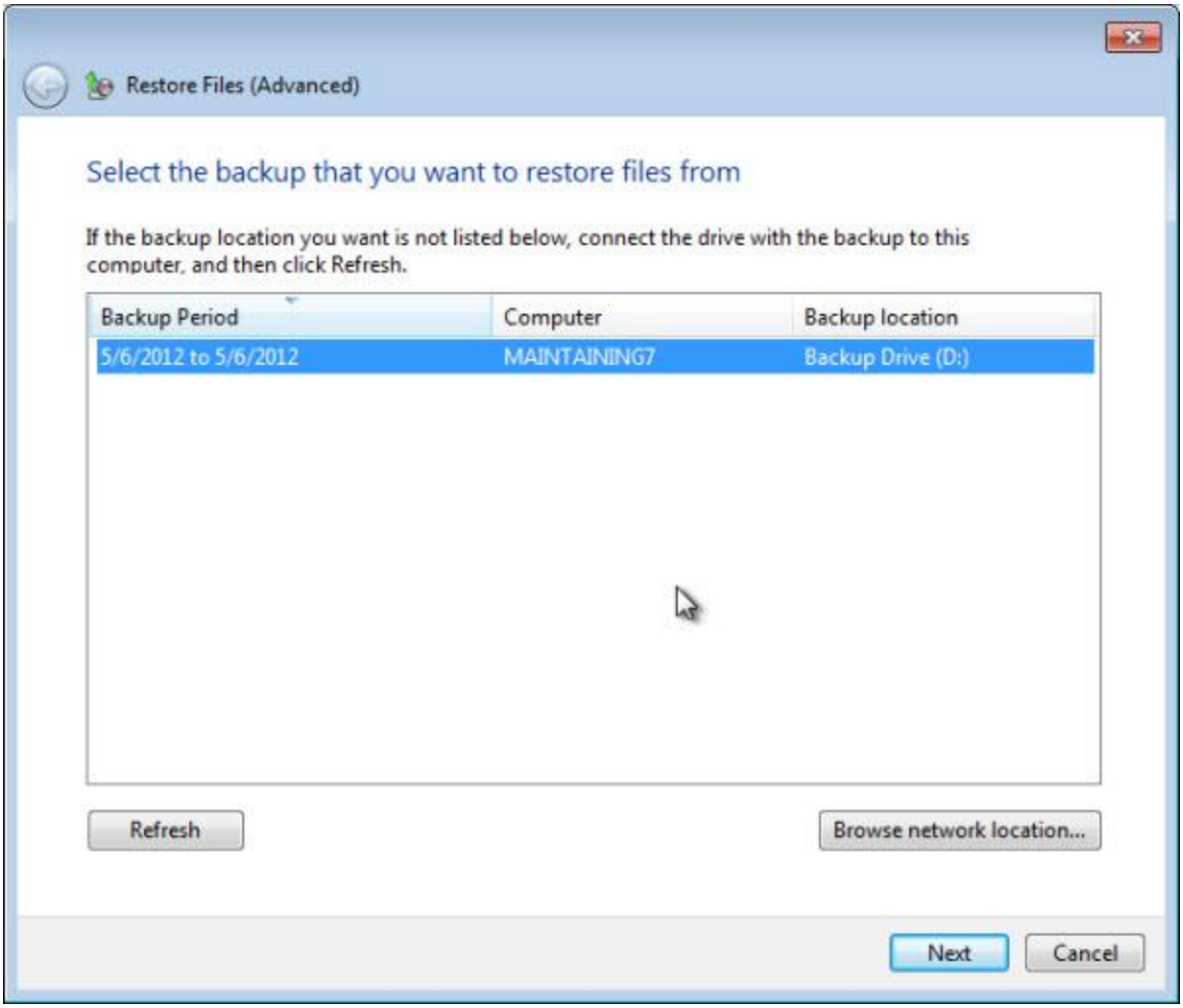


$RECYCLE.BIN and System Volume Information are visible because I have **Show hidden files** enabled, which I typically recommend.

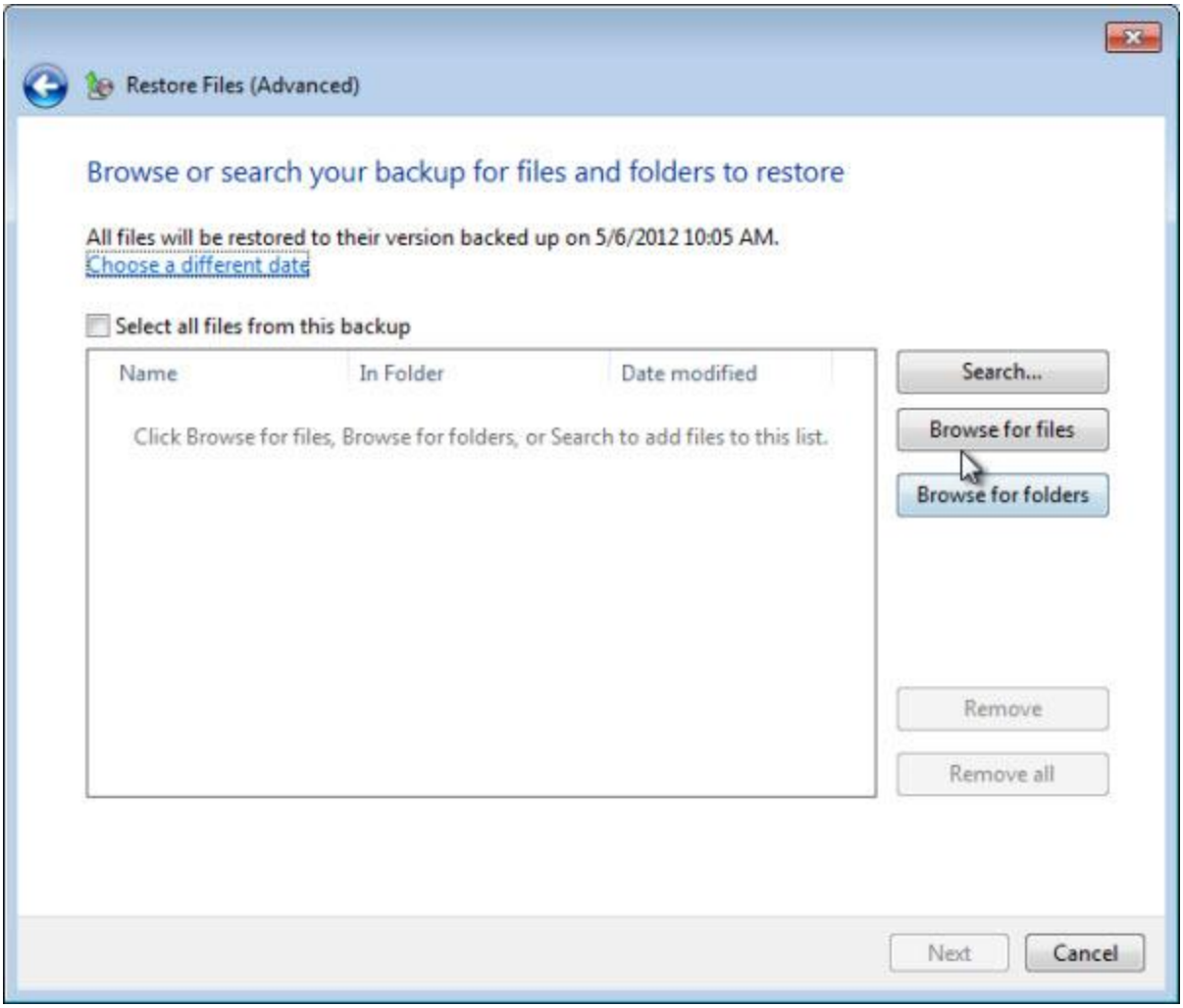
The folder MAINTAING7 with the odd arrow & disc icon contains our file backups. Double-click on it and Windows will ask if you want to restore files:



Click **Restore** and Windows will present a list of all the backups that live in that folder.



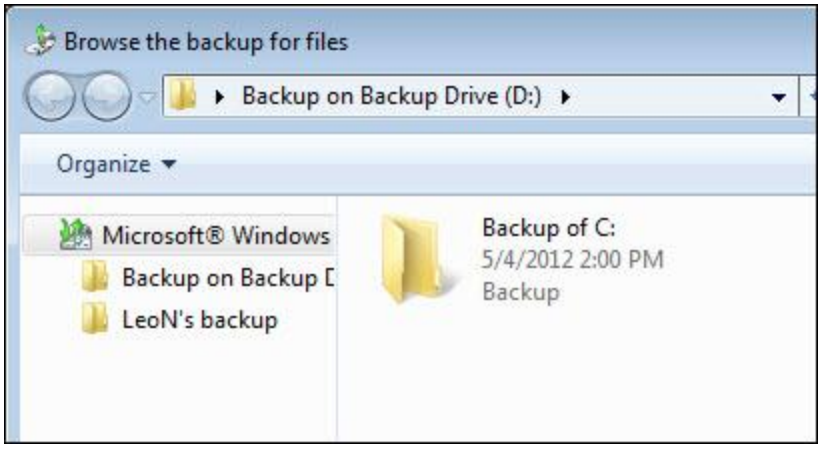
In our example, we have only one, but if you've been taking periodic or automated backups, you'll probably have several. Select the backup that is the most recent that you know contains the file you're looking to restore and click **Next**.



The next dialog allows you to choose what files or folders to restore. There are three methods for selecting them:

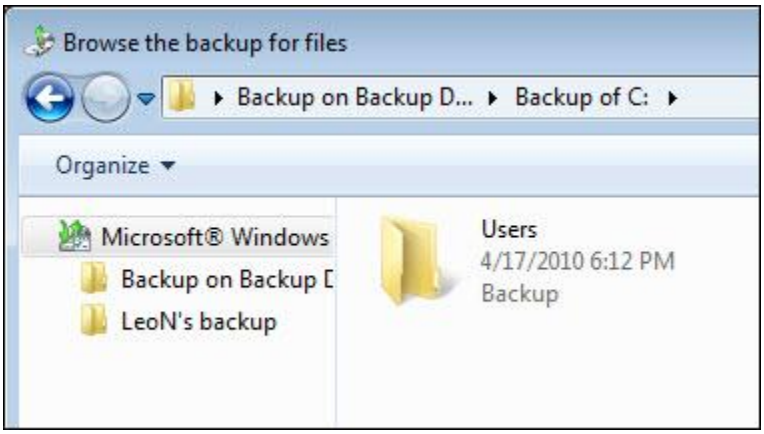
- If you don't know where on your machine the file was located at, you can use **Search...** to locate it within the backed up files.
- If you know the file's location, you can simply **Browse for files** to select the file to restore.
- If you want to restore an entire folder, you can click **Browse for folders** to select the folder to be restored.

For our example, we'll restore a single file, so we click **Browse for files**.



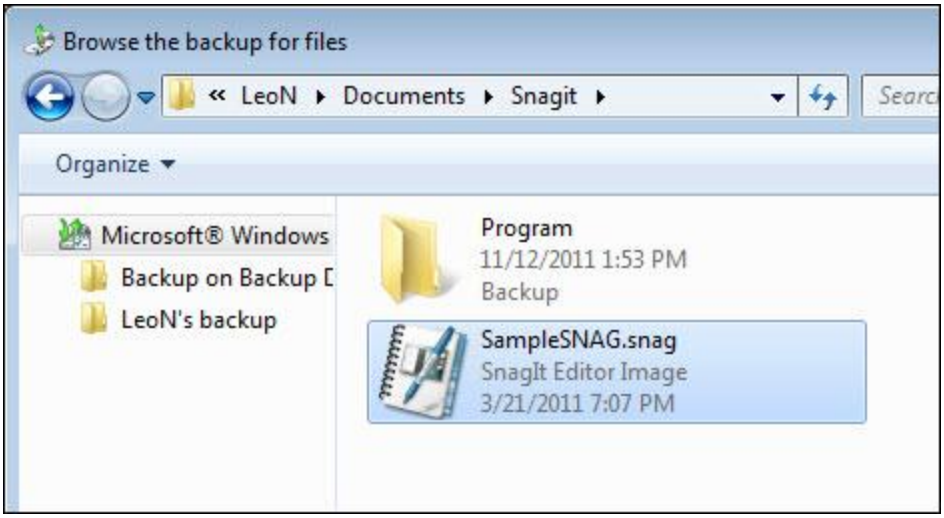
The next step opens up a Windows Explorer-like dialog that allows you to browse the backup contents, starting at the root of the backup.

Double-clicking **Backup of C:**, we encounter something that is important to understand:



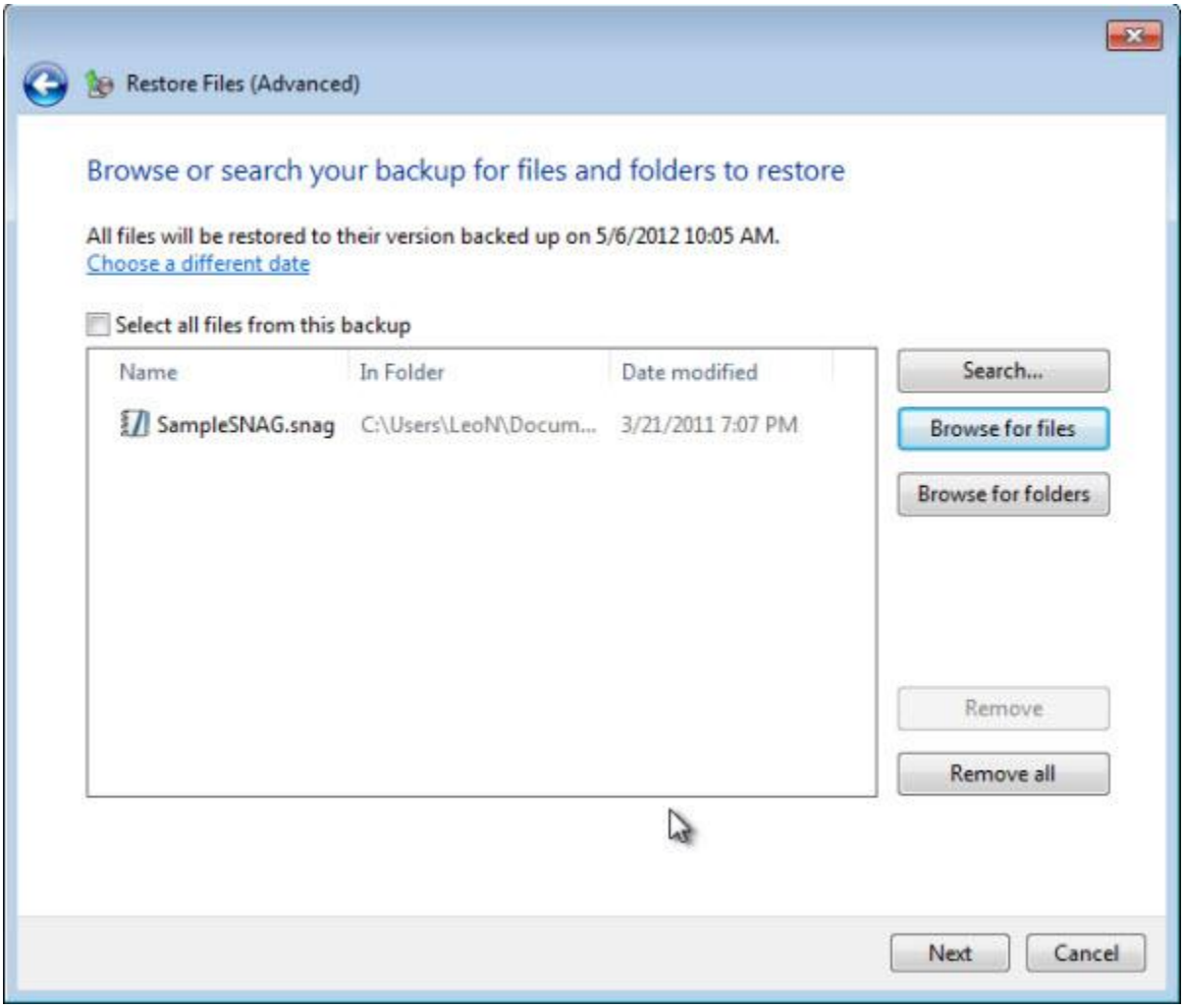
As you can see here, the only top-level folder contained in our file backup is the **User** folder. The important thing to realize is that a Windows file backup does not backup every file on your machine. I mentioned it earlier, but it's an important distinction to keep in mind.

For our example, we'll restore a file from C:\Users\LeoN\Documents – the My Documents equivalent in Windows 7. I'll restore Snagit\SampleSNAG.snag from that folder:



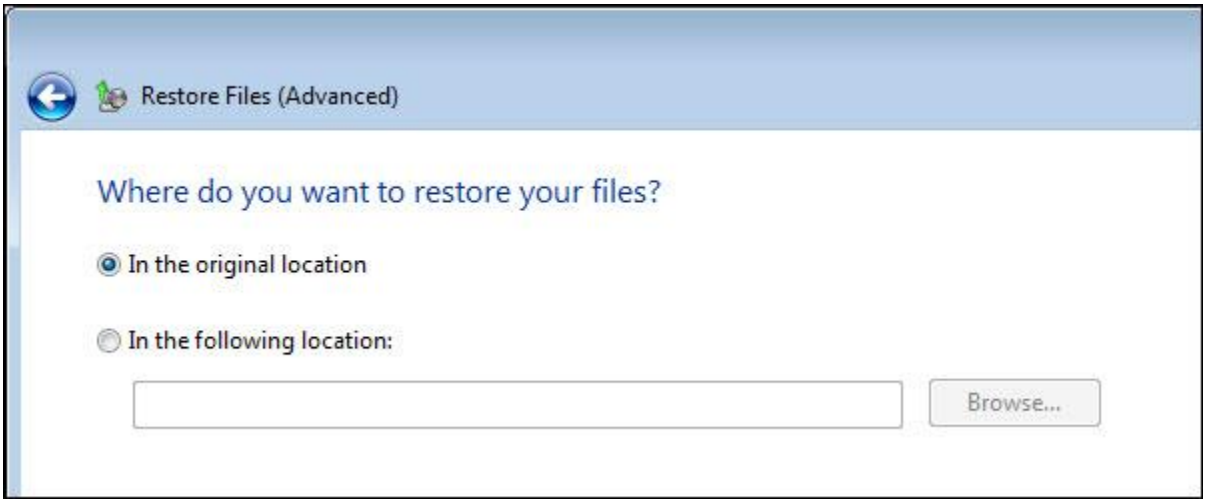
Any file in the backup can be selected in this manner.

Selecting the file adds it to the list of files to be restored:



You can repeat the process to select additional files or folders to be restored.

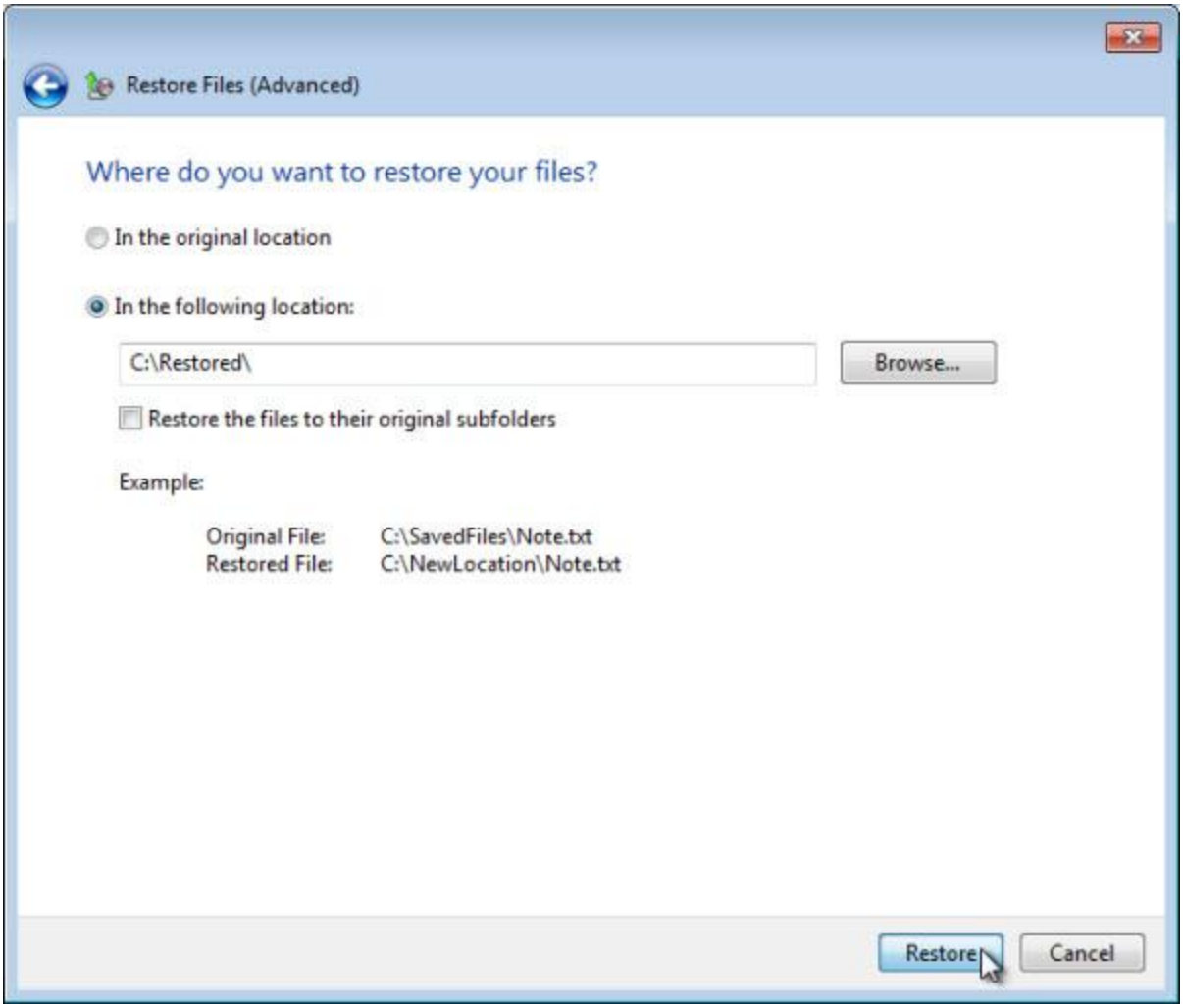
Once you've done that, click **Next**.



When restoring files, you have a couple of options:

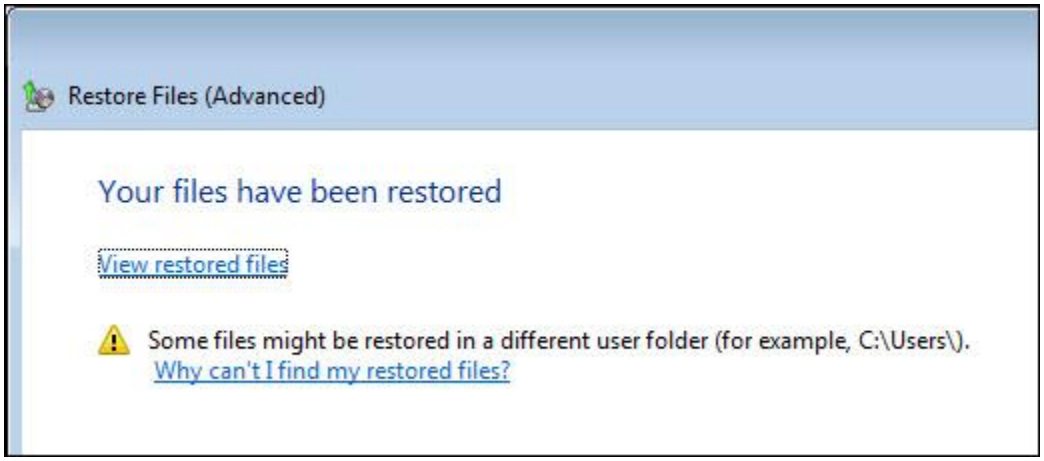
- You can choose to place the files back in the original location in which they were found. Doing so will overwrite any newer version of that same file.
- You can specify a different location to place the restored files.

I typically prefer to do the later for safety:

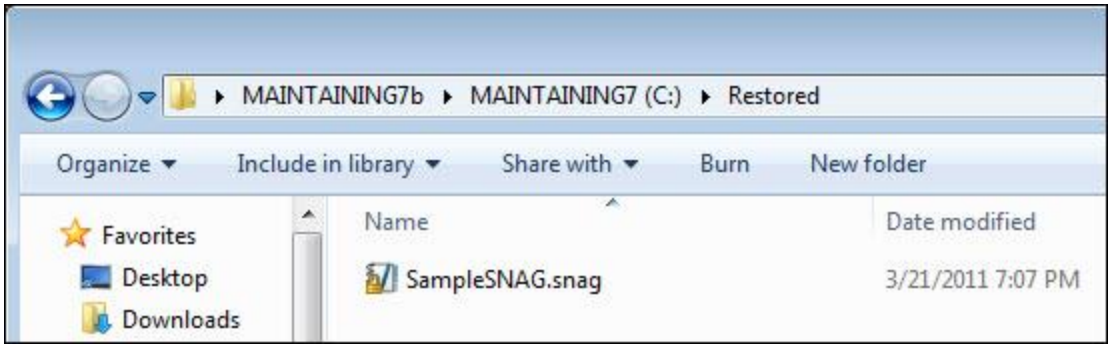


Here, I've created a new folder (c:\Restored) and instructed Windows Backup to restore the files that I've selected by placing them in that folder.

Click **Restore**.



If we now go take a look at c:\Restored, where I indicated that the restored file should be placed:



We see that the file has been placed there.

You can restore files like this as often as you like for as many files as you like, as long as you have the corresponding backup to restore from.

Windows Backup - Restoring Files from a System Image

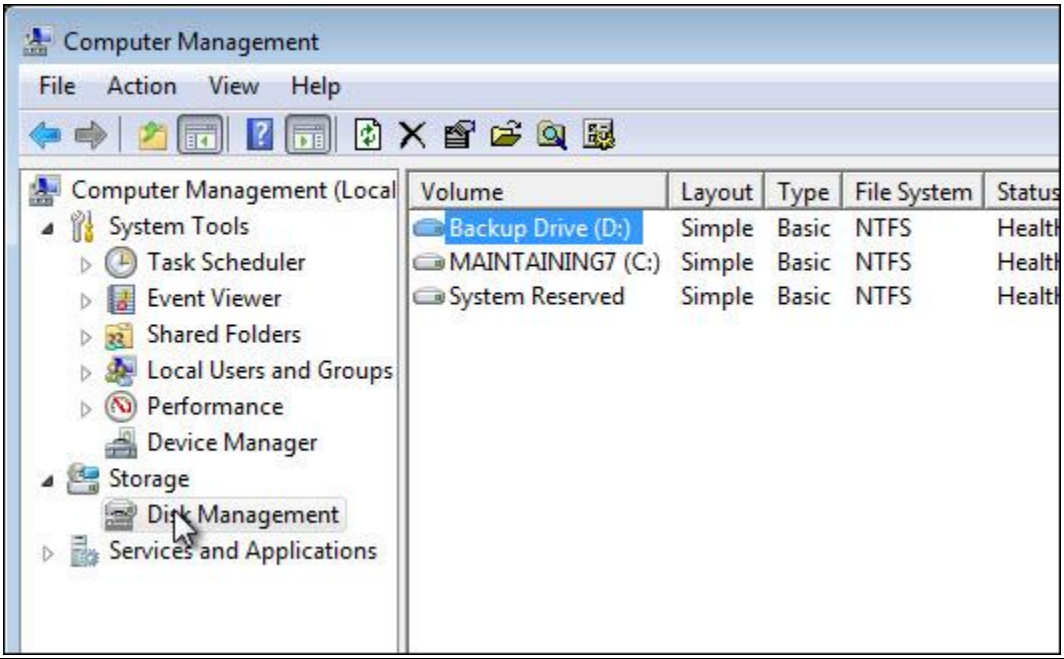
The good news about System Images created by Windows Backup is that everything is in there. By definition, a system image contains all of the files and folders – yours, Window's, your applications ... everything – that was on the drive being imaged.

The bad news is that for whatever reason, it isn't obvious in the Windows Backup on how to extract just a single file from such an image at all. As we saw earlier, restoring the entire image isn't that difficult.

Back to good news: even though they don't make it obvious, restoring parts of your Windows Backup system image is actually pretty easy.

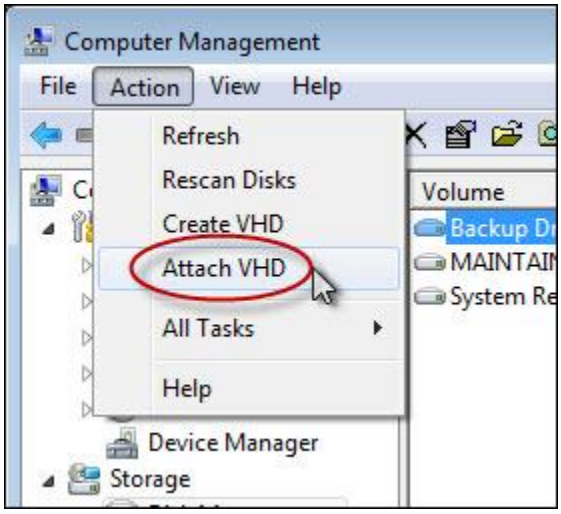
We start in a very non-obvious place: disk management.

Right-click **Computer** in your **Start** menu and click **Manage** to start the Windows Computer Management tool.



Click **Disk Management** and you'll see your disk drives and partitions listed in the right-side pane.

Now, click the **Action** menu:



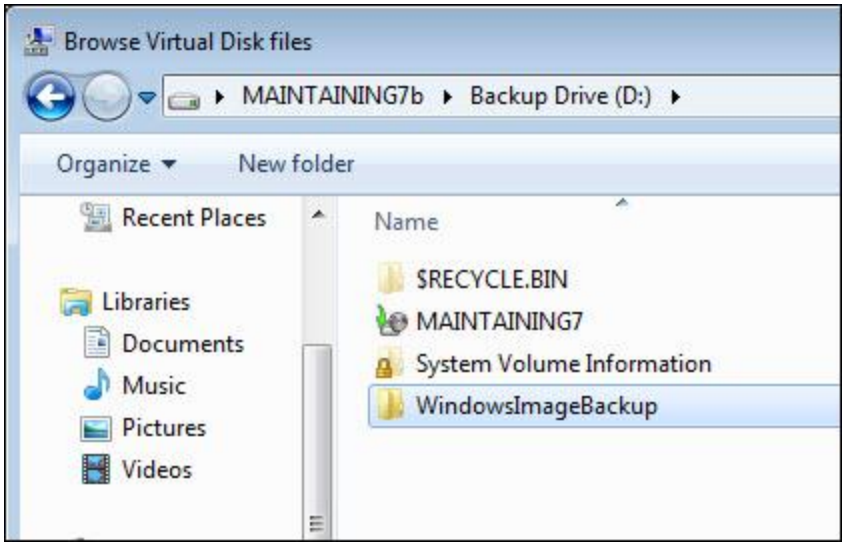
Click **Attach VHD**.

VHD stands for "virtual hard disk" and .vhd files are images of entire hard disks stored in a single file.

As it turns out, Windows Backup uses this format when saving image backups.

We're going to mount or "attach" such an image.

Click **Browse** to begin locating the .vhd file corresponding to the backup.

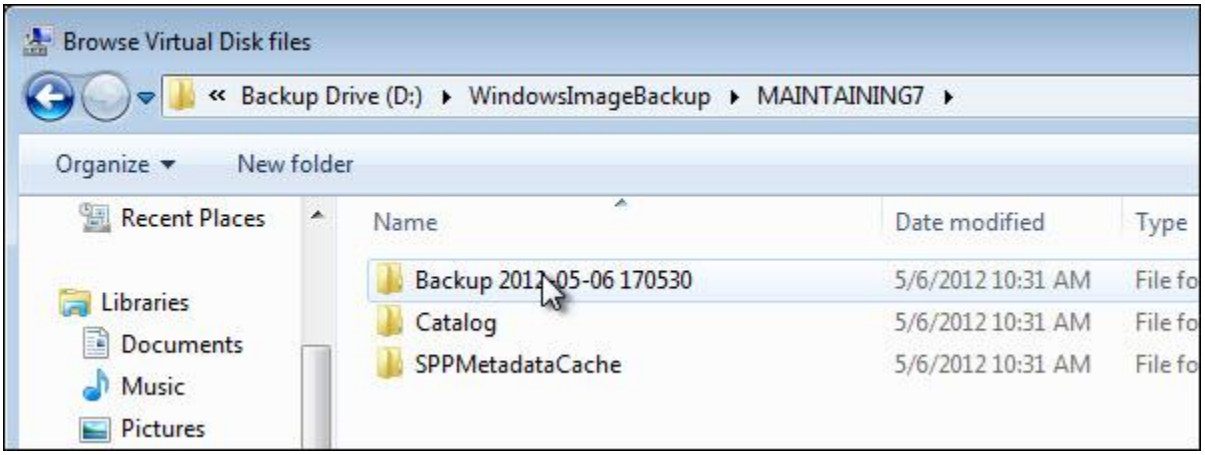


Navigate to the root of your backup drive. In the example above, I'm looking at D:\, the root of the drive on which I had Windows Backup place the backup images.

This time, we're going to look in the WindowsImageBackup folder. Double-click that.

Note: You may get a message that you need permission to access this folder. That's fine. Saying **OK** to that warning should grant you permission. This may happen for each folder that we open.

The next folder will contain a folder with the name of your machine (presumably allowing multiple machines with different names to all back up to the same location). Double-click that.



Now, we find a folder that contains several sub-folders. The only one that we care about is the one that begins with Backup, followed by a date and number. There may be more than one. Double-click the one that represents the backup from which you want to restore files; most often, you'll want the most recent.

Here, you'll find the oddly named .vhd files, one for each disk partition included in the backup.

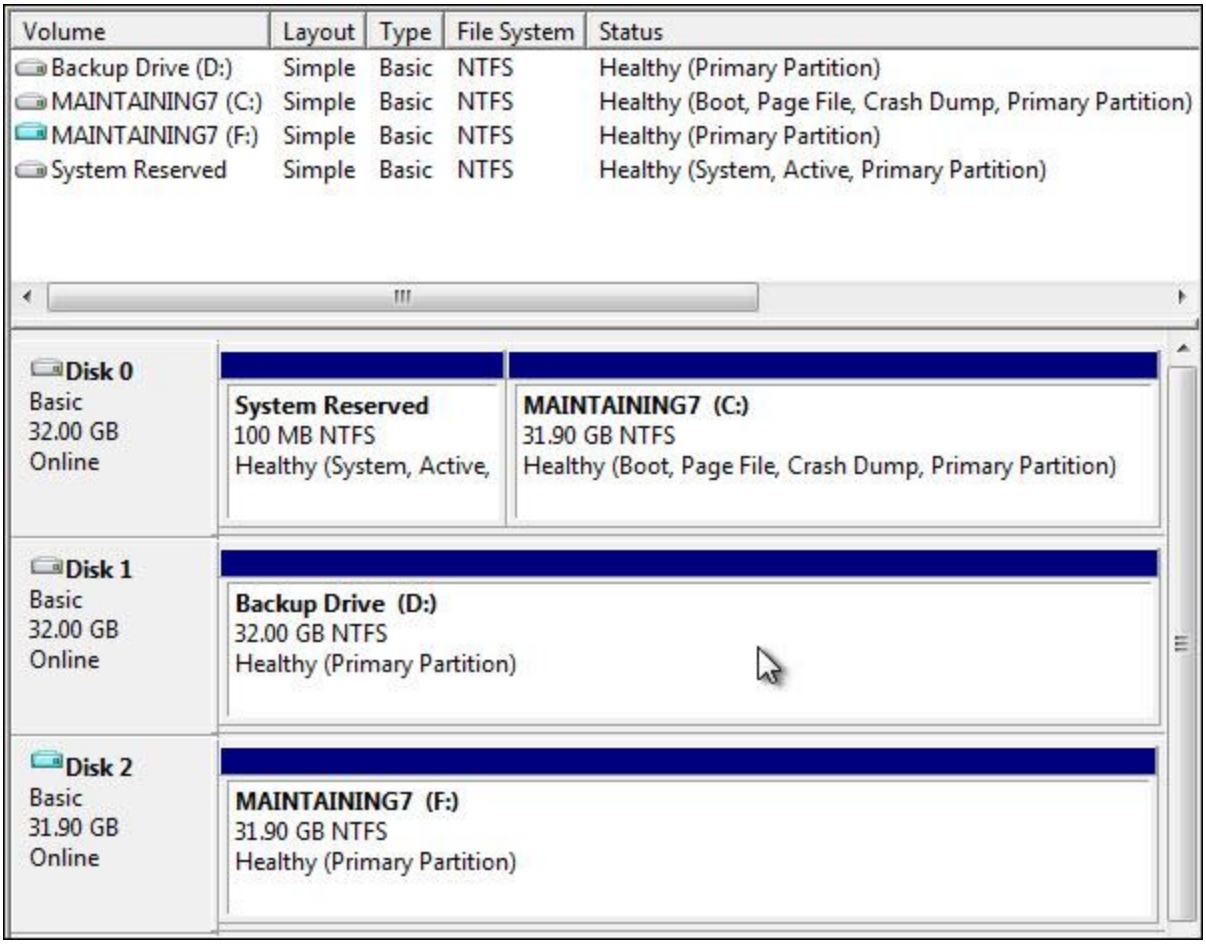
It can be a little difficult to determine which one is which. Our example above is pretty easy: the smaller of the two files is the smaller "system reserved partition," while the larger is the backup of the C: drive that we took at the same time.

In general, image size is perhaps your best clue. If you have two similarly sized backups for similarly sized drives, make your best guess – you can always repeat the rest of this process with the other image if you turned out to be wrong.

Double-click the one that represents the backup of the drive that contains the file that you want to restore.

I actually recommend that you don't click the **Read-only** checkbox. Doing so may prevent some images from being successfully mounted. If your image is mounted and appears empty like mine does, double-check that this didn't get checked accidentally.

Click **OK**.



You'll note that a new drive has appeared in disk manager.

This new drive is the backup image mounted to appear as "just another drive" on your system. You can browse the contents of that virtual drive using Windows Explorer or just about any tool for that matter.

And you can copy files from it.

In the example above, I can use Windows Explorer to copy a file from:

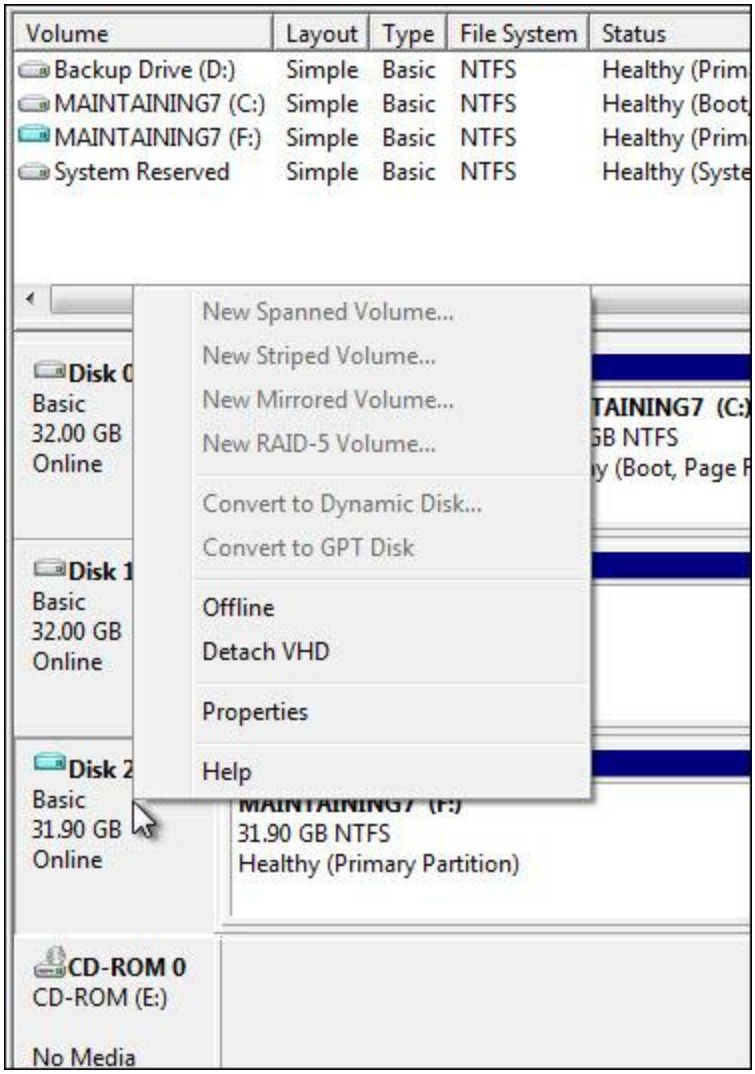
F:\Users\LeoN\My Documents\Snagit\SampleSNAG.snag

which is a single file from the backup image, to:

C:\whereever you want

Well, basically to wherever you might want to on your C: drive. You can copy it back to its original location or elsewhere – it's up to you.

When you're done restoring files from the backup image, you need to unmount or "detach" it. Return to the Disk Management tool, and right-click the leftmost column of the lower pane:



As you can see, **Detach VHD** is a menu item. Click it and the backup image will be detached from your system and the virtual drive that was present will disappear. The backup image file remains, of course.

Virtual hard disks can be useful for various other tasks as well, but that's beyond the scope of this book. For now, the fact that Windows Backup stores its System Images in the form of a .vhd file makes accessing the contents of a system image fairly easy to do without requiring any additional tools.

Even if Windows Backup does "under-advertise" this fact just a little.

Testing Your Backups


Video

The single most common concern about backups that I heard from my newsletter readers when I asked was very simple: they were concerned that the backup that they had so painstakingly created would fail when it was needed.

It's a valid concern.

When it comes to full system image backups, the only true test is a complete restore. The problem, of course, is that a restore overwrites whatever's on the machine. If you've got a working machine and want to test your backup by restoring, if that fails, you no longer have a working machine.

Not exactly what we're looking to backups to do.

In this section, I'm going to look at how to stack the deck in favor of success. While we can't perform the ultimate test of a complete restore, there are a few things that we can and should do after backups have been created to make sure that they'll be there for us when the time comes.

The tests that we'll perform boil down to this:

- Confirm that the rescue media boots and can access your backups
- Confirm that a system image contains the files that you care about and that you can restore individual files

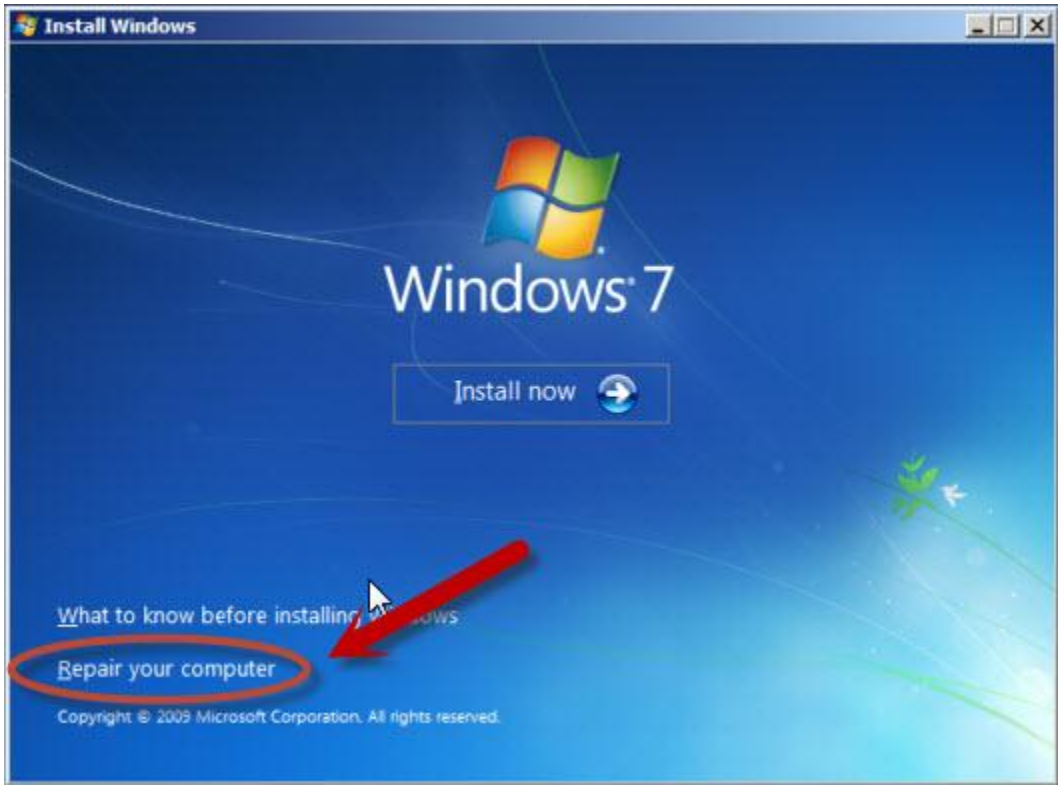
In both cases, the process will look very similar to an actual restore or recovery, as we've performed above.

With those tests succeeding, you can feel pretty confident that your backup is what you need it to be. Most importantly, even if a complete restore operation still fails for some reason when needed at a later date, you'll have confirmed that the backups taken do at least contain your precious data.

Test 1: Using rescue media to access the backup

Insert your Windows installation disc or the Windows recovery disk that you created and reboot your machine to boot from that media. I'll use the installation disc for my examples here.

Choose your language, time, and keyboard settings if they're different than what Windows offers as default, and click **Next**.

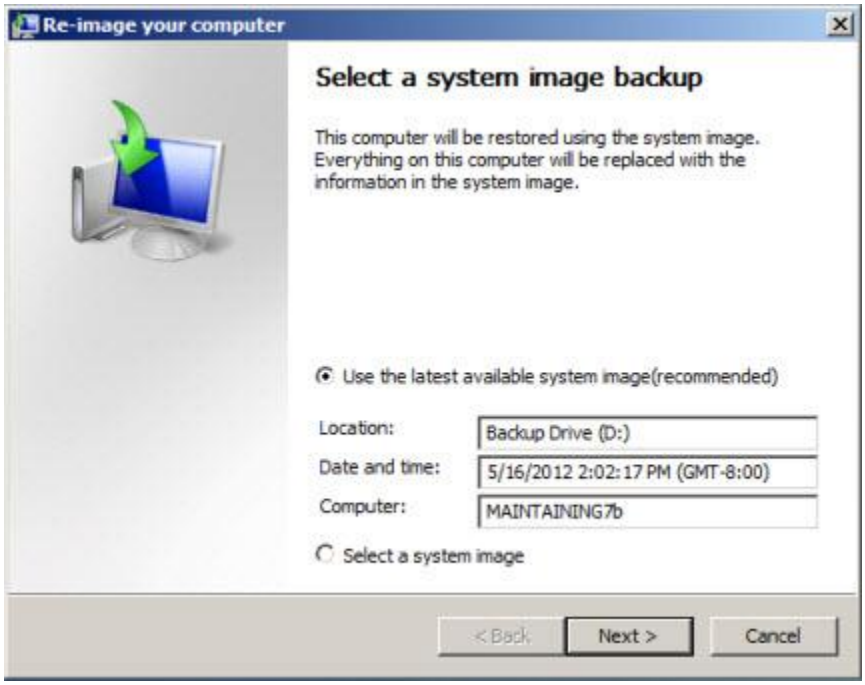


Click **Repair your computer** to start the recovery and maintenance tools that are also present on the setup disc.

The recovery tools will take a few seconds to locate all installations of Windows that it can find.

Ignore all of that.

Instead, click **Restore your computer using a system image that you created earlier.** and then click **Next**.



The recovery tools once again search your system, looking this time for backup images from which to restore.

If the recovery tool cannot find a backup, then your system has failed this test. The most important thing to check for before re-running this test is that your external backup drive is plugged in and turned on. Try clicking **Select a System Image**, if available.

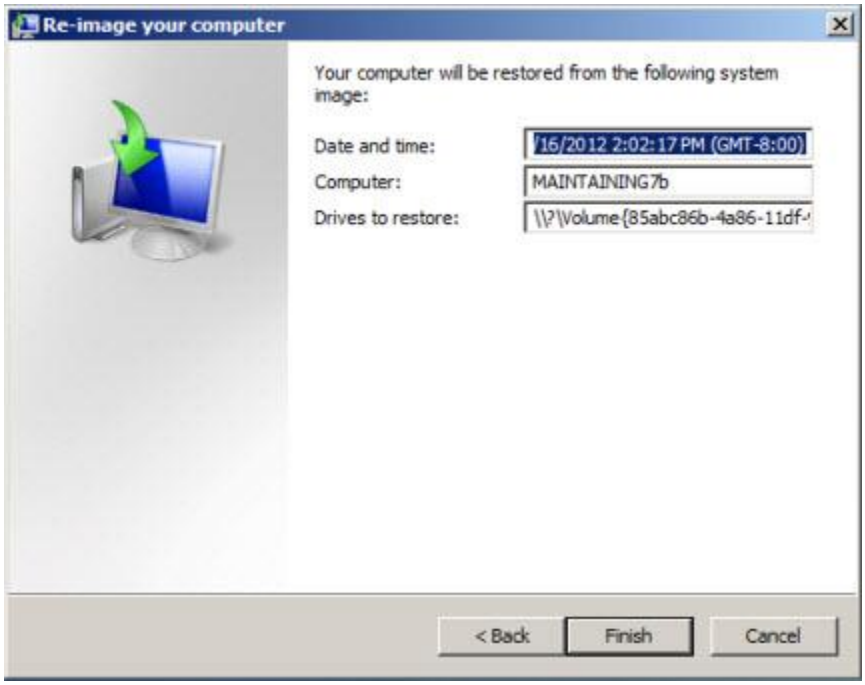
If you cannot resolve this problem, then you will very likely not be able to restore the entire system image to your machine. Your *files* may still be backed up – we'll check on that momentarily – but restoring your entire system from the image may not be possible.

Unfortunately, it's impossible for me to say what might lead to this type of failure. It could be, as I said, as simple as the backup drive not being accessible or it could be something more complex such as Windows Backup simply being stubborn (which, sadly, I've also seen). In a case like this , my advice would be to carefully create a new system image backup and repeat the test.

Or consider a new backup program.

Assuming the tool was able to locate and identify your backup image, click **Next**.

You'll be presented with a screen containing additional restore options. Click **Next**.



>> DO NOT CLICK FINISH! <<

We've taken the process to the brink of restoration. If everything has worked so far, then we've tested what we can and can have a fairly high level of confidence that should a restore be needed, it'll most likely work.

Do not click Finish. That would begin the actual restore process which is *not* what we want for this test.

Instead, click **Cancel**.

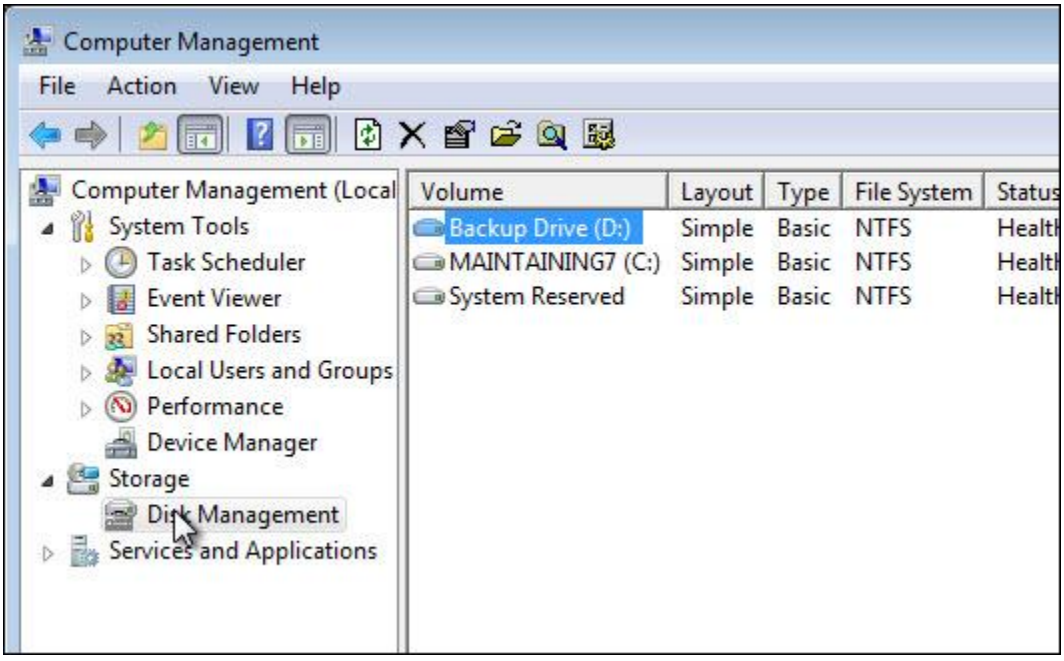
That'll return you to the System Recovery tools selection, where you can click **Restart**.

Remember to remove the disc that you booted from so as to boot back into Windows.

Test 2: Access the backup image from within Windows

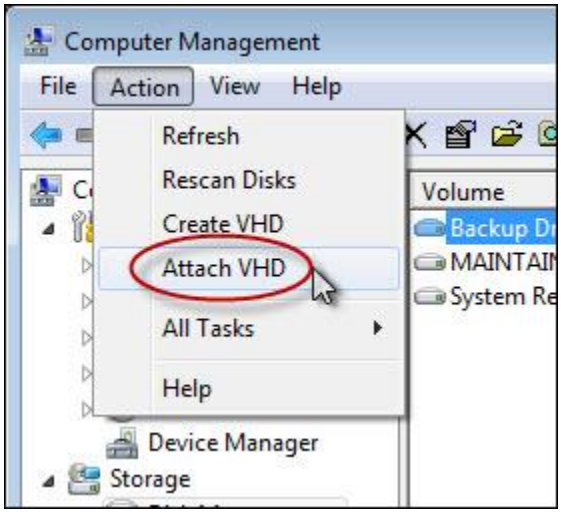
In this test, we're going to look into the system image backup, confirm that a few files are present, and then actually restore one of our own data files as a test.

Just as I described earlier, when discussing restoring files from a Windows backup image, right-click **Computer** in your Start menu and click **Manage** to start the Windows Computer Management tool.



Click **Disk Management** and you'll see your disk drives and partitions listed in the right-side pane.

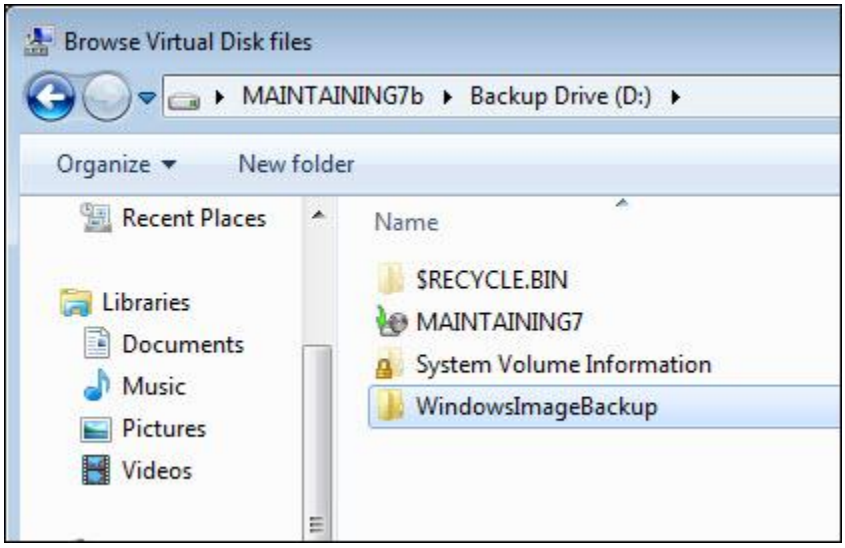
Now, click the **Action** menu:



Click **Attach VHD**.

As we did before, we're going to mount or "attach" the .vhd file created by Windows Backup.

Click **Browse** to begin locating the .vhd file corresponding to the backup.

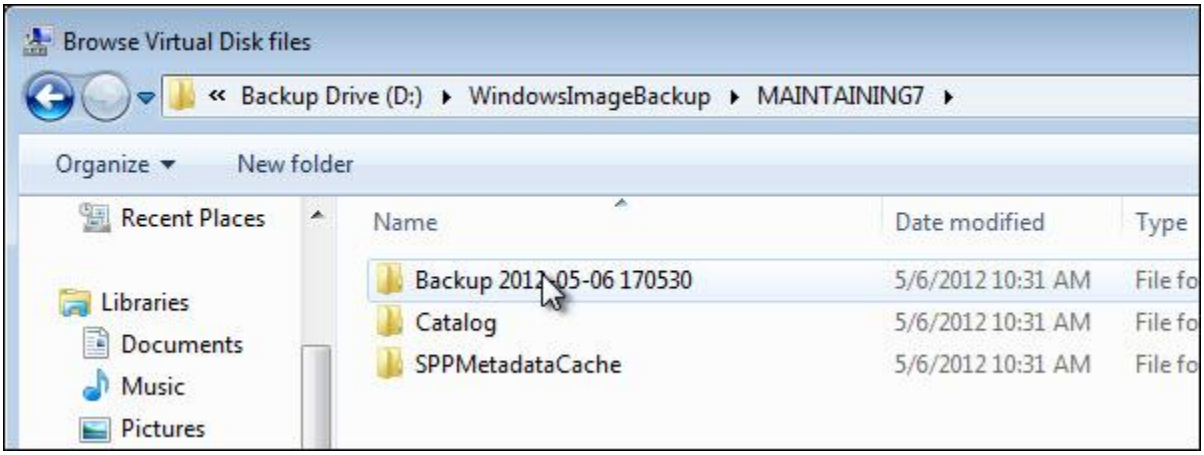


Navigate to the root of your backup drive. In the example above, I'm looking at D:\, the root of the drive on which I had Windows Backup place the backup images.

This time, we're going to look in the WindowsImageBackup folder. Double-click that.

Note: You may get a message that you need permission to access this folder. That's fine and saying **OK** to that warning should grant you permission. This may happen for each folder that we open.

The next folder will contain a folder with the name of your machine which you should double-click.



Now, we find a folder that contains several sub-folders. The only one that we care about is the one that begins "Backup" followed by a date and number. There may be more than one. Double-click the one that represents the backup you wish to test; I'll recommend using the most recent.

Here, you'll find the .vhd files, one for each disk partition included in the backup.

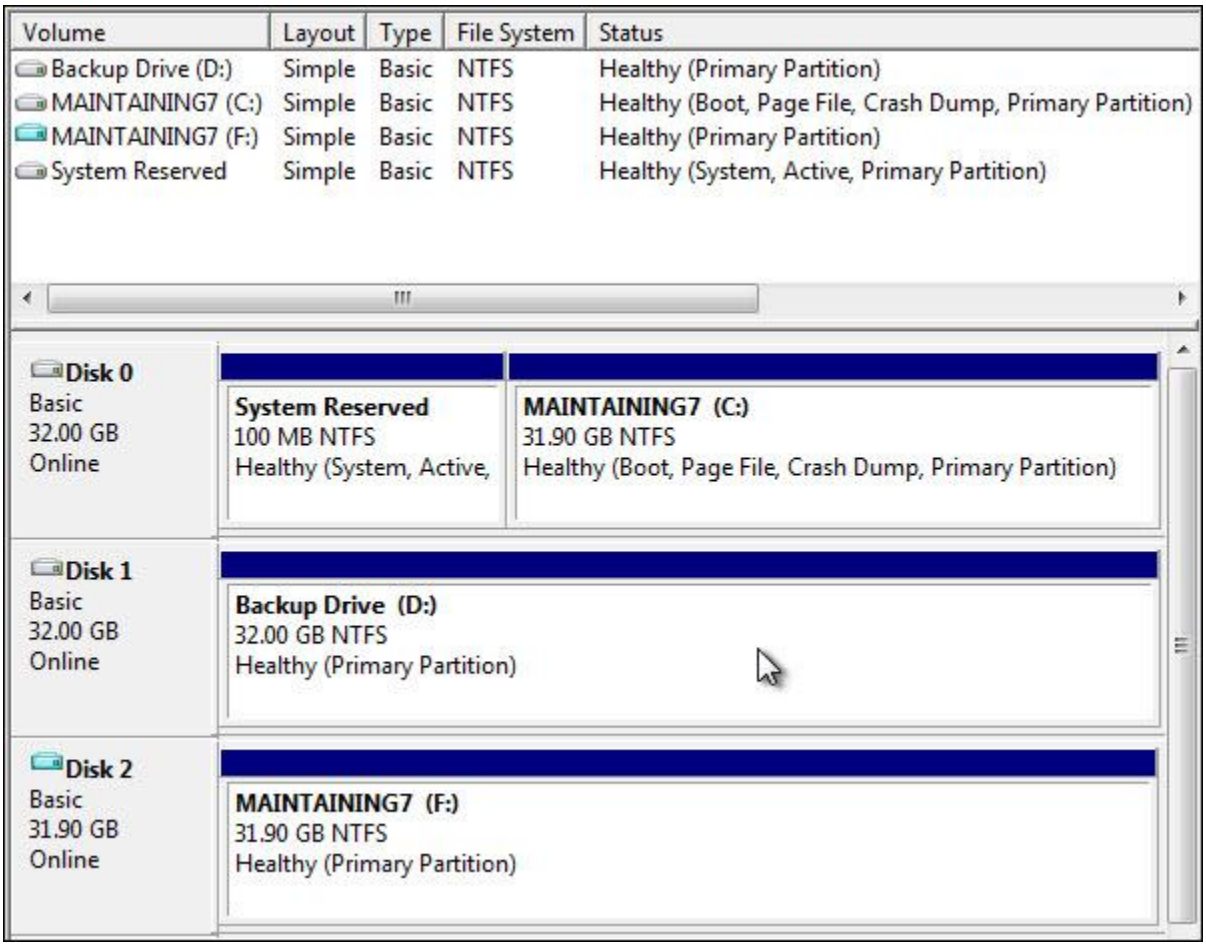
It can be a little difficult to determine which is which. Our example above is pretty easy: the smaller of the two files is the smaller "system reserved partition," while the larger is the backup of the C: drive that we took at the same time.

In general, image size is perhaps your best clue. If you have two similarly sized backups for similarly sized drives, make your best guess – you can always repeat the rest of this process with the other image if you turned out to be wrong.

Double-click the one that you choose to test.

I actually recommend that you *not* click the **Read-only** checkbox. Doing so may prevent some images from being successfully mounted. If your image is mounted and appears empty like mine does, double-check that this didn't get checked accidentally.

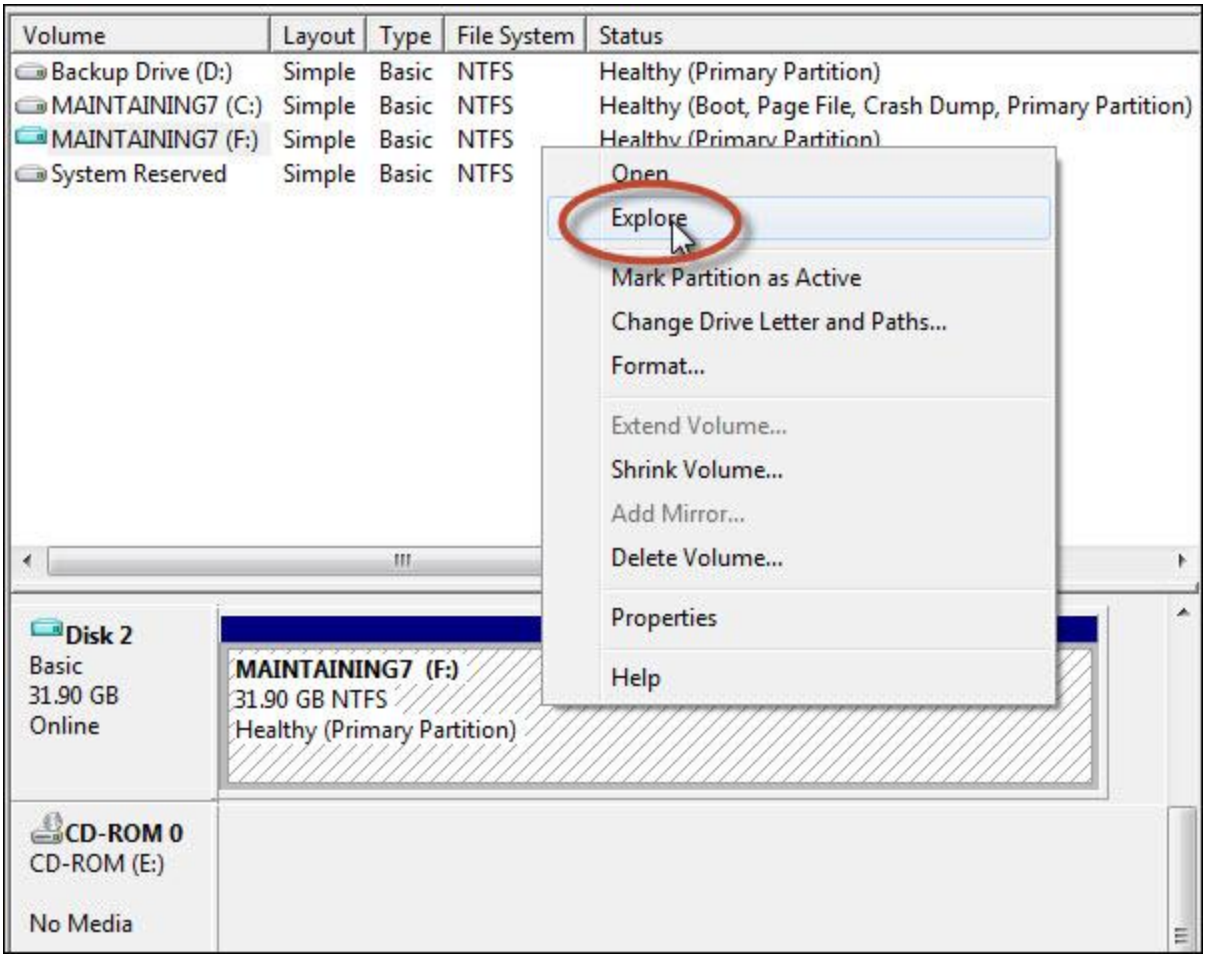
Click **OK**.



You'll note that a new drive has appeared in disk manager.

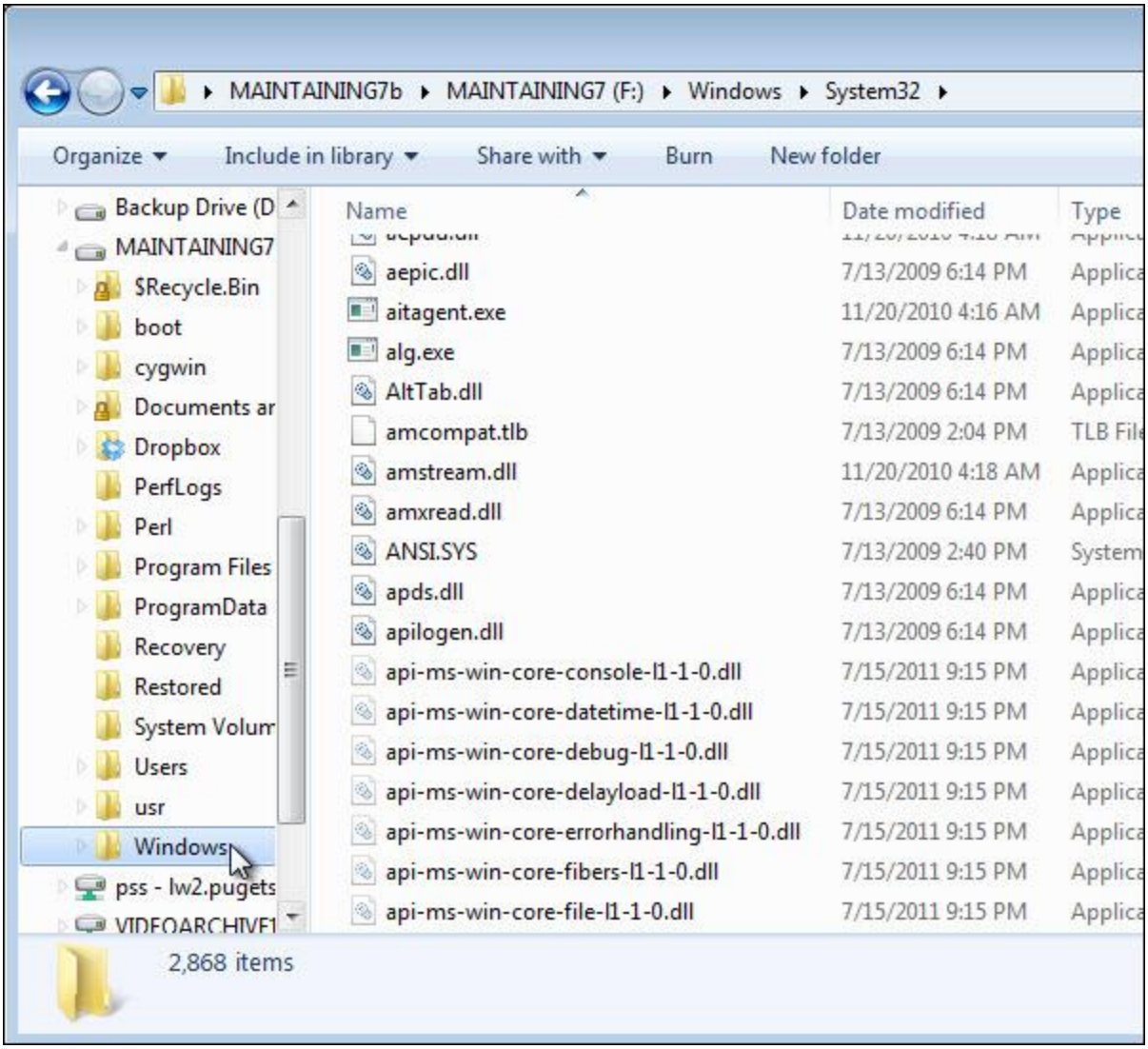
This new drive is the backup image mounted to appear as "just another drive" on your system.

That means that we can go exploring in Windows Explorer.



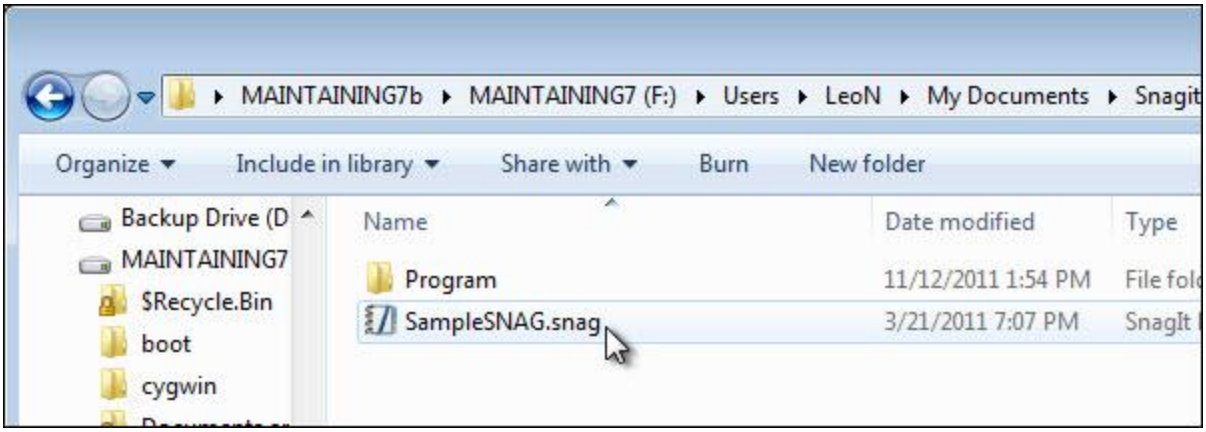
Right-click the drive in Disk Management and click **Explore**.

My first test is simply to navigate to \Windows\system32 on that drive:



If it exists and contains "a lot" of files and folders, that gives us a level of confidence about Windows itself being backed up. You can certainly browse around and check for other Windows files, but having this critical folder and its files present is pretty big indicator that the backup image at least contains Windows.

Now, navigate to another folder of your own choosing that should contain the data files that you care about. My Documents is an obvious choice.



Here, I've navigated to My Documents folder and located within it a folder and data file that I expect to be present.

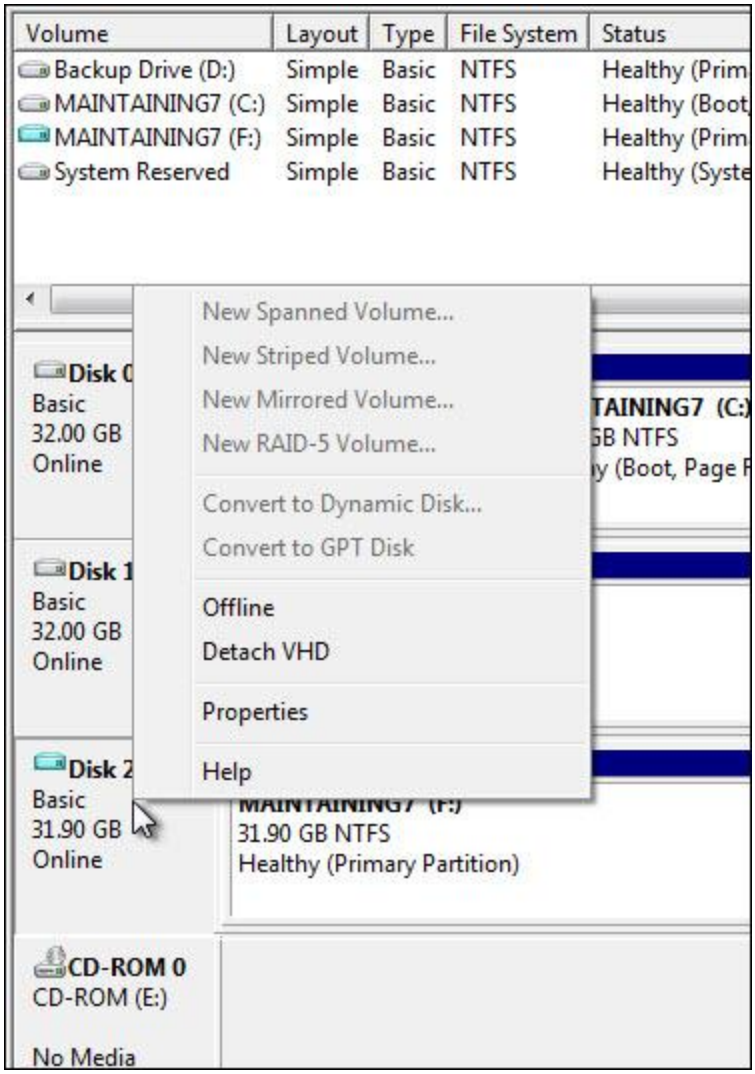
You should do this for a few of your own data files that you expect to be backed up. They don't have to be in My Documents – it doesn't really matter where they are – but take a few moments to browse around the backup image to locate the files that you care about.

If you can find them, then you can feel confident that they're not only successfully backed up, but that you can restore them – either as part of restoring the entire system image or by extracting them from the system image individually.

If you can't find them, then it's time to review the settings that created this backup. Is it backing up the right disk? Are you examining the backup that you think you are? Did the files that you're looking for exist at the time the backup was taken?

If you're not finding what you're looking for, it's important to understand why, and from that, understand what you might need to do to make sure that your backups contain what you expect in the future.

After you've completed your tests, remember to detach the mounted drive.



In Disk Manager, right-click the mounted drive and click **Detach VHD**.

Afterword

I hope that some (if not most) of the items in this book help you get the most out of your Windows 7 computer for as long as you possibly can.

If it's helped you at all, then I consider this a success.

If you have found this book valuable, I'd really appreciate it if you posted a review up on Amazon. That'll help more people find and get the value that you've found.

If you find what you believe to be an error in this book, please register your book and then visit the errata page for this book. That page will list all known errors and corrections, and give you a place to report anything you've found that isn't already listed.

If you're left with questions, suggestions, or – dare I say it – even complaints, then by all means let me know. The best way is to, once again, register your book. That'll give you access to a prioritized feedback form specifically for Maintaining Windows 7.

If you prefer not to register, you can use this form:

http://ask-leo.com/book

That's the Ask-a-question form for newsletter subscribers and book purchasers.

If you have a more general technical question that's perhaps not related to what's covered in this book, I strongly encourage you to visit Ask Leo! and search the site for your answer. I know I often sound like a broken record on this, but I get asked so many questions that are answered already on the website that you'd be shocked. It'll be faster for you if you can simply find it there first, rather than waiting for me to get back to you.

If you do need to ask a question that's not answered on the site, use that ask-a-question form I mentioned above:

http://ask-leo.com/book

If you haven't already subscribed, you might find my weekly newsletter helpful as well. Each week, I highlight the latest articles published on Ask Leo!, reader comments, popular articles, and recommendations along with some my own commentary and musings from time to time. Learn more about the newsletter and sign up here:

http://newsletter.ask-leo.com

Thanks again for your support.

Here's to happy, safe, and problem-free computing.

Leo A. Notenboom
http://ask-leo.com

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Having purchased this book, you're entitled to additional updates, errata, and other *bonus materials*. In particular, many of the screenshots that you've seen throughout **Maintaining Windows 7** have actually been taken from companion *videos* that demonstrate and further explain the topics being discussed here in the book.

Registering gives you access to all those videos and more.

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right now and register. That link is mentioned only here and it's totally FREE to owners of Maintaining Windows 7 🙂.

You only need to register *once* to gain access to the bonus materials for this and all future volumes of Maintaining Windows 7.

About the Author

I've been writing software in various forms since 1976. In over 18 years at Microsoft, I held both managerial and individual contributor (i.e. programmer) roles in a number of groups ranging from programming languages to Windows Help, Microsoft Money, and Expedia. Since leaving Microsoft, I've been answering tech questions at the extremely popular Ask Leo! website (http://ask-leo.com) and expending my efforts on various consulting and entrepreneurial projects ... like this book!

Curious for more? Someone asked and I answered on the site: Who is Leo?

Feedback, Questions and Contacting Leo

I truly appreciate reader input, comments, feedback, corrections, and opinions – even when the opinions differ from my own! (Honest!)

Here's how best to contact me:

- If you have a computer or tech related question, the best approach by far is to first search Ask Leo! (http://ask-leo.com). Many, many questions are already answered right there, and finding those is much faster than waiting for me.
- If you can't find your answer using search, visit http://ask-leo.com/book and submit your question. That's a special form just for book purchasers and newsletter subscribers, and it gets prioritized attention.
- If you have a comment on any part of this book, register your book for access to a prioritized feedback form. If you prefer not to register, simply use the form mentioned above to let me

know. Just mention "Maintaining Windows 7" in your comment. Even though I may not reply, every comment is read – honest.
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- If you just want to drop me a line or have something that want to share that isn't covered above, you can use http://ask-leo.com/book for that, too.

A Note of Thanks

I would like to thank the thousands of Ask Leo! newsletter subscribers and site visitors. Without your support, and of course, your questions and comments, Ask Leo! would simply not be possible.

Thank you!

Leo A. Notenboom
http://ask-leo.com

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