



Support/Maintenance Software

Mephisto

The DVS Data Optimizer

User Guide

Mephisto User Guide

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User Guide Version 1.0 for the Mephisto Software Version 1.0

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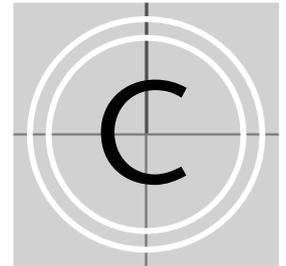
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Introduction

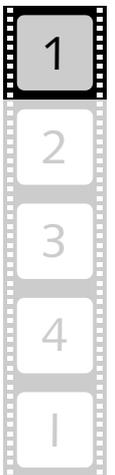


Mephisto is DVS's data optimization and defragmentation tool for SAN storages manufactured by DVS. It is a service and maintenance software designed to optimize the physical alignment of image sequences (video clips) on hard disk arrays so that they are more suited for real-time operations (play-out or record).

Even the fastest storage can be slowed down considerably if data accesses require many seeks. The worst case would be that real-time accesses to data may not be possible anymore. However, seeks can be minimized if the data on the storage is arranged in the same sequence as it would most likely be accessed during an operation. Data alignment includes the order of data within individual files (de-fragmentation) and the order of files of a file sequence (de-segmentation). Modern file systems like the StorNext File System (SNFS) provide pre-allocation algorithms which minimize fragmentation and segmentation during saving operations automatically. But they cannot avoid either if existing data is modified: Many programs create a new copy of a file and delete the old one when modifications are saved. This always leads to segmentation and very often to fragmentation.

The data optimization program Mephisto is able to scan and defragment data stored on SNFS storages. It has been especially developed to observe the requirements of video sequences (e.g. of DPX image files) and can be used on either individual directories or complete volumes. When a defragmentation is performed with Mephisto, its routines will defragment all fragmented files found at the selected storage location – even files of unknown formats will be defragmented. Furthermore, it will desegment the file sequences of the storage location and align them contiguously in larger blocks on the storage which will minimize access times during read procedures.

Via an integrated scheduler the program can start or stop automatically at defined times.



1.1 Overview

This user guide informs you about the general handling of Mephisto as well as about its complete controllable interface.

The chapters in this user guide contain the following information:

Chapter 1	Begins with a short introduction to the DVS software, followed by a note regarding the audience this manual is written for and an explanation of the conventions used in this manual. Furthermore, it lists the system requirements to run the program and some important notes that you should read.
Chapter 2	This chapter provides basic information about the DVS software. Here you can find details about how to install the program (in case it is not already available on your system). Furthermore, the most basic handling will be explained, i.e. how to start and exit the program.
Chapter 3	Explains how to operate and handle the DVS software, i.e. the steps required to perform defragmentations.
Chapter 4	Describes the user interface of the program. You may use this chapter as a reference to individual program items or features.
Index	This chapter facilitates the search for specific terms.

1.2 Target Group

To use this manual and the DVS software you should have experience in PC handling and be familiar with the handling of the computer device (e.g. metadata server) connected to a hard disk array.

1.3 Conventions Used in this User Guide

The following typographical conventions will be used in this documentation:

- Texts preceded by this symbol describe activities that you must perform in the order indicated.
- Texts preceded by this symbol are parts of a list.



Texts preceded by this symbol are general notes intended to facilitate work and help avoid errors.



You must pay particular attention to text that follows this symbol to avoid errors.

“ ” Texts enclosed by quotation marks are references to other manuals, guides, chapters, or sections.

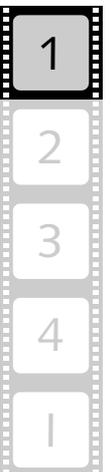
BUTTON	Text in small caps and bold indicates push buttons
<i>Menu</i>	Text in italic and bold indicates either a menu name or options in a menu list
<i>Menu » Option</i>	In the specified group or menu select the stated item
Item	Text in bold only stands for other labeled items of a user interface
<i>Directory/File</i> Entry	Directory structure or file Indicates parameters or variables, as well as selections or entries made in a program; it may also indicate a command (e.g. at a command line), a syntax or contents of a file/output
[Key]	An individual key or a key combination on a keyboard

Keyboard Shortcuts

To perform options or procedures with the keyboard often requires a simultaneous pressing of two keys.

Example:

[Ctrl + F1] If this is given, hold down the [Ctrl] key and press simultaneously the [F1] key.



1.4 System Requirements

Supported Hardware

The DVS software can be used on SNFS (StorNext file system) storages of, for example, a DVS-SAN or SpycerBox manufactured by DVS (SNFS 3.1.2).

Supported Operating System

The program can be executed on the following operating systems:



Be sure that you have installed the latest system updates and/or service packs for your system, otherwise you may encounter software and/or hardware problems.

- SUSE Linux Enterprise Server 10 (64 bit)
- SUSE Linux Enterprise Desktop 10 (64 bit)

Required Software

Mephisto does not require the installation of any other DVS software or driver.



To perform a defragmentation the DVS software needs valid license keys for the storages to be defragmented.

1.5 Important Notes

To use the DVS software correctly please observe the following:



The defragmentation degrees displayed by the DVS software do not indicate whether the respective clips are real-time capable or not. Most clips marked as segmented or fragmented will be real-time capable nevertheless.



The DVS software uses proprietary routines to defragment the data on the storage. The results will not be the same when using a third-party defragmentation tool, because it will not heed image file sequences. Therefore, do not use such for the defragmentation of a video storage.



To perform a defragmentation the DVS software needs valid license keys for the storages to be defragmented.



At all times leave about 15% of the overall video storage capacity empty of data for real-time performance reasons.



It is recommended to defragment storages at regular intervals, even with lesser amounts of data stored on them. Then, newly copied or captured material can be better positioned on the storage and later defragmentation runs have less to deal with.



Getting Started



This chapter provides you with some basic information necessary to get the DVS software running. First, it will be explained how to install the program (in case it is not already available on your system) and how to set a license key file. After this it is described how to start and end the program.



2.1 Installation

Usually it is not necessary to install the DVS software because on most SAN systems by DVS it will already be available. However, if this is not the case, it can be installed as described in this section.



To check whether the DVS software is already installed on your system just try to start it as detailed in section “Starting the Program” on page 2-4.

2.1.1 Installing the Program

The software's installation routine is a single Linux RPM package file. To install the DVS software perform the following:

- If applicable, open a command line (terminal) and log on to the system as root.
- Switch to the directory that contains the package file of the DVS software.
- Then install the DVS software by entering, for example:

```
rpm -ihv <path>/Mephisto-<version no.>_<OS architecture>.rpm
```

This installs all necessary files and libraries of the DVS software on the computer system. Afterwards the installation of the software is complete and as a next step you can start the program (see section “Starting the Program” on page 2-4). However, if not already the case, you may have to set the license keys for the storages to be defragmented first (see section “Setting the License Keys” on page 2-2).



Under Linux the DVS software can usually be found in the system menu under the entry **Utilities » Mephisto**.

After installation the software can be run with a normal user account.

An already installed version of the DVS software can be updated by entering the above command with the option `-Uhv` and deinstalled by entering `rpm -e Mephisto`.

2.1.2 Setting the License Keys

The DVS software requires a valid license key file for the connected storage(s) to perform defragmentation operations. Together with the installation file of the DVS software you will also have received a text file that contains the necessary license keys. With it perform the following:

- If applicable, close the DVS software.
- Copy the provided license key file without any modifications into the directory `/var/opt/DVS/Mephisto/`.

After this the license keys are successfully set and you can now start the DVS software (see section “Starting the Program” on page 2-4). In case you experienced warning messages because of unlicensed storages or features, they should be resolved.



2.2 Starting the Program

This section provides you with a description how to get the DVS software started. After its installation it can be run with a normal user account. To start the DVS software you have to do the following:

- Select from the system menu of the operating system the entry **Utilities » Mephisto**.
Alternatively, you can start the program from a command line (terminal) by entering `Mephisto`.

This will load the DVS software and its user interface will be displayed on the screen.



You can run several instances of the DVS software in parallel on the same system to perform optimization jobs on different storages simultaneously (section “Defragmenting Different Storages” on page 3-7).

2.3 Exiting the Program

To end the current session of the DVS software and exit it perform the following:

- Use either one of the following possibilities:

button EXIT	With the EXIT button at the bottom right of the user interface you can exit the DVS software. After its activation a message box will appear on the screen asking you whether the program should really be terminated. Once this is confirmed, the program will be closed.
[Alt + E]	Same as button EXIT .
[Alt + F4]	Same as button EXIT .
	Same as button EXIT .

After this the DVS software will be closed.

Using the Data Optimizer



This chapter describes shortly how to use the DVS software.

With the DVS software you can keep your connected storages in perfect shape thereby eliminating problems such as dropped frames. It optimizes the alignment of video and audio data on hard disk arrays so that they are more suited for real-time operations.

To use the DVS software you have to perform the following steps:

1. Scan a volume (drive) or individual directory to gather information about the available video and audio material. The detected data will be displayed in the clip list in the middle of the user interface.
2. From the clip list assemble the defragmentation job list.
3. Afterwards edit and refine the job list, for example, by altering the sequence of the jobs to be defragmented.
4. And finally, start the defragmentation – either a background, an immediate or a scheduled one – with the respective controls.

All these steps will be described in step-by-step descriptions in this chapter. It starts with an explanation about how to scan for clips, followed by a description how to add clips to the job list for a subsequent defragmentation. Afterwards it will be described how to refine the job list and defragment the clips on the storage.



For more information about the individual items of the user interface please refer to chapter “The User Interface” on page 4-1.

The chapter will be concluded with a description of how to optimize different storages or volumes simultaneously.



3.1 Scanning a Storage

After starting the program a volume or individual directory has to be scanned in order to gather information about the available video and audio material. With this you will include the latest data available at the selected location and ascertain the state of individual clips.

To perform a scan the items in the upper part of the DVS software's user interface are available:

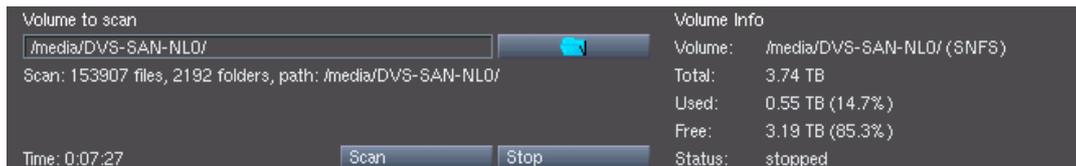


Figure 3-1: Items for a scanning

- Type in in the entry field at the top left the location (path) of either a volume (drive) for a complete scan or an individual directory to scan a single folder only.



Alternatively, you may also select a volume or directory with the button to the right of the entry field (). It will open a standard dialog window to select a volume/directory.

- Next use the button **SCAN** to start the scanning process.

Once a scanning operation is initiated, the contents of the selected location will be examined and analyzed, and the found video and audio material will be displayed in the clip list of the DVS software. There you can discern the respective state (fragmentation) of the clips immediately. Additionally, during the scan the properties of the selected volume will be displayed at the top right of the DVS software's user interface. A scan in progress can be aborted at any time manually with the button **STOP** right beside the button to start a scanning.

After this you have to use the clip list to select a volume or individual directories for a defragmentation.



To initiate a defragmentation process you do not have to finish a scan. It is sufficient when the respective storage location is detailed in the clip list so that it can be set in the job list. Then, an optimization can be started at any time.

3.2 Using the Clip List

The video and audio material found during the scanning process will be displayed in the clip list of the DVS software. After a scan it provides detailed information about the state (fragmentation) of the detected clips:

Path	Clip	Files	from	to	Size	Defrag	Segments	min	n
media									
DVS-SAN-NLO	BigBuckBunny.mov	1	0	0	501.23	100%	1	501....	5
	new_013_00000...	1	0	0	1.08	100%	1	1.08	
	A002_C026_041...	1	0	0	410.09	100%	1	410....	4
	Copy of BigBuck...	1	0	0	501.23	100%	1	501....	5
	DVS_ImageFilm_...	1	0	0	2337.46	100%	3	289....	1
.Trash-dvssan	Dinosaur%03d.bmp	741	100	840	879.94	100%	1	879....	8
A014_0508...									
BACKUP_V	QT_sample.mov	1	0	0	5428.36	100%	6	308....	1
Big Bug Bun...	BB_WMV.wmv	1	0	0	60.58	100%	1	60.58	6
C	Playdoh000_%04...	10	0	9	79.18	100%	1	79.18	7
claudia_com...									
Daten_SMO...									
DEFRAG	Dinosaur%02d.bmp	100	0	99	118.75	100%	1	118....	1
F									
ft1	frame%06d.tst	37332	0	37331	55998....	10%	124	1.50	5
ft2	frame%06d.tst	31902	0	31901	46884....	25%	86	1.50	1
ft3	frame%06d.tst	6731	0	6730	9853.34	90%	1490	0.36	1
ft4	frame%06d.tst	6667	0	6666	10000....	90%	2064	0.50	1
G									

Figure 3-2: Clip list

The various columns of the clip list can be used to assess the defragmentation degrees of the clips. They are summarized in the column **Defrag** with the help of colors and percentage values:

Color	Percent	Explanation
blue	100%	The clip is optimally aligned on the storage and none of its files are fragmented.
–	1% - 99%	The clip exists in segments but none of its files are fragmented.
red	0%	At least one file of the clip is stored in fragments on the storage. Depending on resolution and file size it may cause problems during play-out operations.





Segmentation: A clip is segmented when its image files are not aligned contiguously in larger blocks on the hard disk array but scattered over the storage. Further information about this can be found under **Segments** in section “The Clip List” on page 4-8.

Fragmentation: Either a file is fragmented or a video clip contains fragmented files. In contrast to segmentation here it is the data of a single file that is scattered over the storage.

The defragmentation degrees displayed by the DVS software do not indicate whether the respective clips are real-time capable or not. Most clips marked as segmented or fragmented will be real-time capable nevertheless.

By selecting a whole volume or individual directories (clips) from the clip list you have to assemble the job list which will afterwards be used for a defragmentation:

- Double-click an entry in the clip list to add it to the job list for a defragmentation.



Alternatively, you may also select an entry and use the button **ADD** from the defragmentation controls or the menu option **Add to job list** of the clip list's context menu.

This will add the volume/directory to the job list of the DVS software. When selecting for a defragmentation process an entry from the clip list which is already set in the job list, it will be moved to the bottom of the list. An entry from the clip list that is already included in another job will not be added to the job list again. After this you may continue with the next step and refine the job list and/or start a defragmentation.

3.3 Defragmenting Clips

Once a volume or directories are specified in the job list of the DVS software, you can refine the job list by altering the sequence of the defragmentation and/or start a defragmentation, either a background, an immediate or a scheduled one. To perform these steps you have to use the items in the lower part of the DVS software's user interface:

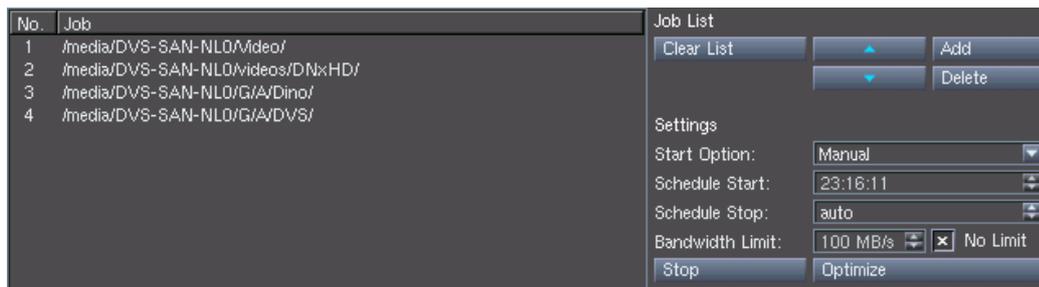


Figure 3-3: Job list with defragmentation controls

The job list will be processed in the order as listed, i.e. from top to bottom. In case you want to refine a defragmentation job list perform the following:

- Select a job from the job list to the left, for example, with a click of the mouse.
- Then use the arrow buttons ( / ) to change its position in the sequence of the appointed jobs.



With the button **DELETE** you can delete a selected job from the job list.

Once the job list is set as desired, you can start a defragmentation:

- Use the settings item **Start Option** and, if applicable, **Schedule Start** and **Schedule Stop** to determine the way the defragmentation should be performed, i.e. assign either a background, a manual (immediate) or a scheduled operation.
- For a defragmentation with the maximum possible speed activate the **No Limit** check box. With concurrent real-time operations on the storage deactivate the check box and select the bandwidth that can be dedicated for the defragmentation process with the **Bandwidth Limit** setting.
- When your settings are complete start the defragmentation process with the button **OPTIMIZE**.

This will start the defragmentation operation. When a scheduled operation has been selected, a countdown will appear below the entry field to select a scanning location:



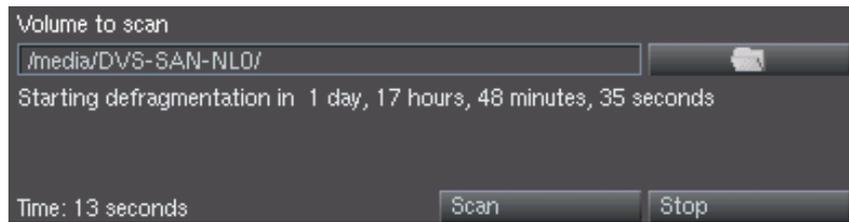


Figure 3-4: Countdown to defragmentation



For a scheduled operation to take place the DVS software must remain running on your system.

Once the time has elapsed or when a background or manual defragmentation has been selected, the DVS software will start the defragmentation of the storage locations entered in the job list according to your settings. Depending on the number of clips to be defragmented this process may take a while.

The defragmentation operation will be finished as soon as all data included by the entries in the job list are processed or when the scheduled stop time is reached. You can abort an optimization process at any time manually with the button **STOP** to the left of the button to initialize a defragmentation.

3.4 Defragmenting Different Storages

With the DVS software you can optimize different storages or volumes simultaneously. For this you have to start other instances of the DVS software:

- To defragment different storages/volumes start the DVS software at least a second time (see section “Starting the Program” on page 2-4).
- Prepare each instance of the DVS software for a defragmentation by selecting the different storages/volumes and scanning them (see section “Scanning a Storage” on page 3-2).



To initiate a defragmentation process you do not have to finish a scan. It is sufficient when the respective storage location is detailed in the clip list so that it can be set in the job list. Then, an optimization can be started at any time.

- With the storage locations detailed in the clip lists of the software instances select and transfer them to their job lists (see section “Using the Clip List” on page 3-3).
- Then set up in each instance of the DVS software the optimization process and start it (see section “Defragmenting Clips” on page 3-5).

This will start the optimization processes of the storages/volumes according to your settings.



This procedure can only be performed on different storages/volumes. When trying it on different directories of the same storage you will receive an error message:

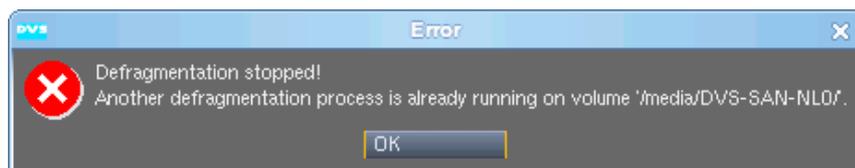


Figure 3-5: Error message because of simultaneous processes



The User Interface



This chapter describes all items and possibilities of the user interface of Mephisto. You may use it as a reference in case questions arise about the handling of individual items or their function.

First, a short overview of the user interface of the DVS software will be given, followed by a description of the items available to scan a volume/directory. By performing a scan you will create a list of clips which will be displayed in the middle of the user interface. This clip list is explained with all its features next in this chapter. After this the items of the job list, its administrative items as well as the defragmentation controls are detailed, followed by an explanation of the status bar of the software. Last but not least, the chapter will be concluded with a description of other features provided by the DVS software, such as the keyboard shortcuts.



4.1 Overview of the User Interface

After starting the DVS software (see section “Starting the Program” on page 2-4) the user interface will be displayed on the screen:

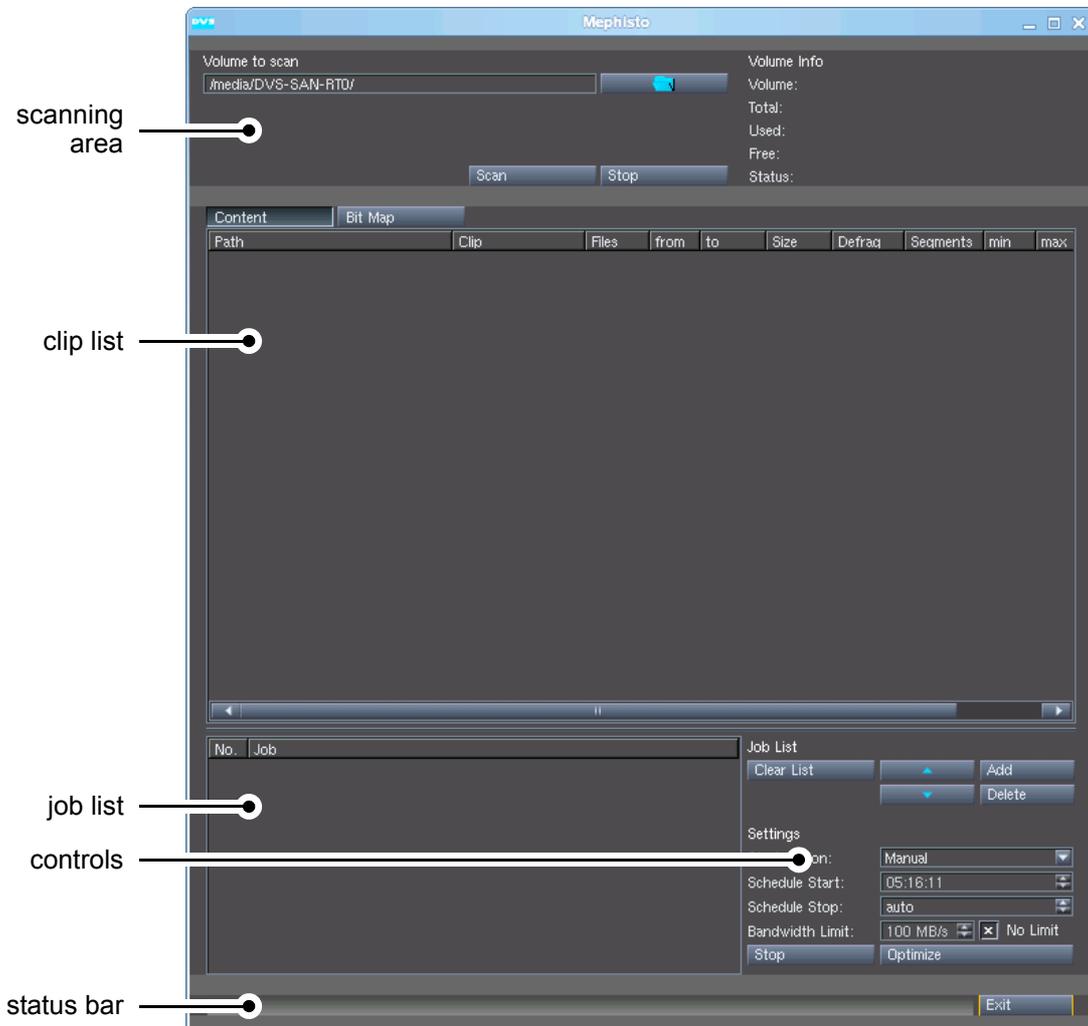


Figure 4-1: User interface of the DVS software

In detail the user interface provides the following items:

- scanning area At its top you can find the scanning area. This area comprises items to start and stop a scanning process of the selected volume/directory as well as various information about the currently selected storage. Additionally, during runs of the DVS software you can find here further status information.

The items of the scanning area will be described in detail in section “The Scanning Area” on page 4-4.

clip list	<p>In the middle of the user interface you can find the clip list. After a scan it will list all clips found at the selected location with detailed information about their respective fragmentation state in a table. In addition, here you can also view a visual representation of the selected volume/directory.</p> <p>The clip list and its features as well as the bit map view are explained in section “The Clip List and Its Visual Representation” on page 4-7.</p>
job list	<p>The job list details the volume or directories that you have chosen for a defragmentation.</p> <p>It will be described with its administrative controls in section “The Job List and the Controls” on page 4-14.</p>
controls	<p>The controls comprise on the one hand the controls of the job list which can be used to administer the list, and on the other the controls of the defragmentation operation. With the latter you can initiate either a background, a manual (immediate) or a scheduled defragmentation.</p> <p>A description of both can be found in section “The Job List and the Controls” on page 4-14.</p>
status bar	<p>The status bar provides a progress bar that indicates the progress of a scanning as well as of a defragmentation process of individual clips. Furthermore, to its right you can find a button that you may use to exit the DVS software.</p> <p>These items are explained in section “The Status Bar” on page 4-18.</p>

Additionally, the DVS software offers several other useful features such as keyboard shortcuts which are detailed in section “Further Features” on page 4-19.



4.2 The Scanning Area

At the top of its user interface the DVS software provides the scanning area. This area contains items to start and stop a scanning process of the selected volume/directory. Additionally, it details various information about the currently selected storage as well as further status information during operations:

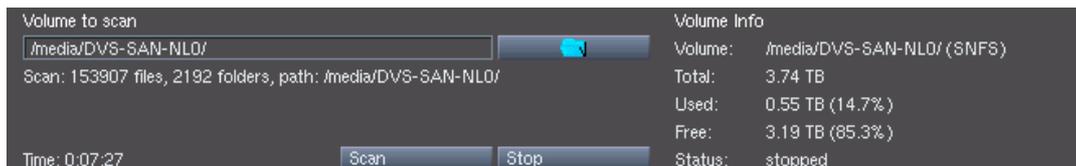


Figure 4-2: Scanning area

All items will be explained in the following:



Hidden entries can be made visible again by simply scanning the volume/directory once more. This way you can also update entries in the clip list.

To initiate a defragmentation process you do not have to finish a scan. It is sufficient when the respective storage location is detailed in the clip list so that it can be set in the job list. Then, an optimization can be started at any time.

The Items to Scan for Clips

The scanning area provides the following items to scan for clips:

entry field

In the entry field enter the location (path) of either a volume (drive) for a complete scan or an individual directory to scan a single folder only.

Notation: `/volume/directory/`



Instead of the slash (/) you may also use a backslash (\).

Example: `/media/DVS-SAN/Video/`



To select a volume/directory directly via a dialog window you may also click on the button to the right of the entry field. Once your selection is confirmed, it will be entered in the entry field to the left.



With the button **SCAN** you can initiate a scanning procedure which will scan the selected volume/directory for video and audio material. The found clips will be listed in the clip list below the scanning area. Depending on the amount of data available at the selected location the scan may take a while.



This button allows you to terminate a scanning operation in progress at any time manually.

Status Information During Operations

Below the entry field to select a scanning location further status information during operations of the DVS software will appear, for example, details about a scanning or defragmentation process.

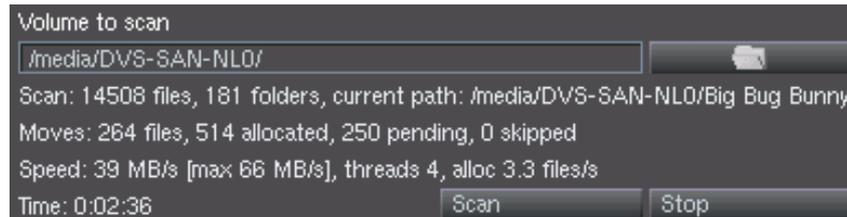


Figure 4-3: Status information

In case you have selected a scheduled operation for the DVS software (see section “The Job List and the Controls” on page 4-14), a countdown will be displayed until the time to the scheduled operation has elapsed and the operation is started.



The data rate (speed) detailed here during a defragmentation operation indicates the speed of the copying (reading and writing). For the total bandwidth that the DVS software currently occupies this value must be doubled.

The Volume Information Area

The volume information area to the right of the scanning items details data about the volume selected via the entry field of the scanning area. They will be displayed as soon as a location is scanned:

Volume	This field indicates some properties of the selected drive/volume, i.e. its name/label as well as file system.
Total	This entry details the amount of total disk space available on the selected drive/volume.
Used	This field shows you the amount of disk space that is currently in use on the drive/volume selected by the entry field to the left (in bytes as well as percent).
Free	Shows the amount of free disk space on the selected drive/volume (in bytes as well as percent).



Status

The field **Status** provides you with status messages about the operation of the DVS software. They will be displayed as soon as an operation, such as a scan or defragmentation, is performed. The status messages are the same as displayed in the status bar (see section “The Status Bar” on page 4-18). Further status information during an operation of the DVS software can be seen below the items to select a storage location (see section “Status Information During Operations” on page 4-5).

4.3 The Clip List and Its Visual Representation

After a scan has been initiated, the clip list will be filled with clips that could be found at the selected location.

Path	Clip	Files	from	to	Size	Defrag	Segments	min	n
media									
DVS-SAN-NLO	BigBuckBunny.mov	1	0	0	501.23	100%	1	501...	5
	new_013_00000...	1	0	0	1.08	100%	1	1.08	
	A002_CD26_041...	1	0	0	410.09	100%	1	410...	4
	Copy of BigBuck...	1	0	0	501.23	100%	1	501...	5
	DVS_ImageFilm_...	1	0	0	2337.46	100%	3	289...	1
.Trash-dvssan	Dinosaur%03d.bmp	741	100	840	879.94	100%	1	879...	8
A014_0508...									
BACKUP_V	QT_sample.mov	1	0	0	5428.36	100%	6	308...	1
Big Bug Bun...	BB_WMV.wmv	1	0	0	60.58	100%	1	60.58	6
C	Playdoh000_%04...	10	0	9	79.18	100%	1	79.18	7
claudia_com...									
Daten_SMO...									
DEFRAG	Dinosaur%02d.bmp	100	0	99	118.75	100%	1	118...	1
F									
ft1	frame%06d.tst	37332	0	37331	55998....	10%	124	1.50	5
ft2	frame%06d.tst	31902	0	31901	46884....	25%	86	1.50	1
ft3	frame%06d.tst	6731	0	6730	9853.34	90%	1490	0.36	1
ft4	frame%06d.tst	6667	0	6666	10000....	90%	2064	0.50	1
G									

Figure 4-4: Clip list

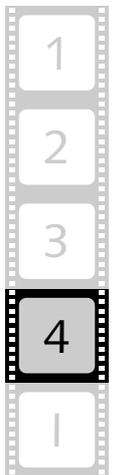
The clip list can be used on the one hand to assess the state of individual clips on the storage, and on the other to select a volume or directories for a later defragmentation. The selected volume/directories are then added to the defragmentation job list (see section “The Job List and the Controls” on page 4-14). For the assessment you may also use a visual representation of the scanned location.

This section explains all items and features provided by the clip list and its visual representation.



It is possible to scan individual directories only or hide entries from the clip list (see section “The Context Menu of the Clip List” on page 4-9).

Hidden entries can be made visible again by simply scanning the volume/directory once more. This way you can also update entries in the clip list.



4.3.1 The Clip List

Via the clip list you can determine the state of individual clips on the storage and assess their defragmentation degree. For this the clip list provides various columns:

Path	This column shows the path to the directories and clips in a tree view. Use the minus or plus sign in front of each volume or directory to collapse or expand the branch that is available below this entry.
Clip	Displays the file name of the clip (if applicable, in C notation).
Files	Indicates the number of files that this clip contains (usually $\langle to \rangle - \langle from \rangle + 1$).
from	This column shows the number of the first frame of the clip, usually given in its file name (its start index).
to	Shows the number of the last frame of the clip that is sequentially available, usually given in its file name (its stop index). Sequentially available means that gaps present in an image sequence are detected by the DVS software: Entries will be created for image sequences that are contiguously available. If frames are missing in a sequence, the respective clip will be displayed with more than one entry in the clip list.
Defrag	Indicates the defragmentation degree of the respective clip with the help of colors and percentage values. For an explanation of them see section "Using the Clip List" on page 3-3.
	 The defragmentation degrees displayed by the DVS software do not indicate whether the respective clips are real-time capable or not. Most clips marked as segmented or fragmented will be real-time capable nevertheless.
Segments	If a clip consists of more than one segment, its data is not aligned contiguously on the storage but split and stored at different locations. This value indicates the amount of data blocks (segments) found for the respective clip. Small clips (< 1 GB) should be stored in one segment only. Large clips (> 1 GB) can be arranged in several segments on the storage: During defragmentation the DVS software tries to align the clips by default in blocks of up to one gigabyte (1024 MB) on the storage. Even larger blocks created during capturing or copying are possible and will not be changed by the software.
min	This value shows the size of the smallest segment of the clip in megabytes (MB).

- max** Shows the size of the largest segment of the clip in megabytes (MB).
- average** The arithmetic mean of the sizes in all segments in megabytes (MB).

By selecting complete a volume or individual directories (clips) from the clip list you can assemble the job list which will afterwards be used for a defragmentation. For this use one of the following procedures which will add the selected entry to the job list:

 One or more entries from the clip list can be selected or deselected easily by applying the common procedures (e.g. hold down the [Shift] or [Ctrl] key while clicking with the mouse, see section “Keyboard Shortcuts” on page 4-19).

- Double-click an entry in the clip list.
- Select an entry and press the button **ADD** from the defragmentation controls.
- Select the menu option **Add to job list** on the context menu of a clip selected in the clip list.

This will add the selected volume/directory to the job list for a later defragmentation (see section “The Job List and the Controls” on page 4-14).

4.3.2 The Context Menu of the Clip List

The clip list provides further features via a context menu. To invoke it you usually have to perform a right-click with the mouse on an entry in the list:

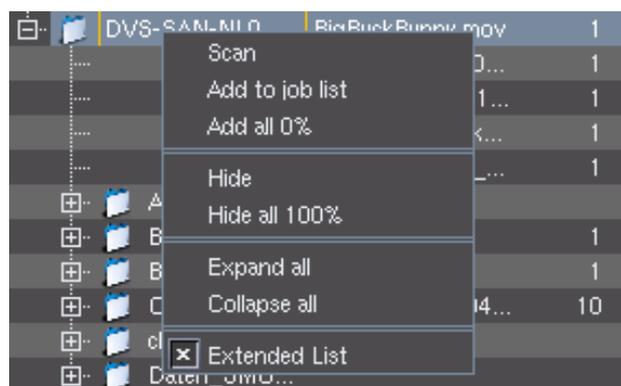


Figure 4-5: Context menu of clip list

You may use the context menu to perform the following:

 Hidden entries can be made visible again by simply scanning the volume/directory once more. This way you can also update entries in the clip list.



- Scan** Scans the selected volume/directory only and builds up its branch again in the clip list. If entries were hidden from the list, they will be displayed once more.
- Add to job list** Adds the selected volume/directory to the job list.
- Add all 0%** Adds all fragmented clips to the job list in one step.
- Hide** Hides the selected entry from the clip list.
- Hide all 100%** Hides all entries from the clip list that are optimally defragmented, i.e. the ones that show a defragmentation value of 100%. After this only the segmented and fragmented clips will be displayed in the list.
- Expand all** Expands the whole tree and all branches in one step.
- Collapse all** Collapses the whole tree and all branches in one step.
- Extended List** By default the clip list is in its extended view and shows all columns as described in section “The Clip List” on page 4-8. With this menu option you can activate or deactivate the extended list view. If it is activated, the menu option will show a tick in front. In its deactivated state the clip list displays the most important columns only (among others **Path**, **Clip** and **Defrag**).

4.3.3 The Visual Representation of the Scanned Path

The area of the clip list also provides a visual representation of the scanned path after a scanning procedure has been performed. It can be accessed with the tab **Bit Map** at the top of this area:

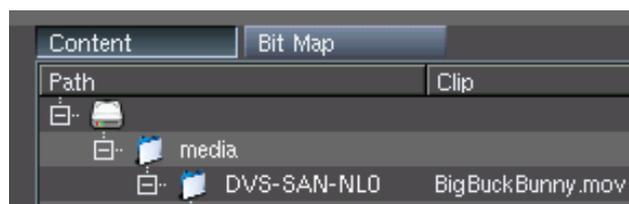


Figure 4-6: Tabs above the clip list

Once this tab is selected, something like the following will be displayed:



The bit map view can be activated prior to or during an operation of the DVS software (e.g. a scan). It will be updated at certain intervals thereby showing you the progress of the operation.

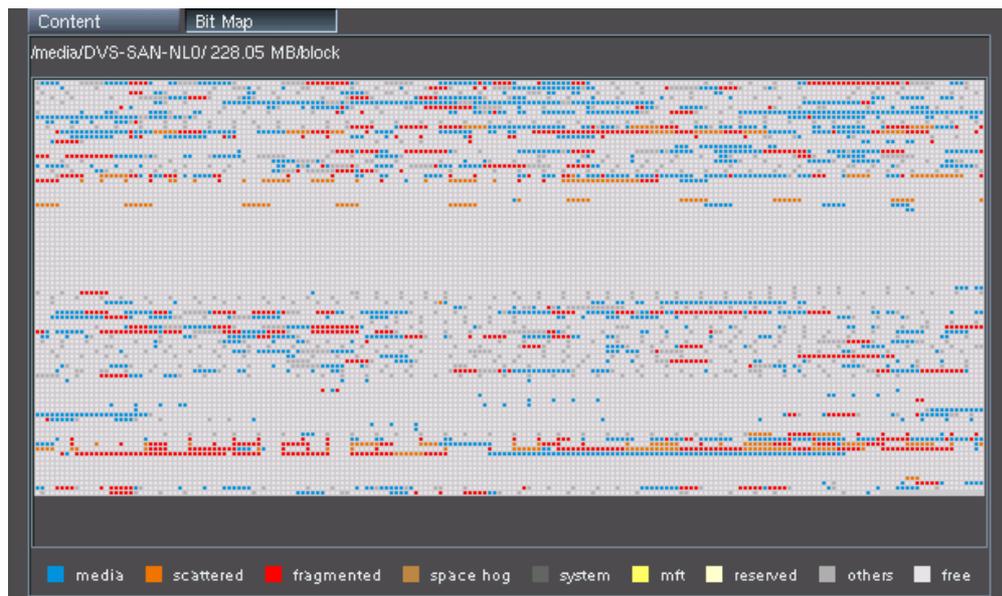


Figure 4-7: The visual representation

With the tab **Bit Map** activated the clip list area shows you a representation of the scanned path. The amount of data that is shown by each square (block) in the visual representation can be seen to the right of the path indication of the scanned volume/directory (below the tabs). The visual representation has to be interpreted line-wise from left to right.

At the bottom of this area a color legend is provided that can be used to distinguish the different meanings of the colored squares:

media	The clips shown in this color are currently in a perfect state (defragmentation value 100%). Only data recognized by the DVS software as media files will be displayed in this color.
scattered	The clips displayed in this color are segmented (scattered) but none of their files are fragmented (defragmentation value between 1% and 99%). Only data recognized by the DVS software as media files will be displayed in this color.
fragmented	The files displayed in this color are fragmented and may cause problems during real-time operations. All fragmented files, i.e. the files of all formats, will be displayed in this color.
space hog	If data is detected that obstruct the formation of a data block (segment) for a clip, it is marked with this color. During defragmentation the DVS software will try to move it to free the space for the data block.
system	Reserved for future use.



mft	Reserved for future use.
reserved	Reserved for future use.
others	All other files as long as they are not fragmented, such as project files of a DVS system software or executables are shown in this color.
free	Free space is displayed in this color.

You can switch back at any time to the view of the clip list by activating the tab **Content**.

4.3.4 The Context Menu of the Visual Representation

The visual representation provides additional features and settings via a context menu. To invoke it you usually have to perform a right-click with the mouse on the visual representation:

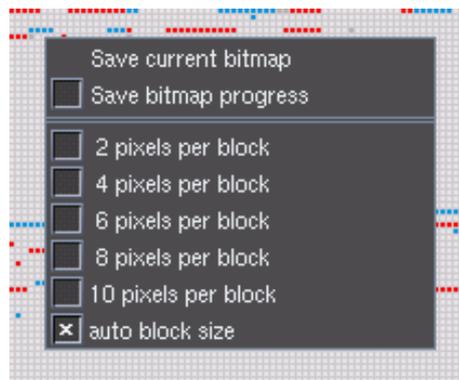


Figure 4-8: Context menu of visual representation

You may use the context menu for the following:

Save current bitmap	Saves the visual representation that is currently displayed to a file (<i>*.bmp</i>). This option opens a standard dialog window to save a file where you have to specify a storage location and file name for the image to be saved.
----------------------------	---

Save bitmap progress

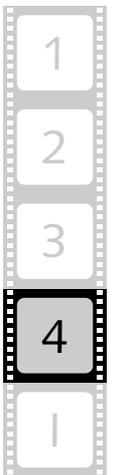
During an operation of the DVS software (e.g. a scan) the visual representation will be updated at certain intervals thereby showing you the progress of the operation. The updated representations can be saved to files (**.bmp*) with this option automatically. It opens a standard dialog window to save a file where you have to specify a storage location and file name for the images to be saved. Once activated, the menu option will show a tick in front, and it can be deactivated by selecting the option again.

... pixels per block

These menu options allow you to change the view/zoom on the visual representation.

auto block size

The software automatically selects the best possible view/zoom on the visual representation that can be displayed at the current window size.



4.4 The Job List and the Controls

Below the clip list you can find the job list and controls areas. Together they provide the job list with its administrative controls as well as the controls for a defragmentation:

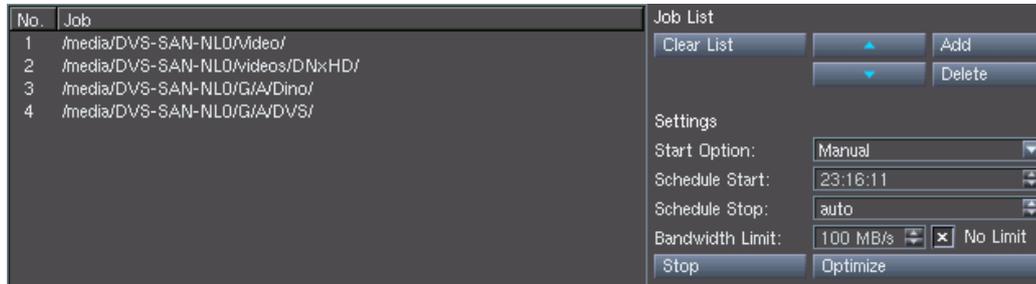


Figure 4-9: The job list and controls areas

With them you indicate the volume/directories that have to be defragmented as well as control the defragmentation process. The features and items provided in these areas are described in this section.

The Job List and Its Controls

The job list details the volume and/or directories that you have selected for a defragmentation via the clip list (see section “The Clip List and Its Visual Representation” on page 4-7). They will be defragmented in the order indicated in the list, i.e. from top to bottom. When selecting for a defragmentation process an entry from the clip list which is already set in the job list, it will be moved to the bottom of the list. An entry from the clip list that is already included in another job will not be added to the job list again.

To the right of the job list you can find some controls that allow you to administrate the job list. In detail they provide the following functions:



One or more entries from the job list can be selected or deselected easily by applying the common procedures (e.g. hold down the [Shift] or [Ctrl] key while clicking with the mouse, see section “Keyboard Shortcuts” on page 4-19).

Clear List

Deletes all entries available in the job list in one step.



These buttons enable you to change the sequence of jobs in the list. Just select an entry in the job list and move it one position up or down in the list by pressing the respective button.

Add

Adds the entry/entries currently selected in the clip list to the job list.

Delete

Deletes the entry/entries currently selected in the job list from the list.

The Defragmentation Controls

As soon as the job list is in the desired sequence, you can start either a background, manual or scheduled defragmentation at any time. To configure this use the defragmentation controls as follows:



For a scheduled operation to take place the DVS software must remain running on your system.

Start Option

With this item select the operation mode of the defragmentation, i.e. either a background, a manual or a scheduled one. The following settings are available:

Manual	Selects the manual operation mode where a defragmentation is performed immediately.
Single Event	Sets the DVS software to a scheduled operation mode where a defragmentation is performed once at a specified time and date. The date and time has to be set with the field Schedule Start .
Daily	Determines a scheduled operation where the DVS software will operate at a specified time every day. The time when to start the operation has to be set with the field Schedule Start .
Weekly	Selects a scheduled operation where the DVS software will operate at a specified time and day every week. The date and time when to start the first operation has to be set with the field Schedule Start . Afterwards it will operate at the same time and day every week.



Background Mode In background mode the optimization process will be performed immediately and automatically start again about 10 minutes after finishing a run. With this the DVS software will continuously defragment the selected location(s).

Schedule Start This field will be available as soon as a scheduled operation mode is selected via the setting **Start Option**. With it you have to detail the date and time (system time) when to start the scheduled operation. The format for `Daily` is `hh:mm:ss` and for all others it is `hh:mm:ss MMM DD YYYY`.

Schedule Stop The defragmentation of large storages can take a long time (hours or even days). With this setting you can determine the amount of time (in hours) that the DVS software should operate, and thus specify when the operation should be stopped automatically. With the setting `auto` the optimization will be stopped when it is complete.

Bandwidth Limit This setting allows you to specify a data rate limit for the optimization process. With it you can dedicate a certain amount of the bandwidth totally available for the DVS software. A defragmentation process will not interfere with the overall real-time capability of your connected storage if your concurrent real-time accesses to the storage never occupy the bandwidth that is totally available, and this setting is set to a value that is smaller than the remaining bandwidth (smaller than the full bandwidth of the storage minus the concurrent real-time accesses).

No Limit This check box deactivates the **Bandwidth Limit** setting and enables a full speed optimization. The defragmentation will only be limited by physical constrains such as the CPU power and the speed of the data connection to the storage. An activated **No Limit** setting should be used carefully because it may disrupt real-time operations.



With this button you can terminate a defragmentation operation manually at any time.

A rectangular button with a dark grey gradient background and the word "Optimize" in white text.

This button starts a defragmentation operation. When a scheduled operation is selected, a count-down will appear below the entry field to select a scanning location (see section "The Scanning Area" on page 4-4). Once the time has elapsed or when the background or manual operation mode is selected, the DVS software will start the defragmentation of the storage location(s) entered in the job list according to your settings. Depending on the number of clips to be defragmented this process may take a while.



4.5 The Status Bar

The status bar provides a progress bar that indicates the progress of a scanning or defragmentation process of individual clips.



Figure 4-10: Progress bar

All states of the DVS software such as scanning, analyzing, moving, etc. will be indicated by the progress bar. However, the different states will be detailed for each clip individually, meaning it will not be detailed, for example, how long it will take to defragment several selected clips. The states indicated by the progress bar will also be shown in the field **Status** of the scanning area (see section “The Scanning Area” on page 4-4).

Furthermore, to the right of the progress bar you can find the button **EXIT** that you may use to close the DVS software (see also section “Exiting the Program” on page 2-4).



4.6 Further Features

In addition to the items of the visible user interface the DVS software provides several other useful features such as keyboard shortcuts or log files. They will be described in this section.

4.6.1 Keyboard Shortcuts

For a more easy work with the DVS software there are various keyboard shortcuts available which are listed in the table below:

Shortcut	Action
[Alt + A]	Stop a scan in progress
[Alt+ S]	Start a scan of the selected location(s)
[Alt + D]	Start a defragmentation
[Ctrl + A]	Select all entries in clip or job list (the one that has the focus)
[F1]	Display details about system and software, such as the version number of the software, system information and the storage location of the configuration, license key and log files
[Alt + E]	Exit and close the program
[Alt + F4]	Exit and close the program

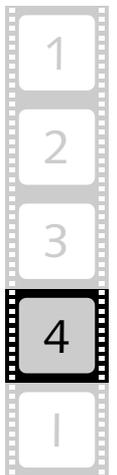
Additionally, the following combinations of keyboard and mouse actions may be helpful:

Key/Mouse Action	Action
Hold [Ctrl] while selecting with the mouse	Select several entries in a list disjointedly
Hold [Shift] while selecting with the mouse	Select a range of adjoining entries in a list

4.6.2 Log Files

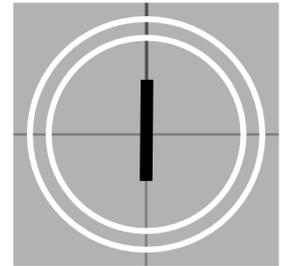
To aid a debugging the DVS software stores log files that detail the actions that you have performed with the program. You may get asked by the DVS service department to send in these files in case you experience operation problems with the DVS software.

The log files are stored in the directory `/home/<user>/.DVS/Mephisto/log/`. There are two types of log files available: One for de-



bug purposes and one detailing the most important actions performed by the DVS software only (results). The log files are written as soon as the DVS software is started. When exiting the DVS software, the log files are finished and saved. Of each type only the last ten log files will be kept.

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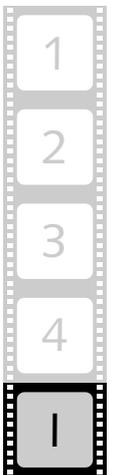
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