

File Systems FAT,FAT32,exFAT,NTFS,ReFS

Feature	FAT	FAT32	exFAT	NTFS	ReFS
Maximum volume size	4 GB	32 GB	128 PB	256 TB	4.7 ZB (zettabytes)
Maximum file size	4 GB	4 GB	16 EB (exabytes)	18 EB (exabytes)	18 EB (exabytes)
Maximum filename length	8.3 characters	255 characters	255 characters	255 characters	255 characters
Maximum cluster size	64 KB	32 KB	32 MB	2048 KB	64 KB
File compression	No	No	No	Yes	No
File encryption	No	No	No	Yes	No
Permissions	No	No	No	Yes	Yes

Backup Types

Full backup

Takes a full copy of the source and copies it to the desired destination

Incremental backup

Takes a backup of anything that has been changed or created since the last check. Looks for the "ready for archiving" bit to check if the file has been edited.

Differential backup

Similar to "Incremental backup" the first time it is performed. It copies all data changed from the previous backup. However, each time it runs afterwards, it will continue to copy all data change since the previous FULL backup. It requires more storage and time to complete than "Incremental Backup"

Block backup

Block-level backup is a feature of incremental backup that allows uploading for only changed parts of files instead of whole files. In order to do that, it uses a snapshot technology.

File backup

Archive bit must be active on file

Volume / Partition

Volume

A Volume is treated like a separate drive from the physical drive, formatting a volume will only affect the volume.

Partition

A Partition is the definition of a section on a drive, using partitions enables the user to divide a drive into multiple sectors also known as Logical Volumes.

Basic Disk

Max 4 partitions

Supports Extended Partitions

up to 26 logic drives

introduced in MS-DOS

Dynamic Disk

Do not support OS

Supports simple, Spanned, Triped, Mirrored & Raid 5 Volumes

introduced in Windows 2000

Shadow Copy

Recovers Files and Folders

VSS stands for Volume Shadow copy Service

Storage area <= 300 Mb

64 changes/snapshots are recorded

Only works on NTFS file systems

Commands :

vssadmin add shadowstorage

vssadmin create shadowstorage

vssadmin delete shadowstorage

vssadmin resize shadowstorage

vssadmin list shadowstorage

vssadmin list providers

vssadmin list volumes

vssadmin list shadows

vssadmin list writers

vssadmin list shadows

vssadmin resize shadowstorage

Disk Quota

FSRM Stands for File Server Resource Manager

Quota is a feature that tracks and can be used to restrict the amount of space that a user's files can use on an NTFS volume

Hard quotas impose a hard limit on system resources; any operation that would result in exceeding the limit fails. The following settings create hard quotas: Disk Limit parameter Files Limit parameter

Soft quotas send a warning message when resource usage reaches a certain level, but do not affect data access operations, so you can take appropriate action before the quota is exceeded. The following settings create soft quotas: Threshold for Disk Limit parameter Soft Disk Limit parameter Soft Files Limit parameter

RAID (Redudant Array Of Independent Disks)

<i>Raid0</i>	Minimum 2 disks - Not redundant
<i>Raid1</i>	Minimum 2 disks - Mirroring
<i>Raid2</i>	Minimum 3 disks - Data is shared on bit-level on multiple disks
<i>Raid5</i>	Minimum 3 disks - Stripping with distributed partitions
<i>Raid6</i>	Minimum 4 disks - Stripping with double distributed partitions
<i>Raid10 (1+0)</i>	Minimum 4 disks - Stripping then mirroring

Windows Server Backup

```
DISKPART> select disk 1
Disk 1 is now the selected disk.
DISKPART> attribute disk clear readonly
Disk attributes cleared successfully.
DISKPART> convert dynamic
Selected disk is already a dynamic disk.
DISKPART> create volume raid size=30000 disk=1,2,3,4
DiskPart successfully created the volume.
```

Remember to run:

```
# Attribute disk clear readonly
# convert dynamic
```

On ALL the drives for the RAID5

Raid Types

Volume Type	Characteristics
<i>Mirrored Volume</i>	Stores data to two duplicate disk at the same time. Fault Tolerant, can lose on disk as data is preserved on both. The system automatically switches to the functioning disk to maintain service.
<i>Striped Volume</i>	Uses storage areas on several different disks. Improves performance by writing to mulitple disk simultaneously. Saves data from a single file to mulitple disks. NOT fault tolerant, if one disk dies then all data is lost. Can NOT contain system or boot files.

Raid Types (cont)

<i>RAID5</i>	Contain three or more disks.
<i>Volume</i>	Like a striped volume, portions of a single file are written to each disc in the set. RAID5 volumes add fault tolerance to striping through a process called parity (data recovery information is added to each disk). Often called a striped set with parity.

GPT / MBR

MBR (Master Boot Record)	GPT (Guided Partition Table)
A special type of boot sector at the very beginning of a physical storage device.	A standard for the layout of the partition table on a physical storage device.
Max Diskspace 2.2TB	Max Diskspace 1.8EB
Max 4 primary partitions	max 128 partitions
Supports only one extended partition (up to 26 total partitions)	Supports UEFI

Disk Administration

MCC	diskmgmt.msc
CMD	diskpart.exe

Startup/Recovery Commands

To recover files or folders you can use either the Recovery Wizard or wbadmin start recovery

BCD	Boot Configuration Data
EASYBCD	Software utility for BCD/BootMGR
DSRM	Directory Services Restore Mode
Bootrec.exe	Executable for troubleshooting startup issues
Ntdsutil.exe	Active Directory database maintenance tool
MSCONFIG	Command for accessing Microsoft System Configuration
BCDEDIT	Sets properties in boot database to control boot loading
CHKDSK	Checks a disk and displays a status report

Startup/Recovery Commands (cont)

DISKPART	Displays or configures disk partitions
WBADMIN	Enables you to back up and restore your operating system, volumes, files, folders, and applications from a command prompt.
AUTHOR- ITATIVE RESTORE	Used to restore AD data after executing the Ntdsut-il.exe command. When you perform an authoritative restore, you prevent specific objects from the backup from being overwritten by Active Directory replication.
UNAUTH- ORATIVE RESTORE	Any changes that took place since the backup are replicated to the restored domain controller.

AT commands Backup

```
at 23:00 cmd /c copy C:\Dokumenter. C:\Backups  
at \products 00:00 /every:M,T,W,Th,F backup
```



By **Nectus**
cheatography.com/nectus/

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