Helen Smith - U3A Nunawading

Before it’s too late …

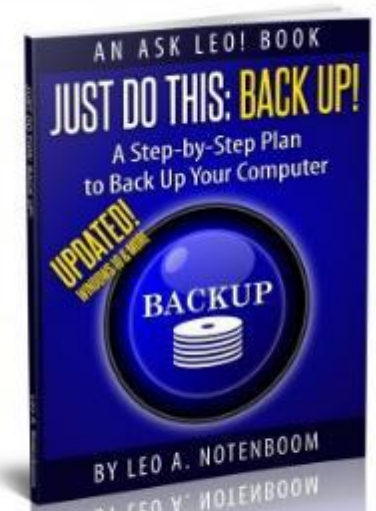
BACKUP YOUR COMPUTER!

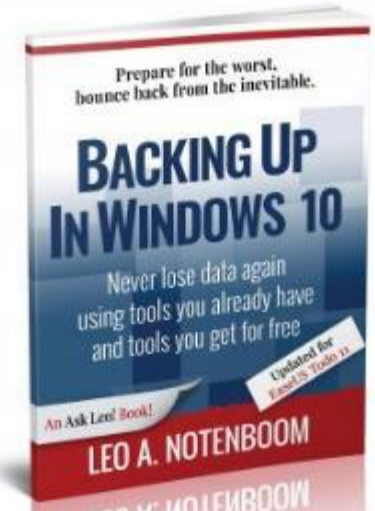
Credits

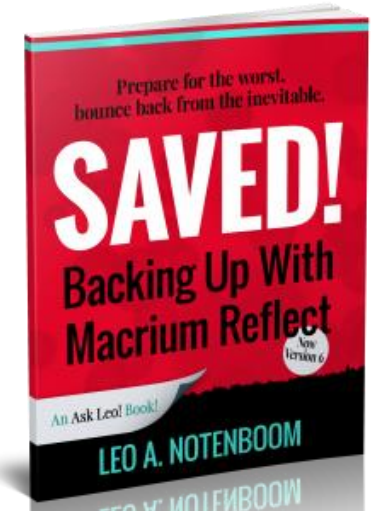
eBooks

- Leo A. Notenboom (2018) **Backing Up In Windows 10 (v1.1)** eBook available at https://askleo.com/backing-windows-10/
- Leo A. Notenboom (2015) **Saved! Backing up with Macrium Reflect (v6)** Edition 2, eBook available at https://askleo.com/saved-backing-macrium-reflect/
- Leo A. Notenboom (2018) **Just Do This: Back Up! (v1.1)**, eBook available at https://askleo.com/just-do-this-back-up/
- Rob & Lauren Lim (2013) **Backup or Die – How to keep your photos safe**, https://photographyconcentrate.com/

Leo Notenboom ebooks







What we'll cover

You can click the links on this page to go straight to a section

1. Some theory about backing up
2. Get prepared – what you need and why
3. Quick view of Windows 10 backup
4. Overview of Macrium Reflect backup
5. Step through Macrium Reflect backup together
6. Rescue disk overview and step through
7. Check your backups!
8. Summary and questions

1. Why Backup?

Do we really need to backup?

What does a backup do for us?

5 Ways to Lose your Data

1. Human error – e.g. accidental deletion
2. Malware infection – e.g. viruses or ransomware prevents you accessing your data
3. Hard drive failure – hard drives wear out!
4. Disaster – fire, flood or theft destroys or removes your data
5. Data corruption – e.g. power surges, operating system errors …

2. What IS a backup?

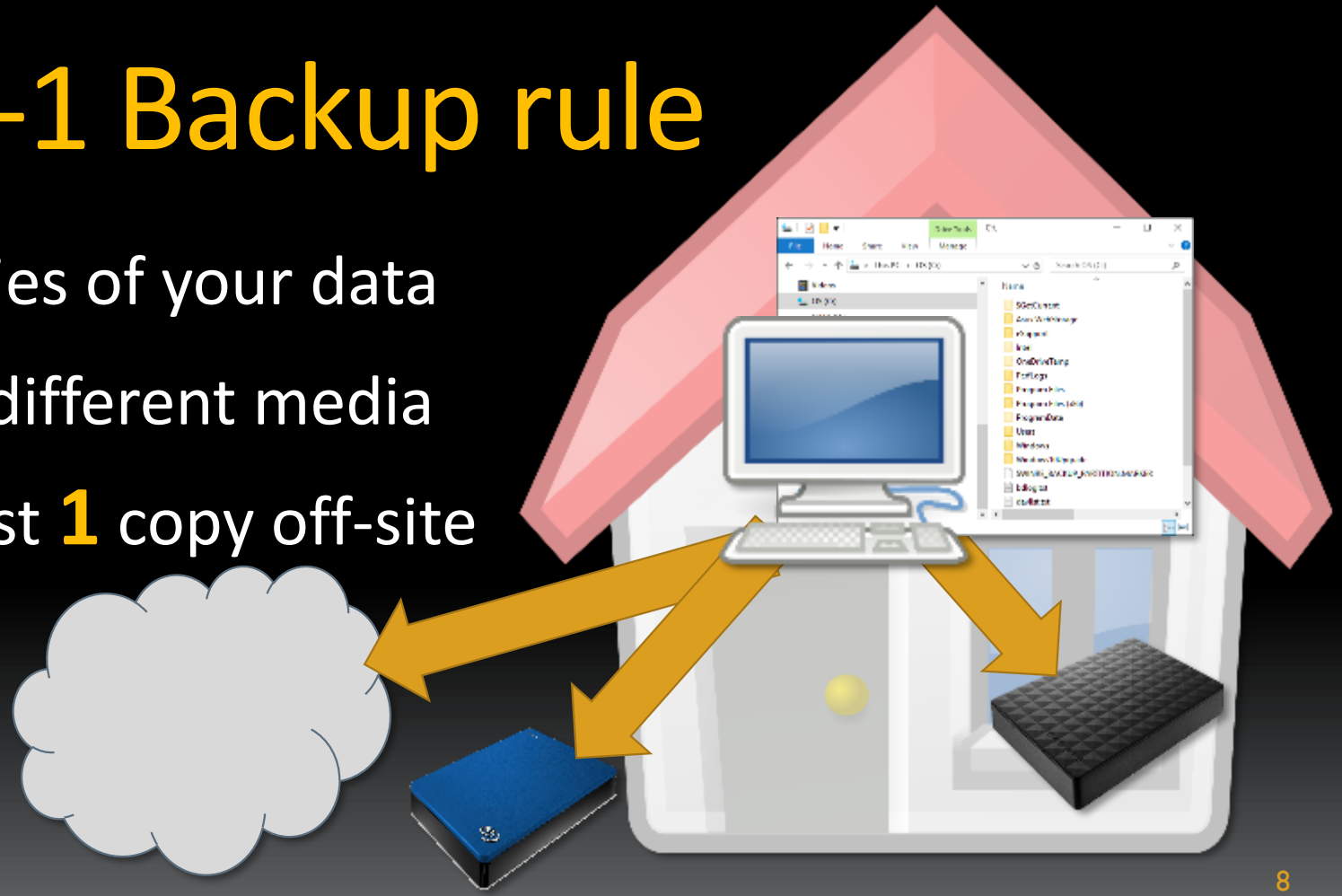
What exactly IS a backup, anyway?

… a copy of a file or other item of data made in case the original is lost or damaged

Backups capture a point-in-time snapshot that is then used to return data to its previous state.

3-2-1 Backup rule

- **3** copies of your data
- On **2** different media
- At least **1** copy off-site



2 TYPES of backup - Image Backup

- **Image backup**
  - a copy of:
    - the operating system (OS)
    - all the data associated with it, including the system state and application configurations.
  - The **backup** is saved as a single file that is called an **image**.

2 TYPES of backup - File Backup

- **File backup** - copies of your (individual) files on another drive in case something happens to the originals.

Recovering your computer – File Backup

- Find all your original software incl OS
- Install the OS
- Update all drivers
- Reinstall all software (incl registration codes!)
- Recover your files from somewhere …

Recovering your computer – Image Backup

- Find all your original software incl OS
- Install the OS
- Update all drivers
- Reinstall all software (incl registration codes!)
- Recover your files

What am I protecting against?

	Lose single files	Lose all your data
Human error	X	X
Malware infection		X
Hard drive failure	X	X
Disaster		X
Data corruption	X	X
You need:	File backup	System image backup

3. Get Prepared

What do I need in order to backup?

You need:

- External hard disk (how many, what size?)
  - Separate discs for Image and File backup is best
- Backup software
- A backup plan:
  - what to backup
  - how often to backup
  - where to store your backups

Leo Notenboom – [you need] an external drive *at least* three times as large as the amount of data you expect to back up.

Backup drives

1 / 2 / 4 / 5 TB Drive,
USB powered

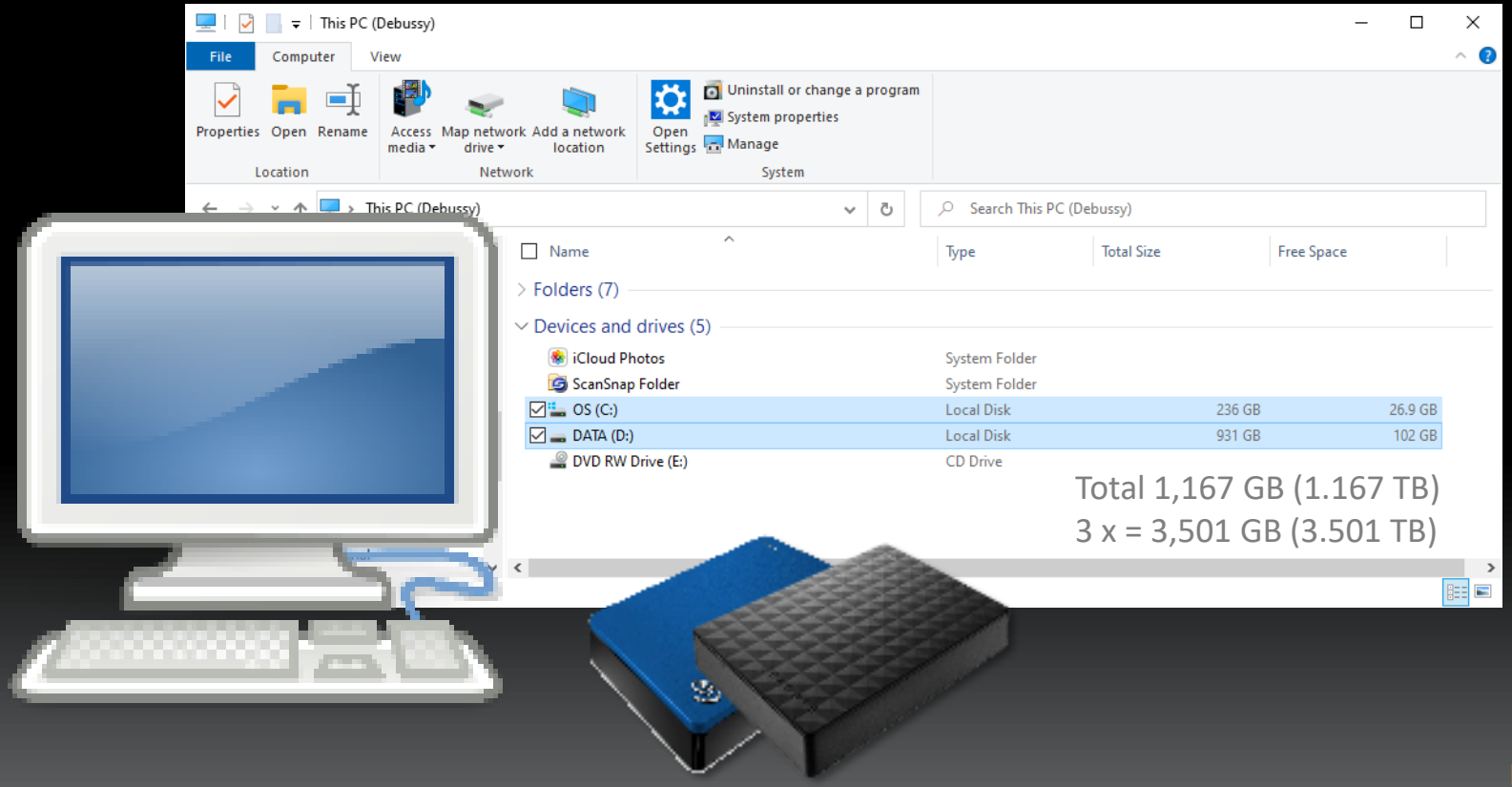
4 / 6 / 8 TB Drive,
externally powered

2 TB + Network Drive (NAS),
externally powered

8 – 512 GB Drive,
USB powered

Cloud service account
– free may not be enough
eg OneDrive
Google Drive
Dropbox etc

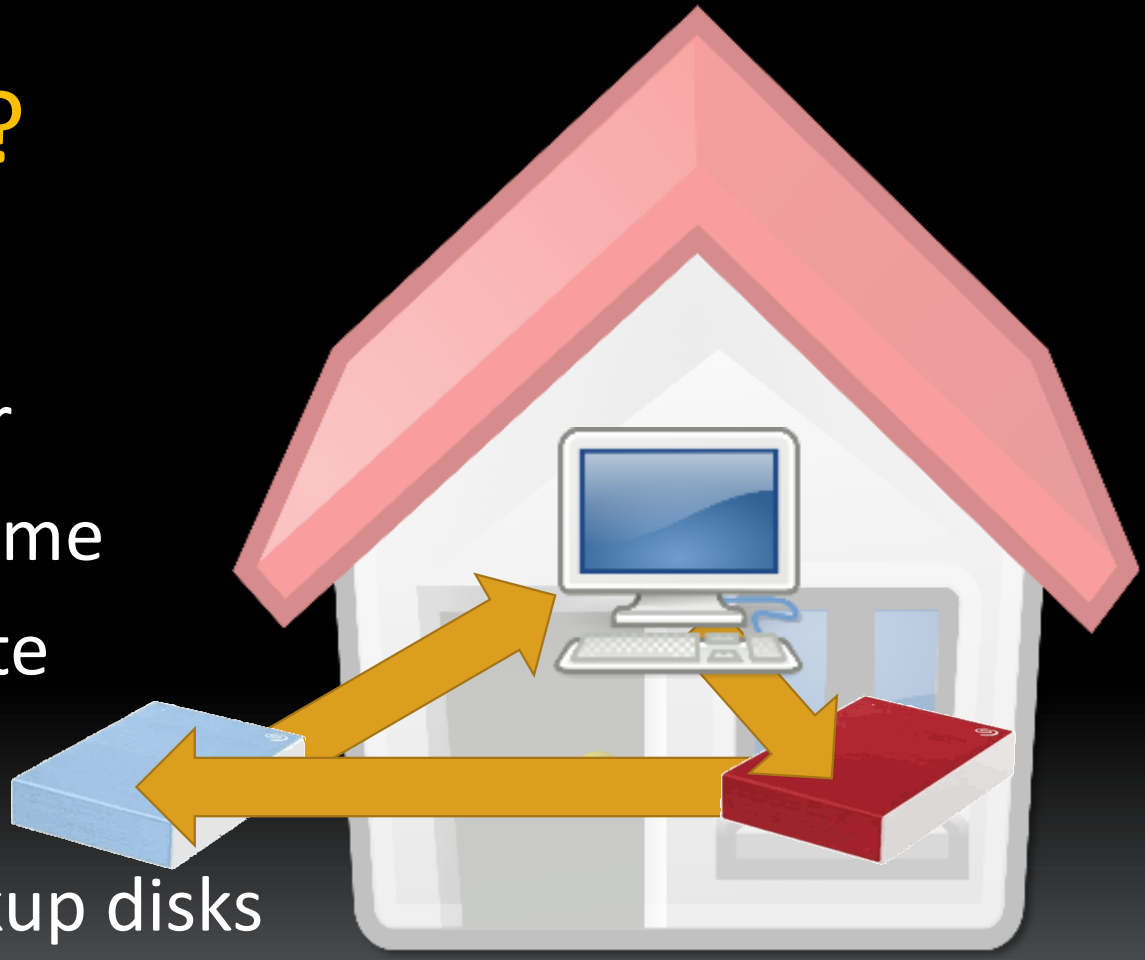
How large?


This PC (Debussy)
File
Computer
View
Properties
Open
Rename
Location
Access media
Map network drive
Add a network location
Network
Open Settings
Uninstall or change a program
System properties
Manage
System
This PC (Debussy)
Search This PC (Debussy)
Name
Type
Total Size
Free Space
Folders (7)
Devices and drives (5)
iCloud Photos
System Folder
ScanSnap Folder
System Folder
OS (C:)
Local Disk
236 GB
26.9 GB
DATA (D:)
Local Disk
931 GB
102 GB
DVD RW Drive (E:)
CD Drive
Total 1,167 GB (1.167 TB)
3 x = 3,501 GB (3.501 TB)

How many?

3 copies:

- 1 on computer
- 1 backup @home
- 1 backup offsite



At least 2 backup disks

Online File Synchronisation (Cloud accounts)

In addition to hard drive backups you could consider online backups, eg:

- Microsoft OneDrive
- Dropbox
- Google Drive
- iCloud

These synchronise your files between the computer and the ‘cloud’

- not strictly backup, particularly if you delete files.
- usually an ongoing cost involved beyond a small free amount of storage
- slower than a hard drive

Online File Backup

Real Online Backup options include:

- Backblaze (US$5 /month /computer)
- Carbonite (from US$6 / month)
- MozyHome (uses Carbonite)
- SugarSync (from US$7.49 /month /unlimited devices)
- SpiderOak (from US$5 / month)

Software – Either of these:

- Windows
  - Built-in
  - Windows 10 uses old Windows 7 version
  - Windows 10 may discontinue inbuilt backup
- Macrium Reflect
  - Image backup in free version
  - File backup needs paid version

We'll look at this briefly but not actually use it in this session.

We're going to use this one for this session.

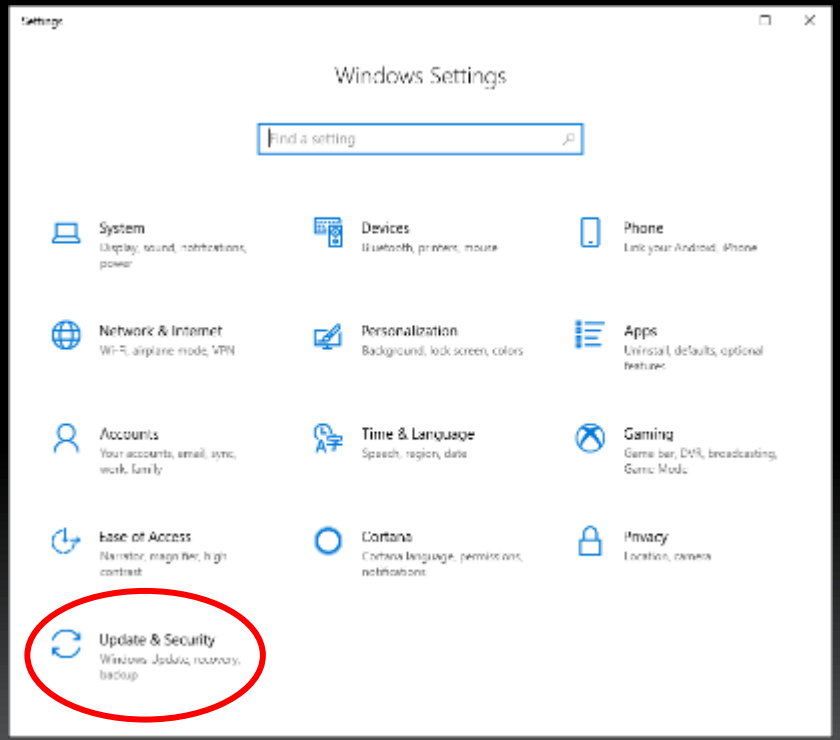
4. Let's step through Windows 10

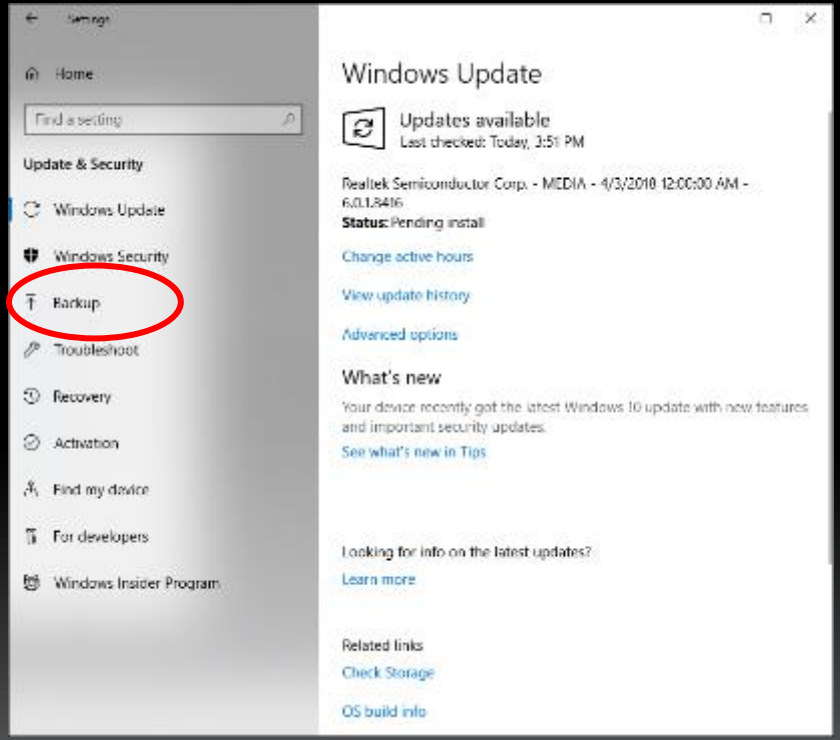
OK, that's the theory

Now, how do we actually do it?

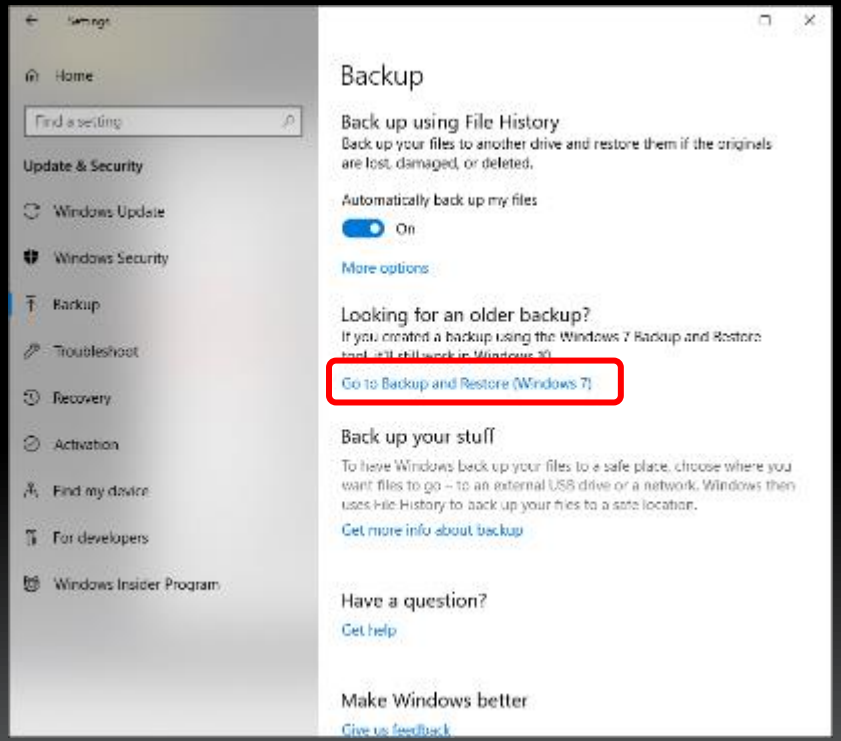
1. *Image backup of C drive*
2. *System repair disc*
3. *File backup of data drive*

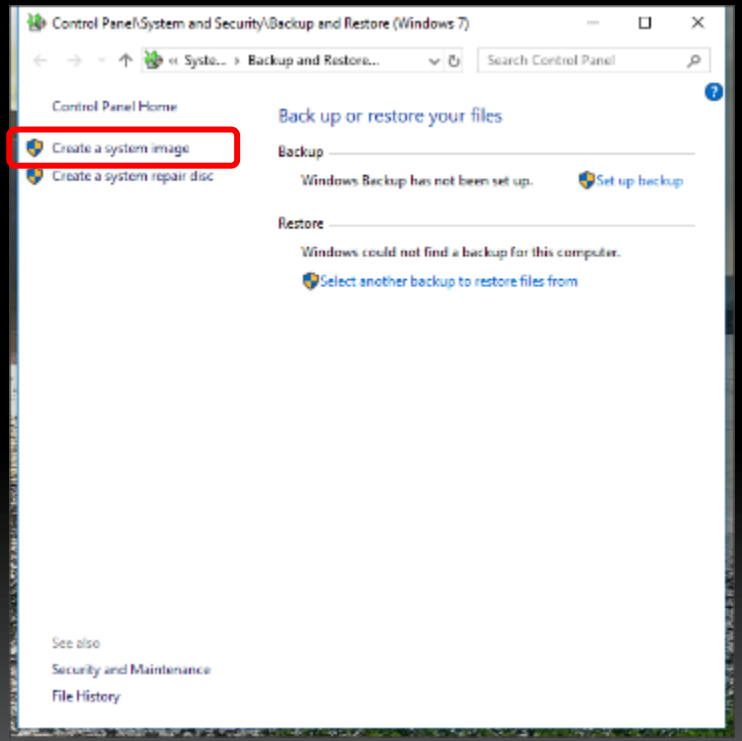
1. Image backup – step 1



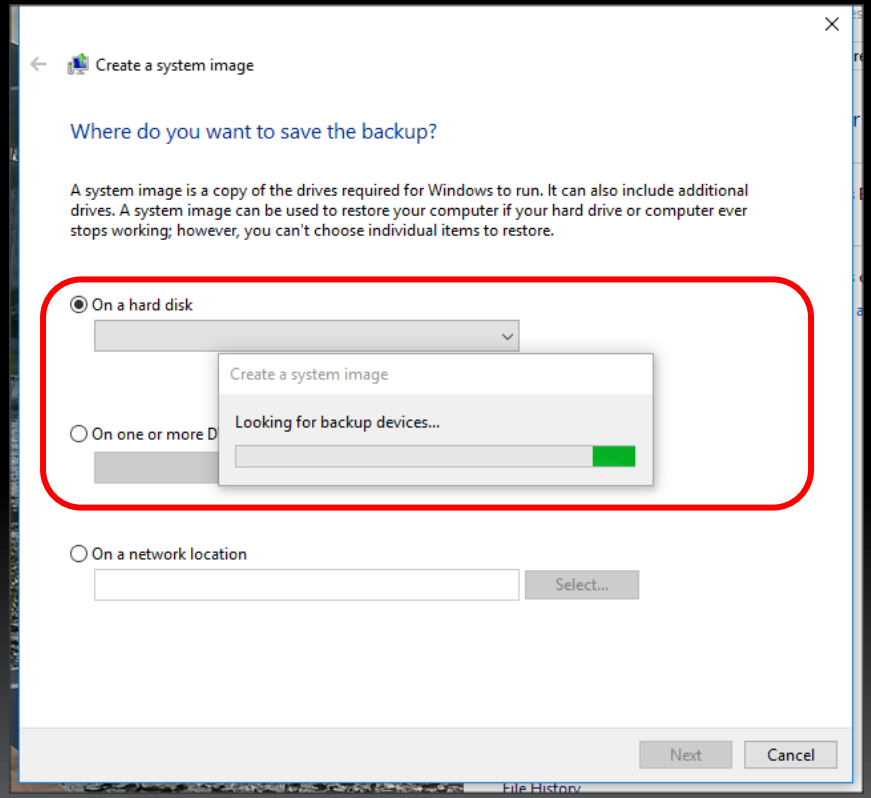


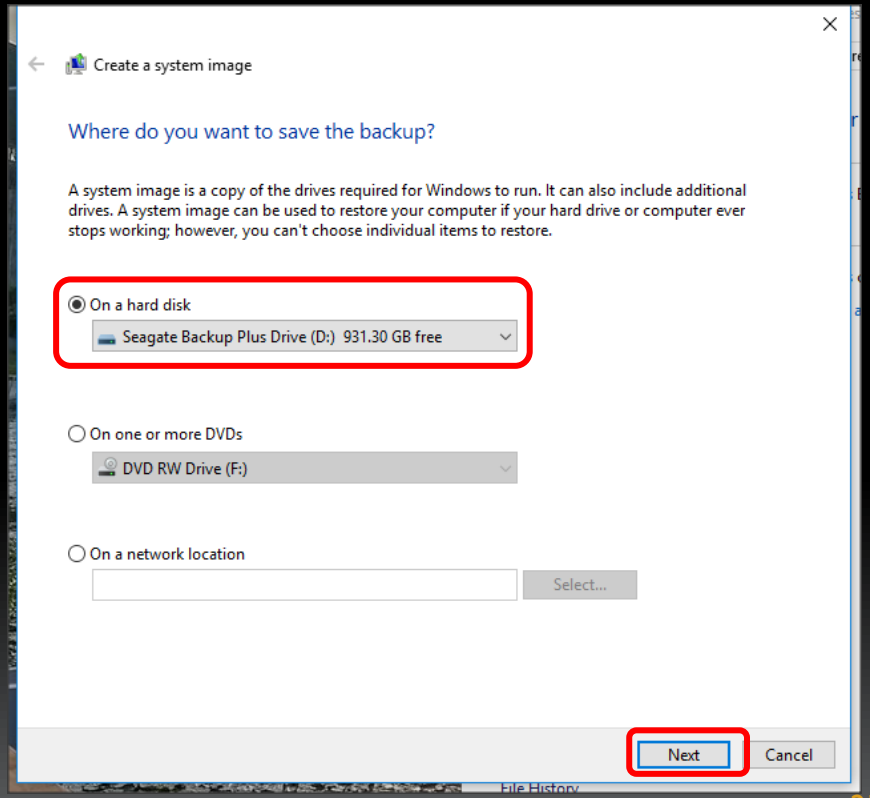
1. Image backup – step 2



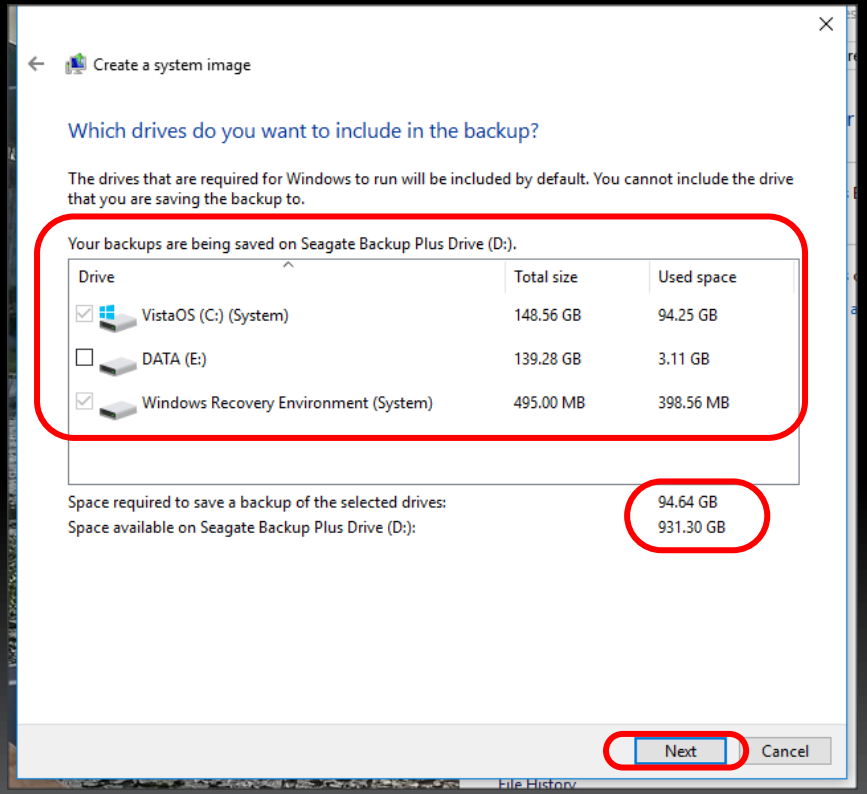


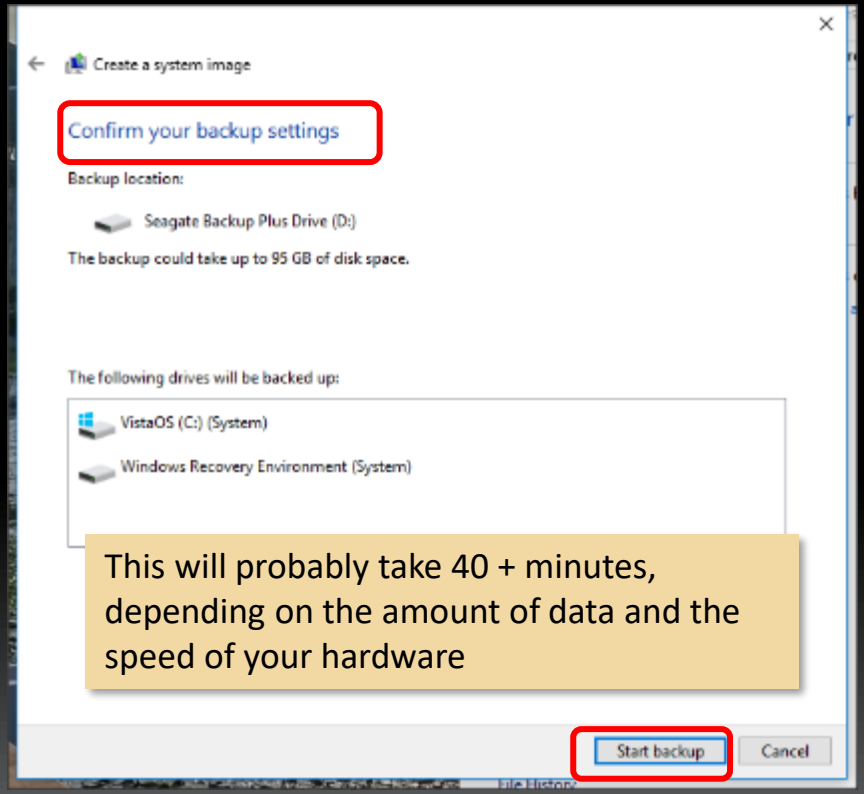
1. Image backup – step 3





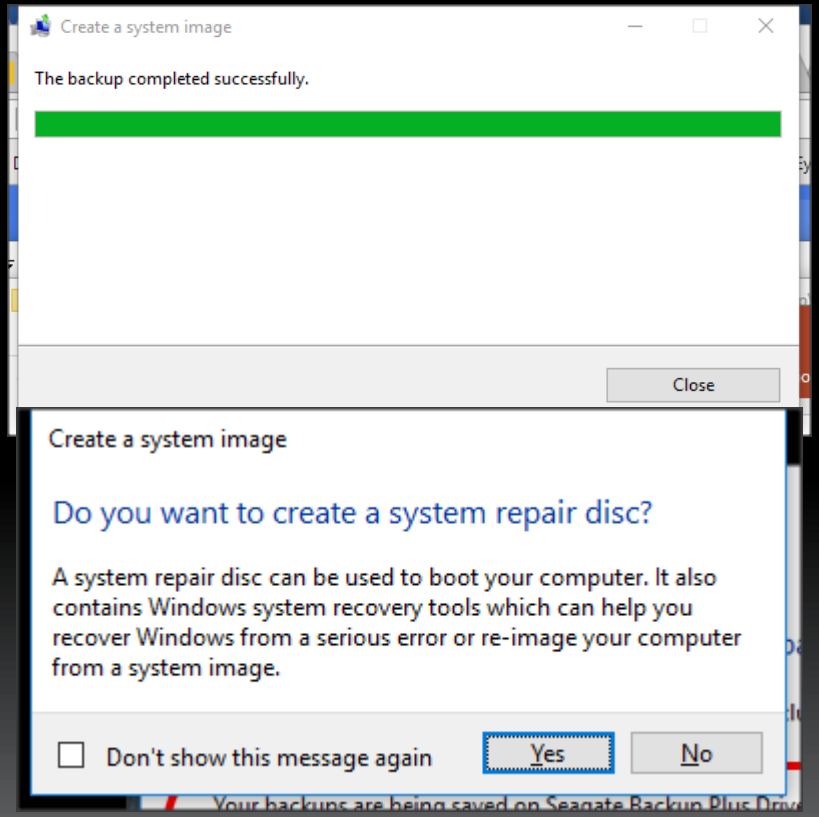
1. Image backup – step 4





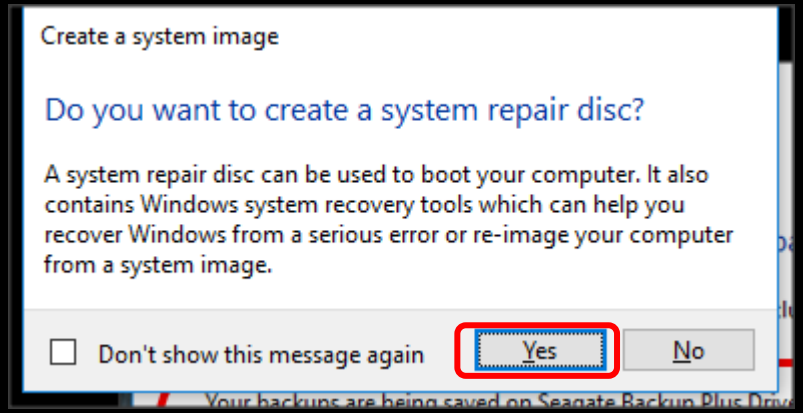
This will probably take 40 + minutes, depending on the amount of data and the speed of your hardware

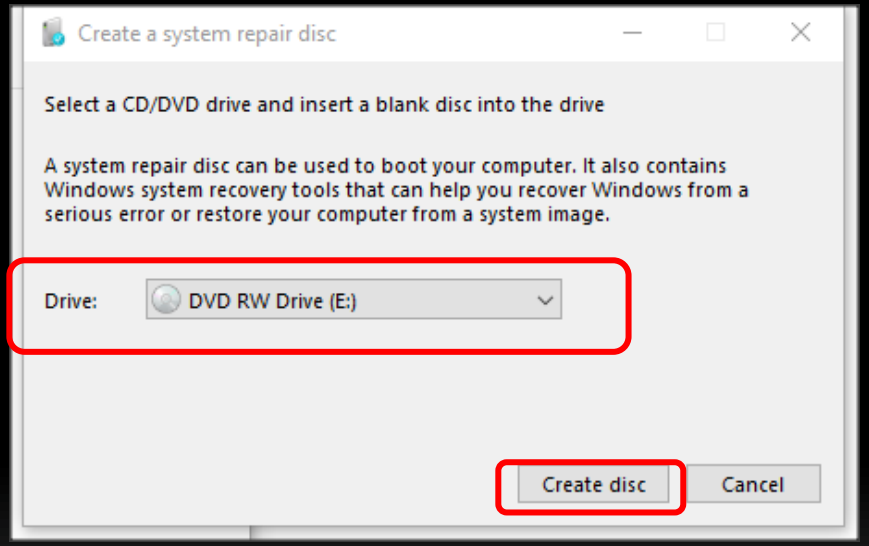
1. Image backup – step 5



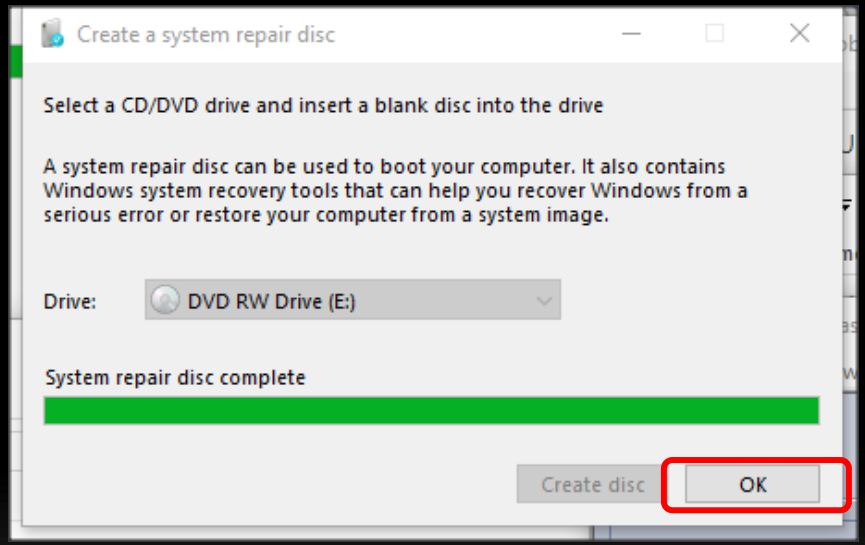
Your system image has now been created.
It is best to remove this drive from your computer so that the image backup cannot be corrupted by malware etc.

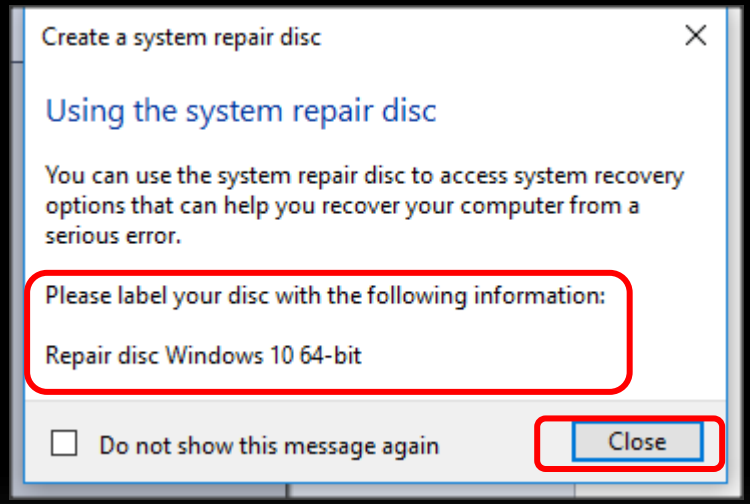
2. System repair disc – step 1



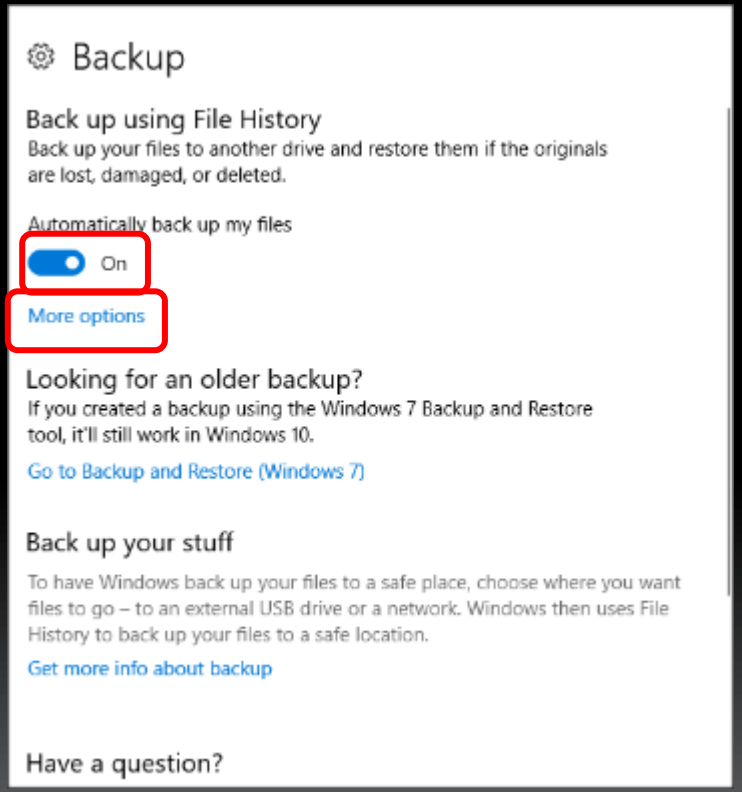


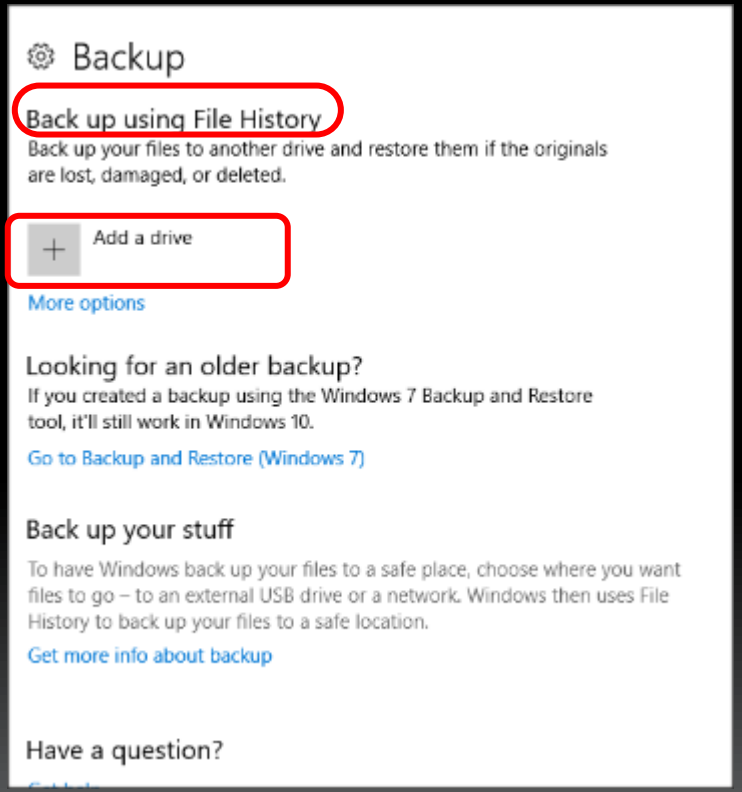
2. System repair disc – step 2



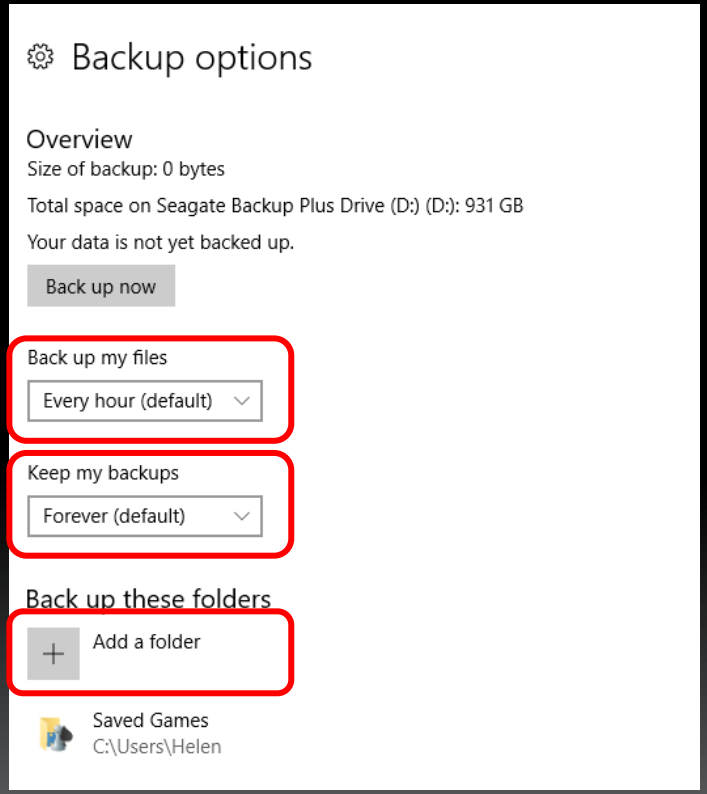


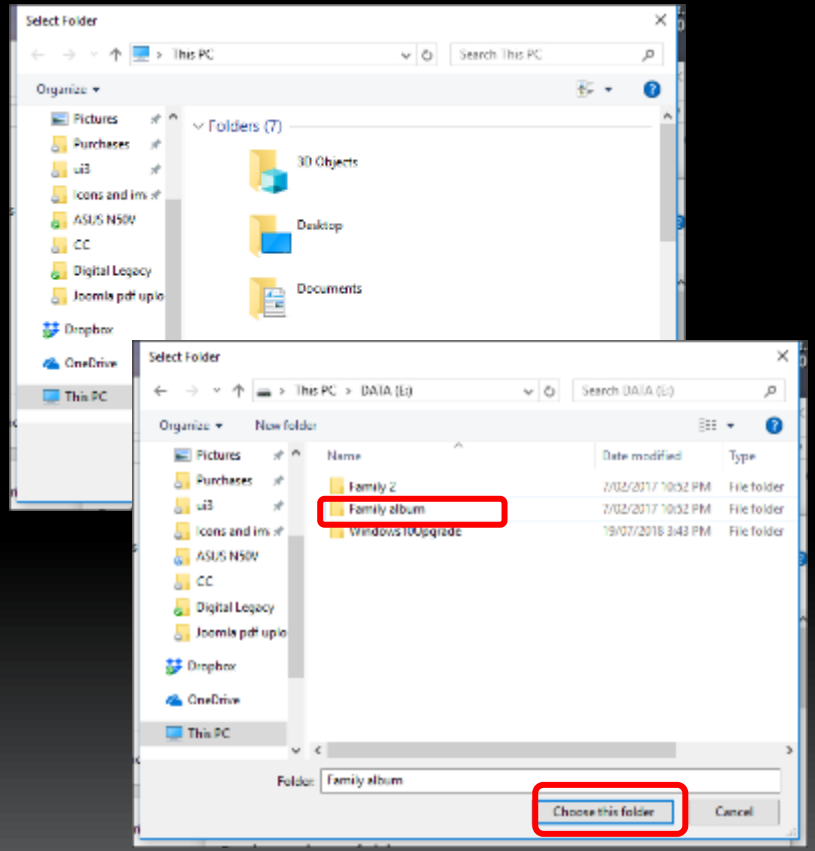
3. File backup – step 1



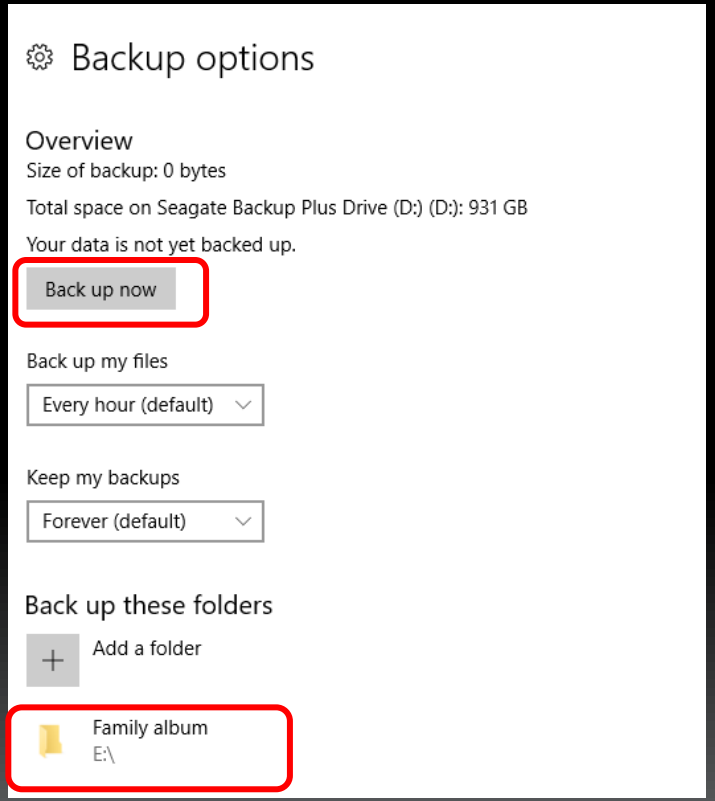


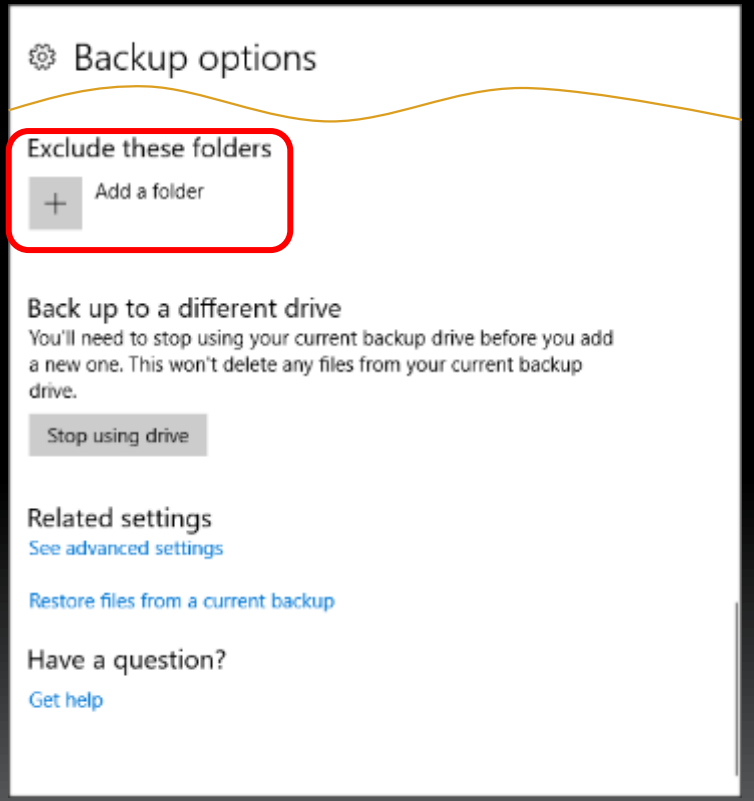
3. File backup – step 2





3. File backup – step 3





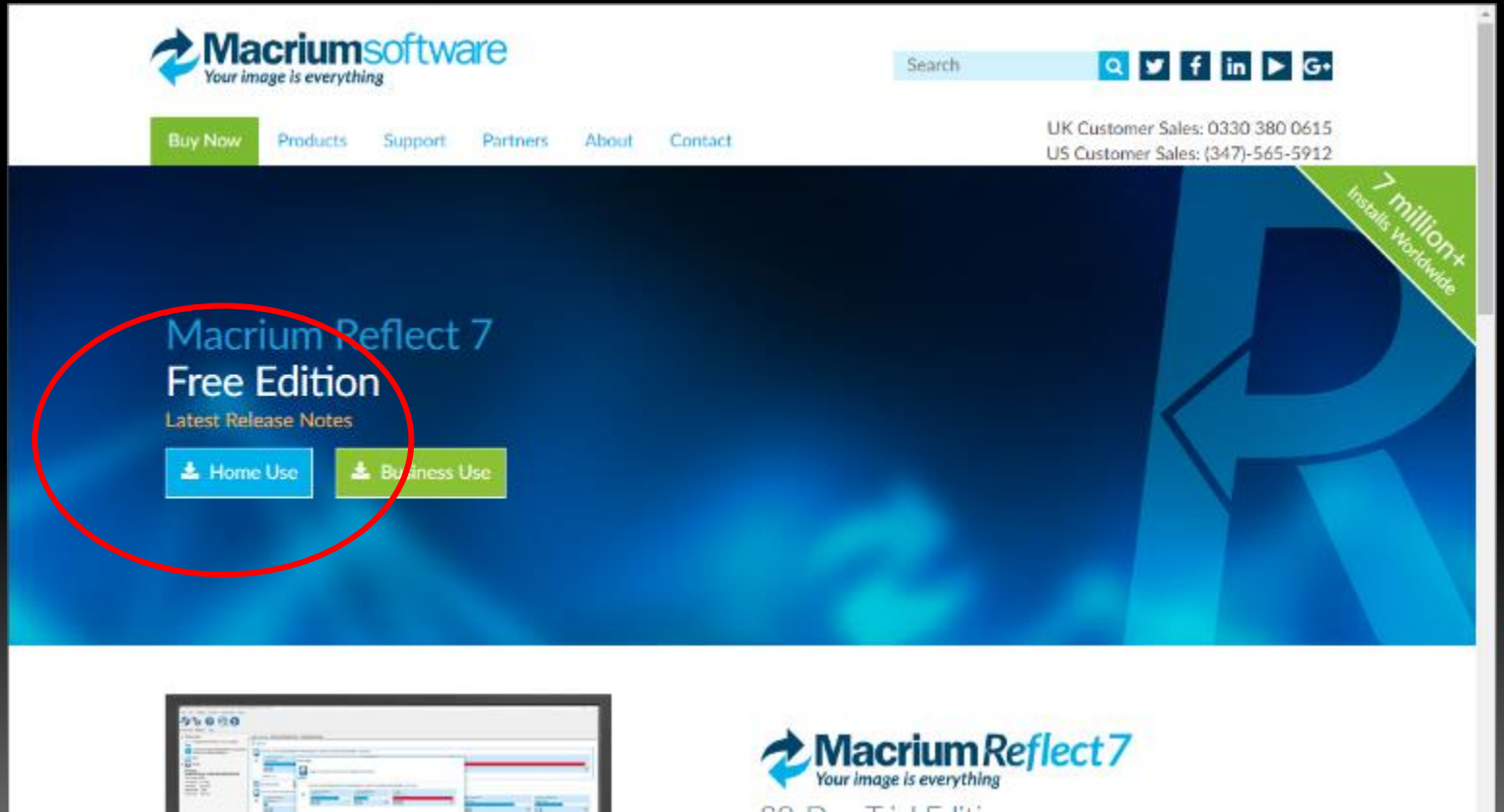
5. Let's step through Macrium Reflect

- *An alternative to Windows inbuilt backup*
- *A free version is available which is adequate.*
- *Relatively easy to use.*
- *You can set up automatic backups.*

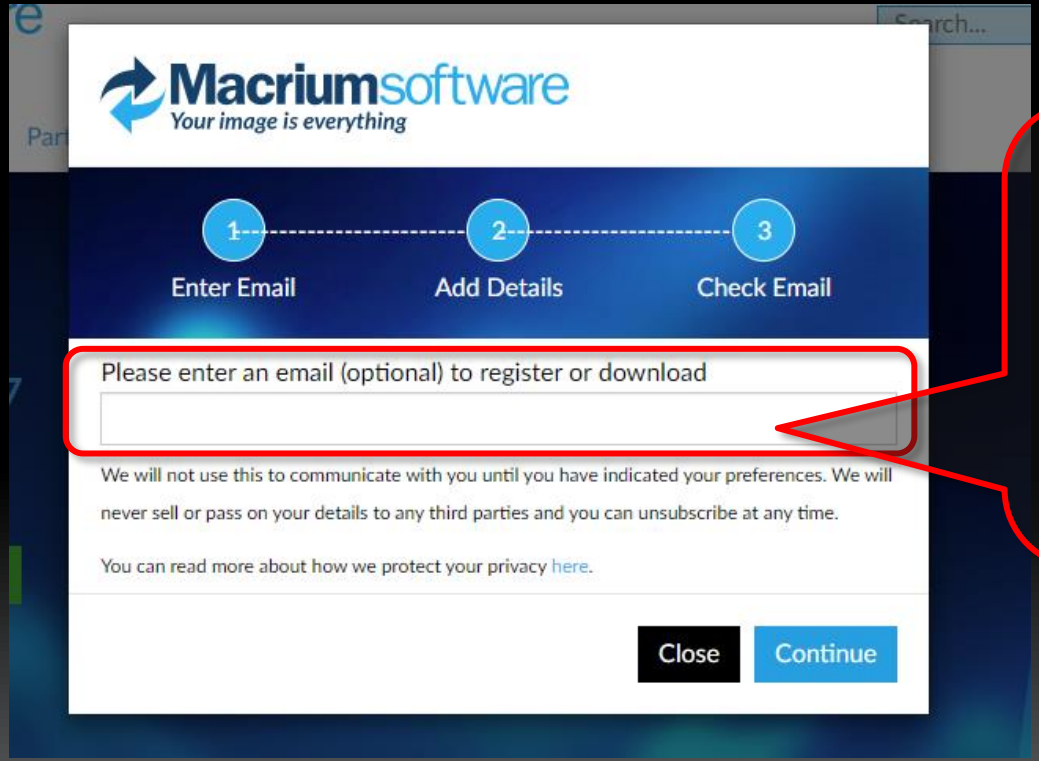
BUT

- *Free version only allows image backups, not file backups*

Download Macrium Reflect



Download step 2



It is not necessary to enter an email address.

If you do, look for the download link in the email you are sent.

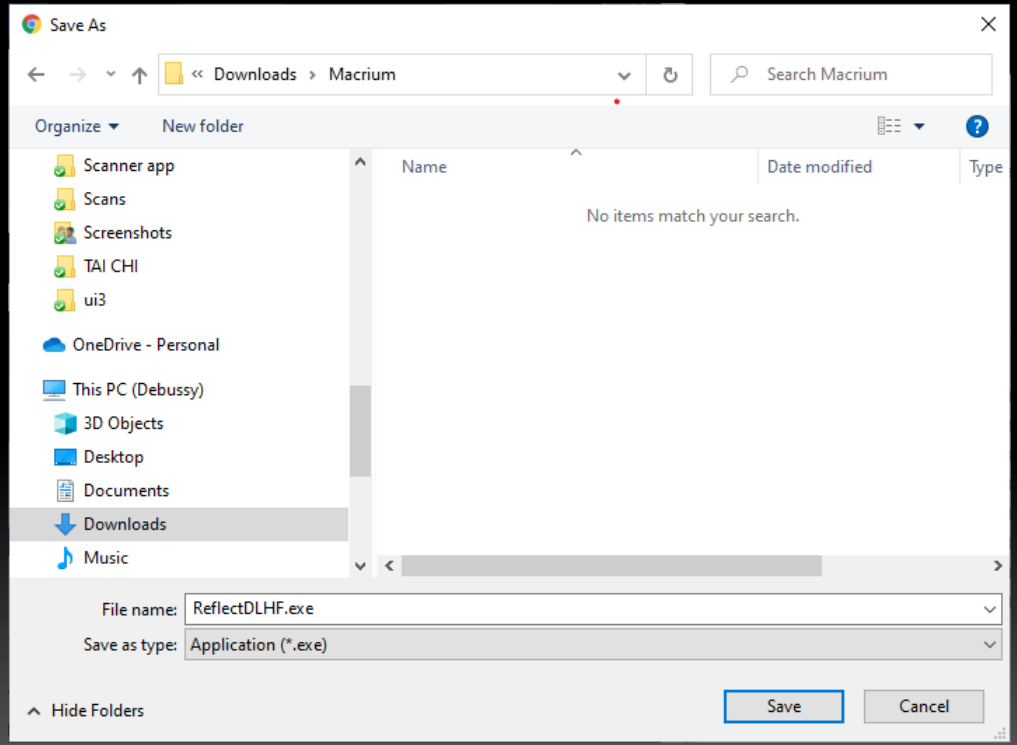
You'll need to click that link for the download to start.

Download step 3

Choose the location where you want to save the installer.

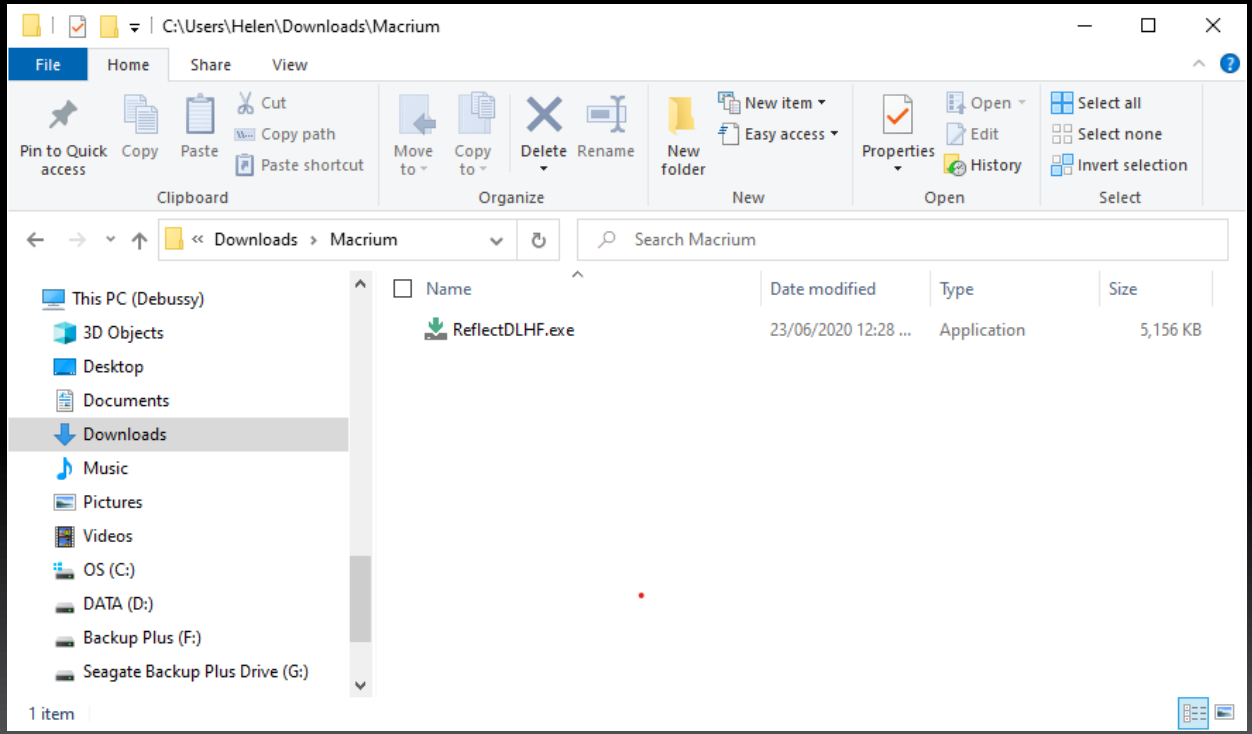
I've created a folder (Macrium) inside the Downloads folder

Click Save.



Install Macrium Reflect

Find the location where you saved the Installer.



Install step 2

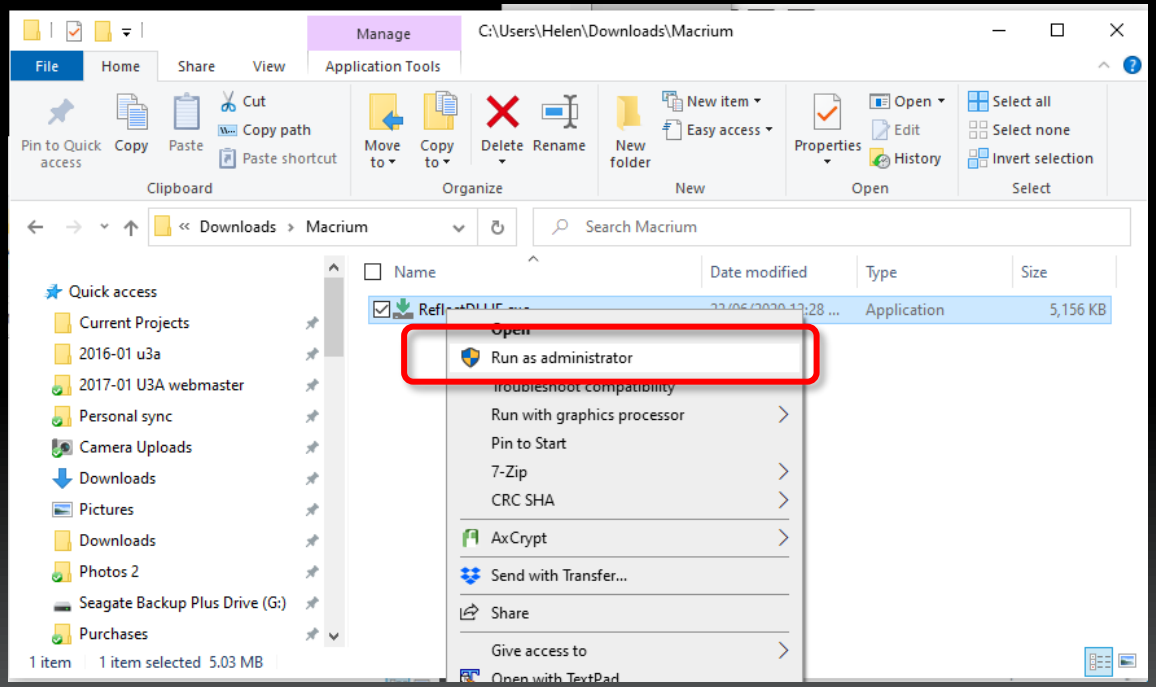
Run the installer.
Either:

- Double click the app

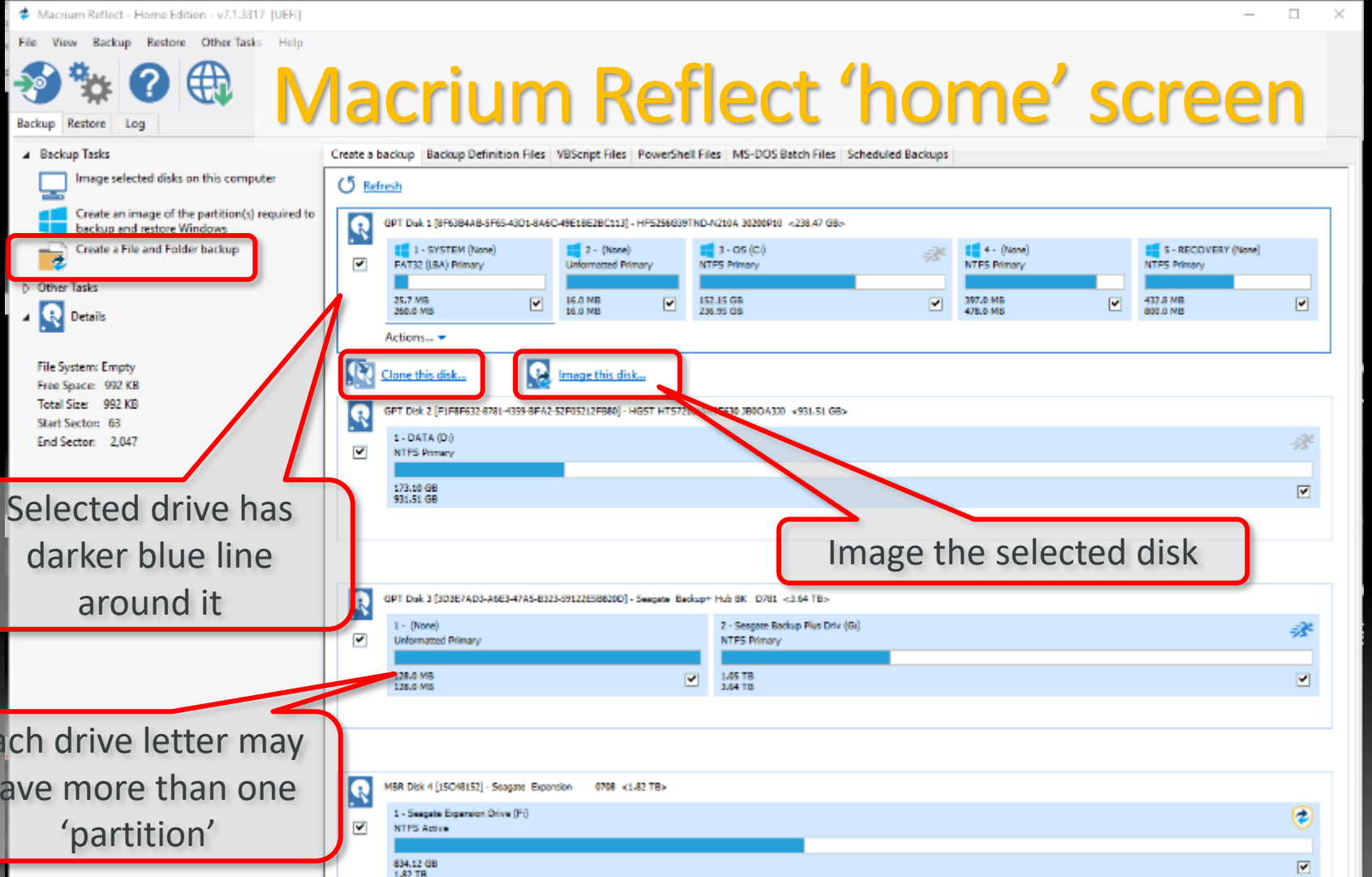
OR

- Right click on the app and choose ‘Run as administrator’.

You will need to allow Macrium to make changes to your computer



Macrium Reflect ‘home’ screen



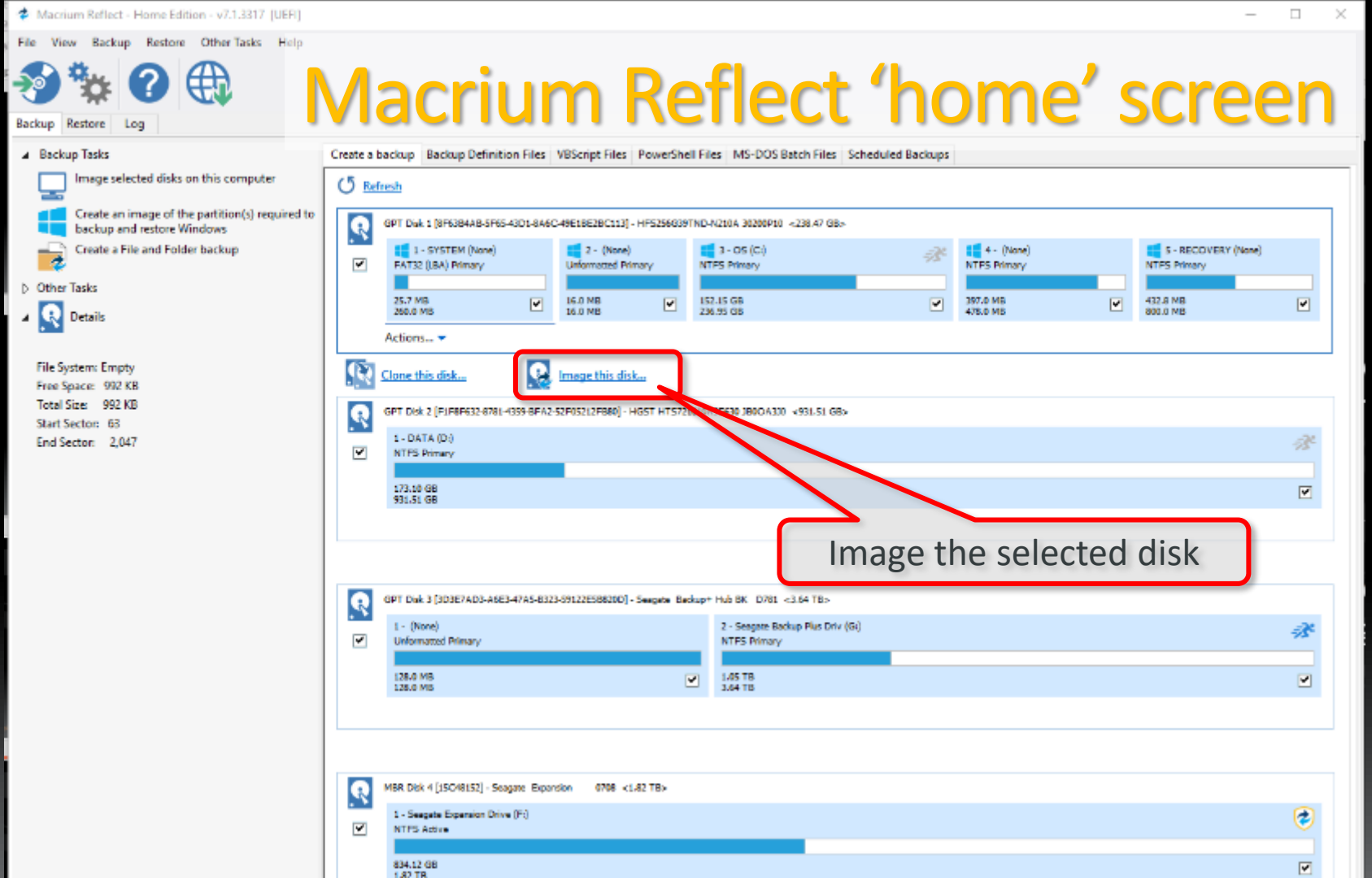
Macrium Reflect

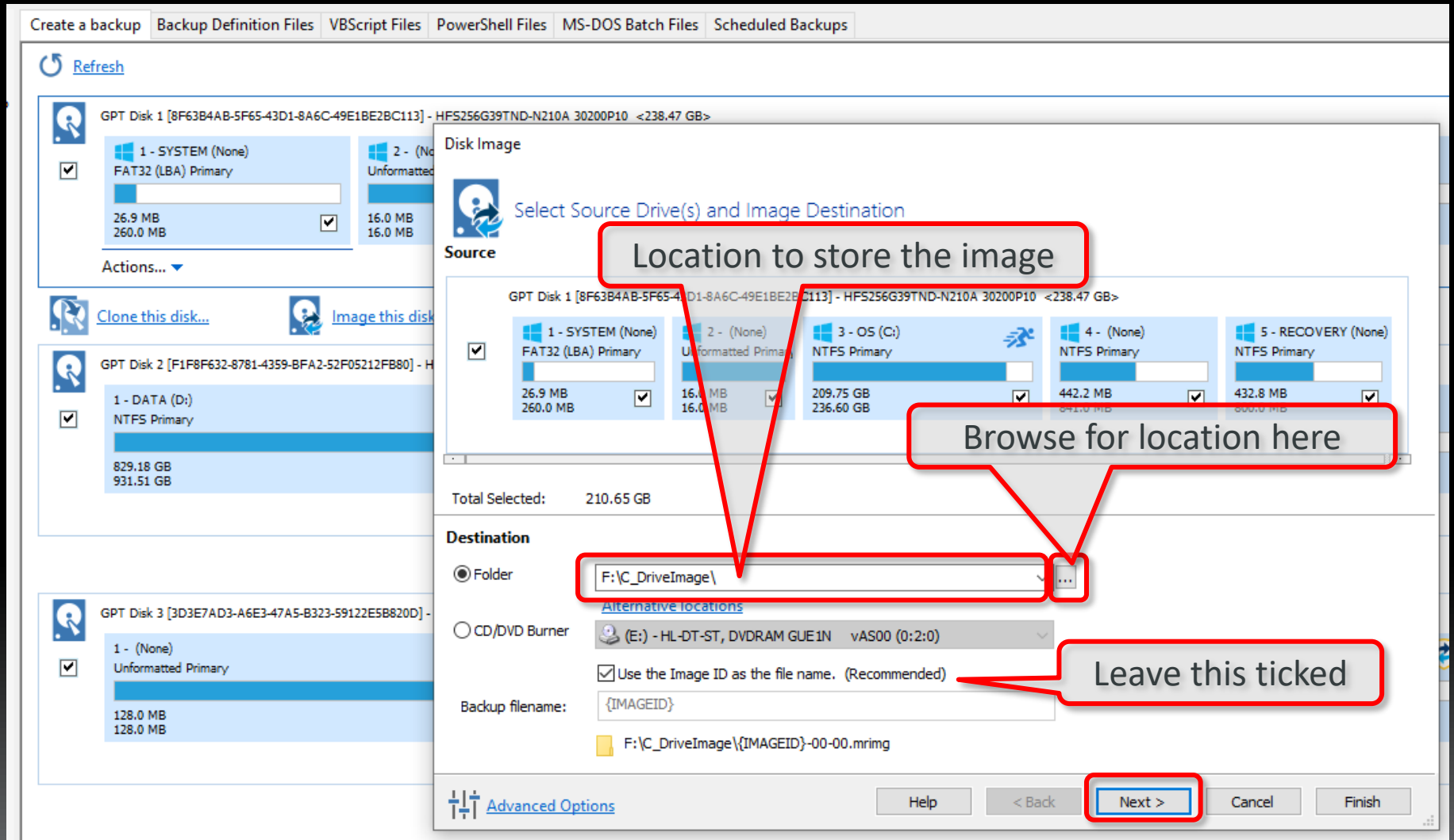
Disk Image - stores the information required to completely restore disks (or their individual partitions) exactly as they were when the image was taken. Will need software to restore it.

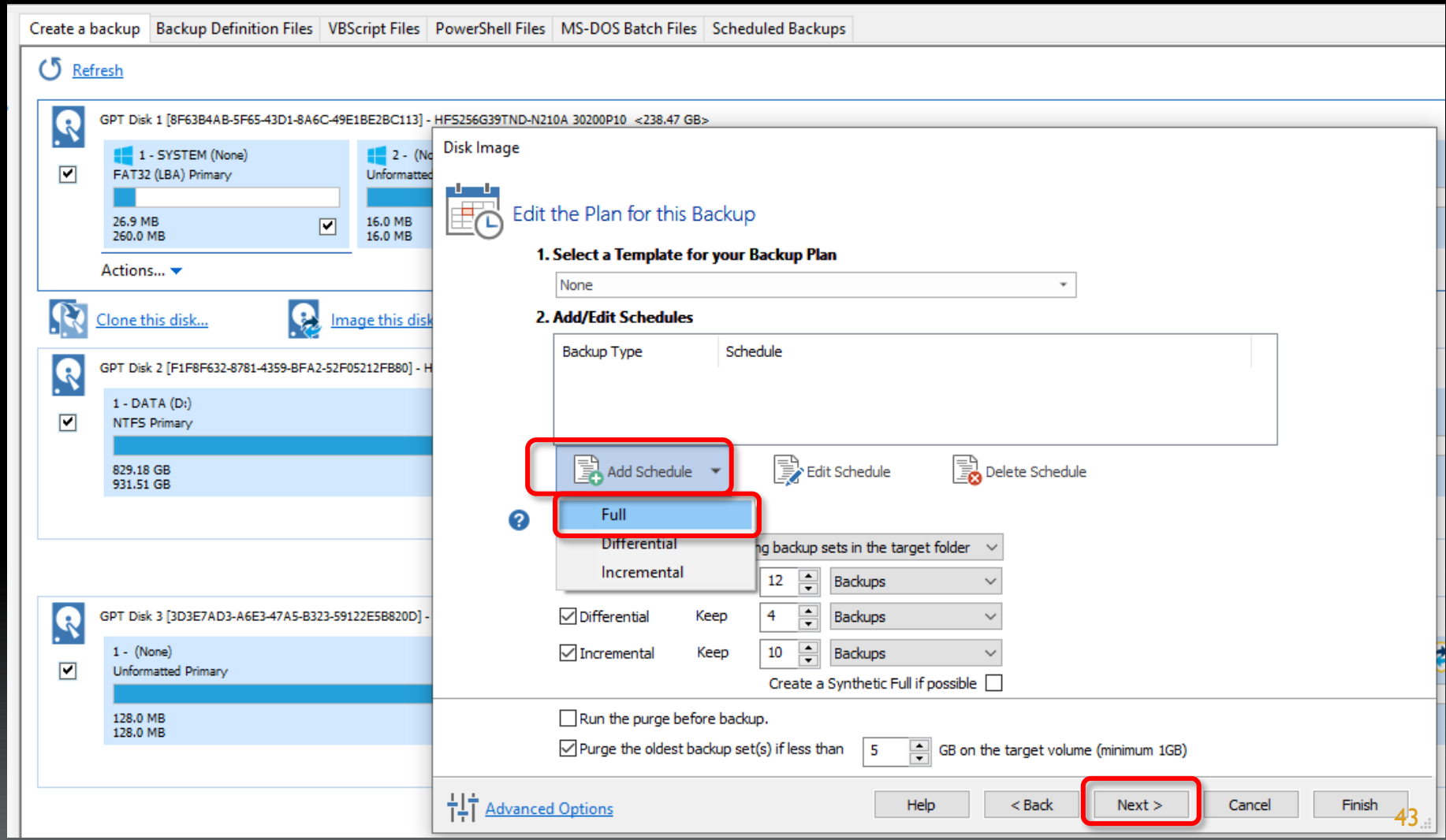
Disk Clone - creates an exact copy (bit to bit) of partitions to a different drive.
For example, upgrading to a larger hard drive or moving from a large magnetic hard disk to a smaller and faster SSD. When you clone a hard drive, you can boot from the target disk on the same system after cloning.

File Backup –not available in free version

Macrium Reflect ‘home’ screen




Create a backup
Backup Definition Files
VBScript Files
PowerShell Files
MS-DOS Batch Files
Scheduled Backups
Refresh
GPT Disk 1 [8F63B4AB-5F65-43D1-8A6C-49E1BE2BC113] - HFS256G39TND-N210A 30200P10 <238.47 GB>
1 - SYSTEM (None)
FAT32 (LBA) Primary
26.9 MB
260.0 MB
Actions...
Clone this disk...
Image this disk
GPT Disk 2 [F1F8F632-8781-4359-BFA2-52F05212FB80]
1 - DATA (D:)
NTFS Primary
829.18 GB
931.51 GB
GPT Disk 3 [3D3E7AD3-A6E3-47A5-B323-59122E5B820D]
1 - (None)
Unformatted Primary
128.0 MB
128.0 MB
Disk Image
Select Source Drive(s) and Image Destination
Source
GPT Disk 1 [8F63B4AB-5F65-43D1-8A6C-49E1BE2BC113] - HFS256G39TND-N210A 30200P10 <238.47 GB>
1 - SYSTEM (None)
FAT32 (LBA) Primary
26.9 MB
260.0 MB
3 - OS (C:)
NTFS Primary
209.75 GB
236.60 GB
4 - (None)
NTFS Primary
442.2 MB
5 - RECOVERY (None)
NTFS Primary
432.8 MB
Location to store the image
Browse for location here
Total Selected: 210.65 GB
Destination
Folder
F:\C_DriveImage\
Alternative locations
CD/DVD Burner
(E:) - HL-DT-ST, DVDRAM GUE1N vAS00 (0:2:0)
Use the Image ID as the file name. (Recommended)
Leave this ticked
Backup filename:
{IMAGEID}
F:\C_DriveImage\{IMAGEID}-00-00.mrimg
Advanced Options
Help
< Back
Next >
Cancel
Finish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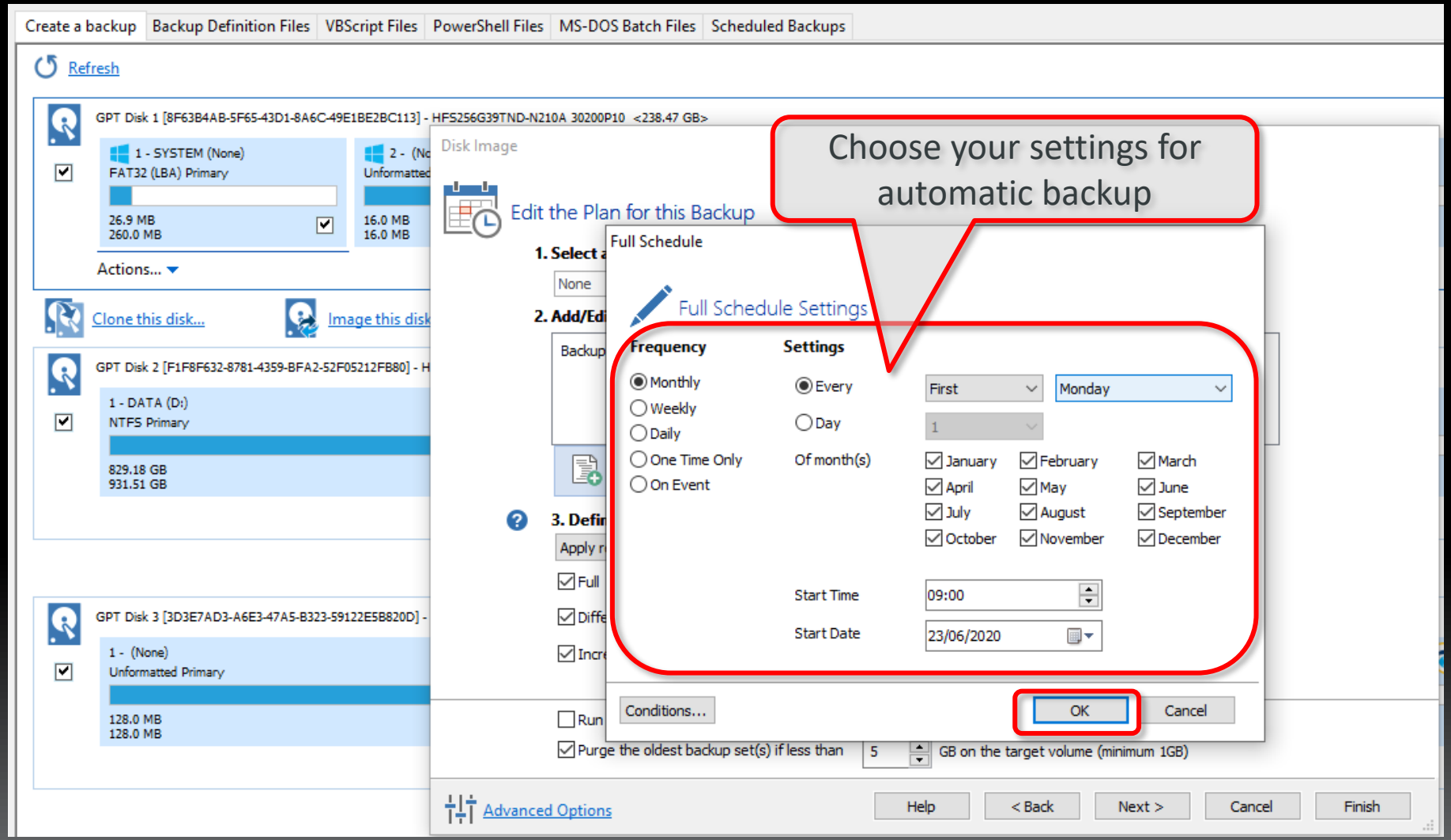
1 - SYSTEM (None)
FAT32 (LBA) Primary
26.9 MB
260.0 MB
16.0 MB
16.0 MB
Actions...
Clone this disk...
Image this disk
GPT Disk 2 [F1F8F632-8781-4359-BFA2-52F05212FB80] - H
1 - DATA (D:)
NTFS Primary
829.18 GB
931.51 GB
GPT Disk 3 [3D3E7AD3-A6E3-47A5-B323-59122E5B820D] -
1 - (None)
Unformatted Primary
128.0 MB
128.0 MB
Disk Image
Edit the Plan for this Backup
1. Select a Template for your Backup Plan
None
2. Add/Edit Schedules
Backup Type
Schedule
Add Schedule
Edit Schedule
Delete Schedule
Full
Differential
Incremental
g backup sets in the target folder
12
Backups
Differential
Keep
4
Backups
Incremental
Keep
10
Backups
Create a Synthetic Full if possible
Run the purge before backup.
Purge the oldest backup set(s) if less than
5
GB on the target volume (minimum 1GB)
Advanced Options
Help
< Back
Next >
Cancel
Finish
43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Backup Definition Files
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1 - SYSTEM (None)
FAT32 (LBA) Primary
26.9 MB
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Unformatted
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16.0 MB
Actions...
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829.18 GB
931.51 GB
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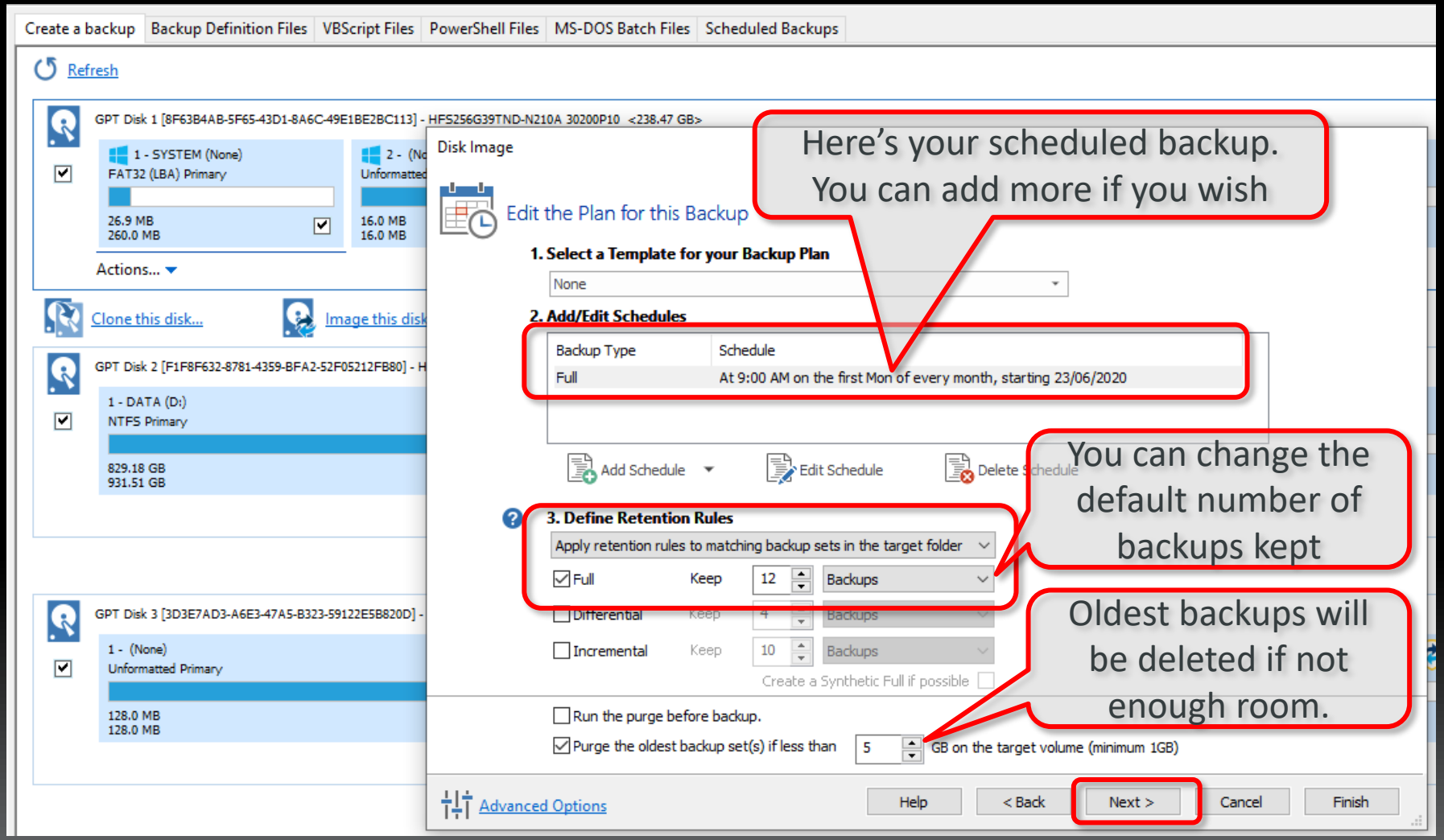
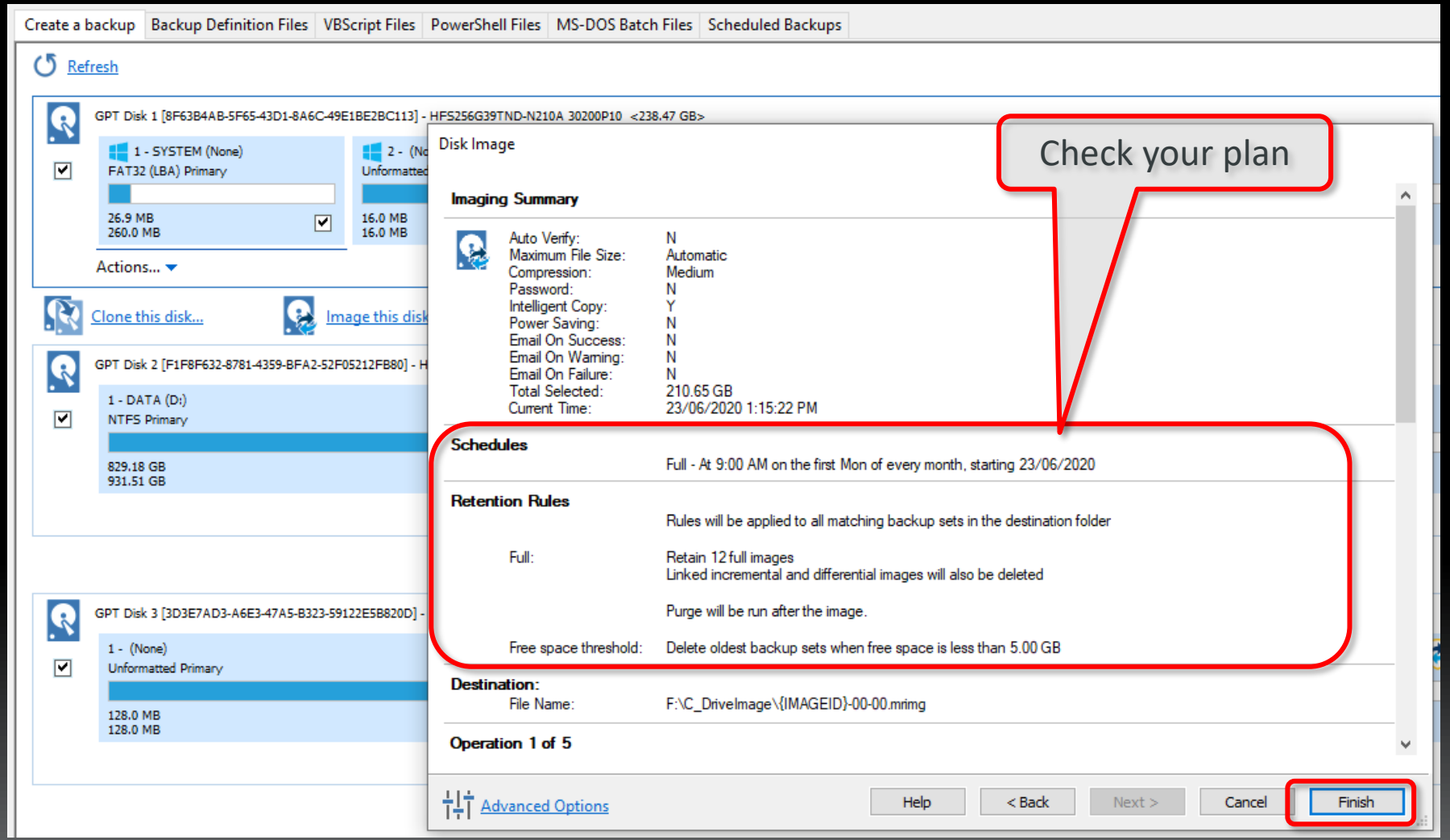
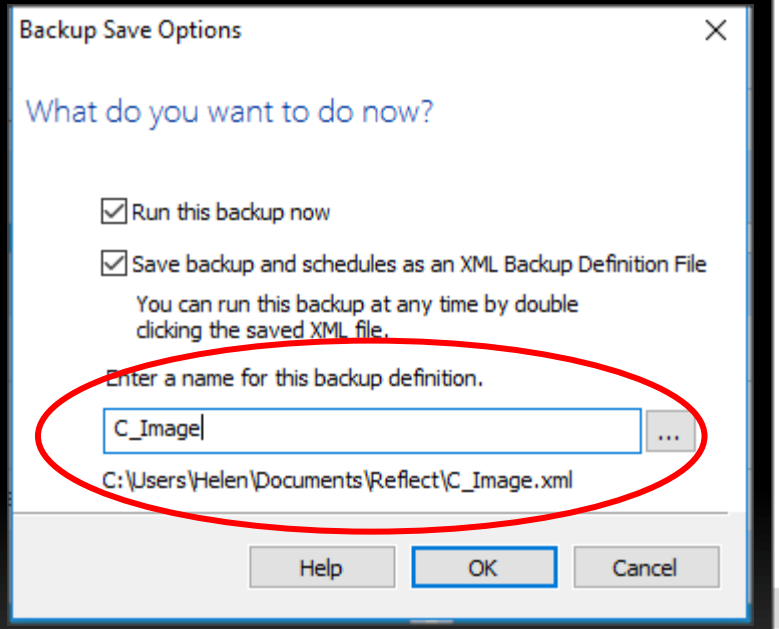
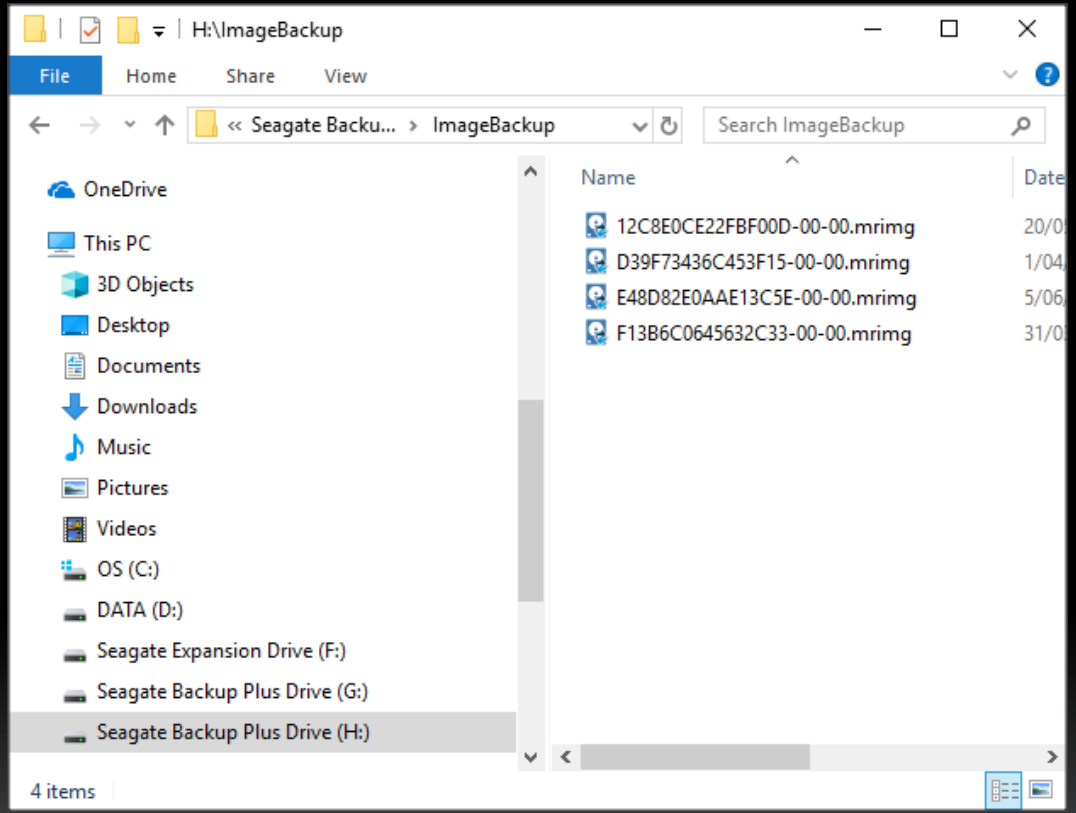
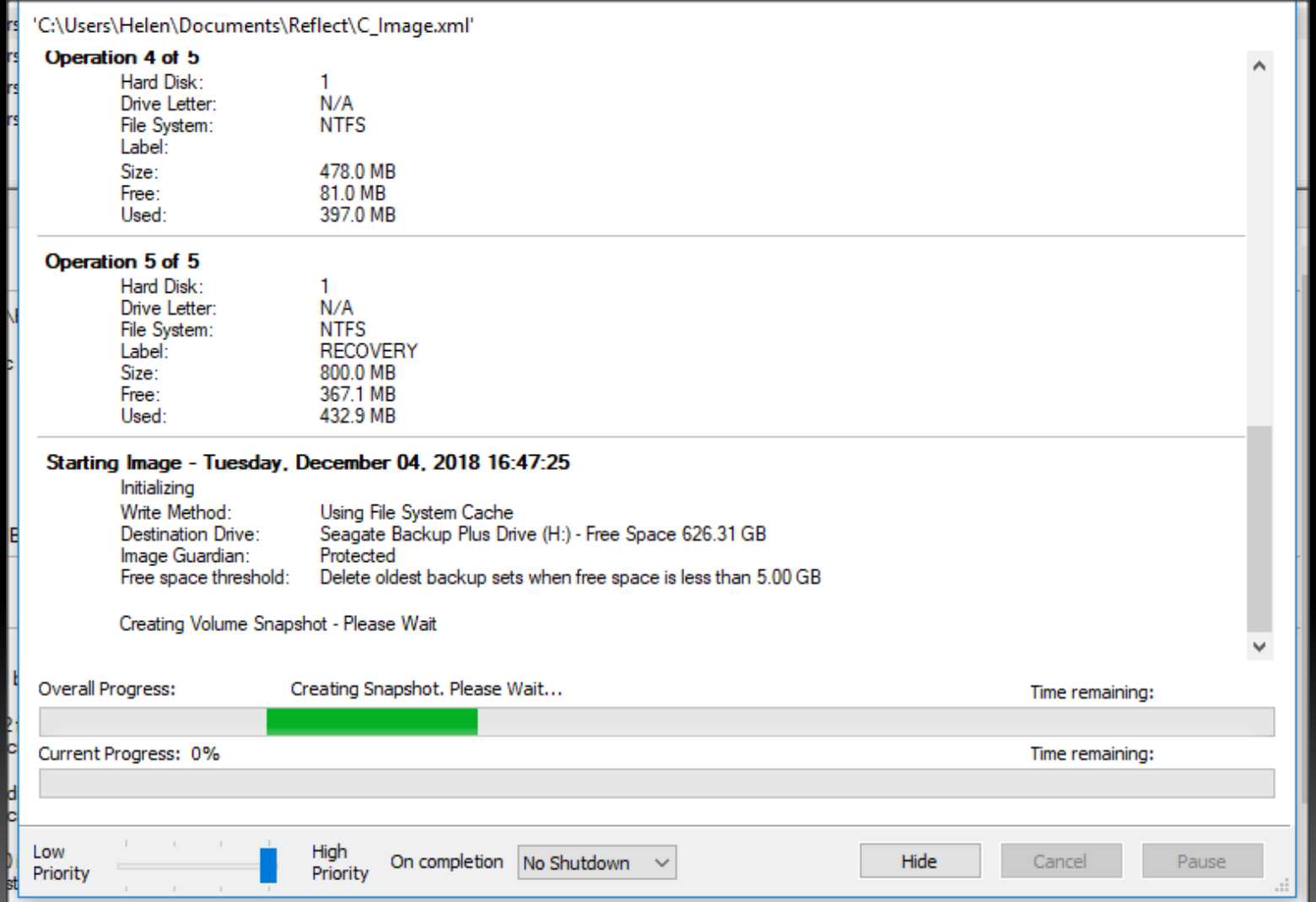
1 - (None)
Unformatted Primary
128.0 MB
128.0 MB
Disk Image
Edit the Plan for this Backup
1. Select a
None
2. Add/Edi
Backup
3. Defi
Apply r
Full
Diffe
Incre
Run
Purge the oldest backup set(s) if less than
5
GB on the target volume (minimum 1GB)
Advanced Options
Help
< Back
Next >
Cancel
Finish
Choose your settings for automatic backup
Full Schedule
Full Schedule Settings
Frequency
Monthly
Weekly
Daily
One Time Only
On Event
Settings
Every
First
Monday
Day
1
Of month(s)
January
February
March
April
May
June
July
August
September
October
November
December
Start Time
09:00
Start Date
23/06/2020
Conditions...
OK
Cancel

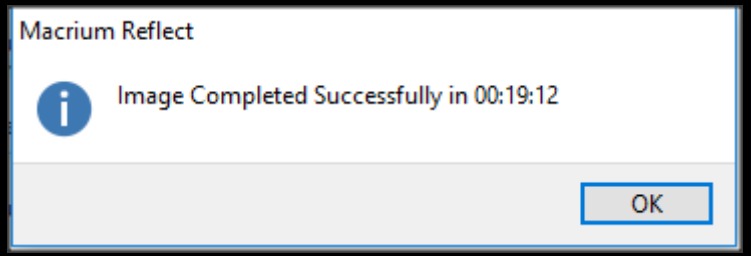

Create a backup
Backup Definition Files
VBScript Files
PowerShell Files
MS-DOS Batch Files
Scheduled Backups
Refresh
GPT Disk 1 [8F63B4AB-5F65-43D1-8A6C-49E1BE2BC113] - HFS256G39TND-N210A 30200P10 <238.47 GB>
1 - SYSTEM (None)
FAT32 (LBA) Primary
26.9 MB
260.0 MB
16.0 MB
16.0 MB
Actions...
Clone this disk...
Image this disk
GPT Disk 2 [F1F8F632-8781-4359-BFA2-52F05212FB80] - H
1 - DATA (D:)
NTFS Primary
829.18 GB
931.51 GB
GPT Disk 3 [3D3E7AD3-A6E3-47A5-B323-59122E5B820D] -
1 - (None)
Unformatted Primary
128.0 MB
128.0 MB
Disk Image
Edit the Plan for this Backup
1. Select a Template for your Backup Plan
None
2. Add/Edit Schedules
Backup Type
Schedule
Full
At 9:00 AM on the first Mon of every month, starting 23/06/2020
Add Schedule
Edit Schedule
Delete Schedule
3. Define Retention Rules
Apply retention rules to matching backup sets in the target folder
Full
Keep
12
Backups
Differential
Keep
4
Backups
Incremental
Keep
10
Backups
Create a Synthetic Full if possible
Run the purge before backup.
Purge the oldest backup set(s) if less than
5
GB on the target volume (minimum 1GB)
Advanced Options
Help
< Back
Next >
Cancel
Finish
Here's your scheduled backup. You can add more if you wish
You can change the default number of backups kept
Oldest backups will be deleted if not enough room.


Create a backup
Backup Definition Files
VBScript Files
PowerShell Files
MS-DOS Batch Files
Scheduled Backups
Refresh
GPT Disk 1 [8F63B4AB-5F65-43D1-8A6C-49E1BE2BC113] - HFS256G39TND-N210A 30200P10 <238.47 GB>
1 - SYSTEM (None)
FAT32 (LBA) Primary
26.9 MB
260.0 MB
16.0 MB
16.0 MB
Actions...
Clone this disk...
Image this disk
GPT Disk 2 [F1F8F632-8781-4359-BFA2-52F05212FB80] - H
1 - DATA (D:)
NTFS Primary
829.18 GB
931.51 GB
GPT Disk 3 [3D3E7AD3-A6E3-47A5-B323-59122E5B820D] -
1 - (None)
Unformatted Primary
128.0 MB
128.0 MB
Disk Image
Check your plan
Imaging Summary
Auto Verify: N
Maximum File Size: Automatic
Compression: Medium
Password: N
Intelligent Copy: Y
Power Saving: N
Email On Success: N
Email On Warning: N
Email On Failure: N
Total Selected: 210.65 GB
Current Time: 23/06/2020 1:15:22 PM
Schedules
Full - At 9:00 AM on the first Mon of every month, starting 23/06/2020
Retention Rules
Rules will be applied to all matching backup sets in the destination folder
Full: Retain 12 full images
Linked incremental and differential images will also be deleted
Purge will be run after the image.
Free space threshold: Delete oldest backup sets when free space is less than 5.00 GB
Destination:
File Name: F:\C_DriveImage\{IMAGEID}-00-00.mrimg
Operation 1 of 5
Advanced Options
Help
< Back
Next >
Cancel
Finish


Backup Save Options
What do you want to do now?
Run this backup now
Save backup and schedules as an XML Backup Definition File
You can run this backup at any time by double clicking the saved XML file.
Enter a name for this backup definition.
C_Image
...
C:\Users\Helen\Documents\Reflect\C_Image.xml
Help
OK
Cancel


H:\ImageBackup
File
Home
Share
View
« Seagate Backu... › ImageBackup
Search ImageBackup
OneDrive
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
OS (C:)
DATA (D:)
Seagate Expansion Drive (F:)
Seagate Backup Plus Drive (G:)
Seagate Backup Plus Drive (H:)
Name
Date
12C8E0CE22FBF00D-00-00.mrimg
D39F73436C453F15-00-00.mrimg
E48D82E0AAE13C5E-00-00.mrimg
F13B6C0645632C33-00-00.mrimg
4 items


'C:\Users\Helen\Documents\Reflect\C_Image.xml'
Operation 4 of 5
Hard Disk: 1
Drive Letter: N/A
File System: NTFS
Label:
Size: 478.0 MB
Free: 81.0 MB
Used: 397.0 MB
Operation 5 of 5
Hard Disk: 1
Drive Letter: N/A
File System: NTFS
Label: RECOVERY
Size: 800.0 MB
Free: 367.1 MB
Used: 432.9 MB
Starting Image - Tuesday, December 04, 2018 16:47:25
Initializing
Write Method: Using File System Cache
Destination Drive: Seagate Backup Plus Drive (H:) - Free Space 626.31 GB
Image Guardian: Protected
Free space threshold: Delete oldest backup sets when free space is less than 5.00 GB
Creating Volume Snapshot - Please Wait
Overall Progress:
Creating Snapshot. Please Wait...
Time remaining:
Current Progress: 0%
Time remaining:
Low Priority
High Priority
On completion
No Shutdown
Hide
Cancel
Pause


Macrium Reflect
Image Completed Successfully in 00:19:12
OK

Helen Smith - U3A Nunawading

Before it's too late …

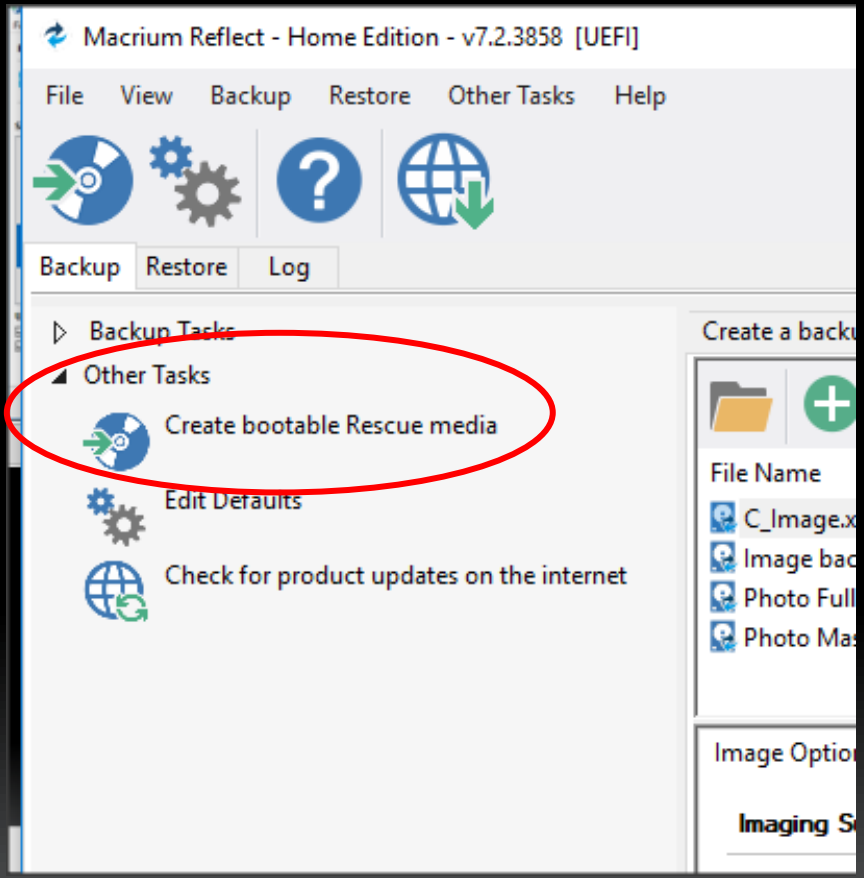
BACKUP YOUR COMPUTER!

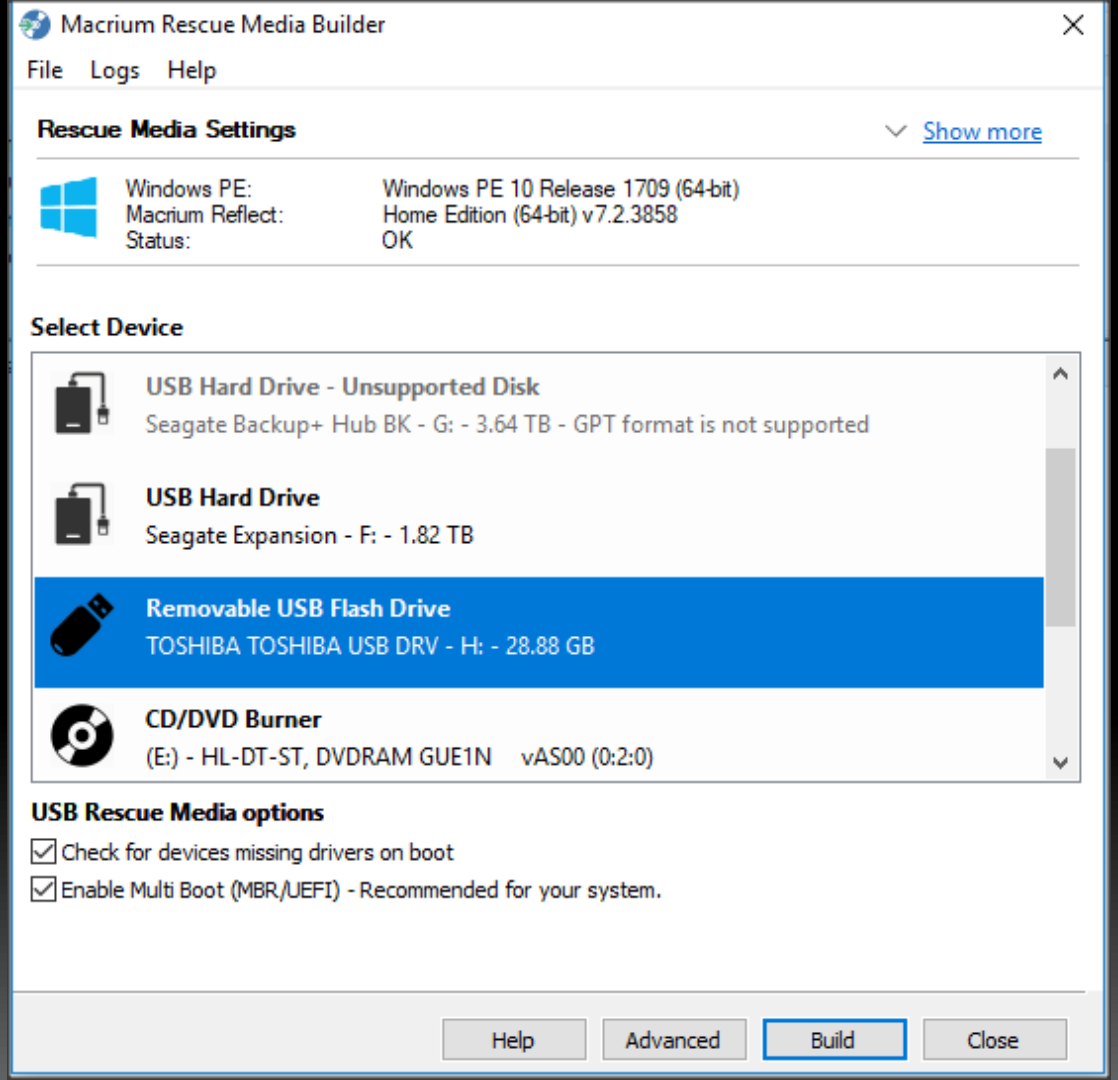
PART 2

6. Create Rescue Media

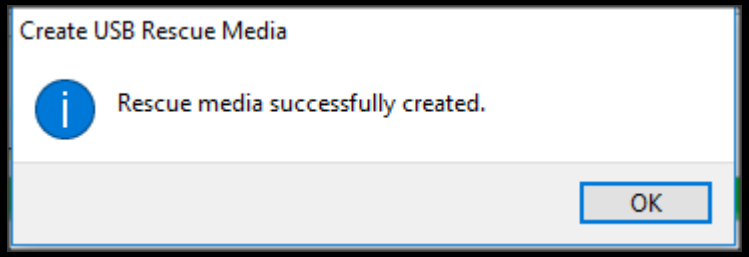
Rescue Media - CD, DVD, or USB stick that you would boot from in order to restore from your image.

Note: The Image backup isn't a direct copy of your C: drive. It's just a copy of the contents, but not setup to boot from.


Macrium Reflect - Home Edition - v7.2.3858 [UEFI]
File
View
Backup
Restore
Other Tasks
Help
Backup
Restore
Log
Backup Tasks
Other Tasks
Create bootable Rescue media
Edit Defaults
Check for product updates on the internet
Create a backu
File Name
C_Image.x
Image bac
Photo Full
Photo Ma
Image Optio
Imaging S


Macrium Rescue Media Builder
File
Logs
Help
Rescue Media Settings
Show more
Windows PE:
Windows PE 10 Release 1709 (64-bit)
Macrium Reflect:
Home Edition (64-bit) v7.2.3858
Status:
OK
Select Device
USB Hard Drive - Unsupported Disk
Seagate Backup+ Hub BK - G: - 3.64 TB - GPT format is not supported
USB Hard Drive
Seagate Expansion - F: - 1.82 TB
Removable USB Flash Drive
TOSHIBA TOSHIBA USB DRV - H: - 28.88 GB
CD/DVD Burner
(E:) - HL-DT-ST, DVDRAM GUE1N vAS00 (0:2:0)
USB Rescue Media options
Check for devices missing drivers on boot
Enable Multi Boot (MBR/UEFI) - Recommended for your system.
Help
Advanced
Build
Close

Label and save your rescue media



- You don’t need to create a new rescue drive each time you backup. But after a major update is a good idea.

7. Check your backups worked

Backups generally work.

BUT If your backups don’t work, you don’t have a backup!

How to test your backups

1. Check some files in the backup
2. Restore some files
3. Boot from ‘rescue media’
4. Perform an image restore – BUT STOP AT THE LAST STEP

1. Check some files in the backup

a) ‘Mount’ the image backup as a new drive (ie ‘pretend’ that the backup is a hard disk)
b) Explore the ‘drive’
c) Open a few files and check they look OK
d) ‘Unmount’ or ‘Detach’ the drive when you are finished.

2. Restore some files

a) Pick an important file on your hard disk.
b) Rename it.
c) Now restore the original from your backup, and make sure it’s the same.
d) Repeat this for several files in different locations to ensure the files you expect to be backed up actually have been, and can be recovered.

3. Boot from ‘rescue media’

a) Create an ‘emergency disk’ or ‘rescue media’
b) boot from the ‘emergency disk’ or ‘rescue media’ to make sure it works.
c) Once loaded, make sure it can ‘see’:
   - the backup you’ve created,
   - the hard disk onto which the backup might be restored.

4. Perform an image restore – BUT STOP AT THE LAST STEP

a) Follow the sequence to perform an image restore BUT …

b) Stop at the very last step. Do not actually perform the restore.

(This assumes your backup strategy involves image backups.)

Why not restore the image?

- It would be the only FULL test of the backup process BUT
- If it doesn't work – you've possibly destroyed what was on your hard disk
- If we HAVE to use the backup 'for real' we accept that risk
- If we're just testing, that risk may be too great.

When to test your backups

- Immediately after you set up your backup strategy, ie after your first backup
- Regularly after – say every six months
- Keep an eye open to check that backups are happening – frequently check your drive to ensure the backup files are there

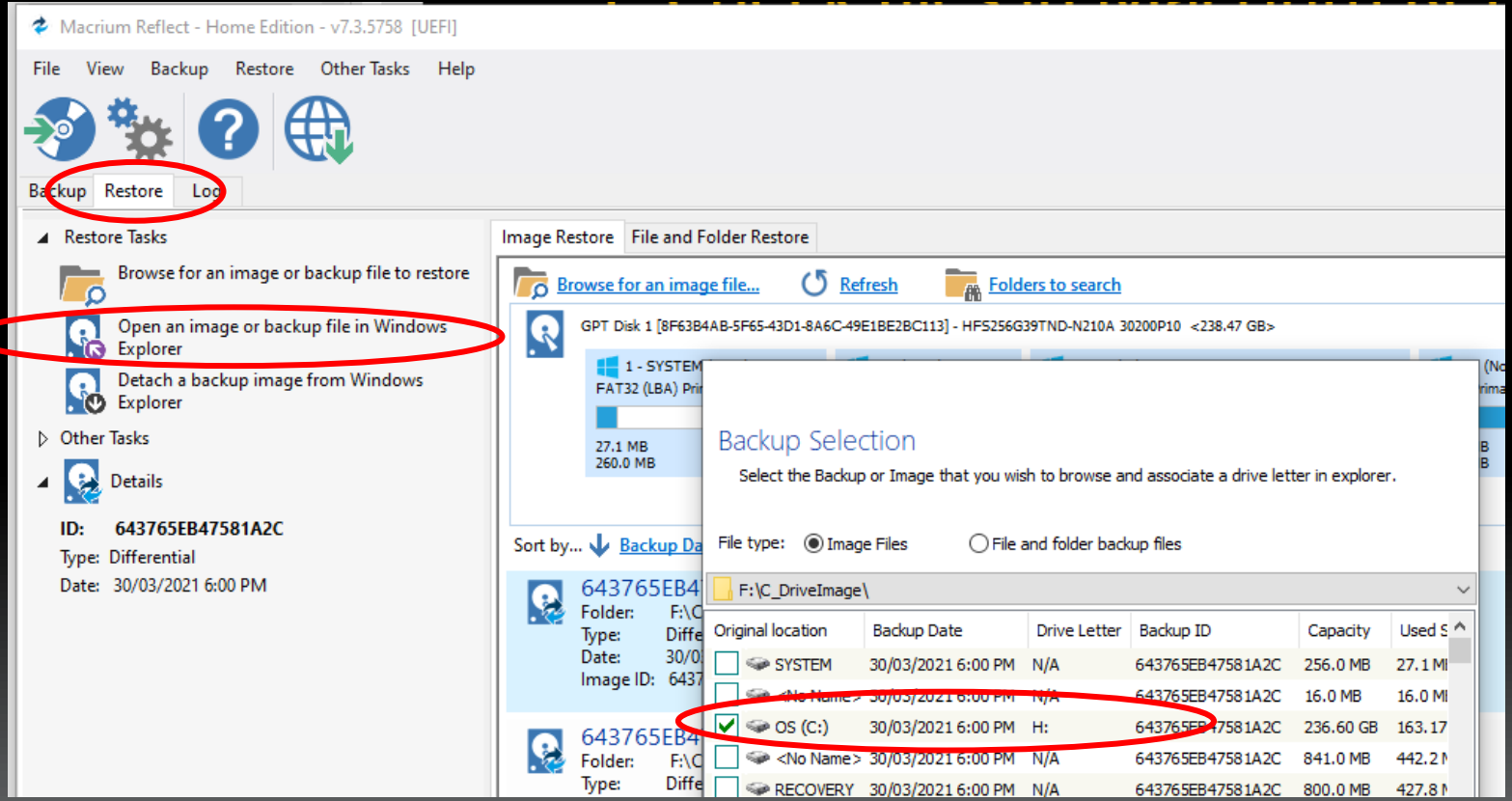
What if your backup test fails?

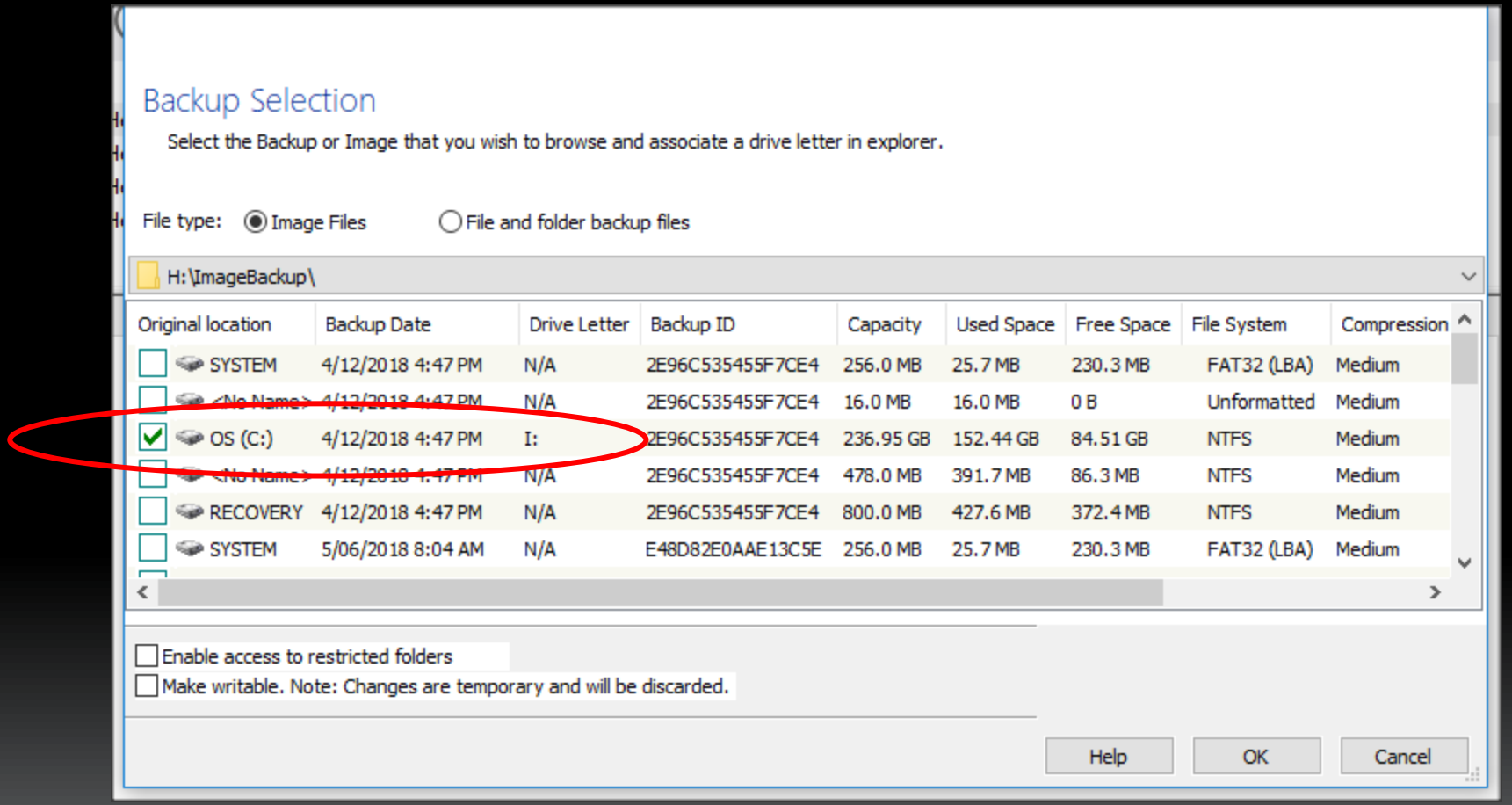
- STOP
- Fix the problem – depends on what it is
- Do it now – don't put it off, because you don't have a backup!

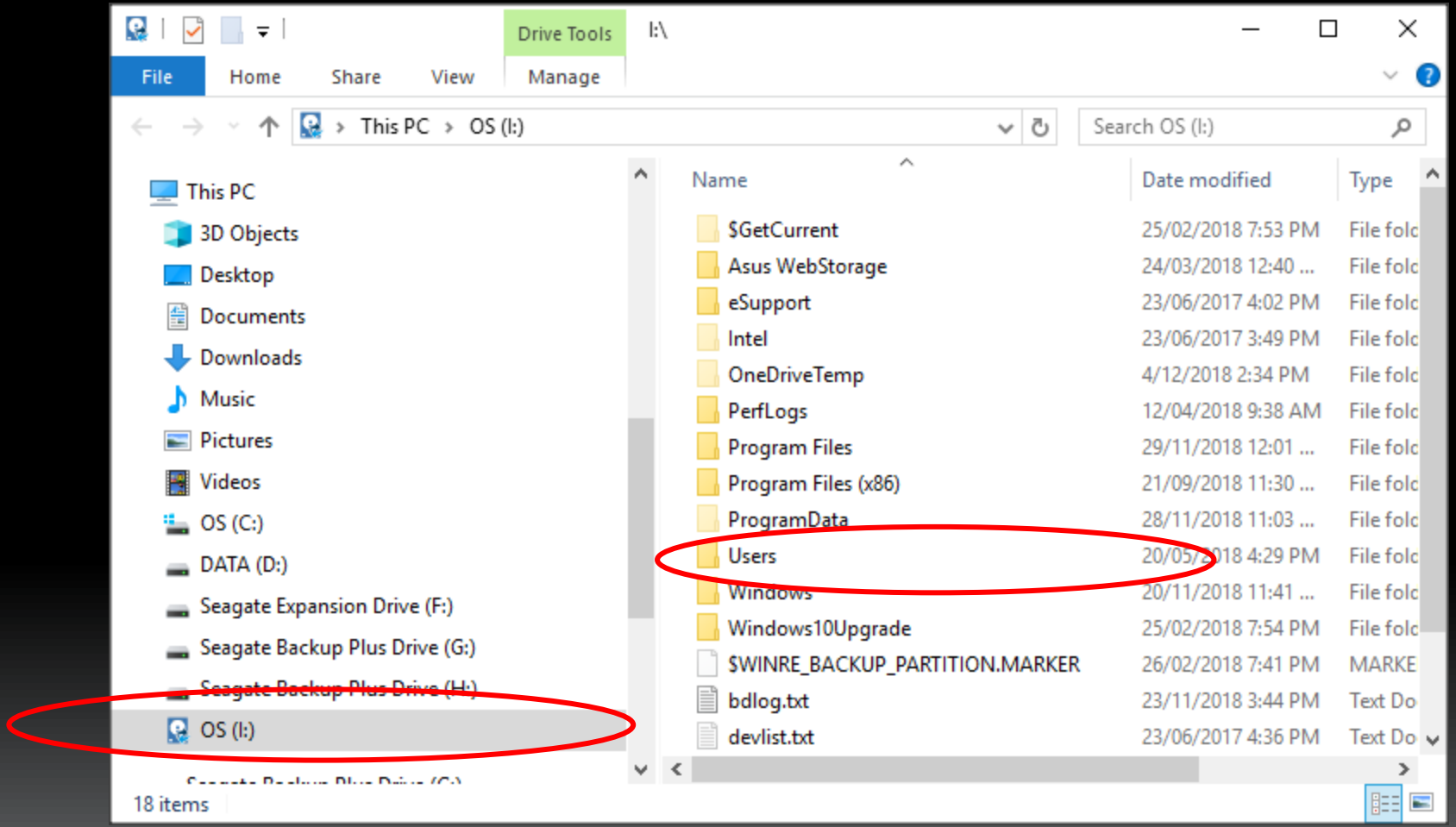
Don't panic!

Backups generally work

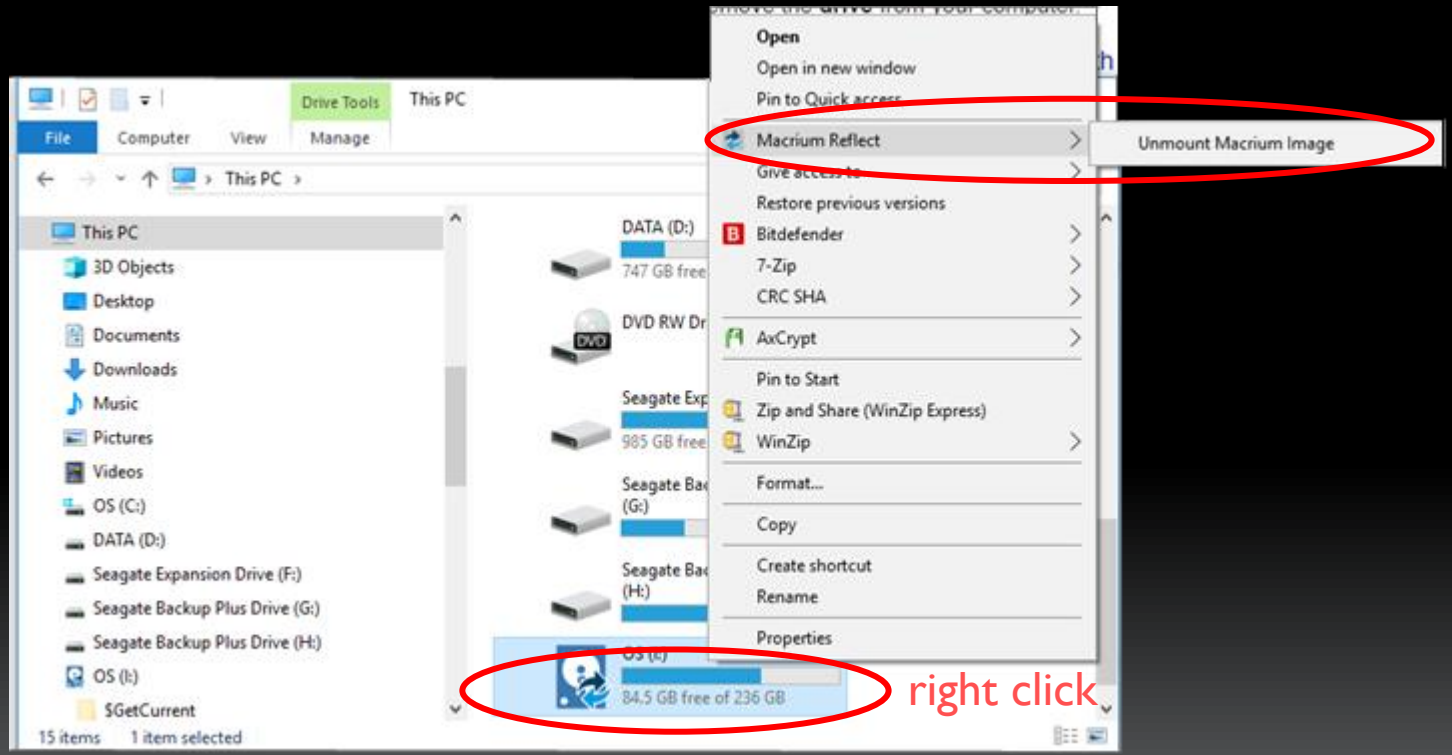
1. Check files in Macrium Reflect




Backup Selection
Select the Backup or Image that you wish to browse and associate a drive letter in explorer.
File type:
Image Files
File and folder backup files
H:\ImageBackup\
Original location
Backup Date
Drive Letter
Backup ID
Capacity
Used Space
Free Space
File System
Compression
SYSTEM 4/12/2018 4:47 PM N/A 2E96C535455F7CE4 256.0 MB 25.7 MB 230.3 MB FAT32 (LBA) Medium
<No Name> 4/12/2018 4:47 PM N/A 2E96C535455F7CE4 16.0 MB 16.0 MB 0 B Unformatted Medium
OS (C:) 4/12/2018 4:47 PM I: 2E96C535455F7CE4 236.95 GB 152.44 GB 84.51 GB NTFS Medium
<No Name> 4/12/2018 4:47 PM N/A 2E96C535455F7CE4 478.0 MB 391.7 MB 86.3 MB NTFS Medium
RECOVERY 4/12/2018 4:47 PM N/A 2E96C535455F7CE4 800.0 MB 427.6 MB 372.4 MB NTFS Medium
SYSTEM 5/06/2018 8:04 AM N/A E48D82E0AAE13C5E 256.0 MB 25.7 MB 230.3 MB FAT32 (LBA) Medium
Enable access to restricted folders
Make writable. Note: Changes are temporary and will be discarded.
Help
OK
Cancel


Drive Tools
I:\
File
Home
Share
View
Manage
This PC
OS (I:)
Search OS (I:)
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
OS (C:)
DATA (D:)
Seagate Expansion Drive (F:)
Seagate Backup Plus Drive (G:)
OS (I:)
Name
Date modified
Type
$GetCurrent
Asus WebStorage
eSupport
Intel
OneDriveTemp
PerfLogs
Program Files
Program Files (x86)
ProgramData
Users
Windows
Windows10Upgrade
$WINRE_BACKUP_PARTITION.MARKER
bdlog.txt
devlist.txt
18 items

‘Unmount’ the drive when you’re finished



8. What to do next

1. *Get TWO (or more) external hard drives – each 3 x capacity of the drive(s) you want to backup*
2. *Choose your BACKUP SOFTWARE (Windows or Macrium Reflect)*
3. *Set up REGULAR IMAGE BACKUPS of your C: drive and SAVE OFFLINE*
4. *Consider setting up regular backups of other storage drives*
5. *Make sure you have a RESCUE DISK*
6. *CHECK your backups regularly*

My Backup Plan

- Now I know what to do, I can
  - set up a backup plan and
  - KEEP to it!

ANY QUESTIONS ?

Thank you for attending this
U3A presentation / demonstration