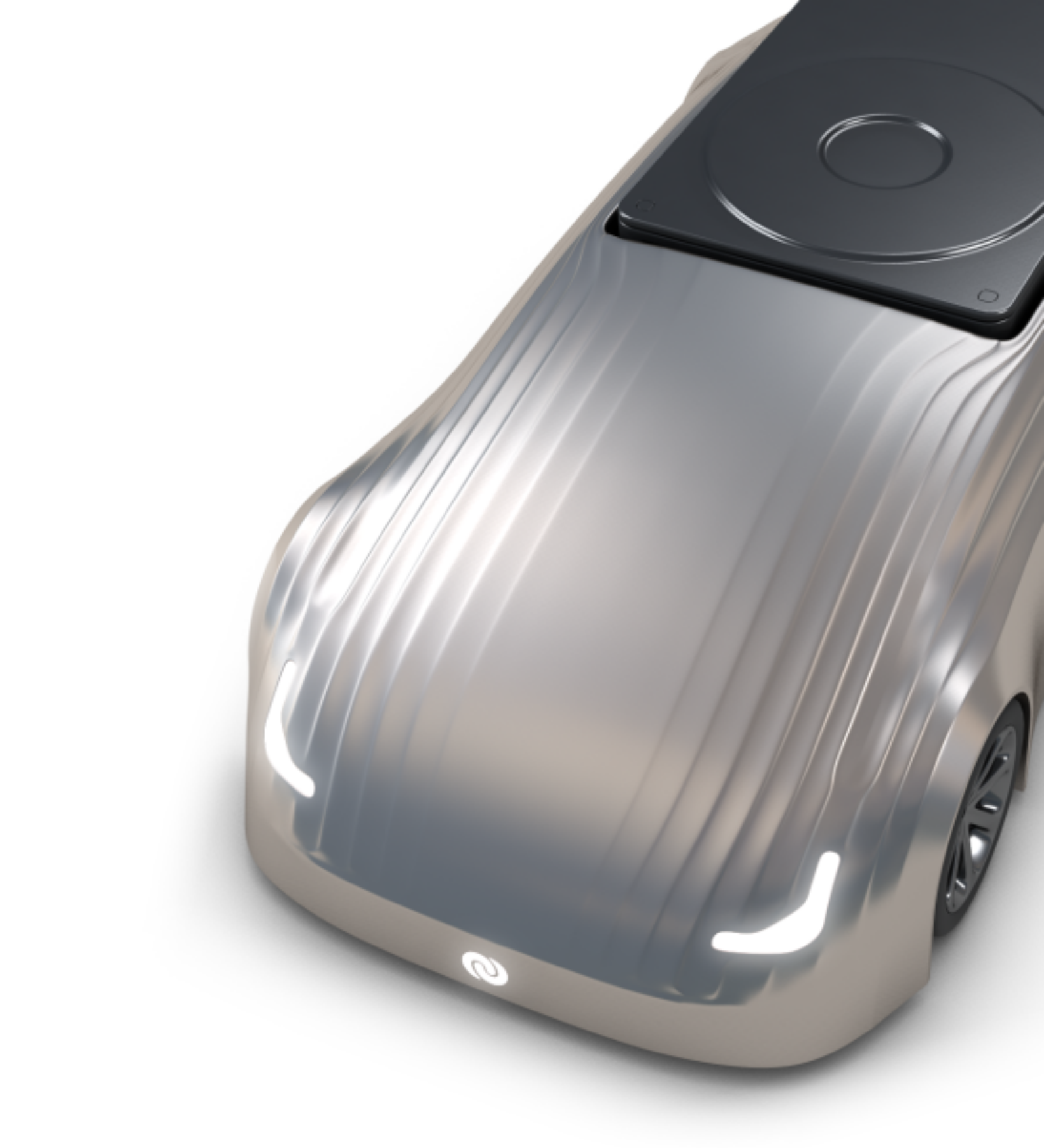


O&O software

O&O Defrag 25

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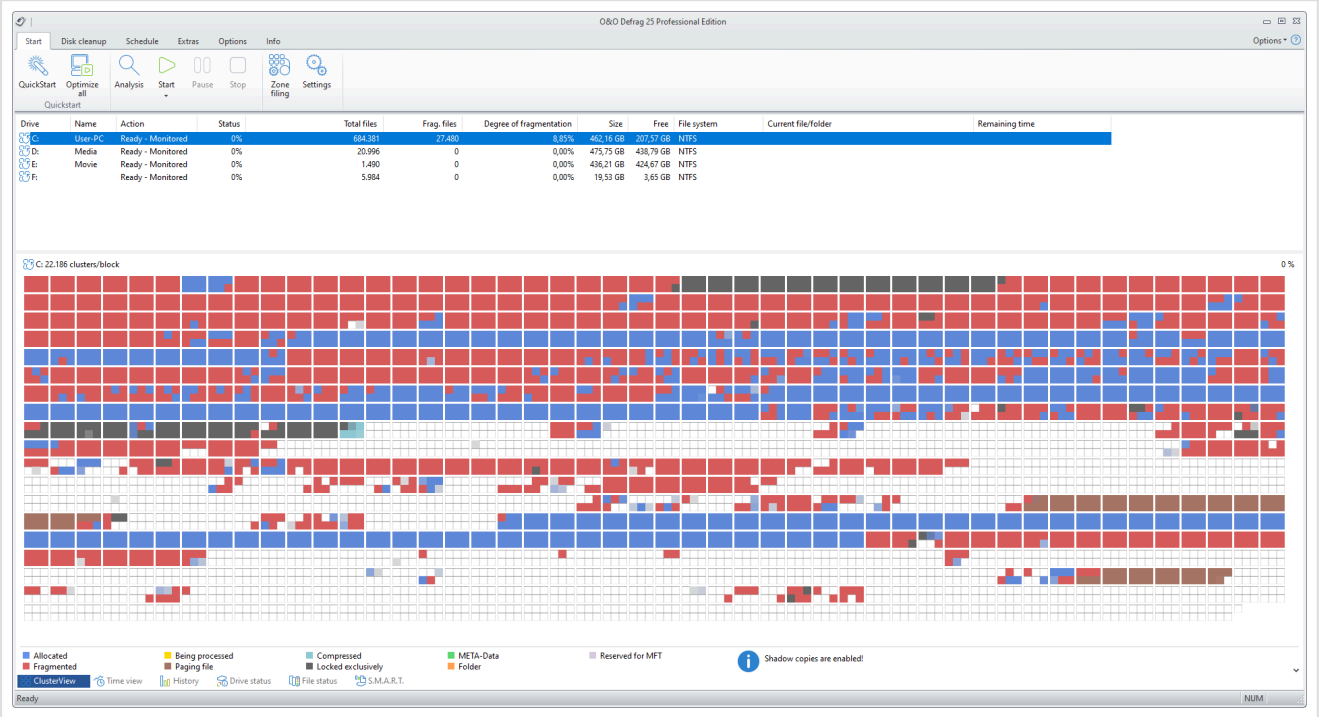
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Introduction

O&O Defrag 25 consolidates fragmented files on hard disks and SSDs and so restores the performance of your computer. It defragments automatically in the background, at scheduled times or when you start it, and offers special methods for SSDs. You control it from a window with a ribbon bar, a drive list and the cluster view.



Earlier Version

This is the manual of O&O Defrag 25. It is no longer updated. The manual of the current version is available at manuals.oo-software.com/oodefrag/.

Where to start

You want to	Start here
Get to know the functions and editions	About O&O Defrag 25
Check the requirements	System requirements
Install, license or uninstall O&O Defrag	Installation, licensing and uninstall
Set up O&O Defrag in a few steps	QuickStart
Analyze and defragment a drive	Analyze your drives and Defragment your drives
Choose the right method	Defragmentation methods
Defragment automatically or at set times	Automatic defragmentation and Schedule defragmentation jobs
Get help	Support and more from O&O

Licensing

O&O Defrag is commercial software. You can try it during the trial period; continued use requires a valid license.

About O&O Defrag 25

Thank you for choosing O&O Defrag! O&O Defrag activates the hidden performance of your computer and packs file fragments efficiently and securely together. O&O Defrag gives you everything from fully automated defragmentation to a professional set up: everything a good defragmentation software should give you.

An increasingly fragmented hard disk compromises the performance of your computer. This occurs as a result of frequent write and read access, during your daily routines, while surfing or gaming, or due to frequent user access on Server. For a lasting maximum speed while accessing files, it is important that your data is organized systematically.

Windows disperses single file fragments all over the entire hard disk, which increases the time for its access. The defragmentation packs file fragments coherently together on the hard disk and files the data into separate zones. Windows as well as other programs will start and run faster.

O&O Defrag includes a clever scheduling function, which allows you to schedule regular automated defragmentations if you wish. In addition, the permanent and automatic optimization in the background is key to prevent a loss in performance of your computer as well as a renewed fragmentation. This will allow you to save time compared to running a manual defragmentation.

We sincerely hope you are satisfied with our new O&O Defrag and that you will be able to maintain your optimal system performance like million other users worldwide.

Your O&O Software Team www.oo-software.com

Editions

O&O Defrag is available in two versions:

- O&O Defrag Professional Edition
- O&O Defrag Server Edition

The Professional Edition is the version to use for defragmenting a single PC. It cannot be used on a server operating system.

System requirements

- The system requirement of each operating system have to be fulfilled
- 64-bit Support
- Windows® 8 till Windows® Server 2019 (all editions):

Supported operating systems

Operating system	Professional Edition	Server Edition
Windows 11	yes	yes
Windows 10	yes	yes
Windows 8	yes	yes
Windows Server 2012	no	yes*
Windows Server 2012 R2	no	yes*
Windows Server 2016	no	yes*
Windows Server 2019	no	yes*

* All variants of this server operating system are supported, except Core-Installations

If you wish to use the network functionality, you must also have the following available:

- Network card and connection

Access permissions

You need local administrator permissions for the installation and for its later use. This is usually the case, if you were able to install other programs before.

In a network, you must be the domain administrator if you wish to install and control O&O Defrag locally as well as on the network computers.

Microsoft Windows Installer

The installation takes place with the help of the Microsoft Windows Installer. It is a Windows integrated component which controls all installation and uninstallation.

O&O Defrag supports all Windows file systems. The following paragraphs will tell you more about each of these file systems.

File System	Explanation
exFAT	Starting from Windows Vista, the exFAT-file system is supported. This was designed especially by Microsoft in regard to flash drives, and delivers better performance than FAT. It is also much better against structural damage to the file system and protected against data loss.
FAT	FAT is the oldest data system, the roots of which go back to MS DOS. It is supported by Windows. O&O Defrag can be used without any problem on FAT drives.
FAT32	FAT32 is the native file system of Windows 95b/98/Me. It offers some advantages compared to the older FAT. FAT32 drives are Windows- supported by default and can be defragmented without any problem using O&O Defrag.
NTFS	The NT file system was developed completely new for the Windows NT family. It offers the option of security restrictions on the file level, increases the security against data errors, and achieves higher performance. It is supported by Windows. And O&O Defrag gets optimal results when defragmenting NTFS drives.
EFS	A file system introduced with Windows 2000 which is based on NTFS and its encryption ensures higher data security against abuse or unauthorized access. The Encrypted File System (EFS) makes data for unauthorized users unreadable. O&O Defrag supports EFS hard disks; neither data integrity nor data security is compromized.

Supported hardware O&O Defrag supports all hardware components that are supported by Windows. Please note the software requirements of the corresponding manufacturer.

As a rule: if you can access your hardware with Windows as you would a normal Windows partition, and this partition is formatted using a supported file system, this hardware can be defragmented. Removable drives such as streamers or CD-RWs are exceptions, since defragmenting them might not be useful. You can also set network drives as target for defragmentation.

RAID Striped-, Mirrored- and RAID5-Volumes: The advantage of these drive types lies in their superior speed, which on the one side facilitates accessing and storing processes, and on the other hand offer a higher degree of data security.

O&O Defrag supports all known RAID systems. According to many hardware manufacturers, defragmenting RAID systems is especially important: as their files are spread over several hard disks, their fragmentation level is likely to be very high.

Please note: Optimizing SSD drives in a RAID is not possible! RAID controllers present a virtual drive to the operating system. The actual drives behind them are hidden and cannot be technically addressed.

Installation, licensing and uninstall

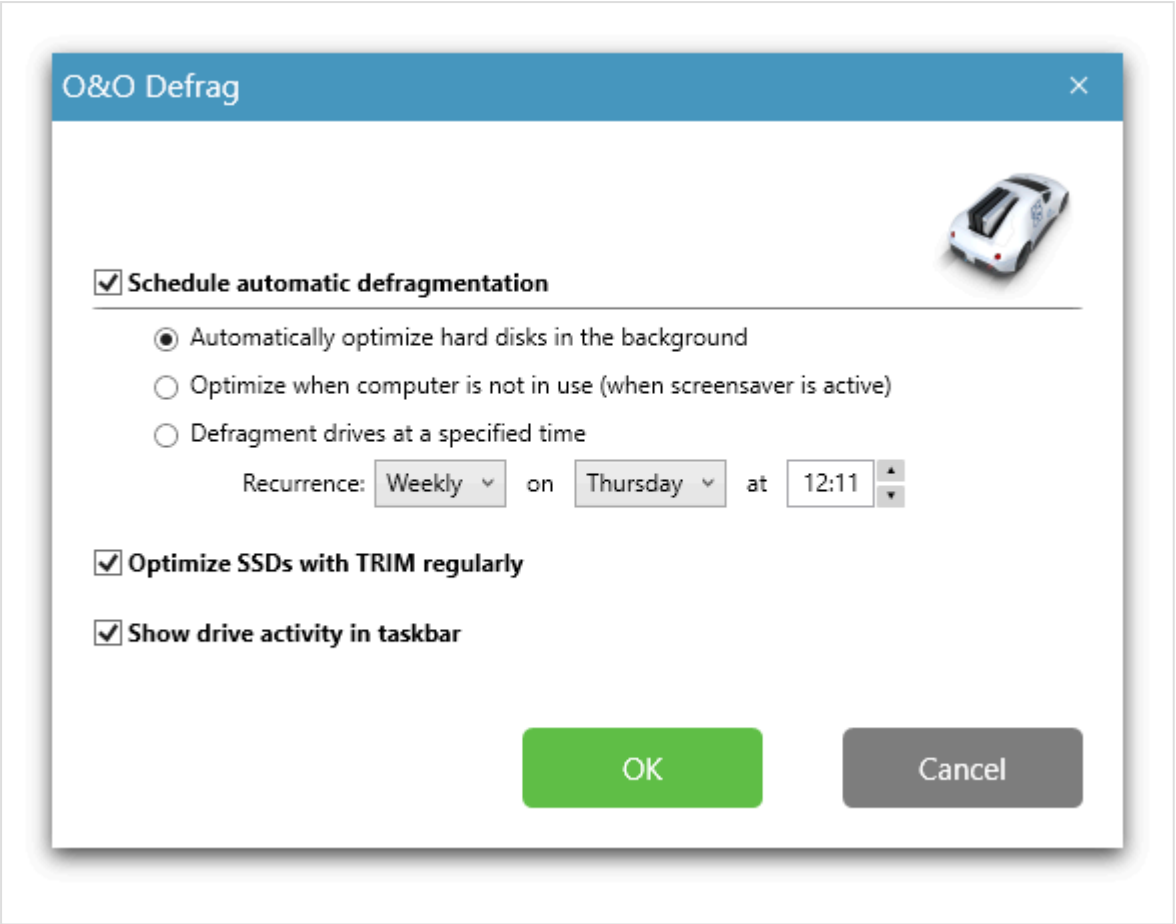
The installation of O&O Defrag is very simple. Please follow the steps below:

1. Turn on the computer on which you would like to install O&O Defrag.
2. Login as a local Administrator.
3. Insert the data medium with the required software in its respective disk drive, e.g. your CD-ROM drive, or start the installation file provided (SETUP.EXE).
4. Please follow the installation guide and confirm the End-User license Agreement (EULA). Please read it carefully before the installation - it is binding.
5. To complete the installation of the program, please restart your computer, if you have not been prompted to do so already.

Install and That’s All

When you download O&O Defrag from our website or from a link sent by our Online Shop, you receive a simplified installation. This installs O&O Defrag in the standard configuration and sets optimized settings for your computer during the new installation. Once installation’s completed, O&O Defrag, without any further action on your part, starts working in the background to improve your computer’s performance.

If you’re running an update or upgrade, we recommend checking the settings for automatic defragmentation and optimization just in case you disabled them at an earlier point in time.



In the event you don't want the standard installation, click **Advanced installation** in the reduced installation dialog. Once you do, the classic O&O Defrag installation wizard with all the usual configuration options will then be opened.

Information about licensing

:::note

In order to activate the product after installation or to gain access to the Full Version at a later time, you must possess a valid license key. This license key is also called a registration code, serial number, or product ID.

:::

O&O Defrag needs to be licensed per computer; in other words, you have to purchase a license for each computer where you want to employ O&O Defrag.

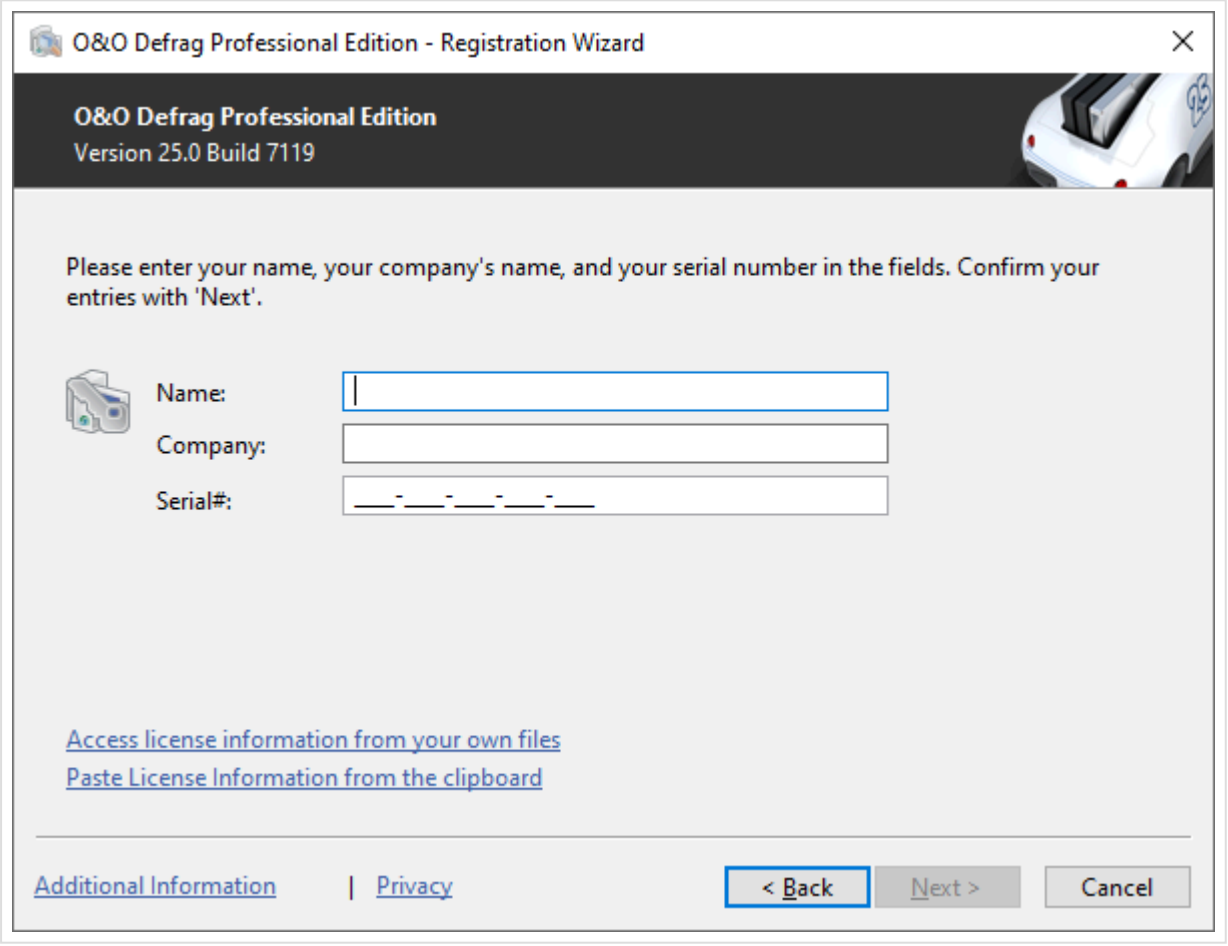
If you do not enter a valid license key, you will only be able to use O&O Defrag as a trial version with a limited functionality.

If you would like to implement O&O Defrag in your company or as a technician for your customers, then please contact one of our resellers or our Sales Department.

Enter license

When the program is started, a summary dialog automatically opens and this gives you the option of opening the registration dialog at the lower left. You can also open the registration dialog under **Info** from the ribbon bar by clicking **Register now**.

1. The registration wizard makes licensing very easy for you.
2. When you select the option **Enter your registration code**, a window appears where you can enter the license information you received after purchasing the software. If the product was delivered **electronically as a download,** enter the license information (Name, Company, and Serial Number) as it appears in the email you received in the documents sent to you after placing your order.
3. When entering the serial number, make sure you don't confuse the digit "1" with the capital letter "I". You should also avoid entering any empty spaces.
4. Click **Continue** to enter the license data or **Cancel** to exit the window without entering any data.
5. If the license key is entered correctly you'll see a confirmation in the next window.



If you have any problems entering the license key, please contact our Support under: support@oo-software.com

Using the trial version

You can use all O&O Defrag features free of charge and without any obligations for 30 days as a trial version. The registration wizard will display the amount of time remaining in the trial period every time you open the program.

Online registration

You are automatically registered by O&O Software if your order was made directly in the O&O Online Shop. If the software was purchased from a different vendor, you'll be asked if you wish to register after you enter the license information. You have the option of registering directly or at a later date. A working internet connection and a valid license key are the only requirements for doing so.

You can also click the link below to find the registration form:

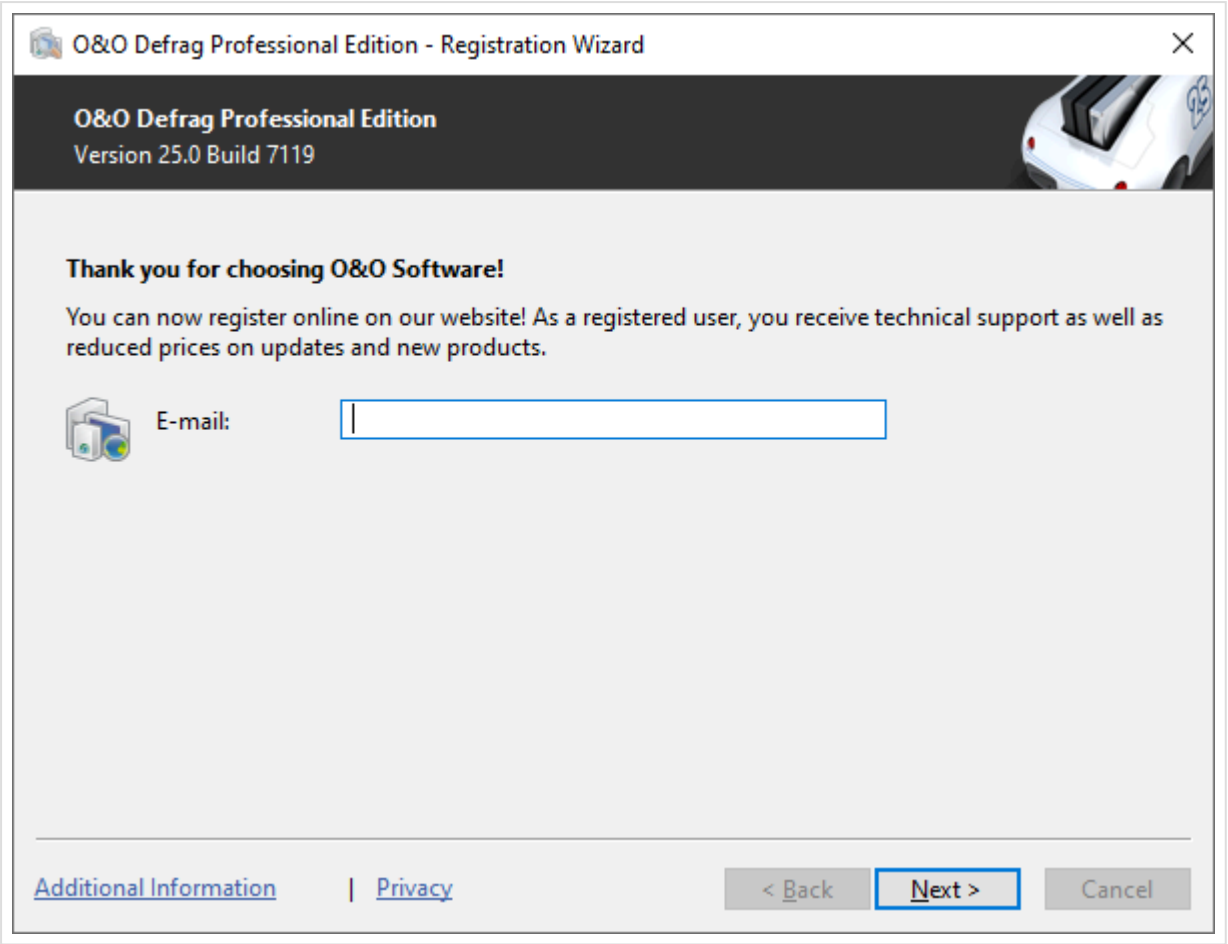
www.oo-software.com/register

Just return the completed online form by clicking "Send" and you'll be eligible to take full advantage of our O&O Customer Service.

What are the advantages of online registration? The advantage of online registration is that your customer data is saved by us and this enables us to help you more effectively in the future. If you ever misplace your license information, for example, we'll be able to resend it to you quickly upon request. You'll need the license key to convert your program to a full version, for updates, or after a new setup when you want to reinstall the program.

Further advantages will let you:

- Latest information about our products
- Free updates on new releases of the product you purchased (so-called minor updates)
- Option of upgrading to new versions at a discount (so-called major update)
- Access to our Customer Support
- and much, much more...



Install O&O Defrag updates

O&O Defrag checks automatically for new versions every time you start the program.

Whenever a new program version is available, you'll be able to install the update.

So-called "minor updates", meaning program versions containing small adjustments and enhancements (from version 24.1 to 24.2, 24.3, 24.5…) are available free of charge. "Major updates" such as from Version 23 to 24 involve purchasing a new license.

:::tip

In the ribbon bar under **Info** you'll find **About O&O Defrag**. This is where you can see your license data and the correct number of your program version.

:::

So-called Minor-Updates (Version 25.1 to 25.2, 25.0 to 25.5, etc.), where smaller changes in the program have been made, are free. Major updates, such as from version 25 to 26, must generally be purchased.

Removal

Please use the following instructions when you're ready to uninstall O&O Defrag:

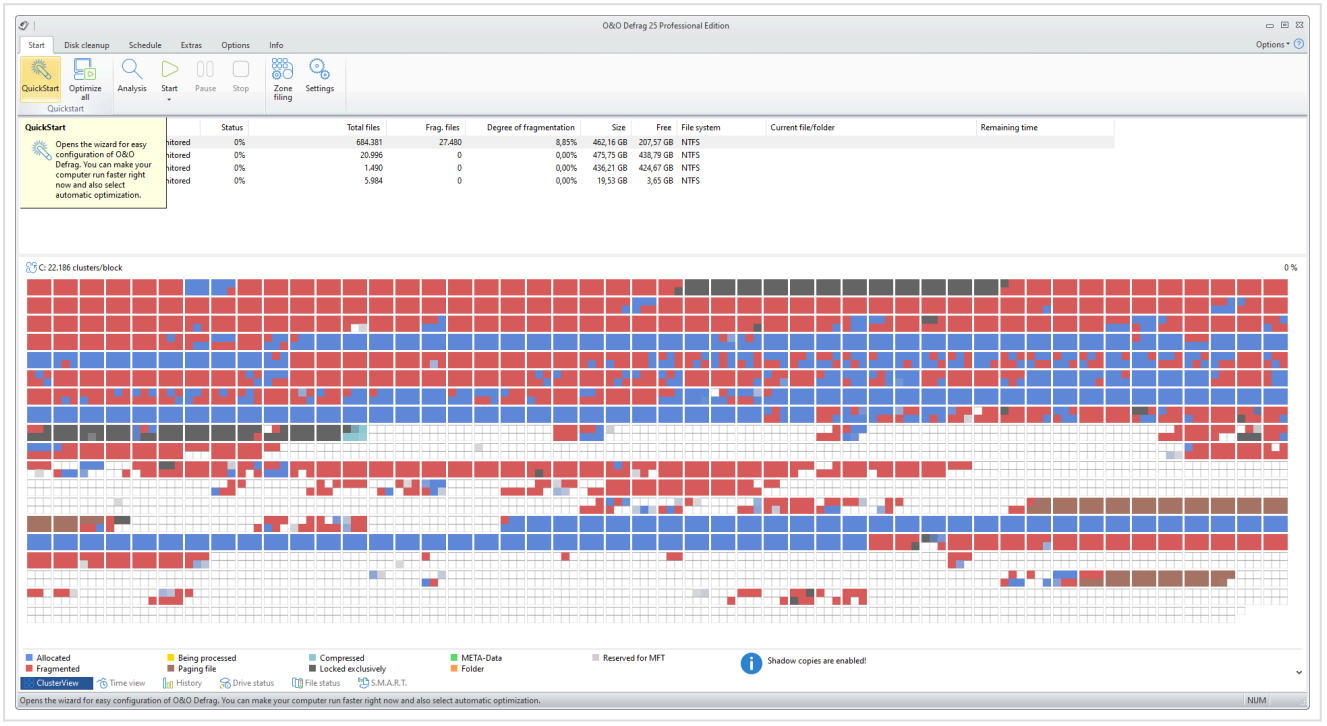
1. Open **Settings** from the start menu.

2. Click **Apps** (Apps and Features)
3. Select the Edition you have installed **O&O Defrag Professional Edition** or **O&O Defrag Server Edition** from the software list.
4. Click **Uninstall**.
5. The O&O Defrag uninstallation program will be started.
6. Confirm uninstallation of O&O Defrag. Following successful uninstallation you might have to restart the computer.

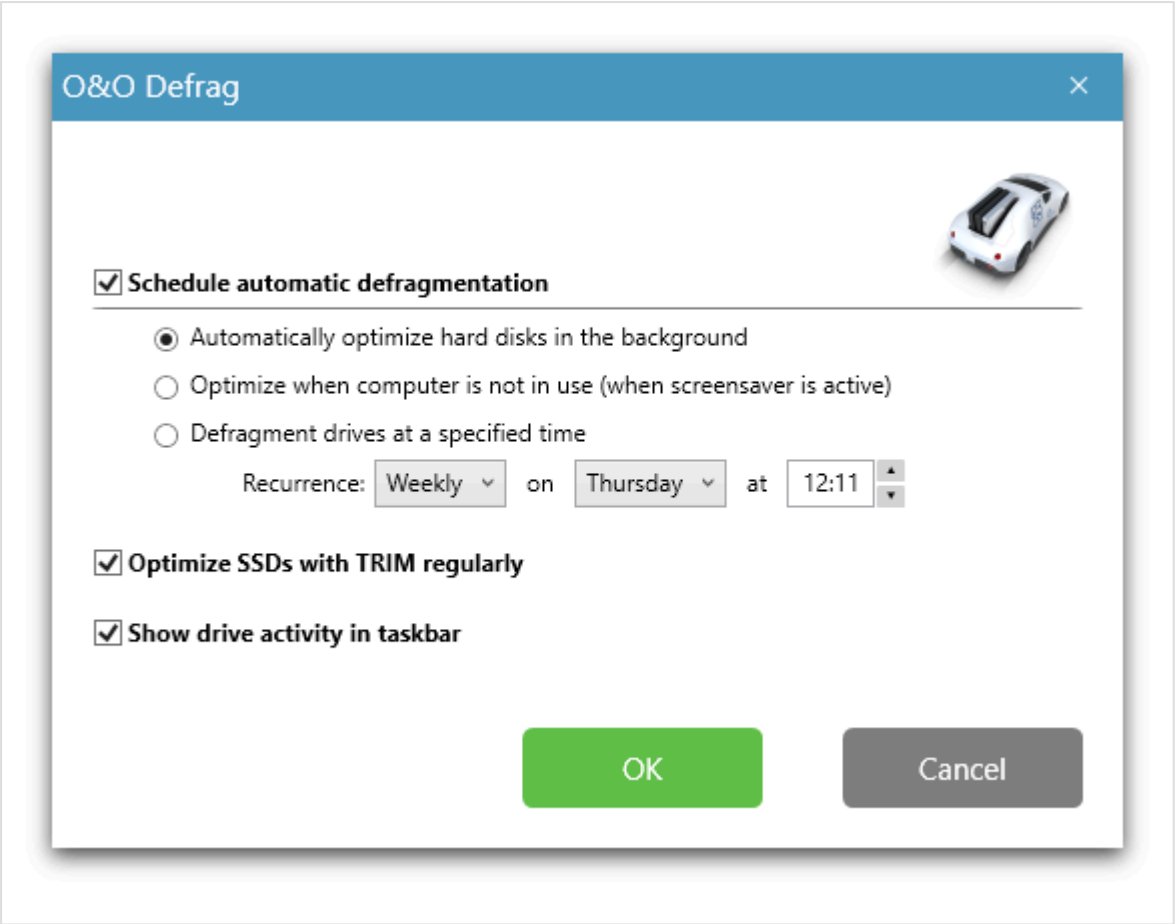
QuickStart

O&O Defrag was designed to fit the needs of almost any user. The default settings for O&O Defrag are already optimally configured for most computers. The choice of options in the QuickStart dialogue covers the most common user scenarios. This means your computer can continue performing at its very best without your having to make any special settings.

The QuickStart wizard can be started in the Ribbon Bar on the left side of the program window.



If you're using the default settings, click **OK** to apply the changes.



Schedule automated defragmentation

Automatically optimize hard disks in the background All modified and newly added files are checked during the automated defragmentation. Newly fragmented files will be automatically defragmented once they are no longer being accessed. This will ensure that your system is being constantly kept at its highest level of performance, and effectively prevent any additional fragmentation. The various zones of a drive will also be taken into consideration, when this option is enabled.

Optimize when computer is not in use (when screensaver is active)

The defragmentation always starts whenever your screen saver is on. For example, when you are out for lunch or away from your computer. Defragmentation will be cancelled whenever you're working on your computer, and will continue once the screen saver comes on again.

Defragment drives at a specified time

Here you can specify whether defragmentation should recur automatically. The next defragmentation will then start by itself without you're having to start it manually.

Additional automatic optimizations

For the first time, O&O Defrag enables you to optimize all makes of SSD drives. Using regularly scheduled ATA TRIM commands, an SSD will be kept informed of those hard disk areas that are available for new data. Instead of continuing to save the contents of data that's no longer needed, the SSD can now use those freed areas for a

drive-internal optimization of its data management. As a result, the SSD is able to process accesses significantly faster, and wear out on flash chips is kept to a minimum.

ThinProvisioning is available for virtual machines. Using it on a regular basis results in faster clearance and new allotment of space that’s become available. This increases performance and in many cases reduces the amount of space needed by the virtual machine.

ThinProvisioning can be run at any time by itself or upon completion of any defragmentation.

Analyze your drives

By analyzing hard disks, you can get an overview of how files are arranged on a drive, and how heavily fragmented they are. O&O Defrag creates a detailed status report about the fragmentation level once the analysis has been completed.

This level can lie between 0% and 100% whereby a lower value (ideally 0%) indicates that your data is not fragmented. A value close to 100 is really a worst case scenario – your files are almost completely fragmented. Even values of around 15% indicate that the performance of your system is seriously affected, and that a defragmentation is strongly recommended.

Level	Description and Recommendation
< 2%	Almost all files are optimally arranged on the hard disk. This is the ideal condition and can only be achieved and maintained by running a defragmentation at regular intervals.
2% – 5%	This degree of fragmentation is still acceptable for a system drive and indicates that your system is running at an almost ideal level of performance.
6% – 10%	This degree of fragmentation is still acceptable for data drives but frequent accessing of such data requires a lot more time than under ideal conditions.
11% – 20%	Your system is working slower than normal because of heavy fragmentation. Use O&O Defrag's scheduling feature to run defragmentations at regular intervals. This will help keep your system running at a good speed.
Above 20%	Your system is very heavily fragmented and suffering from severe performance loss. You should defragment your system right away, and create jobs for defragmenting at regular intervals. Compare the fragmentation levels before and after the next defragmentation run.

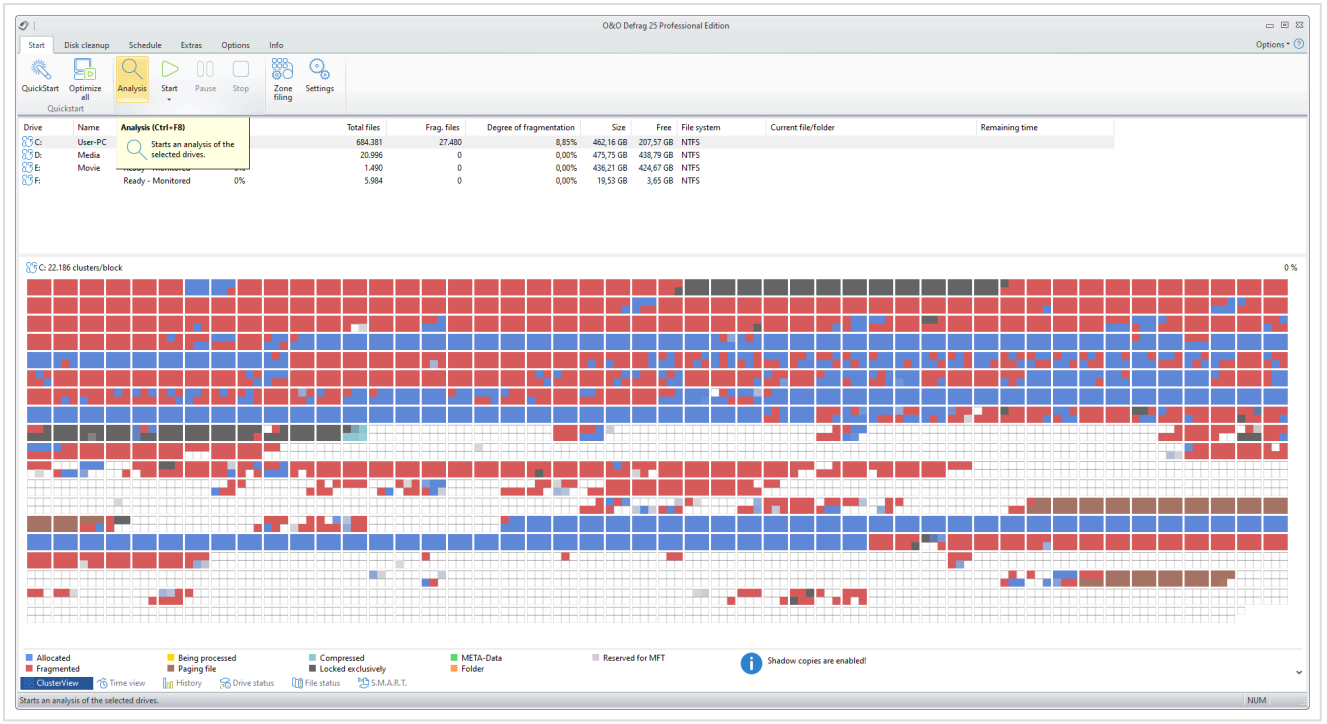
Starting an Analysis

1. Select the drive you want to have analyzed from the list of drives.
2. Start the **Analysis** using the Ribbon bar or the right-click menu.
3. Depending on the size of the drive, the analysis can take some time. You can see the analysis being done on the drive icon and in the status display.
4. When the analysis is complete, you can view the detailed status report as a HTML document in your web browser.

:::note

You can analyze several drives simultaneously. Mark the various drives by keeping the Ctrl key pressed while selecting.

:::


O&O Defrag 25 Professional Edition
Start
Disk cleanup
Schedule
Extras
Options
Info
QuickStart
Optimize all
Analysis
Start
Pause
Stop
Zone filing
Settings
Quickstart
Analysis (Ctrl+F8)
Starts an analysis of the selected drives.
Drive
Name
Total files
Frag. files
Degree of fragmentation
Size
Free
File system
Current file/folder
Remaining time
C:
User-PC
684.381
27.480
8,85%
462,16 GB
207,57 GB
NTFS
D:
Media
20.996
0
0,00%
475,75 GB
438,79 GB
NTFS
E:
Movie
1.490
0
0,00%
436,21 GB
424,67 GB
NTFS
F:
Ready - Monitored
0%
5.984
0
0,00%
19,53 GB
3,65 GB
NTFS
C: 22.186 clusters/block
0 %
Allocated
Fragmented
Being processed
Paging file
Compressed
Locked exclusively
META-Data
Folder
Reserved for MFT
Shadow copies are enabled!
ClusterView
Time view
History
Drive status
File status
S.M.A.R.T.
Starts an analysis of the selected drives.
NUM

Defragment your drives

Defragmentation is a useful tool for optimizing performance on both HDDs and SSDs, but for different reasons.

HDDs slow down considerably when they’re fragmented because the write-heads have to cover longer distances if file fragments are dispersed far apart from each other. Aside from the slowing-down of read and write processes, the life expectancy of the disk will also be reduced. As a result of fragmentation, the write head is forced to make additional movements and this affects the disk mechanics, which thereby leads to increased abrasion.

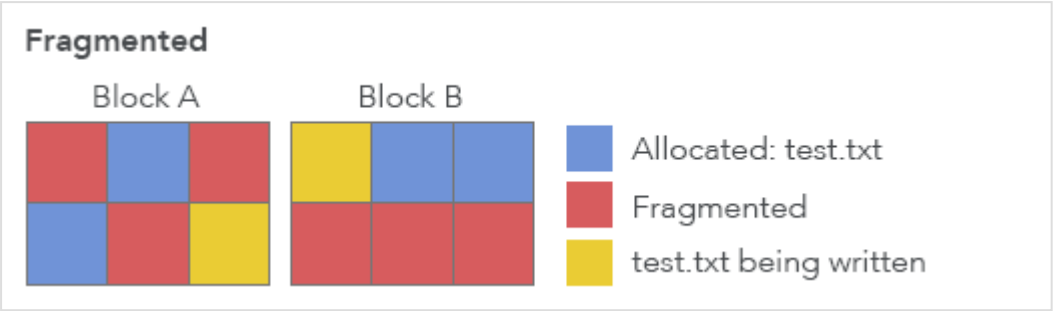
An SSD doesn’t have a classical read-write head. Data is instead coded using an electrical charge. In spite of this, fragmentation still ends up reducing disk performance and the life expectancy of SSDs. This is the result of internal activity on such disks. Whenever files are saved, the SSD controller distributes file fragments into the next available storage sections with the right amount of space (so-called “pages“). These file fragments have to be found by the read and write-heads using mapping tables. Depending on the level of fragmentation, this searching activity can take some time.

It can also be seen that an SSD with fragmented data tends to take up more blocks. This is because the system notices the number of fragments arising from any file and saves them in an equal number of blocks, even though they could fit into a smaller number. In the long run this ends up using more memory cells than are needed, which can result in unnecessary and premature disk failure.

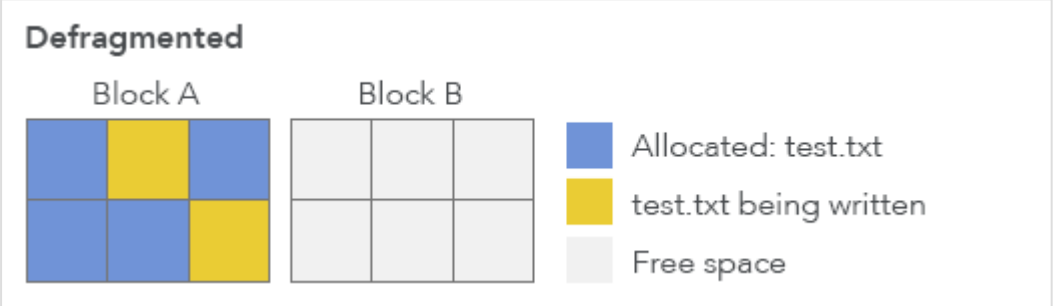
Defragmentation of an SSD can also reduce write cycles. An SSD has only a limited number of write (or deletion cycles) available. While it may take time to reach this number (under normal circumstances several years), users of SSDs are still encouraged to reduce the number of write cycles. Just how defragmentation reduces the number of write cycles can be seen in the following example:

Process file test.txt

Case 1: File test.txt is found scattered above blocks A and B. When accessing the file and changing its content, blocks A and B each loose one write cycle.



Case 2: File test.txt is only located in block C. When processed, block c loses one write cycle.



Because a block doesn't contain just one cluster but generally up to 8 of them, 8 times fewer write cycles can be achieved for case 2 in comparison to case 1. This reduction extends the life expectancy of the SSD enormously and can be achieved in SSDs by the special defragmentation methods available in O&O Defrag.

Please note that the calculation above is very simplified. It should only serve to illustrate the conduct of SSDs and is not meant to be an accurate source of technical information.

Defragment single drives

1. Select the drive you wish to defragment from the drive list.
2. Clicking the **Start button** in the Ribbon Bar will start defragmentation using the SPACE default method. If you want to change this method, open the Start button's lower menu and select the Method you desire.
3. Depending on the size of your database, defragmentation can take up to several hours. You can see the defragmentation in progress on the drive symbol and the status display.
4. Once defragmentation is completed, you can have a detailed status report displayed as an HTML document in your web browser.

:::note

You can defragment several drives simultaneously by pressing the Ctrl key and selecting the drives you want to have included.

:::

Defragmenting SSDs When saving files, the controller of an SSD splits them into individual file fragments and then distributes them into the next free and "suitable" memory sections, called pages. This behavior can slow down SSDs because the individual parts must be found and the number of parallel accesses are limited. If the SSD is fragmented, it might require more memory cells because the system remembers how many fragments there were in the original file and saves them in this same number of cells, even if these files could fit into fewer cells. In the long run, this means being burdened with more memory cells than needed, which can lead unnecessarily to early failure of the storage device. SSDs save file fragments on morememory cells than needed. The resource and hardware friendly SOLID/COMPLETE method defragments these file fragments so that only the number of memory cells required will be used for reading and writing in the future. SOLID/COMPLETE can be used on both SSDs as well as HDDs.

Defragmenting HDDs An increasingly fragmented hard disk compromises the performance of your computer. This occurs as a result of frequent write and read access, during your daily routines, while surfing or gaming, or due to frequent user access on Server. Windows disperses single file fragments all over the entire hard disk, which increases the time for its access. The defragmentation packs file fragments coherently together on the hard disk. Windows as well as other programs will start and run faster.

:::note

Existing system restoration points will be deleted by disabling computer protections.

:::

Defragment an entire computer

1. To defragment your entire computer, select all the drives in the drive list. A multiple selection can be done by pressing Ctrl.
2. If you click the **Start button** in the Ribbon bar, defragmentation with the SPACE default method will begin. If you want to change this method, first open the Start button's lower menu and select the Method you desire.
3. Depending on the size of your database, defragmentation can take up to several hours. You can see the defragmentation in progress on the drive symbol and the status display.
4. Once defragmentation is completed, you can have a detailed status report displayed as an HTML document in your web browser.

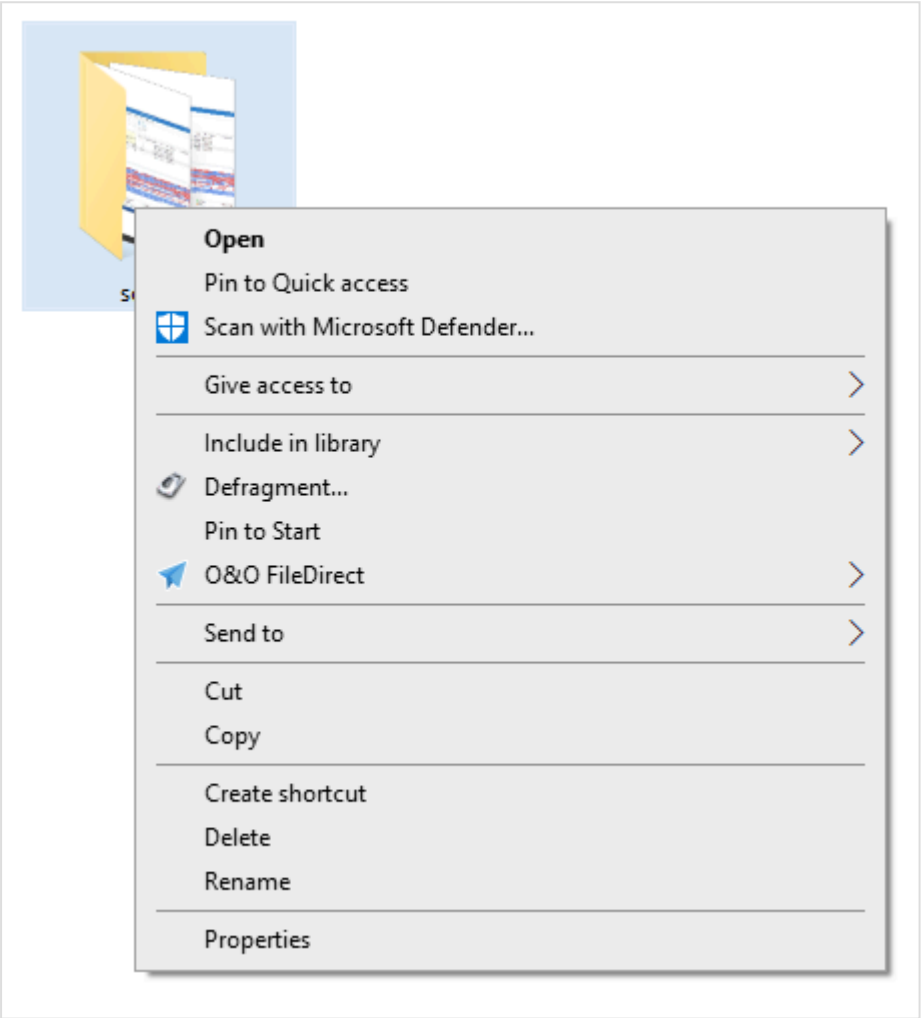
Defragmenting individual files and folder

You can also defragment individual files and folders. Just right-click the folder or file you want and select **Defragment**. O&O Defrag will be opened and the defragmentation begins. Defragmentation of smaller amounts of data is often completed within just a few seconds.

:::note

If you wish to have the defragmentation of a file verified, you can run an analysis and then check to make sure the file is no longer in the list of fragmented files.

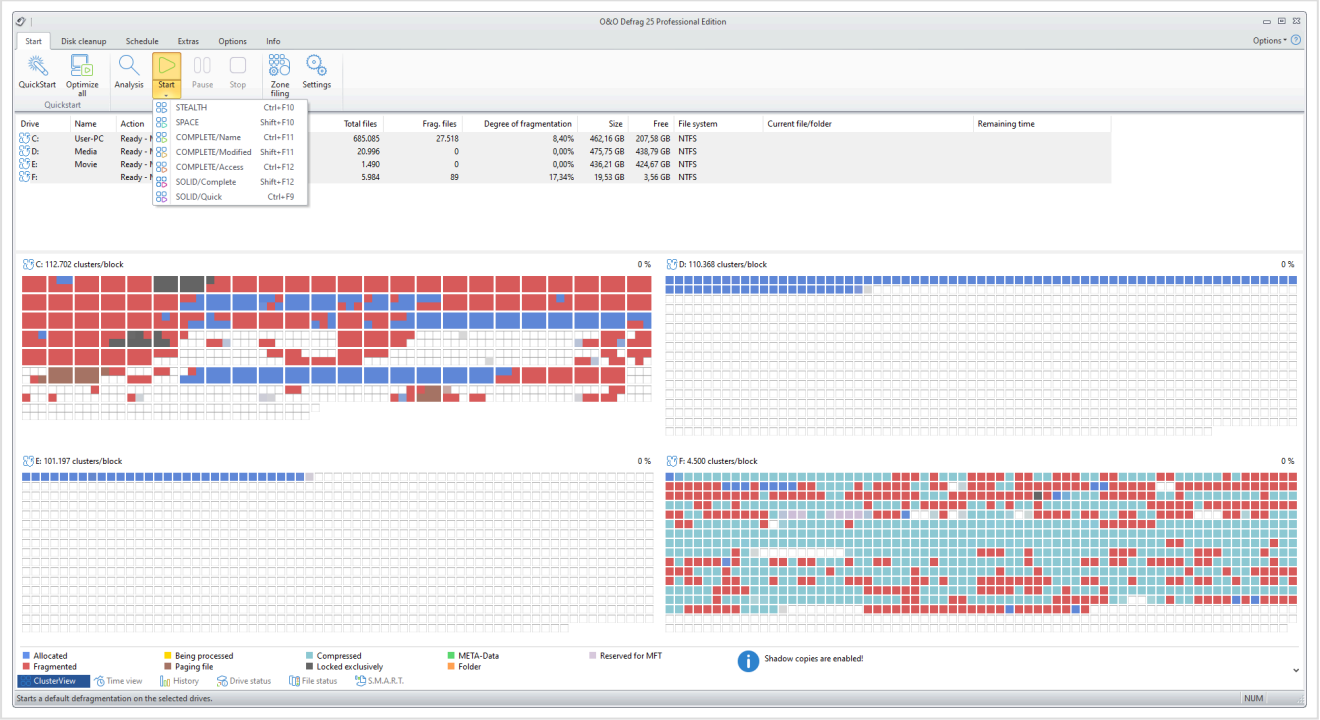
:::



Defragmentation methods

In addition to the five methods for Zone filing, O&O Defrag continues to offer its seven methods for defragmenting your computer.

- STEALTH
- SPACE
- SOLID/Complete
- SOLID/Quick
- COMPLETE/Access
- COMPLETE/Modified
- COMPLETE/Name



:::note

Please bear in mind that the older methods can only be selected if zone filing is disabled.

:::

Performance standard methods of O&O Defrag

	SOLID/Complete	SOLID/Quick	SPACE	STEALTH	COMPLETE-Methods
Defragmentation of files	+ +		+ +	+	+ +
Defragmenting the free space	+ +		+ +		+ +
Prevention of further fragmentation	+ +		+ +		+
Results of high-level fragmentation*	+ +			+	+
Suitability for very large files (> 4 GB)	+ +			+	
Suitability for many files (> 1 M)	+ +		+	+ +	
Run time of first defragmentation**	+ +		+	+ +	
Run time of recurring defragmentation	+ +		+	+ +	
Required RAM	+ +	+ +	+	+ +	
CPU Load	+ +	+ +	+	+ +	
HDD	+			+ +	+ +
SSD	+ +	+ +			

+	Very Applicable (with runtime: quick)
+ +	Extremely Applicable (with runtime: very quick)

* Our understanding of high-level fragmentation is a poorly maintained drive containing a large number of heavily fragmented files with little free space available.

** The run time of the first defragmentation lasts longer than with the previous version as a result of data being divided into zones.

COMPLETE/Access

The COMPLETE/Access method defragments your files and reorganizes your file structure. Although this method is slower than the STEALTH and SPACE methods, it guarantees maximum system performance when your files are being read.

Algorithm

Files are sorted according to when they were last accessed. The files that have been accessed the least will be placed at the beginning of the partition and those accessed most frequently are put near the end. Seldom-used files are defragmented and will not need to be moved in future. Frequently-used files are placed at the end of the drive. This strategy means that future defragmentation runs will require the least amount of time, as fewer files need to be checked and defragmented.

Recommended Application

If you want to use the COMPLETE/Modified method for your regular defragmentation runs, you should bear in mind that you only use this method on your drive. Combining various methods (COMPLETE, STEALTH, and SPACE) can result in defragmentation taking much longer, as the file system would need to be reorganized each time.

- Maximizes the read access performance on servers
- For regularly defragmenting your volumes
- On computers that have sufficient resources available when the defragmentation takes place – CPU usage is likely to increase significantly (it is strongly recommended that you use the O&O ActivityMonitor). A larger amount of free disk space is necessary with this method.
- All kinds of servers and workstations

COMPLETE/Modified

The COMPLETE/Modified method defragments your files and also reorganizes your file structure. Although this method is slower than the STEALTH and SPACE methods, it guarantees maximum system performance when your files are being read.

The COMPLETE method is particularly suitable for databases and file servers. It is important to bear in mind that this method requires quite a lot of main memory due to file reorganization. If this is likely to be a serious problem for your system, we recommend you use the STEALTH or SPACE methods.

Algorithm

Files are sorted according to the date on which they were last changed. The files which have not been changed recently are placed at the beginning of the partition and those recently changed are placed at the end. This option is a good one for file or database servers containing files that have never been changed (e.g. system files), but where others, on account of their size or content, are frequently modified. (e.g., database files)

This strategy means that future defragmentation will require the least amount of time, as only a few files need to be checked and defragmented.

Recommended Application

If you want to use the COMPLETE/Modified method for your regular defragmentation runs, you should bear in mind that you only use this method on your drive. Combining various methods (COMPLETE, STEALTH, and SPACE) can result in defragmentation taking much longer, as the file system would need to be reorganized each time.

- Maximizes the performance for write access on servers
- For regularly defragmenting your volumes
- On computers that have sufficient resources available when the defragmentation takes place – CPU usage is likely to increase significantly (it is strongly recommended that you use the O&O ActivityMonitor). A larger amount of free disk space is necessary with this method.

COMPLETE/Name

The COMPLETE/Name method defragments your files and also reorganizes your file structure. Although this method is slower than the STEALTH and SPACE methods, it guarantees maximum system performance when your files are being read.

The COMPLETE/Name method is particularly suitable for system drives. It is important to bear in mind that this method requires quite a lot of main memory due to file reorganization. If this is likely to be a serious problem for your system, we recommend you use the STEALTH or SPACE methods.

Algorithm

Files are sorted alphabetically from the beginning to the end of the partition and this leads to quick access to files in a directory. When Windows starts up, many system files will be read in sequence from the WINDOWS and the WINDOWSsystem32 directories (DLLs, system drives, etc.) and the start-up time will therefore be shorter.

This method is particularly recommended for computers on which the files rarely change. This reduces the reorganization time that is needed for every defragmentation.

Recommended Application

Please bear in mind that if you use the COMPLETE/Name method for your regular defragmentation runs, it should be the only one used on the drive. Combining various methods (COMPLETE, STEALTH, and SPACE) can result in defragmentation taking much longer, as the file system would need to be reorganized each time.

- Maximizes the performance for the read access to workstations
- For regularly defragmenting your volumes
- On computers that have sufficient resources available when the defragmentation takes place – CPU usage is likely to increase significantly (it is strongly recommended that you use the O&O ActivityMonitor). A larger amount of free disk space is necessary with this method.
- All kinds of servers and workstations

SOLID/Complete

As a result of SOLID/Complete, fragments are first combined and then a second run is started which closes any gaps. The easiest and fastest way is of course to combine the fragments and possibly even reduce their number. Access will then be faster and the number of memory cells used will be reduced. If there are now many gaps between data, these will be filled with new data in the future, which then must be fragmented because there isn't not enough space available for the entire file.

Upon completion of successful defragmentation, SOLID/Quick will also be run on SSDs to guarantee that the space gained and freed cells are used optimally. The result is an immediate improvement of performance and preservation of resources in the future.

SOLID/Quick

SSDs manage their own memory intelligently and by doing so try to prevent losing speed as a result of fragmentation or ineffective data distribution. And up to a certain point this is also enough.

After intensive or prolonged use, however, it's necessary to clean up internal optimization to regain its benefits. SSDs offer board resources for this purpose. SOLID/Quick uses these board resources in combination with a straightening up mechanism to improve future performance and resource allocation. It's advisable to run SOLID/Quick regularly on an SSD because this is the only way for the SSD to achieve 100% of its performance continuously.

SPACE

The SPACE methods offer you a great solution for heavy fragmentation. It also allows you to consolidate your data so that the amount of contiguous free space is as large as possible and further fragmentation is prevented.

Algorithm

All fragmented files will be defragmented, and then placed into the free slots in which they fit. This maximizes contiguous free space. This method is very quick and efficient and it does reorganize your volume, but not as thoroughly as the COMPLETE methods.

Recommended Application

The SPACE method is ideal for the first defragmentation run on a system that has never been defragmented, as it requires far less free space than the COMPLETE methods. SPACE can also be used for regular defragmentation runs.

- Initial defragmentation of your system
- Computers with few available resources, as the method does not greatly increase the CPU usage and does not require much free hard disk space
- Servers with large hard disks (e.g. more than 1 terabyte)
- Computers with a large number of files (more than 100,000 files)

STEALTH

The STEALTH method differs from other methods in that it is much faster and uses much less main memory for the defragmentation.

Algorithm

The STEALTH method is based on our unique STEALTH technology and allows an unprecedented level of defragmentation on computers having a large number of files, little free space or available main memory.

This method defragments all fragmented files and tries to consolidate them in order to optimize available free disk space. Speed and resource usage are the main considerations here, and the method is therefore not quite as thorough as the SPACE and COMPLETE methods.

Recommended Application

The STEALTH method is especially useful for defragmentation on a regular basis.

- Initial defragmentation of your system
- Computers with few available resources, as the method does not greatly increase the CPU usage and does not require much free hard disk space
- Servers with very large hard disks (e.g. more than 4 terabytes)
- Computers with a very large number of files (more than 3,000,000 files)

Zone filing

The division of drives into zones enables the logical separation of the data into performance critical and non-critical files. A special algorithm makes sure that the data on the disk is optimally organized after defragmentation. Files are organized and moved into zones depending on their intended use and access rate. For instance, system and program files, which need to be accessed very quickly, are separated from other data like documents and downloads.

:::warning

Dividing SSDs into speed zones is not recommended. SSD controllers arrange data on SSDs so that all blocks are used equally. As a result, division into speed zones is not possible and makes no sense.

:::

By the division of files according to their write frequency, it is possible to intelligently prevent fragmentation. Thanks to this logical grouping, program and system start times are shortened, future defragmentation runs faster, and new fragmentation can be prevented.

The system drive is divided into 3 zones by default. The zone filing proposed by O&O Defrag is optimal for the majority of users. You may adapt this functionality to your needs by clicking **Configure zones** in the Ribbon bar (see "User-defined zone filing").

The following rules are set by default for the system drive:

1. Zone Windows system files and installed applications

2. Zone: user data, e.g. Office documents, temporary files, user profile

3. Zone: Seldom used data and very large files, e.g. Windows Recycle Bin and files over 500 MB

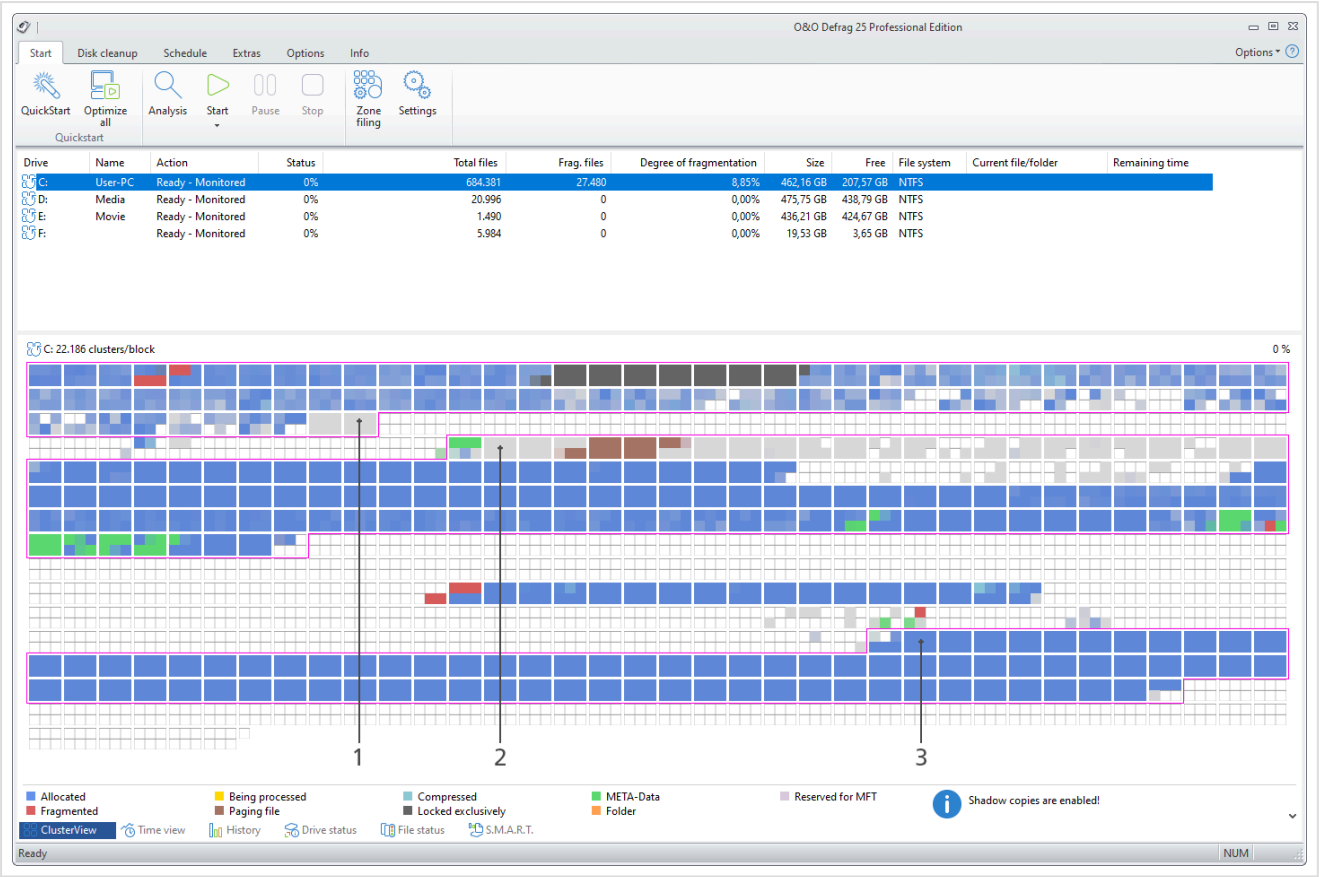
:::note

Zone filing is disabled by default.

:::

Enable zone filing To enable zone filing, select **File into zones** in the drop down menu in the tab **O&O Defrag** under **Settings** in the ribbon bar.

Disable zone filing To disable zone filing, deselect **File into zones** in the drop down menu in the tab **O&O Defrag** under **Settings** in the ribbon bar.



Key:

1. Zone 1 (light background)
2. Zone 2 (dark background)
3. Zone 3 (light background)

Defragmentation method for zone filing

O&O Defrag provides three methods for defragmenting a hard disk divided into zones. The choice of methods appears whenever you open the lower menu of the Start button.

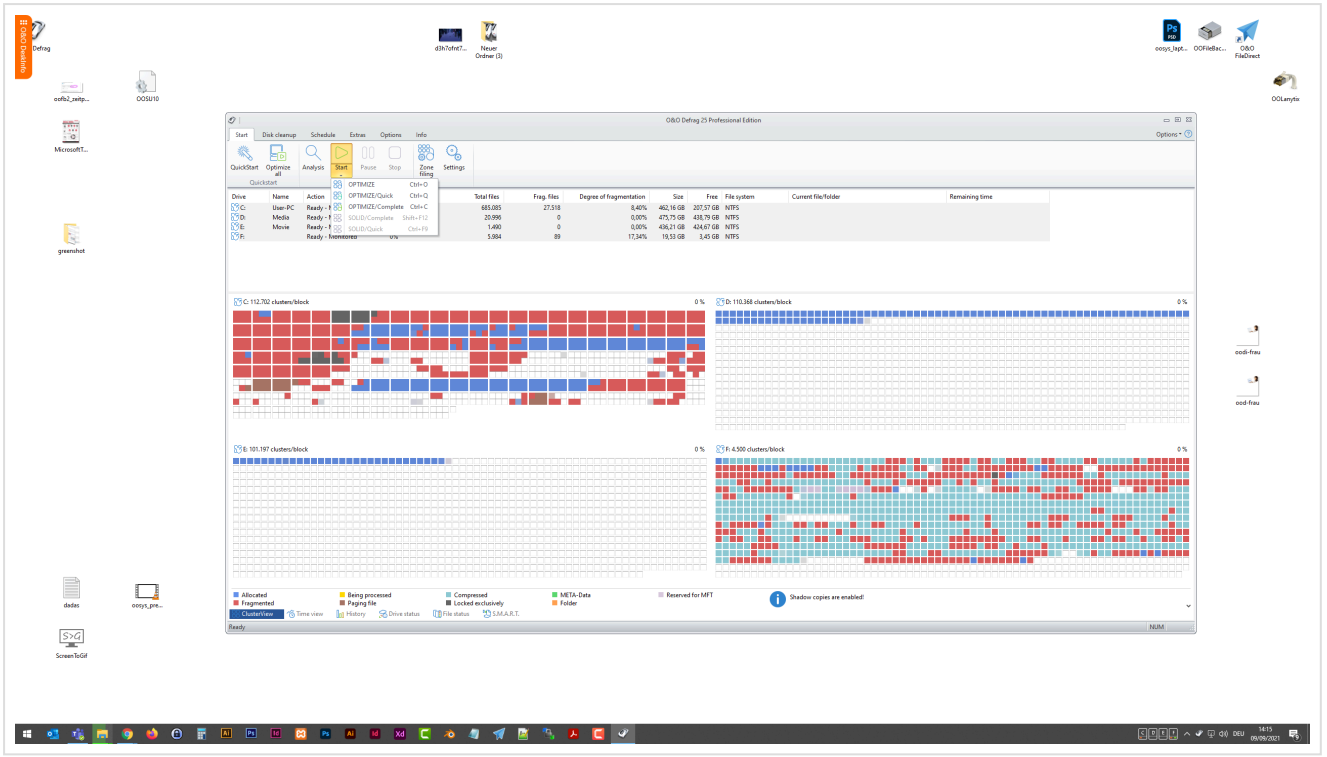
:::warning

Dividing SSDs into speed zones is not recommended. SSD controllers arrange data on SSDs so that all blocks are used equally. As a result, division into speed zones is not possible and makes no sense.

:::

Default sorting (can be customized by the user, see "Zone filing"):

- Zone 1 (operating system and installed programs) - sorted by file name
- Zone 2 (user data and settings) - sorted by date of last access
- Zone 3 (seldom used and large files) - Files consolidated to get the most contiguous free space



Overview

The following chart provides an overview to help select the right method for each intended use. The best results can be achieved by your selecting the right method for the function that is being performed. An empty field means that another method is better suited for getting optimal results.

Recommendation for:	OPTIMIZE	OPTIMIZE/Quick	OPTIMIZE/Complete
First-time defragmentation	+		+ +
Occasional, repeated defragmentation	+ +	+	+
Frequent defragmentation	+	+ +	
After the installation of a larger program	+ +		+
After the installation of a game	+ +		+
After the installation of a comprehensive Update (e.g. Service Pack)	+		+
After the installation of a program or a game	+ +		
Defragmentation of system drives	+ +	+	+ +
Defragmentation of data drives	+ +	+ +	
Very large files, seldom changed	+	+ +	
100.000 files	+ +		+ +
500.000 files	+ +	+	+
1 million files	+	+ +	
Above 5 million files		+ +	

Key:

+ +	**Very applicable**
+	Applicable

OPTIMIZE

OPTIMIZE executes a SPACE defragmentation in all three zones of the selected drive. The files will be so arranged in order to maximize the resulting free disk space. It is the recommended default method because it works thoroughly as well as well as quickly.

OPTIMIZE/Quick

OPTIMIZE/Quick provides a speedy defragmentation requiring very little hard disk usage. It defragaments files in all the different zones. It also moves files which are not located in the correct zone to the right one. This method is new in that it aggressively reduces fragmentation of extremely fragmented files, without having to analyze the entire file system.

OPTIMIZE/Complete

OPTIMIZE/Complete replaces or combines the properties of the previous COMPLETE-Methods. The user decides which method should be run on each zone (SPACE or COMPLETE sorting). A new sorting of the data allows the defragmentation to be done more thoroughly, but at a considerably slower pace than the standard Optimize

method. This method is only needed when, for example, you want to rearrange the files on a hard disk following a large-scale program installation.

Rules for individual drives

You can customize the default configuration according to your wishes and create new settings for individual drives or drive groups.

1. If you want to create new rules for individual drives, click Zone filing and under **All drives** click **Add new**.
2. In the following dialog, select the drive for which you want to create a new rule. You have a choice between the **System drive** or **All other drives (data volumes).** You can also select individual drives for the list.
3. Confirm your selection with **OK.**

The drives you selected will then appear in the list of drives. To create a new rule, you have to select the drive and on the right side of the program window, under **User-defined rules** for the separate zones, click **Add new rule**.

User-defined zone filing You can modify the default configurations, by defining your own rules for zone filing. With the help of these rules, you can specify where a file should be placed in the zone based on its name and the paths.

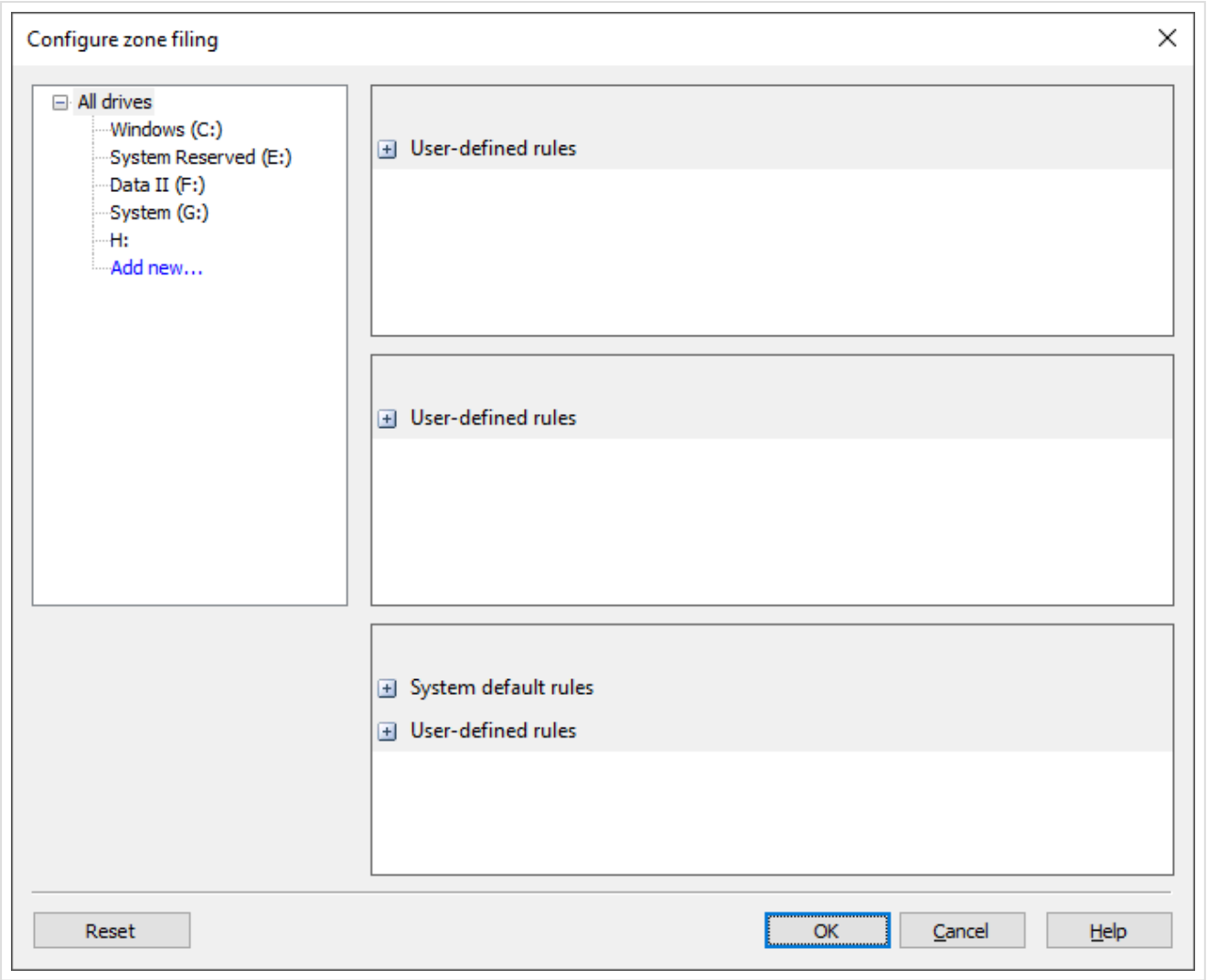
For the notation of the rules, see Notation for rules.

- You can create user-defined rules valid for all drives. Select **All drives** from the drive list, and then select the corresponding zone under **User-defined rules** in the sub-item **Add new rule**.
- If you only want to create rules for certain drives, select the drive from the list, click the corresponding zone to the right under **User-defined rules**, and then the sub-item **Add new rule**. This specific rule overrides the higher rule if they intersect.

Always file into three zones Here you can specify that files with a certain size should always be filed to zone three. Path-based rules, which include a very large file, always have a higher priority than the size based rules. You can specify different optimization strategies for each zone. The strategy allowed is used by OPTIMIZE/Complete, the most thorough method employed by O&O Defrag. You have the following strategies to choose from:

Consolidate files Files are defragmented and packed together as closely as possible to create large connected free hard disk areas. This prevents a fragmentation of newly created files.

Sort files Files are sorted based on a certain criterion (file name, modification date, last access date). This allows files that are often in use to be accessed and loaded faster.



Notation for rules

To have data filed into zones according to your wishes, use the correct syntax. You'll find user-defined rules for doing this in the following examples:

If you want to work on a file, then enter the absolute path:

Example: `c:\windows\explorer.exe` - only this file is worked on.

If you want to capture all of a folder's sub- entries (files and sub- folders) by a rule, the rule expression needs to end with `\*` :

Example: `c:\windows\system32\*` .

If only one folder without sub folder should be captured, then enter it without an expression:

Example: `c:\windows\system32` .

If you want to move all files of a certain type to one zone, enter a star before the file ending.

Example: `*.omg` includes all files and folders ending in .omg. The star jumps over a number of symbols and searches for the expression which is located behind it.

Only files with a certain characteristic in their name and with the exact file ending are supposed to be captured:

Example: `*test*123*.txt` includes all text files which contain a "test" and "123" in their name. This means for example: test123.txt (the star can only jump over zeros) or also xtestyz123abc.txt.

Files can also be approached that are not constrained by where they are stored in a drive:

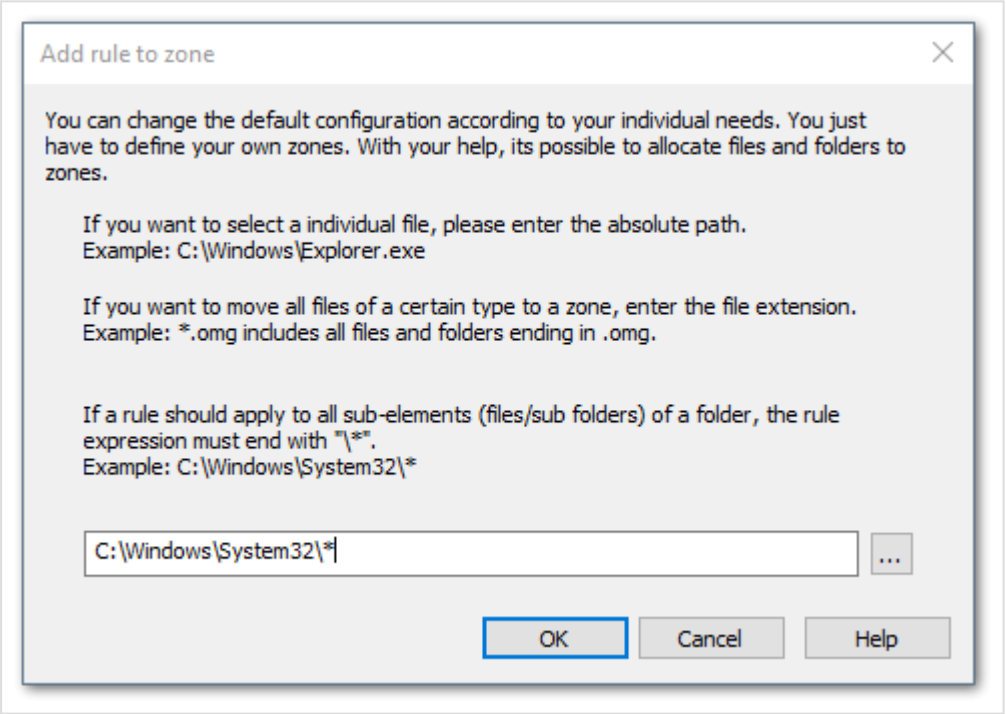
Example: The rule `\file.txt` finds all files which are called file.txt, and lie in the root directory of any drive. If no drive letter is given and the rule starts with a backslash, a path is intended that is independent from the drive on which the file it is located.

If you want to include all sub-folders of a folder, use the backslash in the beginning and at the end of the folder name and the star:

Example: `\windows\*` all sub-entries of all Windows folders on all hard disks

Further examples:

`c:\hall?.txt` - Here the question mark is any (not empty) symbol. It is also possible to cover `c:\hallo.txt` and `c:\halli.txt` or also `c:\hall8.txt`.



Automatic defragmentation

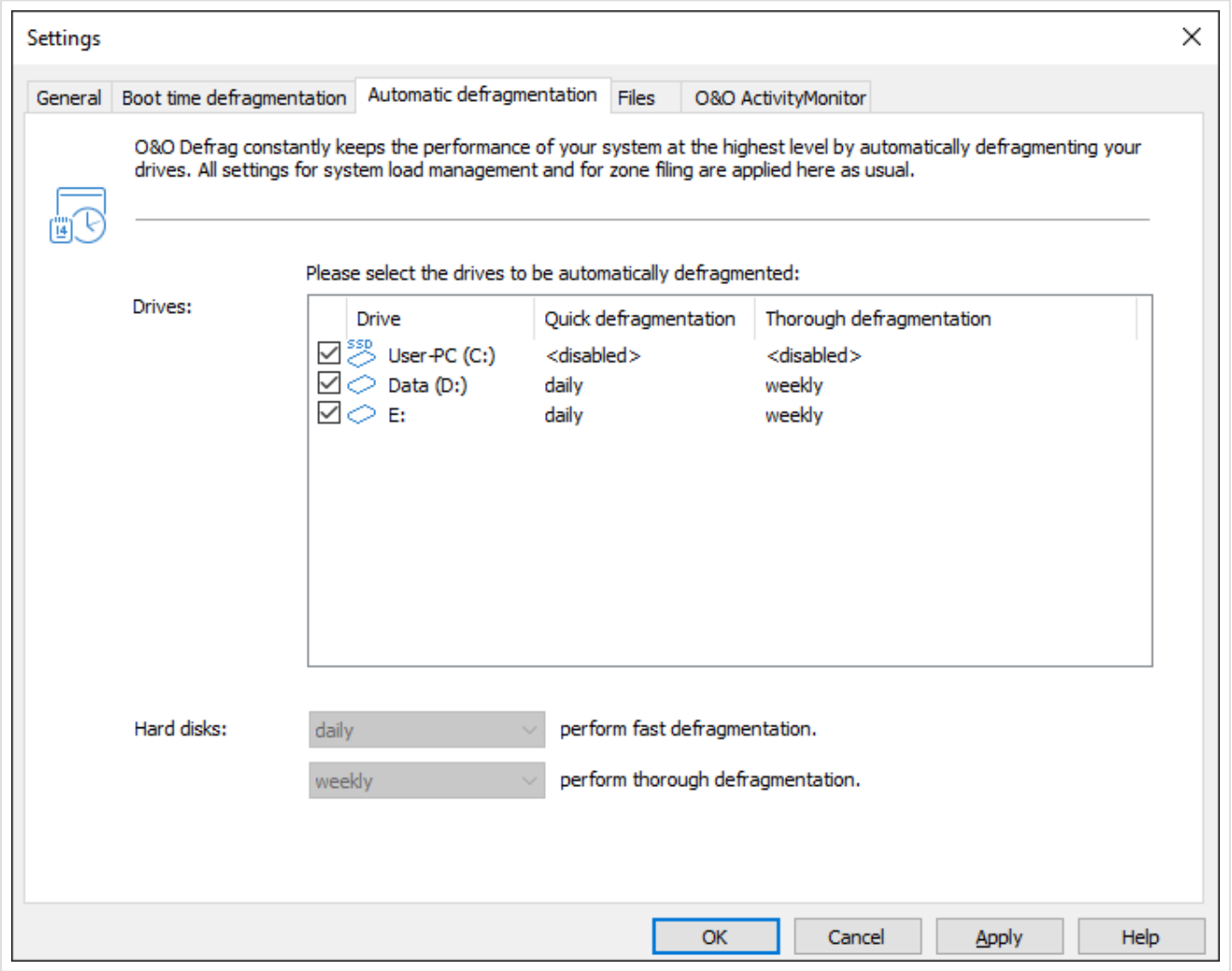
Thanks to automatic defragmentation, there is no need to set defragmentation settings manually. Once activated, the automatic defragmentation optimizes your hard disk in the background; without your computer losing any of its performance. This innovative function makes it possible for administrators under pressure, as well as for- non professionals, to maintain the highest performance levels without losing time learning about the program.

You can also modify the default settings and adapt them to your needs.

:::note

Automatic defragmentation will only be started on your hard disk and not on your external storage media. This helps avoid any inconsistencies and data loss that might occur if an external disk is removed accidentally from your computer during an active background defragmentation.

:::



All write accesses and newly added files are monitored. Newly fragmented files are automatically defragmented as soon as they are no longer being accessed by the user. This basically ensures your system's full performance capacity while continually preventing new fragmentation. Furthermore, a defragmentation of all files will be

performed at regular intervals which will minimize existing fragmentation and put little strain on available resources.

The normal and regular use of your computer could lead to particular files being accessed very often. These files can be your registry database, container files of download programs, or Temporary Internet Files. These files are then defragmented during the regular defragmentation session without the user having to guide the process.

You can also influence the behavior of the automatic defragmentation heavily:

You can decide between fast and thorough defragmentation. The quick defragmentation employs the OPTIMIZE/Quick method, the thorough defragmentation the OPTIMIZE method.

Notes for the automatic defragmentation: If the automatic defragmentation defragments large files, such as the data container of virtual computers, without you wanting it to, and the system slows down because of it, we recommend excluding these files from defragmentation under **Settings/Files**.

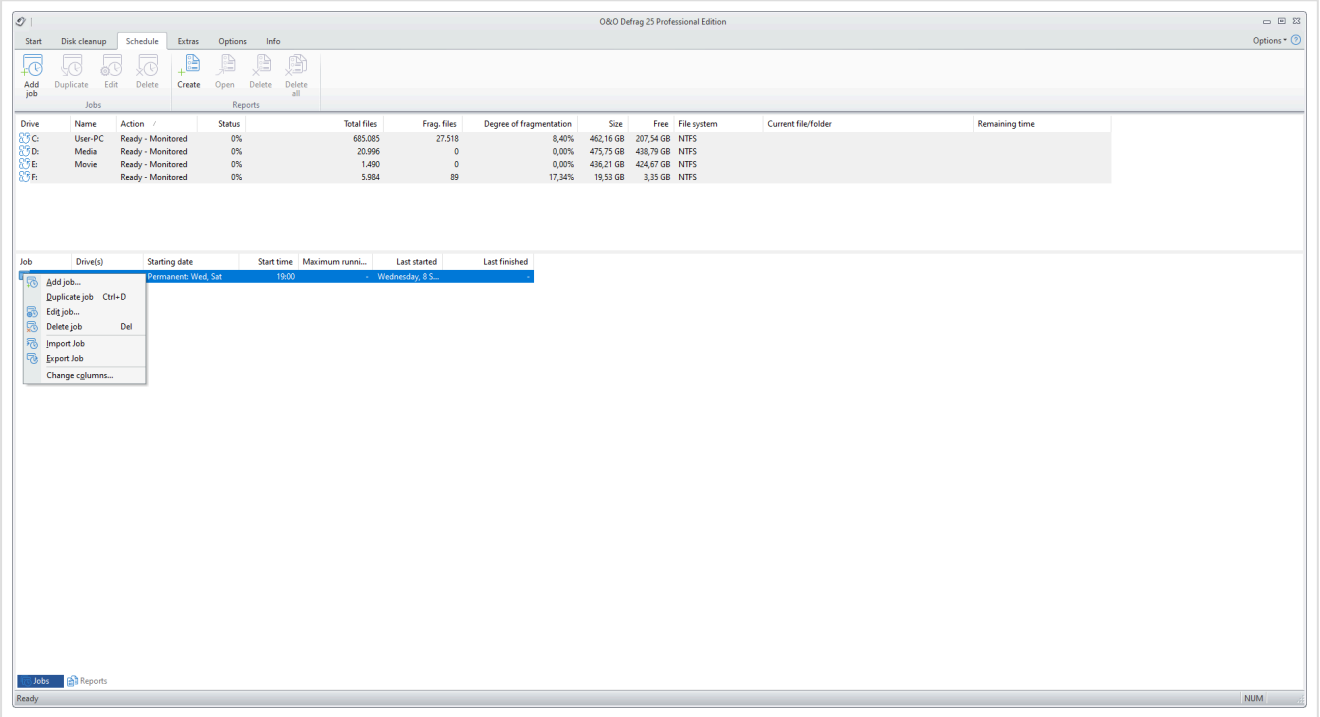
Automatic defragmentation will never be applied to external USB and firewire drives. This has been restricted for reasons of data security. It is possible to lose data if a drive is removed without having been properly logged off. Since automatic defragmentation runs permanently in the background without your notincing any negative effects, it’s easy to overlook the defragmentation of an external drive.

Schedule defragmentation jobs

Defragmentation on a regular basis is the key to always getting maximum performance from your computer. If you don’t wish to take care of this on your own, automatic defragmentation is an ideal alternative. You can, however, also use the elaborate scheduling feature in O&O Defrag to plan exactly when defragmentation should be run. With the help of so-called defragmentation jobs, you can set the time and action as well as additional parameters for defragmentation.

You can create, edit and delete jobs. If you want to leave out a job for a short period of time, but don’t wish to cancel it completely, you can disable it. In this way, the job will not be run until you enable it once again.

To create a new defragmentation job, select in the ribbon bar under **Schedule Create**. You can then define all settings for the jobs in the O&O Defrag job dialogue.



Create a job – General

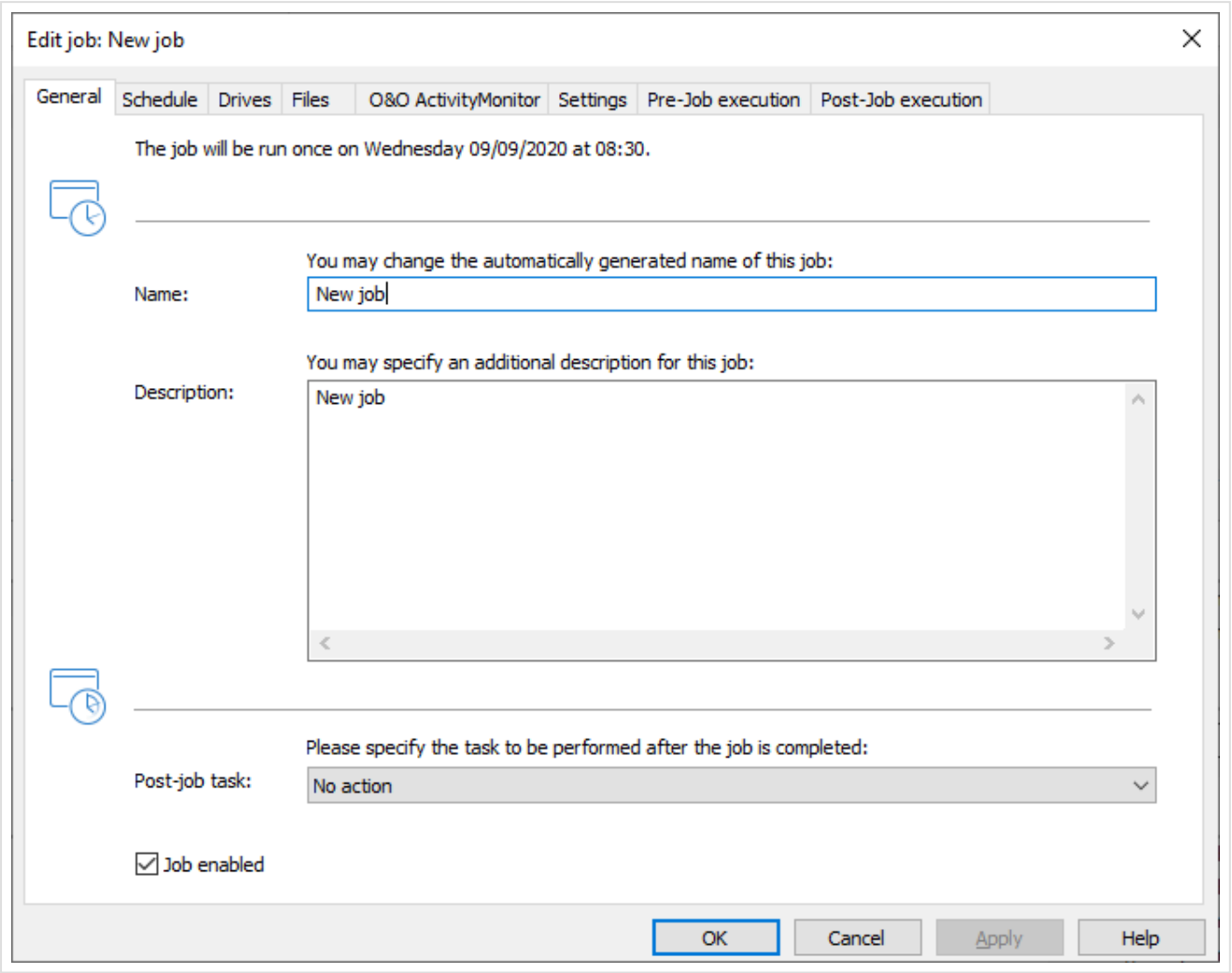
Enter the name of your job. This name will later be used for creating reports and will provide information about the action the job runs. The name of the job is only important for this purpose and it is possible to use this name for other jobs too. In the field Notes you may enter text that can provide a few details about the job.

Post-job task Here you can optionally select an activity you want completed after defragmentation. If your system BIOS supports power management functions, you can get O&O Defrag to shut down or restart your system when the defragmentation is finished.

Shut down: the operating system will be shut down after the defragmentation job has been completed.

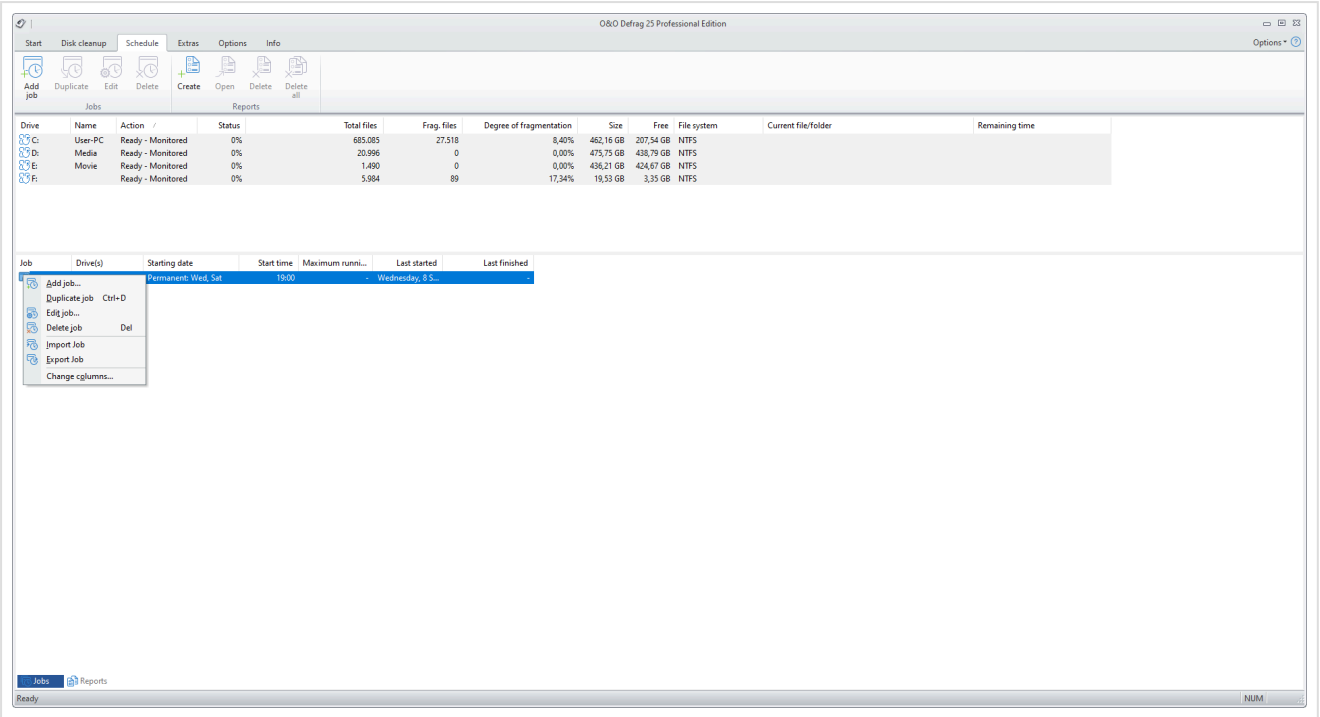
Restart and run Boot time defragmentation: The computer will be restarted after the defragmentation has finished, and will then run a boot time defragmentation.

Restart and shut down after boot time defragmentation: The boot time defragmentation can be executed after the restart. You can then leave your computer while it is being defragmented – It will shut down afterward automatically.



Edit, duplicate or delete jobs

Edit jobs You can modify a job at a later time, by selecting it in the job view and then right-clicking and selecting **Edit**. The O&O Defrag job dialogue will appear with the options for that job. Make the changes and confirm your entries with **OK**.



Duplicate job If you are using an already existing job and want to edit it, you may duplicate it. Select the job from the job list, right-click it and select **Duplicate job.**

You can select the job with a double click, and then edit and save it in the corresponding job dialogue.

Delete jobs To delete a job, select it in the job list, right-click on it and select **Delete job**. The job will then be deleted. The execution of the job is cancelled immediately.

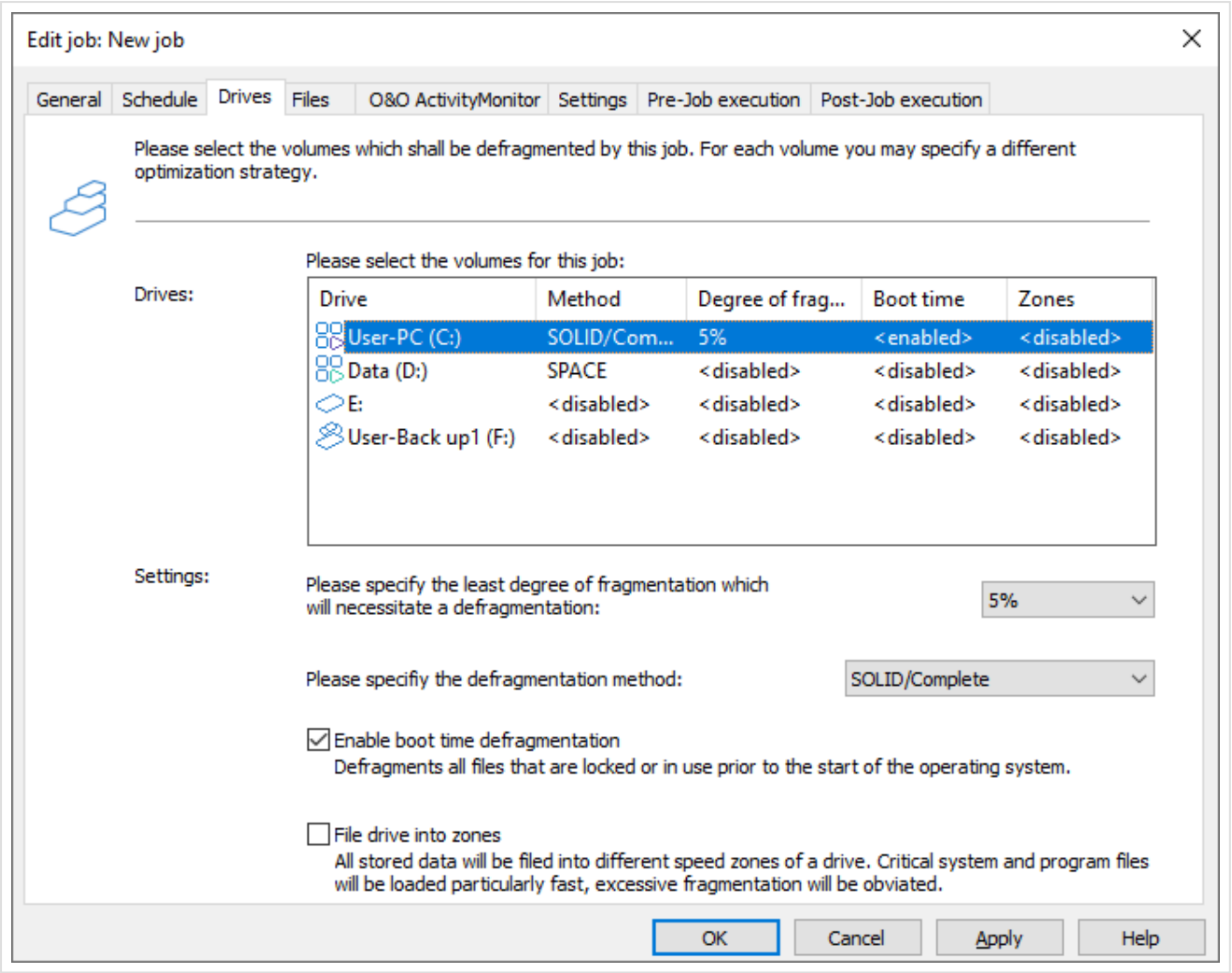
Job settings

Select drives

Specify the defragmentation method for each drive you want to optimize. You can also enable boot time defragmentation for each drive, so that blocked files can be defragmented when your system starts up.

By entering a minimal fragmentation level, you can define the fragmentation level at which defragmentation will automatically be started. You can thereby reduce significantly the number of defragmentation runs needed, if you don’t require a fully defragmented system all the time. A 0% level of fragmentation means that defragmentation is being run at all times. We would recommend you enter a value of between 2% and 6%.

You can also specify whether the data of a drive should be filed into zones during defragmentation. This division will allow for even faster system and program starts. In addition, important system and program files will be prevented from fragmentation.



Exclude and include files

Exclude and include files You can specify individual settings for every job. These settings complement the global settings for this computer while the job is running.

Under **Files** in the Job assistant, you can exclude files and folders from defragmentation. You can for instance exclude a complete folder, but still put certain files from it the list of files to be defragmented. In addition, you can also specify that large files should not be defragmented or moved due to time constraints.

Exclude files Under **Excluded files** you can specify which files you want to exclude from defragmentation.

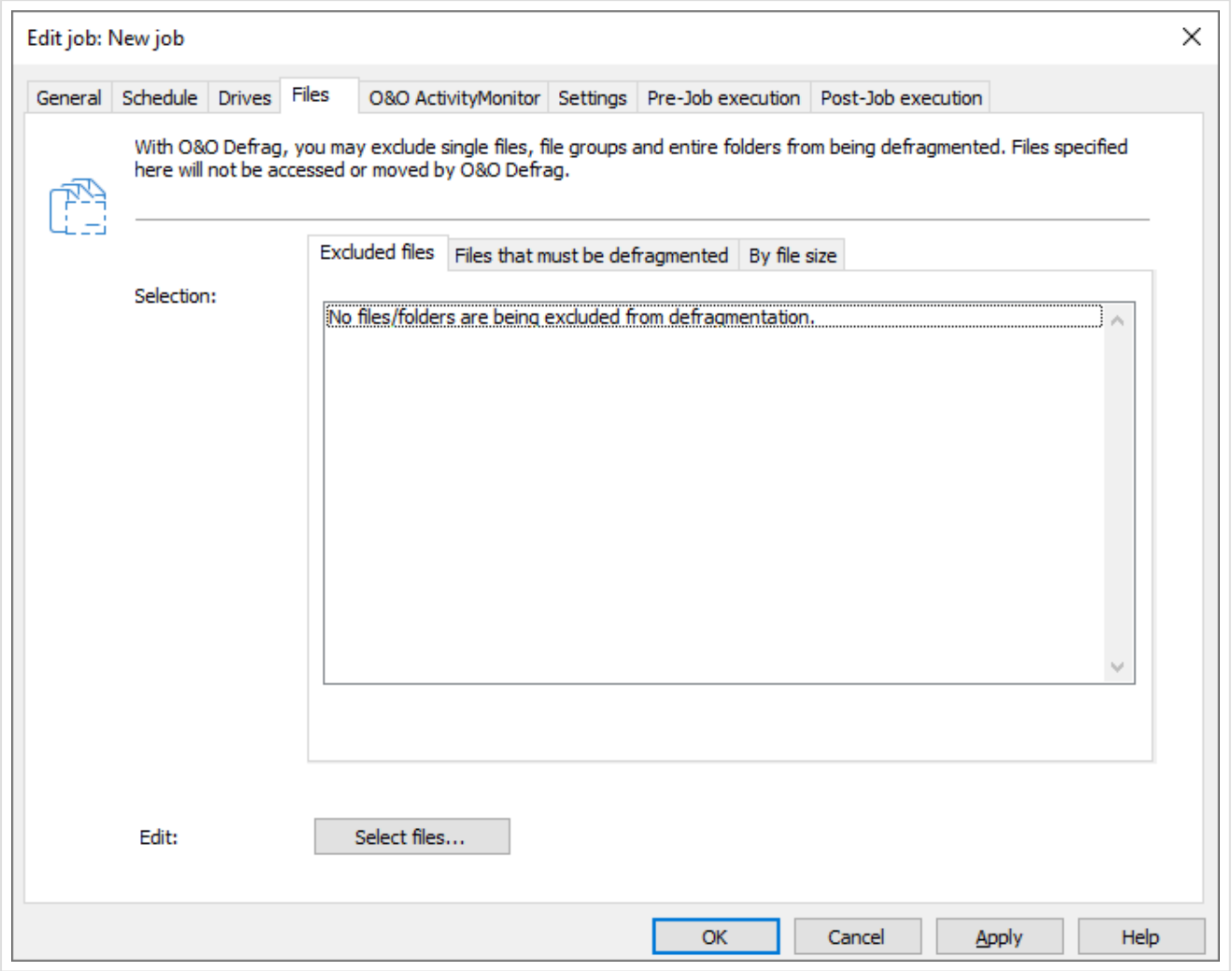
1. Click **Select files**.
2. Select the file or the folder you wish to exclude in the dialogue in the Explorer view and click **Add**. You can also allocate more files and folder to the selection.
3. If you have made your selection, confirm your entries with **Apply**.

Include files at all costs Under **Files that must be defragmented** you can specify which files must be defragmented, even if they have been excluded previously due to a higher ranking condition.

1. Click **Select files**.

2. Select the file or the folder you wish to exclude in the dialogue in the Explorer view and click **Add**. You can also allocate more files and folder to the selection.
3. If you have made your selection, confirm your entries with **Apply**.

By size Optionally, you can also exclude very large files from the defragmentation due to time constraints. In the dialogue specify the size above which a file should not be optimized or moved during defragmentation.



O&O ActivityMonitor for jobs

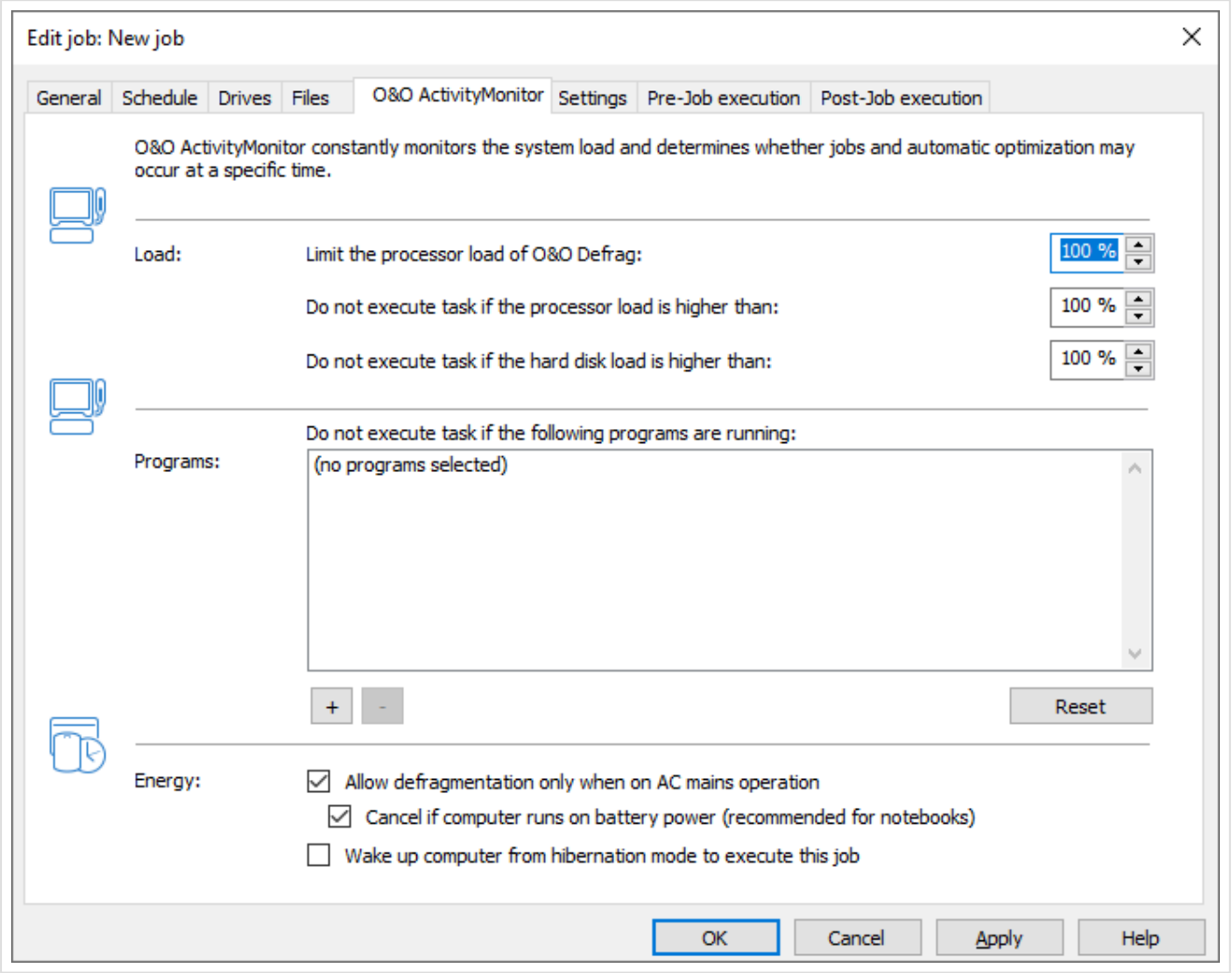
O&O ActivityMonitor for Jobs Under **O&O ActivityMonitor**, you can specify the start of a job depending on the system load as well as the maximum share of the CPU that may be used by O&O Defrag at one time.

System load Here you can specify that O&O Defrag should not exceed the CPU by a certain value during a defragmentation. In addition, you also have the possibility to prevent a job from being run if the target drive is in heavy use or other programs are consuming much CPU.

Program list Here you can specify that a job should not be run if certain other programs are currently being executed. These programs could include imaging programs, a virus scanner, or even games. For this, click the plus sign and select the programs in the browser window.

Energy Jobs can also be scheduled to run only if the computer is working from a main power supply, which is very useful when using notebooks.

If a computer is in standby mode whenever a job is scheduled to start, the job cannot be executed. Here you can also set to reactivate the computer from the standby mode to successfully run a job.



Further job settings

Further job settings Under **Settings** in the job dialogue you can influence the default behavior of different drive types during the job execution.

Check drives before defragmentation and cancel if errors exist

You can have O&O Defrag check the integrity of your drives before a defragmentation. If O&O Defrag finds an error on one of your drives, the defragmentation will not be run (for safety reasons). Checking the drives corresponds with the Windows chkdsk function, yet, it only can run scans in the read-only mode and thus not correct errors. In case of error, you need to run the chkdsk command manually.

Job may defragment several physical data volumes at the same time

You can defragment your drives either parallel or sequentially. Sequential defragmentation means that one drive will be defragmented after the other, in alphabetical order.

During parallel defragmentation, partitions that are located physically on different hard disks are processed at the same time. This shortens the total time needed for completing defragmentation but also leads to a higher system load by O&O Defrag. If you only have one hard disk in your computer, all partitions on it will be defragmented sequentially.

Considering the system parameters on how to allocate files.

During defragmentation, the layout.ini file is used as reference to allocate files optimally on the hard disk. The optimal sequence for start files proposed by the operating system will be considered in order to initiate the system start as quick as possible.

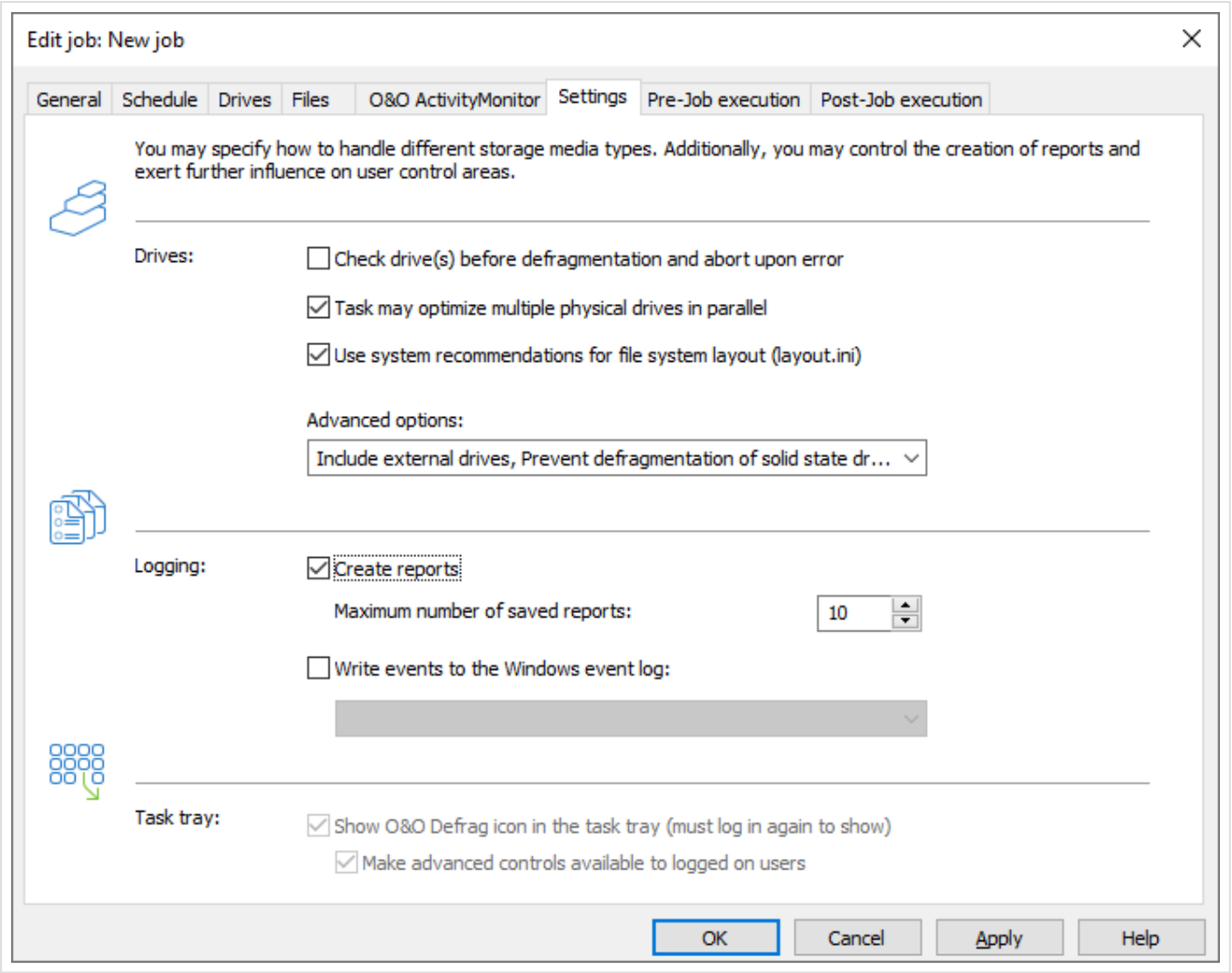
Under **Advanced options** you can specify how different drive types are supposed to be handled during the completion of the job:

- **Include removable drive** Removable drives (e.g. ZIP, Jaz or DVD RAM) can also be defragmented.
- **Include external drives** It is also possible to defragment drives that are connected by an external interface, such as a USB or FireWire.
- **Protect SSD drives from defragmentation** To counteract wear and at the same time to optimize the performance of SSDs, O&O Software has developed the defragmentation method SOLID. By using the defragmentation method SOLID, these distributed file parts are defragmented so that in the future significantly fewer memory cells have to be read out and also written to when changing a file.
- **File into zones** This option is enabled by default. The data is filed into different hard disks areas (zones) during the defragmentation based on access requirements, also see "Zone filing" (Zone filing is not recommended for SSDs).

Reports and Logging

You can create status reports in an HTML format. A maximum of 999 reports can be created and saved.

Please enable this function if you want to log all O&O Defrag activities into the Windows Event log. You can specify the detail level for notifications - whereas level 1 only logs errors and level 4 stores all the information available. Please bear in mind that this might lead to many log entries, which in turn overwrite entries by other programs or systems.



Run scripts before and after a job

Running batch commands before and after a job enables you, for example, to pause certain Windows services before defragmenting and then continuing them afterwards. Files that are normally in use by other applications can now be defragmented online. If you use O&O Defrag on a Microsoft Exchange or SQL-Server, you can pause these services before defragmentation, optimize the drives and then automatically continue with the services. You no longer need to create a script to do this.

Please note: All commands must exist and be capable of running on the target computer. All commands are run under the SYSTEM username with the maximum system permissions.

Running scripts before a job

When this option is enabled, all the commands entered into the text field will be run before defragmentation. You can also import an existing file and insert its contents into the text field.

To do so, simply click the Import button and select the desired file in the dialog box (.BAT, .CMD, or .TXT). Confirm with **OK**.

Running scripts after a job

If this option is enabled, the commands entered in the text field will be run after defragmentation. The entering and running of commands after a job are similar to those run before a job.

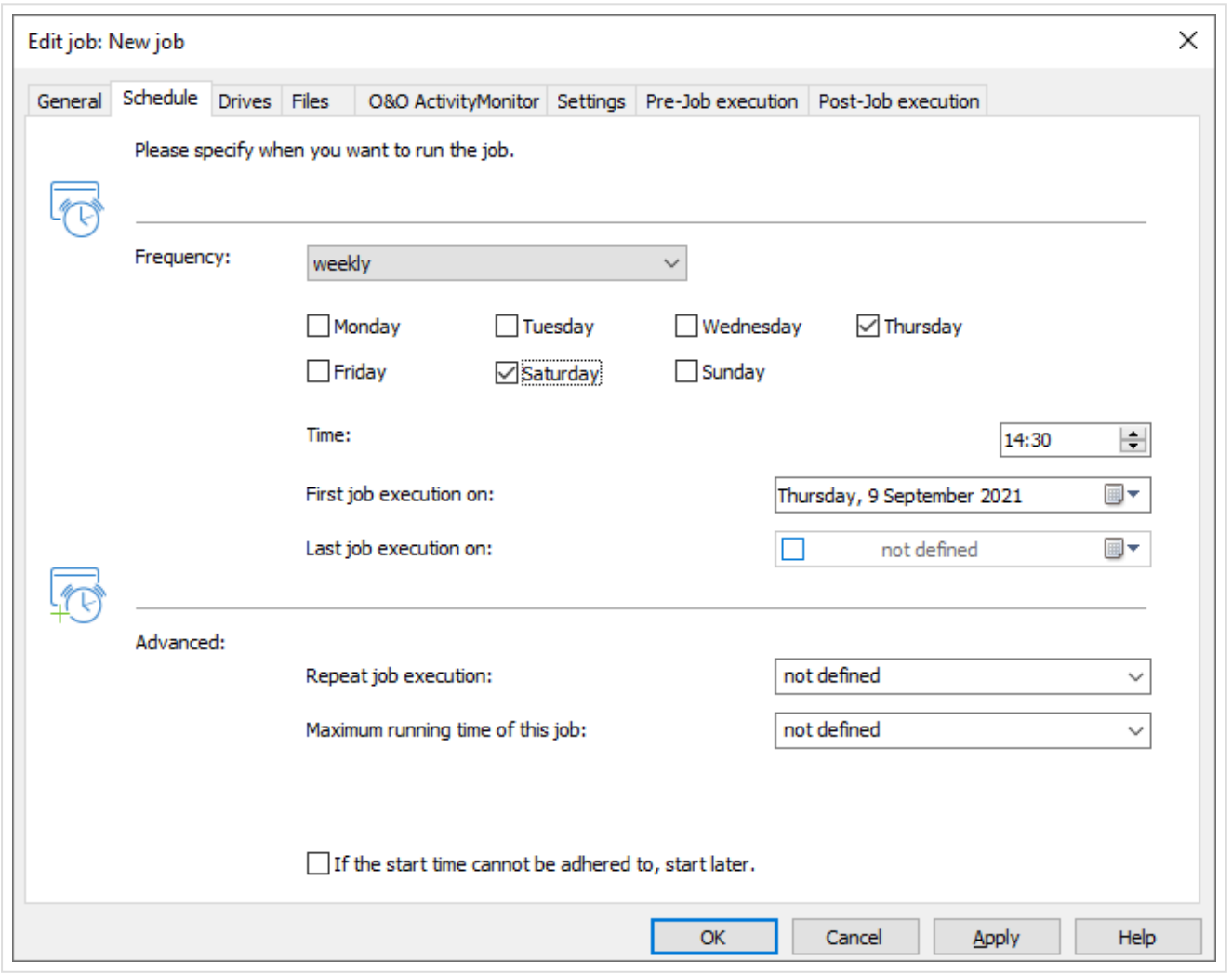
Plan a schedule

Under **Schedule** you can specify the time of execution. You can schedule a job for one time only or repeatedly at a specified week day, or whenever the Screen saver is running. The options for how this should be done will change according to the way you select to run the job.

With the help of the start and end date (**First job execution/Last job execution**) you can specify the time frame, in which the job is to be executed. The maximum running time limits the running of a job to a particular time frame, after which the job will stop whether it has finished or not. It will be continued at the next run.

You can also enter advanced options. If you want to run the job several times a day, enter the desired interval under **Advanced/Repeat job execution**.

The option **If the start time cannot be adhered to, start later** is meant for computers that are not switched on the whole time. Normally, a job is skipped if the computer is shut down, and will be continued whenever it is turned on again. If this option is enabled, the defragmentation will be run whenever the computer is switched back on. This ensures that your job won't be ignored.

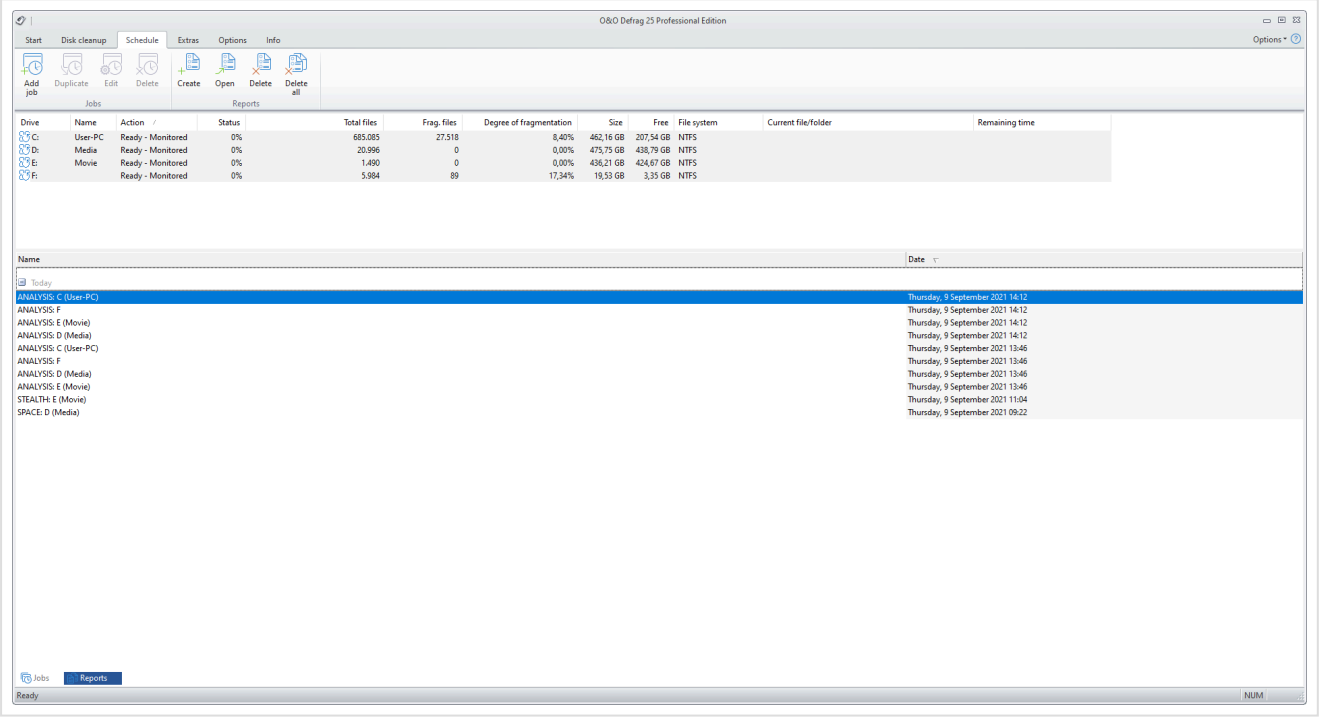


Reports

O&O Defrag saves and manages all reports in Reports. To find reports, click **Schedule** and then **Reports** at the bottom of the program screen. Once you've enabled the option for creating status reports, the results of all analyzing and optimization processes will be recorded. The reports are listed chronologically and grouped in folders. The information in brackets indicates the drive and job for which the report was created. The reports contain all the relevant information about a drive's database, see "Status reports".

Status reports inform you on the performance state of your computer. The status reports by O&O Defrag include general information about drives and file systems, as well as the results of already executed defragmentations. They also include detailed lists of files that negatively influence system performance the most, either by their size or level of fragmentation.

The reports are HTML documents and can be read with any internet browser.



Creating Status Reports

Status reports are created after each analysis and after each defragmentation. Make sure that the option **Create reports** under **Settings/General** is enabled.

The O&O Defrag agent can keep a maximum of 999 reports for one computer, after which the oldest reports will be replaced by newer ones.

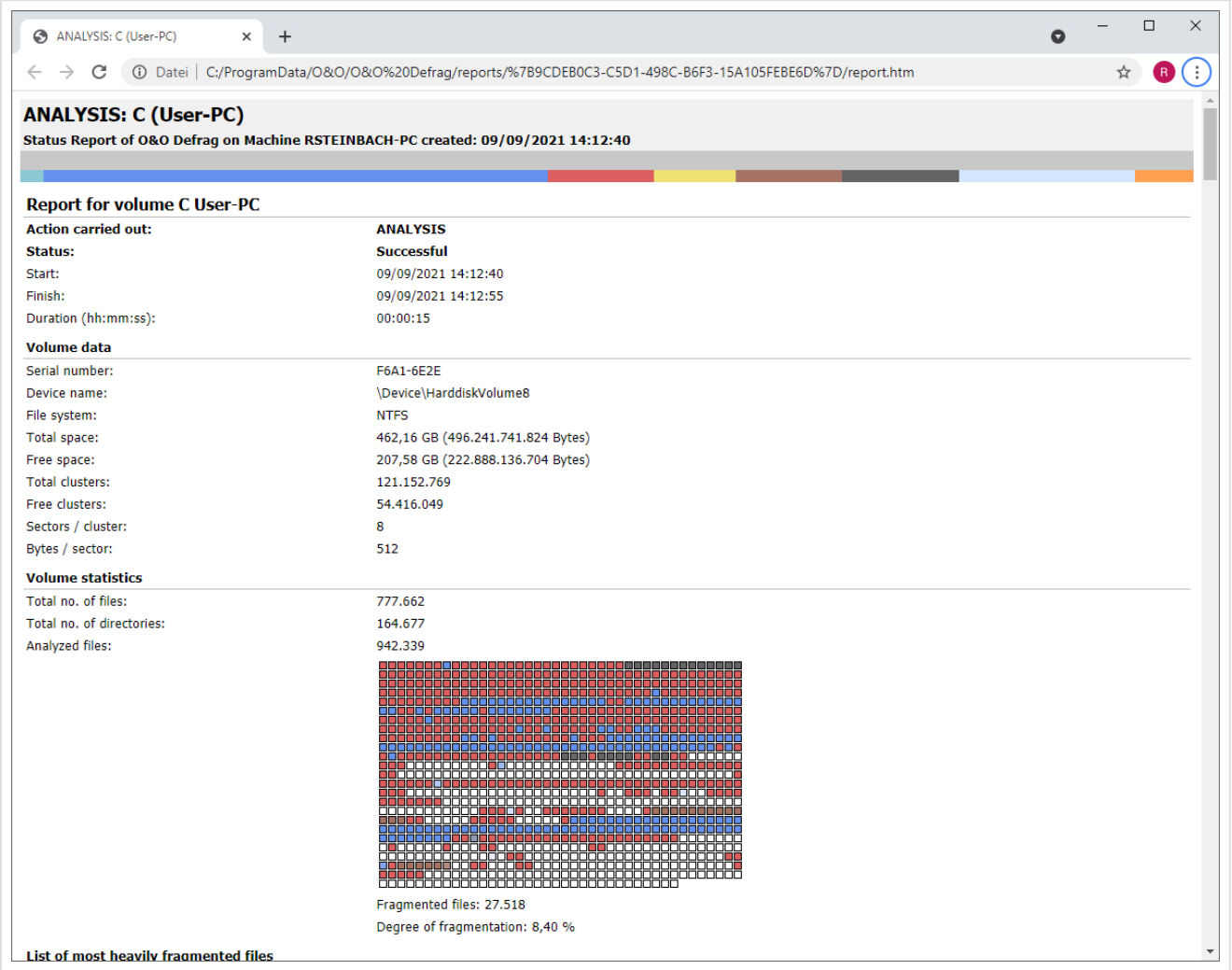
- Please select the drive for which you want to create a report from the drive list.
- Create the status reports by clicking **Create** in the Ribbon bar.
- The drive will be analyzed. You can see an analysis being run with the drive symbol in the progress display.
- Once an analysis is completed, the status report will be automatically saved and displayed.

:::note

You can also create status reports for several drives at the same time by pressing the Ctrl key and selecting the drives you want to have included.

:::

Evaluating Status Reports



Based on the O&O Defrag status reports, you can document the level of fragmentation as well as the results of defragmentation on your system. Status reports contain all important information regarding your hard disk drives.

The level of fragmentation is particularly important. It constitutes a normalized value of the fragmentation and can be used as a comparison for different systems and for hard disks of different sizes. This value ranges from 0 (completely defragmented) to 100% (completely fragmented). A low value of (under 5%) is recommended. You can also use this value in jobs when defining a threshold for an automatic defragmentation.

Deleting status reports

To deletea status report, select it in the report list and use your keyboard's **delete** key. If you want to delete an entire report group, e.g. "Last month", all reports will be deleted in the specified time period.

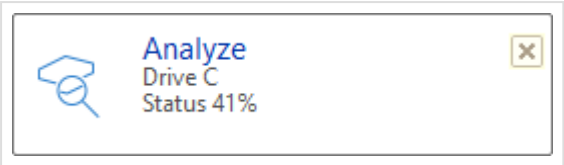
The function **Delete all**, allows you to delete all reports at the same time.

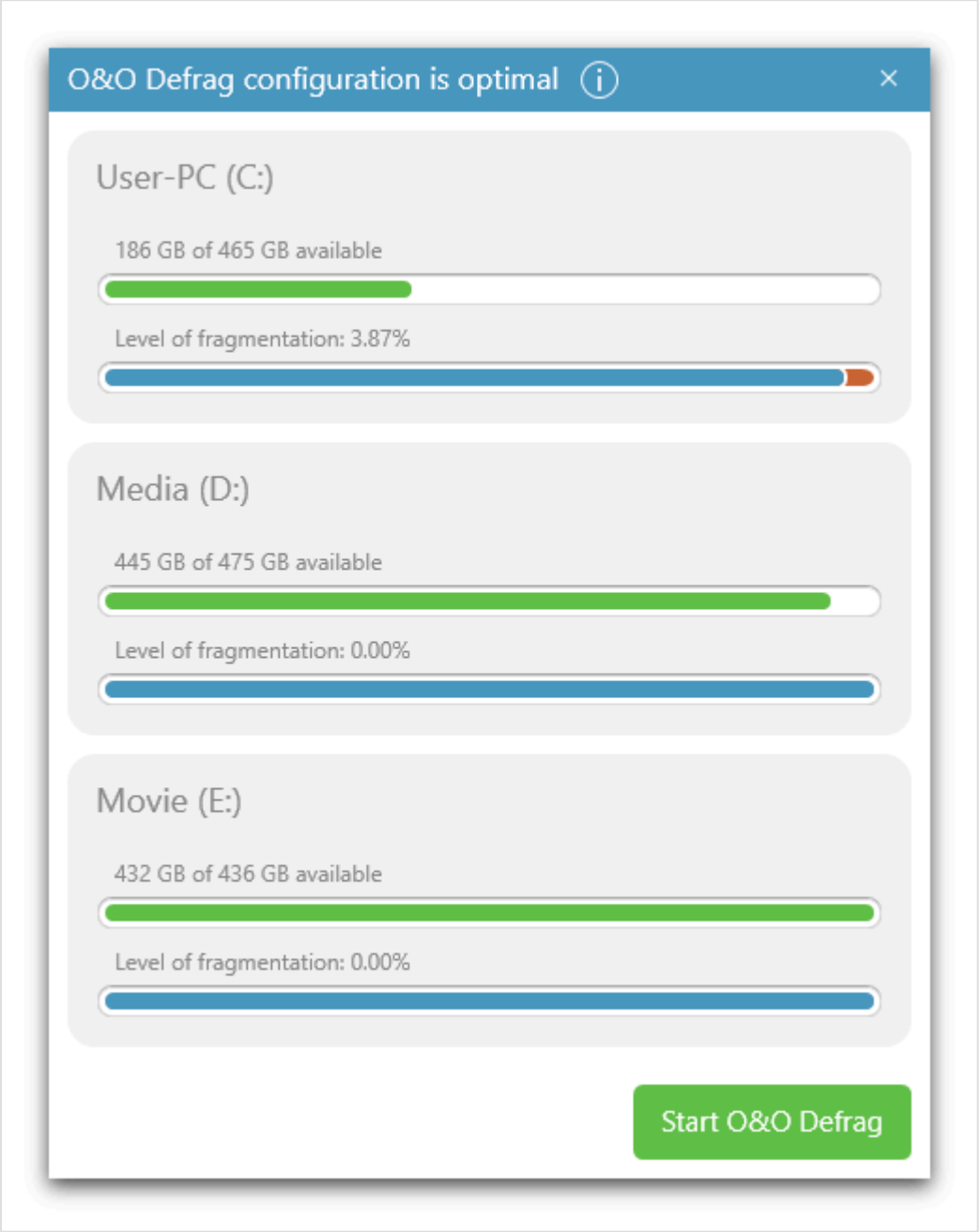
Tray icon and drive activity

You can check the status of a running defragmentation using the tray icon (or Notification area icon) as well as the user interface. The tray icon is located on the Task bar.

- To check the current status of O&O Defrag, place your mouse cursor over the TrayIcon.
- You can also use the right-click menu to start and stop defragmentation, exit hibernation mode, and open the user interface.
- The tray icon can be closed using the right-click menu entry **Close**.

You'll be able to see the program's current activity displayed in the tray icon. By running your mouse over the tray icon, the tooltip will provide you with more information about the program's current status.





:::note

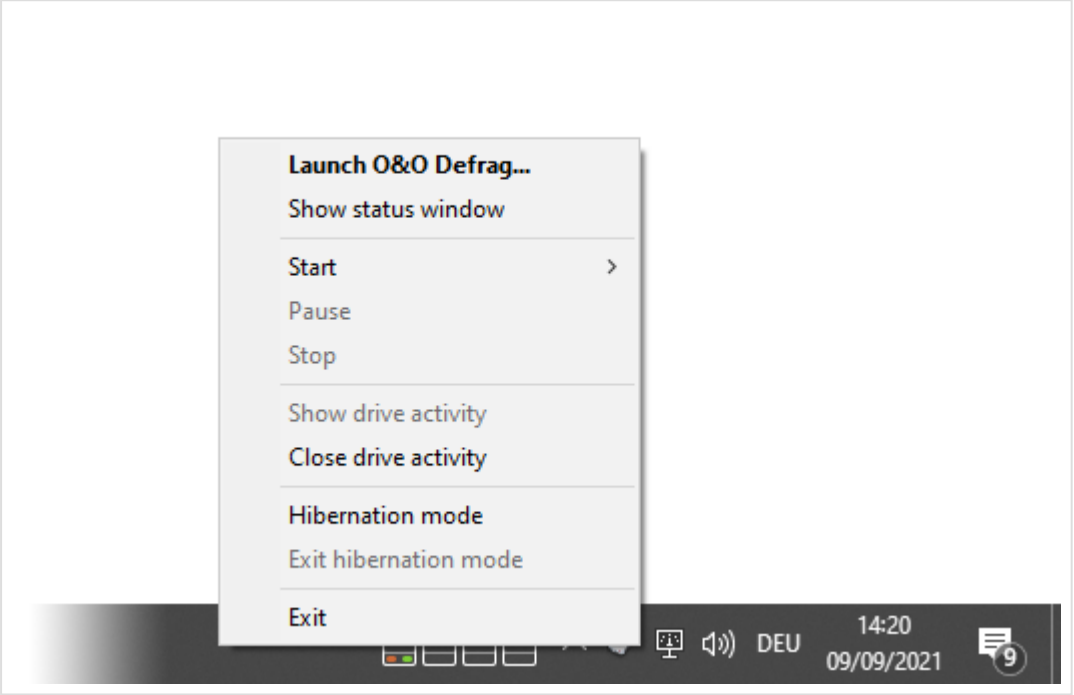
to reopen a closed tray icon, the user needs to login again.

:::

Hibernation mode

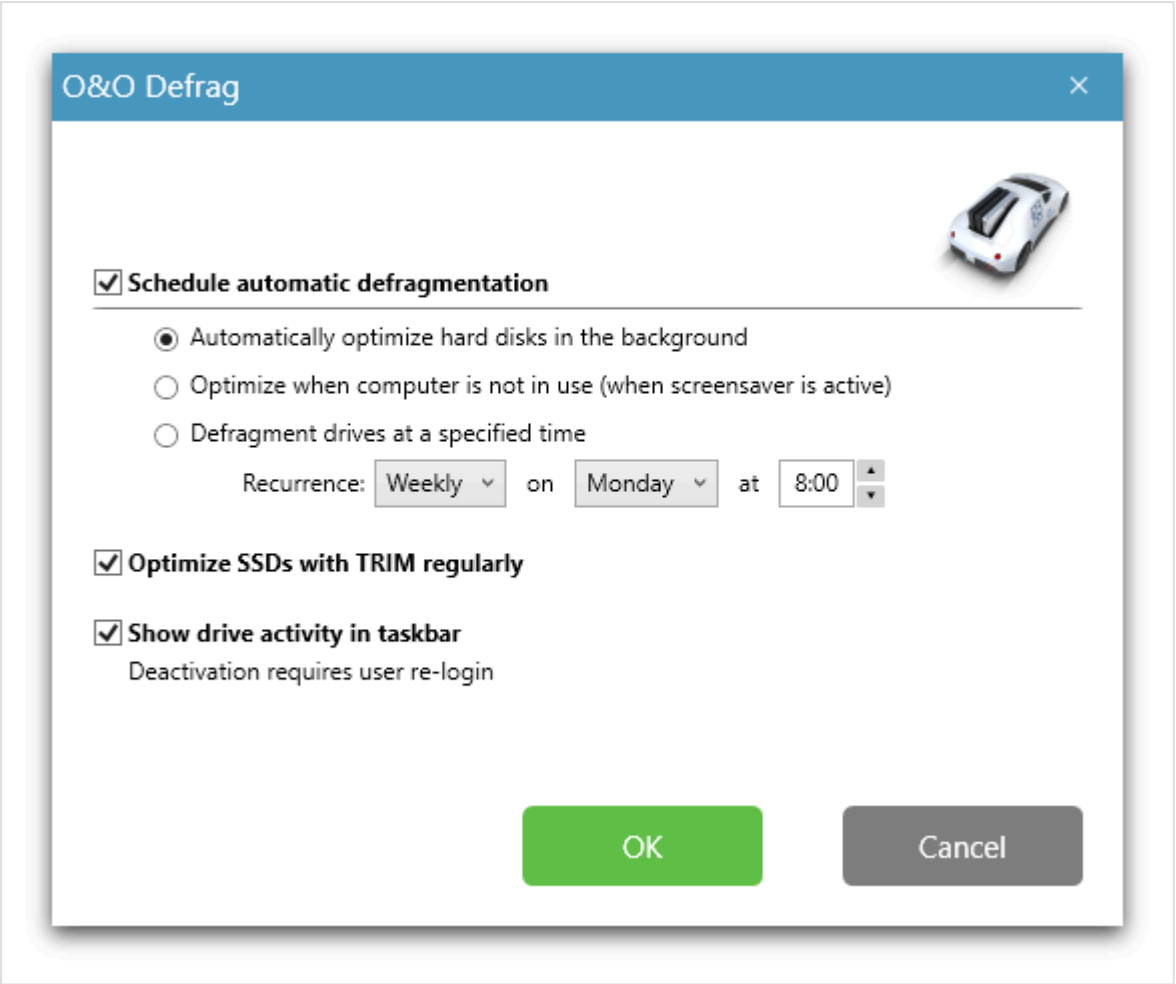
You can set O&O Defrag in the hibernation mode using the right-click menu of the Tray icon. This makes sense if you need the full capacity of your computer for your applications, and want to make sure that O&O Defrag is not in operation during this time. We recommend closing the user interface to save load on your main memory.

- To set O&O Defrag into hibernation mode, right-click the Tray icon and click **Hibernation mode**.
- To exit O&O Defrag's hibernation mode, select **Exit hibernation mode** in the right-click menu of the Tray icon, and reopen the user interface if needed.



Drive activity

The Deskband for displaying drive activity shows the read and write accesses on the computer. You can activate the drive activity here: **Start** > **QuickStart** > **Show drive activity in the task tray**. A search on the respective drive can be started by right-clicking.



You can hide the drive activity by right-clicking on one of the drive letters in the task tray, for this select **Close**.



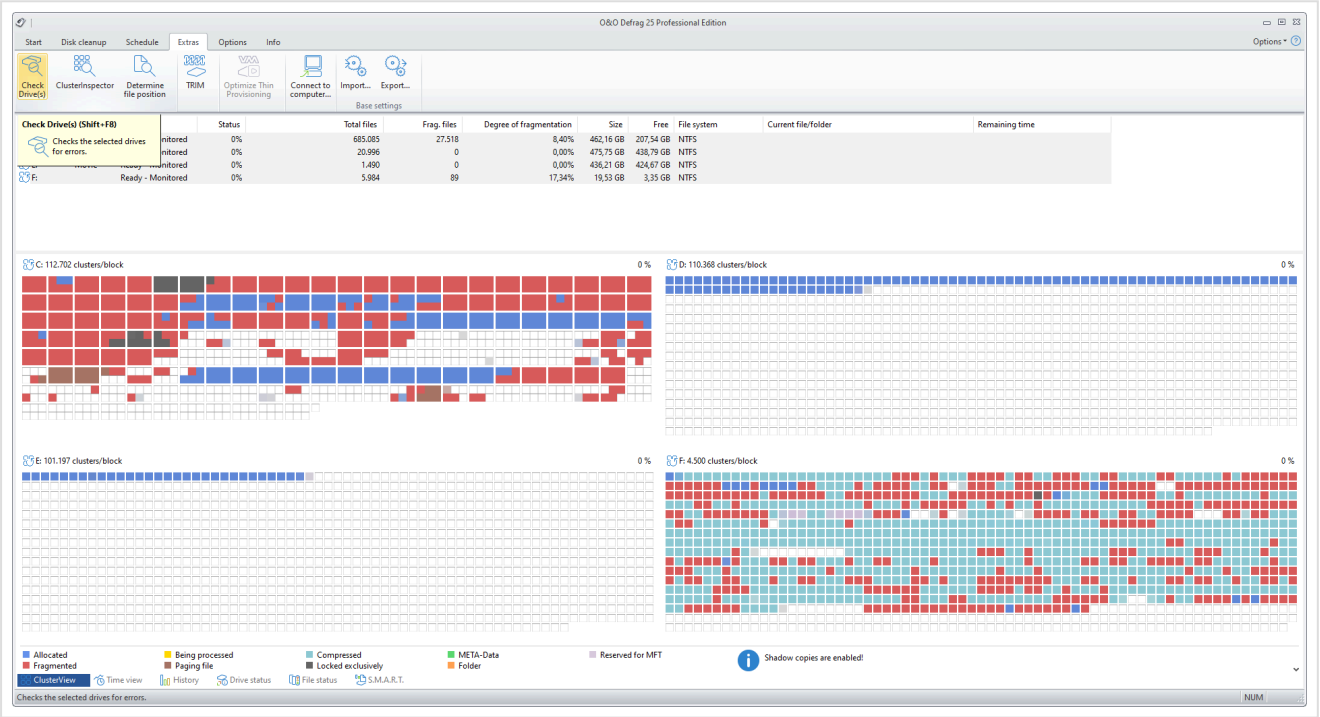
Extras

Check drive

In the Ribbon bar under **Check drive**, you have the possibility to check the drive for errors. You can find the corresponding report as usual under **Schedule** the tab **Reports**. Checking the drives corresponds with the Windows chkdsk function, yet, it only can run scans in the read-only mode, and thus cannot correct errors. In case of error, you need to run the chkdsk command manually.

It is strongly recommended to thoroughly check a drive if an error is detected. More information can be found in the Windows Help file.

You can cancel the check by clicking on stop in the Ribbon.



O&O ClusterInspector

With the O&O ClusterInspector, O&O Defrag gives you a convenient tool for checking how the hard disk is being used.

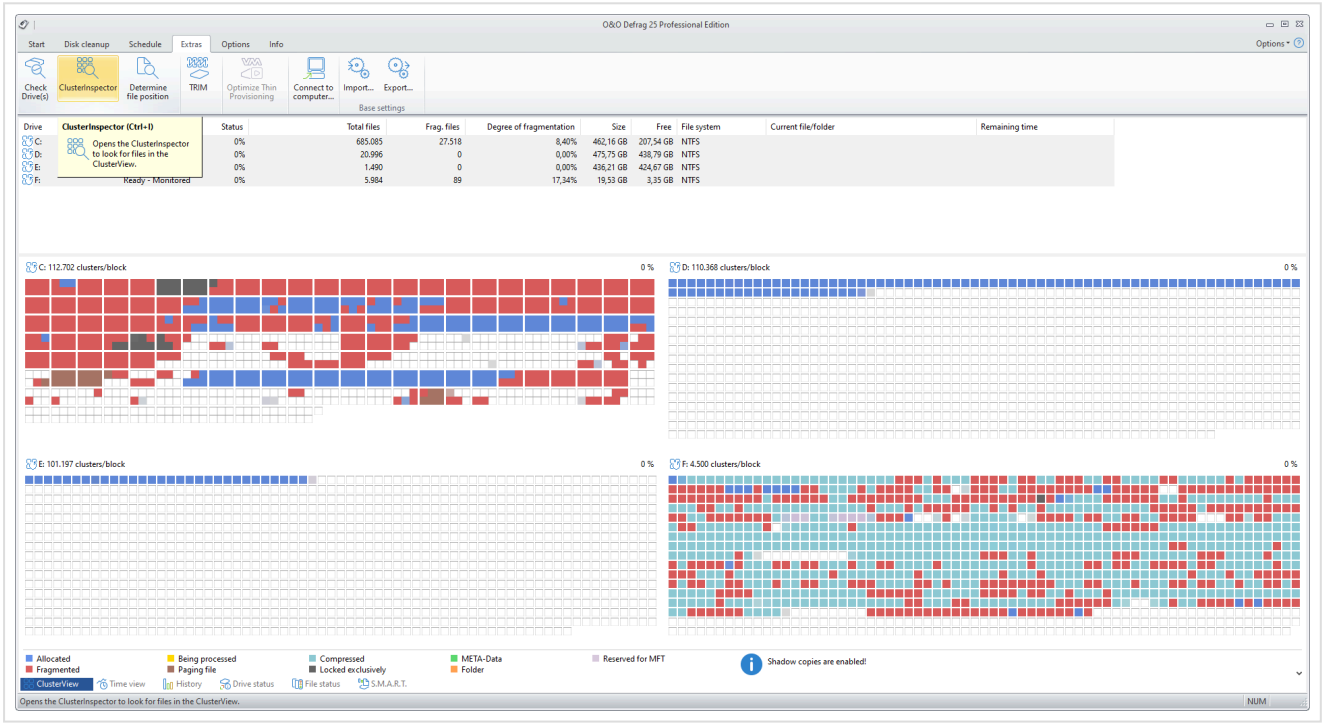
- Access the O&O ClusterInspector by double-clicking on a block in the ClusterView. The O&O ClusterInspector will then show you the files located on the block.
- About 50 file entries will be displayed by default. To show the following files, click the arrows to control the currently selected hard disk section.

Start cluster	Start of the currently displayed file section on the hard disk
Cluster number	Specifies, how many clusters are used by this file in this block
Fragments	Number of areas in which this file is divided. A fragment number higher than 1 means that the file is fragmented.
Size	Specifies how much physical area space the file occupies on the data volume.
File	Absolute path of the file

:::tip

A cluster is the smallest allocation unit that the operating system uses for storing of files on a disk.

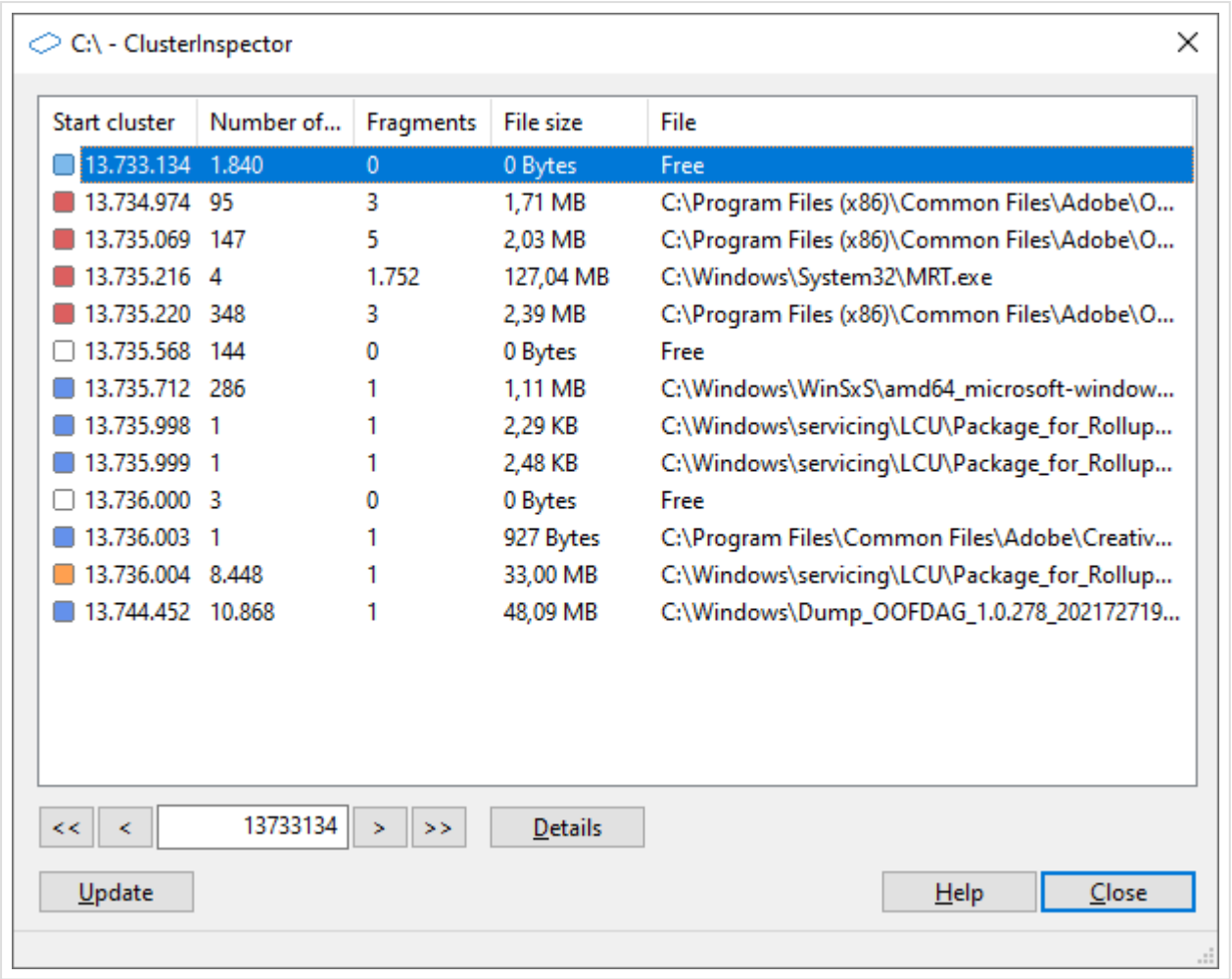
:::



Display file position (Details)

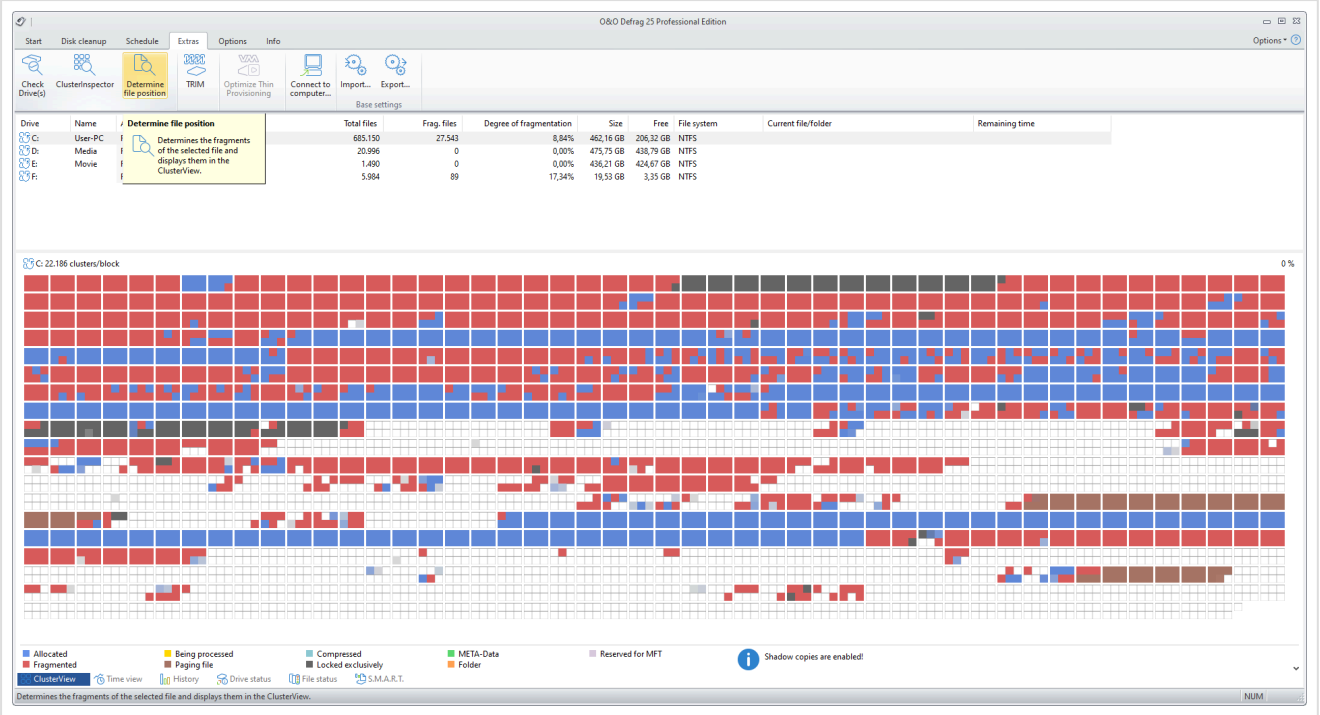
Through Details of a file, you will find out, where the individual fragments of the file are located on the hard disk and to what degree they are fragmented.

1. To find out more on the selected file click on Details.
2. All corresponding file fragments are listed with a cluster number and their size. All clusters used by a file are highlighted in the ClusterView. You will be able to find out the degree to which the scanned file is fragmented, as well as where it is located on the hard disk.



Determine file position

If you want to find out where and how a certain file is located, click **Determine file position** in the Ribbon and select a file in the following dialogue. All areas occupied by this file will then be displayed by the ClusterView.

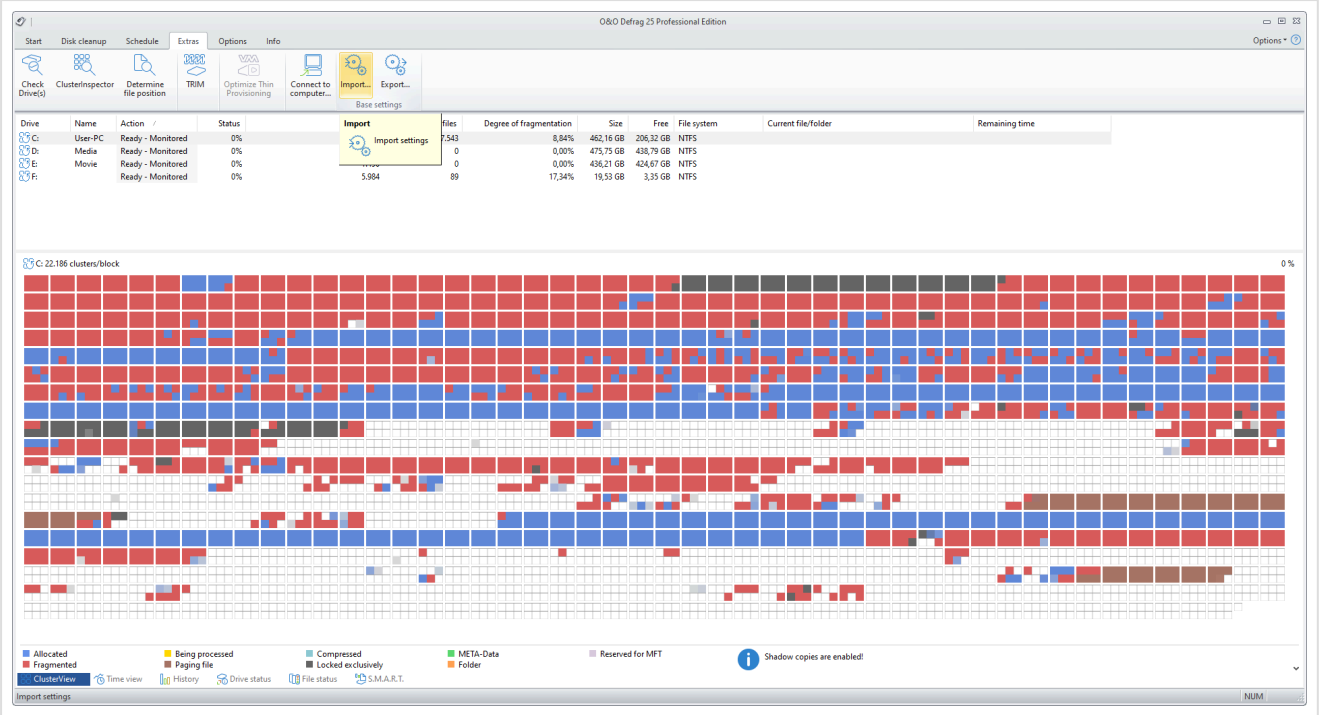


Thin Provisioning

Thin Provisioning is a process by which virtual machines can allocate available space as needed. Doing this reduces power consumption, space requirements, and the amount of heat generated. O&O Defrag supports Thin Provisioning by reporting changes in the amount of space needed, especially lower amounts of space needed, to virtual machines which then leads to a reduction in the allocated space. This results in less space being needed in the future and less wear on resources.

Import/Export Base settings

With **Import.../Export...** you can import and export an .xml file with your user-defined configuration of O&O Defrag.



Exporting a configuration is very easy. In the main program window under Extras click on **Export...**. Enter the name of the configuration file (e.g. ood_settings.xml). Use the browser to find a location on your computer where you want to save the configuration file.

The steps to import a configuration are similar. In the main program window under Extras click on **Import...**. Use the browser to find your configuration file that you want to import.

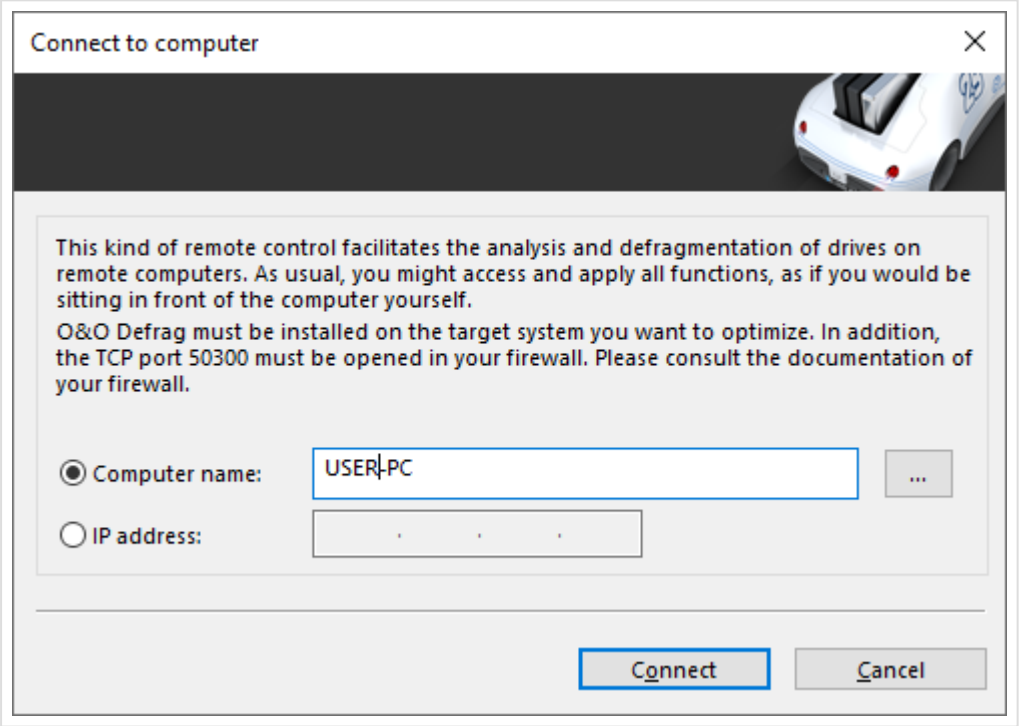
Work within the network

The network function serves to control O&O Defrag from another computer in the network. You can establish a connection to a desired computer and on it, you can remotely execute all the same program functions you have on your local O&O Defrag.

For this feature to work, O&O Defrag has to be already installed on the target computer. You also have to open port 50300 of your firewall of the target system. Please consult the manual of your firewall for further information.

- Access the network connection dialogue over the Ribbon Bar with **Connect to computer**.
- Now you will be able to connect to a remote computer.

By default, you can only remote control O&O Defrag on computers where your user account is member of the Local Administrators group. If you would like to grant all users from the same network unrestricted remote access to O&O Defrag, please activate the option **Enable remote administration from same network**in the "O&O Defrag Settings".

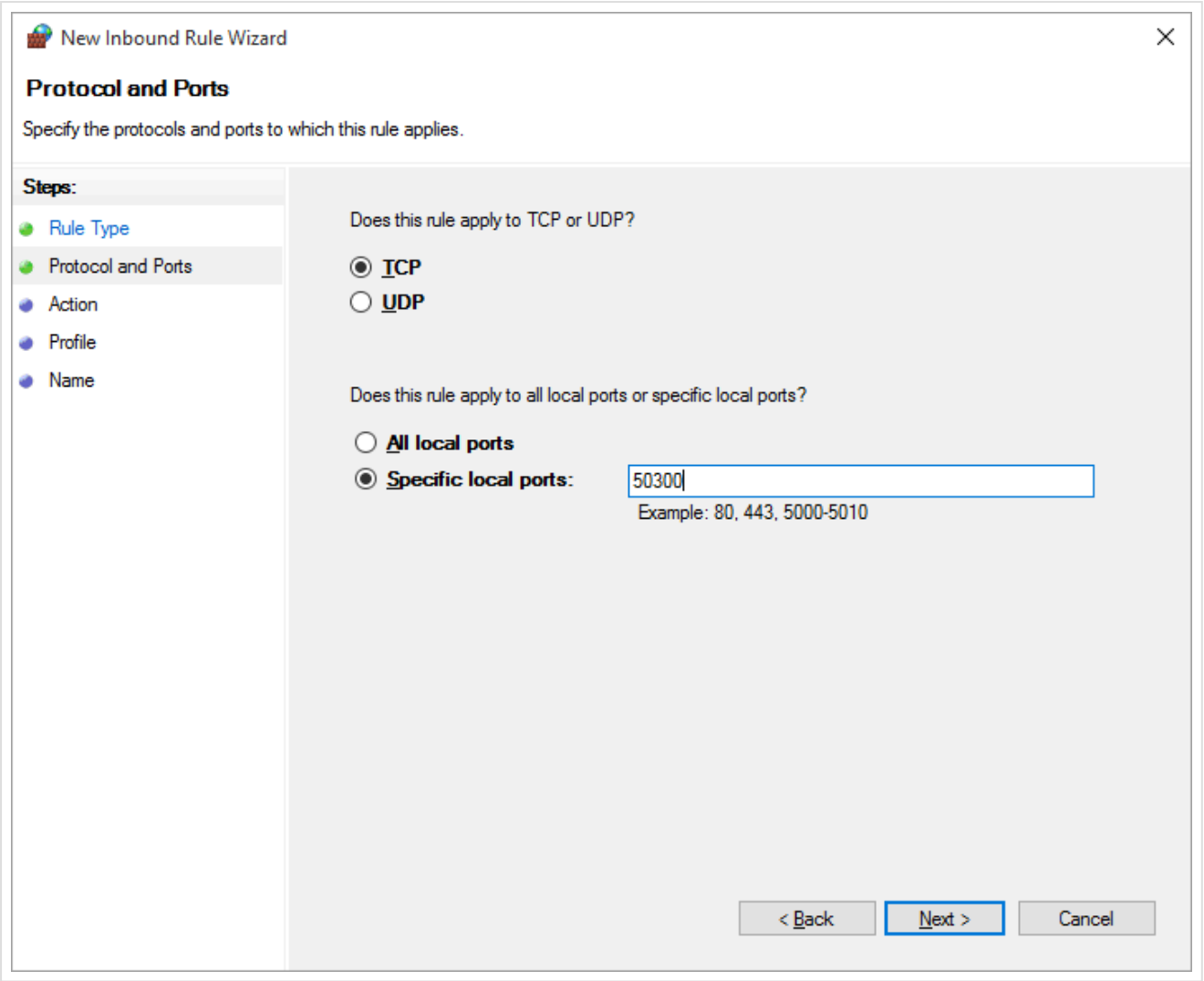


Firewall settings

To build a remote network with another computer, you have to make the following changes to your firewall settings:

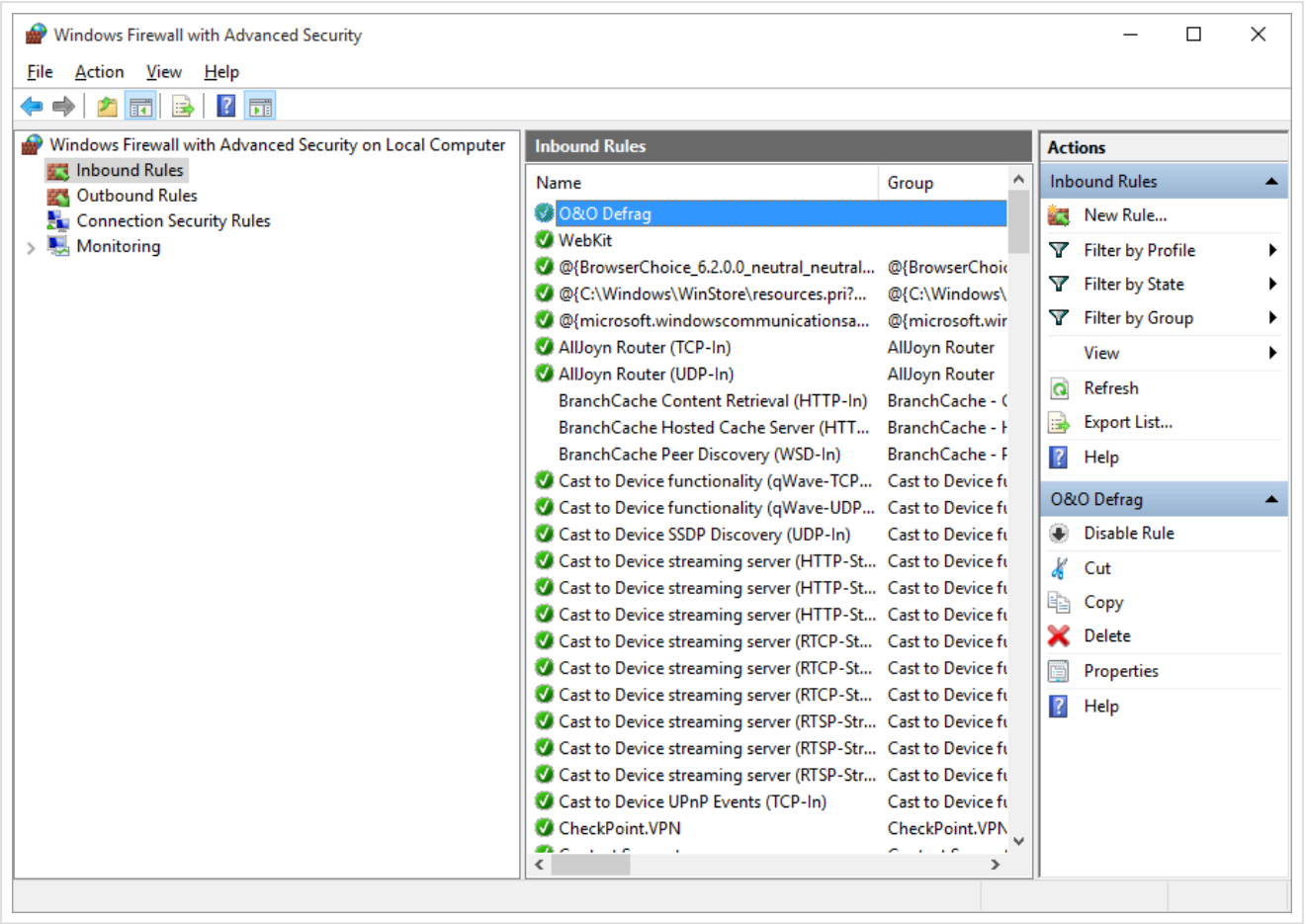
Hint: You can find the settings for the Windows Firewall on your computer under: **Start/Control Panel/Security Center/Windows Firewall/Change settings/Exceptions.**

- Create a new port.
- Enter the number **50300** and name the port **O&O Defrag**.

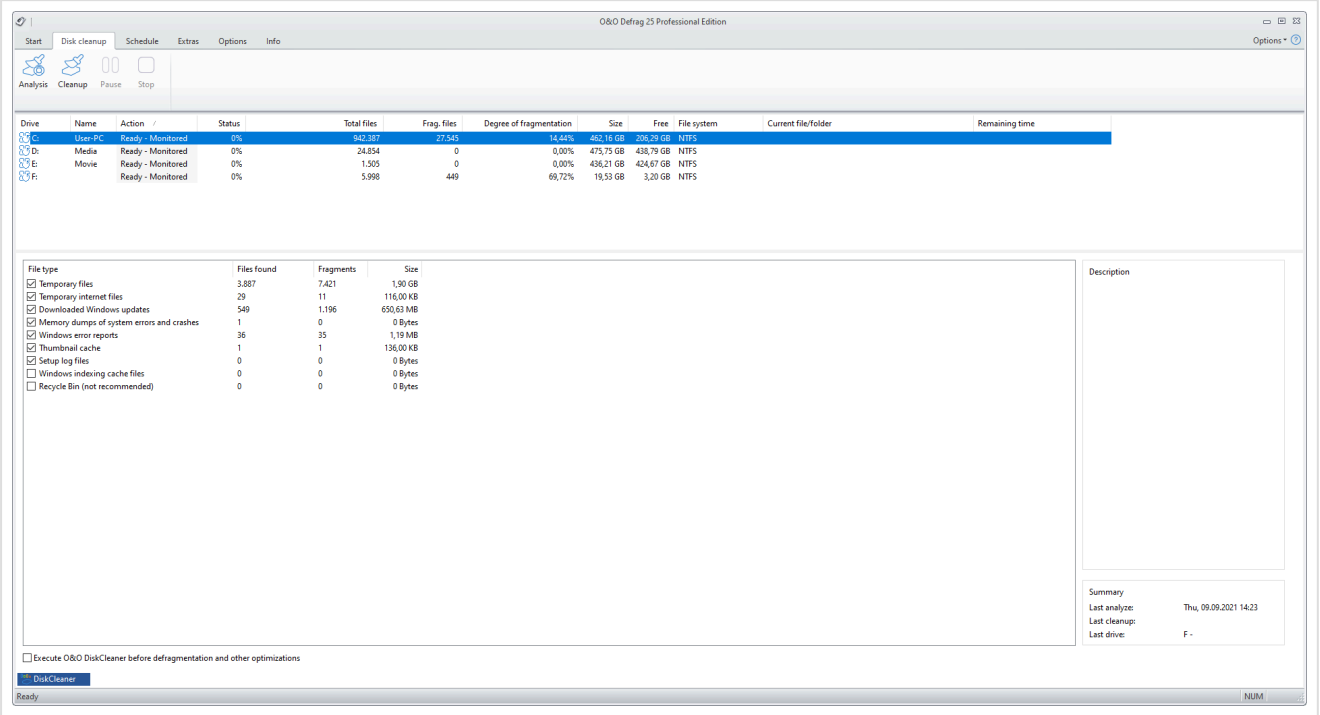


- Confirm the changes.
- Place a check next to **O&O Defrag** in the list.

More information on the firewall settings concerning O&O Defrag can be found under "hints and frequent questions".


Windows Firewall with Advanced Security
File Action View Help
Windows Firewall with Advanced Security on Local Computer
Inbound Rules
Outbound Rules
Connection Security Rules
Monitoring
Inbound Rules
Name
Group
O&O Defrag
WebKit
@{BrowserChoice_6.2.0.0_neutral_neutral...
@{C:\Windows\WinStore\resources.pri?...
@{microsoft.windowscommunicationsa...
AllJoyn Router (TCP-In)
AllJoyn Router (UDP-In)
BranchCache Content Retrieval (HTTP-In)
BranchCache Hosted Cache Server (HTT...
BranchCache Peer Discovery (WSD-In)
Cast to Device functionality (qWave-TCP...
Cast to Device functionality (qWave-UDP...
Cast to Device SSDP Discovery (UDP-In)
Cast to Device streaming server (HTTP-St...
Cast to Device streaming server (HTTP-St...
Cast to Device streaming server (HTTP-St...
Cast to Device streaming server (RTCP-St...
Cast to Device streaming server (RTCP-St...
Cast to Device streaming server (RTCP-St...
Cast to Device streaming server (RTSP-Str...
Cast to Device streaming server (RTSP-Str...
Cast to Device streaming server (RTSP-Str...
Cast to Device UPnP Events (TCP-In)
CheckPoint.VPN
Actions
Inbound Rules
New Rule...
Filter by Profile
Filter by State
Filter by Group
View
Refresh
Export List...
Help
O&O Defrag
Disable Rule
Cut
Copy
Delete
Properties
Help

O&O DiskCleaner



O&O Defrag offers a convenient tool with O&O DiskCleaner that searches for and removes temporary and unnecessary files that consume space and increase fragmentation.

- O&O DiskCleaner wins back otherwise used space
- Advantage for data protection:
- Analyzes the database and provides you with an overview of temporary and unneeded files.
- Particularly in temporary files, temporary Internet files, thumbnails and the cache of the Windows Indexing Service may contain residues of highly personal data. You have almost no possibility to overlook where, for example, remains of Word documents or photos are located on the hard drive.
- With just one click, you can optimize the database of drives and decide which file types to delete.
- You can find O&O Disk Cleaner as Ribbon-entry under **O&O DiskCleaner**. You now have the opportunity to select **Analysis** or **Cleanup**.

O&O DiskCleaner – Settings

The settings are among the drive list. Here you can decide what file type should be deleted, we have already set up a safe default setting for you.

:::note

Cache of the Windows Indexing Service and **Recycle Bin** are disabled by default. If the Indexing Service Cache is cleared, the Windows Search can be significantly slowed. Since data might be accidentally sent to the **Recycle Bin**, it is not selected. You should select this option only if you are sure that data in the Recycle Bin can be deleted.

:::

Temporary files	**Files temporarily stored by the system or programs and not deleted after use. These are no longer required and can be safely deleted.**
Temporary internet files	Files downloaded by browsers and mail programs when online and retained for speed increase purposes. They can be very large, and they can be deleted safely.
Downloaded Windows updates	As a rule, after Windows and Program updates are downloaded certain components remain left over. These are no longer required and can be safely deleted.
Memory dumps of system errors and crashes	After driver errors or program crashes, images of the system are retained for diagnostic purposes. They can be very large, and they can be deleted safely.
Windows error reports	After driver errors or program crashes, error logs are collected and retained to be sent to Microsoft. This data can be safely deleted.
Thumbnail cache	With every access to pictures, videos and documents the operating system creates miniature versions for a quicker preview of the content. They can be very large, and they can be deleted safely.
Setup log files	During an installation process the operating system creates logs on the progress. This data can be safely deleted.
Windows indexing cache files	The Windows Indexing Service scans pictures and documents in order to make their content quicker to find in Windows search. This data can be safely deleted but will reduce the speed of Windows search.
Recycle Bin (not recommended)	The Recycle Bin contains safety copies of data that was deleted by the user. The automatic cleaning of the Recycle Bin means data deleted in error can no longer be restored.

O&O DiskCleaner – Analysis

You can select a drive for the analysis, and then click **Analysis**. Files that can be deleted with the help of O&O DiskCleaner are displayed after the analysis. The process can be paused or canceled at any time. Upon completion of the analysis, a report dialog ("File summary") is shown; your drive can be cleaned up after.

O&O DiskCleaner – Cleanup

Once you have started the cleanup, it can be paused or canceled at any time. After the cleanup, there is both an entry in the history, as well as a detailed report with the list of deleted and locked files.

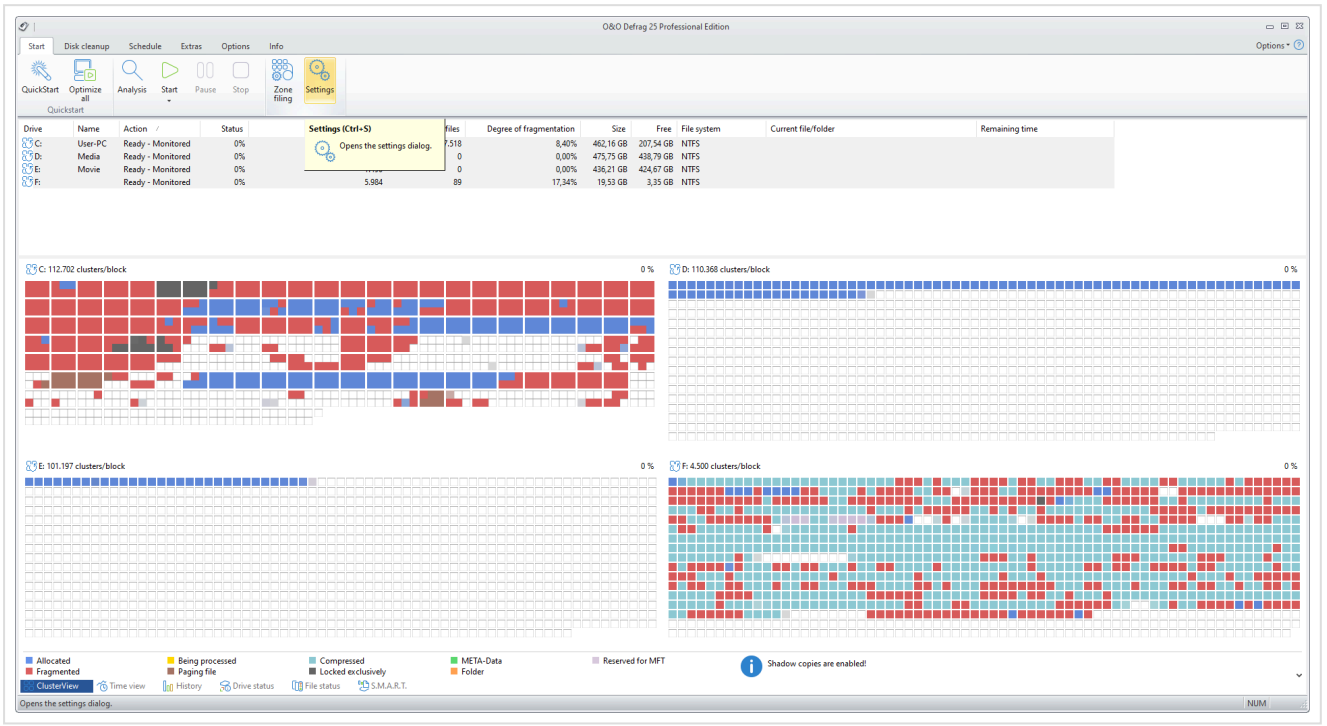
:::note

Not all files can be deleted. This is the case, for example when temporary files are still in use, or the operating system has locked a file.

:::

Settings

To adapt O&O Defrag optimally to your intended use, you can set different settings. The settings control the behaviour of O&O Defrag during the analysis and the defragmentation. Click **Settings** in the Ribbon bar.



General settings

The settings control the behavior of O&O Defrag during analysis and defragmentation.

Chkdsk before the defragmentation and cancel if errors are found

You can have O&O Defrag check the integrity of your drives before a defragmentation. This check is like the Windows chkdsk function but errors that are found will not be corrected. These need to be corrected manually using the chkdsk function.

Please note: This option in O&O Defrag makes use of the native Windows chkdsk functionality. When activated, O&O Defrag executes a chkdsk on the selected drive(s) prior to running a defragmentation. Out of concern for data security and system integrity, O&O Defrag will refuse to initiate a defragmentation if chkdsk encounters a problem or error. **A yellow warning triangle is displayed next to the affected drive.**

A test of the connected drives in Windows can also be run manually. It is strongly recommended to thoroughly check a drive if an error is detected. More information can be found in the Windows Help file.

Defragment several physical data volumes at the same time

You can defragment your drives either parallel or sequentially. Sequential defragmentation means that one drive will be defragmented after the other, in alphabetical order.

During parallel defragmentation, partitions that are located physically on different hard disks are processed at the same time. This shortens the total time needed for defragmentation but leads to a higher system load by O&O Defrag. If you only have one hard disk in your computer, all partitions on it will be defragmented sequentially.

Considering the system parameters on how to allocate files.

The layout.ini file is used as reference during defragmentation to allocate files optimally on the hard disk. The optimal sequence for start files proposed by the operating system will be considered in order to initiate the system start as quick as possible.

Under **Advanced options**you may modify additional functional aspects of O&O Defrag:

- **Include removable drive** Removable drives (e.g. ZIP, Jaz or DVD RAM) can also be defragmented.
- **Include external drives** It is also possible to defragment drives that are connected by an external interface, such as a USB or FireWire.
- Show defragmentation summary Normally, after each defragmentation, a popup presenting a ClusterView before and after defragmentation with fragmentation statistics is shown. You may deactivate this feature if you would like to suppress the summary popup.
- **Prevent defragmentation of solid state drives** SSDs are subject to physical erosion of flash building blocks, and this negative effect can be strengthened as a result of defragmentation. In view of the SSD's particular construction, it's advisable to use the two methods developed especially for use on SSDs, SOLID/Complete and SOLID/Quick.
- **File into zones** This option is disabled by default. If enabled, during defragmentation files will be placed in different hard drive areas (speed zones) according to specific file access patterns; for more information please refer to zones.
- **Disable automatic optimization** Enable this feature if you don't want your system to be optimized in the background.
- **Enable remote administration from same network** This feature is disabled by default. Upon enabling, all users from the same network are granted remote access to O&O Defrag on your computer. Your firewall will be automatically configured to allow incoming connections to the O&O Defrag service on your computer. You may find additional information in Work within the network.

Reports and Logging

You can create status reports in an HTML format. A maximum of 999 reports can be created and saved.

Please enable this function if you want to log all O&O Defrag activities into the Windows Event log. You can specify the detail level for the notification - whereby level 1 only logs errors and level 4 stores all the information available. Please bear in mind that this might lead to many log entries, which in turn overwrite entries by other programs or systems.

Tasktray

If you wish, the O&O Defrag icon may be placed on the tasktray to display the status of defragmentation.

The logged- in user may optionally use the advanced control possibilities.

For more information about the tray icon, see Tray icon and drive activity.

Settings for the Tray icon

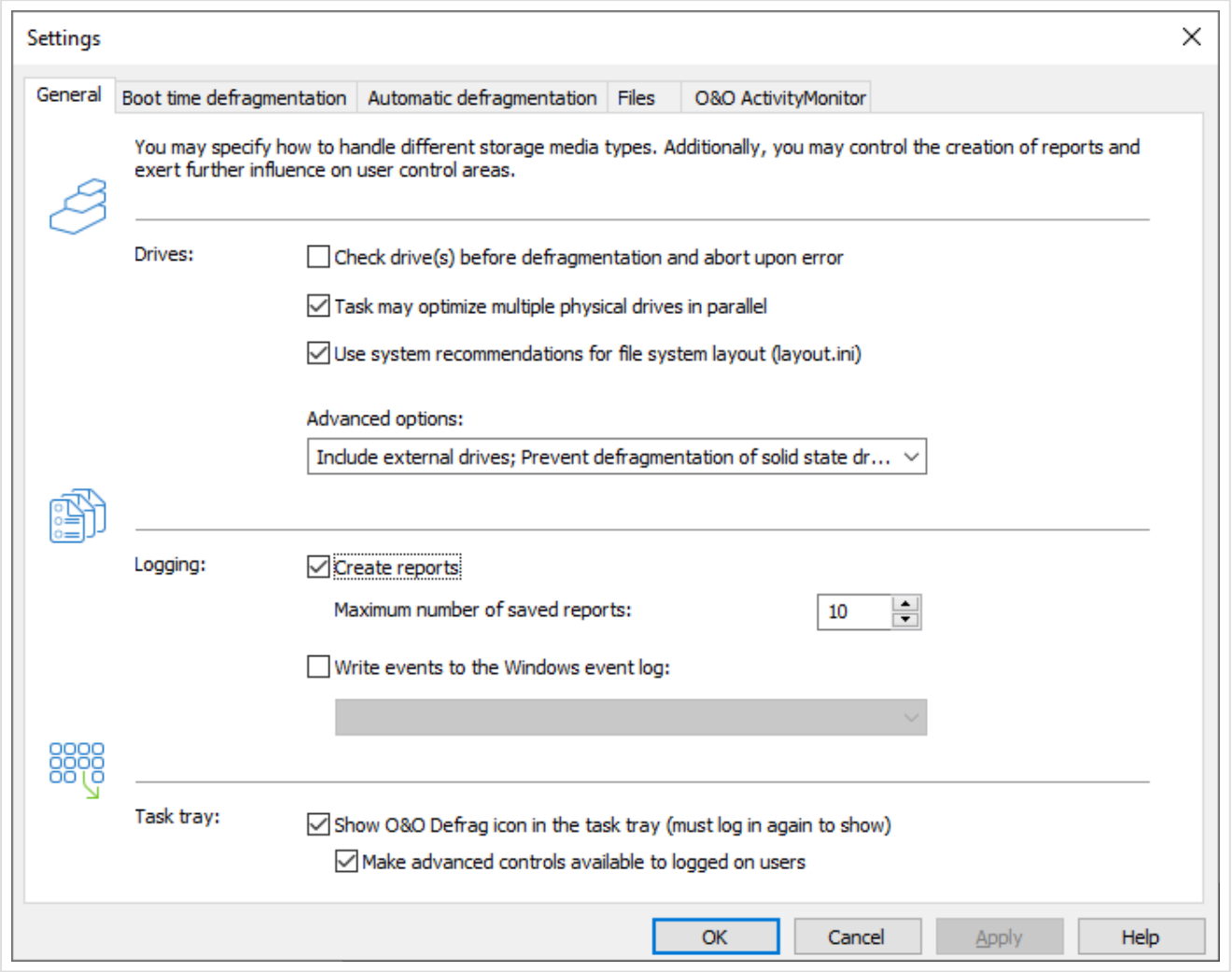
Under **Setting/General** in the user interface you can specify various control possibilities for the tray icon.

Display the O&O Defrag icon in the notification area

This option allows you to set whether the TrayIcon should be displayed or not. If you change this option, you will need to login again to validate the new settings.

Enable enhanced control for logged in users

You can allow the logged in user to pause the defragmentation or to stop it completely. If you disable this option, the user will only receive information on the running defragmentation, he will not be able to control it.



Files

Under **Files** in the settings dialogue you can exclude files and folder from defragmentation. You can, for instance, exclude a complete folder, but still put certain files from it in the list of files to be defragmented.

In addition, when time doesn't permit, you can also specify that large files should not be defragmented or moved.

Exclude files

Under **Excluded files** you can specify the files you want to exclude from defragmentation.

1. Click **Select files**.
2. Select the file or the folder you wish to exclude in the dialogue in the Explorer view and click **Add**. You can also allocate more files and folders to the selection.
3. If you have made your selection, confirm your entries with **Apply**.

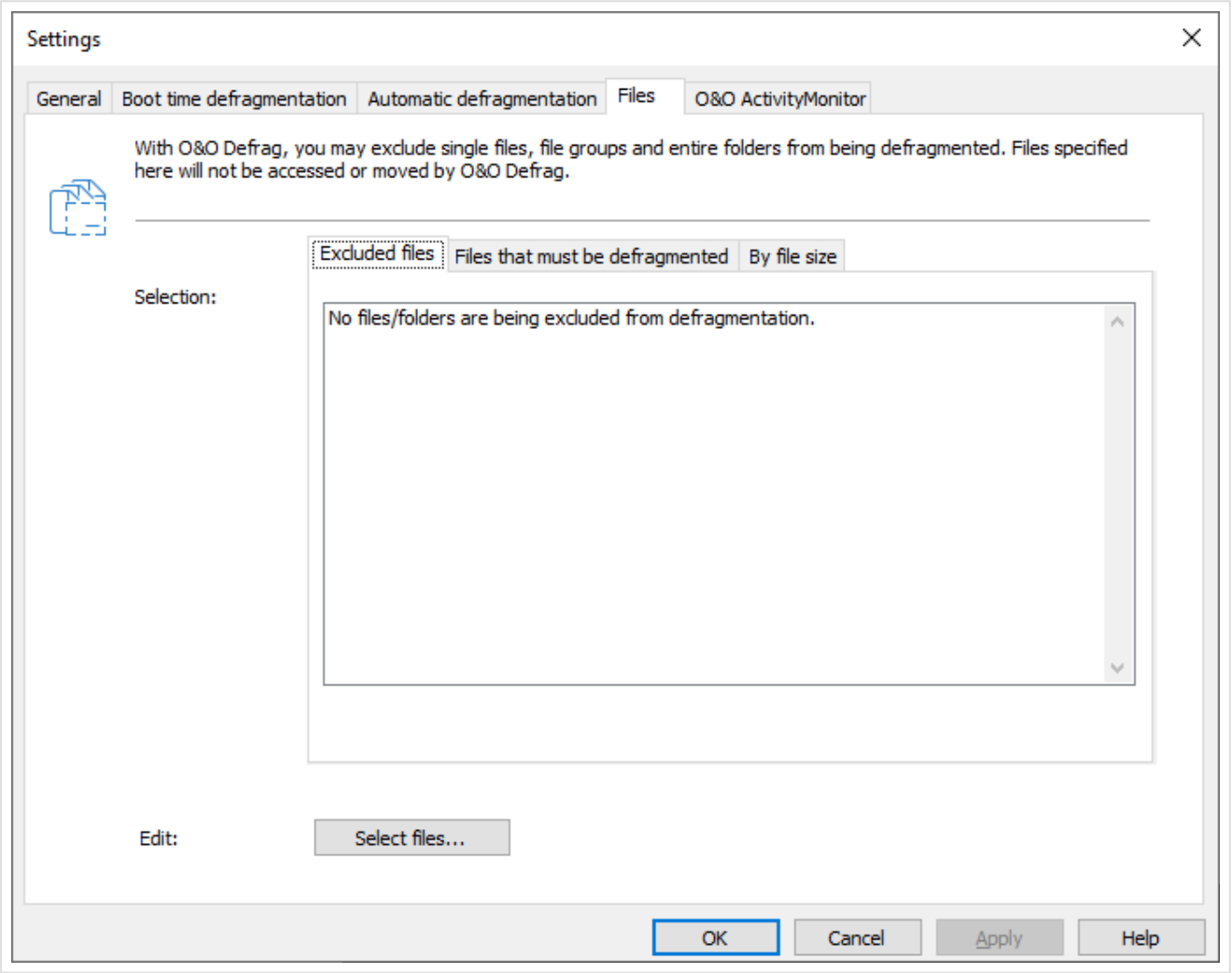
Include files at all costs

Under **Files that must be defragmented** you can specify the files that must be defragmented, even if they have been excluded previously due to a higher ranking condition.

1. Click **Select files**.
2. Select the file or the folder you wish to exclude in the dialogue in the Explorer view and click **Add**. You can also allocate more files and folders to the selection.
3. If you have made your selection, confirm your entries with **Apply**.

By size

Optionally, if time doesn't permit, you can also exclude very large files from the defragmentation. In the dialogue, please specify the size above which a file should not be optimized or moved during a defragmention.



O&O ActivityMonitor

Under the O&O ActivityMonitor you can specify the CPU when defragmenting should start and the maximum CPU that O&O Defrag may use. The O&O ActivityMonitor periodically determines degree of use of the CPU. It controls the performance demand of O&O Defrag during a defragmentation and adapts it to the current state. You can thereby work undisturbed while your system is being defragmented in the background. O&O Defrag offers many

ways in which you can make your defragmentation even more effective and efficient. The default configurations are already optimized for most systems, which means you won’t normally have to make any changes here. You may, however, also adjust the tuning options yourself.

The settings are valid for recurring jobs and automatically run defragmentation processes, see Automatic defragmentation. You have the possibility to specify further settings of the O&O ActivityMonitor for a specific job in the job dialogue.

System load

Here you can specify that O&O Defrag should not exceed the load of the processor by a certain value during a defragmentation. In addition, you have the possibility to specify that an automated defragmentation not be started if the target drive is in use or other programs are using a high level of CPU.

Program list

Here you can specify that automatic defragmentation should not be executed if certain programs are running simultaneously. These might be imaging programs, a virus scanner, or even games.

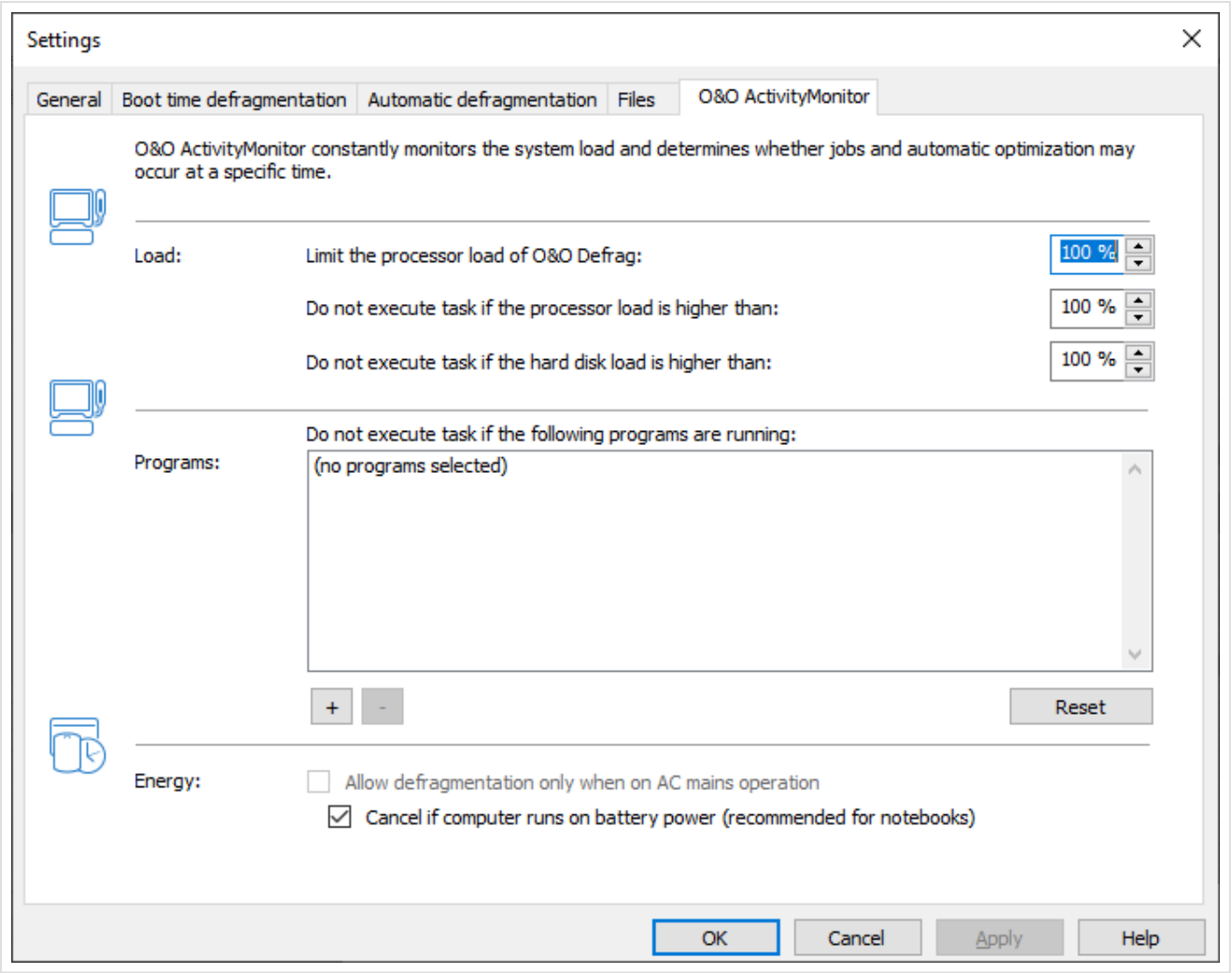
Energy

Jobs can also be scheduled to run only when the computer is connected to a main power source - something very useful when using notebooks.

:::tip

For notebooks we recommend enabling the option **Cancel if computer runs on battery power**.

:::



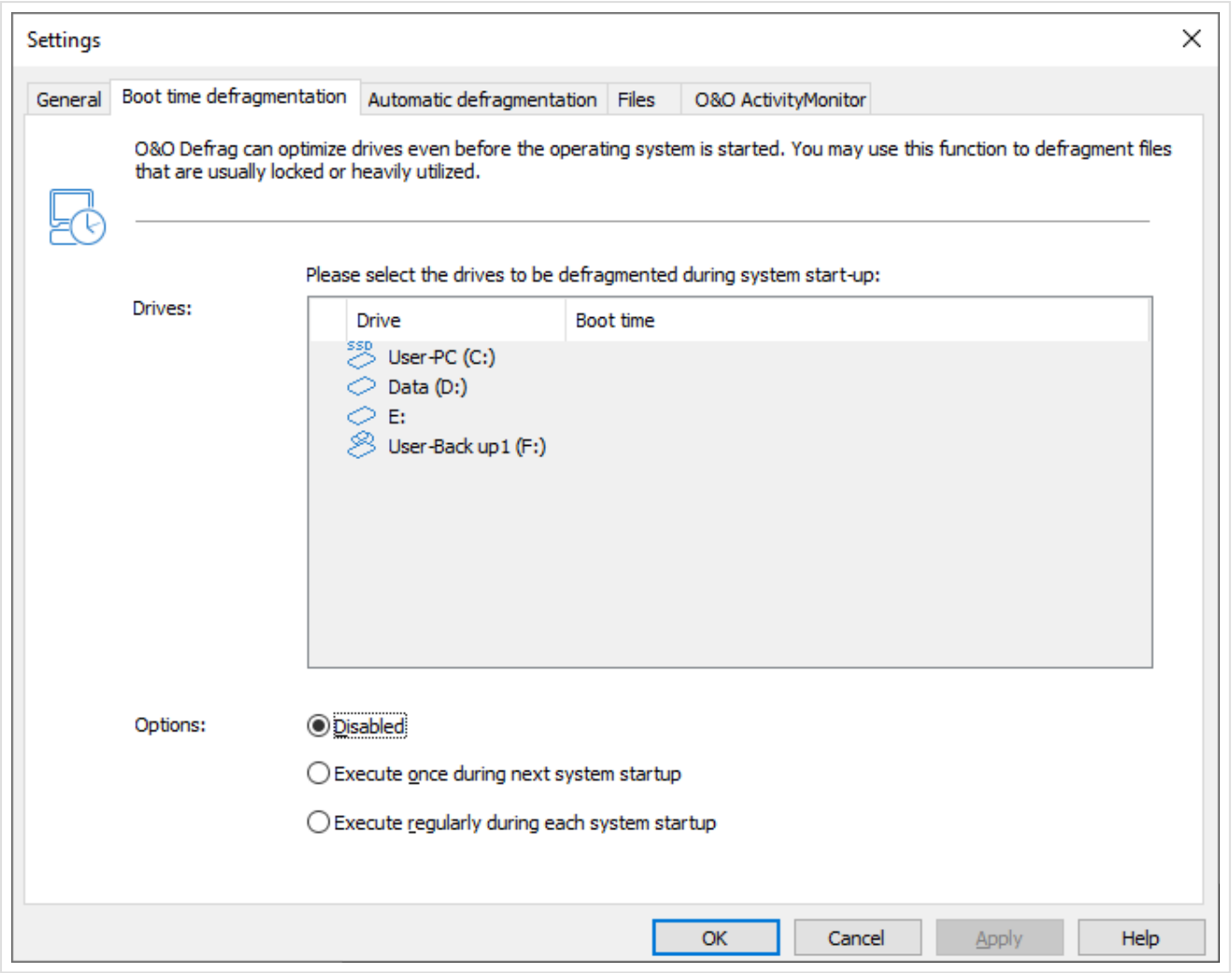
Boot time defragmentation

Defragmentation is executed in the background while the system is running and normally optimizes most files. Some system files, however, are locked by the operating system while it is running. These files can only be defragmented when they are not being used by the operating system. This is only possible at an early start phase of Windows, even before the graphical login prompt appears. At this point, no system operating processes are enabled and you cannot start any application. This phase is called **Boot time defragmentation**.

It is now possible, using this feature, to defragment a file which is being used exclusively by the operating system. Depending on the operating system, for example, this can be the swap file, the registration database as well as the MFT (Master File Table).

- The options for the boot time defragmentation can be easily set in the settings dialogue under boot time defragmentation.
- Please select whether you want to useboot time defragmentation regularly at every system start or one time only at the next system start.

You can also **disable** boot time defragmentation.


Settings
General
Boot time defragmentation
Automatic defragmentation
Files
O&O ActivityMonitor
O&O Defrag can optimize drives even before the operating system is started. You may use this function to defragment files that are usually locked or heavily utilized.
Please select the drives to be defragmented during system start-up:
Drives:
Drive
Boot time
SSD
User-PC (C:)
Data (D:)
E:
User-Back up1 (F:)
Options:
Disabled
Execute once during next system startup
Execute regularly during each system startup
OK
Cancel
Apply
Help

Command line version

You can also control the defragmentation by means of the command line version of O&O Defrag. In this way, you can integrate O&O Defrag into scripts that can be run at startup or login.

The graphical user interface of O&O Defrag will not be shown during a start from the command line. A mini O&O Defrag icon will appear in the task tray, and you can follow the progress of the actions in your DOS prompt.

O&O Defrag runs independently of the main user interface and the DOS prompt in the background. If you close the DOS prompt or cancel the command line tool with Ctrl+Break/Ctrl+C, you can choose whether to end the program or have it continue in the background. You can also cancel the started activity later with the help of the **STOP command** or by using the user interface.

:::tip

If you start O&O Defrag from the command line, you can also start the main user interface later. This will show you the status as usual without interrupting or stopping the running processes.

:::

Call

The O&O Defrag command line control processes the following commands and parameters:

```
OODCMD {C:[,] | ... | Z:} | {/{<command>}:{C[,] | ... | Z | ALL}}
 [/OUTPUTFILE:] [/SILENT] [/NOHEADER] [/NOWAIT] [/WAITKEY]
```

where `<command>` is one of the following activities:

ANALYSIS, OPTIMIZE, QUICK, COMPLETE, COMPNAME, COMPACC, COMPMOD, FRAGFILES, SPACE, STEALTH

Parameters

Syntax	Description
/ANALYSIS:{C[,] | ... | Z | ALL}	Analyzes the given drives. The result will be shown in the standard output device (generally the DOS prompt), or written into the output file.
/OPTIMIZE:{C[,] | ... | Z | ALL}	Starts OPTIMIZE defragmentation on the given drives or on all drives (ALL).
/QUICK:{C[,] | ... | Z | ALL}	Starts OPTIMIZE/QUICK defragmentation on the given drives or on all drives (ALL).
/COMPLETE:{C[,] | ... | Z | ALL}	Starts OPTIMIZE/Complete defragmentation on the given drives or on all drives (ALL).
/COMPACC:{C[,] | ... | Z | ALL}	Starts COMPLETE/Access defragmentation on the given drives, or on all drives (ALL). Please bear in mind that this defragmentation method does not support any drive zones.
/COMPMOD:{C[,] | ... | Z | ALL}	Starts COMPLETE/Modified defragmentation on the given drives, or on all drives (ALL). Please bear in mind that this defragmentation method does not support any drive zones.
/COMPNAME:{C[,] | ... | Z | ALL}	Starts COMPLETE/Name defragmentation on the given drives or on all drives (ALL). Please bear in mind that this defragmentation method does not support any drive zones.
/FRAGFILES:{C[,] | ... | Z | ALL}	Analyzes the given drive and lists the fragmented files. The result will be shown in the standard output device (generally the DOS prompt), or written into the output file.
/INFO:{C[,] | ... | Z | ALL}	Shows the drive information for the given drives or for all drives (ALL).
/NOHEADER	Stops the display of program information when the program is started from the DOS prompt.
/NOWAIT	Starts the given operation and ends the command line program immediately. The operation runs in the background. This is useful if you want to start an operation with a multiple file, but don’t wish to wait until this process has finished.
/OUTPUTFILE:	All output will be redirected to a file with the given path and name.
/SILENT	No output is being displayed.
/SPACE:{C[,] | ... | Z | ALL}	Starts SPACE defragmentation on the given drives or on all drives (ALL). Please bear in mind that this defragmentation method does not support any drive zones.
/STEALTH:{C[,] | ... | Z | ALL}	Starts STEALTH defragmentation on the given drives or on all drives (ALL). Please bear in mind that this defragmentation method does not support any drive zones.
/SSDOPTIMIZER	Optimizes the SSD using a method that goes easy on resources.
/STOP:{C[,] | ... | Z | ALL}	Stops all processes (analysis, defragmentation etc.) on the given drives or on all drives (ALL).
/TRIM	Sends the TRIM command to the SSD.
/THINPROV	Optimizes the memory allocation of a virtual hard disk.
/WAITKEY	Waits for a keystroke before ending the command line program (once the operation has ended).

Defragmentation and S.M.A.R.T.

O&O Defrag offers various options for receiving further information about defragmentation. The tabs in the lower section of the "Start" ribbon will help you switch between the categories explained below.

Time View

The Time View illustrates recent actions you have run. For each drive there’ll be a brief summary displaying the results of any corresponding action.

History

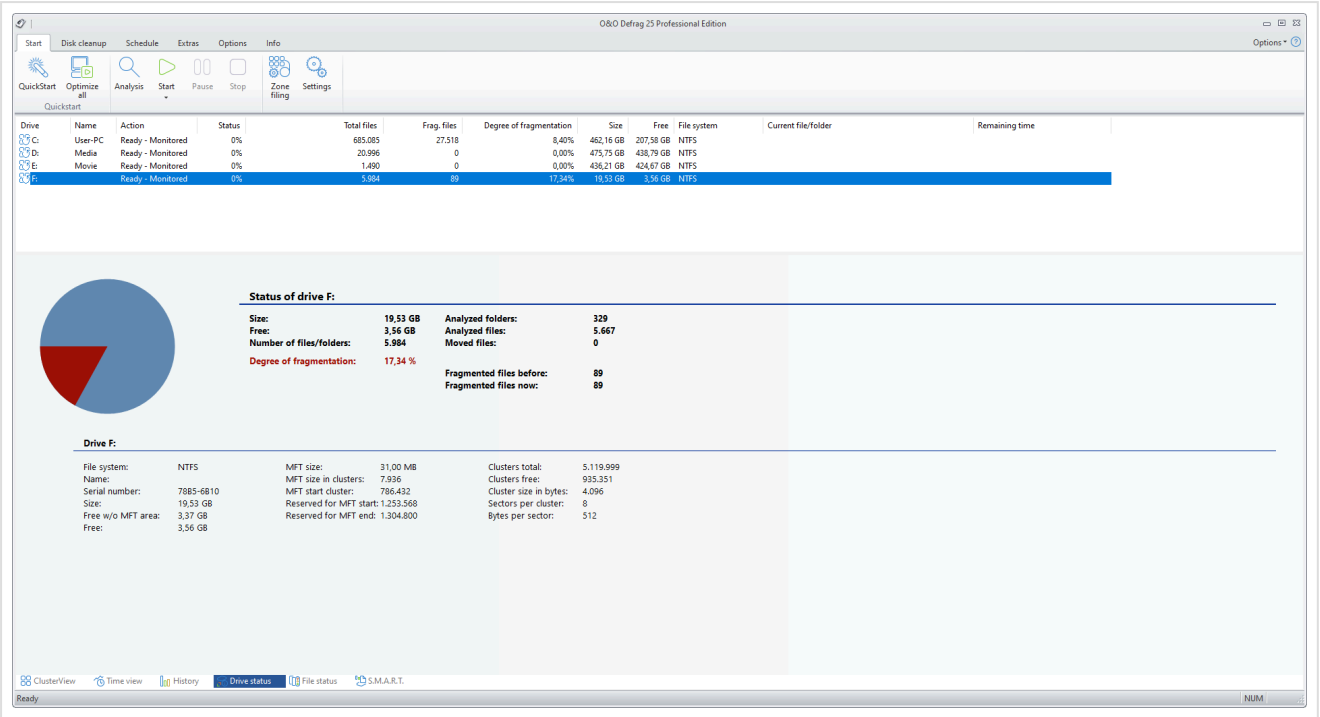
Thanks to clearly displayed statistics, you can tell what effect a regular defragmentation is having on your system and you can track the success over weeks and months. You can monitor how many files have been sped up and how many excessive file fragments have been put together, for example. Based on the, you can then adjust your settings to match the defragmentation to your computer habits in order to get the best results.

Drive status

Displays information about the conditions of selected drives before and after defragmentation.

Here you can find information about your drive, the amount of space being used on it, and the file system. The refreshed pie chart will dynamically represent the proportional level of fragmentation during a defragmentation run.

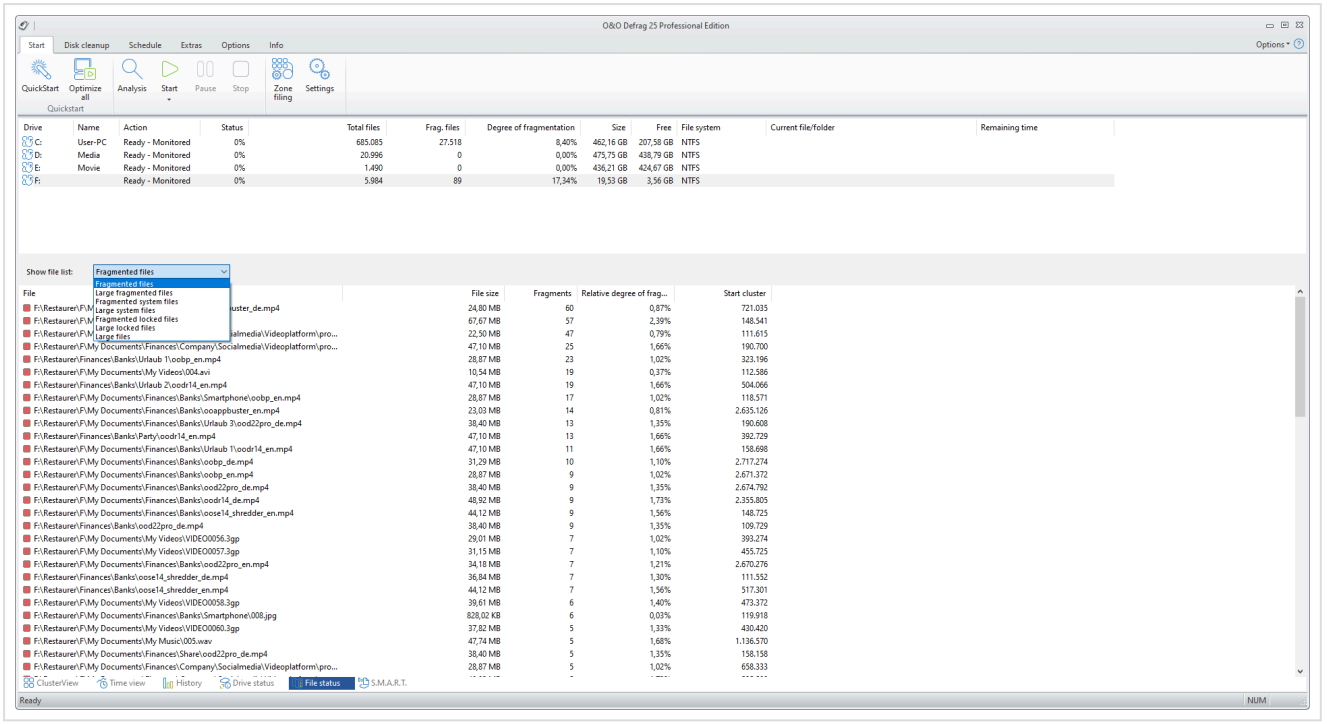
The Status for the entire drive informs you about both the analyzed as well as the non-analyzed files and folders. A new evaluation occurs dynamically with each defragmentation.



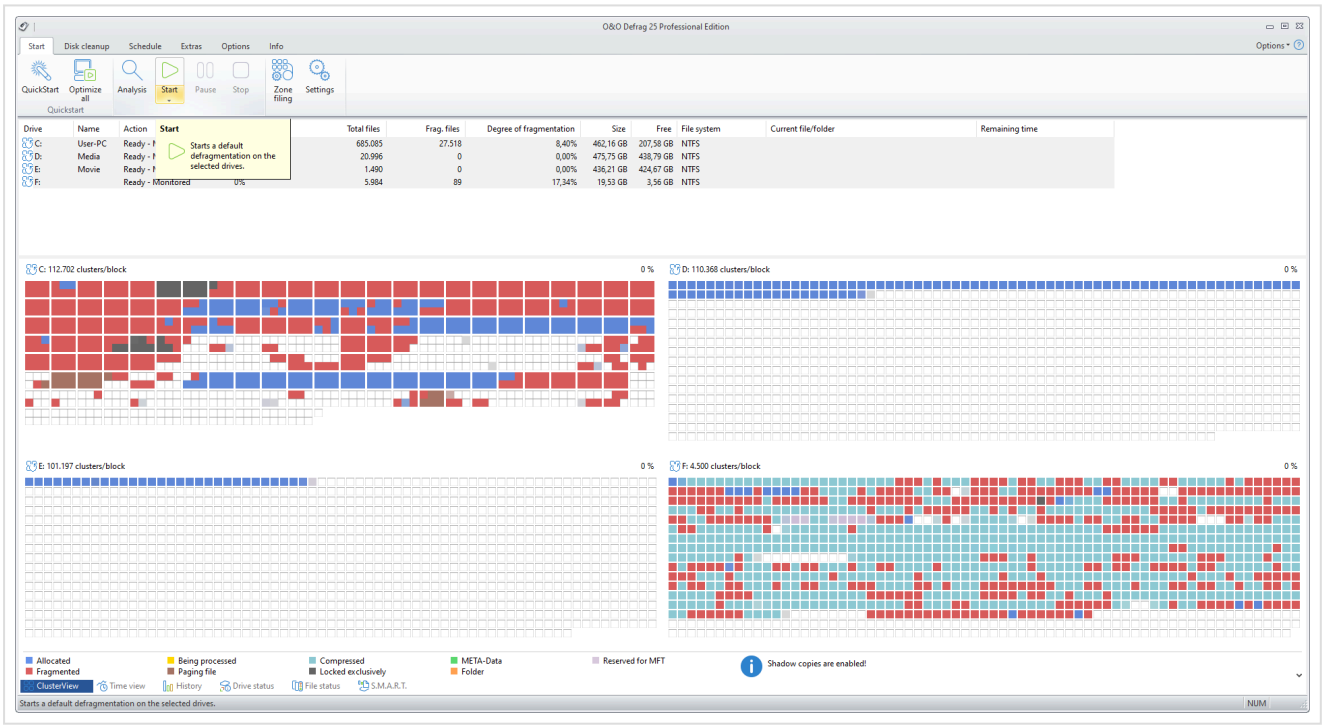
File status

File Status provides an overview of the largest and most heavily fragmented files on your drive. The contents of this file system statistic can also be found in the status reports. You have to first analyze the file statistics of a drive in order to have them displayed here. This will occur after you click Analysis in the Ribbon bar.

Files can be listed according to various criteria with the Sorting drop-down menu.



O&O Defrag allows you to defragment individual drives or entire computers with just a few mouse clicks.



Recommendations for your first defragmentation The first defragmentation usually requires the most time because O&O Defrag has to check your entire system and move all files into their optimal position. This is especially the case with systems that have been in use for a long time and have rarely or never been defragmented.

The COMPLETE methods in particular are very time-consuming because the entire file structure needs to be optimized, which involves moving even files that are not fragmented.

We therefore recommend an initial defragmentation with the STEALTH or SPACE methods. These methods consolidate your hard disks very quickly and efficiently. Afterwards, you can use the COMPLETE methods for optimum performance or stick to the quicker STEALTH and SPACE methods. Whichever method you choose, your system will be significantly quicker than it was before!

S.M.A.R.T.

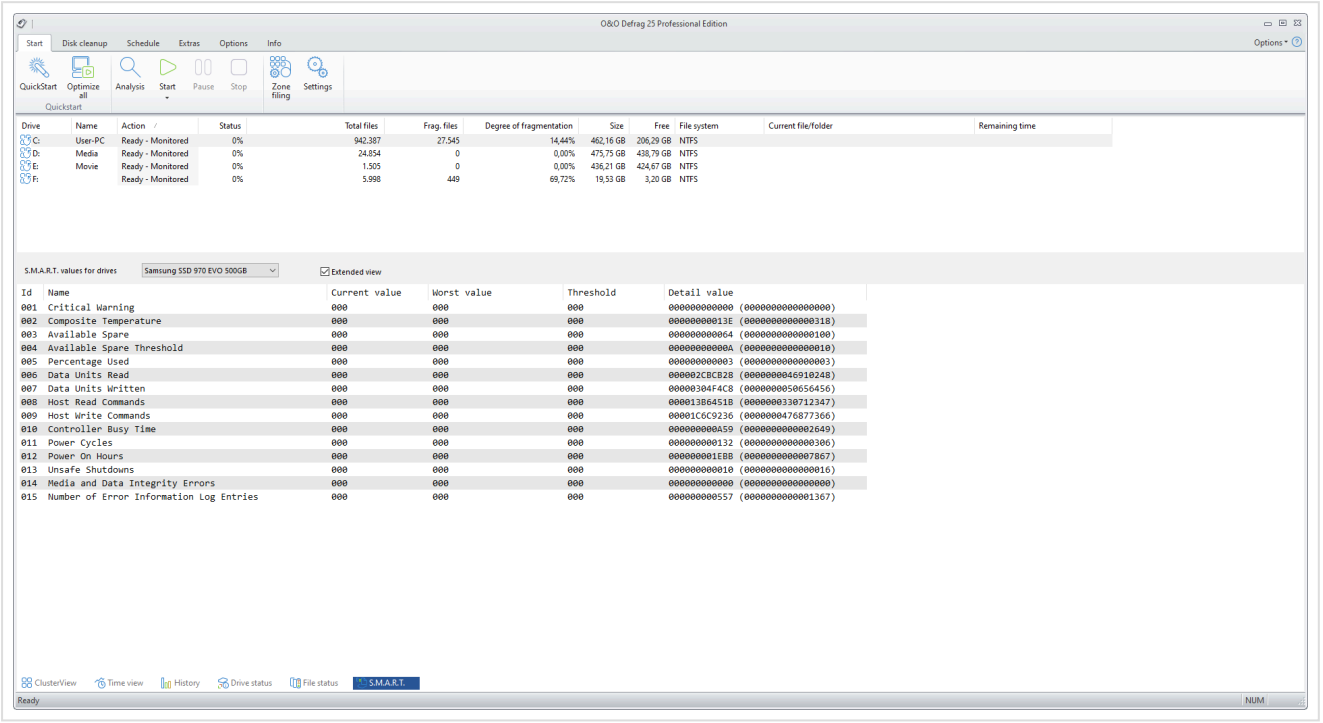
O&O Defrag uses the S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) integrated in hard disks to permanently monitor the status of drives. This allows the program to readout the values for essential properties that are detected by the hard disk during a self-diagnosis. Some of these values might be the total number of hours in operation or the read error rate. A detailed readout keeps you informed about the most important data on your hard disk: everything from the number of previous system starts up to the current temperature. In this way, O&O Defrag warns you about impending problems.

Each value in the expanded view is sorted on a value scale (raw value) from 0 to 100, 200 or 255.

For SSDs / Name	Description
Temperature	Temperature of your drive in ° C. With normal use, temperatures between 40°C and 65°C are possible. The lower the raw value, the better.
Operating hours	Indicates in hours how long the SSD has been in operation (including standby). Indicates wear and tear, but says nothing about usage conditions during this time. The lower the raw value, the better.
Switch-on processes	The number of times your drive has been turned on and off. The lower the raw value, the better.
Transmission mode	Indicates how the SSD is connected (interface).
Interface	Indicates how the SSD is connected (interface).
Reads	Number of reads.
Write processes	Number of write processes.
block size	Specifies the block size of your hard drive.
Critical Warning	Number of critical warnings.
Available reserve storage	Indicates the available spare memory on your hard drive.
Wear in percent	Indicates the percentage of wear and tear on your hard disk.
Data blocks read	Indicates how many data blocks were read.
Data blocks written	Indicates how many data blocks were written.
Executed read commands	Indicates the read commands executed.
Executed write commands	Specifies the write commands executed on your hard disk.
Waiting time for commands in minutes	Specifies the waiting time for commands in minutes.
Number of improper shutdowns	Indicates the number of improper shutdowns of your hard drive.
integrity error	Number of hard drive integrity errors. The lower the raw value, the better.
Number of entries in the error memory	Number of entries in the error memory. Entries in the error memory.

For HDDs / Name	Description
temperature	Temperature of your drive in ° C. With normal use, temperatures between 40°C and 65°C are possible. The lower the raw value, the better.
Operating hours	Indicates in hours how long your HDD has been in operation (including standby). Indicates wear and tear, but says nothing about usage conditions during this time. The lower the raw value, the better.
Switch-on processes	The number of times your drive has been turned on and off. The lower the raw value, the better.
Transmission mode	Indicates how your HDD is connected (interface).
Interface	Indicates how your HDD is connected (interface).
Read error rate	Incorrectable errors while reading from your hard disk, will lead to reading again. Indicates a problem with the plate surface. The lower the raw value, the better.
Mean start-up time	Number of attempts to rev up your hard disk to the nominal speed. An increasing value indicates mechanical problems in the drive of the hard disk. The lower the raw value, the better.
Start / stop cycles	Number of start and stop processes for your drive (also in standby). Indicates wear and tear, as this is the hardest drive stress. The lower the raw value, the better.
Reallocated Sectors	Indicates the number of spare sectors that your hard disk has had to use up to now. With falling values, the probability of failure increases.
Positioning error of the read / write heads	Incorrectable errors while reading from your hard disk, will lead to reading again. Indicates a positioning problem in the read / write unit. The lower the raw value, the better.
Attempts to start the hard disk mechanics	Average of the start time in (milli-) seconds. Indicates problems with the motor or the plate bearings. The lower the raw value, the better.
New recalibration attempts	Number of attempts to recalibrate your hard drive. The lower the raw value, the better.
Abortions during the switch-off process	Number of aborts during the shutdown process of your hard disk. The lower the raw value, the better.
Number of parking processes of the read and write heads	The read / write unit is parked on the plastic ramp next to the plate. The read / write unit is parked when it is switched off or after idling for around 10 seconds. The lower the raw value, the better.
Number of used reserve sectors	Number of spare sectors consumed. Indicates surface problems, as only then does a reserve sector automatically replace a previously used one. The lower the raw value, the better.
Number of reserve sectors not yet assigned	Number of reserve sectors that have not yet been allocated.
Number of uncorrectable sectors	Number of uncorrectable sectors on your hard drive. If the values fall, the probability increases that your drive will suffer data loss and damage the read / write heads.
Transmission error	Number of transfer errors caused by your hard disk. The lower the raw value, the better.

For HDDs / Name	Description
Spelling mistake	Number of read errors that cannot be corrected by software. The lower the raw value, the better.



TRIM compatibility

You will also find suggested solutions for making your system capable of carrying out TRIM commands to optimize your SSD.

If you have a question or if you need assistance, please contact our technical support. We look forward to hearing your suggestions!

What is TRIM and why is it necessary?

Solid State Drives store data on flash chips and because they do not contain any moving parts, they are faster than hard drives. However, flash chips have a major drawback: a limited lifetime. Upon each write request, flash memory cells experience a physical degradation and if written onto too frequently, flash memory may in fact fail.

To keep flash chips in a perfect working condition for as long as possible, the controlling processor inside an SSD must perform wear leveling by distributing recurrent writes to as many flash cells as possible. This is a proven means of preventing data from being written to just a few flash cells, ultimately leading to their destruction and the loss of all data contained on them.

This necessary function can be facilitated by software using the so-called TRIM command. Through this command the SSD is told about unused space in a file system and this free space may be then used to assist wear leveling. If used in a clever way, TRIM will extend the lifetime of a solid state drive and will improve its performance.

What is required for TRIM to work?

In order to perform TRIM optimizations of your solid state drive, the following four prerequisites must be met:

1. **The SSD must implement the ATA TRIM command or its equivalent SCSI UNMAP.** Most drives that were introduced in the year 2010 or later should support TRIM. If the drive features SATA-600 speeds, then it is a good indicator that it supports TRIM.
2. **The SSD needs to be attached to a controller that will pass through TRIM commands to the drives.** This is usually the case if the drive is attached to a SATA chip which is running in AHCI mode. A good sign is if the SSD is directly attached to a SATA port provided by the main chipset on the motherboard.
3. If the SSD is attached to a **RAID controller**, it must be used as a **single drive volume**. In most cases RAID volumes consisting of multiple SSDs cannot be optimized by TRIM. Also, the SSD needs to be partitioned as a Basic Disk since Dynamic Volumes are not compatible with TRIM.
4. **The controller’s driver must not block TRIM commands and needs to pass them through to the drive**. The most common reason for TRIM incompatibility lies in severely outdated drivers or OEM drivers that will not pass through TRIM commands. However, if the **Standard AHCI driver which is already included in Windows** is installed, then nothing should hinder a successful TRIM optimization.

Known bad configurations

We would like to present you the two most common cases for TRIM incompatibility.

SATA controller is running in IDE mode

Problem Due to BIOS settings the SATA controller is running in the now obsolete IDE mode. When SATA was introduced over a decade ago, the IDE mode was needed to provide compatibility with existing drivers. Usually, the IDE mode is enabled by default on somewhat older motherboards.

Solution In order to unlock the full performance potential of SSDs, the SATA controller needs to be switched to AHCI mode. As the first step the Windows registry needs to be adjusted in order to enable the AHCI driver provided by Windows. See Switching from obsolete IDE mode to AHCI mode.

Marvell SATA controller running OEM drivers

Problem Back when motherboard chipsets were still offering SATA-300 ports only, Marvell chips were added to premium motherboards in order to provide additional SATA-600 ports. Frequently, the same Marvell controllers were used on add-on SATA controller cards and for eSATA ports. While these chips by themselves are good SATA controllers, they will have **compatibility issues if Marvell OEM drivers are used instead of the Windows' built-in drivers,** e.g. as provided on motherboard driver CDs. The problem is that these OEM drivers **do not pass through any TRIM commands** to the SSD. In addition, Marvell drivers simulate SATA drives as SCSI devices. This leads to severe difficulties in properly detecting an SSD as such a drive and to protect it from unnecessary defragmentation.

Solution A One possible solution is to attach the SSD to a SATA port provided by the main motherboard chipset, if it is running in AHCI mode.

One rather common counter-argument is that the Marvell controller offers SATA-600 and thus is faster than SATA-300 provided by the main chipset. However, this is not correct: because the additional controller is attached by a narrow PCI Express x1 or x2 lane, the built-in chipset ports are not slower when measured against the usual benchmarks.

Solution B The second solution is to **use the Windows' Standard AHCI drivers**. Marvell controllers are fully compatible with the AHCI standard and if the controller is driven by standard Windows drivers, it does not show any negative performance impact. In order to use the built-in driver, the OEM driver must be replaced. This procedure is 100% safe and can be easily done using the Windows Device Manager. See Replacing an OEM SATA driver with the Windows' Standard AHCI driver.

Your configuration is not listed?

The vast majority of compatibility problems are due to SSDs being attached to additional SATA controllers whose drivers do not pass through TRIM commands to the drive. As a rule of thumb, we recommend to replace the OEM driver with the Standard AHCI driver provided with Windows.

If our suggested solutions s did not improve the situation or if your configuration is not listed and you are in doubt as to what to do next, then please contact our technical support directly. We will be more than happy to assist you!

Which configurations are known to work?

We would like to present you a list of sample configurations which we have tested internally and which are compatible with TRIM optimizations. Please note that this list is by no means exhaustive, we provide it purely as an example of what a working configuration could look like.

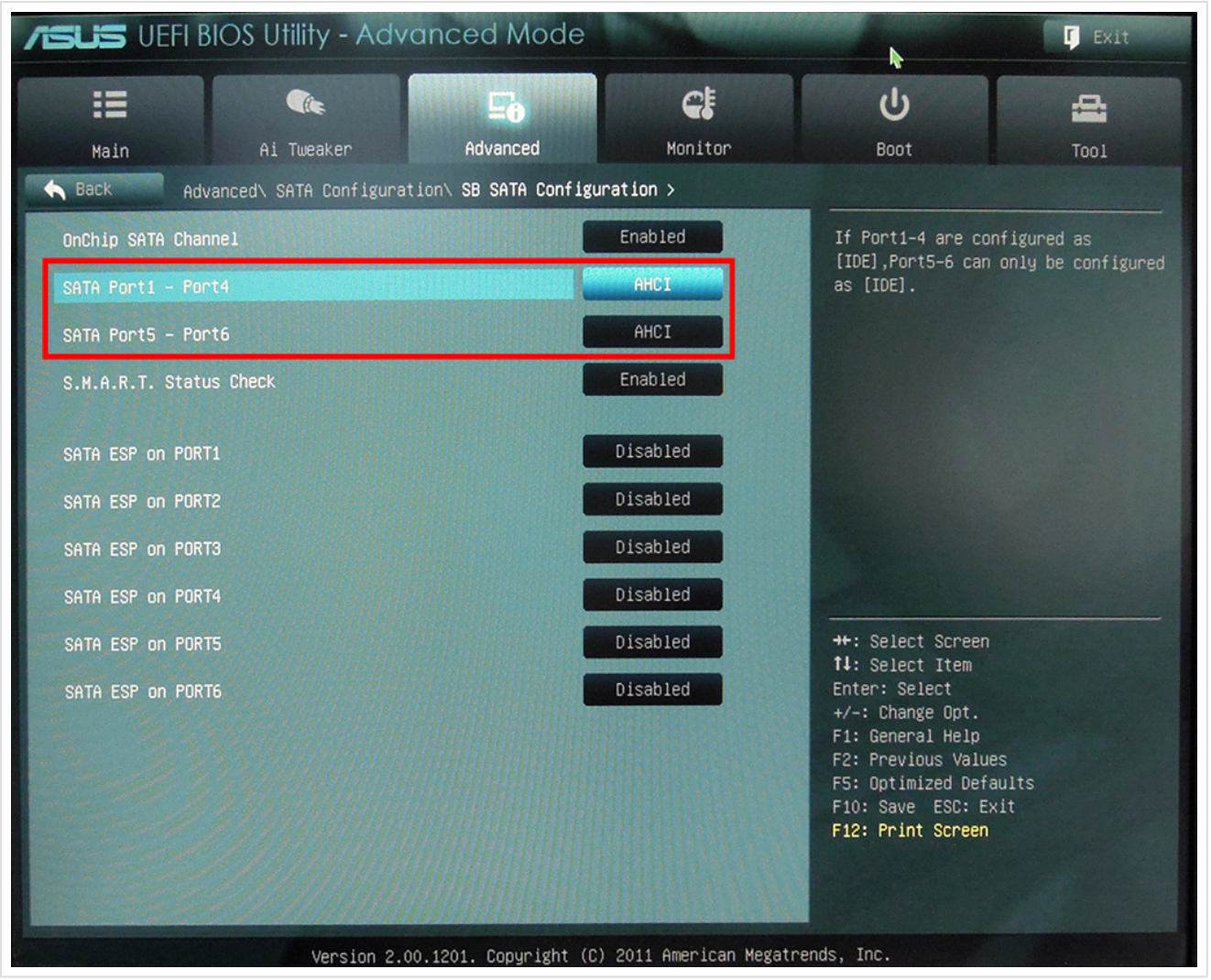
SSD interface	Controller	SATA Mode	Drivers	Notes
SATA	SATA port on main chipset	AHCI	Standard AHCI drivers provided by Windows	-
SATA	SATA port on main chipset (Intel or AMD)	AHCI	Current version of manufacturer's drivers	Chipset drivers must be up to date.
SATA	SATA port on additional controller (e.g. Marvell)	AHCI	Standard AHCI drivers provided by Windows	Sometimes OEM drivers are incompatible with TRIM. We suggest using the standard AHCI drivers.
SATA	SATA port on main chipset (Intel or AMD)	RAID	Current version of manufacturer's drivers	SSD must be used as a single drive; RAID volumes consisting of SSDs are not supported. Chipset drivers must be up to date.
SATA	SAS host bus adapter (e.g. LSI Logic or Adaptec)	-	Firmware and drivers must be up to date.	Controller needs to implement SCSI ATA Translation Layer.
SAS	SAS host bus adapter	-	-	-

Suggested Solutions for the most common cases

Switching from obsolete IDE mode to AHCI mode

Before you change the SATA mode in the computer's BIOS, some preparatory steps are necessary. These steps are required to enable the AHCI SATA driver to start upon booting. If not carried out properly, the system will not be able to boot if switched to AHCI mode.

If you have changed the SATA mode to AHCI without first activating the appropriate drivers, the system will likely not boot. While this may be an unpleasant experience, there is a simple remedy. Simply switch the SATA mode back to IDE and execute the preparatory step and try again.



Windows 8/8.1 and Windows 10

The Windows registry needs to be modified for the Standard AHCI driver to load upon next boot. The necessary changes must be applied to two registry keys:

```
Windows Registry Editor Version 5.00

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\storahci]
"Start"=dword:00000000

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\storahci\StartOverride]
"0"=dword:00000000
```

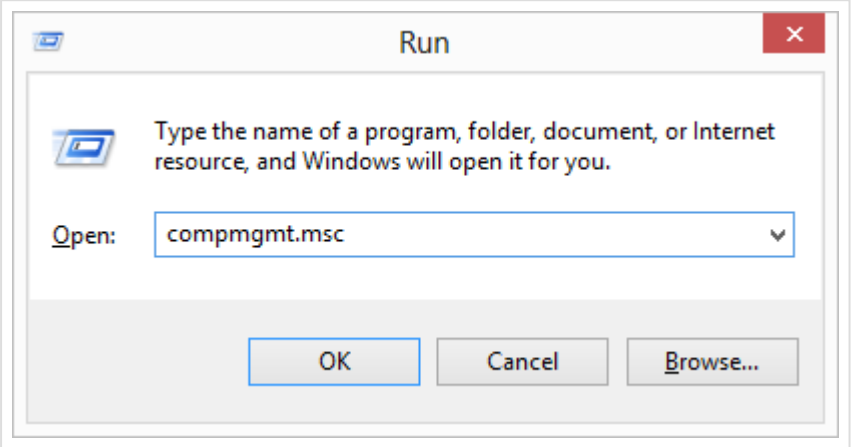
If you do not want to modify the registry by hand, you can also apply these changes automatically: save the lines above as a file with the extension `.reg` and execute it by double-clicking.

Then you can safely switch the SATA mode to AHCI in the computer's BIOS.

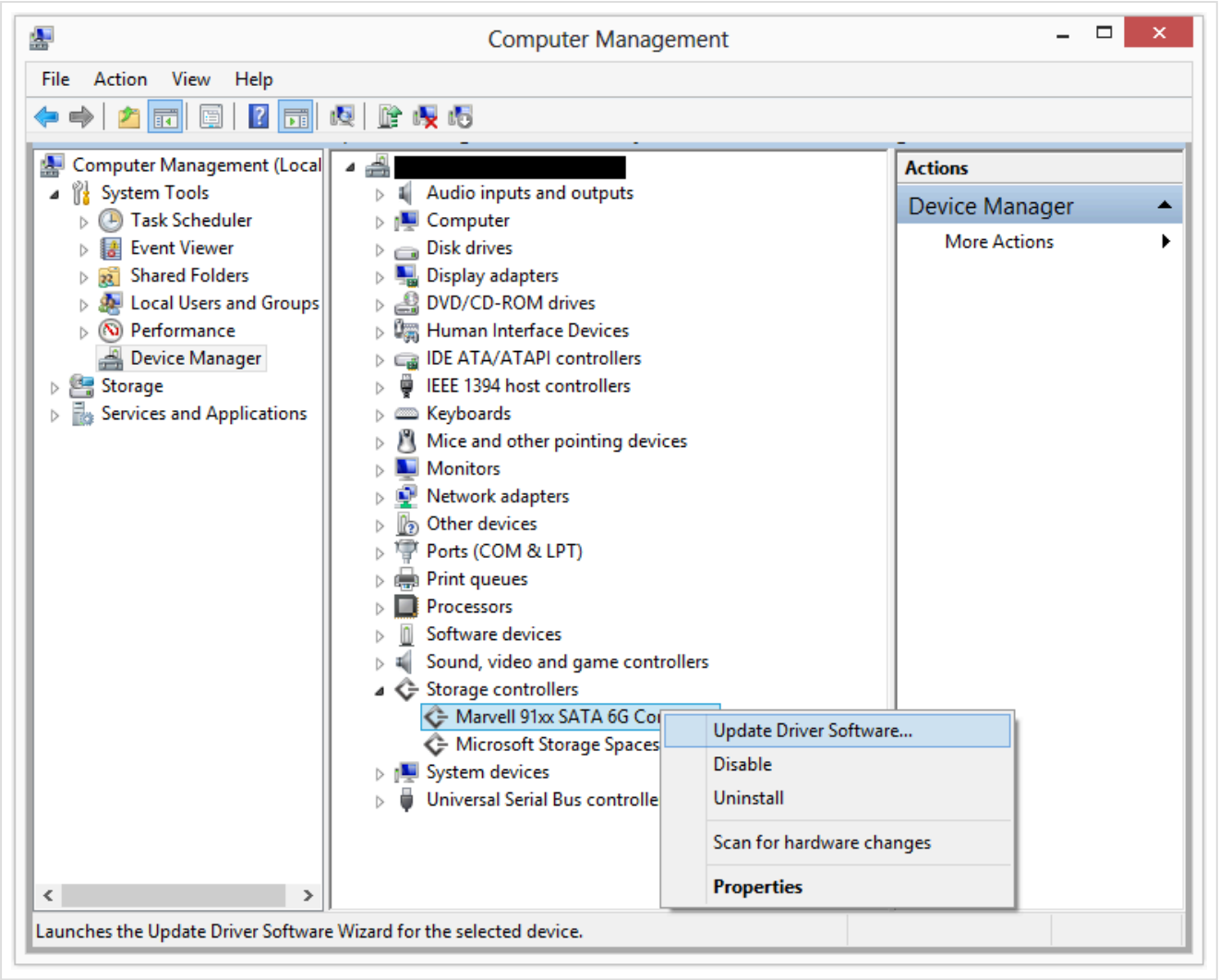
Replacing an OEM SATA driver with the Windows' Standard AHCI driver

If you are not sure how to replace an existing driver, please follow these instructions consisting of seven easy and safe steps:

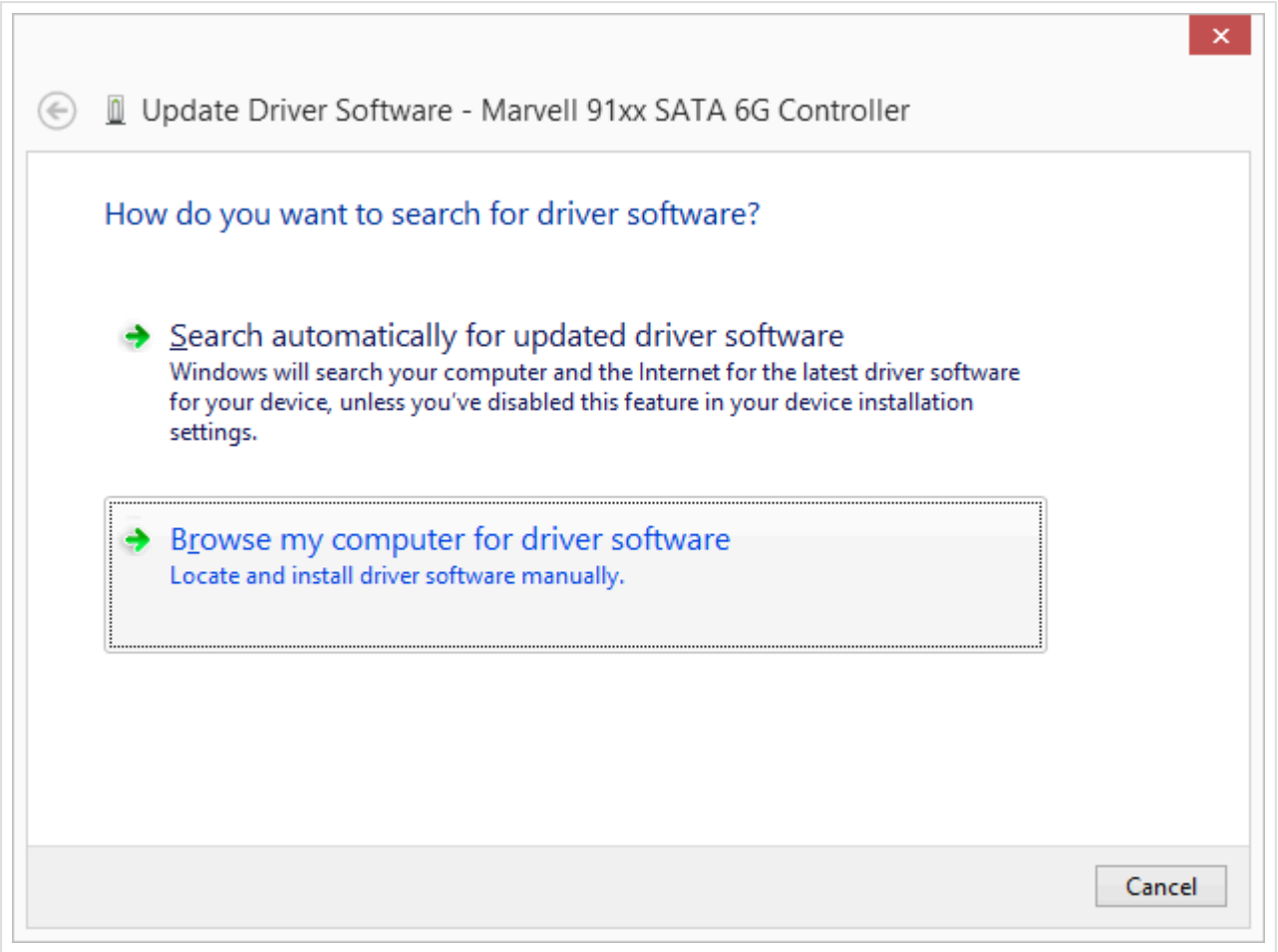
1. Please open the computer management app by running the file **compmgmt.msc**.



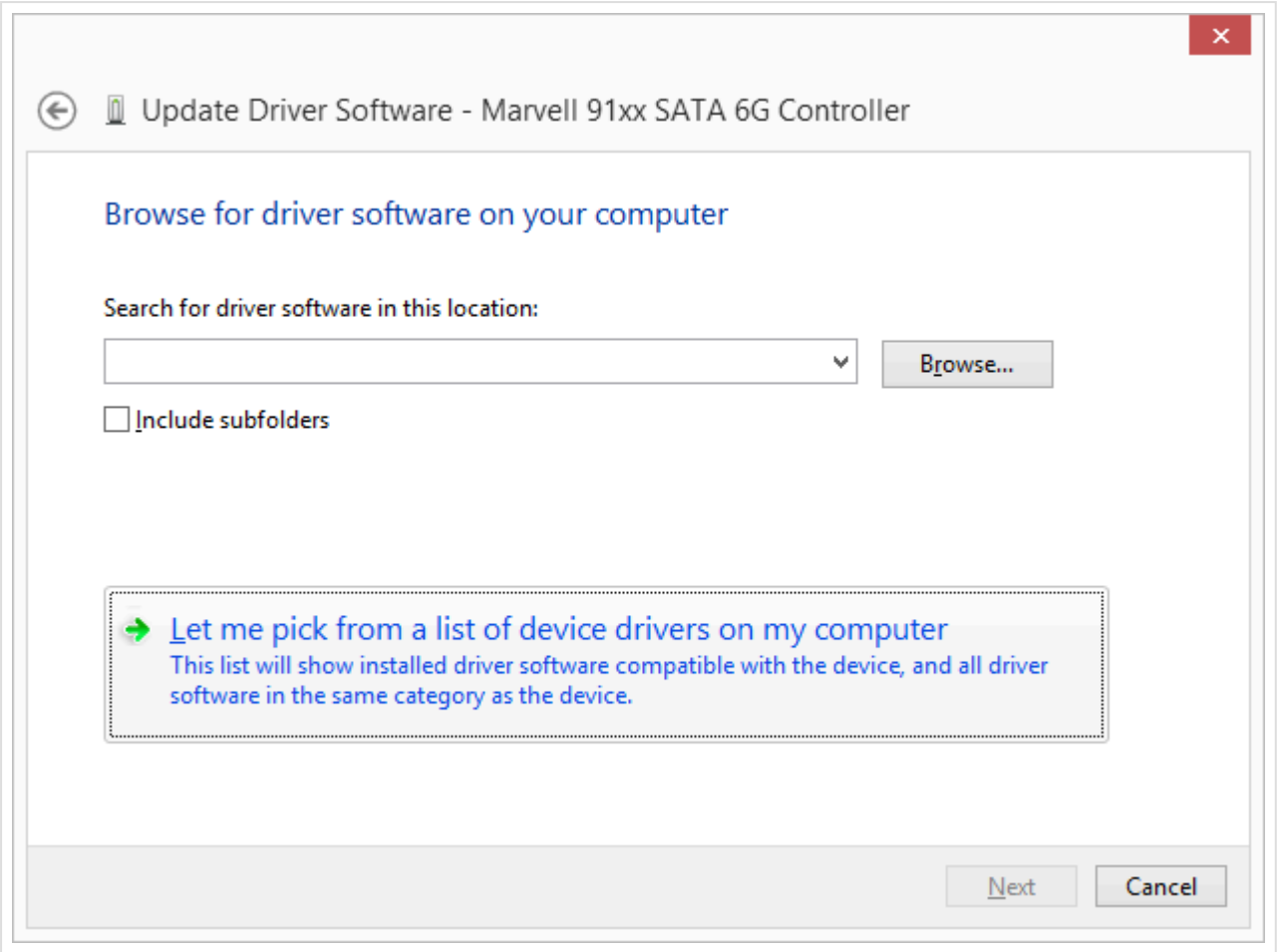
2. Please open the Device Manager and navigate to the category "**SCSI and RAID controllers"** or "**Storage controllers"**.
3. Please select the appropriate controller and click "**Update Driver Software"** from the controller's context menu.



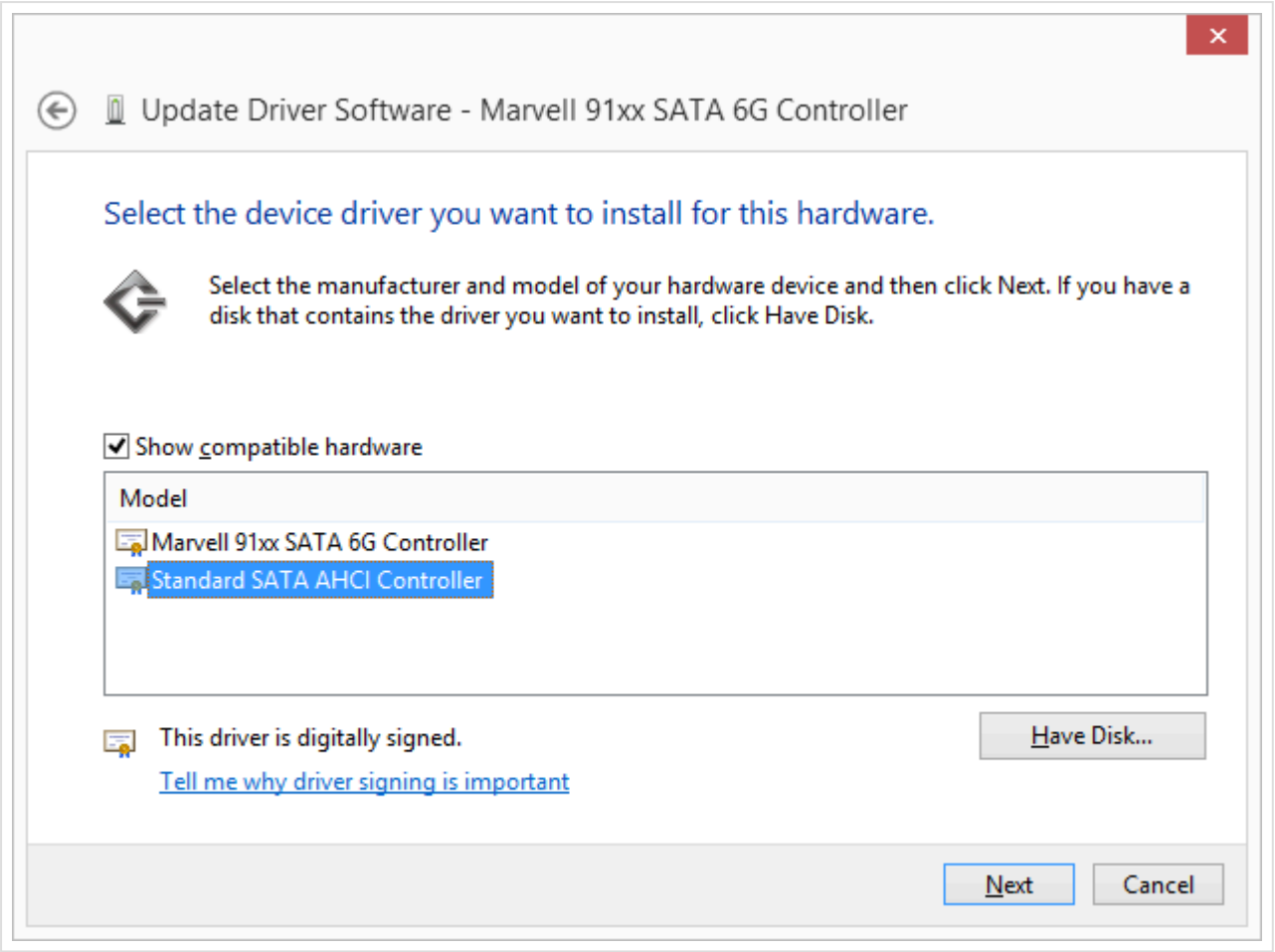
4. In the next dialog, please select “**Browse my computer for driver software”**.



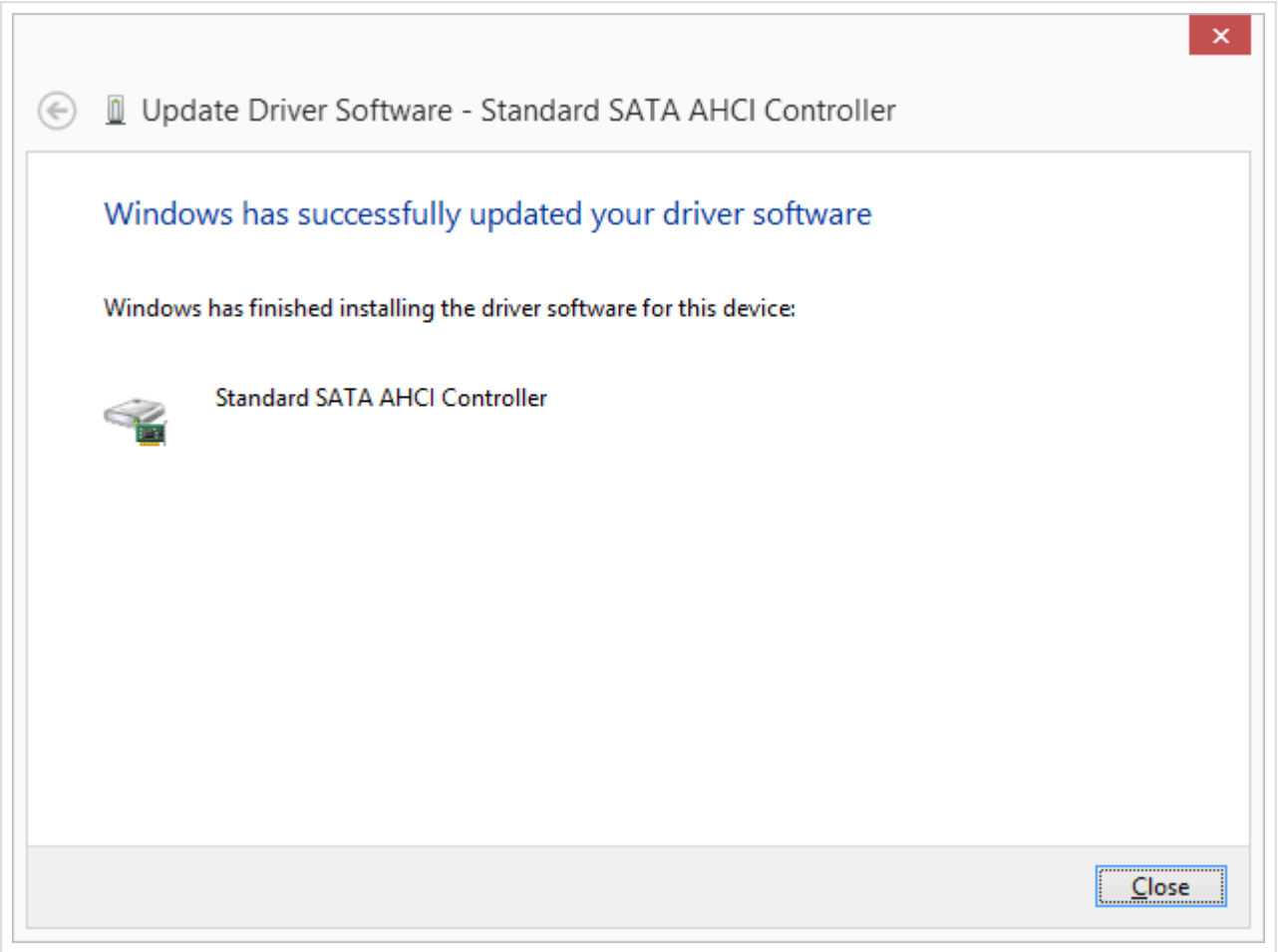
5. On the next page, please opt to select a driver manually.



6. Windows will show you a list of compatible drivers installed on your system. Here, please select the “**Standard AHCI SATA controller”** and click “Next”.



7. Windows will the replace the OEM driver with the standard driver provided by Microsoft. After the driver has been replaced successfully, you may be prompted to restart your computer. Upon next system start the controller will be running the Standard AHCI driver.


Update Driver Software - Standard SATA AHCI Controller
Windows has successfully updated your driver software
Windows has finished installing the driver software for this device:
Standard SATA AHCI Controller
Close

Free space needed for defragmentation

The following limitations are valid for O&O Defrag. These are caused by Windows and cannot be circumvented.

Size of Drive

All drive sizes supported by Windows are supported by O&O Defrag.

O&O Defrag was optimized for use on file systems having an especially large number of files. The storage capacity of a drive is therefore irrelevant.

Folders

Any number of folders can be defragmented. O&O Defrag has an optimized memory management which allows it to record all file and folder information.

Free hard disk space

Drives without any free disk space cannot be defragmented. For the best possible results, at least 5% of the whole hard disk capacity should be free. Files larger than the maximum free and connected storage space, may not be possible to defragment, and if so only with several runs.

To accelerate defragmentation, we recommend reserving at least 10-15% free hard disk space, however, this percentage decreases the higher the hard disk size is. What really matters is the size of the largest file that needs to be defragmented or moved around. For an optimal defragmentation, the file should have enough connected storage space available.

Recommendations and FAQ

Defragment your system regularly!

Only defragmentation on a regular basis can ensure that you always get the best out of your system! Along with automatic defragmentation in the background, O&O Defrag offers you the option of scheduling defragmentation jobs that can be run whenever you decide.

Recommended use defragmentation plan

Recommendation for:	Manual defragmentation	Automatic defragmentation	Screen Saver jobs	Scheduled jobs
Game computer operating for hours	+ +		+	
Private Desktop PC	+	+ +	+	
Workstation Desktop	+	+ +	+	+
Workstation	+	+	+ +	+
Notebook running on battery		+		
Video cut, Harddisk Recording	+ +		+	
Server with large files (> 4 GB)	+			+ +
Server with many files (> 1 Mio)	+			+ +

+	Very Applicable
+ +	Extremely applicable

For constantly running **gaming computers** we recommend manual defragmentation. Only the gamer himself can decide when he can afford to lose system performance as a result of defragmentation. Alternatively, we recommend configuring the O&O ActivityMonitor so that an automatic defragmentation will not start while a game is running.

For a **regular desktop PC**, where mainly Internet or office applications are used, or even some games are played, we recommend keeping the default setup of O&O Defrag. Automatic defragmentation makes sure that your system is always running at its optimal performance level – without any effort on your part.

For **office computers** requiring average performance, the rule for for private desktop PCs should apply: We recommend keeping the default setup of O&O Defrag as it is.

With *video editing or hard disk recording systems* the data throughput of the disk subsystem plays a decisive role. In particular with hard disk recording systems, some unwanted failures might occur which can render an entire recording session useless. We recommend manual defragmentation of drives before and after a session. Please do not use automatic defragmentation. It could start analyzing your drives while you are working!

For **Servers** used heavily during the week or in daytime, we recommend a nightly job which runs an Optimize/Quick as well as a complete Optimize on the weekend.

Don’t wait too long before you defragment!

As soon as you've installed your operating system, the file system will begin to fragment. Avoid reduced performance right from the beginning and install O&O Defrag as quickly as possible! Only then can you be sure that your hard disks will access your files quickly. You will also avoid unnecessary wear and tear on your hardware due to increased movement of the read/write head.

Avoid moving large numbers of files during defragmentation

O&O Defrag will calculate the best position for your files before and during the defragmentation. If you copy, move or delete files, these calculations will have to be carried out again. This will take time and lengthen the defragmentation time.

Automatic defragmentation with the threshold tool

Along with automatic defragmentation in the background, O&O Defrag offers you the option of scheduling defragmentation jobs that can be run whenever you decide. You can shorten the duration of a defragmentation by specifying a border value for its execution. This means that defragmentation will only take place when a particular degree of fragmentation is reached. You can thereby avoid unnecessary defragmentation runs. In the job dialogue under **Drives**, just enter a degree of fragmentation, e.g., 5%, upon which the job should be run.

O&O Defrag on notebooks

The Power Management enables you to prevent defragmentation if your notebook is running on battery power. The length of your battery's life will therefore not be affected and you won't have to stop the defragmentation manually. O&O Defrag recognizes the switch between main and battery power and will run the defragmentation according to your own configuration. You can read more about this in the section Settings.

Continue working undisturbed while defragmenting

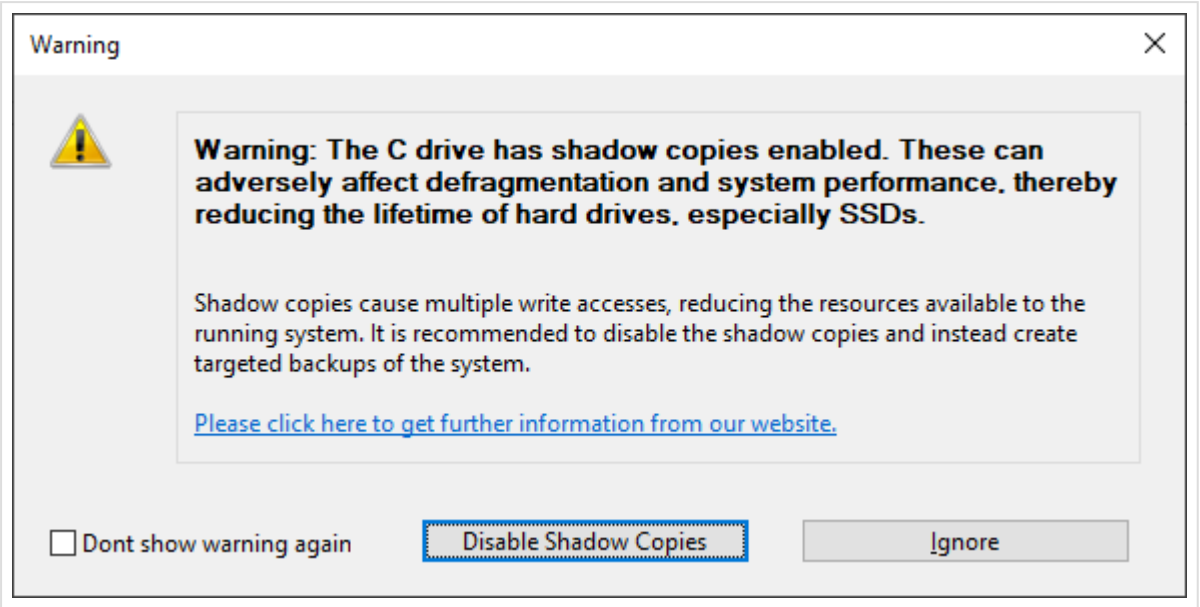
Particularly in the case of workstations or servers that are under pressure all the time, it is important that defragmentation take place in the background without negatively affecting the day-to-day running of the system. In such situations, we recommend you use O&O ActivityMonitor for keeping an eye on the resource usage and automatically adjusting the burden placed on your system by O&O Defrag.

Data security and integrity

O&O Defrag guarantees you complete data integrity and security. Only functions that are implemented in Windows by the operating system itself are used for defragmentation and synchronization of all file accesses.

File attributes (Date, Time, System, Archive etc.) and the security settings for NTFS drives will not be changed. Access rights also remain unchanged. In addition, only one file per drive will be processed at any one time. This ensures that even in a worst case scenario, only one file will be lost (e.g. if there is a power cut). If you have more questions concerning data security, we can provide you with more information. Do not hesitate to contact us at: support@oo-software.com

Conflicts with shadow copies during defragmentation



Shadow copies have been set by default starting from Windows 7. They are designed to protect against data loss by providing multiple versions of files and enabling the creation of restoration points. These features provide a continuous backup of the system. Along with all its obvious advantages, however, shadow copies do come with some drawbacks.

All changes to files are written multiple times and this ends up using additional resources. For HDDs this means write accesses are considerably slower and for SSDs, a shortened life expectancy as a result of multiple write accesses. This is why it's advisable to make targeted backups of the system. These can be made while the system's not being used to make sure there's no loss in performance when you want to use the system. You can also save the backup on an external disk. Doing so reduces the number of write accesses on your system disk and will help increase its life expectancy. Your backups will also be unaffected by any possible defects in the system or the internal hardware.

The negative effects of shadow copies have a strong impact on defragmentation because files are constantly being moved during the process. Windows classifies such movement as deletion and so it creates a completely new shadow copy for every repositioned file. In view of the many files being moved during defragmentation, large numbers of new shadow copies must occupy additional disk space. This results in the disk now having less free space than it did prior to defragmentation. Such activity can cause older shadow copies to be overwritten by new ones. This can unfortunately also result in the system restoration points being deleted! The impact of this is especially obvious when running a COMPLETE defragmentation method.

O&O Defrag gives you the option of disabling shadow copies before defragmentation.

If you want to enable shadow copies after defragmentation, use the key combination **Windows + R** to access **Run** where you can enter **sysdm.cpl** and confirm with **Enter**. Switch to the **System Protection** tab and click **Configure…**. A new window will then open where, in the upper section, you'll find the **Turn on system protection** option. Select this and confirm by clicking **OK** in the dialog. Shadow copies will now be enabled once again.

:::note

Existing system restoration points will be deleted by disabling system protection.

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O&O Defrag and firewalls

At the start of O&O Defrag, my firewall notifies me of an attempted access. I receive the error "10061". Why does this happen and and how can I solve the problem?

The communication of the individual O&O Defrag program components (O&O Defrag Agent and user interface) is based on TCP/IP. This communication only runs inside your computer - without any access to the Internet or the network. Most firewalls, however, are programmed to recognize internal IP communication, so you receive a warning message.

You don't have to turn off your firewall! Simply open up port 50300. Since O&O Defrag automatically checks access permissions, there can be no external access over this port even if you are connected to the internet.

In most cases, it is enough to authorize O&O Defrag for exclusively internal communication when the software is started for the first time.

If this did not happen, however, including the files OODAG.EXE and OODCNT.EXE on your firewall’s list of trusted programs has also proven successful with all of the firewalls we have tested.

Please consult your firewall’s documentation for precise configuration procedures.

:::note

If you have configured your firewall accordingly and are still receiving Error Message “10061”, please verify that the services "O&O Defrag" and "Event Viewing" are enabled. If this is not the case, please enable these services.

:::

Status notices and program output

Results logging of the defragmentation

O&O Defrag logs the start and stop times of defragmentation runs as well as any errors encountered. These are recorded according to the systems’ own settings for application logging.

How to start the event viewer when running Windows: Please go to the Control Panel of your computer and select **Administrative Tools**/**Event Viewer**.

Notifications of boot time defragmentation

The chart below contains a list of all notifications possible during boot time defragmentation and their corresponding explanations.

Output	Type	Explanation
Drive could not be opened	ERROR	The given drive could not be found by the system, or the file system is not supported.
File could not be opened	ERROR	The given file could not be found, is encrypted or has been exclusively locked by the system.
Not enough space to move	ERROR	Contiguous free space is required to move a file somewhere else on the disk, and this amount of space must be at least as large as the file. Defragmentation cannot take place because there is not enough free space available.
Could not be moved	ERROR	The defragmentation failed because of problems with the file system. The file is fragmented.
MFT could not be defragmented	ERROR	The defragmentation of the MFT failed because of problems with the file system. It is still fragmented.
Not enough space to move the MFT	ERROR	In order to defragment the MFT, contiguous free space at least as large as the MFT must be available. The defragmentation cannot take place because there is not enough free space available.
Could not write to partition	ERROR	During the MFT defragmentation a file system error occurred which blocked writing on the disk. The MFT has not been changed. The drive should be checked for errors.
Attribute error in the MFT. Please start chkdsk.	ERROR	Erroneous entries in the MFT were found during the defragmentation. The drive should be checked for errors.

Why do the write access counters of my SSD increase with SOLID/Quick and SOLID/Complete?

SSDs change the computer’s status internally whenever anything is written or deleted. As a result, the change from 0 to 1 indicates a write access and a change from 1 to 0 a delete operation. Actual wear of the SSD occurs when changing from 1 to 0, which means only as a result of deletion. In most cases, however, deletion is necessary if anything needs to be written in any particular cell.

The SOLID/Quick method resets memory cells that contain obsolete data. These would have needed to be reset anyway at the next write access. The number of write accesses remains the same in the long run. Since the SSD won’t have to delete anything at the next write access, writing can now be executed much faster.

SOLID/Complete repositions current data so that fewer blocks are used and new data can be written faster, and with less fragmentation. Although this requires more write accesses at first, there will be fewer accesses needed in the future.

Why is the ClusterView different on HDDs and SSDs?

The ClusterView should display the hardware as exactly as possible.

An HDD is subdivided into clusters that correspond mostly to the size of pages in Windows. These are arranged approximately as they appear in the classic ClusterView.

This basic view is, however, too imprecise for SSDs. SSDs are also subdivided into clusters but they manage these clusters in blocks. This changes the type of allocation as well as the consequences of fragmentation.

If an HDD becomes fragmented, the speed and wear of the HDD are relatively unaffected by the fragments being combined in one group or arranged consecutively in a row. Small gaps don’t pose any problem although the fact remains that data arranged consecutively can still be read faster as a result of the read/write head‘s movements being kept to a minimum.

With SSDs it’s entirely different. When fragments are combined, there may be more blocks occupied than are actually needed. That’s why it’s important to combine all fragments and have data written consecutively so that any gaps can be removed. Doing so can potentially reduce the number of occupied blocks and thereby extend the lifespan and performance of the SSD considerably.

The new ClusterView displays the blocks on an SSD along with any clusters they contain. In extreme cases, a clear reduction in the number of occupied blocks will be visible. It’s also possible to read if there are any poorly occupied blocks present. There may, for example, be one block with two occupied clusters and another with three occupied clusters. These two blocks could then be combined.

Support and more from O&O

O&O Software support helps with questions and problems concerning O&O Defrag 25.

Contact support

Open O&O Software support. Include:

- The version and edition of O&O Defrag (ribbon bar **Info → About O&O Defrag**).
- The Windows version of your computer.
- The type of the affected drive (hard disk or SSD) and how it is connected.
- The complete error message.

Never send passwords. O&O support does not need them.

Licensing and updates

O&O Defrag is commercial software. You can try it during the trial period; continued use requires a valid license. See Installation, licensing and uninstall. Information on the current version is available on the O&O Defrag product page.

More from O&O

Product	Purpose
O&O DiskImage	Backup and recovery of drives and complete systems
O&O SafeErase	Secure, permanent deletion of files and drives
O&O BlueCon	Repair and recovery of Windows systems that no longer start
O&O ShutUp10	Control of the Windows privacy settings

See all O&O products.