



Delta Media Server

File System File Size and Size on Disk

Technical Guide



File System File Size and Size on Disk : Technical Guide

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Printed: December 2020

This edition is for software version N/A
Document ref.: M484-1

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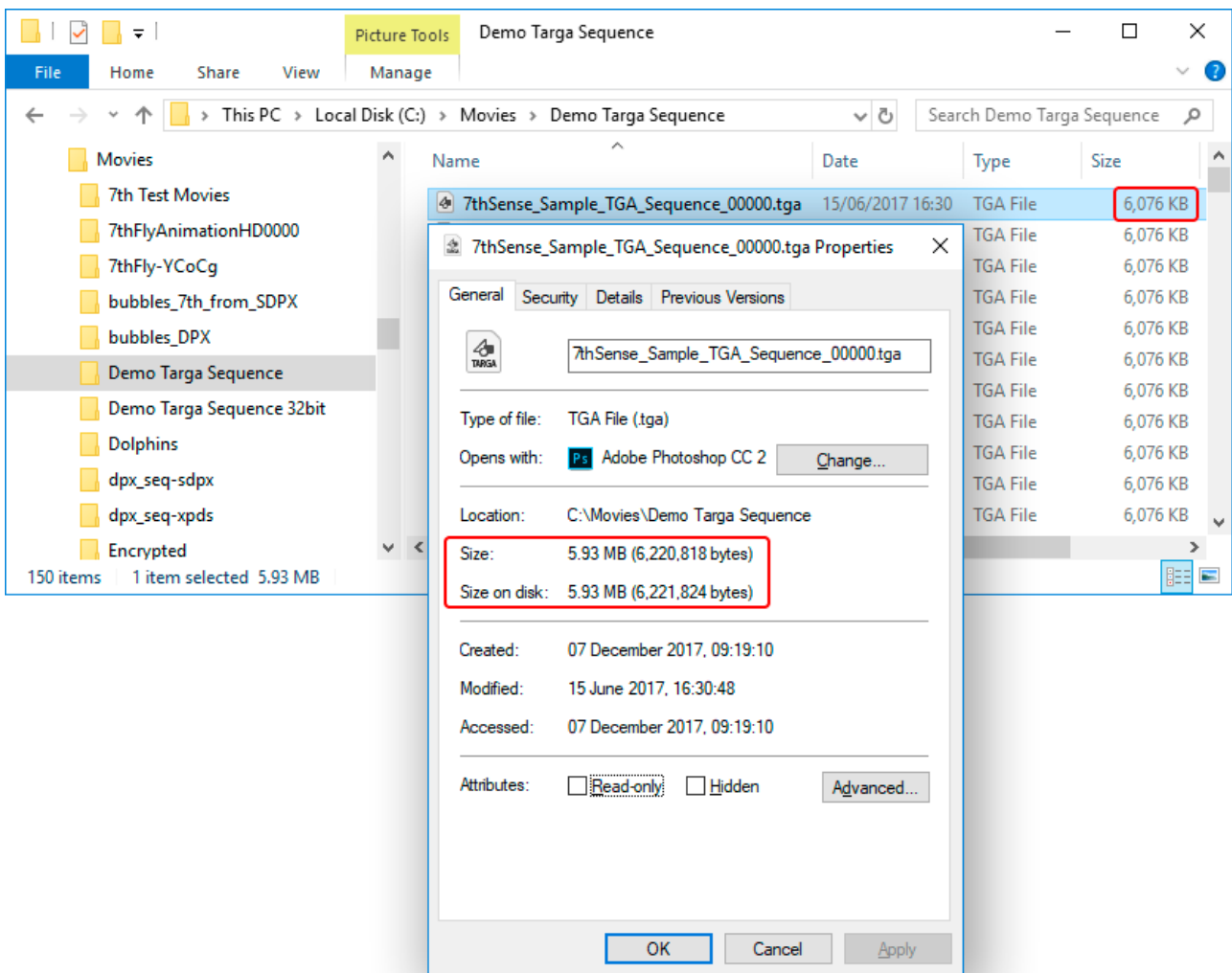
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File size versus Size on Disk

In Windows, the size of a file and its size on disk are two different measures, so when you examine file properties, they will usually be different, and the size on disk value will be higher. When it comes to movie playback load in Delta, the first step is reading the video frames from disk, so it's the 'Size on Disk' that matters first for performance considerations. 'Size on Disk' is of course what's pertinent to storage capacity planning as well.

Windows File Explorer: list and file properties

In Windows File Explorer the requirement is to show disk space and allocation, not the data size of files per se. If you want to know that, the file properties will tell you. Note the indicated size units when comparing the list sizes with the file properties dialog which may be showing different units. Remember that 1 MB = 1024 KB (likewise, 1 KB = 1024 B and 1TB = 1024 MB).



In the file **properties**, there are two further file sizes, each typically expressed in MB and Bytes. So in the example above, the KB **list** value $6,076 \times 1024 = 6,221,824$ bytes in the 'size on disk' in properties. Similarly $6,076 \text{ KB} \div 1024 = 5.93 \text{ MB}$.

In rounded MB values, they may look the same, as here, but the bytes values show there is a difference.

Size and Size on Disk

A disk is divided into tracks divided into sectors. Groups of sectors comprise 'disk allocation units' or 'clusters' of fixed sizes. Files occupy as many clusters as required, and a cluster cannot be shared between files. Therefore a file will most likely leave a cluster incompletely filled. Its space on disk is therefore bigger than its actual data size. The larger the cluster size, the more 'wasted' space there will be. Even if a single byte spills over into a new cluster, the whole of that cluster is registered to the file.

When the file is read from disk, it is the disk that is being interrogated: which clusters contain parts of this file? So we read clusters, full or partly empty, and the multiple of cluster sizes is the required bandwidth.

How big are my disk clusters (allocation units)?

The size of a cluster can vary, but typical ranges are from 512 B to 32 KB or more. For example, on your C:\ drive, the allocation unit may be 4096 bytes. This means that Windows will allocate 4096 bytes for any file or portion of a file that is from 1 to 4096 bytes in length. You can find your NTFS cluster size from the elevated CMD prompt:

```
fsutil fsinfo ntfsinfo C:
```

```
Administrator: Command Prompt
C:\WINDOWS\system32>fsutil fsinfo ntfsinfo C:
NTFS Volume Serial Number : 0x8a5c67d65c67bc17
NTFS Version : 3.1
LFS Version : 2.0
Number Sectors : 0x0000000037b8c3d8
Total Clusters : 0x0000000006f7187b
Free Clusters : 0x0000000010f630e
Total Reserved : 0x00000000000015d1
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 : 0x000000006fcc0000
Mft Start Lcn : 0x000000000c0000
Mft2 Start Lcn : 0x0000000000000002
Mft Zone Start : 0x000000006694380
Mft Zone End : 0x000000006698f60
Max Device Trim Extent Count : 512
Max Device Trim Byte Count : 0xffffffff
Max Volume Trim Extent Count : 62
Max Volume Trim Byte Count : 0x40000000
Resource Manager Identifier : 2A82A0D4-1AC3-11E7-8182-902B3433C8CC
C:\WINDOWS\system32>
```

Or from an elevated PowerShell window:

```
Get-Volume -DriveLetter C | Format-List
```

```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\WINDOWS\system32> Get-Volume -DriveLetter C | Format-List

ObjectId           : {1}\DESKTOP-DTJ0JSA\root\Microsoft\Windows\Storage\Providers_v2\WSP_Volume.ObjectId="{8c334dde-f2e3-11e6-8175-806e6f6e6963}:VO:\?\Volume{d89ed89e-0000-0000-0000-501f00000000}\"
PassThroughClass   :
PassThroughIds     :
PassThroughNamesp :
PassThroughServer  :
UniqueId          : \?\Volume{d89ed89e-0000-0000-0000-501f00000000}\
AllocationUnitSize : 4096
DedupMode          : NotAvailable
DriveLetter        : C
DriveType          : Fixed
FileSystem         : NTFS
FileSystemLabel    :
FileSystemType     : NTFS
HealthStatus      : Healthy
OperationalStatus  : OK
Path              : \?\Volume{d89ed89e-0000-0000-0000-501f00000000}\
Size              : 478646087680
SizeRemaining     : 72829427712
PSComputerName    :
PS C:\WINDOWS\system32>
```

Or if you want cluster sizes available per file system or disk volume, then use the `diskpart` command in an elevated CMD window:

```

Administrator: Command Prompt - diskpart
C:\WINDOWS\system32>diskpart

Microsoft DiskPart version 10.0.17134.1

Copyright (C) Microsoft Corporation.
On computer: DESKTOP-DTJ0JSA

DISKPART> list volume

   Volume ###  Ltr  Label           Fs      Type          Size      Status       Info
   -----  ---  -
   Volume 0                System Rese   NTFS    Partition     500 MB    Healthy     System
   Volume 1                C             NTFS    Partition     445 GB    Healthy     Boot

DISKPART> select volume 0

Volume 0 is the selected volume.

DISKPART> filesystems

Current File System

Type                : NTFS
Allocation Unit Size : 4096
Flags               : 00000000

File Systems Supported for Formatting

Type                : NTFS (Default)
Allocation Unit Sizes: 512, 1024, 2048, 4096 (Default), 8192, 16K, 32K, 64K, 128K, 256K, 512K, 1024K, 2048K

Type                : FAT
Allocation Unit Sizes: 8192 (Default), 16K, 32K, 64K

Type                : FAT32
Allocation Unit Sizes: 512, 1024, 2048, 4096 (Default)

DISKPART>
    
```

Document Information

Date	Document edition	Software version	Revision Details	Author/Editor
March 2019	1	N/A	Refers to MediaGrabs registry entries in Delta 2.6	Ken Showler

C

cluster sizes 4

D

disk allocation units 4

F

file size 4

file size on disk 4

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