The Default Cluster Size for the NTFS and FAT File Systems

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System Tip

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This article was previously published under Q314878
For a Microsoft Windows 2000 version of this article, see 140365 (http://support.microsoft.com/kb/140365/EN-US/) .

SUMMARY

This article describes and lists the default values that Windows XP uses to format a volume. The article lists default values for both the NTFS file system and the file allocation table (FAT) file system.

MORE INFORMATION

All file systems that Windows XP uses to organize the hard disk are based on cluster (allocation unit) size, which represents the smallest amount of disk space that can be allocated to hold a file. The smaller the cluster size, the more efficiently your disk stores information.

If you do not specify a cluster size for formatting, Windows XP Disk Management bases the cluster size on the size of the volume. Windows XP uses default values if you format a volume as NTFS by either of the following methods:

- By using the **format** command from the command line without specifying a cluster size.
- By formatting a volume in Disk Management without changing the **Allocation Unit Size** from **Default** in the **Format** dialog box.

The following table shows the default values that Windows XP uses for NTFS formatting.

```
Drive size (logical volume) Cluster size Sectors ------------------------------------------------------------ 512 MB or less 512 bytes
1 513 MB - 1,024 MB (1 GB) 1,024 bytes (1 KB) 2 1,025 MB - 2,048 MB (2 GB) 2,048 bytes (2 KB) 4 2,049 MB and larger 4,096 bytes (4
KB) 8
```

The maximum default cluster size under Windows XP is 4 kilobytes (KB) because NTFS file compression is not possible on drives with a larger allocation size. The Format utility never uses clusters that are larger than 4 KB unless you specifically override that default either by using the **/A:** option for command-line formatting or by specifying a larger cluster size in the **Format** dialog box in Disk Management.

If you use the Convert utility to convert a volume from FAT to NTFS, Windows always uses a 512-byte cluster size. FAT structures are aligned on 512-byte boundaries; a larger cluster size does not allow conversion. Note also that in Microsoft Windows NT 4.0 and earlier, when a partition is formatted under Windows Setup, the partition is first formatted as FAT and then converted to NTFS. Therefore the cluster size is always 512 bytes when a partition is formatted in Setup. (This information does not apply to Microsoft Windows 2000 Setup or Windows XP Setup, which both format the partition according to your choice of a file system.)

The FAT file system uses the following cluster sizes. These sizes apply to any operating system that supports FAT:

```
Drive size (logical volume) FAT type Sectors Cluster size ------------------------------------------------------------------------ 15
MB or less 12-bit 8 4 KB 16 MB - 127 MB 16-bit 4 2 KB 128 MB - 255 MB 16-bit 8 4 KB 256 MB - 511 MB 16-bit 16 8 KB 512 MB - 1,023 MB
16-bit 32 16 KB 1,024 MB - 2,048 MB 16-bit 64 32 KB 2,048 MB - 4,096 MB 16-bit 128 64 KB *4,096 MB - 8,192 MB 16-bit 256 128 KB
Windows NT 4.0 only *8,192 MB - 16384 MB 16-bit 512 256 KB Windows NT 4.0 only
```

To support FAT partitions that are greater than 4 GB using 128- or 256-KB clusters, the drives must use sectors that are greater than 512 bytes.

Note that on very small FAT partitions, a 12-bit FAT is used instead of a 16-bit FAT. The FAT file system supports only 512-byte sectors, so both the sectors per cluster and the cluster size are fixed.

Properties

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APPLIES TO

- Microsoft Windows XP Home Edition
- Microsoft Windows XP Professional

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