

ORGANIZING HARD DRIVES IN A "WINDOWS 7.." COMPUTER

by Francis Chao
fchao2@yahoo.com

TuCS COMPUTER
Son
SOCIETY

WINNERS
WINdows usERS



An International
Association of Technology
& Computer User Groups

**Web location for this
presentation:**

<http://aztcs.org>

Click on “**Meeting
Notes**”

SUMMARY

You can use the "Dynamic Volumes" capability inside the bundled "Disk Management" applet inside a "Windows 7.." computer to organize your hard drives in order to merge existing hard drives into larger virtual hard drive volumes and mirror two hard drives to reduce the probability of data loss.

TOPICS

- Basics of Disk Installation and Management
- "Dynamic Volumes" in "Windows 7"
- When Not To Convert A "Basic Disk" to "Dynamic Disk"
- Three Types of "Dynamic Volumes" in "Windows 7"
- Mirrored "Dynamic Volumes"

BASICS OF DISK INSTALLATION AND MANAGEMENT

- Attach a blank ("bare metal") hard drive via SATA, SCSI, IDE, SAS cabling to your Windows.. computer
- "Initialize" (= "partition") the hard drive (makes the hard drive into a "simple disk")
- Inside the hard drive, create "volume(s)" (select between simple volume, mirrored volume, spanned volume, or striped volume) ⁵

BASICS OF DISK INSTALLATION AND MANAGEMENT (continued)

- Inside the hard drive, create "volume(s)" (select between simple volume, mirrored volume, spanned volume, or striped volume).

BASICS OF DISK INSTALLATION AND MANAGEMENT (continued)

- No "Storage Spaces" capability in "Windows 7.." where only "Dynamic Disk(s)" with "Dynamic Volume(s)" are available
- When you "Initialize" the hard drive "simple disk" is the default
- "Simple disk" only allows "simple volume(s)"

BASICS OF DISK INSTALLATION AND MANAGEMENT (continued)

- "Dynamic disk" is required for a "mirrored volume", a "spanned volume", or a "striped volume"

USING "DISK MANAGEMENT" APPLET IN "WINDOWS.."

- When you attach a blank ("bare metal") hard drive to a "Windows.." computer and the "Windows.." operating system recognizes the drive for the first time, you will usually get a dialog box for "initializing" the blank hard drive.

USING "DISK MANAGEMENT" APPLLET IN

"WINDOWS.." (continued)

- If the previous does not happen, use one of the methods at <https://www.digitalcitizen.life/open-disk-management-windows> to start up the "Disk Management" applet

The locate the blank hard drive and right-click on the left side of the representation of the hard drive and then click on "Initialize Disk"

USING "DISK MANAGEMENT" APPLET IN "WINDOWS.." (continued)

- Color coding in "Disk Management" for "dynamic volume(s)" is described in <http://www.pearsonitcertification.com/articles/article.aspx?p=332154&seqNum=3>

"BASIC DISK" AND "DYNAMIC DISK"

- According to https://en.wikipedia.org/wiki/Microsoft_basic_data_partition :
When a Microsoft operating system converts a GPT-partitioned basic disk to a dynamic disk, all BDPs are combined and converted to a single Logical Disk Manager data partition

"BASIC DISK" AND "DYNAMIC DISK"

- According to

https://en.wikipedia.org/wiki/Logical_Disk_Manager

when a disk is converted from "Basic Disk" to "Dynamic Disk", the metadata for "Dynamic Volumes" is stored in a "metadata partition" while one or more "data partitions" store the actual files and folders in the Dynamic Volumes that are created:

Partition table types [\[edit \]](#)

ID (GUID Partition Table and MBR Partition Table)	Description
GPT: <code>5808C8AA-7E8F-42E0-85D2-E1E90434CFB3</code> MBR: None ¹	"metadata" partition. The area of the disc that is used for holding configuration data that describe the volumes that LDM manages.
GPT: <code>AF9B60A0-1431-4F62-BC68-3311714A69AD</code> MBR: <code>0x42</code>	"data" partition. The area of the disc that is used for holding LDM volumes themselves.

"BASIC DISK" AND "DYNAMIC DISK"

- The "metadata" partition is usually called the "LDM Metadata Partition"
- The "data" partition is usually consists of one or more "LDM Data Partitions".
- ("LDM" stands for "Logical Disk Manager")

"BASIC DISK" AND "DYNAMIC DISK"

- The virtualized "Dynamic disks" and "Dynamic volumes" are always visible in the "Disk Management" applet of "Windows..".

"BASIC DISK" AND "DYNAMIC DISK"

- The actual, physical "LDM Metadata partition(s)" and the "LDM Data partition(s)" are not shown inside the "Disk Management" applet in "Windows.." but they are easily seen inside the free "GPartED" software utility inside "Linux":

/dev/sdb - GParted

GParted Edit View Device Partition Help

/dev/sdb (50.00 GiB)

/dev/sdb3
49.98 GiB

Partition	Name	File System	Size	Used	Unused	Flags
/dev/sdb1	LDM metadata partition	unknown	1.00 MiB	---	---	
/dev/sdb2	Microsoft reserved partition	unknown	14.98 MiB	---	---	msftres
/dev/sdb3	LDM data partition	unknown	49.98 GiB	---	---	

0 operations pending

Partition	Name	File System	Size
/dev/sdb1	! LDM metadata partition	■ unknown	1.00 MiB
/dev/sdb2	! Microsoft reserved partition	■ unknown	14.98 MiB
/dev/sdb3	! LDM data partition	■ unknown	49.98 GiB

/dev/sdc - GParted

GParted Edit View Device Partition Help

/dev/sdc (50.00 GiB)

/dev/sdc3
49.98 GiB

Partition	Name	File System	Size	Used	Unused	Flags
/dev/sdc1	LDM metadata partition	unknown	1.00 MiB	---	---	
/dev/sdc2	Microsoft reserved partition	unknown	14.98 MiB	---	---	msftres
/dev/sdc3	LDM data partition	ntfs	49.98 GiB	---	---	

0 operations pending

Partition	Name	File System	Size
/dev/sdc1 ❗	LDM metadata partition	■ unknown	1.00 MiB
/dev/sdc2 ❗	Microsoft reserved partition	■ unknown	14.98 MiB
/dev/sdc3 ❗	LDM data partition	■ ntfs	49.98 GiB

"BASIC DISK" AND "DYNAMIC DISK"

- This metadata information inside the "metadata partition" is displayed in the "Disk Management" applet of "Windows.." (but it would not show up in "GPartEd" in a Linux computer)

"DYNAMIC VOLUMES"

- "Dynamic Volumes" Reside Inside "Dynamic Disks"
- "Dynamic volumes" is the only bundled way to combine multiple hard drives into one virtual hard drive in "Windows 7.."
- "Dynamic volumes" can only be created and used in "Windows.." computers:
"Dynamic volumes" cannot be used in Linux or Mac OS X computers.

"DYNAMIC VOLUMES" (continued)

- Three types of "Dynamic Volumes":
 - ❑ Spanned "Dynamic Volumes"
 - ❑ Striped "Dynamic Volumes"
 - ❑ Mirrored "Dynamic Volumes"

"DYNAMIC VOLUMES" (continued)

- A hard drive of any size can be used for a "dynamic volume"
- A hard drive that is attached to a "Windows 7.." computer by means of USB 2.x or USB 3.x cannot be used as a dynamic disk and hence it cannot contain dynamic volume(s).

"DYNAMIC VOLUMES" (continued)

- Using Windows..'s bundled "Disk Management, you cannot convert a "Dynamic Disk" back to a "Basic Disk" without deleting any existing volumes (and hence all data files and folders) that reside on the "Dynamic Disk". When you do so, the hard drive automatically reverts back to being a "Basic Disk".

"DYNAMIC VOLUMES" (continued)

- A hard drive that is attached to a "Windows 7.." computer by means of SATA, SCSI, or SAS can be used as a "dynamic disk"

"DYNAMIC VOLUMES" (continued)

- If a hard drive is connected by means of eSATA and an passive eSATA to SATA adapter/cable is used, then the hard drive can be used as a dynamic disk
- If a hard drive is connected by means of eSATA and an eSATA to PCIe adapter card is plugged into a PCIe slot on the motherboard, then the hard drive cannot be used as a dynamic disk

"DYNAMIC VOLUMES" (continued)

- "Disk Management" in "Windows.." cannot convert a "Dynamic Disk" back to a "Simple Disk" until you delete the "dynamic volumes" inside the disk

"DYNAMIC VOLUMES" (continued)

- However, if you use the not-free versions of various third-party hard drive software utilities, you can convert a dynamic disk back to a basic disk without removing (without destroying) any existing volumes on the hard drive. Two examples of not-free software programs can perform this magic are "Minitool Partition Wizard Pro Edition" and "Easeus Partition Master Professional".

"DYNAMIC VOLUMES" (continued)

- Most of the non-free versions of the software utilities in the following article can perform this magic:
<https://www.lifewire.com/free-disk-partition-software-tools-2624950>

WHEN NOT TO CONVERT A "BASIC DISK" TO A "DYNAMIC DISK"

- See <https://searchenterprisedesktop.techtarget.com/tip/When-not-to-convert-basic-disks-to-dynamic-disks> for some of the reasons for not converting a "Basic Disk" to a "Dynamic Disk"

WHEN NOT TO CONVERT A "BASIC DISK" TO A "DYNAMIC DISK" (continued)

- You cannot successfully convert a hard drive that dual boots between two versions of Windows.. or between Windows.. and Linux.. from a "Basic Disk" to a "Dynamic Disk".

If you do so, the hard drive will then fail to boot any operating system.

- See item #4 at <http://www.differencebetween.net/technology/difference-between-basic-disk-and-dynamic-disk/>

WHEN NOT TO CONVERT A "BASIC DISK" TO A "DYNAMIC DISK" (continued)

- Conclusion from the previous two articles:

The internal hard drive where the C: drive volume resides should not be converted from a "Simple Disk" to a "Dynamic Disk", even though it is possible to do so

USING "MIRRORED" "DYNAMIC VOLUME(S)" IN "WINDOWS 7"

- The "Mirrored" "Dynamic Volumes" are only available for the ..Professional, ..Enterprise, and ..Ultimate editions of "Windows 7.."
- <https://www.howtogeek.com/howto/17926/use-drive-mirroring-for-instant-backup-in-windows-7/>
- <https://www.windowscentral.com/how-set-mirrored-volume-file-redundancy-windows-10>

USE "MIRRORED" "DYNAMIC VOLUMES IN "WINDOWS 7" (continued)

If you are running the ..Professional, ..Enterprise, or ..Ultimate editions of "Windows 7..", you can convert the hard drive that the C: drive partition resides on from "Simple Disk" to "Dynamic Disk" without wiping out the C: drive partition.

However, afterwards, you cannot use "Disk Management" to mirror the existing C: drive partition. For most computers, the only valid reason for converting this hard drive to a dynamic would be if you then want to use any unused space on it for a dynamic volume.

COMPLEX PROCEDURE FOR USING "DYNAMIC VOLUMES" TO MIRROR THE BOOT DRIVE

To use dynamic volumes to mirror the boot drive (where the C: disk partition resides) in Windows 7, 8.1, and 10, see <https://www.wintips.org/how-to-mirror-boot-hard-drive-on-windows-10-legacy-or-uefi/>

THIRD-PARTY SOFTWARE PROGRAMS FOR MIRRORING/SYNCHRONIZING FILES/FOLDERS

- If you are running "Windows 7 Home Basic" or "Windows 7 Home Premium", you can use third-party software programs to mirror or synchronize files between hard drives:

See

https://en.wikipedia.org/wiki/Comparison_of_file_synchronization_software

SPANNED "DYNAMIC VOLUMES" IN "WINDOWS.."

- See <https://www.cnet.com/how-to/how-to-turn-old-hard-drives-into-one-large-drive-in-windows/>

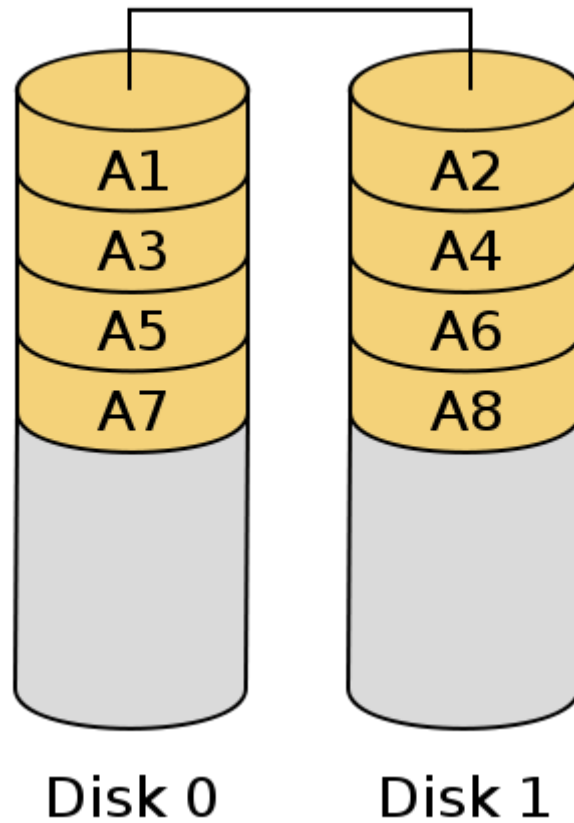
SPANNED "DYNAMIC VOLUMES" IN "WINDOWS.." (continued)

- For a software program that can recover data from a failed spanned volume, see <https://www.easeus.com/data-recovery/recover-files-from-spanned-volume.html>

STRIPED "DYNAMIC VOLUMES" IN "WINDOWS.."

- According to <https://www.howtogeek.com/school/using-windows-admin-tools-like-a-pro/lesson4/> :
Striped Volume – data is striped across multiple hard drives so that every other segment of data is staggered between the drives for maximum performance. There is no redundancy.

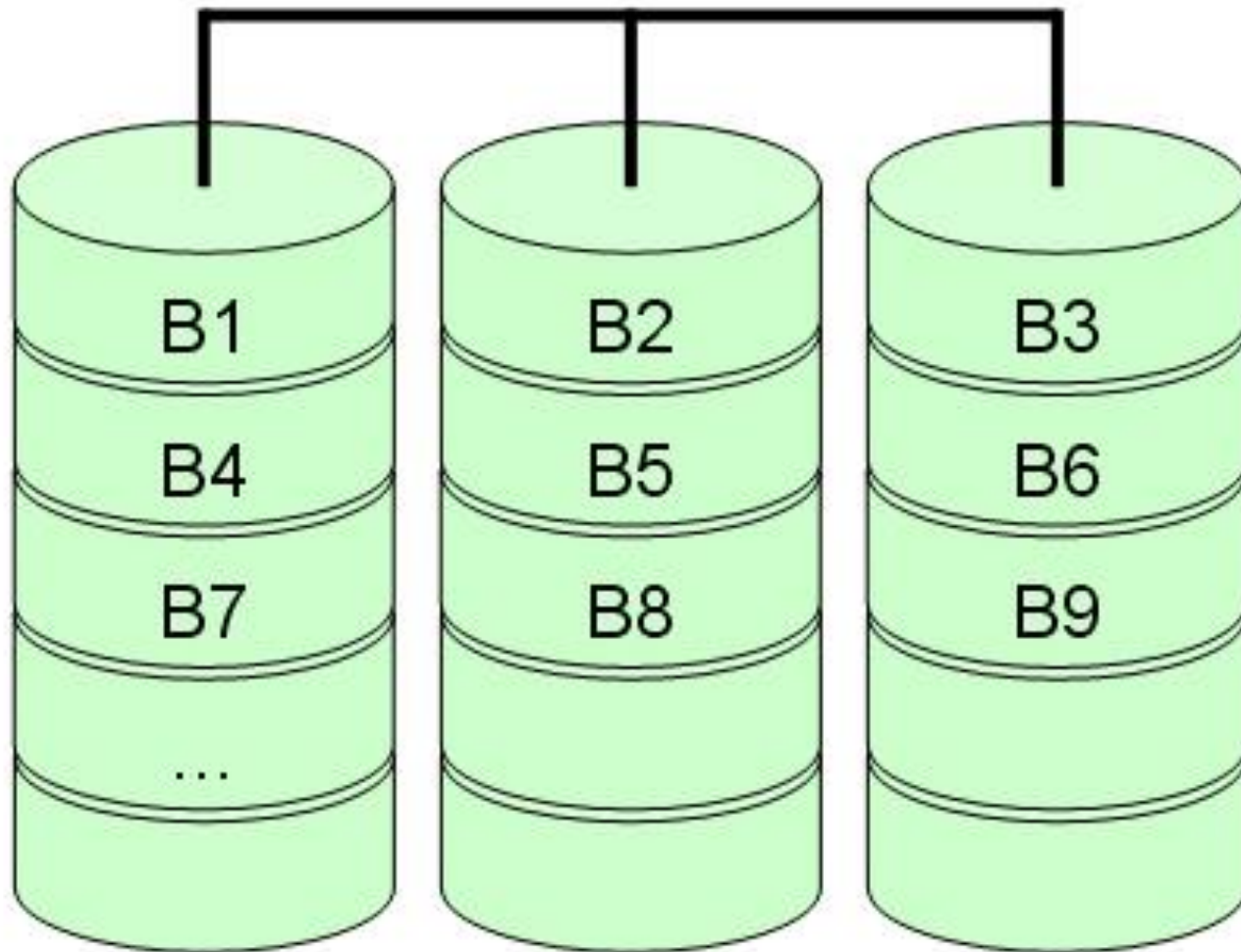
RAID 0



STRIPED "DYNAMIC VOLUMES" IN "WINDOWS.." (continued)

- Reference for previous image:
<http://www.linux-mag.com/id/7582/>

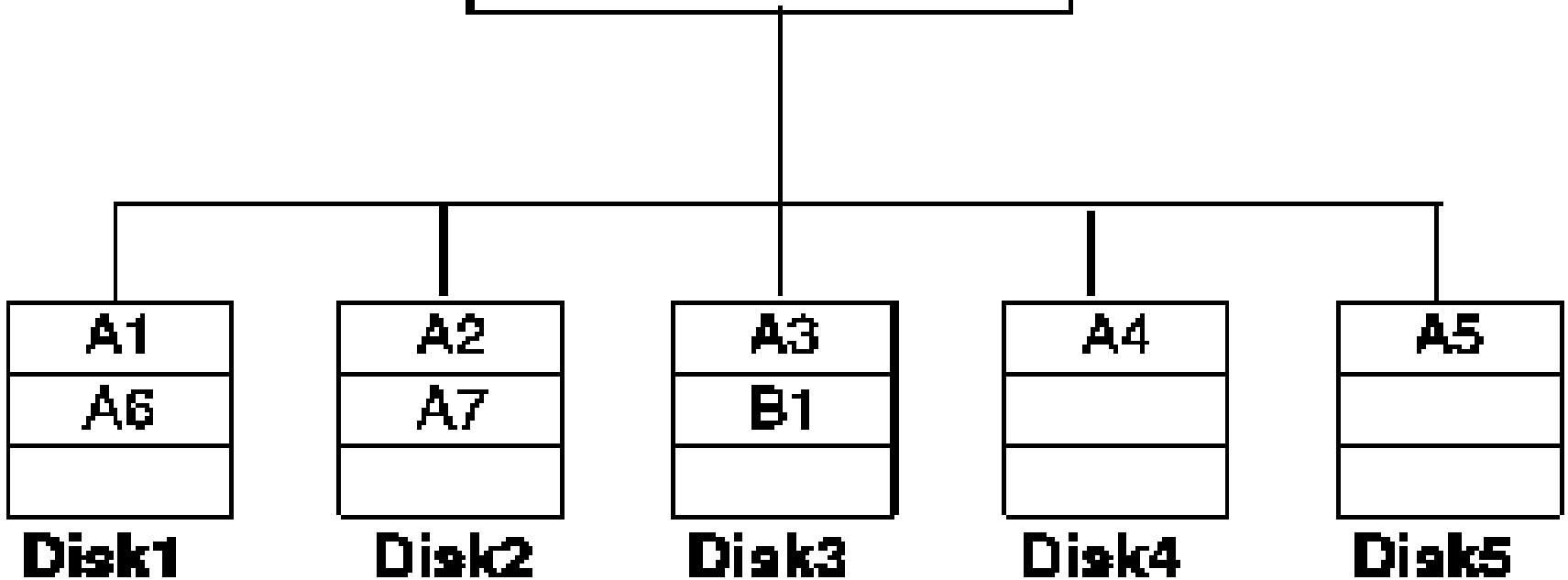
RAID 0



STRIPED "DYNAMIC VOLUMES" IN "WINDOWS.." (continued)

- Reference for previous image:
<https://asmed.com/raid/>

Disk Controller



A = File A

B = File B

STRIPED "DYNAMIC VOLUMES" IN "WINDOWS.." (continued)

- https://www.ibm.com/support/libraryserver_os390/handheld/BOOKS/EZ3EAD00/7.9.1.2?SHELF=ez2rbk23&DT=19990611192843