



Tech Notes

Dr.Backup - S.M.A.R.T. Local Backup Service for Windows

Full Image Backups Provide Additional Data Protection for your Business

While online backups provide the ultimate in mission critical data protection, a full local image backup can be an excellent complement. This add-on service enables you to capture and store full image backups of your files, application software and Windows operating system on local disk media that you purchase and maintain. This increases your organization's ability to rapidly recover from a data disaster.

BACKGROUND

The **Dr.Backup S.M.A.R.T. Local Backup Service for Microsoft Windows** performs LOCAL image backup(s) of NTFS-formatted disk partition(s) using the Microsoft Volume Shadow Copy Service (VSS). Each backup is a standalone complete version of all blocks in use at the time the backup began and is suitable for bare metal restore or virtualization purposes.

Backups are stored in Microsoft Virtual Hard Disk (VHD) format on customer premise disk storage -- supplied and maintained by the customer. In the event of data loss, the Dr.Backup client software can be used locally to unpack a copy of the ENTIRE DISK IMAGE to replacement storage. Once this entire image is restored, locally archived information can be retrieved using the standard Microsoft Windows file explorer interface. Disk volumes that exceed 2TB in size can be backed up into a VHDX format beginning in Dr.Backup version 11.16.7.

To backup or restore local disk images, the customer must 1) have an active contract in place with Dr.Backup that includes the local backup service option, and 2) provide an adequate amount of local disk storage on a designated disk volume.

Note: FOR BEST RESULTS, WE STRONGLY RECOMMEND THAT ALL LOCAL BACKUP STORAGE DEVICES BE PLUGGED INTO A BATTERY BACKUP POWER SUPPLY.

A PDF-formatted document containing a service description summary, pricing information and brief FAQ can be found online at the following network location:

<http://www.drbackup.net/partner/DrBackup-SMARTLocalBackupServiceAddOnPricelist.pdf>

SUPPORTED SYSTEM CONFIGURATIONS

Dr.Backup supports local image backups on a wide variety of operating system client and server platforms. These are shown in the table below.



During an image backup, Dr.Backup does NOT examine any specific files, folders or applications on the disk partitions. Rather, it backs up the entire disk block structure of the volume. Both “fixed” VHD and “dynamic” VHD formats are supported, with the latter being favored due to its reduced disk storage requirements.

When provisioning local disk storage, consider the **entire partition size of all volumes** you want to protect in computing your disk storage requirements.

Table 1: Supported Versions of Microsoft Windows

Operating System	Image Backup	Restore Volume	Restore VHD	Notes
Windows 2000	No	N/A	N/A	No VSS support available
Windows XP + Server 2003	Yes	Yes	Custom	VHD: requires install of VHDMount
Windows Vista + Server 2008	Yes	Yes	Custom	VHD: requires install of VHDMount
Windows 7 + Server 2008R2	Yes	Yes	Yes	VHD: 512-byte disk storage sectors
Windows 8 + Server 2012	Yes	Yes	Yes	VHD/X: 512 & 4096-byte disk sectors
Windows 8.1 + Server 2012R2	Yes	Yes	Yes	VHD/X: 512 & 4096-byte disk sectors
Windows 10 + Server 2016	Yes	Yes	Yes	VHD/X:512 & 4096-byte disk sectors

Additional Technical Notes:

1. PC operating system must meet revision levels of the Dr.Backup online backup client software.
2. VHD standards restrict the maximum size of a volume (partition) backup to 2 TB.
3. VHDX supported automatically for volumes that exceed 2TB
4. VHDMount requires prior customer installation of select components from Microsoft Virtual Server 2005 R2 SP1 product. This requires a network download from Microsoft.
5. Interoperability with other installed image backup programs is uncertain.
- 6. If you are using third-party encryption technology, please consult with your software provider for appropriate mount and recovery procedures.**

RECOMMENDED DISK STORAGE REQUIREMENTS

Due to the extremely large size of a full image backup, and the extended time required to perform a backup, most customers will likely select to run these backups weekly – during off-hours. Dr.Backup recommends that clients maintain a minimum of two (2) complete image backups locally at all times. This provides for a 14-day local recovery window and is the basis for the recommended minimum disk storage recommendations shown in the table below.

To account for an “in-progress” backup (plus 2 additional on-disk copies) the disk storage requirements



listed in the table below call for customers to locally provision approximately three times (3x) the amount of disk storage they need to protect for their backups.

Table 2: Recommended Disk Storage to Provision

Storage to Protect	Local Disk Storage to Provision	Notes
100 GB	500 GB	
250 GB	1 TB	
500 GB	2 TB	
1 TB	4 TB	VHD: sector sizes > 512 Windows 8+ or Server 2012+
2 TB	6 TB	VHD: sector sizes > 512 Windows 8+ or Server 2012+

Additional Technical Notes:

1. Volume based restores are supported on all storage density drives Windows “recognizes”
2. Individual disks with storage capacities exceeding 2 TB generally have sector sizes of 4096 bytes. If these high-density volumes are used for backups, you will NOT be able to rapidly recover your data by directly mounting a backup VHD (on systems prior to Windows 8 or Server 2012). Rather, the data must be restored (copied) to a supported storage device (generally 2 TB in size or lower) before mounting
3. USB 3.0 drive speeds can help to maximize data transfer speed and shorten backup windows
4. Due to light service duty, we recommend using disk storage components which efficiently manage power utilization

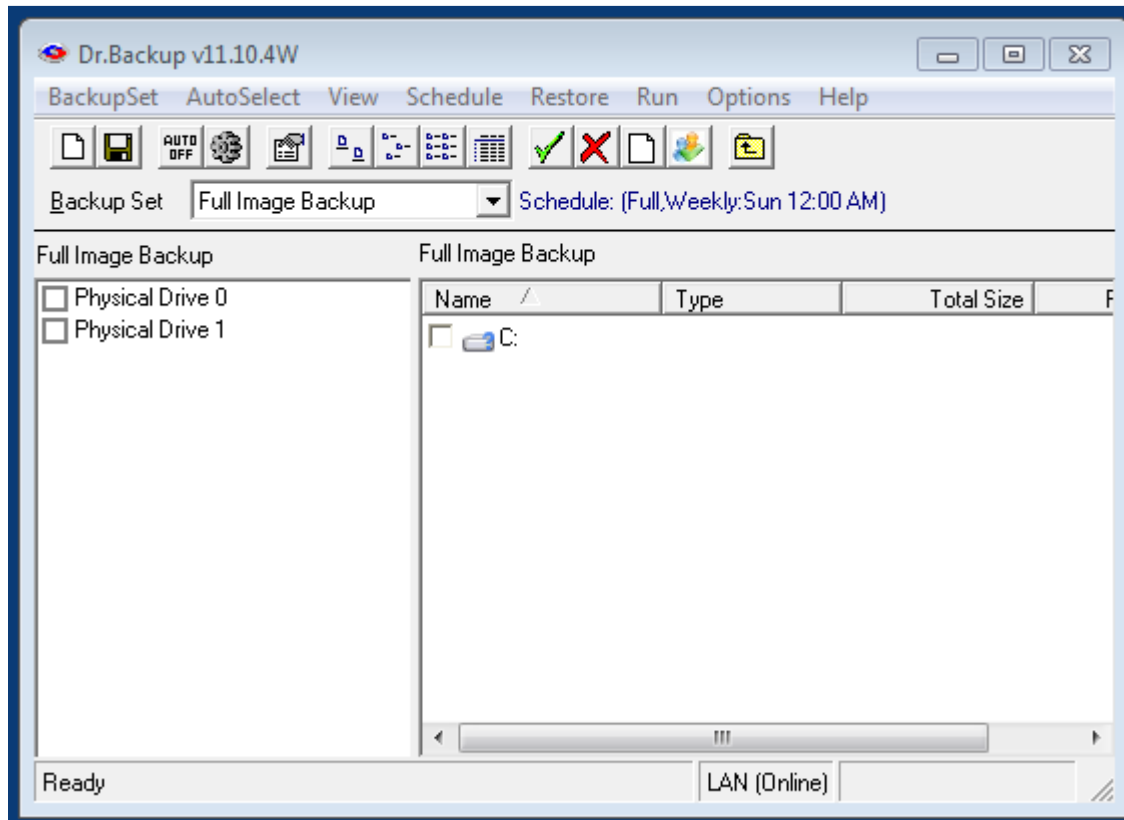
PREPARING FOR FULL IMAGE BACKUPS

The Dr.Backup software client version 11.10 or greater is required to use the full image backup feature. If you are an existing online backup client, contact customer support and request your software be upgraded so that you can trial/use this new capability as a complement to your online backup protection.

To determine if your software is at the correct revision, open the “Remote Backup” software by clicking on the icon on your desktop – or clicking directly on the program itself at **C:\Program files (x86)\Remote Backup\rbclient.exe**



The version of your software can be seen in the title bar of the program window. In this case, version 11.10.4 is pictured.



All backup disk storage is owned, maintained and operated locally by the customer. Dr.Backup software uses this customer-provided local storage to hold the image backups. **Dr.Backup does not sell or rent local disk storage**, however, we can often provide you with general suggestions on the types of devices that others have been successful using.

Local disk storage must be provisioned prior to configuring the image backup software. Storage options include: 1) USB drive connected directly to PC being backed up, 2) A shared Network Attached Storage (NAS) device accessible via a local area network, 3) a PC on the local network with sufficient attached storage that can be shared. See above for local disk storage recommendations.

NAS devices and shared PC storage must be provisioned to support secure access via fixed username and password. The customer representative assisting in configuring the full image backups must be privileged with these access credentials – as they are required to be programmed into the image backup



software. If for any reason these credentials change, Dr.Backup support should be immediately notified - so that we may assist in the reconfiguration of the image backup software.

CONFIGURING FULL IMAGE BACKUPS

Full image backup capability has been integrated directly into the Dr.Backup online backup client software. Configuration of the image backups is very similar to configuration of online backups.

The configuration steps include:

1. Specify the location of the (local) cloud storage by providing a fully qualified path name
2. Select the "Full Image Backup" set using the backup set pull down menu
3. Place a check mark on the right pane of the user interfaces corresponding to the volumes (partitions) on each disk you want to archive locally – then save the backupset configuration
4. Use the schedule menu to establish the data/time when the local image backups will take place
5. **Select cloud service as the destination (also on the schedule menu)**
6. If you are using a NAS device or mapped drive to another computer, establish the path to that external device using the network drives dialog box. Also, make sure to add credentials to your Windows task scheduler job – so it can access the off machine resources of the NAS

Note: In order to backup a disk partition, that partition must be assigned a drive letter. Non-NTFS partitions or partitions which are not assigned a permanent drive letter will not be visible in the user interface and are not selectable for backup.

If you are going to be directly involved in the setup and management of local image backups, you may want to take some time to watch a technical training video. The video walks through the full configuration process, discusses data retention strategies and over views one technique which can be used to rapidly recover data from a local NAS device.

You can access the video training session at this network location:

<http://drbackup.net/video/FIB/FIB.htm>

Please note that the screenshots and options shown in this video may over time change due to program enhancements or changes in the Windows operating system. However, the concepts shown in the training session should be applicable to all versions of Dr.Backup.

In a complementary video session, we discuss how easy it is to recover lost data by simply mounting a VHD disk image. We also cover the basics of what is required to "virtualize" a VHD – effectively using the disk image contents to create a working PC running under a virtual machine "hypervisor" such as VMWare Workstation. That video is here: <http://drbackup.net/video/FIB/virtualize.htm>



ADDITIONAL TECH NOTES: USING HIGH CAPACITY DRIVES PRIOR TO WINDOWS 8.

Certain enterprise-class drives with capacities of 4GB and up claim to support sector size “512n”. This technology emulates (via firmware) the existence of 512 byte sectors sizes – even though the actual physical sector size is larger.

Microsoft details support for these types of drives (and others) here: [http://msdn.microsoft.com/en-us/library/windows/desktop/hh848035\(v=vs.85\).aspx](http://msdn.microsoft.com/en-us/library/windows/desktop/hh848035(v=vs.85).aspx)

If you use a disk drive with a capacity that exceeds 2TB, and wish to see if it can be used to mount VHD files for OS versions PRIOR to Windows 8/Server 2012, Microsoft recommends you check the “bytes per physical sector” value of your disk using the “fsutil” disk utility.

Two examples are provided here. Example 1 (C: drive) presents itself to Windows as a drive with 512 byte physical sectors. You should be able to successfully mount a VHD file on this drive. Example 2 (H: drive) presents itself to Windows as a drive with a 4096 size sector. You cannot directly mount a VHD stored on this volume unless you are using Windows 8/Server 2012 or greater.

Example #1 (Physical disk format supported)

Command: C:\Windows\system32>fsutil fsinfo ntfsinfo C:

```
NTFS Volume Serial Number : 0xcaf0b5bff0b5b1d5
Version : 3.1
Number Sectors : 0x000000003a3847ff
Total Clusters : 0x00000000074708ff
Free Clusters : 0x000000000508f9bd
Total Reserved : 0x00000000000007d0
Bytes Per Sector : 512
Bytes Per Physical Sector : 512
Bytes Per Cluster : 4096
Bytes Per FileRecord Segment : 1024
Clusters Per FileRecord Segment : 0
Mft Valid Data Length : 0x000000005cc00000
Mft Start Lcn : 0x00000000000c0000
Mft2 Start Lcn : 0x0000000000000002
Mft Zone Start : 0x00000000015712e0
Mft Zone End : 0x0000000001578f40
RM Identifier: 9EA20AD9-F52D-11E3-890A-92E6EA767416
```



Example #2 (Physical disk format NOT supported)

Command: C:\Windows\system32>fsutil fsinfo ntfsinfo H:

NTFS Volume Serial Number : 0x04084ed4084ec480
Version : 3.1
Number Sectors : 0x000000001ffffdff
Total Clusters : 0x000000001ffffdff
Free Clusters : 0x00000000f751998
Total Reserved : 0x0000000000000000
Bytes Per Sector : 4096
Bytes Per Physical Sector : <Not Supported>
Bytes Per Cluster : 4096
Bytes Per FileRecord Segment : 4096
Clusters Per FileRecord Segment : 1
Mft Valid Data Length : 0x0000000000100000
Mft Start Lcn : 0x00000000000c0000
Mft2 Start Lcn : 0x0000000000000002
Mft Zone Start : 0x00000000000c0100
Mft Zone End : 0x00000000000cc820
RM Identifier: CA9D54EA-0D64-11E4-8CF6-40F02FD4E479