

How data is stored (Windows)

File Manager (what the user sees)

My Docs Folder

great_photo_1.jpg
great_photo_2.jpg

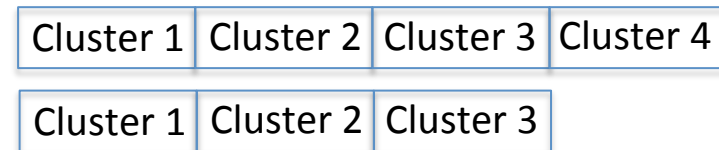
Recycle Bin Folder

Device Manager (what the user doesn't see)

File Allocation Table (FAT)

Flag	Name	Pointer
A	great_photo_2.jpg	→
A	great_photo_1.jpg	→
U		
U		

Storage Clusters on Hard Drive



→ A = Allocated
U = Unallocated

Cluster Size is dependent on version of Operating System and Hard Disk Size (up to 128KB)

Saving a file

File Manager (what the user sees)

My Docs Folder

bad_photo_3.jpg
great_photo_1.jpg
great_photo_2.jpg

Recycle Bin Folder

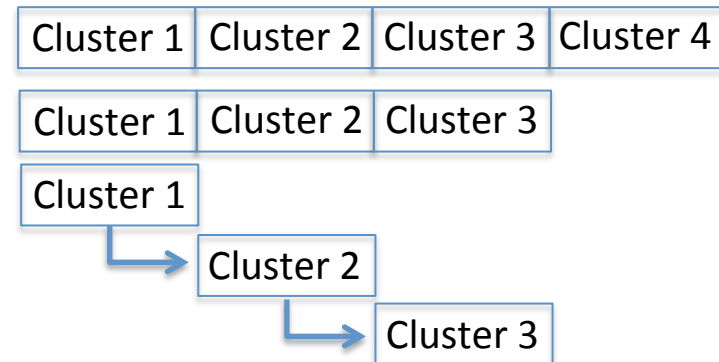
Device Manager (what the user doesn't see)

File Allocation Table (FAT)

Flag	Name	Pointer
A	great_photo_2.jpg	→
A	great_photo_1.jpg	→
A	bad_photo_3.jpg	→
U		

A = Allocated
U = Unallocated

Storage Clusters on Hard Drive



Unused clusters are used to store data. In this example, data is fragmented

Deleting a file 1 – from My Docs Folder

File Manager (what the user sees)

My Docs Folder

great_photo_1.jpg
great_photo_2.jpg

Recycle Bin Folder

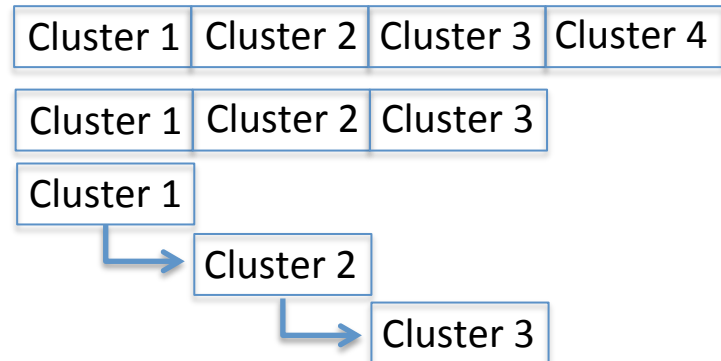
bad_photo_3.jpg

Device Manager (what the user doesn't see)

File Allocation Table (FAT)

Flag	Name	Pointer
A	great_photo_2.jpg	→
A	great_photo_1.jpg	→
A	bad_photo_3.jpg	→
U		

Storage Clusters on Hard Drive



A = Allocated
U = Unallocated

FAT entry & data still exist and FAT Flag is still set to Allocated.

Deleting a file 2 – from Recycle Bin

File Manager (what the user sees)

My Docs Folder

great_photo_1.jpg
great_photo_2.jpg

Recycle Bin Folder

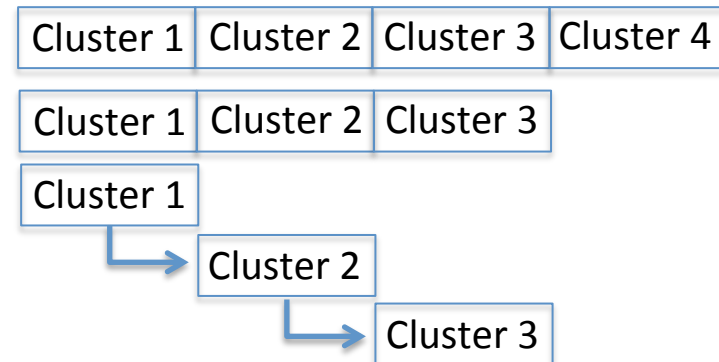
Device Manager (what the user doesn't see)

File Allocation Table (FAT)

Flag	Name	Pointer
A	great_photo_2.jpg	→
A	great_photo_1.jpg	→
U	bad_photo_3.jpg	→
U		

A = Allocated
U = Unallocated

Storage Clusters on Hard Drive



FAT entry & data still exist but FAT Flag has been set to Unallocated.
FAT entry & Clusters are free to be re-allocated

How is deleted data recovered?

File Manager (what the user sees)

My Docs Folder

Recycle Bin Folder

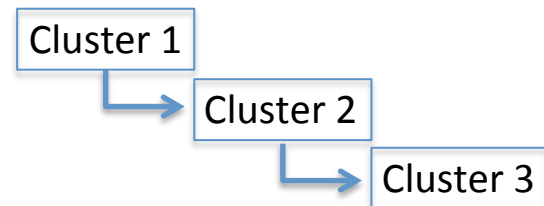


Device Manager (what the user doesn't see)

File Allocation Table (FAT)

Flag	Name	Pointer
U	bad_photo_3.jpg	
U		

Storage Clusters on Hard Drive



If the recovered data makes sense

File Manager (what the user sees)

My Docs Folder

bad_photo_3.jpg

Recycle Bin Folder

Data Recovery Application

Device Manager (what the user doesn't see)

File Allocation Table (FAT)

Flag	Name	Pointer
A	bad_photo_3.jpg	
U		

Storage Clusters on Hard Drive

Cluster 1 Cluster 2 Cluster 3

