SEPsesam User Manual

Ewald Einwanger SEP AG 83629 Weyarn

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Hint
This user manual describes all **SEPsesam** functions.
There may be restrictions on some functions due to the actual licence structure used .
In order to release the restictions please contact your distributor or SEP AG info@sep.de.

Contents

Chapter 1

Overview

SEPsesam is an automatic data dackup system for heterogeneous network environments. All standard tapes, disk devices and loader devices (robots) can be used as backup devices.

Furthermore it is possible to backup on hard disks, diskettes and other similar directory-oriented storage media.

In order to easily and effectively form the configuration of the system, a design, based on the following six basic components was chosen.

Drive	Local or remote storage device
Loader	Robot loading the media from/to the drive
Client	Computer from which the data is backed up
media	Carrier of the saved Data
Task	Description of a Backup or Restore
Appointment	Start time of different activities

Other features:

- applicable on Windows, Linux, UNIX, VMS platforms

- software can be installed easily and quickly

- graphical user interface is programmed in JAVA

- all types of loader robots can be used

- full access from the clients (Client/Server)

- full, differential, incremental and copy backup

- time control through user configureable appointments

- media administration and development of flexible media strategies via schedule control

- user configureable interfaces (Alarm, Pre/Post, Disaster etc.)

- fast data restore via effective administration of the backup savesets and implementation of well-designed search algorithms

- full and selective restore to the original paths or in newly-created directories with or without preserving the original path structure

- appointment control can be used for any external applications

- on-line interfaces for database backup SAP R/3, ORACLE and INFORMIX are available.

- optimized tape usage by use of parallel backup of several clients; Sesam Multiplex Streaming

- optional selection of fast datapaths through the network.

Chapter 2

The Basic components of SEPsesam

2.1 Drives

Drives are defined as devices, which are used for data storage. They are either **local drives** connected to the **SEPsesam** server itself or **remote drives**, connected to another computer, so that the backup data are not transferred over the network.

Advantage
Already available drives at the customer's clients can be used by **SEPsesam** as well, which contributes to a decrease in the network load.

Disadvantage
In cases of disaster the remote drives possibly are located in an area of destruction, thus the storage media may be affected, too.

Remote drives allow location of storage devices used by **SEPsesam** in areas geographically distant from one another. Thus it is no longer necessary to store the corresponding storage media at one central place (Wide Area Network WAN).

In addition to tape drives as the classical storage devices with permanently increasing capacities and transfer rates, **SEPsesam** can also use directory-oriented devices such as disks for backup.
These are treated as **virtual drives**, because here the physical drives and media are simulated using directories and files on disks, thus there is no difference for the user compared to real tapes (except during configuration).
The type DISK_HARD is fully simulated on the disk, DISK_CHNG is a disk device with changeable media (e.g. diskettes), where the media really must be moved (manually or with a loader).

2.2 Loader

Drives can be integrated into loaders, which (through of robot devices) move a media from a magazine into a drive and vice versa. They enable fully automated operation of the backup system during long periods of time.

One also distinguishes between **local loaders** and **remote loaders**.
Corresponding to virtual drives there is also a **virtual loader**, which is always configured as number 0, and serves all DISK_HARD drives. For this, media are not physically moved but entries in specific files are made which then control the data streams.

2.3 Client

Clients are computers within a network whose data are to be backed up.

2.4 Media

A media is defined as a data carrier, on which the backed up data are recorded and preserved in case of emergency.
These can be cassettes in tape devices, CDs in CD-Writers or even virtual media as directories on hard disks.
SEPsesam only uses media which are listed in its **media archive**.

2.5 Task

A task is the description of a backup or restore.

2.6 Appointment

Time control of **SEPsesam** is performed through schedules, i.e. all activities are entered into a central appointment calendar and a program - the so called SEPuler (see 4) - ensures that these appointments are executed at the right time.

2.7 SEPsesam Principle

To start a **backup** one needs a **task** containing information about which files of which **client** are to be backed up, a **media** inserted into a **drive** and an appointment when this will happen.

These basic components must be configured during initialisation phase using the graphical user interface GUI of **SEPsesam** described below (see 8).

The following picture exemplifies the embeddinging of **SEPsesam** within a network and the usage of the various storage devices.
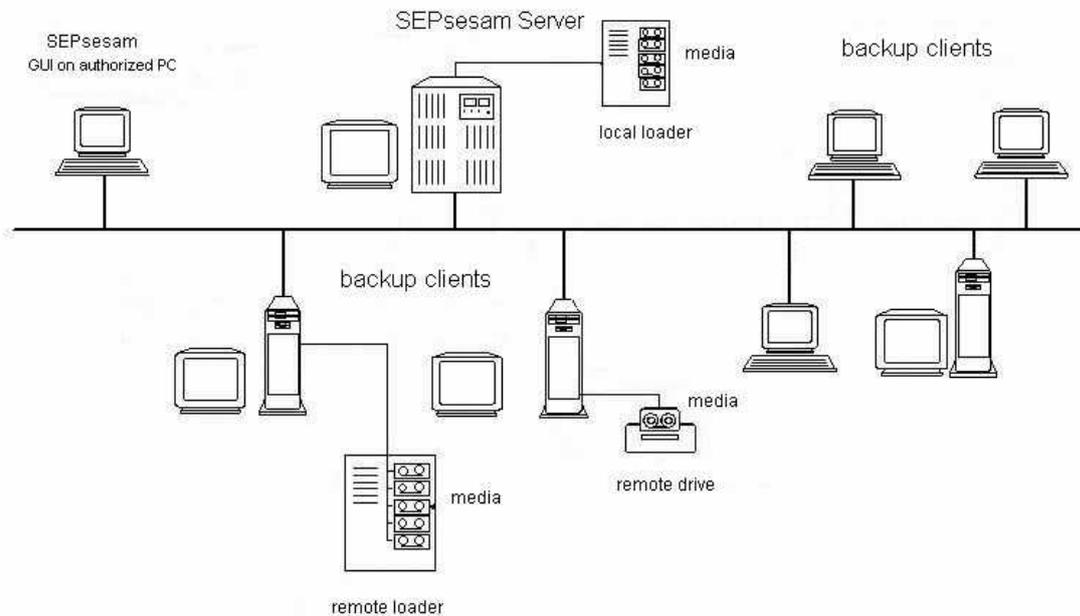
2.8 Grouping of SEPsesam Components

Some of the objects described above can be arranged hierarchically and organized into groups.

2.8.1 Location

A **location** is an organisational set of **clients**. Each client **must** be assigned to a certain location, which is benficial for clarity, especially with WAN-applications. Locations can be hierarchically organized in further sub-locations.

2.8.2 Drive group

Usually several drives are used for one **SEPsesam** Server-System. If the drives are of one and the same type, it is preferable to collect them into a group and to direct the backup to the group. In this way backup is performed automatically on a currently free drive. Especially in case of a drive failure, each backup is automatically executed only on the available drives. This is particularly true in cases of big loaders with several drives.

2.8.3   Task group

Pooled tasks within a task group can be activated with a single appointment.

2.8.4   Media pool

For the administration of media relating to the different types of backup data, backup sources (e.g. file backup, DB backup) or drive types, media must be inserted into **media pools**. **SEPsesam** requires the configuration of media pools and therefore the organisation of media in such units.

2.8.5   MasterSesam

The top group is implemented with the concept of **MasterSesam**. This is using the assumption that in a network (mostly WAN) there are several standalone 'backup islands' each around a **SEPsesam**-Server, and these should be controlled from a certain **SEPsesam**-Server.
This server is called MasterSesam.
Each **SEPsesam**-Server can be defined as MasterSesam.
The MasterSesam has some additional buttons and setup possibilities in its interface so that the user can link to the GUIs of the other **SEPsesam**-Servers from it.

Chapter 3

Media administration

All media whichare to be used by **SEPsesam** must be registered under a non-ambiguous identification called **label** in the **media archive**. The corresponding tools are provided through the GUI (initialization, properties, etc.).

3.1   Media strategy

The media **SEPsesam** is working with are administered in media pools using non-ambiguous labels. The labels consist of the pool name and a five-digit number which **SEPsesam** assigns within the pool (this is the reason why a pool name never is allowed to end with 5 digits). In the GUI a new media pool is created under **GUI:Components-Media Pools-New Media Pool**. An important parameter of a media pool is **Locked Days**, i.e. for how many days a media of this pool must not be used, therefore preserving the backup data. This is a number of days and called **EndOfLife = EOL**.

For each media the following information is stored in media archive:

Label	Identification of the media
Media Pool	Name of the pool to which the media belongs
ID	Number within the pool
Write Protection	Can be set up by the user; blocks the media against new usage until the protection is cancelled
Backup Day	Date of backup day (see 4.4)
Locked until	Date from which it can be used again = backup day + Pool_EOL (see 3.1)
Drive Number	of the drive used for backup
Media Type	is compatible only with certain drive types
Loader	in whose magazine is currently loaded
Slot	of the magazine
Occupancy	in MB, GB, etc.
Error Count	accumulated count of potential error messages of the drive for this media

The fields ”‘Write Protection, Loader”’ and ”‘Slot”’ can be changed directly by the user.
The write protection of a media prevents its repeated usage and potential data loss. Write

protection is preserved until the user cancels it manually .
EOL-write-protection however is automatically controlled by **SEPsesam**.

Loader and slot numbers must always coincide with the real location of the media. Especially with smaller loader types (without barcode readers) it is technically impossible to recognize manual changes in the magazine. Media can be taken out of or put into the magazine at random, without the program recognizing this. Thus after such changes it is absolutely necessary to either start an **archive adjustment** (see 3.4) (via the GUI) or to enter the correct data (loader and slot numbers) directly into the archive.

Usage of media is triggered by media appointments. They execute the strategies for media selection, reinitialize the media and prepare them for the respective backups.

If there is only a media pool connected to a media appointment, then the so-called **GET_OLDEST**-strategy is always applied trying to preserve the data on the media for the longest possible time. The GET_OLDEST-strategy requires that the media

- with the lowest locking date of the media pool (= the oldest one)

- with not set write-protection

- with already exceeded locking date

has to be used as the next one.

If the media appointment includes a label directly , the system will try to load it into a drive.
The user must take care of accessibility in the magazine, otherwise the backup is blocked.

Blockings can be prevented by using so-called **SPARE-Pools** .
The name of spare-pools start with **SPARE_**. Here, initially unused media are inserted and kept for later use. For each type of drive an adequate spare-pool has to be generated and filled with the compatible media (see 8.5.5.2).
These spare-pools are used by media appointments in case of not being able to get a media from the actual pool. A media is moved from the compatible spare-pool to the pool currently requested by the backup. Thus the media migrate from spare-pools to the working pools resulting in a dynamic buildup of these pools depending on the amounts of data.
SPARE-pools can be used for automatic insertion of new media into working media pools. For big loaders the media are pre-initialised with labels of SPARE-pools at **SEP AG** saving time during the installation phase. The media then migrate to the working pools on the production system.

Usage of media can be influenced in follwing ways:

- locking time-limits of media pools (see 3.1)

- set/unset write-protection in media archive

- media appointments in SEPuler (see 4)

- modify the locking date of a media in archive to an already exceeded date and execute a media appointment

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3.2 Examples of different media strategies

In the matrices of the examples below, the date of a virtual month is given in downward direction, to the right the appropriate media label is shown. In the two-dimensional field, date information for the newly calculated EOL-day can be identified.

Example 1

Full-backups, Pool_EOL=3, OLDEST-Strategy. EOL in the Matrix are initially set to 0 (blank)

Dat	Typ	S1	S2	S3	S4	S5	S6	S7	S8
1	F	4	0	0	0	0	0	0	0
2	F	4	5						
3	F	4	5	6					
4	F	4	5	6	7				
5	F	4	5	6	7	8			
6	F	4	5	6	7	8	9		
7	F	4	5	6	7	8	9	10	
8	F	4	5	6	7	8	9	10	11
9	F	12	5	6	7	8	9	10	11
10	F	12	13	6	7	8	9	10	11
11	F	12	13	14	7	8	9	10	11

During the first day media S1 is used, during the second S2 is used, and so on, until all eight media have been used once. Locking date is set to current date + Pool_EOL, i.e. after this date reuse of media is allowed again. For S1 the locking date is set to $1 + 3 =$ Day 4 for example. At the ninth day, media S1 is reused in accordance with the OLDEST-strategy (see 3.1). This way, a cycle is created in which full backups remain preserved for a maximum of seven days.

Example 2

Full backups, Pool_EOL=14, OLDEST-Strategy
shows appearance of a blocking caused by increase of the Pool_EOL.

Dat	Typ	S1	S2	S3	S4	S5	S6	S7	S8
1	F	15	0	0	0	0	0	0	0
2	F	15	16						
3	F	15	16	17					
4	F	15	16	17	18				
5	F	15	16	17	18	19			
6	F	15	16	17	18	19	20		
7	F	15	16	17	18	19	20	21	
8	F	15	16	17	18	19	20	21	22

Blocking of backup occurs due to increase of Pool_EOL. At the ninth day there is no longer any unlocked media, since S1 will be unlocked at the 15th day of the month. Therefore, there must be a minimum of 15 media provided for the strategy selected above.

Example 3

Full and incremental backups, Pool_EOL=3, OLDEST. I-backups demand that the preceding F and all intermediate I must be preserved; this is achieved by moving the locking date of the media storing the F and I-backups to the one of the current media.

Dat	Typ	S1	S2	S3	S4	S5	S6	S7	S8
1	F	4	0	0	0	0	0	0	0
2	I	5	5						
3	I	6	6	6					
4	I	7	7	7	7				
5	I	8	8	8	8	8			
6	F	8	8	8	8	8	9		
7	I	8	8	8	8	8	10	10	
8	I	8	8	8	8	8	11	11	11
9	I	12	8	8	8	8	12	12	12
10	I	13	13	8	8	8	13	13	13

Note that for example the locking dates of S1 have increased.

Example 4

Full and differential backups, Pool_EOL=3, OLDEST. D-backups demand that the previous F must be preserved; this is achieved by moving the locking date of the media storing the F-backup to the one of the current media .

Dat	Typ	S1	S2	S3	S4	S5	S6	S7	S8
1	F	4	0	0	0	0	0	0	0
2	D	5	5						
3	D	6	5	6					
4	D	7	5	6	7				
5	D	8	5	6	7	8			
6	F	8	5	6	7	8	9		
7	D	8	5	6	7	8	10	10	
8	D	8	5	6	7	8	11	10	11
9	D	12	5	6	7	8	12	10	11
10	D	12	13	6	7	8	13	10	11

3.3 Change of Media

Storage media for the above strategy can be prepared by **SEPsesam** at any time using media appointments .

Media appointments are activated as a user-defined event by the SEPuler (see 4) or as an internal media appointment. Internal appointments were started at the beginning of a backup or during a backup when no media for requested media pool is prepared or in case of reaching end-of-media (EOM).

If the user does not define any media appointment at all, only internal media changes are in effect.

For using media appointments SEP recommends the following procedure:

- set a NEWDAY-appointment after the nightly backup shift (see 4.4)

- set media appointment several minutes after NEWDAY for your media pools.

3.4 Archive Adjustment

The comparison between a loader-magazine, where the media are kept and the **SEPsesam** database (media archive) is called **archive adjustment**. An archive adjustment is mandatory whenever the filling of a loader magazine was changed. Especially after insertion of new media, which up to that point were not registered by **SEPsesam**, it is necessary to execute an adjustment.
Using option **Automatic new Entry** the still unrecognized media are entered into the archive automatically.
The adjustment is started via **GUI:Components-Loader-Content-Archive Adjustment**.

Chapter 4

The SEPuler - an appointment calendar

The time control of **SEPsesam** is implemented by the **SEPuler** - an electronic assistant. The SEPuler is permanently active in the background and checks if appointments entered are due to be executed. If so, then the execution of the corresponding program is started. In case of a recurring appointment the next execution time is calculated using the corresponding schedule and the appointment is rewritten to the calendar.

Possible types of appointments are backup, media, arbitrary command and newday.

Also the "'Immediate starts"' of the GUI are initially posted to the calendar as unrecurring appointments .

In the **SEPsesam** GUI the appointment configuration always starts - even if it is a one-time event - with the so-called **schedule**.

It offers a natural view of the appointment calendar with the completed, executing and future appointments under **GUI:Scheduling-Calendar Sheet**
For already completed backups, restores etc. detailed information can be entered from here (see 8.7.3).

4.1   Schedules

The cyclic behaviour of **SEPSesam** is implemented by the schedules already mentioned above. The schedule is a scheme describing the recurrence of an appointment allowing cycles from minutes to years as well as absolute and relative scheduling (also including the "'one-time execution"').
Presence of a schedule is not enough to execute a program. Only by configuring appointments sing a schedule, entries are made in the appointment calendar which then are executed by the SEPuler.
A modification in the schedule effects all appointments working with this schedule.
A schedule can be deactivated via the GUI.
A schedule can be used for any number of appointments; a particular task (Backup, Restore, etc.) can have appointments in several schedules, whereby overlaps are resolved by means of priorities.

4.2 Prioritisation of Appointments

In order to implement more complex appointment strategies schedules have distinct priorities. Lowest priority is 1 , the highest is 10. Within a **SEPsesam**-day (see 4.4) it is evaluated whether there is a similar appointment with higher priority already executed or planned. In such a case, the execution of lower prioritized appointments is suppressed. For a certain backup task several schedules can be created overlapping during some days. Depending on their priorities they are mutually suppressed (not executed).
Schedules with priority=0 are always executed.

The "'similarity"' of appointments is differently arranged for the particular types:

- BACKUP-appointments are similar when their tasks are equal

- MEDIA-appointments are similar when their drive number or drive group are equal

- COMMAND-appointments are similar when their names are equal

Schedule	Time	Prio	
DAILY	20:00	1	daily incremental
WEEKEND	18:00	2	on weekend differencial
MONTHEND	21:00	3	on month end full

- at week end WEEKEND overrides DAILY

- at month end MONTHEND overrides DAILY

- at coinciding weekend with month end MONTHEND overrides WEEKEND

4.3 Blocking appointments

A blocking appointment is an appointment of any type with high priority which inhibits other appointments of equal type to become active due to its presence and higher priority.
It is used for specific prevention of appointments on specific days (holidays etc.).
Attention

- switching off a schedule blocks the execution of all appointments using this schedule (select "'Execute"' in schedule)

- a blocking appointment has an effect on similar appointments only (select "'blocking appointment"' in appointment).

A blocking appointment is created by marking the corresponding field during the configuration of an appointment.
Example
A backup appointment executing the task CSRC executes daily with priority 2.
A second backup appointment also for CSRC is set up for 24.12. each year only, and it is a blocking appointment with priority 9.

At 24.12. the priority check recognizes that a higher prioritized backup CSRC exists (namely the blocking appointment) and blocks the execution of the backup of the daily appointment. The blocking appointment only sends a message that it was activated.

4.4 The SEPsesam backup day

SEPsesam enables reorganisation of the system by the NEWDAY-appointment.
SEPsesam defines the time interval between 2 NEWDAY-appointments as a **backup day** .
Since there is only one such appointment, it is preset after the installation and only its schedule can be modified (including deactivation).

Having set a daily NEWDAY-appointment at 08:00, the backup day extends until the morning of next day at 08:00. Backups, which run after midnight - the change of the real date - are administered at the date of the previous day.
Especially the protocol files of **SEPsesam** are created with the date of the **backup day**.

Example Backup day from 10.9.1999 08:00 till 11.9.1999 08:00
A backup at 11.9.1999 00:40 will be assigned to **backup day** 10.9.1999 and appears in daily protocol 19990910 .
Backups can be arranged in shifts.

A NEWDAY-appointment executes the following tasks additionally:

- aborts all executing backups (for day shift)

- deletes files and database entries for savesets which no longer exist

- computes the calendar forecast one day in advance

Chapter 5

Backup

Automatic Backups are triggered by the SEPuler (see 4). Data specified in **task** are copied to **saveset** on the current media. **SEPsesam** creates additional data (listings, media segmentation data) so that a quick and convenient restore is possible.

The user defines which data in his network should be backed up and when.
Considerations referring to media, media pools and backup type (full, differential, incremental) have to be made. According to that the administrator configures backup tasks, schedules and appointments.
If requested the PRE- and POST-interface must be configured task-specifically, too.

5.1 Full-, Diff-, Inc-, Copy-Backup

full backup copies all source files as they are. During restore this version of the files can be easily copied back from the media, but in some cases it represents a large amount of data.

A **differential backup** only copies those files changed after the latest **full backup**. Thus a smaller amount of files must be transfered, the backup time is shorter. In order to restore the whole data source, one must first copy back the files from the full backup before copying those of the differential one.
Therefore it is a two-step process which is automatically scheduled and started by the Generation Restore (see 6.3) of **SEPsesam**.

The **incremental backup** copies files changed since the previous backup regardless of its type. This of course generates the smallest amount of data. To restore the whole data source it is necessary to first copy back the saveset of the last **full backup**, and then all intermediate savesets. Therefore, depending on the administrator´s strategy, the restore can contain several steps (see 6.3).
A **copy backup** is a **full backup**, however without change of the archive bits, so that maybe diff/incr backups of external backup systems are not affected.

5.1.1 The Archive Bit

Some operating systems use the archive attribute for file administration. It is a bit in each file's header which is set to 1 when a modifying access occurs to it.

Effect of backup types on the A-Bit:

- Full backs up all files and sets A-Bit = 0

- Diff backs up only files with A-Bit = 1 and leaves A-Bit unchanged

- Inc backs up only files with A-Bit = 1 and sets A-Bit = 0

For backup cycles after a full backup, only unmixed series of diff or incr ought to be performed, otherwise, unexpected effects may occur.

In the examples from left to right the time sequence of Backups and modifications of 3 files A,B,C is presented.
The column S shows (through +/-) if a file is backed up.
The column M shows the archive bit after changes on the file.

Example 1: full/diff backup cycle

File	Full	S	M	Diff	S	M	Diff	S	M	Diff	S
A	0	+	1	1	+	1	1	+	1	1	+
B	0	+	0	0	-	1	1	+	1	1	+
C	0	+	0	0	-	0	0	-	1	1	+

Example 2: Full/Inc-Backup cycle

File	Full	S	M	Incr	S	M	Incr	S	M	Incr	S
A	0	+	1	0	+	0	0	-	1	0	+
B	0	+	0	0	-	1	0	+	1	0	+
C	0	+	0	0	-	0	0	-	1	0	+

Example 3: Full/Diff/Inc-Backup cycle **not recommended**

File	Full	S	M	Diff	S	M	Incr	S	M	Incr	S
A	0	+	1	1	+	1	0	+	1	0	+
B	0	+	0	0	-	1	0	+	1	0	+
C	0	+	0	0	-	0	0	-	1	0	+

5.2 Parallel Backups

SEPsesam supports parallel i.e. simultaneous backup for several data sources onto one drive.
This is denoted as **Sesam Multiplex Stream (SMS)** .

Modern tape drives have increased their performance and capacity so that separate backups hardly use these performance advantages. The drive awaits data from the backup source for most of the time . This idle time can be used for receiving data from other backup sources.
SMS now offers up to 64 channels on a single drive; each channel can serve one backup.

Data of the different streams are distributed into packets, each packet is supplied with an identification mark and is copied onto the media. The data of a certain stream are not contiguously positioned on the media, but are interrupted by packets of other streams.
The identification marker of the packets enables SMS to restore the initial stream during reading. Furthermore, SMS is able to split savesets across several media (EOM = EndOfMedia).

5.3 Administrative Data for the Savesets

Names of the savesets are uniquely determined by **SEPsesam** from the backup starting-time. For the restore each backup creates a listing-file containing the backed up directories, files and positioning data on media named **task-date_execution_number_type.lis** (full/diff/incr).
In the file **task-date_execution_number_type.not** , messages from execution and files not backed up due to operating system dependencies are stored.

In the **SEPsesam** database the following administrative data are filed for each backup executed :

- Name from time stamp as unique identification of the saveset

- Task name

- Date of the backup day

- Execution counter of this task during backup day

- CFDI-Type Copy,Full,Diff,Incr

- Media counter - upon how many media the saveset is distributed

- Label of the used media

- Drive number

- Client from which the data was backed up

- Backup source

- Start and End time

- Success status

- Backed up data amount

   The success status of a backup can be viewed in column status in "'Backups by Status"'.

In **SEPsesam's** user interface these informations are presented with various filters for analysis (Backups by Status, Calendar Sheet, etc.) .

Chapter 6

Restore

Whenever files, directories or whole disks are destroyed during a desaster, they must be reproduced again.

SEPsesam offers full restore (all files of a saveset), selective restore (selected files) or generation-restore.

In the **SEPsesam** interface the **restore wizzard** - an assistant program - is launched. It leads through the entry masks.

6.1 Storage Time Limit, Media Cycle

Before implementing an automatic data backup, the user should consider the overall backup concept.

In particular, the storage time limit and the number of required media and media cycles are to be determined.

If the data are of a rather homogenous structure, relatively few different media pools will be needed. For a heterogeneous structure a pool should be created for almost each category to enable flexible and adaptable strategies.

All media can of course be kept in one pool.

It is necessary to distinguish and decide between short term and long term storage of backed up data.

Short term storage is a media cycle, i.e. media are reused for backup mostly on a weekly to biweekly rotational basis. The effect is a deep and uninterrupted history of data enabling the restoration of rather small granular changes in the data.

Beside this cyclic usage of the storage media it is also necessary to store some backup snapshots such as end of month or end of year etc. in long term storage.

Therefore, the user must decide between the amount of backed up data and the history of the data.

Two different possibilities for backup strategies are:

- to keep all backups in the course of time creates problems with the clarity, storage capacity and costs. Nevertheless, everything can be restored for any given moment.

- to use only one media but have only the changes from the previous day available.

6.2 Selective Restore

During **selective restore** only a subset of files of a saveset is selected. **SEPsesam** positions the media at the last mark before the selected data, skips unselected files and transfers only the desired files. This guarantees a quick and network-optimal restore.

6.3 Generation Restore

Selective restores from differential or incremental backups require a chain of several restores starting from the last full Backup.
SEPsesam switches automatically to the **generation view** and handles the arrangement of these single steps for the user.
In **generation view**, the selection list not only displays the files from the selected differential or incremental backup but all files since the last **full backup** - so all generations of files are presented.

6.3.1 Example: Generation Restore with differential Backups

The backed up directory in the beginning contains the following files:
aa;1 bb;1 cc;1 dd;1 ee;1 ff;1 (version numbers clarify the changes)
additionally xx;1 since 2.day

These files are modified during the week and the directory is backed up every night by Diff-Backups, i.e. all files modified since the last FullBackup are copied onto the media.
The series begins with a FullBackup.

modified files	aa;2 bb;2	cc;2 dd;2 xx;1	ee;2 aa;3	aa;4 dd;3	cc;3 bb:3	
Days	1	2	3	4	5	6
Backup Saveset	Full SF1	Diff SD2	Diff SD3	Diff SD4	Diff SD5	Full SDF6
Listing of files in Saveset	aa;1 bb;1 cc;1 dd;1 ee;1 ff;1	aa;2 bb;2 cc;2 dd;2	aa;2 bb;2 cc;2 dd;2 ee;2 xx;1	aa;3 bb;2 cc;2 dd;3 ee;2 xx;1	aa;4 bb;2 cc;3 dd;3 ee;2 xx;1	aa;4 bb;3 cc;3 dd;3 ee;2 ff;1 xx;1

Generation list GEN_LIS (file and saveset, in which it is saved) :

Generation	1.	2.	3.	4.	5.	6.
	aa;1 SF1	aa;2 SD2	**aa;2 SD3**	aa;3 SD4	aa;4 SD5	aa;4 SF6
	bb;1 SF1	bb;2 SD2	bb;2 SD3	bb;2 SD4	bb;2 SD5	bb;3 SF6
	cc;1 SF1	cc;1 SF1	cc;2 SD3	cc;2 SD4	cc;2 SD5	cc;3 SF6
	dd;1 SF1	dd;1 SF1	dd;2 SD3	dd;2 SD4	dd;3 SD5	dd;3 SF6
	ee;1 SF1	ee;1 SF1	**ee;1 SF1**	ee;2 SD4	ee;2 SD5	ee;2 SF6
	ff;1 SF1	ff;1 SF1	ff;1 SF1	ff;1 SF1	ff;1 SF1	ff;1 SF6
			xx;1 SD3	xx;1 SD4	xx;1 SD5	xx;1 SF6

In normal "'Saveset view"' only files from the above saveset lists are offered for selection.

In "'generation view"', all files up to the last full backup are shown and can be selected.

If the saveset SD3 (= 3.Generation) is selected in the **RestoreWizzard** of **SEPsesam**, the following selection list appears (except VMS without version numbers)

(x)	**aa**
( )	bb
( )	cc
( )	dd
(x)	**ee**
( )	ff
( )	xx

If the files aa and ee are selected for restore, only aa is copied from SD3, ee however is restored from SF1, because it was not modified yet. **SEPsesam** automatically executes these two restore steps including the necessary media changes.

6.3.2 Example: Generation Restore with Incremental Backups

All filesmodified since the last backup (no matter of what type) are copied onto the media.

modified files	aa;2 bb;2	cc;2 dd;2 xx;1	ee;2 aa;3	aa;4 dd;3	cc;3 bb:3	
Days	1	2	3	4	5	6
Backup Saveset	Full SF1	Incr SI2	Incr SI3	Incr SI4	Incr SI5	Full SF6
List of files in saveset	aa;1 bb;1 cc;1 dd;1 ee;1 ff;1	aa;2 bb;2	cc;2 dd;2 xx;1	aa;3 ee;2	aa;4 dd;3	aa;4 bb;3 cc;3 dd;3 ee;2 ff;1 xx;1

Generation list GEN_LIS

Generation	1.	2.	3.	4.	5.	6.
	aa;1 SF1	aa;2 SI2	aa;2 SI2	aa;3 SI4	aa;4 SI5	aa;4 SF6
	bb;1 SF1	bb;2 SI2	bb;2 SI2	bb;2 SI2	bb;2 SI2	bb;3 SF6
	cc;1 SF1	cc;1 SF1	cc;2 SI3	cc;2 SI3	cc;2 SI3	cc;3 SF6
	dd;1 SF1	dd;1 SF1	dd;2 SI3	dd;2 SI3	dd;3 SI5	dd;3 SF6
	ee;1 SF1	ee;1 SF1	ee;1 SF1	ee;2 SI4	ee;2 SI4	ee;2 SF6
	ff;1 SF1	ff;1 SF1	ff;1 SF1	ff;1 SF1	ff;1 SF1	ff;1 SF6
			xx;1 SI3	xx;1 SI3	xx;1 SI3	xx;1 SF6

Selecting the files aa and ee from the 3.generation, aa is now restored from SI2 and ee from SF1.

If cc is selected in addition, then it is to be restored from the Saveset SI3, and three restore steps are necessary.

In the fifth generation all 5 savesets are involved due to the incremental properties, i.e. if the user selects all of them, five restore steps will have to be performed.

6.3.3 Example: Mixed Types

modified files	aa;2 bb;2	cc;2 dd;2 xx;1	ee;2 aa;3	aa;4 dd;3	cc;3 bb:3	
Days	1	2	3	4	5	6
Backup Saves.	Full SF1	Incr SI2	Incr SI3	Diff SD4	Incr SI5	Full SF6
Lists of files in Saveset	aa;1 bb;1 cc;1 dd;1 ee;1 ff;1	aa;2 bb;2	cc;2 dd;2 xx;1	aa;3 bb;2 cc;2 dd;2 ee;2 xx;1	aa;4 dd;3	aa;4 bb;3 cc;3 dd;3 ee;2 ff;1 xx;1

Generation list GEN_LIS

Generation	1.	2.	3.	4.	5.	6.
	aa;1 SF1	aa;2 SI2	aa;2 SI2	aa;3 SD4	aa;4 SI5	aa;4 SF6
	bb;1 SF1	bb;2 SI2	bb;2 SI2	bb;2 SD4	bb;2 SD4	bb;3 SF6
	cc;1 SF1	cc;1 SF1	cc;2 SI3	cc;2 SD4	cc;2 SD4	cc;3 SF6
	dd;1 SF1	dd;1 SF1	dd;2 SI3	dd;2 SD4	dd;3 SI5	dd;3 SF6
	ee;1 SF1	ee;1 SF1	ee;1 SF1	ee;2 SD4	ee;2 SD4	ee;2 SF6
	ff;1 SF1	ff;1 SF1	ff;1 SF1	ff;1 SF1	ff;1 SF1	ff;1 SF6
			xx;1 SI3	xx;1 SD4	xx;1 SD4	xx;1 SF6

In **SEPsesam's** GUI a specific view can be chosen- the one of single backups or the generations view. Using the single backups view the user only works on this selected one, whether it is an incremental or differential one or not (like during a normal restore).

6.4   Restore of the Registry

Starting the restore (complete saveset of the registry-backup of the client to be recovered): The new restore-target **registry_replace** and a specific mode **overwrite** have to be entered.

Chapter 7

Basic Configuration

This is a step-by-step description how to configure the **SEPsesam** components described above (see 2), in order to do a simple data backup. The detailed description of the interface elements can be found below (see 8) .

7.1   Step 1: Clients

First of all, the administrator has to decide which computers need a backup by **SEPsesam**. Information on names, addresses and accesses to these systems is requested.

In **GUI:Components-Topology-New Location**,freely selected location names and their descriptions are inserted since each server or client must be related to a specific location. Location LOCAL is entered as default.

Within this location, a new client is configured in **GUI:Components-Topology-new Client**. According to the operating system of that computer, either WNT - OS/2 or UNIX platform is selected. As the name for the client the name of that computer defined in the network is inserted. If there is a name server in the network, **SEPsesam** automatically selects the TCP/IP address. Otherwise, the address recorded in the local file /etc/hosts has to be entered.

For **Operating system** the operating system installed on that computer is inserted.

If the client has several network cards, their TCP/IP names can be entered in **Interfaces**.

During configuration an attempt is executed to to contact the remote computer (installation of **SEPsesam** software on that computer is a prerequisite).
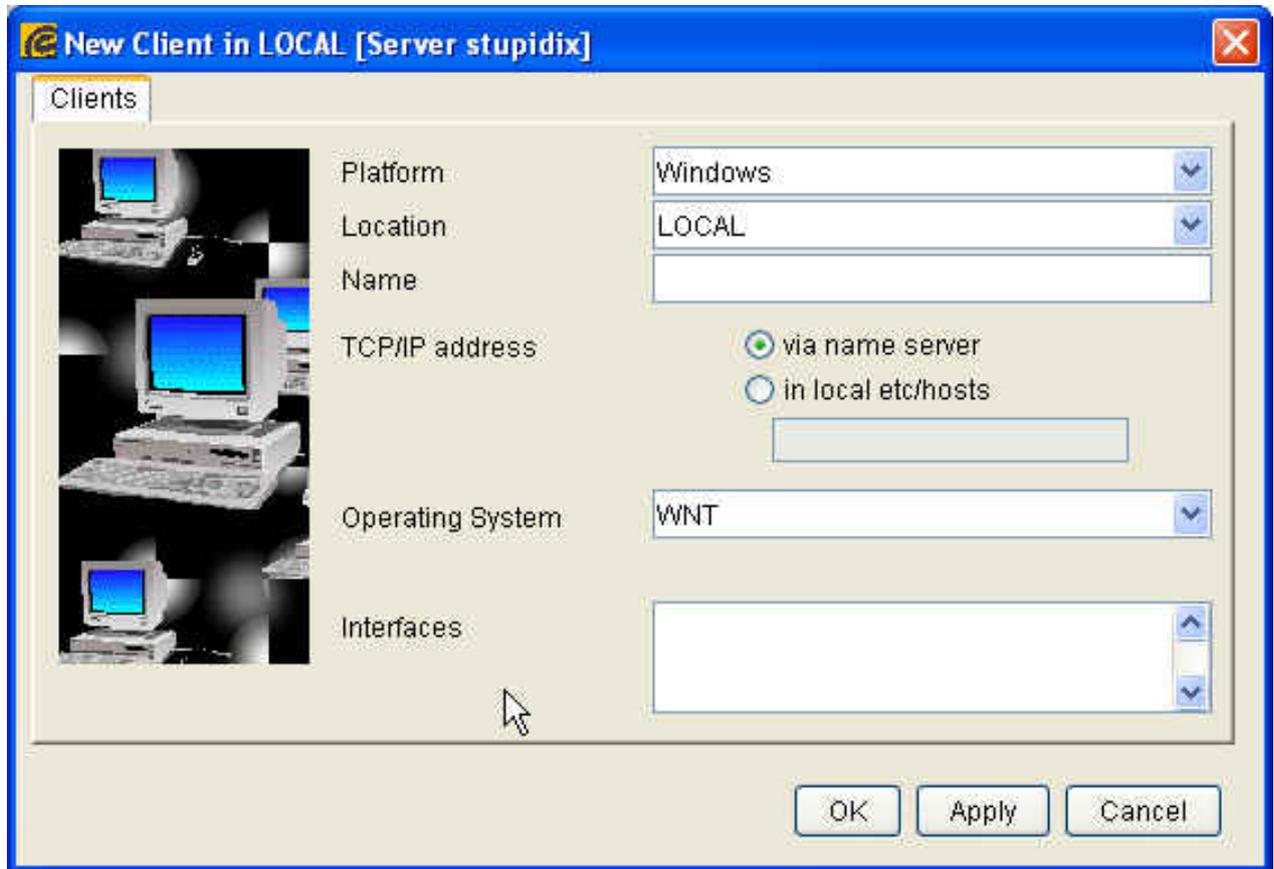
7.1.1 Setup of the SSH-Client

In order to create an SSH-Client, a client must be configured. Then the settings for SSH can be changed.
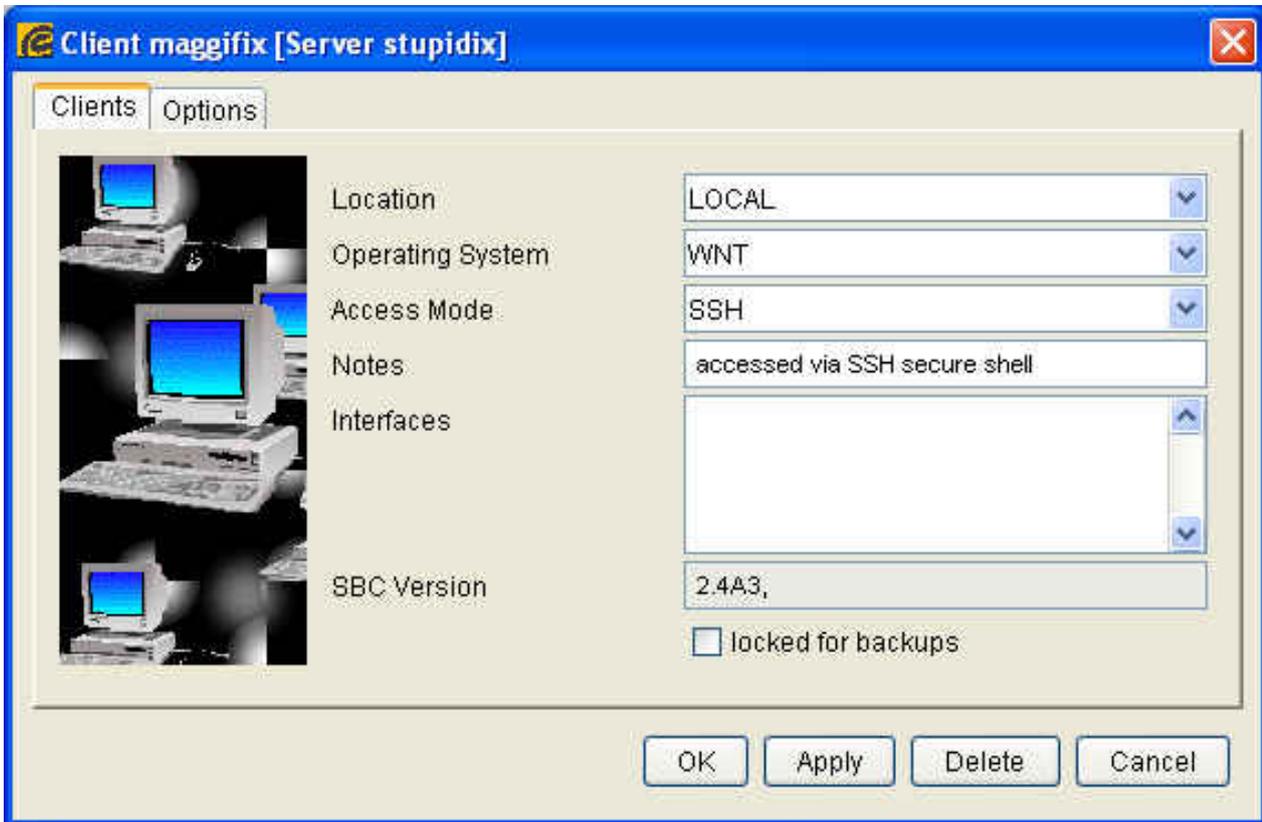
After the confirmation, the pop-up-question if the client is to be newly installed must be answered with **NO**.

Now, the SSH-Client is configured and ready to start.

7.2 Step 2: Storage Hardware - Drives and Loaders

During installation **SEPsesam** checks the SCSI-connected storage devices and enters their data into its database as far as possible.

At certain types of loaders the connection between loader and drives cannot be recognized automatically. Therefore, these devices must be manually verified and entered into the configuration.

For this purpose **GUI:Components-Loader** is selected where the previously set-up loaders can be found. Each loader is marked and its properties are entered. With **OK**, the deviced is finally entered into the configuration.
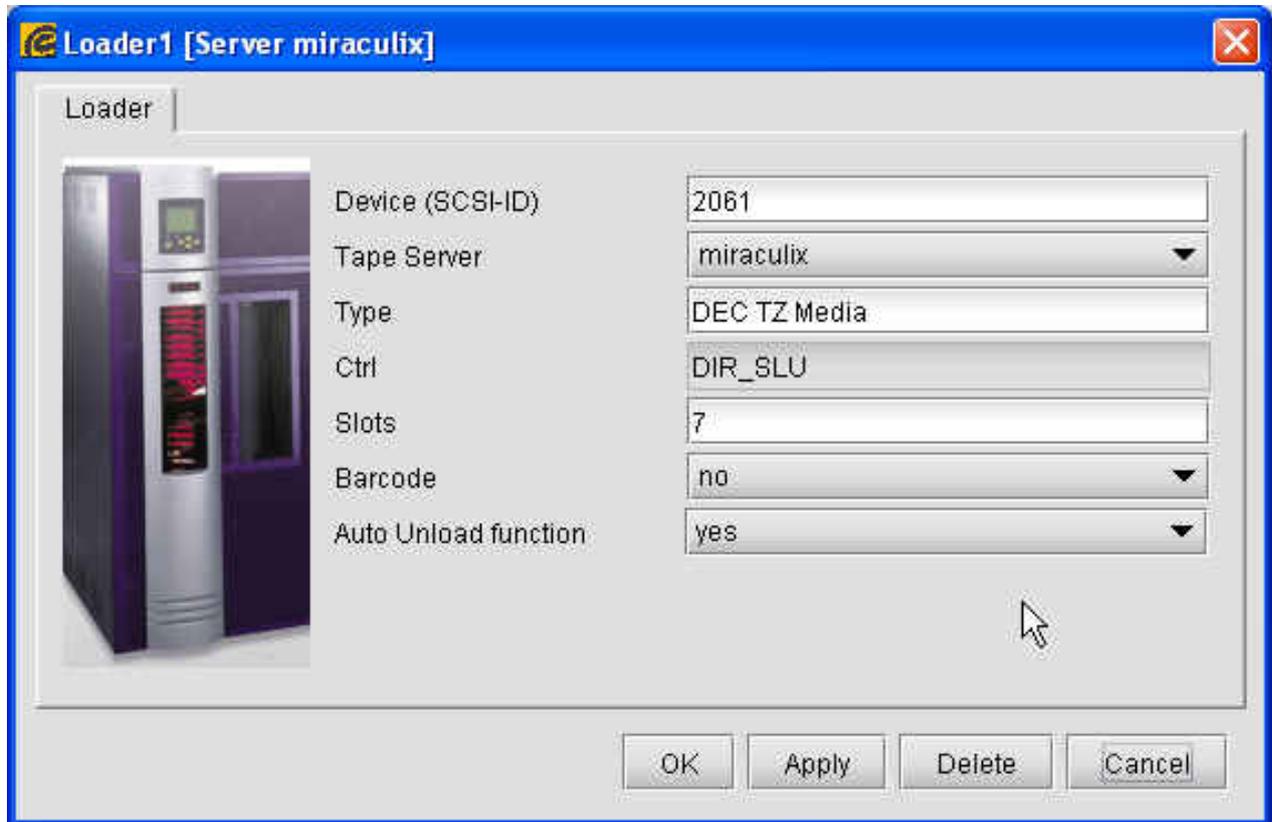
For drives, an analogue procedure is applied. Properties of each drive are selected via
GUI:Components-Drives-Drive Groups . By default, the drive group **local_Hardware** has
already been selected.
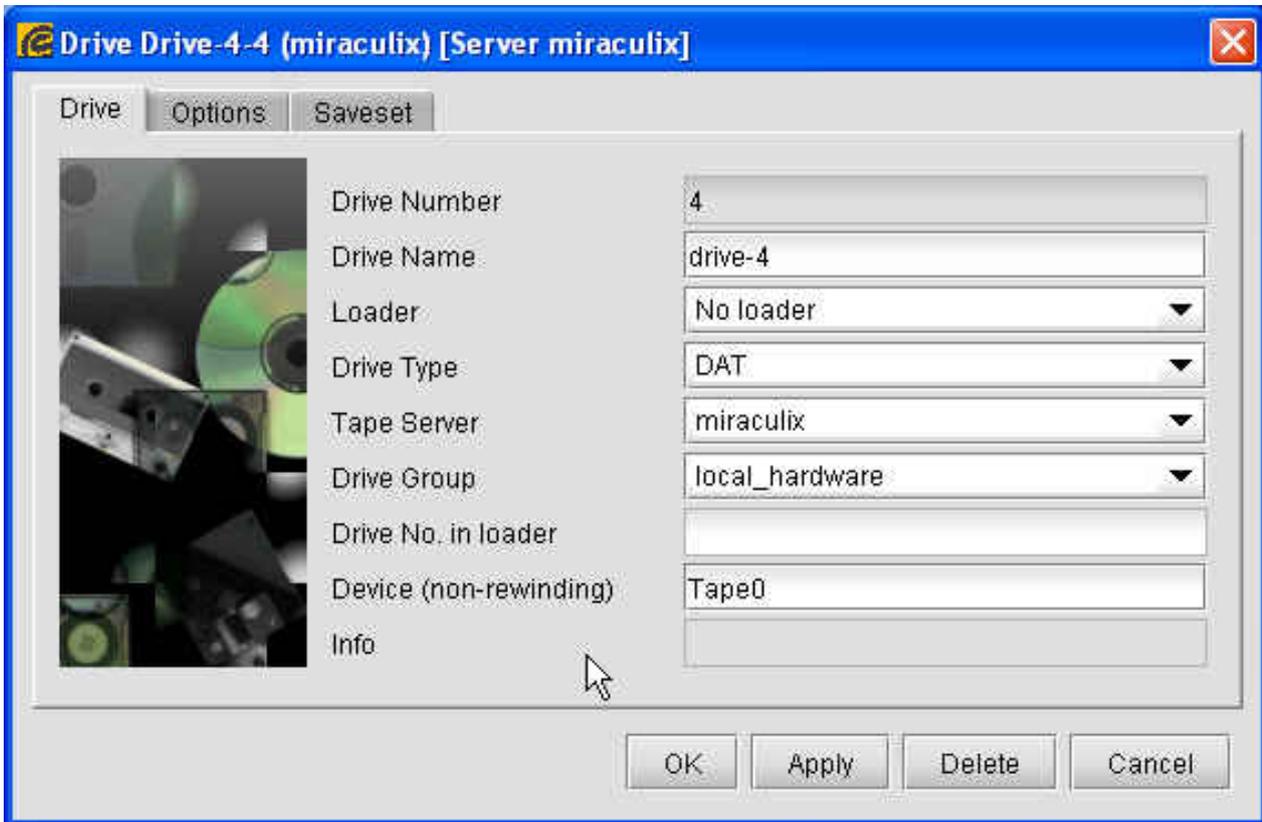
If "'No Load"' is entered in the loader field even though this drive is served by a loader, the case described above is given. In the options of that field, the appropriate loader is selected. With OK, this device is included into the configuration.

7.3   Step 3: Media - Data-carriers

To make media (tape cartridges etc.) usable for **SEPsesam**, they must be identifiable. Each media receives a unique identification, the **label**, which is placed at the beginning of media during physical initialisation.

SEPsesam creates labels of the format {Poolname}nnnnn.

SEPsesam requests that media are organized in pools. Within the pool the media are simply enumerated - **SEPsesam** performs this task for the administrator. After installation a media pool with the name of **SEPsesam** server is generated.

In **GUI:Components-Media Pools-New Media Pool**, a test pool can be created .
Media-strategy **GET_OLDEST** (see 3.1) and change-strategy "'Time"' are the default values.
For drive group, the drive to insert the media in is to be selected.
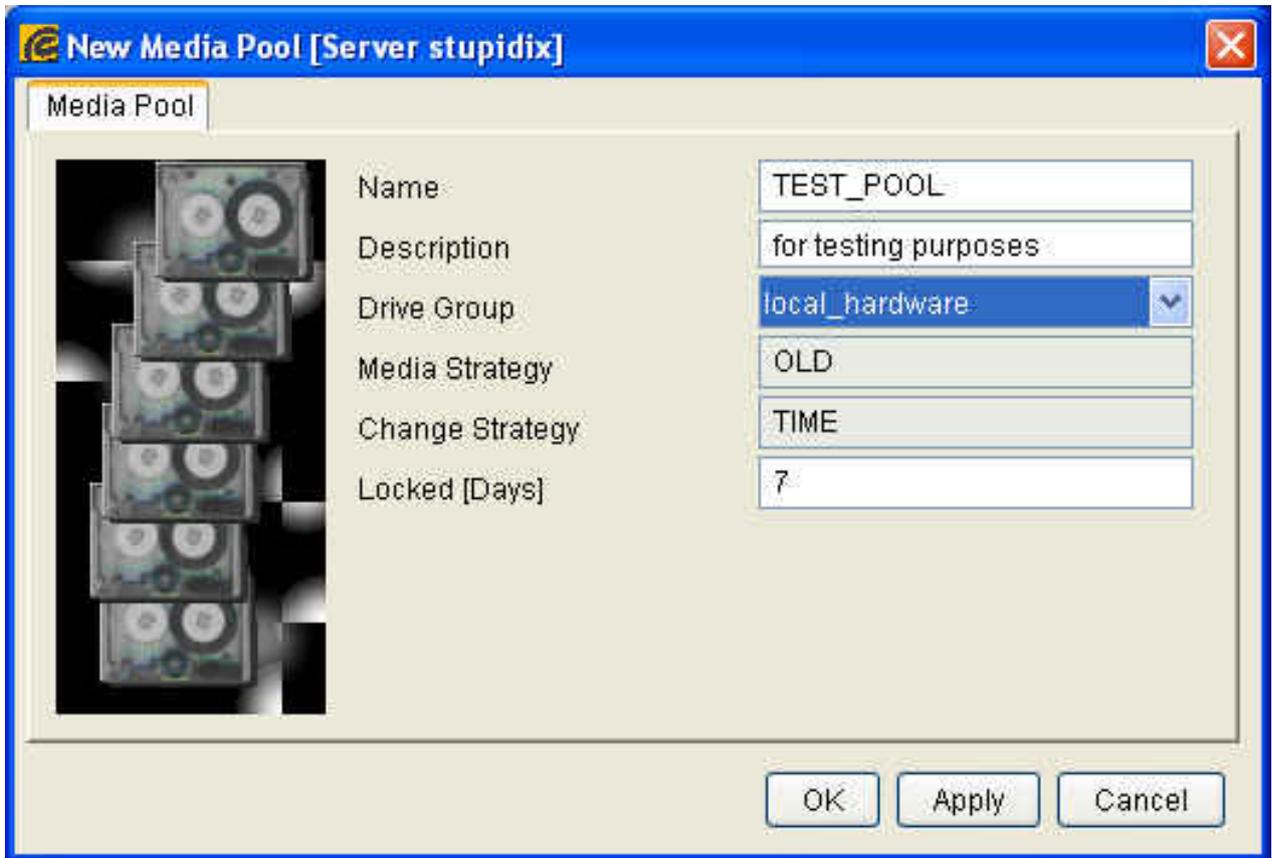
The media must now be introduced into the media archive which is done through **GUI:Components-Media-New Media** .
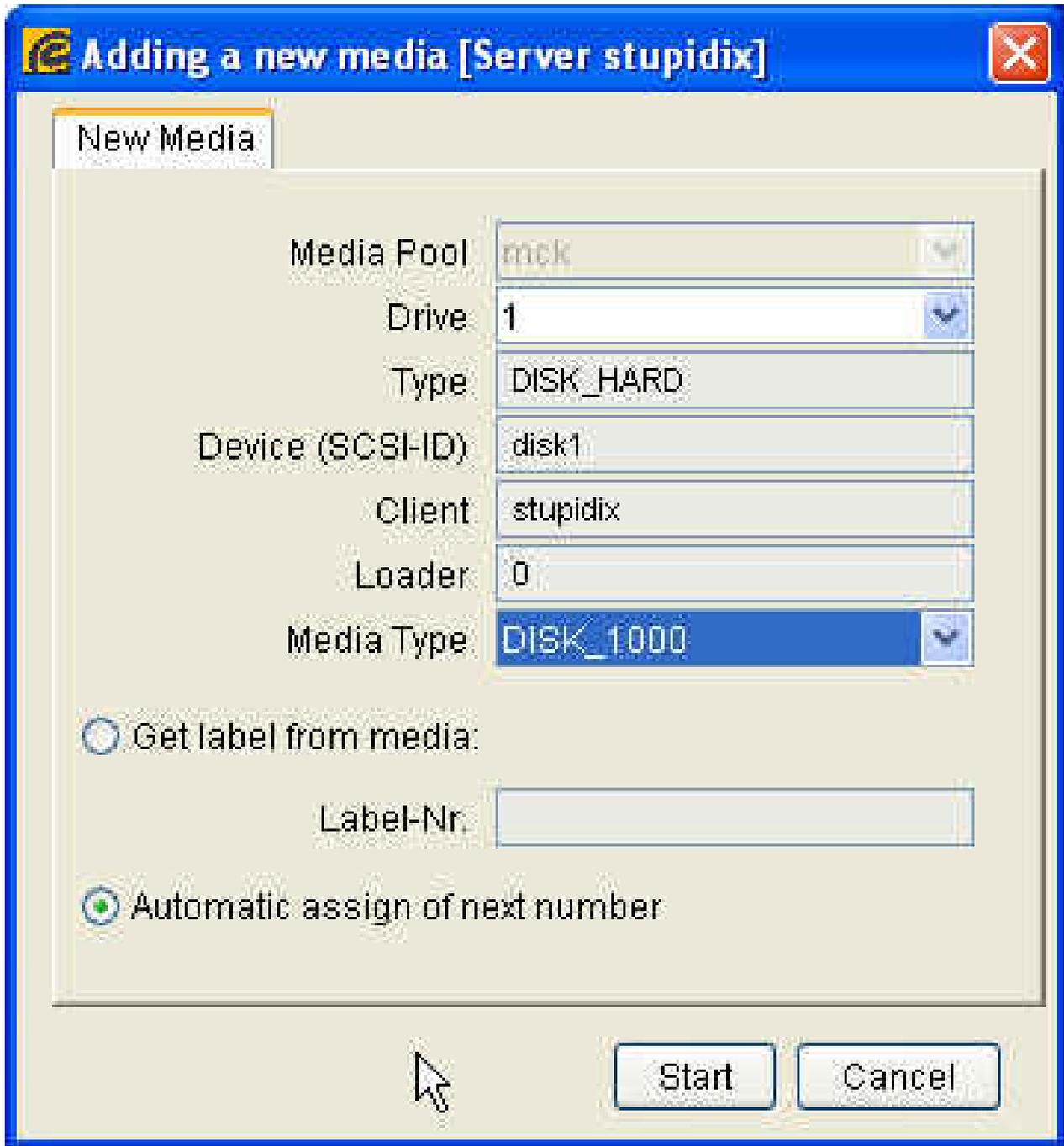
A **New Media** window appears. After the selection of a specific drive the corresponding drive properties appear in the following fields. In **Media type** and **Media Pool**,the appropriate one from the drop-down menu is selected. **Automatic Getting of Next Free Number** at bottom of the window is clicked and started.

SEPsesam now creates the next number in series, physically initializes the media and enters the new media into the database.

When entering a lot of media at a time a loader can execute the manual operations auto-

matically.The magazine must be filled with raw media and the archive adjustment is to be started via the menu (see 3.4).

In **GUI:Components-Media Pools- resp. Media** the created pools and media can be identified.

7.4 Step 4: Backup Tasks

In **GUI:Tasks-by Clients**,the button **new Task** opens an input-window where the description of each backup is to be entered.

The task name is arbitrary (max. 15 letters). In the input-fields, disks, directories and files from which **clients** (see 2.3) will be backed up

need to be specified. Exclude list expects names or name-patterns of files which must not be backed up.
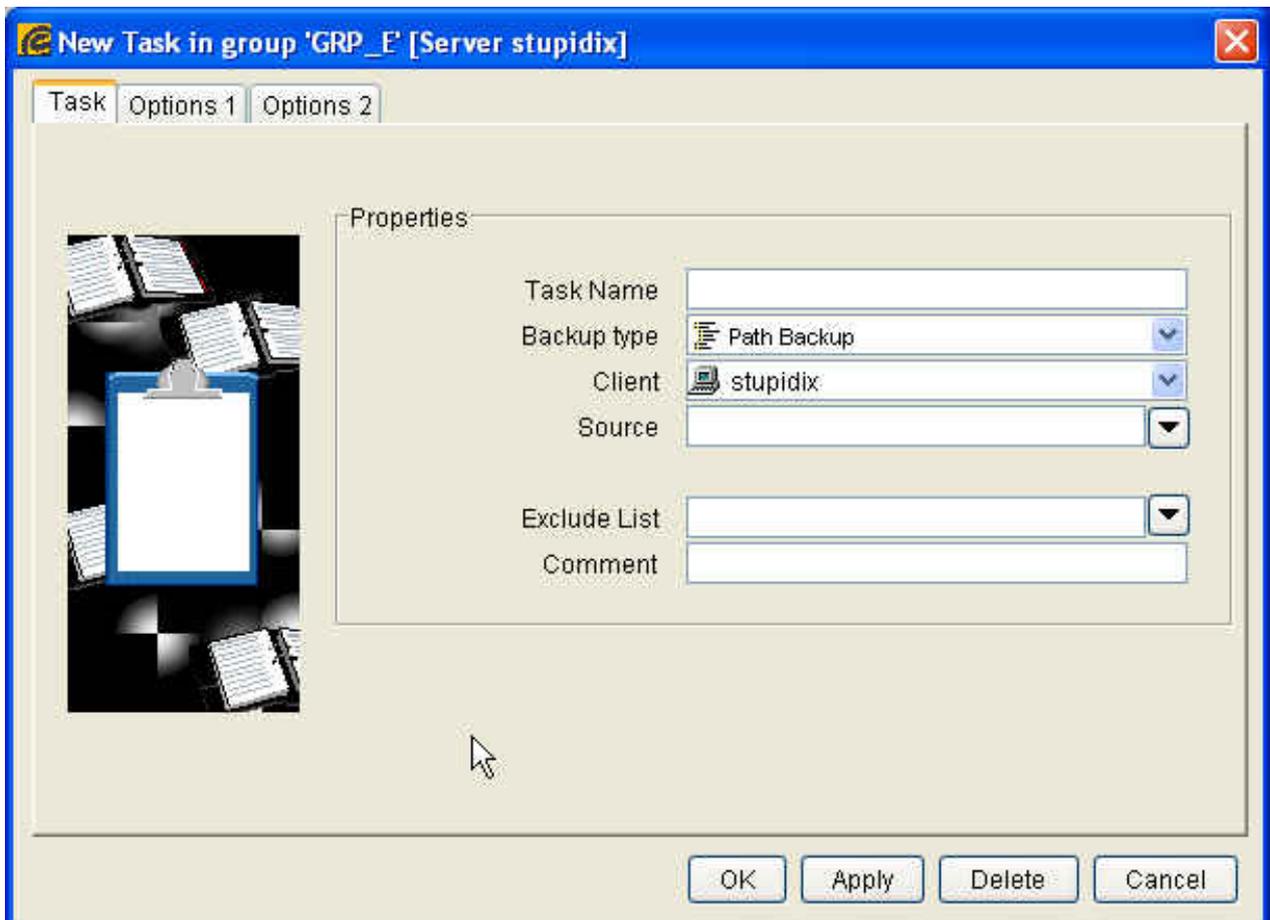
Single tasks can be collected under a specific group name in **task groups** .

7.5 Step 5: Schedules

The **SEPsesam** time control is based on SEPuler (see 4), an appointment calendar program. An appointment is an event which is to happen at a certain time. It consists of a start time, a

description of the event as well as its recurrence.

In **GUI:Scheduling-Schedules** there is already a schedule after the installation, the day change (see 4.4).
In **GUI:Scheduling-Events** the administrator will be able to recognize that day change will be done on the following day at 8:30 (NEWDAY-appointment).
With this, the daily regularity of **SEPsesam** is set up.

Now a media must be initialized, i.e. it is purged from old data and prepared for backups. This is done via **GUI:Activities-Immediate Start-Media Action**.

With the next working cycle of the SEPuler the initialization of the new media begins; in the bottom display window messages about the request for a media (via loader or manually) appear up to its final availability.

To configure a cyclic media appointment, a new daily schedule at about 5 minutes after the NEWDAY-appointment is created (**GUI:Scheduling-Schedules-New Schedule**).
In **GUI:Scheduling-Schedules-New Media Event** a new media appointment using this schedule is set up.
The success of this activity can be checked in the calendar sheet or under backups > by Status.

7.6 Step 6: Backup Start

For one-time backup, **GUI:Activities-Immediate Start-Backup** is seleted, afterwards a task and a media pool are marked (default settings apply) and the task is started.

To configure a periodic backup first a schedule must be created implementing the desired recurrence of the backup. Afterwards, a new backup appointment using this schedule is to be created.
Thus the backup is inserted into the appointment calendar and will be started by the SEPuler at the specified time.

When the backup is finished its proper execution can be checked in **GUI:Scheduling-Calender Sheet** or **GUI:Backups-Status**.
This saveset also appears within the restore wizard.

7.7 Directory Structure of SEPSesam

ID denotes the installation directory in which **SEPsesam** was installed.
The paths are shown in slash notation and are identical for different operating systems.

During installation of the software kit the following directory structure is created:

Template files incl. raw database for first install	**ID**/skel
Templates for user programable interfaces	**ID**/skel/templates
Sesam Server-components	**ID**/bin/sesam
sms- und stpd-components	**ID**/bin/sms
Sesam Server Gui-components	**ID**/bin/gui
Sesam Server database components	**ID**/bin/db

During setup the following directory structure is created:

Initial values files	**ID**/var/ini
Database	**ID**/var/db
Loging main directory	**ID**var/log
Short living files	**ID**/var/tmp
Temporarily files	**ID**/var/work
File pointing to root ini files	/etc/sesam2000.ini

In **{ID}/var/ini** the following initialization files are created:

sm.ini

sm_java.policy

sms.ini

odbc.ini

debug.ini

sm_lic.ini

stpd.ini

Chapter 8

The SEPsesam GraficalUserInterface (GUI)

Starting **SEPsesam**, the connection to **SEPsesam** database is created at first. After this, the main screen opens from where all **SEPsesam** procedures can be started.
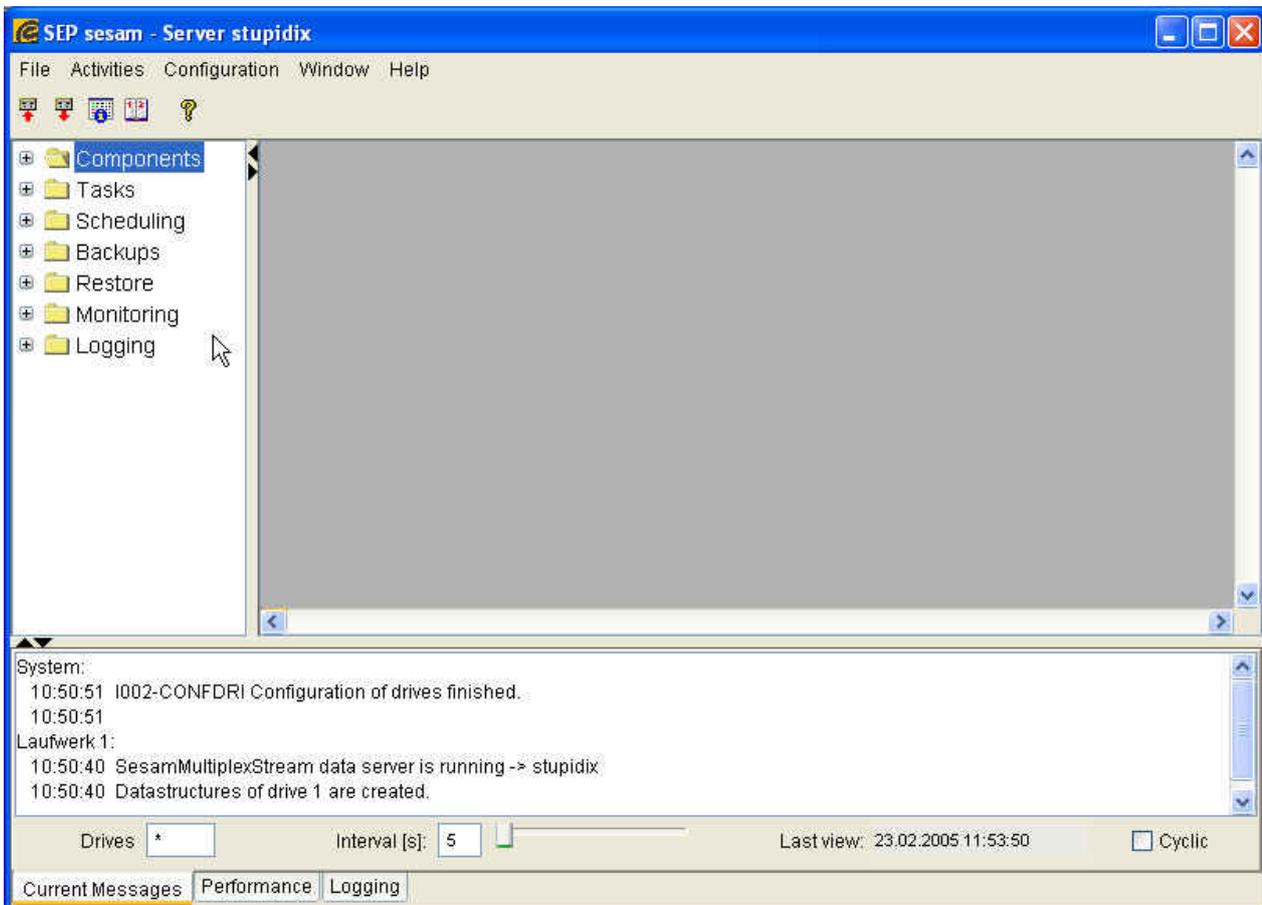
The main screen consists of title-, menu- and tool-bars (top) as well as component window (left), display window (right) and activities display window (below).

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In the **menu bar File, Activities, Configuration and Help** menu titles are displayed. These denote certain groups of similar actions. By clicking with the mouse pointer or activating Alt + the key of the underlined letter, a drop-down menu is opened with several subitems (functions, actions, commands).
These subitems can also be activated by a mouseclick or via Alt + key of underlined letter and input masks for further or more precise definition of an action are opening up.

In the **toolbar**, buttons (shortcuts) for a quickstart of the most important functions such as **backup**, **restore**, **display backups by state**, **calendar sheet**, and **?** = about **SEPsesam** are present.

The display of the current server is only visible in the GUI of a **MasterSesam**.

In the **Component** window on the left, components of the **SEPsesam**system are shown.
With additional mouseclicks submenus can be opened and more and more detailed information is displayed or activities are started.

In the bottom **activities display** window, messages and protocols for the observed drives are shown.
**Last View** indicates the latest update of the information. If the check box cyclic is marked, the update process of messages will be cyclic in pre-set intervals.

Example how to select drives:

*	all drives
1	Drive 1
1,2	Drive 1 and Drive 2
2-5	Drive 2 to Drive 5

In the **performance chart** the transferred data quantities in the single SMS-channels are presented during the executing backups/restores respectively.
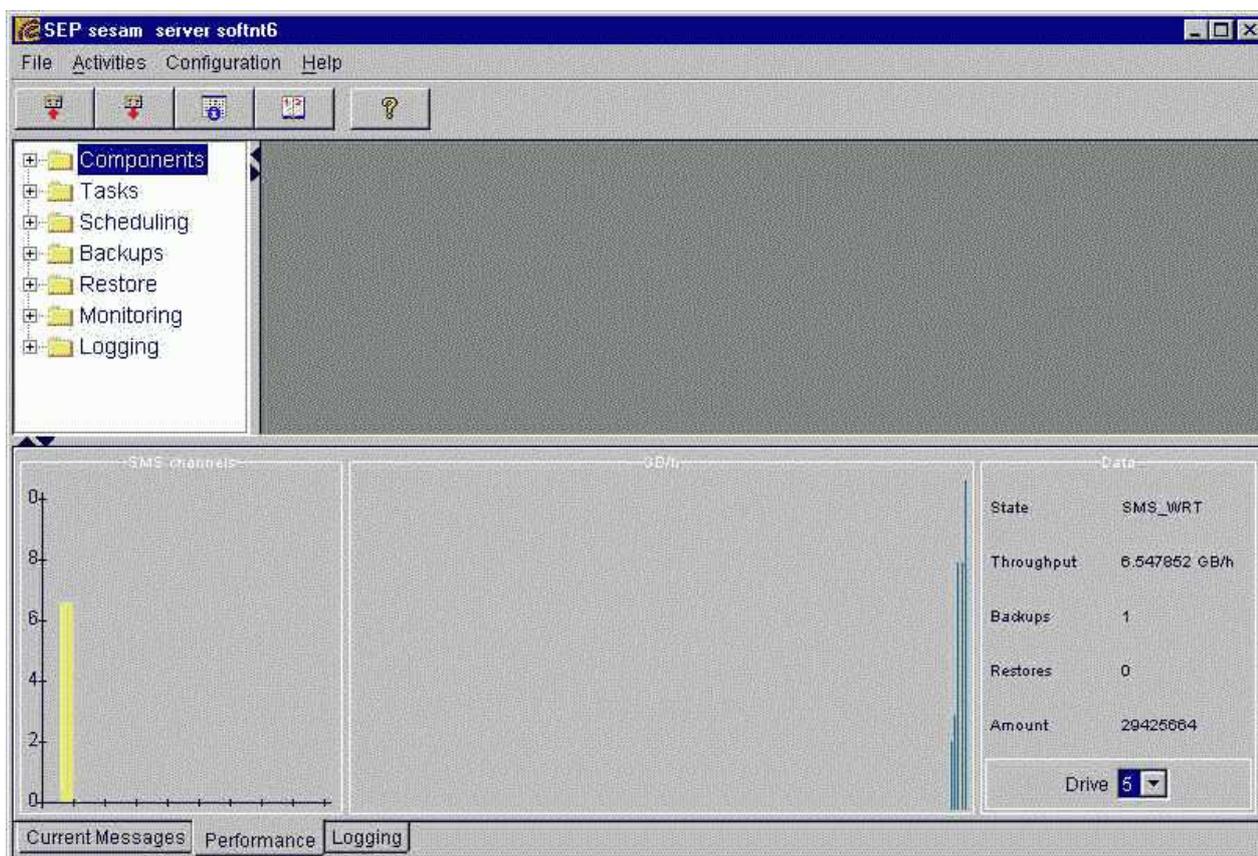
Useful Tips:

By simply dragging the mouse from the corners or the sides all windows can be trimmed to the desired size.

Invalid entries are generally prevented by the interface, i.e. only acceptable charcters can be entered (e.g. the task name must not contain blanks, \, /, ? or *). The input length is also supervised.

The optical appearance of the output table can be interactively adapted to the individual requirements with regards to column arrangement, column width or sequence of sorting.

|	
Column arrangement	By clicking and holding the column head of the desired column, it can be moved within the table
Column width	If the mouse pointer is pulled across the right side of the column head, the mouse pointer changes into ->. If within this space the left button of the mouse is pressed and held, the column width can be changed as desired
order of sorting	By clicking the mouse once in the column head the table is sorted in accordance with this column by the first click upwards. The second click changes it to downwards

8.1 File

Exit closes all open windows and returns to the system level. Running processes such as backup or restore are not affected by this.

8.2 Activities

8.2.1 Restore, Restore wizard

With this function, backed up files can be copied back from backup media (tape, disk etc.) onto the desired computer (client) (see 6).
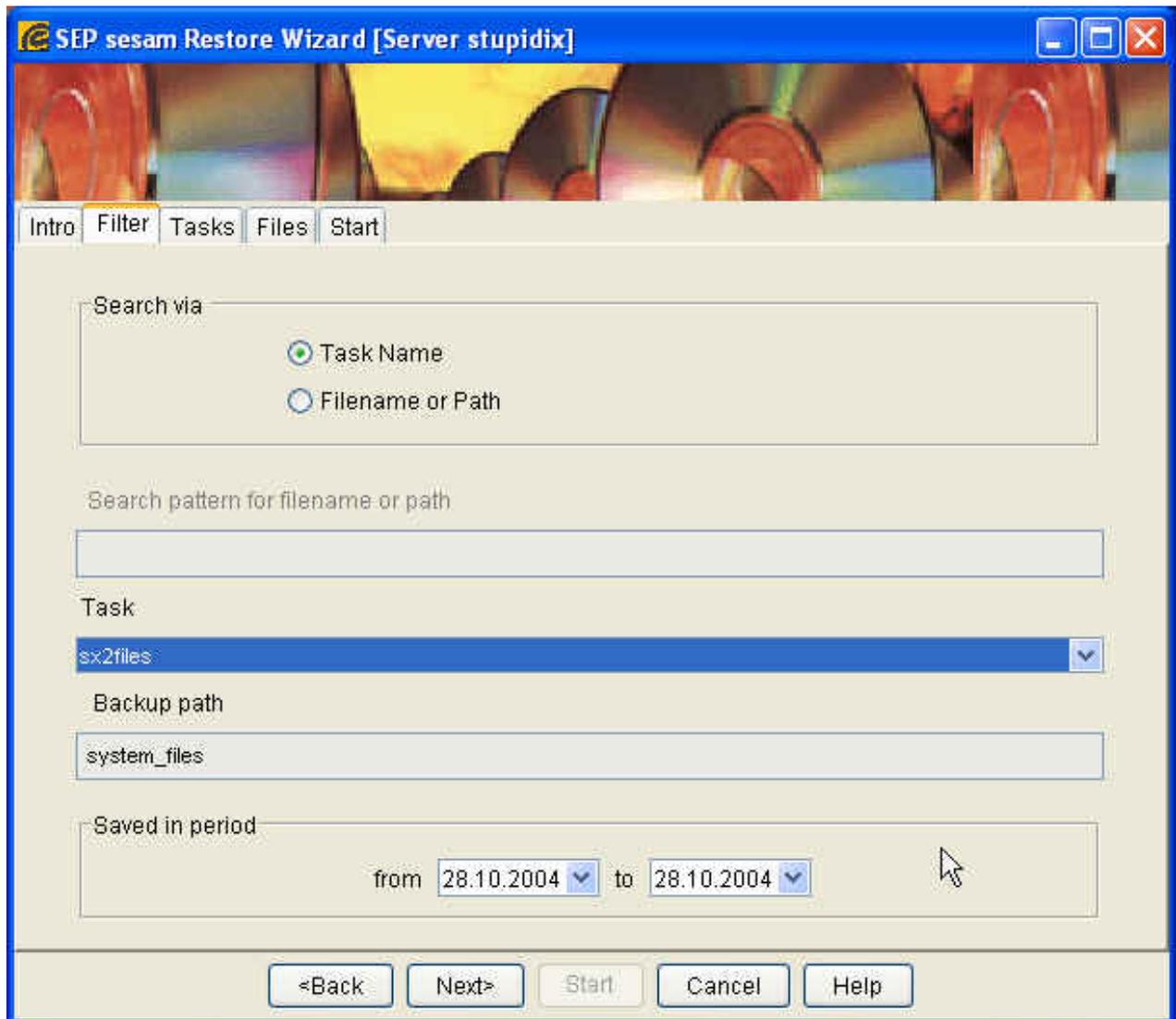
In **Intro** the administrator can find a short description of the restore procedure.

Searching by task name

To search for a certain task intended for restore, the selection fields **task** and **saved in time interval** representing * all tasks are selected.

After activating the button **Next** the savesets created within the given period are shown in table format.

Searching by File or Path Name

This function supports the search for files or directories. By this means backups containing these files or file patterns are found. There is an input-field **Search Pattern for Filename or Path** as well as selection-fields **Task** and **Saved in time interval** (for time limitation of output). With * , all tasks are selected. After activating button **Next**, the savesets created within the given period and matching the file patterns are shown in table format.
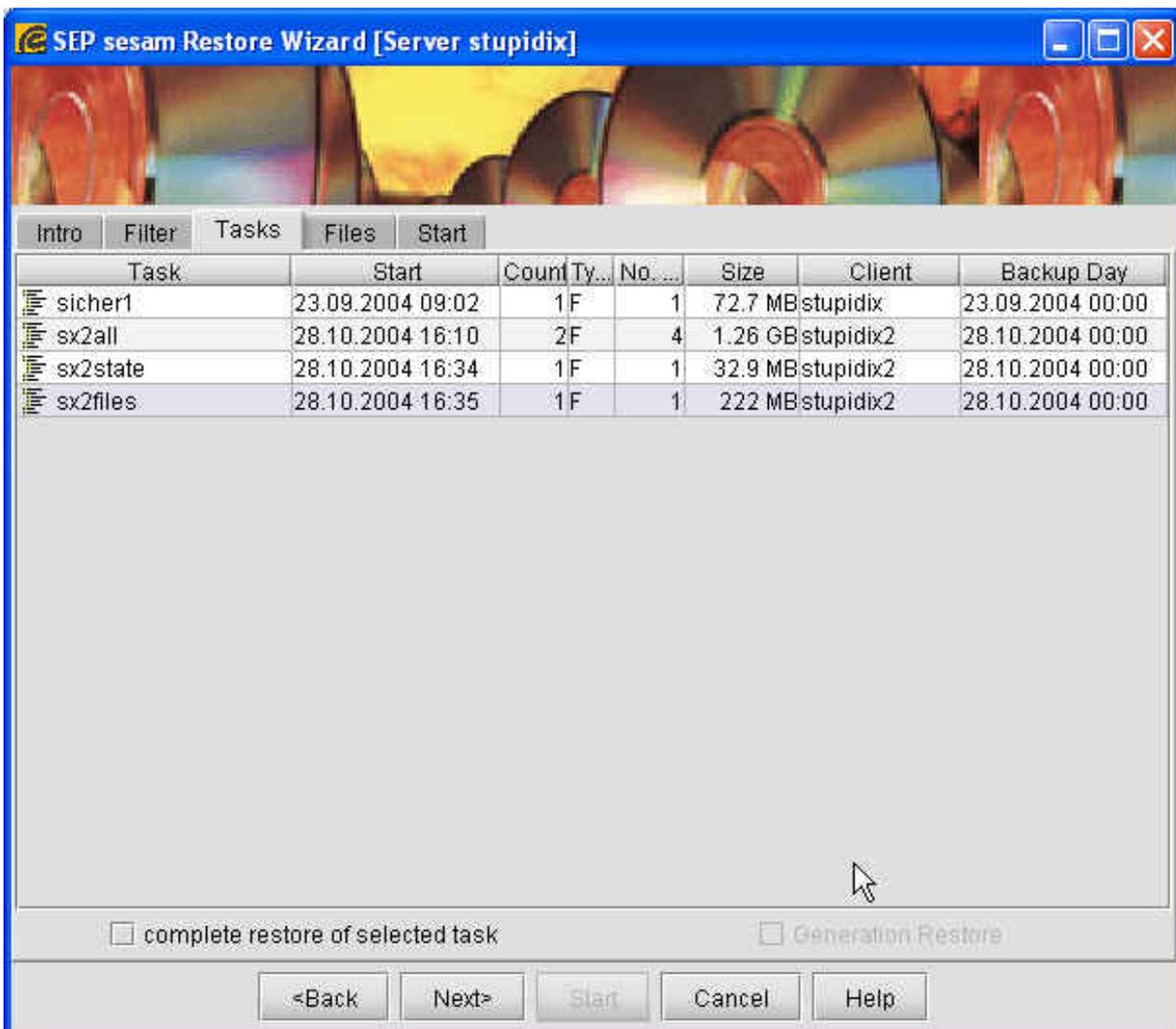
Task	Task name (User specified identifier)
Start	Start time of the backup
Run	Current number of the backup within backup day ( )
Type	Backup type (C=copy, D=differential, F=full, I=incremental)
Media Quantity	Counter of media, written during the backup
Size	Saveset size
Client	Backed up client
Backup Day	Date of the backup day

If **completely restore selected task** is selected, then the final mask of the wizard appears (Start the Restore).
Otherwise, the file selection mask of the selective restore appears.

If a backup of type **diff** or **incr** is selected, then the input field for generation restore (see 6.3) is also activated, i.e. **SEPsesam** calculates all necessary restoring steps from the last full backup up to the selected one and executes these automatically including the required media changes.
If this switch is de-activated, then only the selected saveset is used.

After selection of a certain task and marking the button **Next**], the following screen appears.
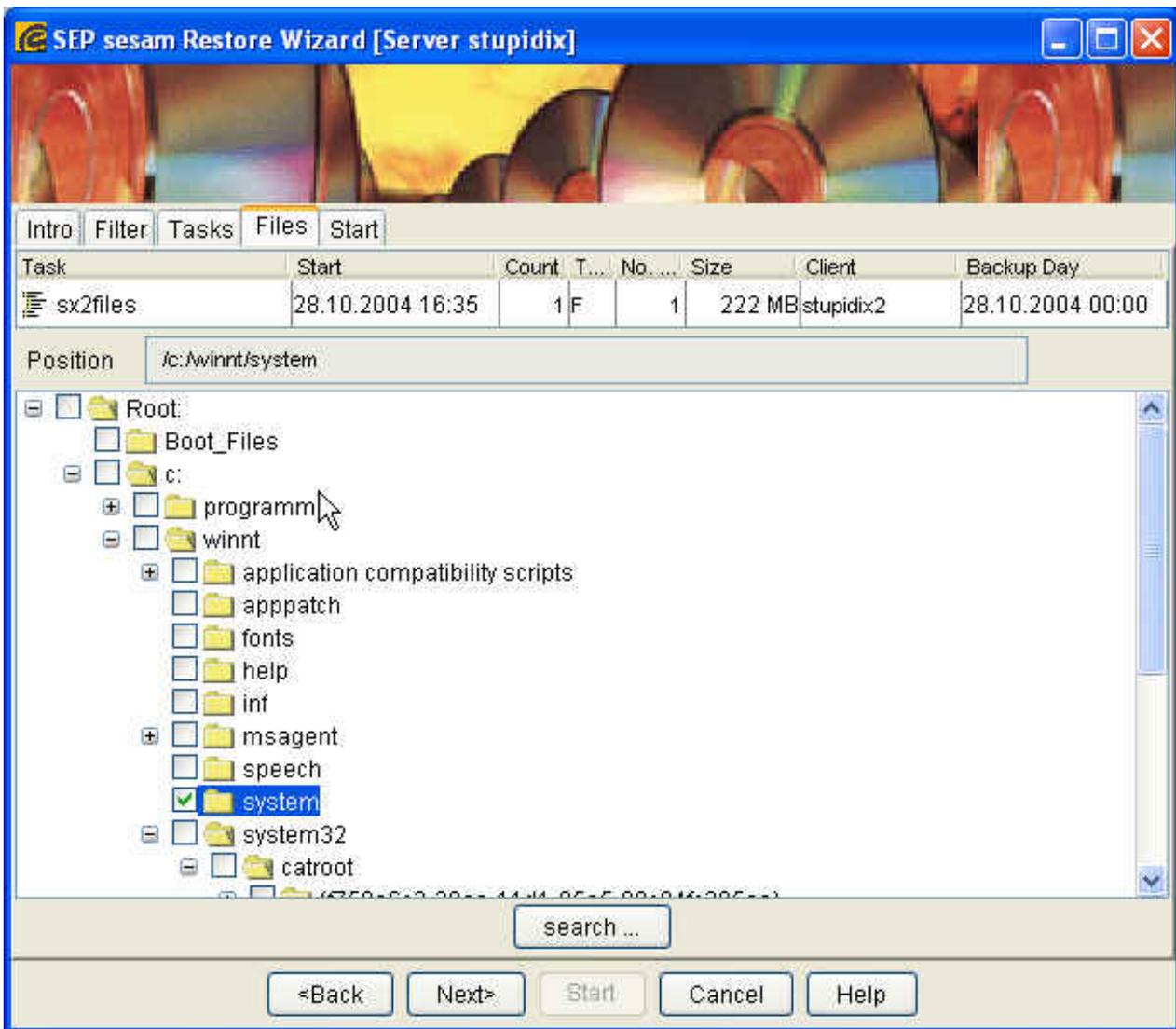
In the screen´s header the task selected before reappears. All directories and files of the saveset are displayed in a tree structure.

Double-clicking the symbol [+] left to a directory changes it to [-] and the directories and files within it become visible. Another click on the [-] closes the directory again.

Clicking the checkbox left to a file or directory marks these directories/files for restore (checkmark).

The absolute path of the marked directory or file is visible in the top field **Position**.

Hint

Marking of a directory refers to all sub-directories and files contained in it.

The **Search** button opens a mask in which directory, file names, or parts thereof, can be entered as criteria. The directories/files found appear directly below in the form of a list. The directories and/or files can be marked (clicking the checkbox) and after pressing the **OK** button they are inserted in the upper window. With the button **Reset** this mark can be reset. After

activating the button **Next** the screen **Start** appears to start a restore.
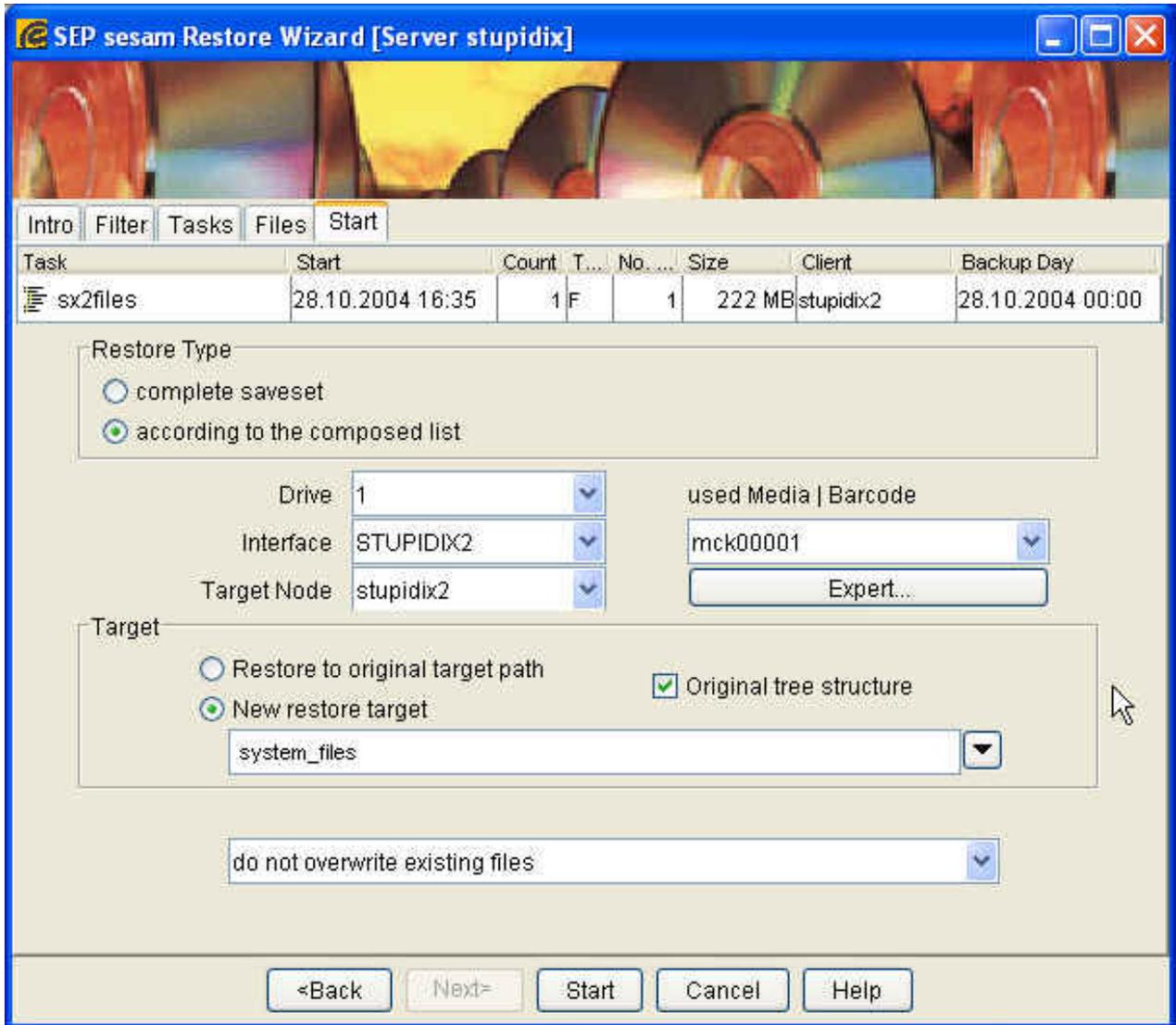
In the header of the mask the selected saveset is shown again. In case of a selective restore the checkbox **Restore according composed list** is marked. If no file was selected in the previous mask (i.e. if the whole saveset must be restored) the optional checkbox **Restore of the Complete Saveset** is marked.

In the middle part the drive (where the media containing the saveset are to be loaded) the network interface to use and the target client for restore is inserted. The field **Used Media** shows the required media.

In **New restore target**, another restore target than the original can be defined. In this case it is necessary to fully define the target path, under which non-existing directories should be created.

There are additional options to select whether the restore can overwrite equally named files or not.

By activating the button **Start** and a confirmation in dialog box, the whole restore process is started.

With the button **Back** it is possible to go back to previous masks.

With **Cancel** the restore wizard exits without any action.

The triggered restore is stored in **SEPsesam's** database as a restore task under the current time stamp (**GUI:Components-Tasks**) and can be repeated in **GUI:Activities-Immediate Start-Restore** (see 6).

Button Expert

By activating the button "'Expert...''' a new window opens with the tabs "'Options''', "'Reduction''' and "'Filter'''.

Tab Optionen
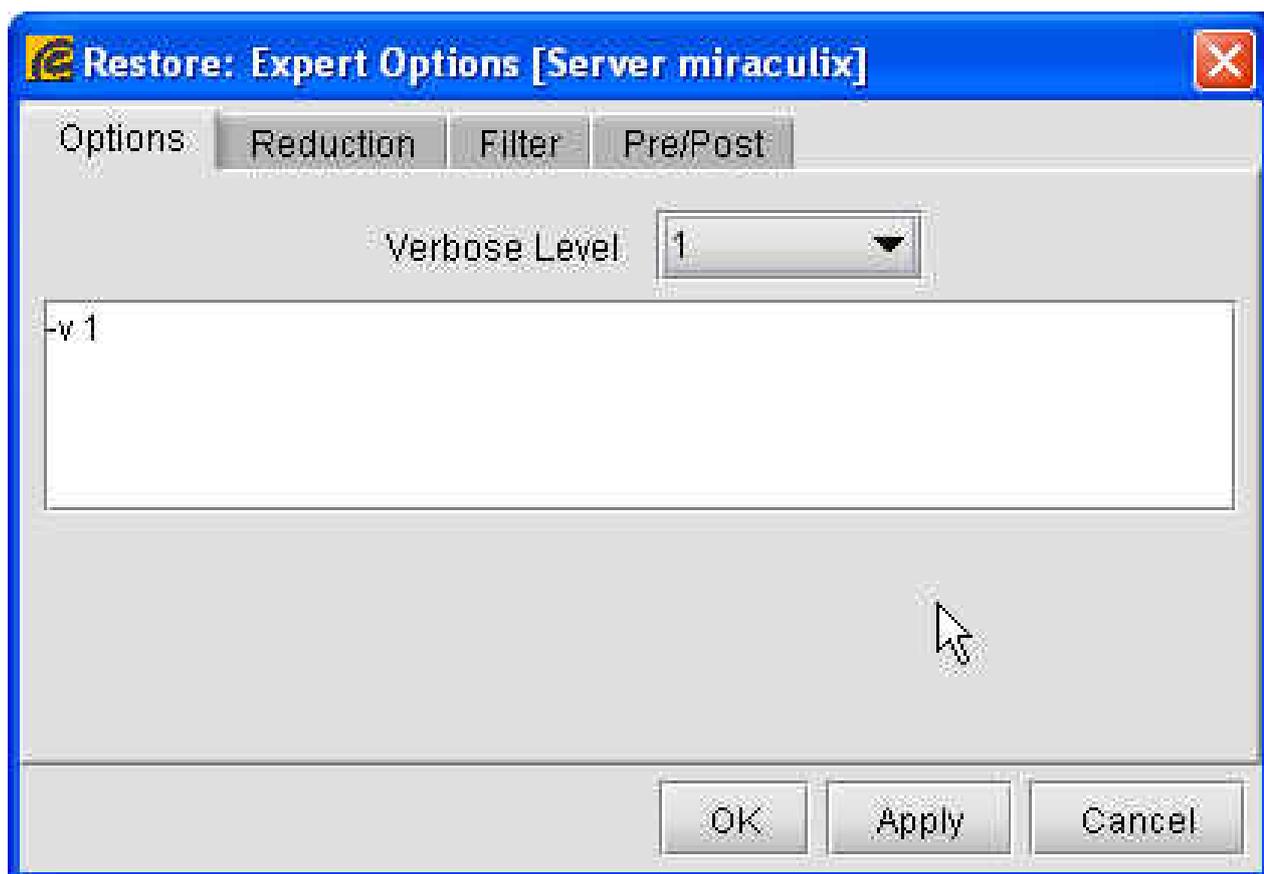
In the window "'Expert Options''' there is a way to assign additional arguments for the restore. This is helpful for special sbc commands. In this tab there is a way to set the verbose levels of the trace output. The verbose level ranges from 0 - 6 or "'no''' can be set. As higher the number as higher the trace information will be logged by the restore. For more options you can contact our support or read the additional documentation for special sbc clients (e.g. sbc für MS Exchange).

Tab Reduction
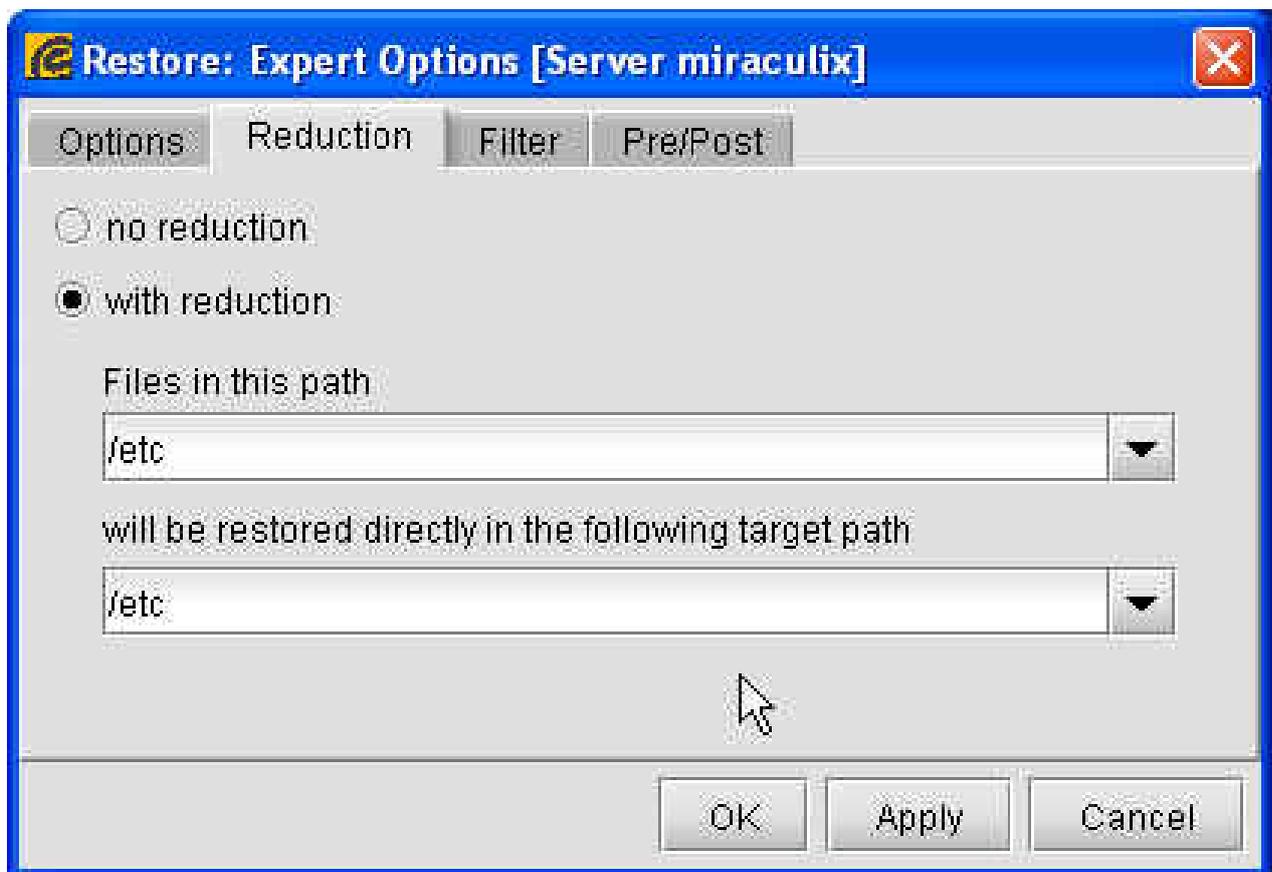
Without the option reduction the restore will be saved with the original tree structure.

With reduction the data content in "'Files in this path"' will be restored in the directly beneath showing path.

Example (with the above Screenshot)

Under D:/Programms/SEPsesam/var/ saved files should receive a new restore target in the folder D:/sesam/var/. The sub directories also will be created in D:/sesam/var/.
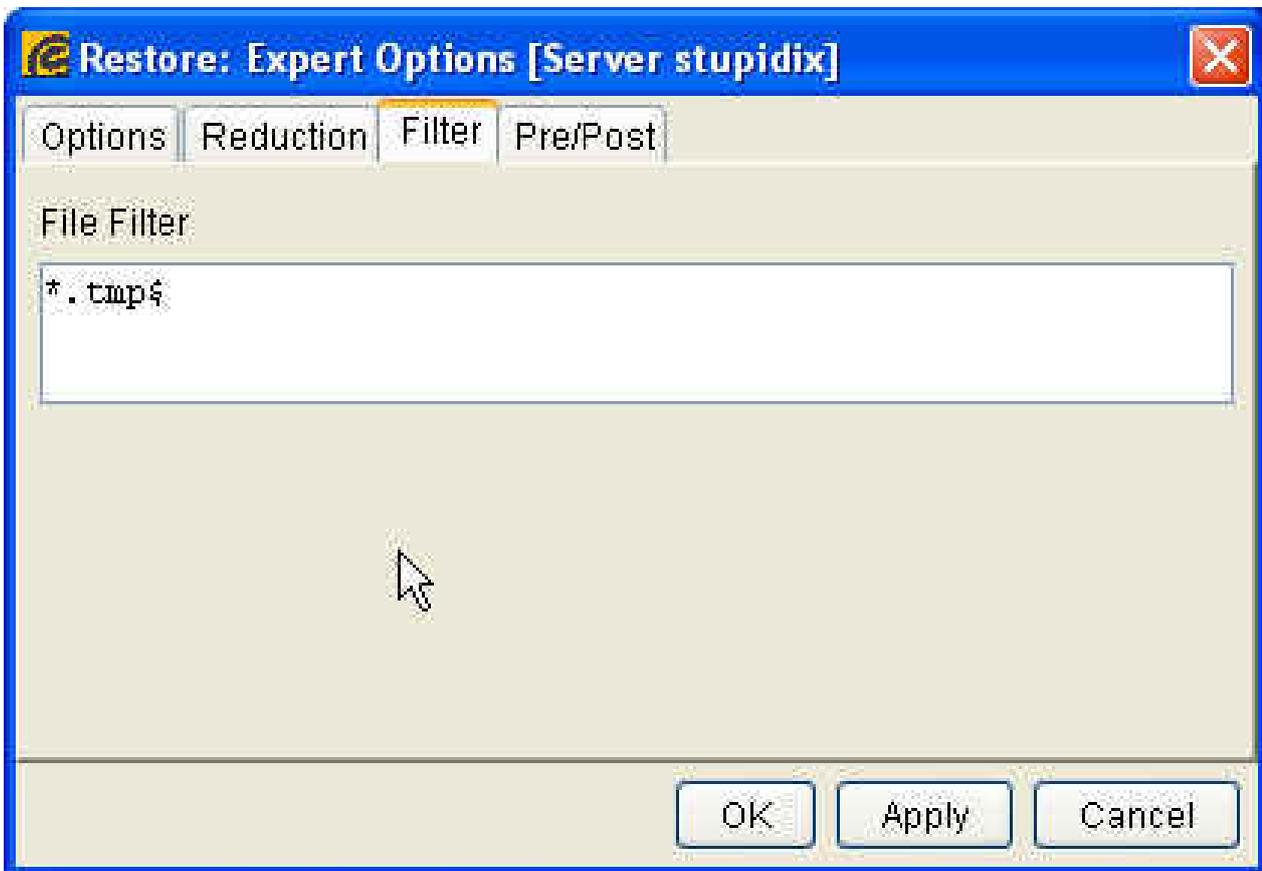
In the tab "'Filter"' it's possible to insert **regular expressions** (see 9.4) to exclude directories or files from the restore.

Confirming the button **Ok** all settings will be saved and the window closes.
Confirming the button **Apply** all settings will be saved.
Confirming the button **Cancel** the "'Expert"' window will be closed.

8.2.2 Immediate Start Backup

Immediately starts a backup process by inserting it into appointment calendar at current time.

Task	Selection of a configured task
Task group	Selection of a configured task group
Backup Type	Selection of backup type (Full, Diff, Inc, Copy)
Media Pool	Selection of a media pool the backup data should be copied to
Drive Group	the backup is executed on a drive, automatically selected by **SEPsesam** from the drive group, specified in the media pool (not editable)
Drive (opt.)	Selection of a specific drive from the selected drive group
Interface (opt.)	additional TCP/IP-Name of the source-client
Start time	Entry in the appointment calendar - can be modified (Delay, etc.)
Function of buttons	
OK	insert into the appointment calendar
Cancel	No action and return to the start screen

8.2.3 Immediate Start Restore

Immediately restarts a restore task already configured through the restore wizard.
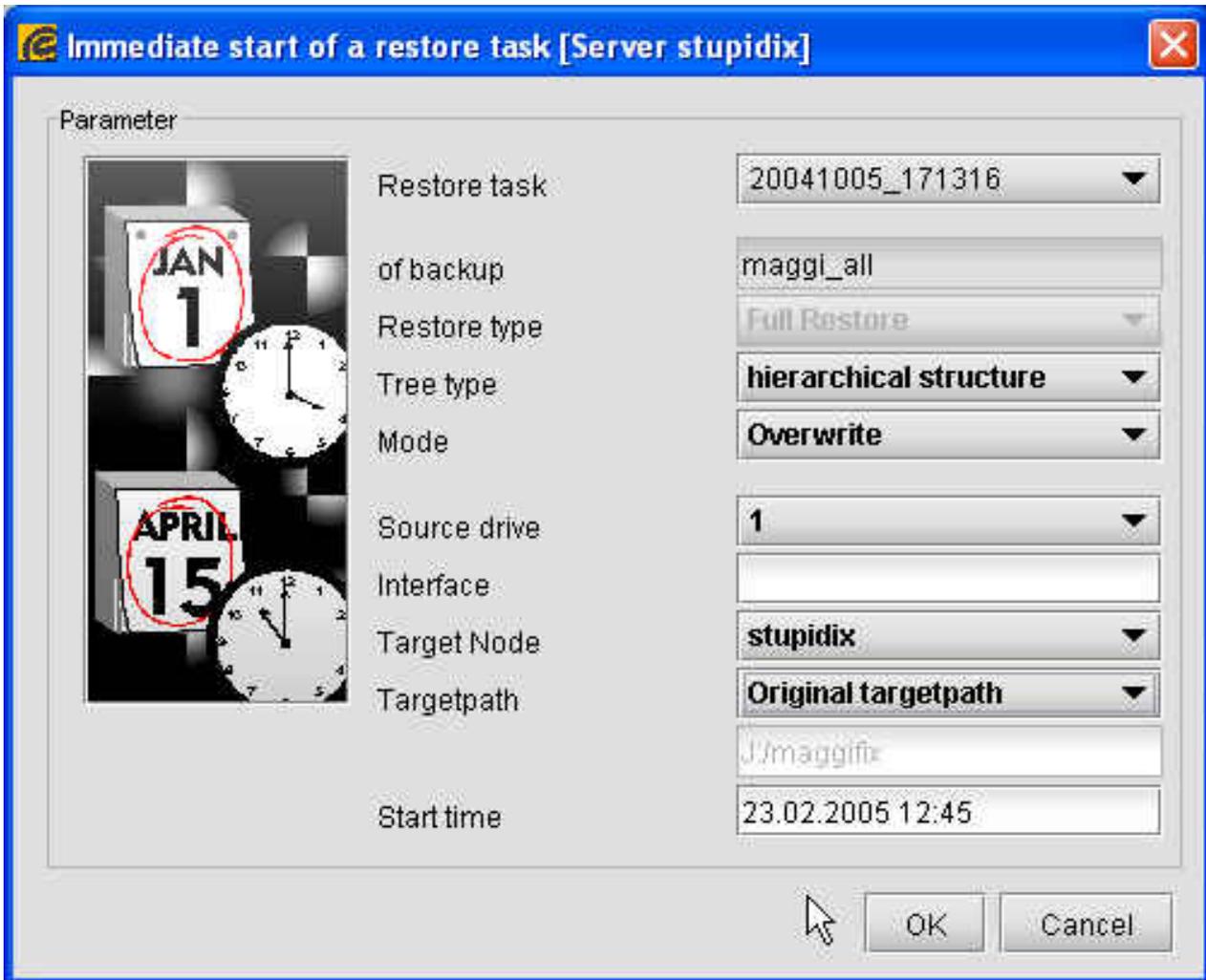
Restore task	Selection of a defined Restore task
of backup	Name of the backup task
Restore type	full or selective
Tree type	keep the directory structure or "'flat"' (=copy everything in 1 directory)
Mode	Overwrite existing files or not
Source drive	Select a drive, from which the Restore should be performed
Interface	further TCPIP-Name of the source-client .
Target Node	Client on which the data from the storage media should be copied
Start time	Entry in the appointment calendar - can be modified (Delay, etc.)
Function of buttons	
OK	Insert into the appointment calendar
Cancel	No action and return to the calling screen

8.2.4 Immediate Start Media Action

Immediately starts a media appointment by inserting it into appointment calendar at current time.
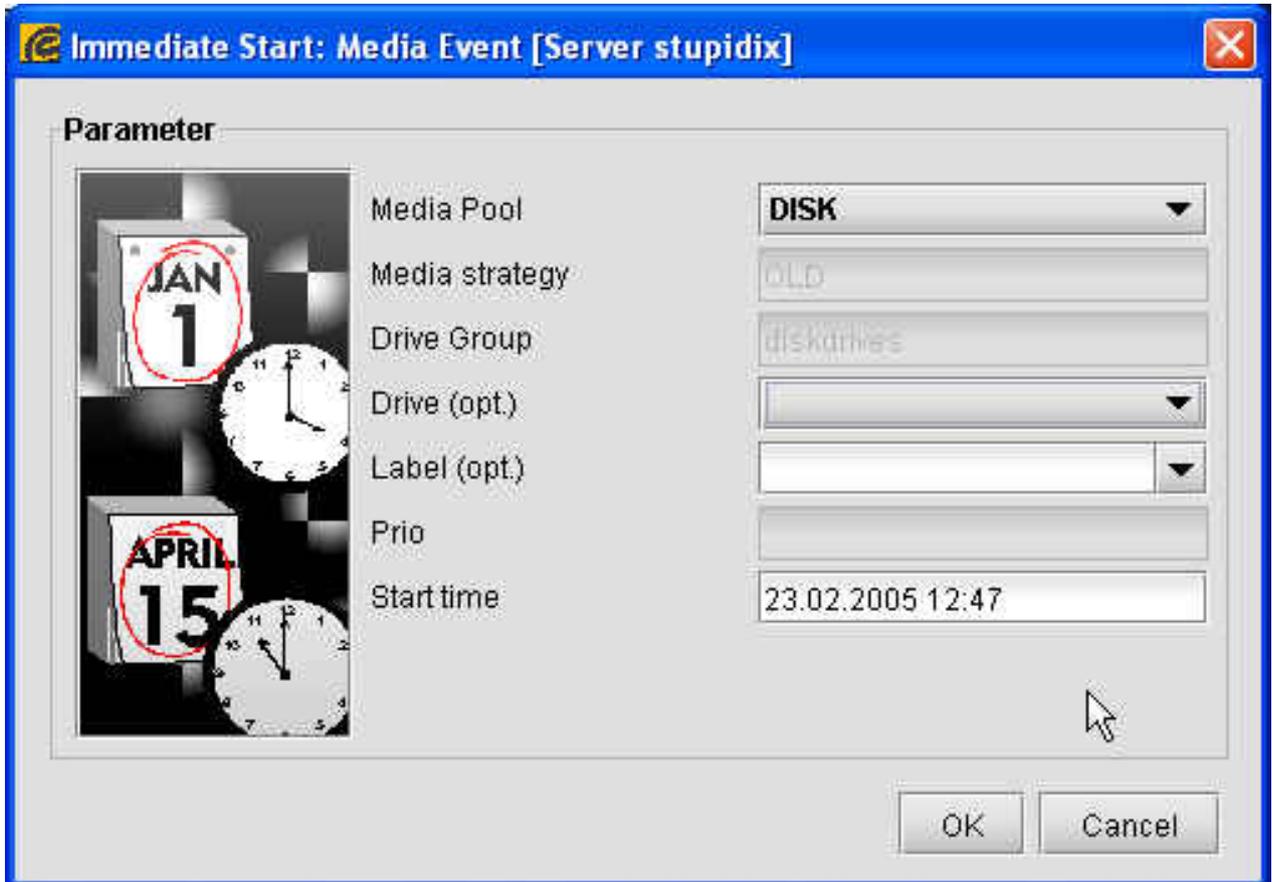

Media Pool	Selects a media pool
Media Strategy	GET_OLDEST-Strategy (not editable)
Drive Group	According to selected media pool
Drive	Selects a certain drive from the specified drive group
Priority	Executed without priority, i.e. always
Start Time	Entry in the appointment calendar- can be modified (Delay, etc.)
Function of buttons	
OK	Insert into the appointment calendar
Cancel	No action and return to the start screen

8.2.5 Immediate Start Command

Immediately starts a command appointment by inserting it into appointment calendar at current time.

Additional hints for the executability of command appointments can be found in the Administration Manual (access restrictions of command appointments) .
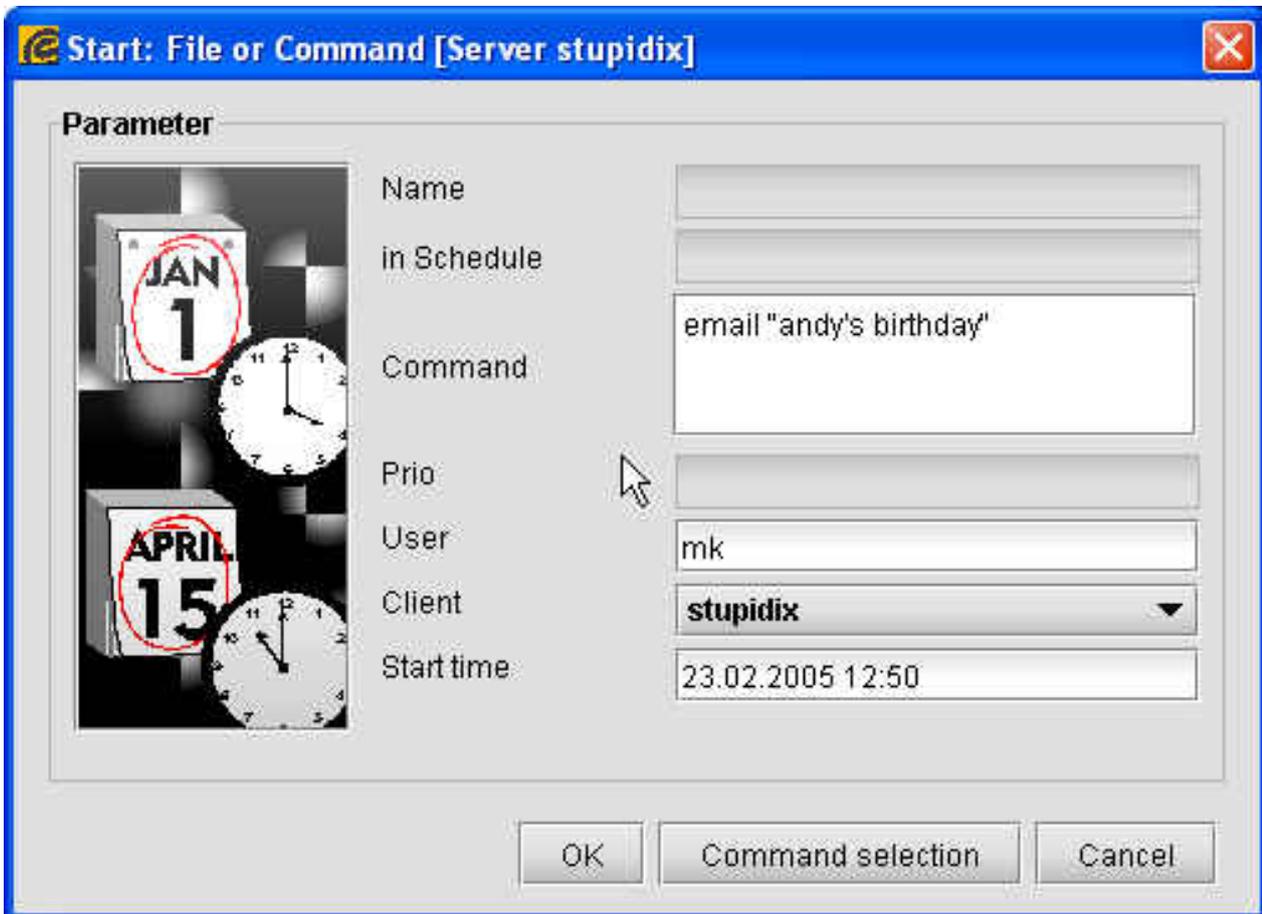
Name	Execution without name
in Schedule	Execution without schedule (once)
Command	Command specification
Priority	Execution without priority, i.e. always
User	appropriate user identified in access restriction table at the client
Client	Computer on which the command should be executed
Start Time	Entry in the appointment calendar- can be modified (Delay, etc.)
OK	insert into the appointment calendar
Command Selection	opens a window to select from already created commands
Cancel	No action and return to the start screen

8.2.6   Restart of Backups

All failed backups of a **SEPsesam** backup day (see 4.4) can be restarted within this window.
Clicking on the button **Start** tasks, the ones not restart can be deselected (the check disappears).
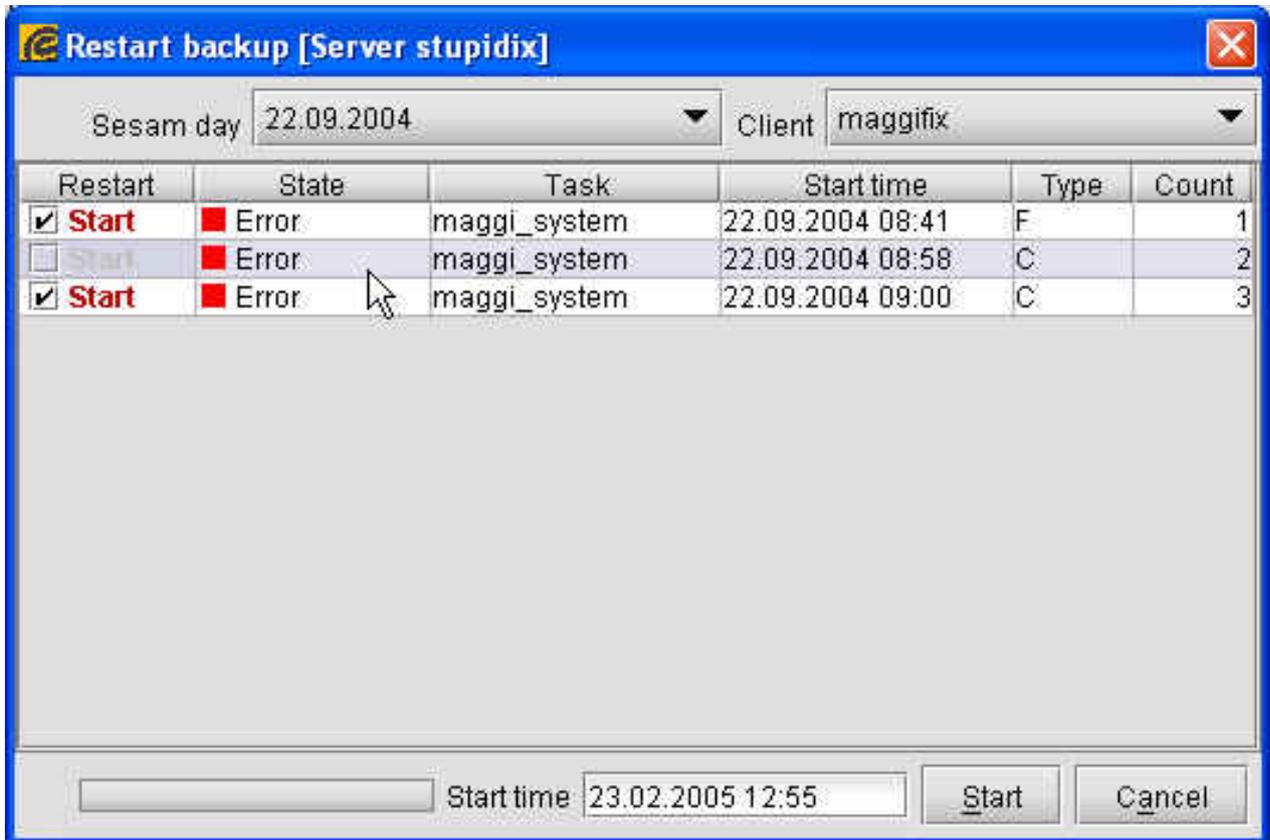
Sesam day	select a **SEPsesam** backup day
Client	Select a client from which information is to be shown
Restart	Activates restart of backup
Server	on MasterSesam only
	shows information from other **SEPsesam** Servers as well
Status	reason of error
Task	Name of backup task
Start time	of failed backup
Type	backup type (F=Full, D=Differential, I=Incremental, C=Copy)
Count	Number of executions of this task during backup day
Start	Starts selected backup tasks at the specified time
Cancel	No action and return to the start screen

8.3 Configuration

The **Configuration** screen is presented as follows:
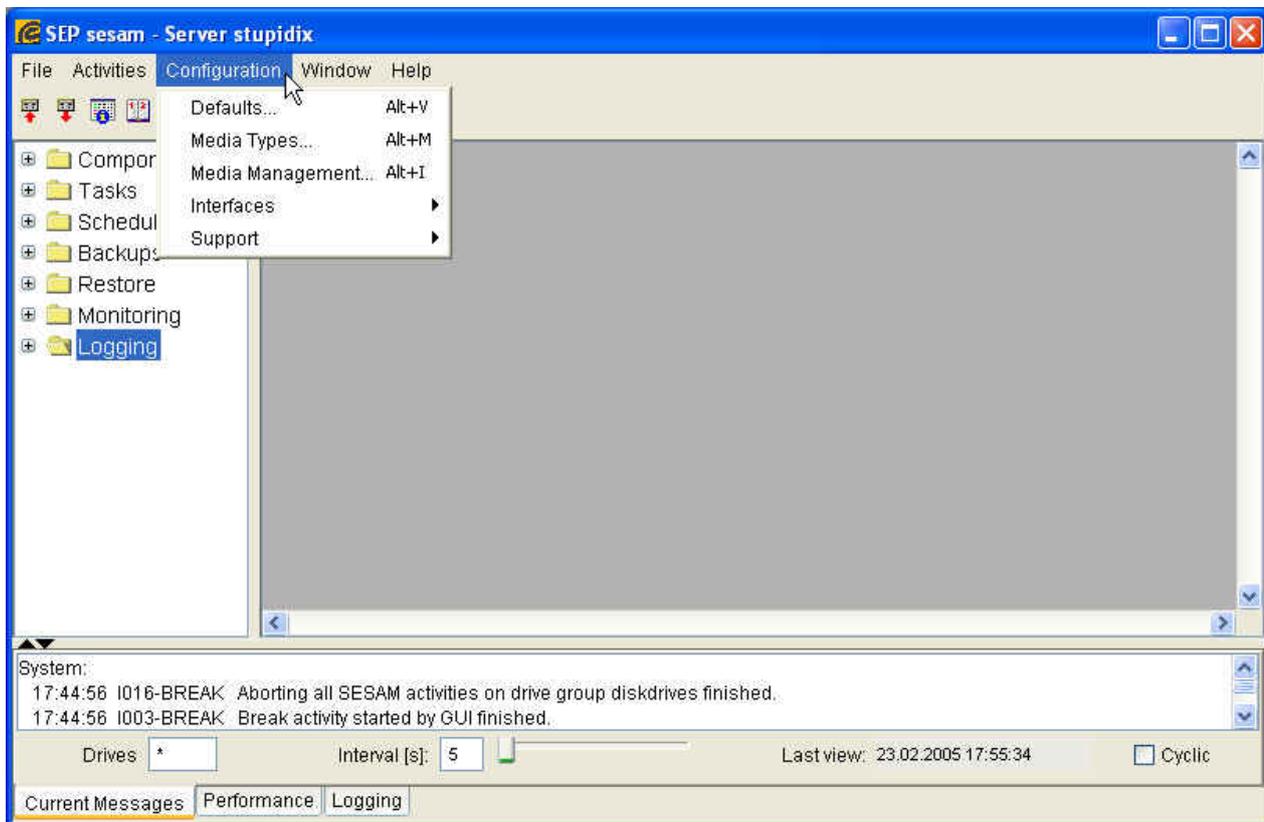
8.3.1 Setting Defaults
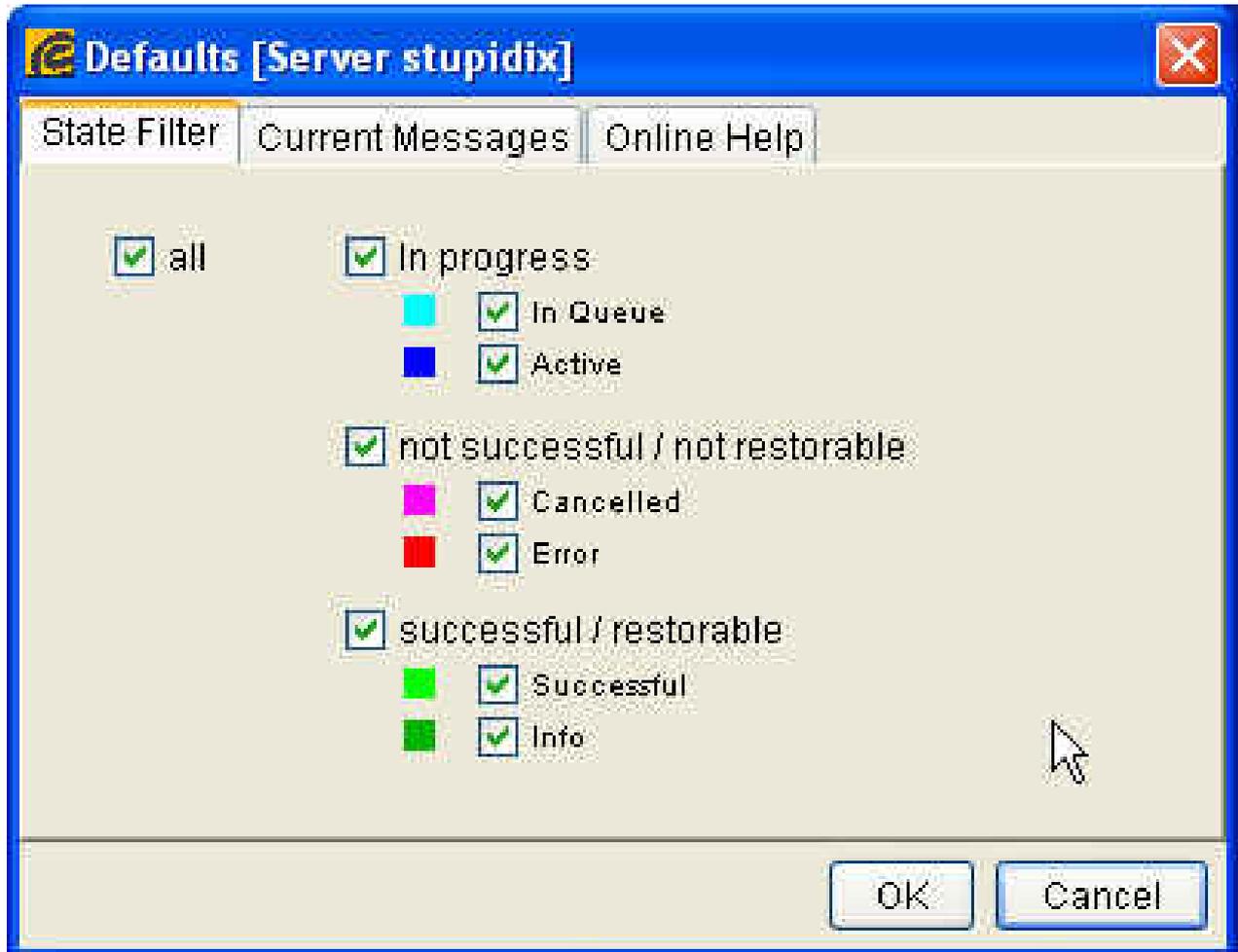
Default values for status filters, the current messages window and online help can be set here.

In **Statusfilter** categories are defined, which are shown in *Backups by Status* (see 8.8) and *Restores by Status* (see 8.9) .
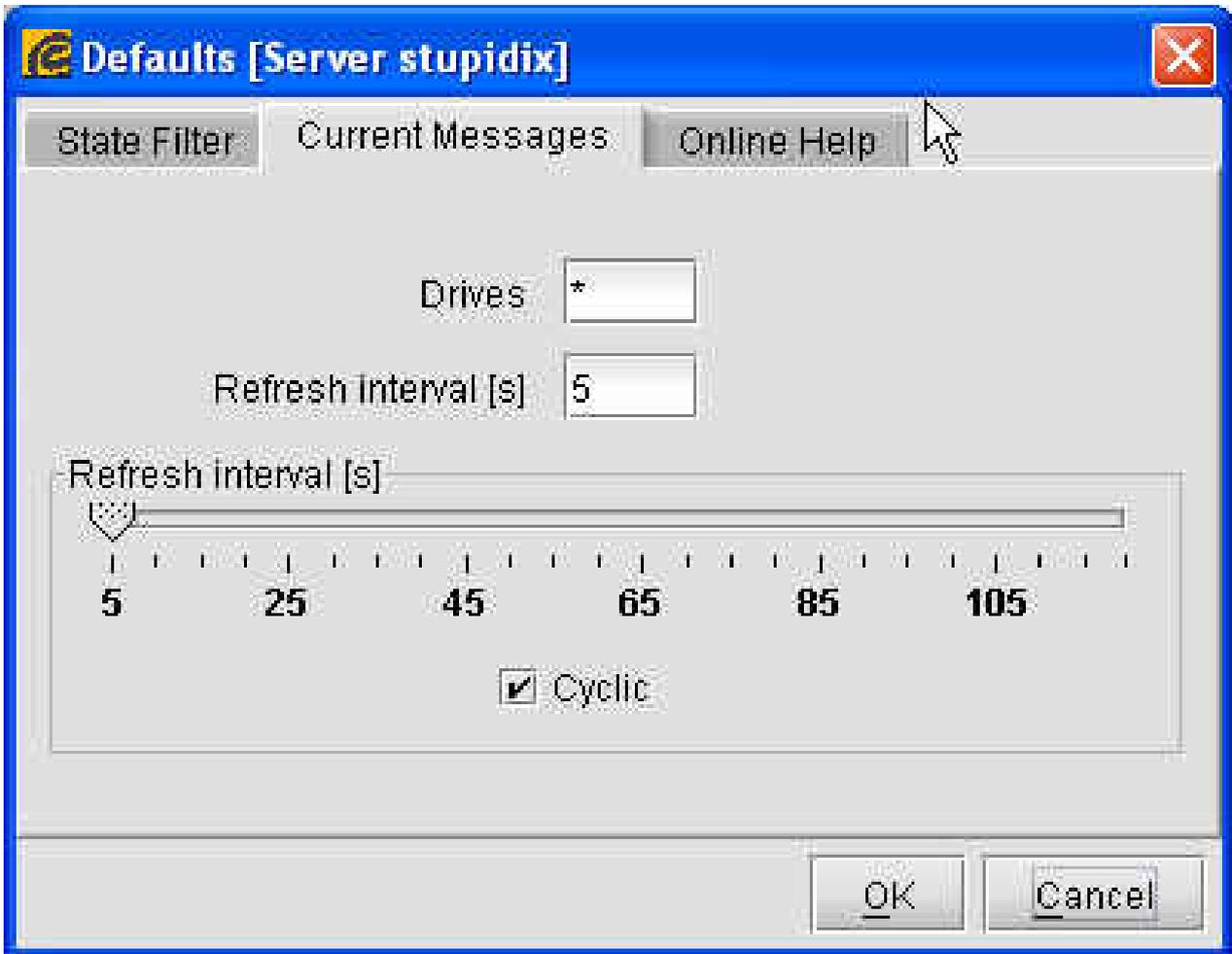
In **Current Messages**, defaults for the bottom informations window are set.
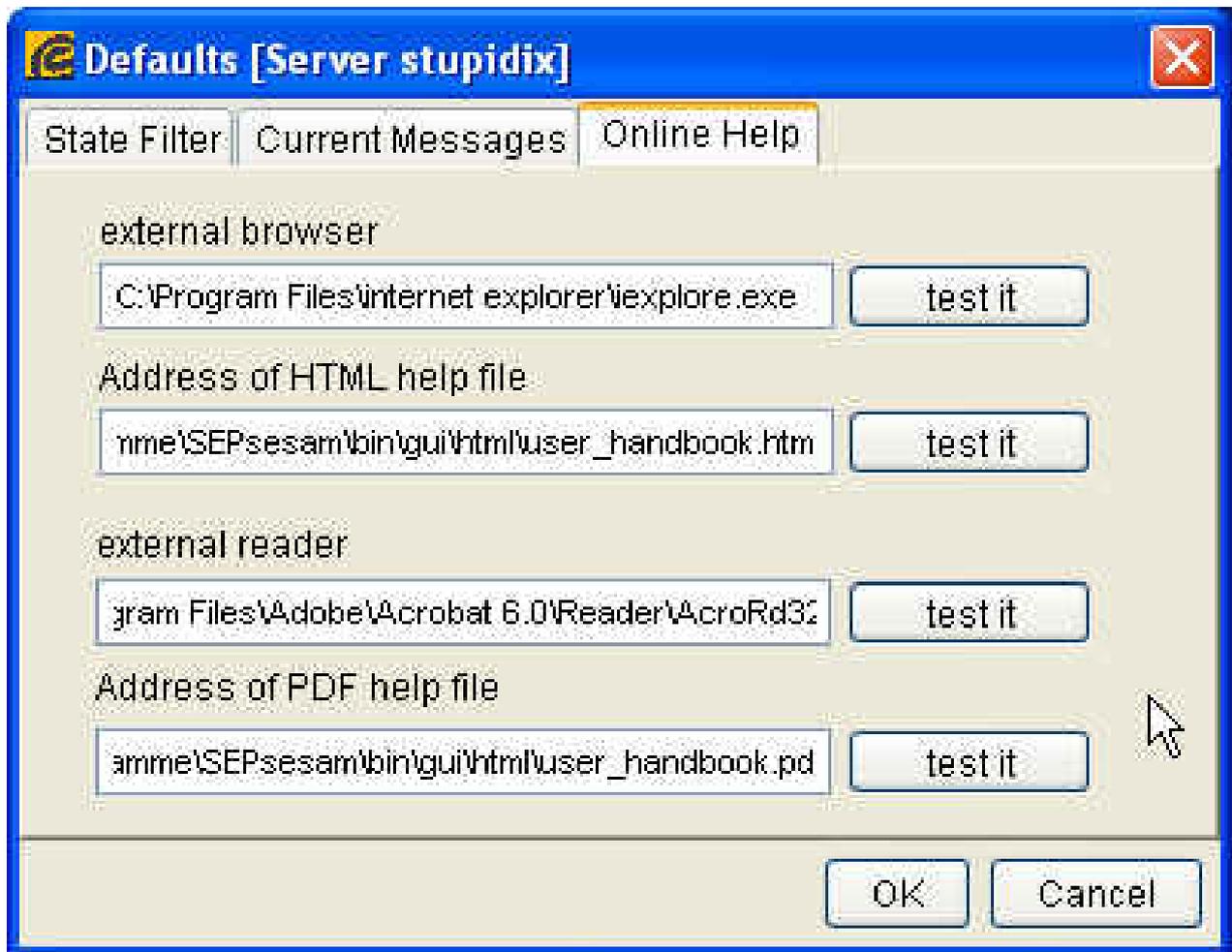
In **Online Help**,the browser and reader installed on the administrator´s computer are assigned. These will work with the HTM- and PDF-files containing **SEPsesam's** online help.

After entry of the appropriate data the button **Search** changes to **test** , immediately allowing a check of online help.

8.3.2 Media Types

Listing of all media-types defined in **SEPsesam**. Entries in black font are the media types currently used. They were set up in the database at the installation of **SEPsesam** and -contrary to the user defined media types (green font)- can be neither erased nor changed.

Media Types [Server stupidix]

Media Type	Drive Type	Capacity
CDR_650	CDR	650 MB
CDR_700	CDR	700 MB
CDRW_650	CDRW	650 MB
DVDR_4700	DVDR	4.70 GB
DVDRW_4700	DVDRW	4.70 GB
DISK_25	DISK_CHNG	25.0 MB
DISK_100	DISK_CHNG	100 MB
DISK_200	DISK_CHNG	200 MB
DISK_300	DISK_CHNG	300 MB
DISK_400	DISK_CHNG	400 MB
DISK_500	DISK_CHNG	500 MB
DISK_1000	DISK_CHNG	0.97 GB
DISK_2000	DISK_CHNG	1.95 GB

New   Change   Delete   Cancel

Media-type	**SEPsesam** internal identification of the media type
Drive-type	**SEPsesam** internal drive types
Capacity	Storage capacity of an allowed combination media / drive
New	Setup of a new media type
Change	Saves changes (then Close to return to the calling screen)
Delete	Remove a media type from the database
Close	No action and return to the start screen

Allowed media-types:

Media-type	Description
DISK_	Media on directory oriented storage devices (disks, diskettes, also virtual etc.)
DAT	4mm technology (Digital Audio Tapes)
TK	1/2 inch technology (DLT)
THXKD	1/2 inch technology (super DLT)
EX	Exabyte 8mm technology (Video)
ULTRIUM	DLT-technology
SLR	QIC-technology

Allowed drive-types:

Drive-type	Description
DISK_CHNG	DISK virtual drive on changable media
DISK_HARD	DISK virtual media on disk
AIT	AIT IBM-Drives
DLT	DLT
SDLT	DLT SuperDLT
DAT	DAT DigitalAudioTape
DDS	DAT DigitalAudioTape
EXA	EXA Exabyte
QIC	QIC Tandberg
SLR	QIC
LTO	LTO
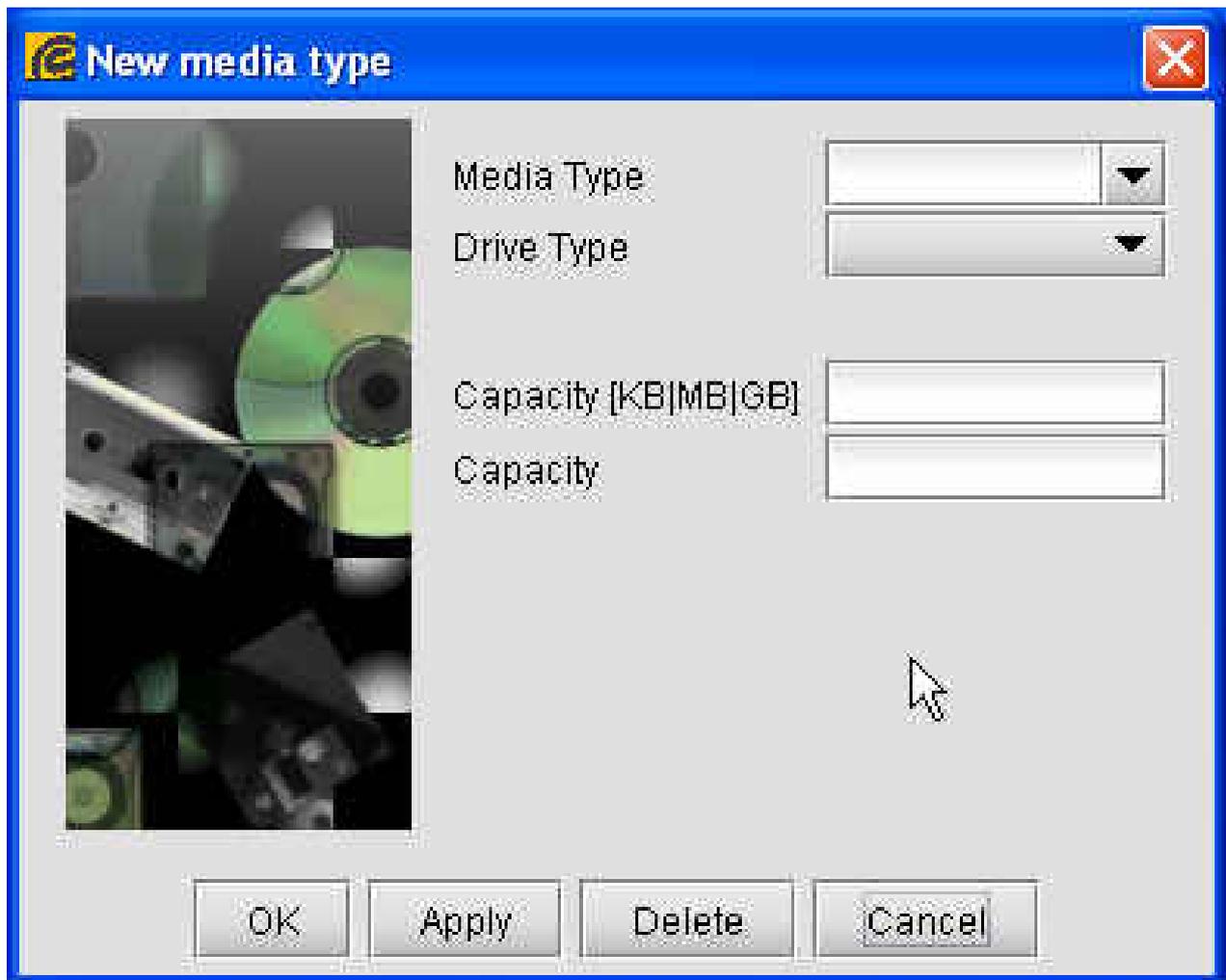
New type designations for media and drives can be created or new combinations can be derived from existing ones.

8.3.3 Remote Server

This item is used for the server administration of **MasterSesam** (see 2.8.5) .
It is possible to both configure or remove **SEPsesam** servers as well as to post new servers to the system.

Hint
Available in the MasterSesam version only.

Server Name	Name of additional **SEPsesam**-Server in the network
Connection	Server is on the network (green = ON)
	Server is not on the network (red = Broken)
	No connection requested (gray = OFF)
DB-Version	Database-Version
Type	Connection type between GUI and Kernel
Operating System	of the **SEPsesam** Server
New	Enter a new **SEPsesam**-Server in the list
Properties	Modify the Server-Parameters
Delete	Remove a Server from the list (after confirmation)
Close	Closes the screen without action

With a **MasterSesam** other **SEPsesam** Systems are administered.

8.3.4 Interfaces

User interfaces are small procedures of the operating system interpreter which can be programmed by the user.
SEPsesam starts these procedures with certain parameters on certain events but is not concerned with what these procedures do.
Only the PRE/POST-interface can have an effect on the execution of backups. These programs should not run for too long since they can delay the backup.

Templates for these procedures are delivered during the installation in the **SEPsesam** directory {ID}/var/skel/templates.
To activate such an interface its corresponding template file must be copied to the directory {ID}/bin/sesam. - it is only active there (at the client).
Having selected a client the user can modify the templates to his needs within a text editor window.

SEPsesam offers the so-called Pre-, Post-, Alarm-,Notify-, and Disaster-Interface.
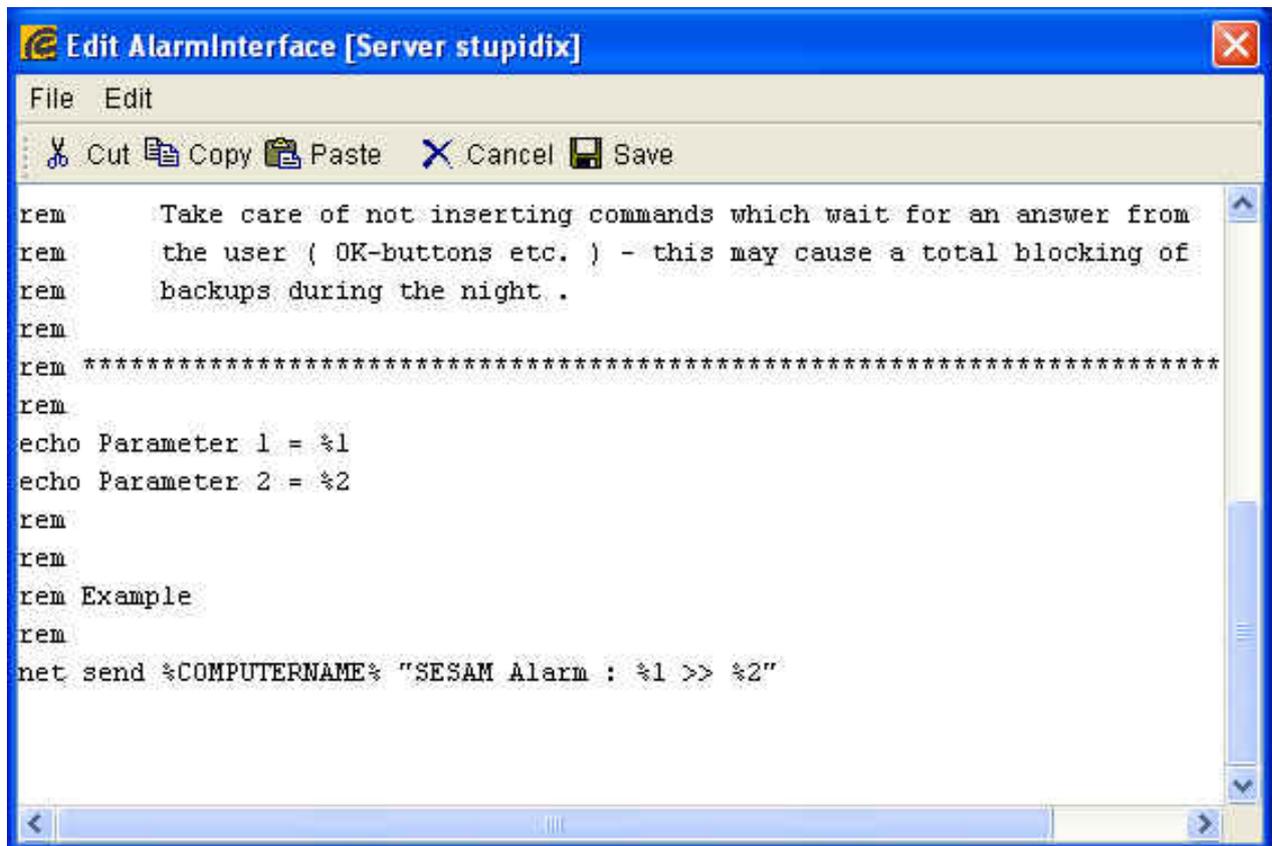
8.3.4.1 PRE-Interface

Before a backup starts its data transfer some special actions may have to be executed (e.g. messages, end/start programs, executing certain preparatory actions in the databases). These actions can be programmed within the PRE-interface.

The PRE-interface consists of a procedure sbc_pre which is copied to the clients during configuration. The procedure {ID}/bin/sesam/sbc_pre is started shortly before backup.

It is called with 10 arguments from the current **SEPsesam** backup task

Arg.Nr	Meaning
1	Backup source
2	Name of backing up computer (tape server interface)
3	SESAM task-name
4	Number of drive
5	Backup-type: C_opy, F_ull, D_ifferential, I_ncremental
6	Execution counter of task during backup day (= number of LIS-file)
7	Saveset-name
8	Label of used media
9	Pool of used media
10	Schedule which started this backup

Return values:
Before the procedure finishes it **must** either write to STDOUT
STATUS:OK or
STATUS:ERROR {text} .

SEPsesam checks this output of PRE-procedure and according to the setting 'Start backup in spite of pre error' (a property of backup-task) the data transfer is started or not.

8.3.4.2 POST-Interface

Having finished the backup data transfer some special actions might also be needed (e.g. messages, program end/start, restart databases etc.). These actions can be programmed with the help of post-interface. The post-interface consists of the procedure sbc_post which is copied to the clients during configuration. The procedure {ID}/bin/sesam/sbc_post is started immediately after backup. **SEPsesam** proceeds according to the setting 'Start post despite backup error' in the backup task, i.e. if this box is not checked and errors exist, then the POST-procedure will not be executed.

The procedure is called with 12 arguments from the current **SEPsesam** backup task:

Arg.Nr	Meaning
1	Backup source
2	Name of backing up computer (tape server interface)
3	SESAM task-name
4	Number of drive
5	Backup-type: C_opy, F_ull, D_ifferential, I_ncremental
6	Backup status (1 = ok, 0 = error)
7	Backup message text
8	Execution counter of task during backup day (= number of LIS-file)
9	Saveset-name
10	Label of used media
11	Pool of used media
12	Schedule which started this backup

Return values:
Before the procedure finishes it **must** either write to STDOUT
STATUS:OK or
STATUS:ERROR {text} .

If the POST-procedure ends with an error, the backup will be rated with status **warning**.

8.3.4.3 Alarm- and Notify- Interface

The **SEPsesam** system needs no administration after complete set-up of all clients and backup tasks during normal operation (except for the restore). If any functional errors occur, e.g. failure of a certain backup, this event is automatically passed on to the **alarm-interface**. This interface is programmable to filter desired messages and their conveyance to the authorised personnel. The alarm-interface consists of the procedure {ID}/bin/sesam/sm_alarm.

For successful backups and restores,the procedure {ID}/bin/sesam/sm_notify is used which can be programmed if necessary.

It is initiated with 2 parameters

Arg1	Name of the **SEPsesam** backup task resp. calling module
Arg2	Text of the message

Hint
Do not use commands which require input from the user (OK-buttons etc.). Such commands may cause interruption of backups during the night.

8.3.4.4 Disaster-Interface

A disaster is defined as the destruction of the **SEPsesam** backup-server and its data.
To prepare for this case, **SEPsesam** provides a so-called **disaster-interface**.

The concept is as follows:

- the backup server saves its own data with normal backups

- the metadata for these backups are copied to another system, thus being available for restore via **SEPsesam** in case of a disaster .

After the installation of **SEPsesam** the file
{ID}/var/skel/templates/sm_disaster (sm_disaster.cmd in Windows)
can be copied by the user to **{ID}/bin/sesam/sm_disaster** (sm_disaster.cmd)
and modified in any way.

This procedure is executed in case of success by all backups containing "'DISASTER"' or "'SESAM"' delivering 2 arguments:

- the label of the currently used media

- the complete restore command, with which the data can be restored from saveset.

The **disaster strategy** is as follows:

- the user sets up at least one backup with name "'SESAM_BACKUP"', which backs up the var-directory of **SEPsesam** (thus saving the listings, loggings, database, INI-files)

- this backup should run daily in mode "'COPY"' or "'FULL"'.

- the user programs sm_disaster(.cmd) in a way that the contents of both input arguments are copied from **SEPsesam** computer to pre-defined locations on another computer (Emails, copies of files, Diskettes etc.). With this, information about the last disaster backup of **SEPsesam** are stored.

In case of emergency the following steps must be executed after the computer restore:

- Reinstall **SEPsesam** from the distribution kit

- Identify the defined location containing the last disaster backup of **SEPsesam** and copy the restore command in a procedure file e.g. sm_disas.cmd (.sh)

- Load the specific media into the drive and start sm_disas.cmd

Example: The metadata of the disaster interface look like:
SESAM_00003 d:/su/var NULL
sbc -r -l full -o over -S softnt6:11001 -d SMS:Tape0 -t SESAM_00003:3 -s SC20020710200512 -n 5 -R /

SESAM_00003 is the media
SC20020710200512 is the saveset on the media
sbc -r ... is the restore command

8.3.4.5 Disaster-Recovery for Windows

Pre-conditions:

- Windows 2000 Installation with active net connection

- Active **SEPsesam**

- SBC from version 2.2 A3

Windows 2000 Server / Windows 2000 Server with Active Directory

Backup

1. Create an All backup-task (e.g. DISASTER_ALL with source "'all"')

2. Create a Registry backup-task (e.g. DISASTER_REG with source "'registry"')

3. Create a System State backup-task (e.g. DISASTER_SYS with source "'system_state"')

Restore

1. Boot in directory services restore mode

2. Restore of the All backup

3. Restore of the Registry backup

4. Reboot in directory services restore mode

5. Restore of the System State backup

6. Reboot

Windows 2000 Professional

Backup

1. Create an All backup-task (e.g. DISASTER_ALL with source "'all"')

2. Create a System State backup-task (e.g. DISASTER_SYS with source "'system_state"')

Restore

1. Restore of the All backup

2. Restore of the System State backup

3. Reboot

8.3.5 Memory monitor
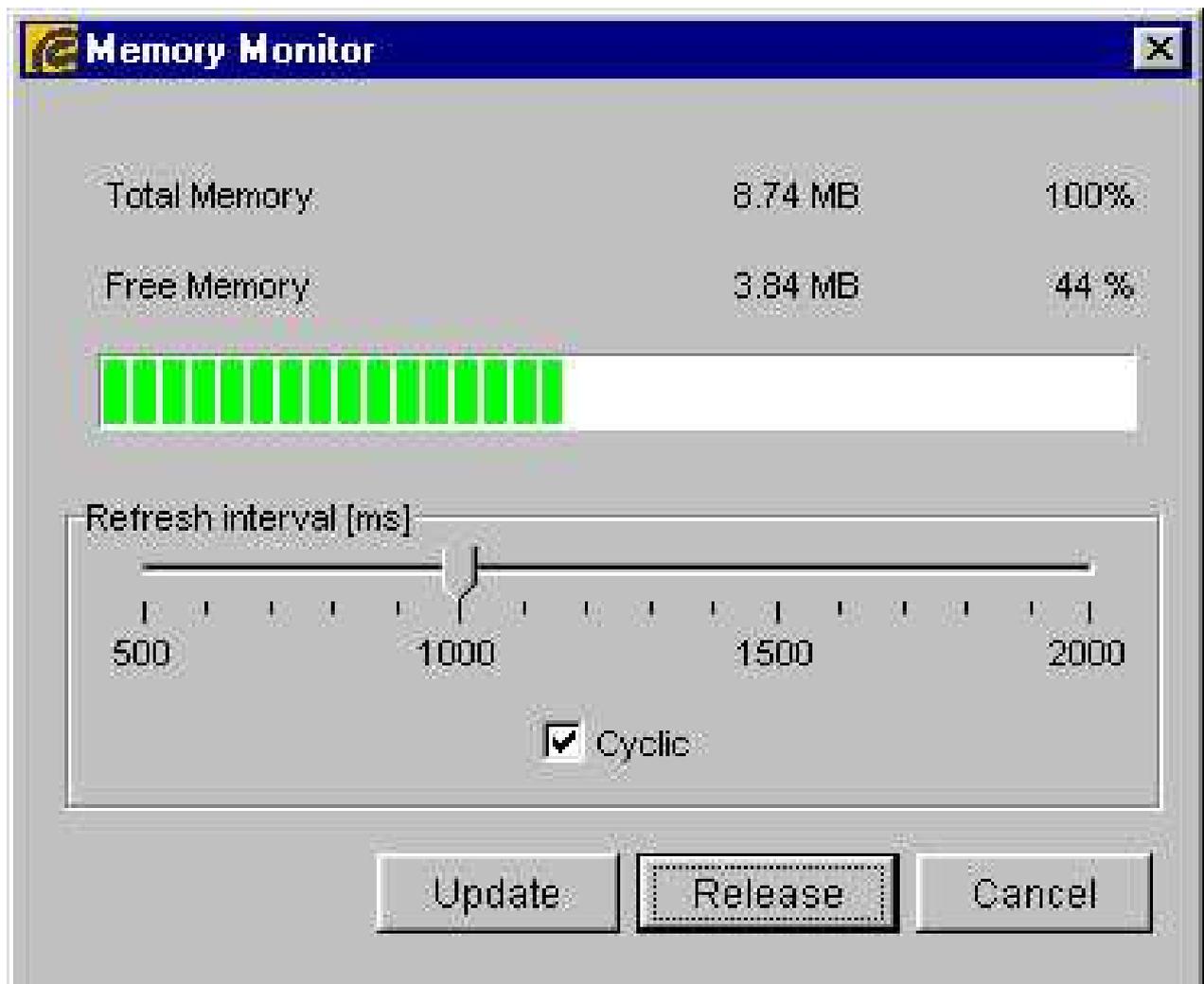
8.3.6 Support - Protocols

Here the scope of the protocolling can be set in the lower window.

Under normal conditions 'user level' is set. For support reasons, 'db levelcan temporarily be set' creating a more detailed output.

'develop level' is set by **SEP AG** support.

8.3.7 Support - Email Settings

After an unlock process triggered by the responsible support authority settings for sending emails can be configured.
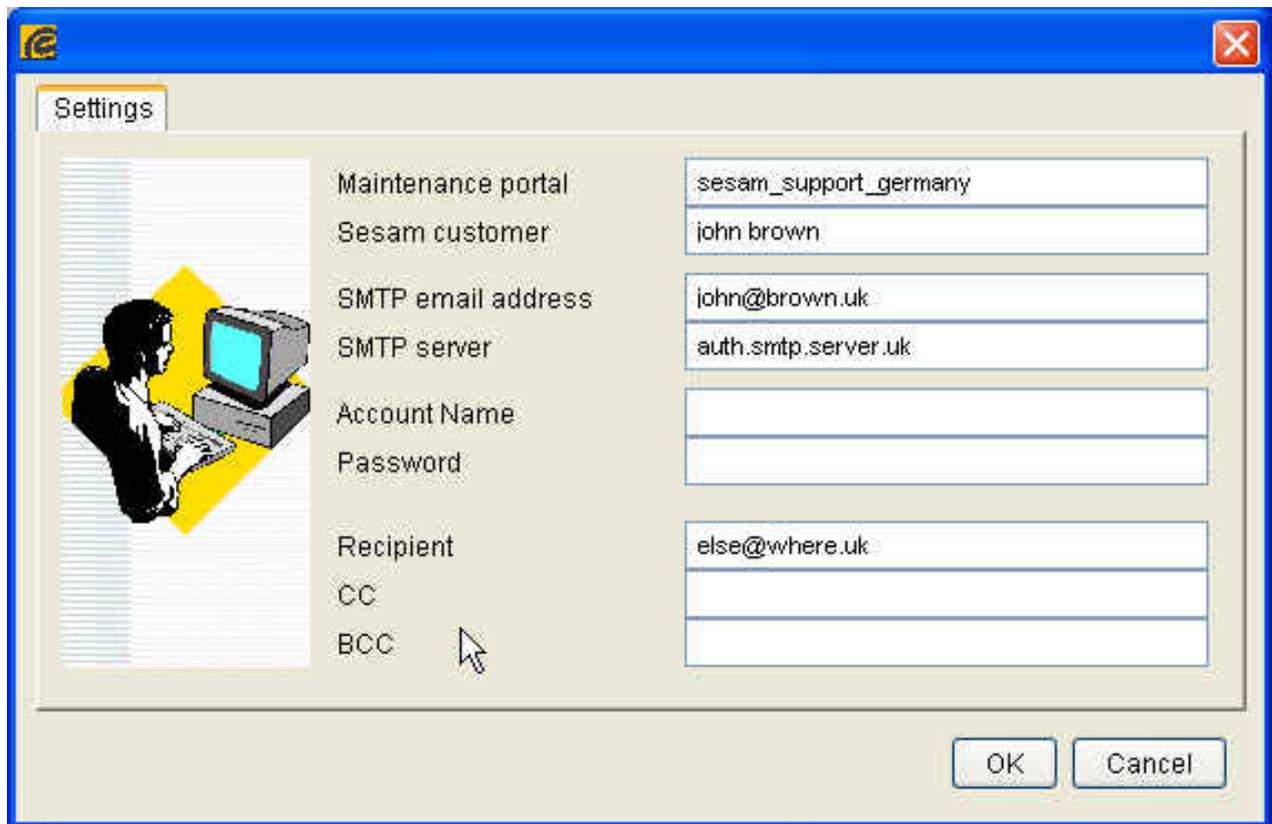
Service Access	Responsible for service (Distributors)
	pre-set at installation - not editable
Customer	Name of the customer
	pre-set at installation - not editable
SMTP Email Address	Mail Sender (Customer)
SMTP Server	Address of the Outgoing Mail Server at the customer
	(also TCP/IP-Address possible)
Account name (optional)	Account name of the Outgoing Mail Server of the customer
	e.g. m8361599-0
	only necessary on smtp-Servers, which perform authentification
	if needed interactively queried
Password (optional)	Password of the Incoming Mail Server at the customer
	masked input
	only necessary on smtp-Servers performing authentification
	if needed interactively queried
Recipient	Address of the responsible support
	pre-set at installation - not editable
CC	Address for copy of the email
BCC	Address for copy of the email - not shown to recipient

If no account name is specified it is assumed that no authorization is necessary at the SMTP-Server. The storage of the password is also optional. If it should not be saved, then it is queried when necessary in a dialogue box and is used for the current session only without saving.

8.4 Help

In **online user guide** this document appears in the GUI.

Under **Online Support** the customer can register himself, may send listings and protocols or comments by e-mail (feedback) to the support .
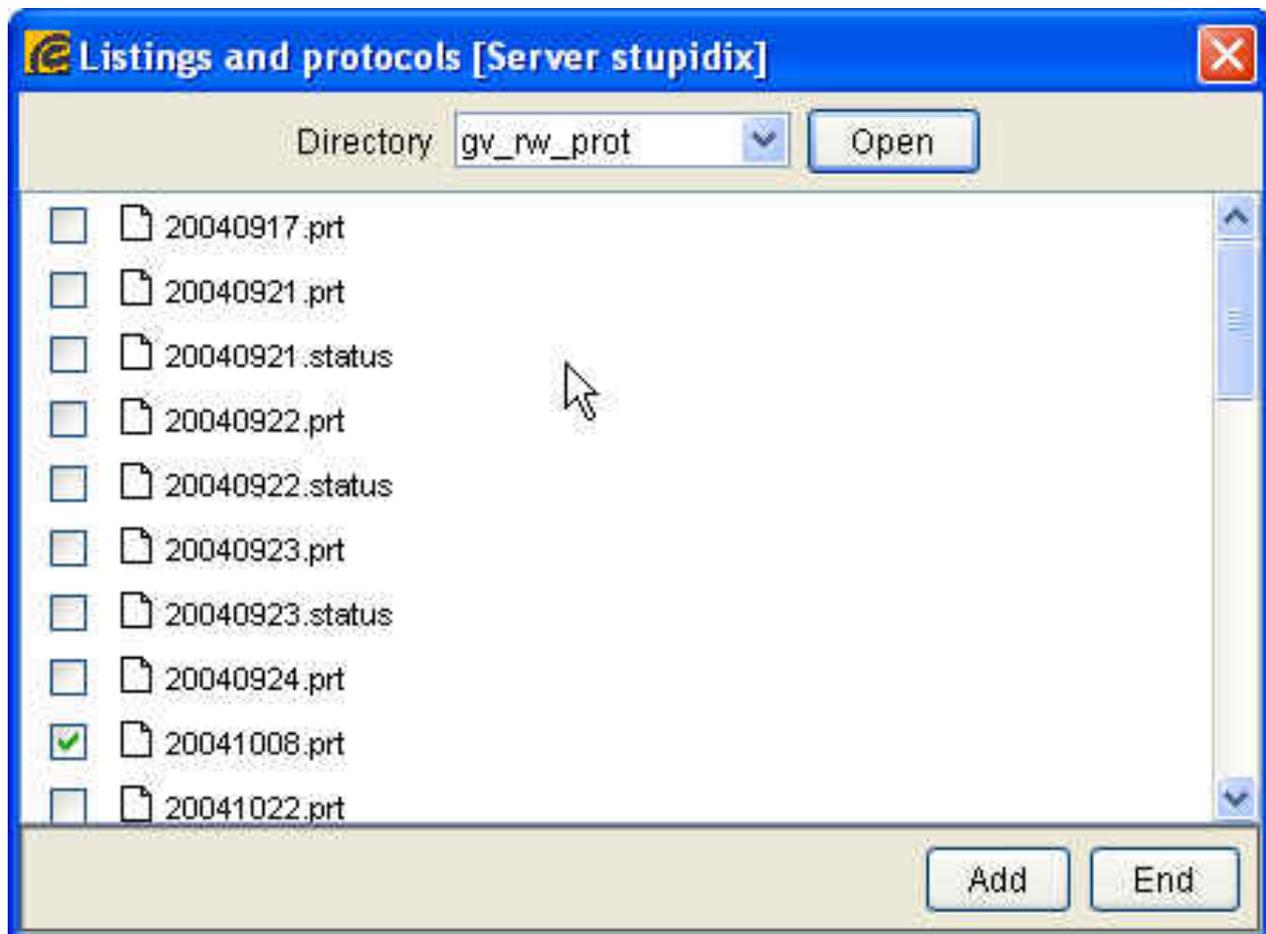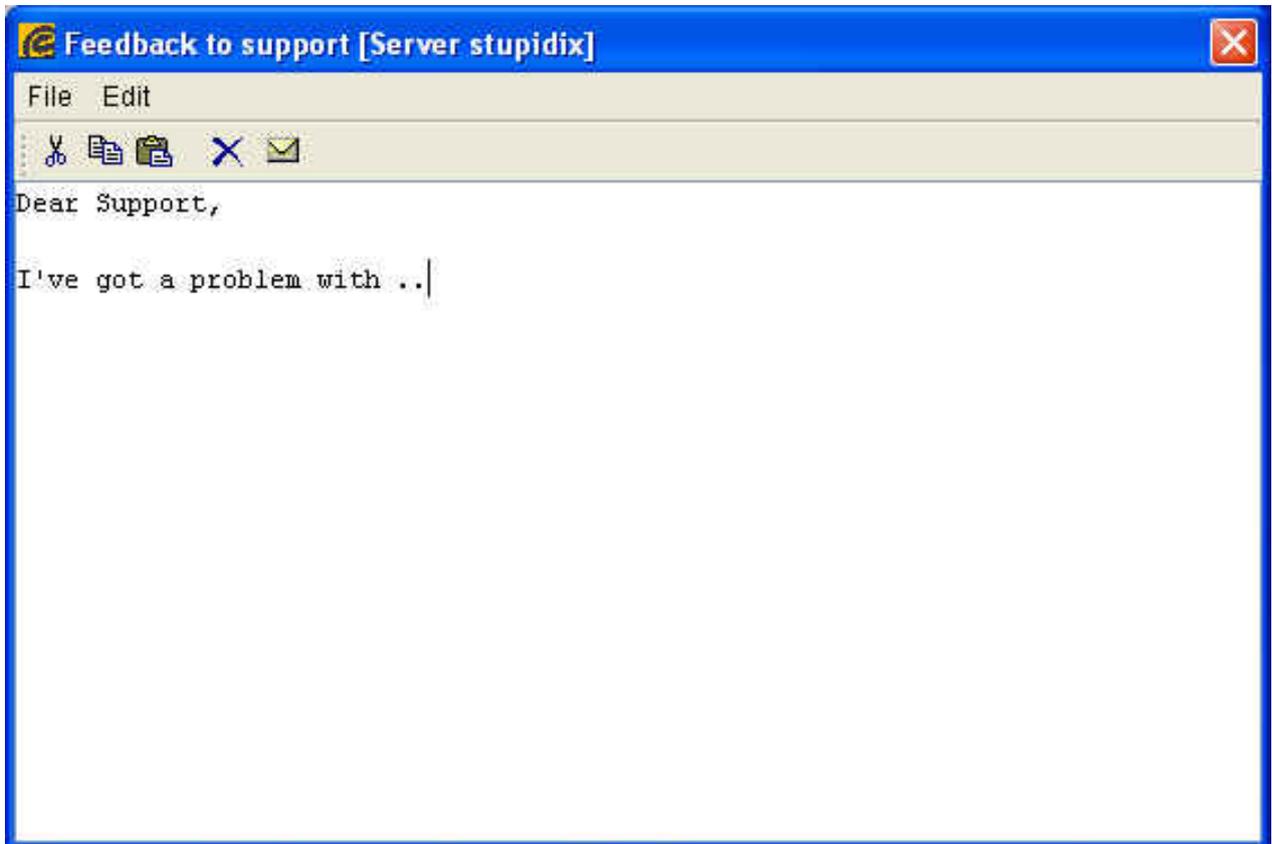
In **License info** the local computer name and TCP/IP-Address are shown as they are found by the licensing module .

8.5 Components
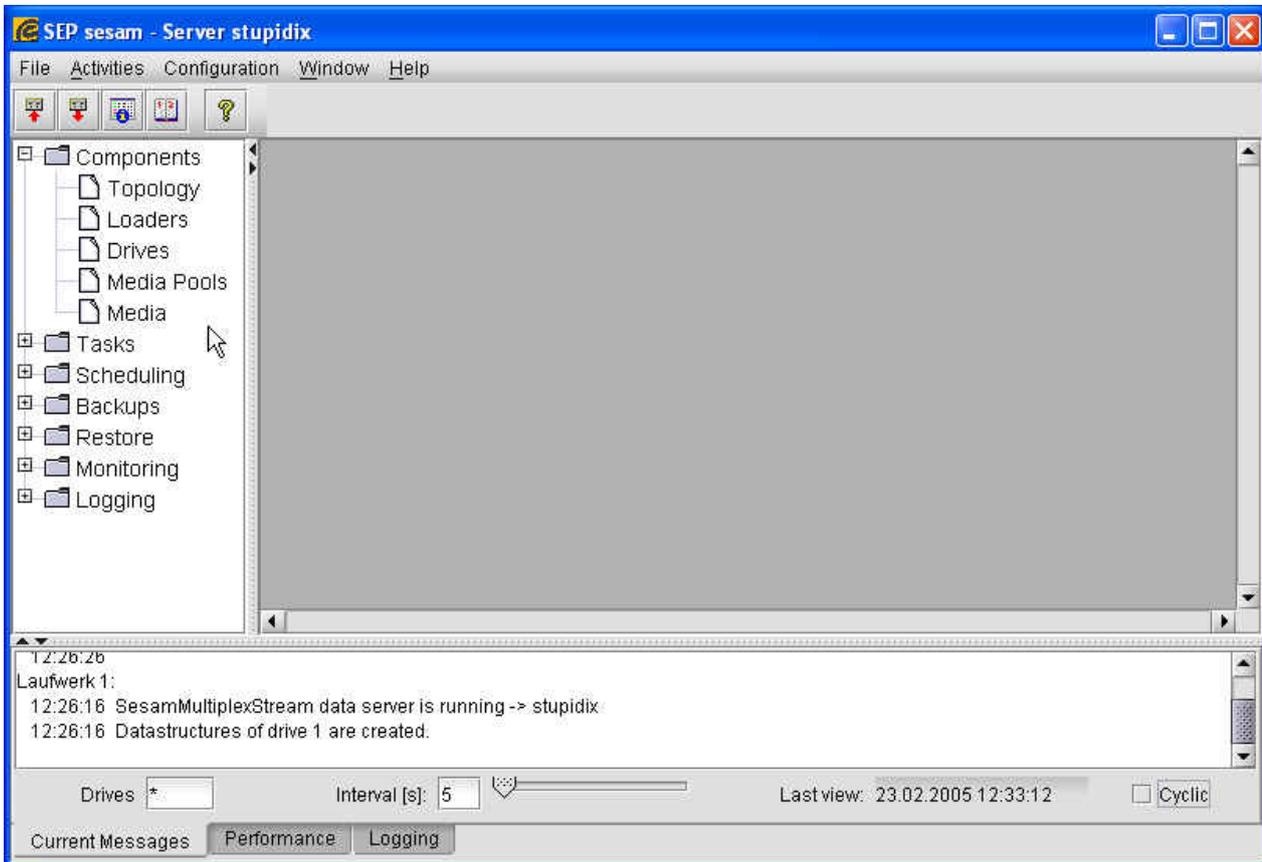
8.5.1 Topology

Topology is the hardware environment of **SEPsesam**.

These are the interconnected computers (clients), which can be grouped into locations and sub-locations as well as the storage devices (loaders, drives), which are available for **SEPsesam** locally and/or at the clients.

The menu item **Topology** shows all **SEPsesam** locations, clients, loaders and drives known as well as the media contained within. By clicking the symbols one can expand into the subordinate structures via a function tree. Each client is related to a location and each loader and drive to a client.
By marking (clicking the mouse on one of the tree components and clicking the switch properties), the user opens the entry masks for the components.

A **MasterSesam** at the highest level presents all currently accessible 'normal' **SEPsesam** computers. With a mouseclick their individual data can be viewed.
A 'normal' **SEPsesam**-server shows one node only, namely itself.
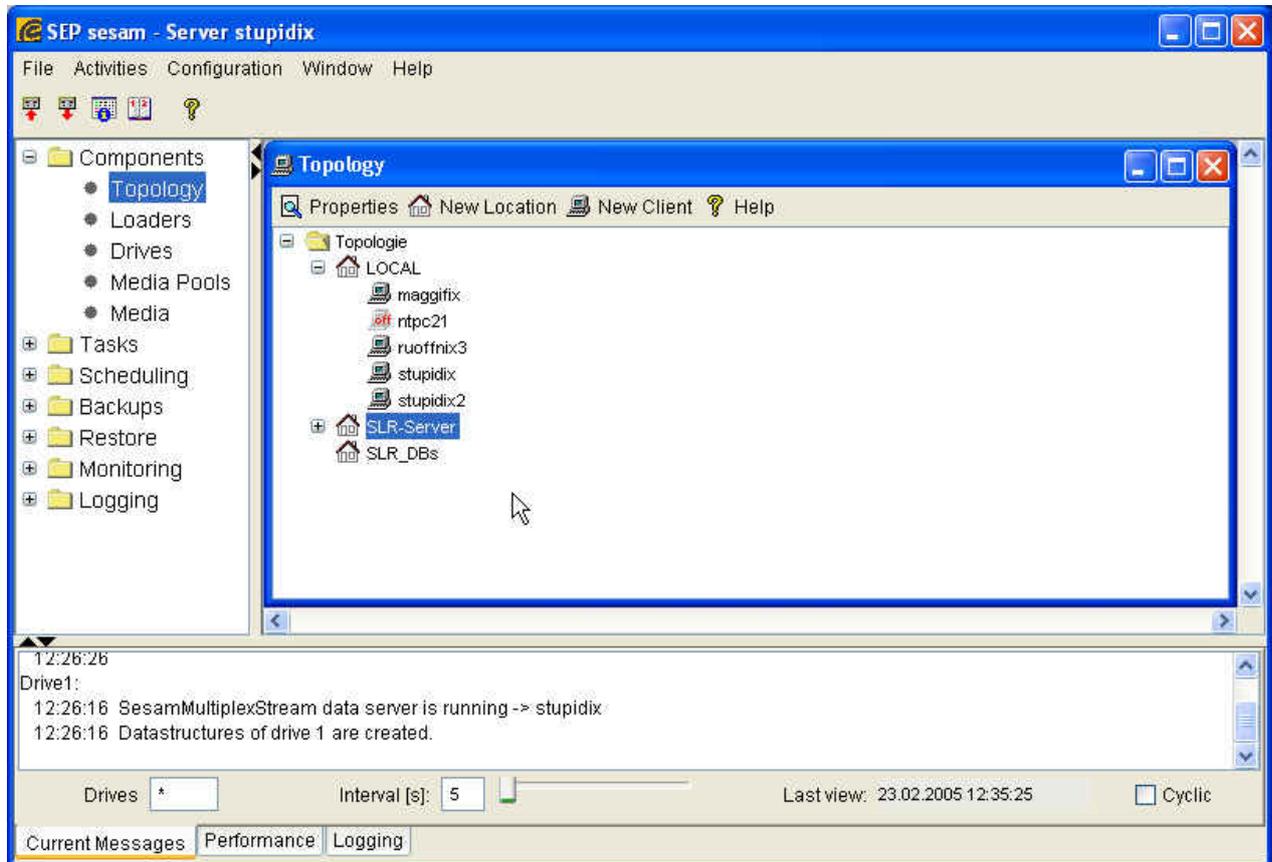
To create a new location independent of a location placed above it, start at **Topology** and click button **New Client**.
A client is always is related to and created within a location.

8.5.1.1 Properties Server
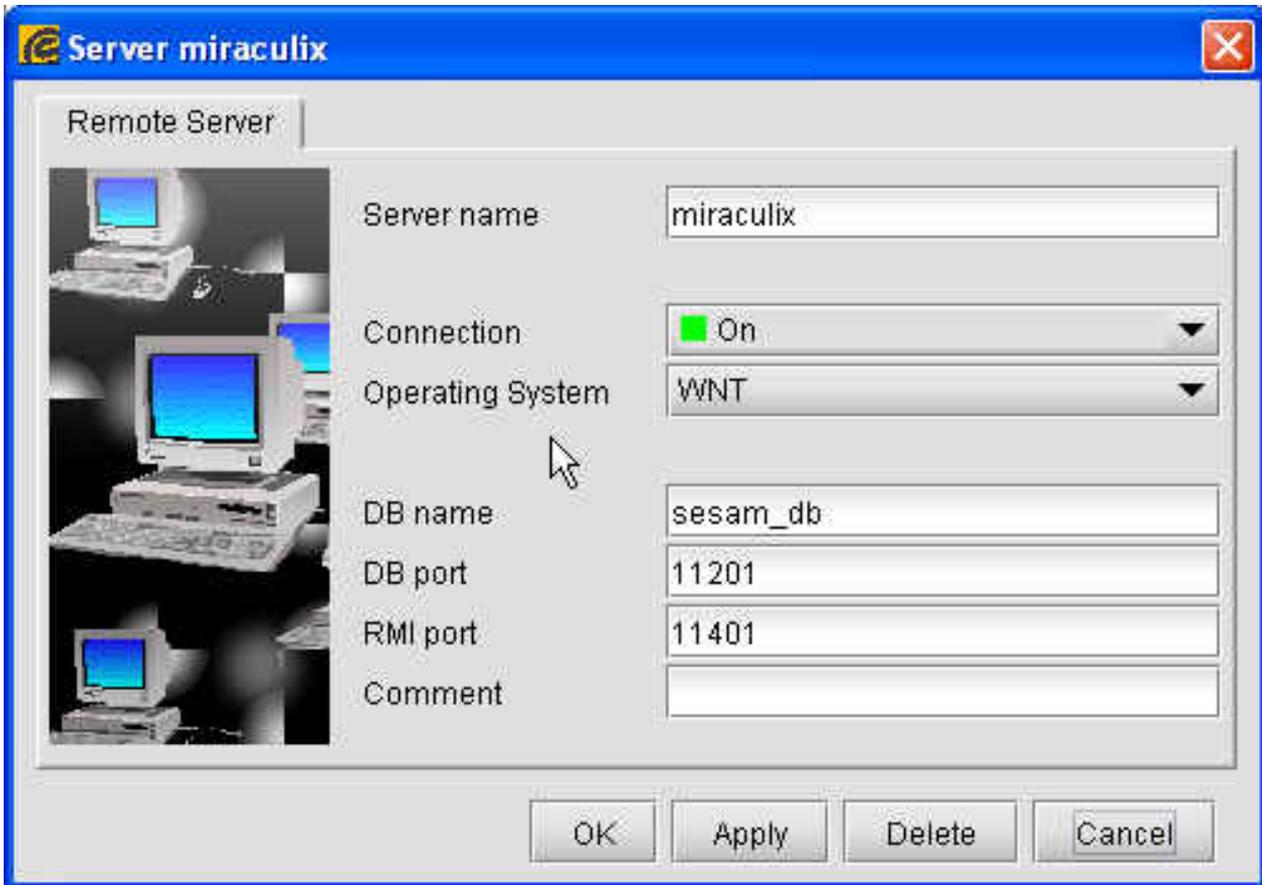
Server Name	Name of the servers in the network
Connection	On (green) / Off (grey) / Broken (red)
Operating System	of the Server
DB-Port	Port of the socket connection to the remote DB
DB-Name	Name of database on the server
RMI-Port	Port of the socket connection to the remote GUI
Comment	User comment

Hint

The parameters of the server cannot be edited here.

8.5.1.2 Properties Location

Location is defined as a group of clients and/or further sub-locations. This should help to organize larger networks so that computers in a building, an external office etc. can be managed and presented in separate units.

New locations can be configured from a **SEPsesam** Server or from an existing location (sub-location)
SEPsesam sets up a tree-structure for all locations(e.g. Germany-Bavaria-Weyarn-SEP) offering greater clarity.
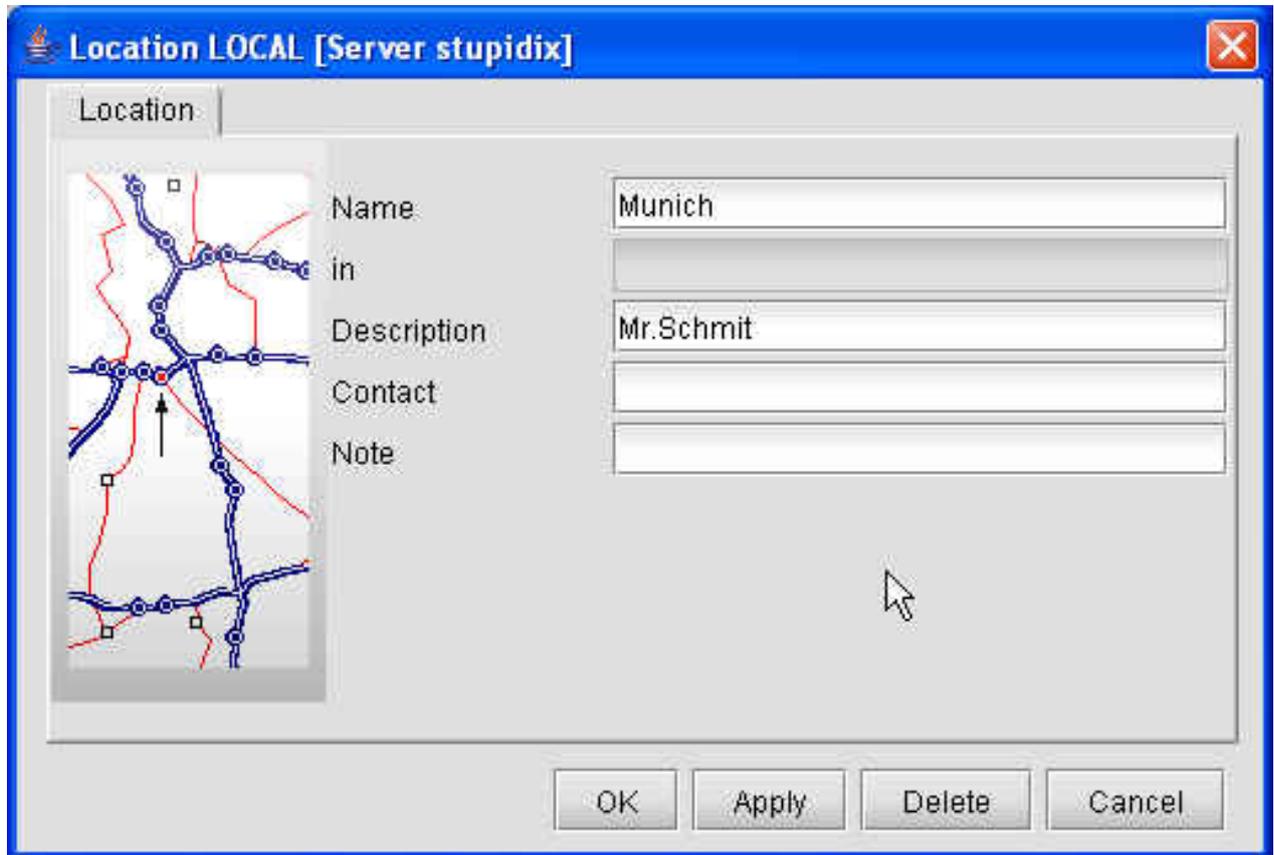
Name	denotes the name of the location
in	superordinated location (uneditable)
Description	more exact description of the location
Contakt	contact person at this location
Notes	additional information

8.5.1.3 Properties Client

Clients are defined as computers in the network from which data are to be saved. The computer on which **SEPsesam** is installed is called the **server**.

If a client is not available for backups (e.g. because of a shutdown), the user can select the checkbox **locked for backups** and prevent unnecessary access (locked clients are marked with "'off"' under topology).

Warning: From that moment on the client is no longer backed up, even if this is marked in the appointment calendar.
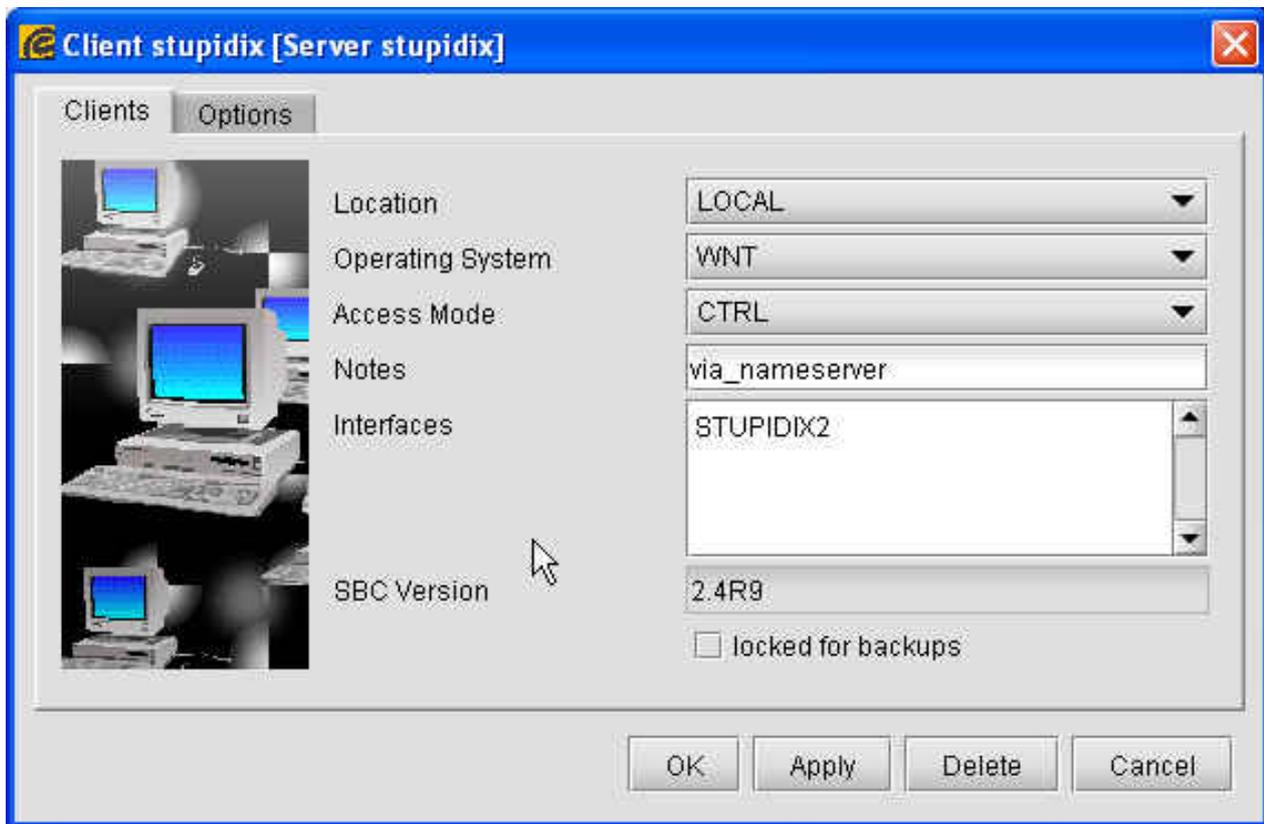
Location	selection of pre-defined locations. A Client must be assigned to a Location
Operating System	selection of an Operating system (WNT, Linux or Unix) for the Client
Access Mode	selection of access method. Default is CTRL. SSH and RSH can be selected, too
Notes	additional information
Interfaces	additional TCP/IP-Names of the client in case there are more network cards installed, these are accessed by their respective names This should allow a fast, smooth data transfer without blocking other network activities over separate fast networks.

Hint

If several interfaces are entered, separate them with Return or Blank.

8.5.1.4 Treating of Firewalls
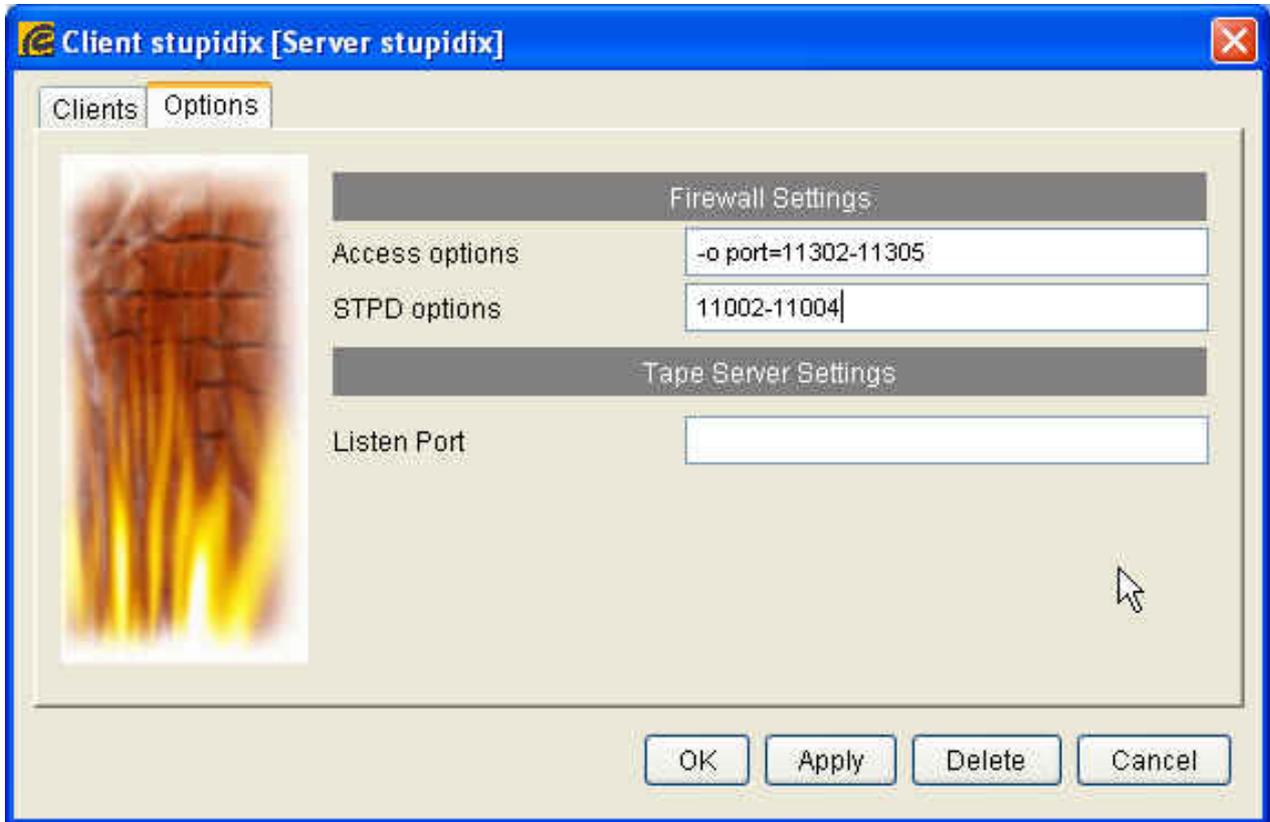
Normally **SEPsesam** uses ports delivered by operating system at random which is not allowed if the client is positioned behind a firewall.

For this a port range can be determined which is to be used by sm_ctrlc for communication with the clients (*Accessoptions* input **-o port=firstport-lastport**).

Another way is to configure a *Singleport connection* (-s), where **SEPesam** uses only one single port (by default 11301). This must not be done for Remote Tape Servers.

The backward ports from client to **SEPsesam** server are placed in *STPD Options*, e.g. 11002-11005. The data are transfered over these ports where each parallel backup needs two separate ports.

8.5.2 Loader

Loaders are devices composed of drive(s), a magazine with slots for media and a robot that can move media between the slots, drives and a potentially available input-output port.

In most cases, this input-output port is a conveyer belt moving the cassettes into/out from the loader.

Loading of media is defined as the movement of a cassette from the magazine into a drive, **unloading** is the opposite.

Loaders enable a fully automated backup system during night or weekends.

The menu item **Loaders** shows the configured loaders and the drives within them and offers the respective tools .
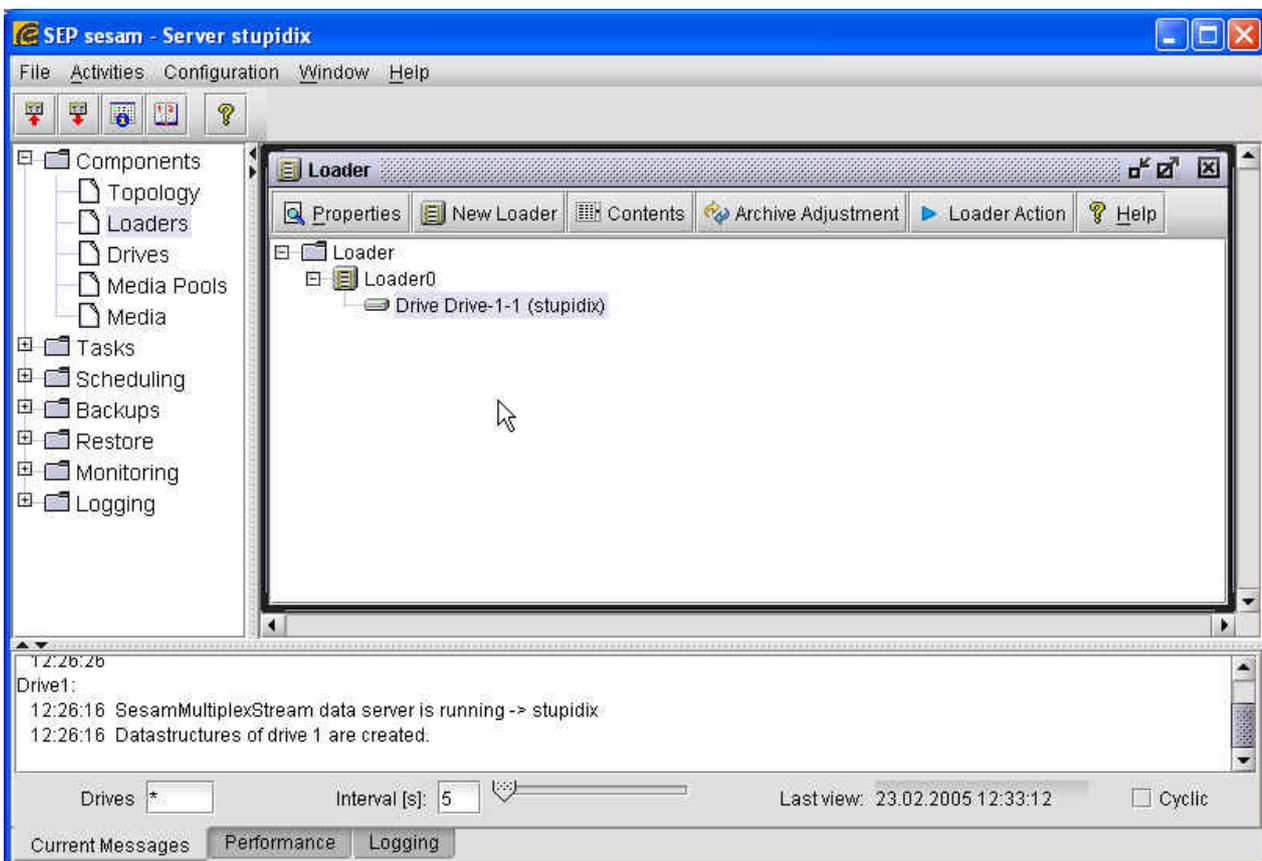
8.5.2.1 Button Properties Loader and New Loader

Device	SCSI device identification of loader (./bin/sesam/sm_slu scan shows the identifications to use)
Tape Server	Client, at which the loader is SCSUI-connected
Type	Producer identification
Ctrl	Loader-control with SesamLoaderUtility SLU
Slots	number of slots of the magazine
Barcode	select yes/no depending on whether the loader has a barcode reader
Autom.Unload	The drives of the loader unload automatically, when robot moves the media. If not, then the drive must be opened with a special command (depends on the loader type) before the robot's movement

The **loader 0** has a special designation, it is the so-called **virtual loader**, i.e. it does not exist physically but is used exclusively for the "'movement"' of virtual DISK-media.
Since DISK_HARD-media are virtual (directories on disks), they do need a virtual loader.

8.5.2.2 Button Contents
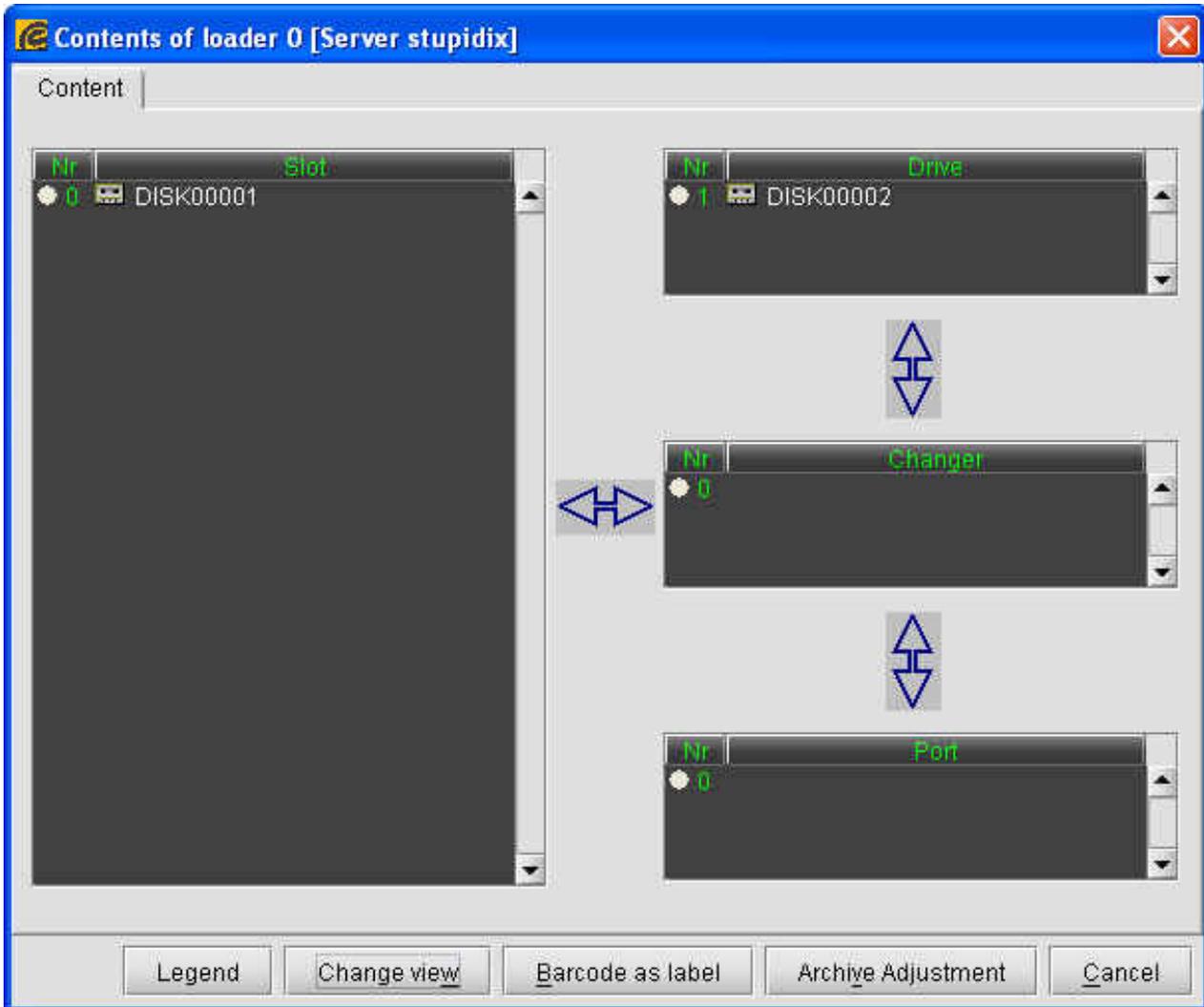
Function of buttons:

Archive adjustment	(see 3.4)
Cancel	closes the contents screen without any action
Legend	lists the meaning of the colored marks

This represents a symbolic view of the loader which refreshes periodically to show the current state.

On the left side the magazine with the slots is represented, to the right the robot, at the top one or more drives, below the input/output port.

Since often only part of the media is changed resp. with big media libraries only part of the media is preserved for **SEPsesam**, the **SEPsesam** user can limit the archive adjustment to certain loader slot areas.

If the media have barcode labels, this is also recognized. Verification of tape labels through direct reading of the label from the media (tape, disk...) is supported.

The archive adjustment can also be done for inventory purposes whereby the user reviews the available media of the loader.

8.5.2.3   Button Loader Action

   Action section

Import	transport of tape cartridge through the input/output port into the magazine
Export	transport of tape cartridge from the magazine through the input/output port to outside of loader
Load from slot	move tape cartridge from the specified magazine slot into the specified drive
Load via label	move tape cartridge with certain ID (e.g. S00001) into the specified drive
Unload	move tape cartridge from the specified drive back into its slot

Loader Number	selection of a defined loader
Drive Number	selection of a defined drive (within that loader)
Slot	defines the number of the slot receiving the tape cartridge, or from which it must be loaded
Label	In case of "'Load via Label"' instead of slot number
Start	of the corresponding action
Cancel	closes the entry mask without an action

8.5.3 Drives

Drives are devices saving data onto a media inside them. They can be connected either to a **SEPsesam** computer (local drive) or to other computers that can be reached through the network (remote drive). These are normally tape devices into which tape cartridges can be inserted. It is also possible to back up data on disks or other directory oriented devices.

According to the grouping principle of **SEPsesam** the organization in drive groups is required here as well. Even standalone drives must belong to a group.

Big loaders can have several internal drives which are loaded from one magazine. It is recommended that these drives are organised into one group. A backup is delegated only to this group. **SEPsesam** searches for the particular drive to be used for the backup.
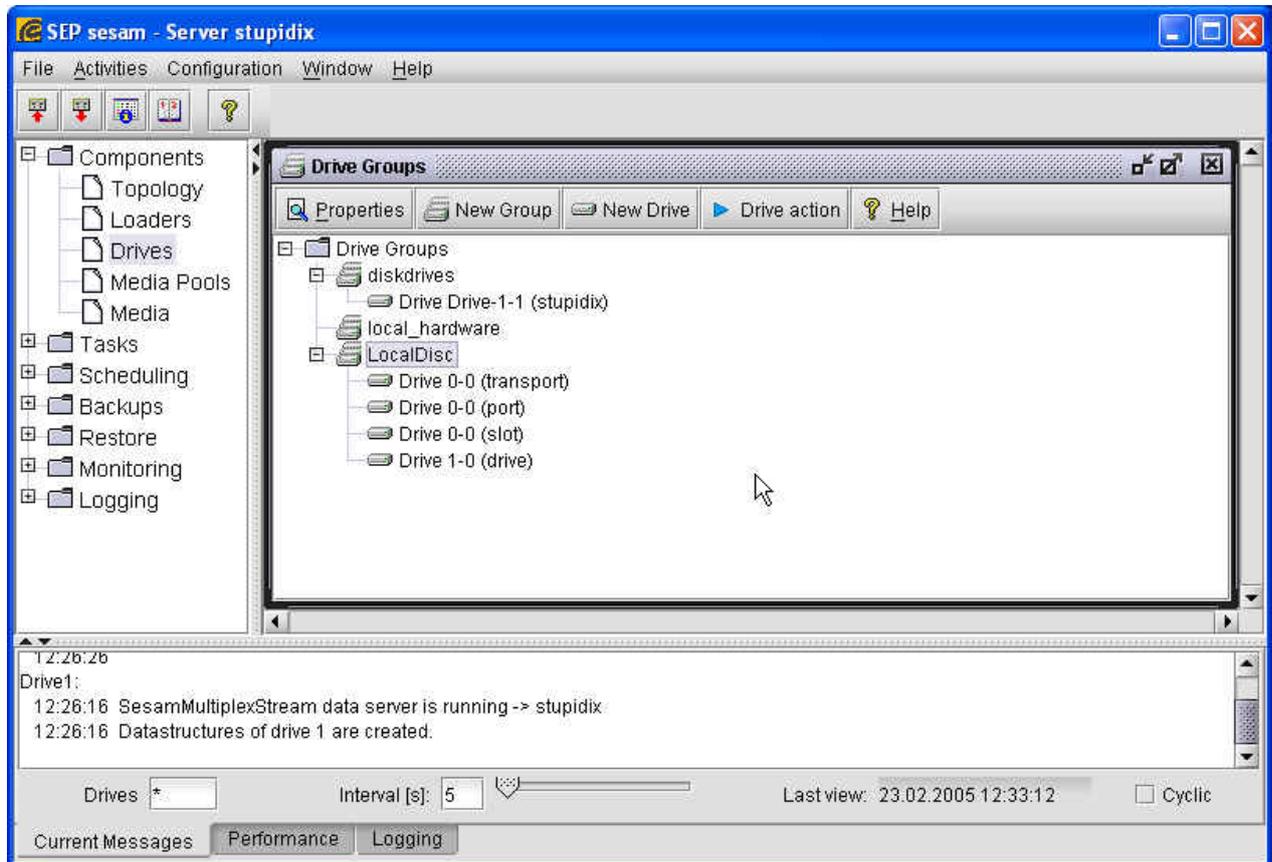
8.5.3.1   Button Properties

Here the parameters of the selected element are shown and changed if necessary (Group or Drive).

8.5.3.2   Button New Drive Group

Here a new drive group is configured.
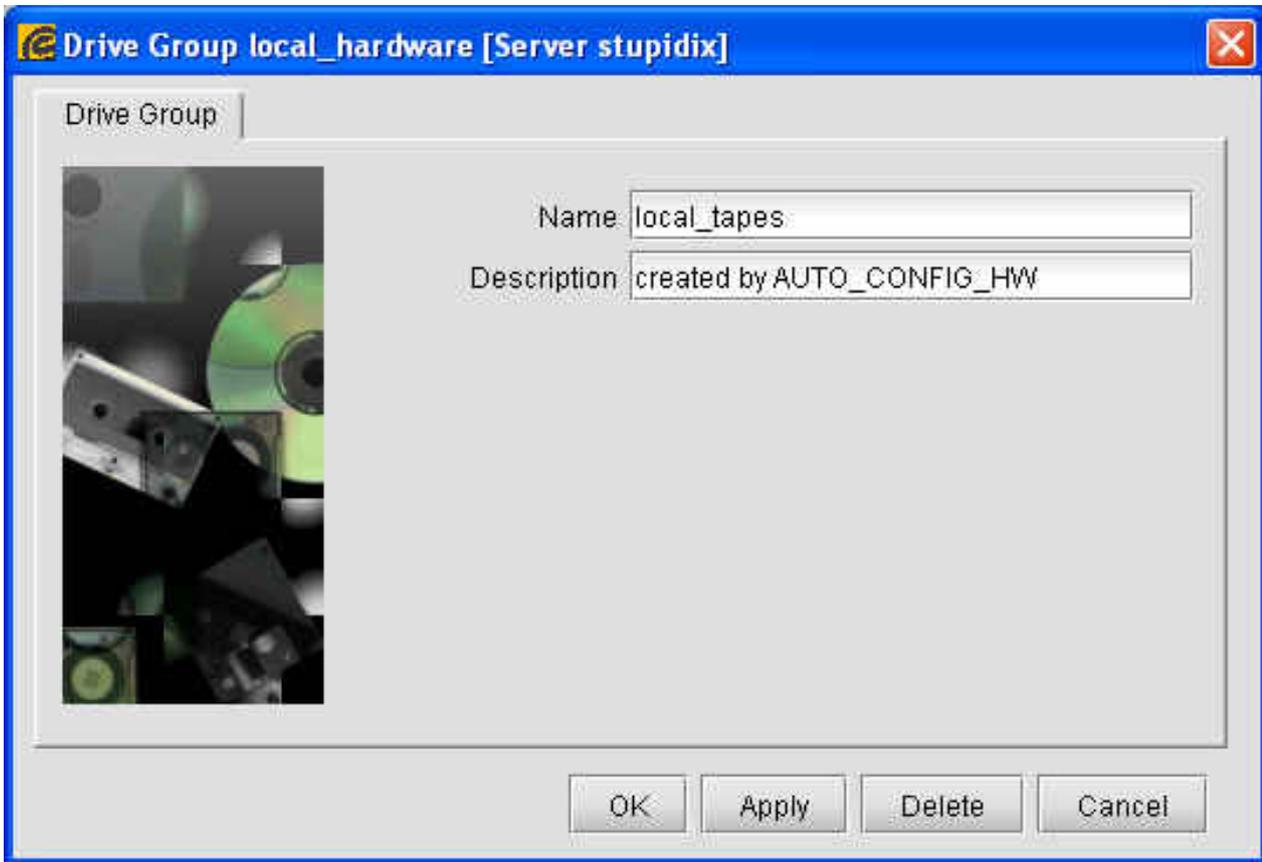
Name	An arbitrary name of the drive group
Description	additional information for the user

8.5.3.3 Button New Drive

Here the new drives are configured.
Each drive must belong to a drive group; this should have been created before.

The **SEPsesam**-internal number of the drive **drive-number** is pre-set.

Field **Loader** specifies whether the drive is served by a loader or not. The loaders configured and accepted in **SEPsesam** appear in a dropdown menu. "'no Loader"' configures a manually operated standalone drive.

In the dropdown **Drive type** the type of the drive is set (DISK-Types see below).

In the field **Tape Server** the client to which the drive is connected is entered.
The dropdown shows all clients configured in **SEPsesam**. The selection of the local computer creates a local, otherwise a remote drive.

In **Device** the operating system specific SCSI-identification of the storage device is inserted.
With the command **{ID}/bin/sesam/sm_slu scan** a list of the connected SCSI-devices can be created.

On Windows-Systems the identification to be entered is displayed in brackets at the end of the row - Tape{Number} (from the registry).
On UNIX- and LINUX-Systems the device representation is /dev/n{AlfaNum} (test with the mt-command suggested).

DISK-Types are automatically entered with diskDrive Nr (see below).
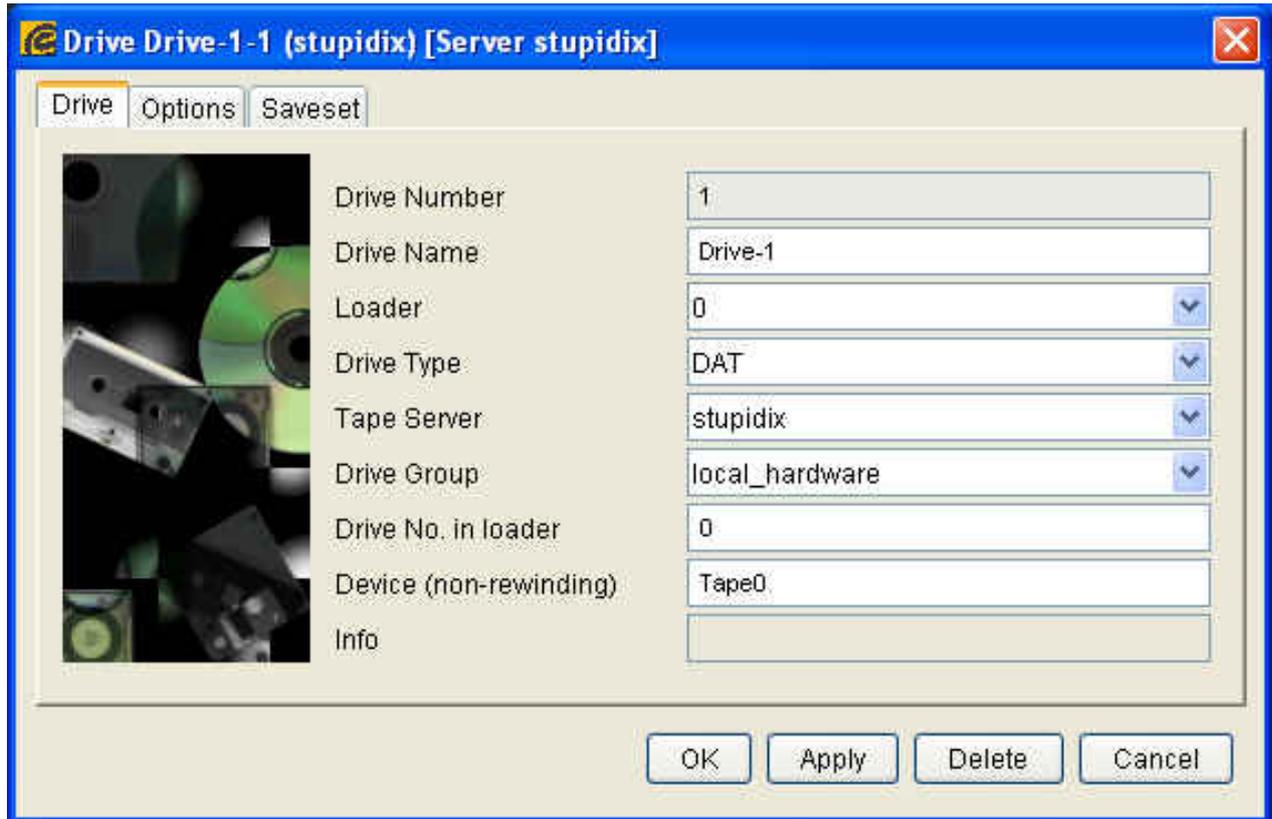
Drive Number	number automatically assigned by **SEPsesam** for a new drive can be changed
Loader	selection of loader which serves this drive (it is possible without loader)
Drive Type	selection of type (e.g. DISK, DISK_HARD or Types of tape devices)
Tape Server	configured **SEPsesam** client the drive is connected to
Drive Group	selection of drive group (since every drive must be assigned to a drive group)
Device	SCSI-Identification, under which the device is configured at system level
SMS-Channels	max. number of parallel backups on Sesam Multiplex Stream Tape (0 = no SMS-Drive)
Options	for type DISK_CHNG, the device directory and the block size must be entered
Saveset	statistics about backups and restores on that drive

A special case are the virtual drives already mentioned above (see 2.1) , where no physical drives and moveable media (tapes) exist.

Type DISK_HARD
Configuration by selection of drive type DISK_HARD and loader 0 . The device is not editable, it is automatically "'disk"' + drive-number.

The assignment of directories to virtual media is performed through the media-pool which also specifies the maximum capacity (in KB) for this pool. This later prevents the unsupervised writing to the disk.
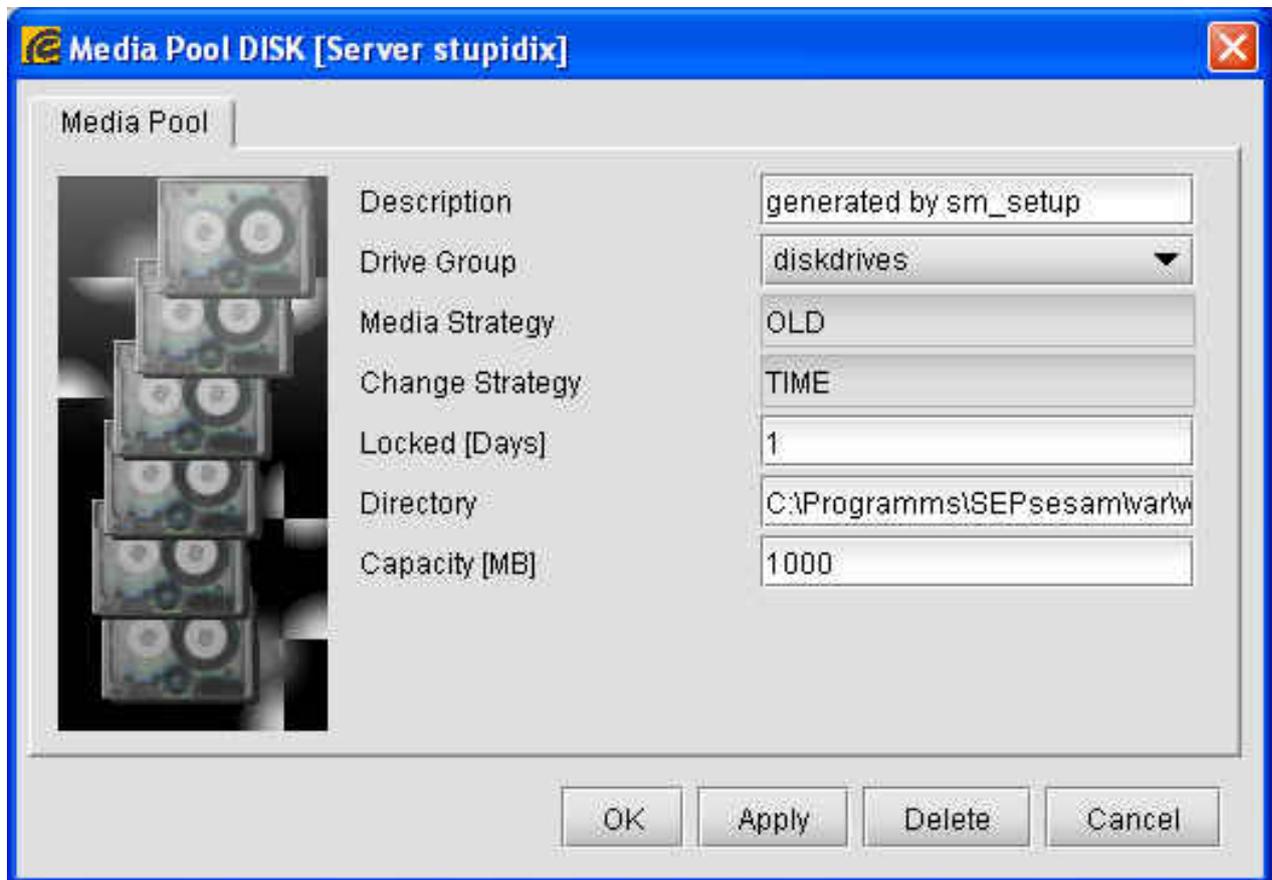
Type DISK_CHNG

Configuration by selection of drive type DISK_CHNG and no loader or physical loader if available.
The device is not editable, it is automatically named "'disk"' + drive number.
In **Options** the path for the virtual media is defined.
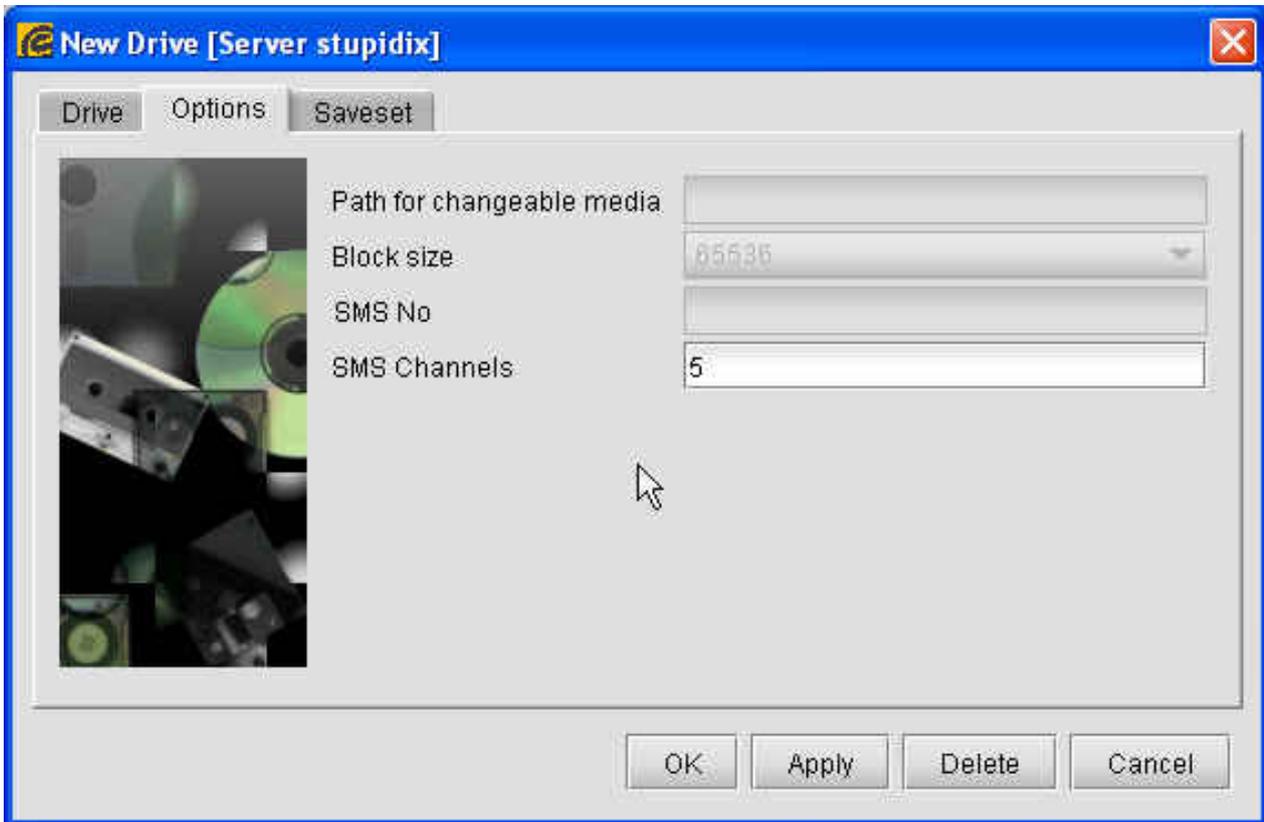
8.5.3.4 Button Drive Action

Pressing this button from drive-group level you'll get following screen.
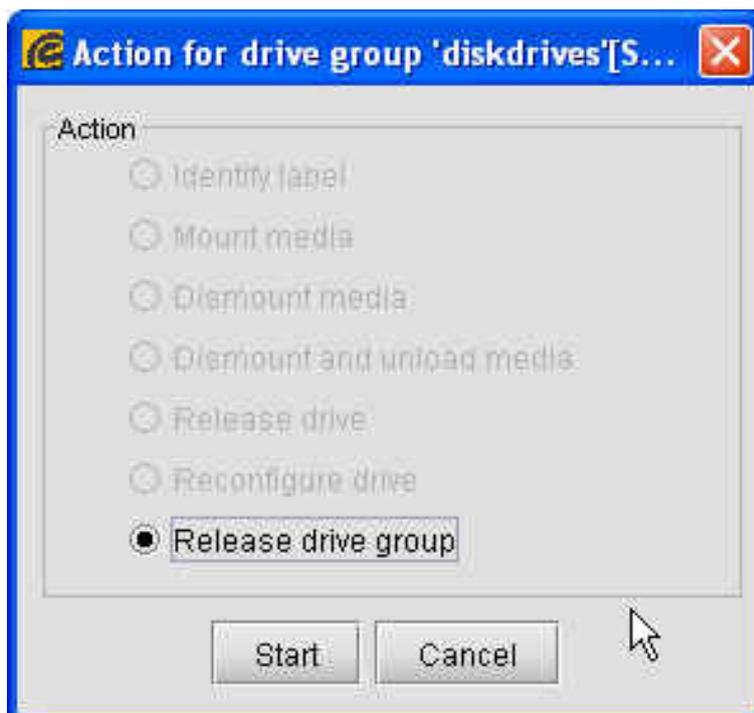
To abort all activities on all drives ofthe group is the only item.

Pressing this button from drive level you'll get following screen.
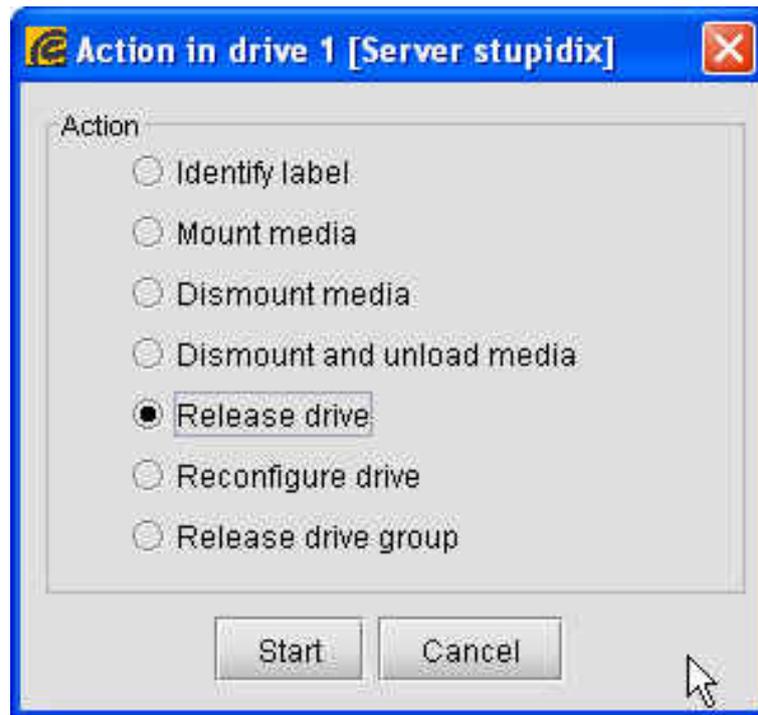
From the GUI, the following 7 actions with the selected drive may be started. The execution and progress of the actions is shown in the lower, cyclically updated information window.

Get label	shows the label of media, currently in the drive
Mount media	the MOUNT-State is a special reservation of the media, which should prevent unnecessary rewindings.
Dismount media	cancels the MOUNT-State.
Unload media	cancels the MOUNT-State and ejects the cassette
Release drive	cancels all running activities on the drive
Reconfigure drive	after change in the drive parameters
Release group	cancels all running activities on all drives of the group

CAUTION

After manual changes in the drive (tapes removal or insertion), the drive must be dismounted.

"'Unload media"' should not be confused with the unloading process of the loader. Here it means that the drive releases the media from the fitting and ejects it.
The loader then can pick it up and transport it back to the magazine (= unload by the loader).

8.5.4 Media pools

In **SEPsesam** media are grouped into **media-pools**.

The identification of a particular media is always "'pool-name + 5-digit number"', this is the reason why a pool-name never is allowed to end with 5 digits.

Media pools provide the main base for building up backup strategies. The user can set up and manage media pools for working days, weekends, specific locations, specific types, databases and more. The virtual DISK-Media are also configured by means of media pools since the pool inherits the directory and capacity information.
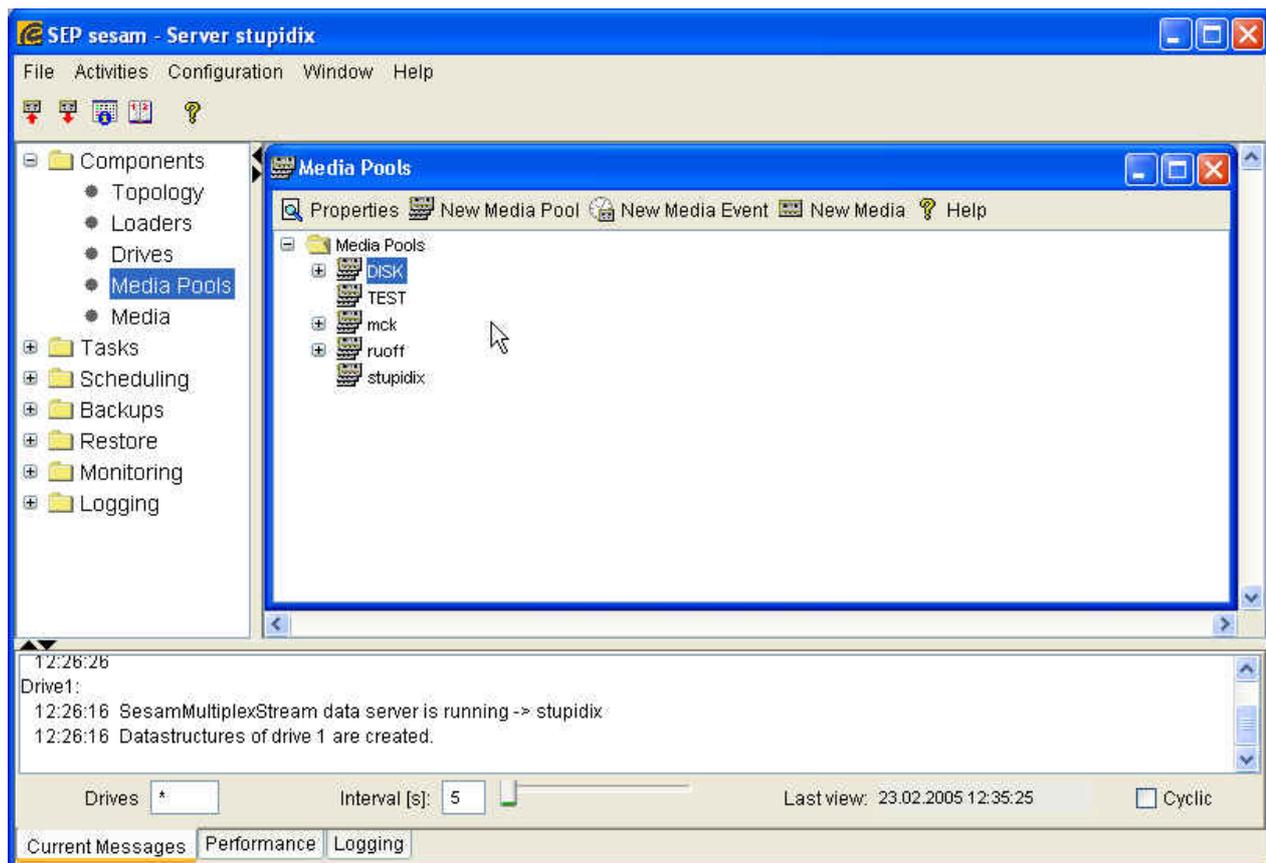
Button New Media Pool
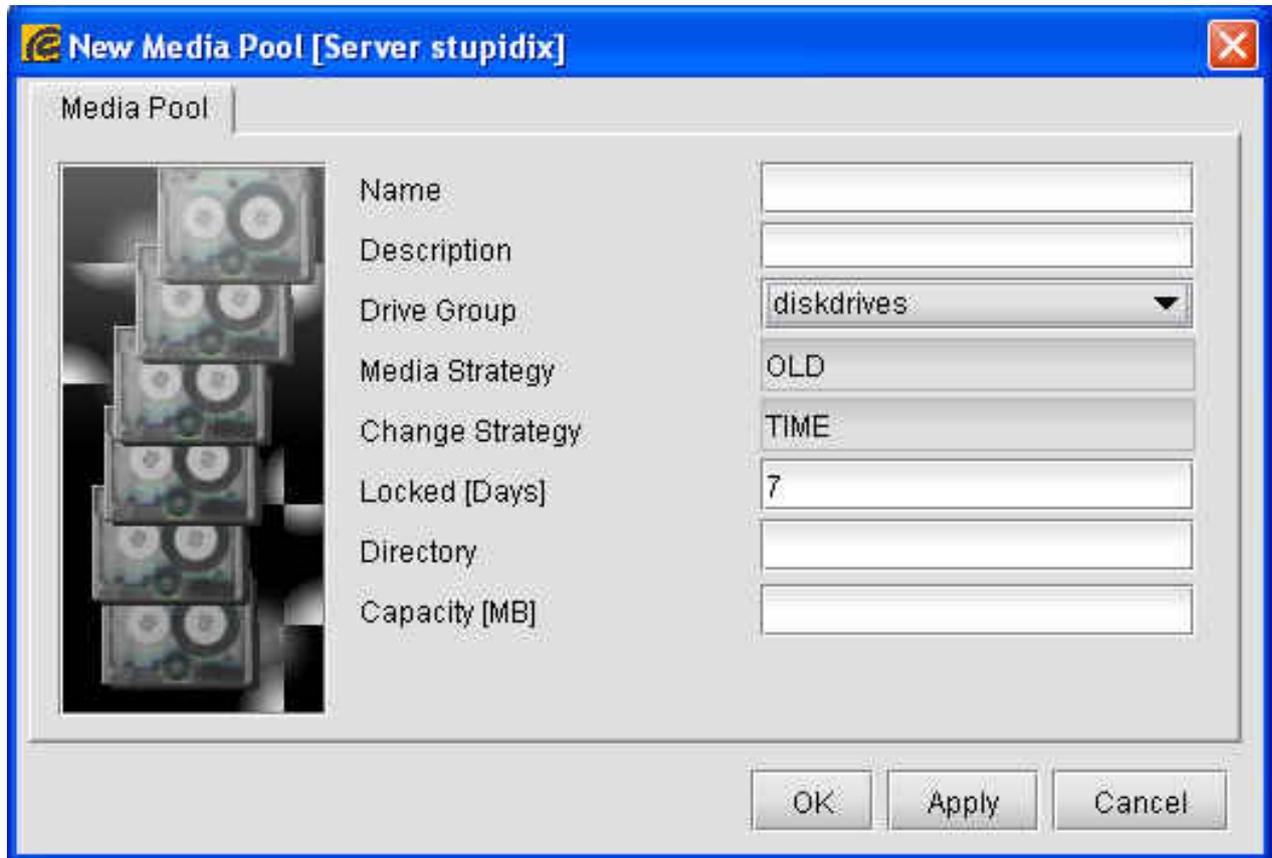
Name	identification of the new pool
Description	User comment
Drive Group	selection of a drive group
Media Strategy	OLDEST strategy, i.e. the oldest, unlocked, type-compatible, EOL-free (EndOfLifetime) media of the pool is used
Change Strategy	TIME (avoiding tape winding times) pre-set
Locked [Days]	number of days for which the media must be write protected after an initialization EOL = EndOfLife is Initialization date + Lockdays
opt.Directory	for DISK_HARD only: specifies the directory on the disk in which the virtual media should be created
opt.Capacity	for DISK_HARD only: specifies the maximum available capacity on the disk for this media pool This determines the maximum possible number of DISK-media within this pool

Button New Media Event branches to **GUI:Scheduling** in the appointment calendar.

Button New Media branches to **GUI:Components-Media-Initialization**.

8.5.5 Media

Media are information carriers used for backup (tapes, disks etc.).
The first window shows the **media-archive** containing all media prepared for use with **SEPsesam**.
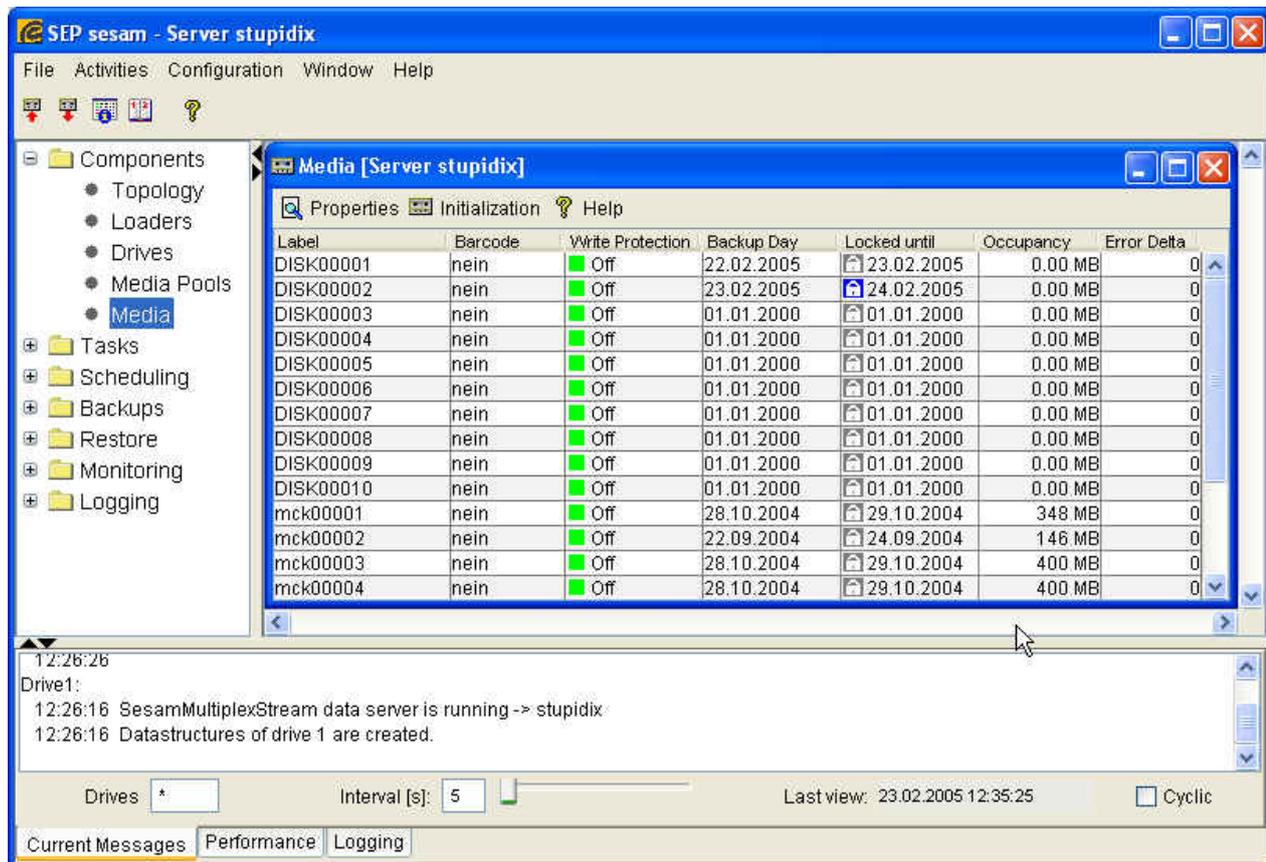
Label	Identification of the media
	always "'pool name + 5-digit number"'
Barcode	Barcode-number of the media, if available
Write Protection	switchable between On/Off
	as long as ON is selected, **SEPsesam** does not use this media for backups
Backup Day	Date of the **SEPsesam** Backup day
Locked until	The media is not available up to this time
	EOL = EndOfLifetime = Backup day + Lockdays of the media pool
Occupancy	occupancy in proportion to the total storage capacity of the media
	(sometimes more than 100 % since the capacity in the beginning is only approximately calculable)
Error Delta	change in number of errors compared with the previous day
Button	
Properties Media	shows detailed information about media
Initialization	opens a window for data input of a new media

8.5.5.1 Button Properties Media

The button **Properties** opens the following window:
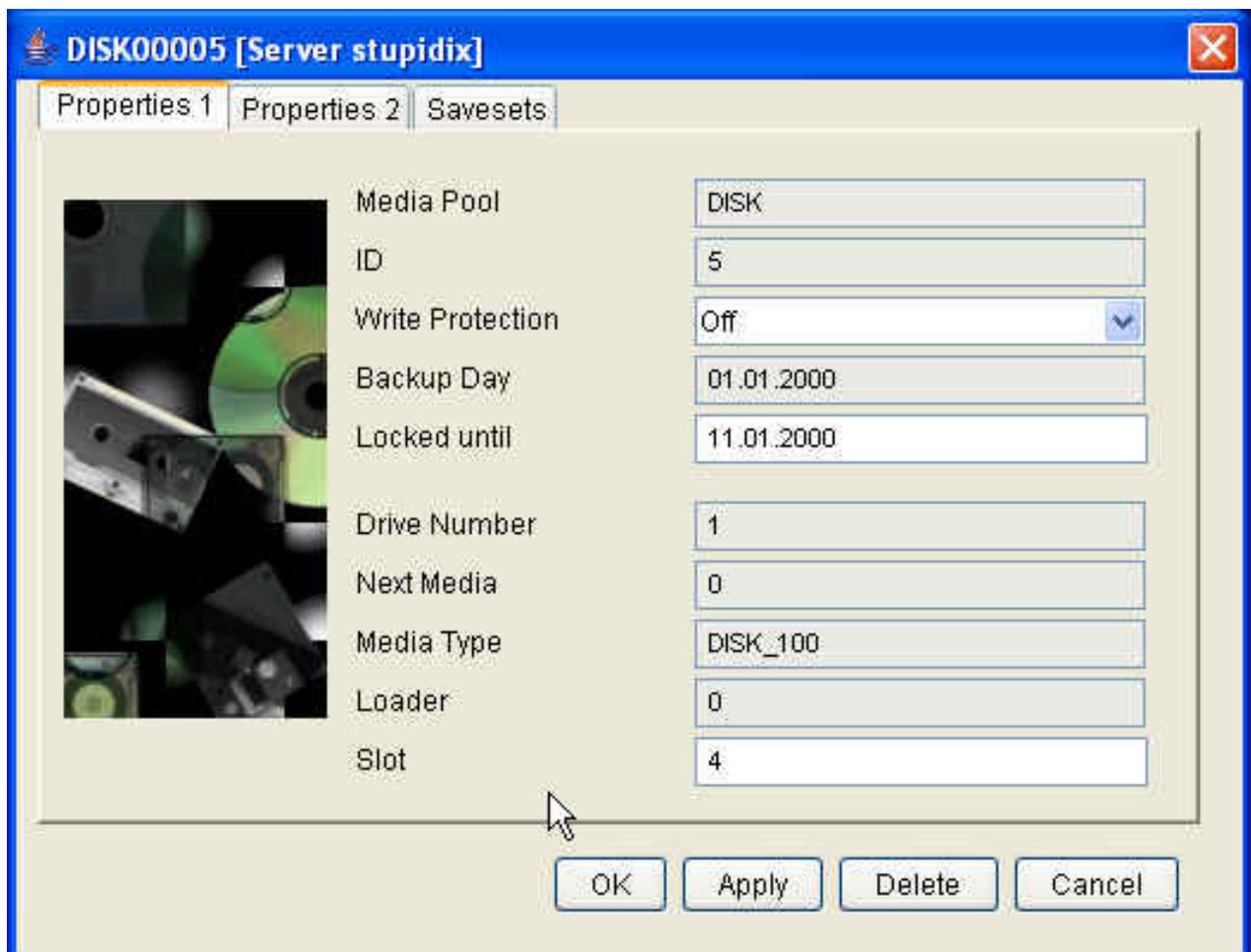
Media Pool	name of the media pool containing this media (uneditable)
ID	identification number of the media (uneditable)
Write Protection	Selection between On/Off, the media can be overwritten or not
Backup Day	date of the backup day (uneditable)
Locked until	The media is not available up to this time Caution: Editing possible
Drive Number	Drive in which the media was last used (uneditable)
Next Media	Number of next cartridge (uneditable)
Media Type	Manufacturer identification of the media (uneditable)
Loader	Number of the loader in whose magazine the media is at present (uneditable)
Slot	number of the slot in the loader Editing possible (Attention! better archive adjustment (see 3.4))
Ok	save the changed media parameters in the database and return to the start screen
Apply	save of the changed media parameters in the database. Entry mask can be used for further changes
Delete	removes the dataset from the archive and closes the entry mask
Cancel	no action and return to the start screen
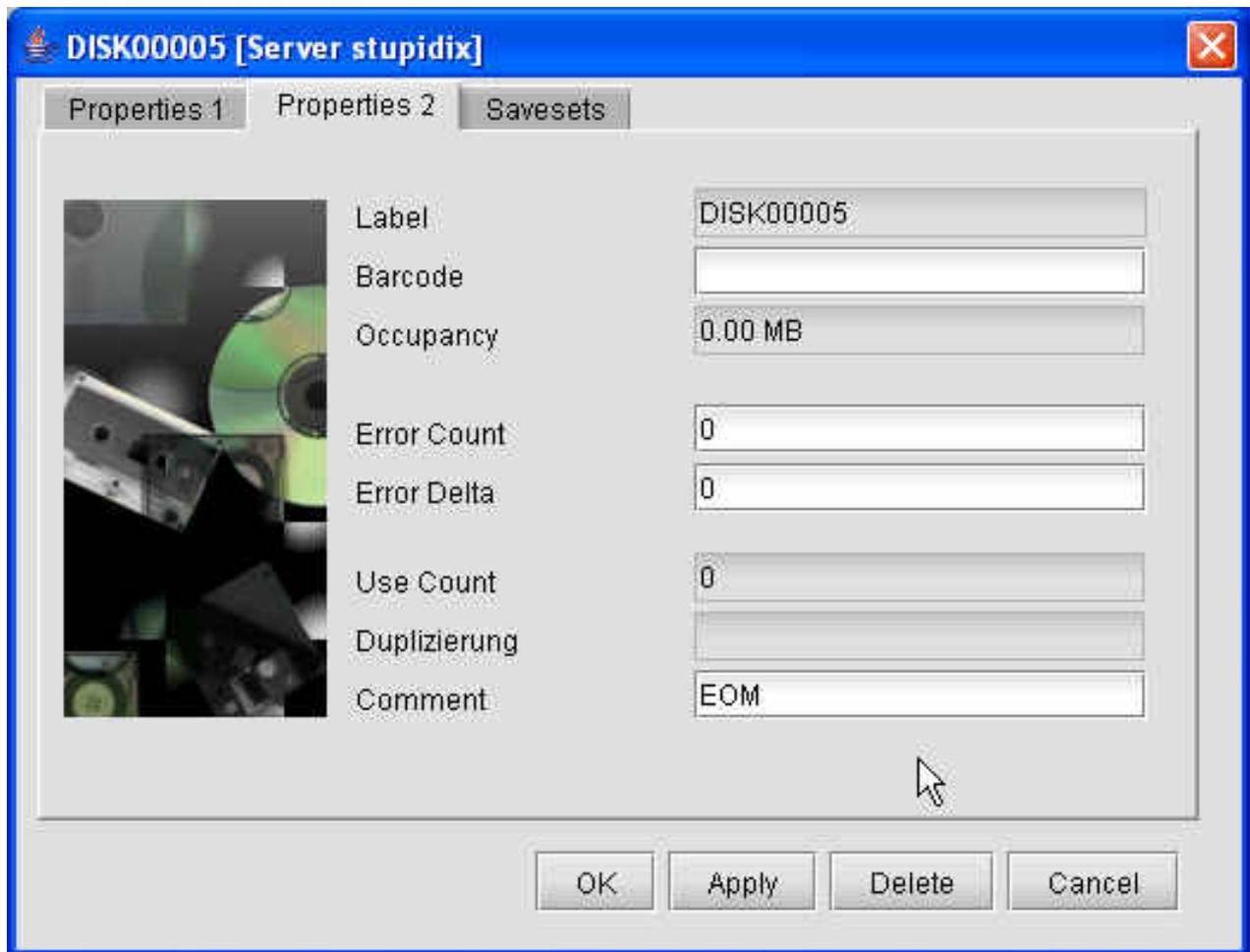
Label	denotion for media identification
Barcode	barcode number of the media
Occupancy Level(%)	percentage of current filling of a media (uneditable)
Error Count	absolute number
Error Delta	change in number of errors compared with the previous day
Use Count	counts the initialisations of the tape (uneditable)
Duplication	has this media been duplicated (yes/no, uneditable)
Comment	additional information
Ok	save changed media parameters in the database and return to the start screen
Apply	save changed media parameters in the database. Entry mask can be used for further changes
Delete	removes the dataset from the table and closes the entry mask
Cancel	no action and return to the start screen

In the view **Savesets** all savesets stored on the media are listed.
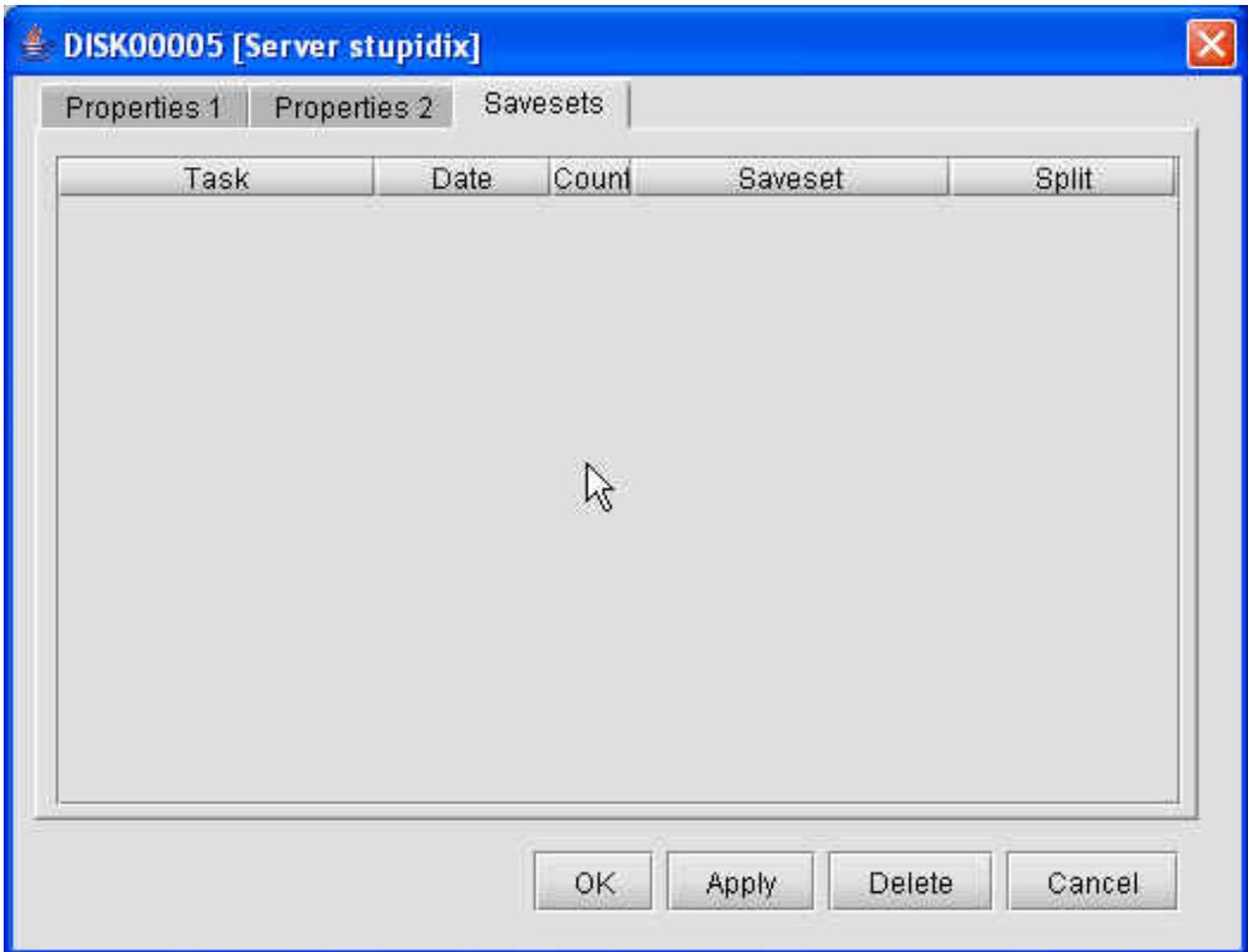
Task	task name
Date	start time of the backup run
Count	count of the backup executions per backup-day
Saveset	identification of the saveset
Split	is the saveset located on one media (no) or distributed on several media (number of parts)

8.5.5.2 Button Initialization

Here a new media is inserted into the media-archive.

Media Pool	Select one of the configured pools
Drive	Selection of drive in which the media must be initialized (depends on the selected pool)
Media Type	selection of media type (pre-selection depends on drive type)
Get label from media	use already existing label on media
Automatic assign of next number	**SEPsesam** automatically counts up label numbers for the initialized media.
Button	Function
Start	Start insertion of new media
Cancel	close screen, no insertion

8.6 Tasks

8.6.1 By Clients

Shows all backup tasks, defined for the selected client.
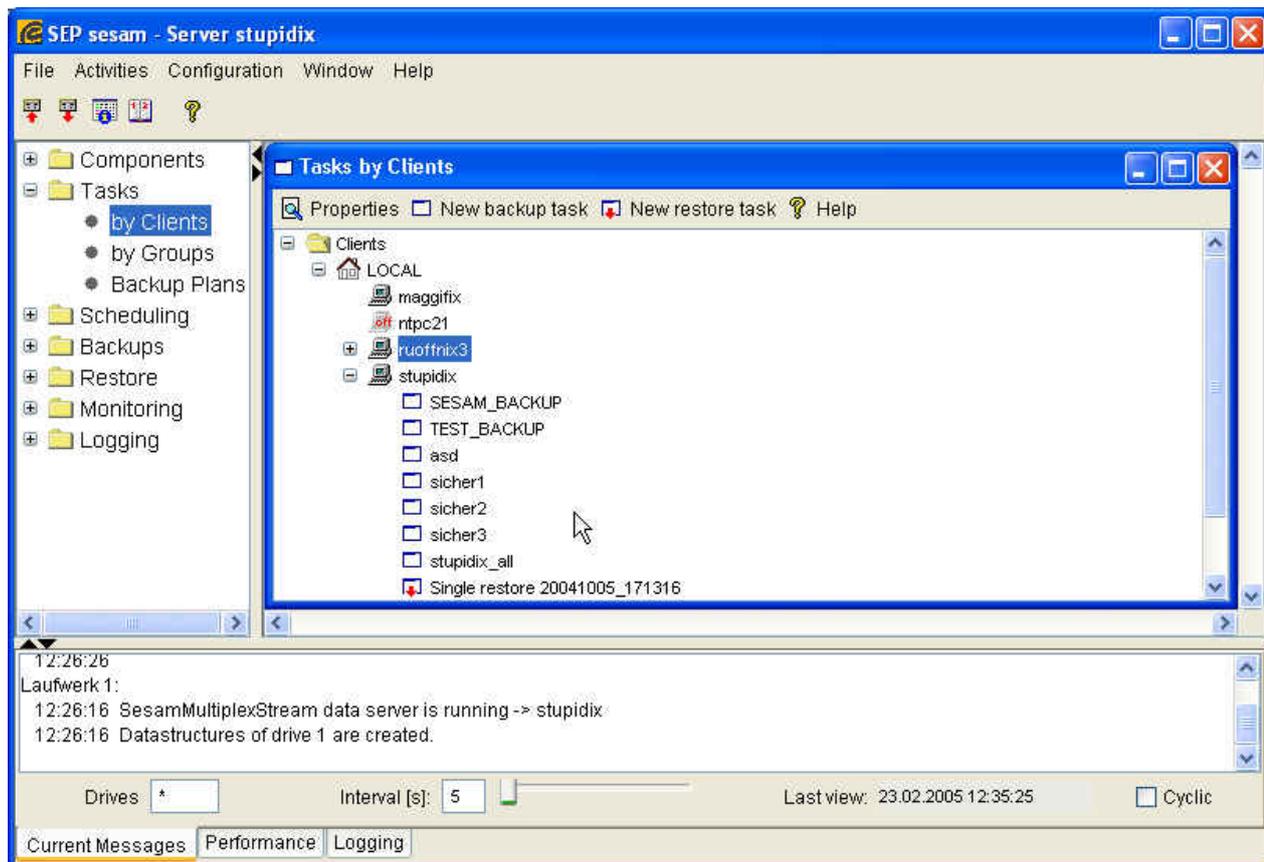
Button Properties shows the details of a task and allows modifications.

Button New backup task shows the following window:
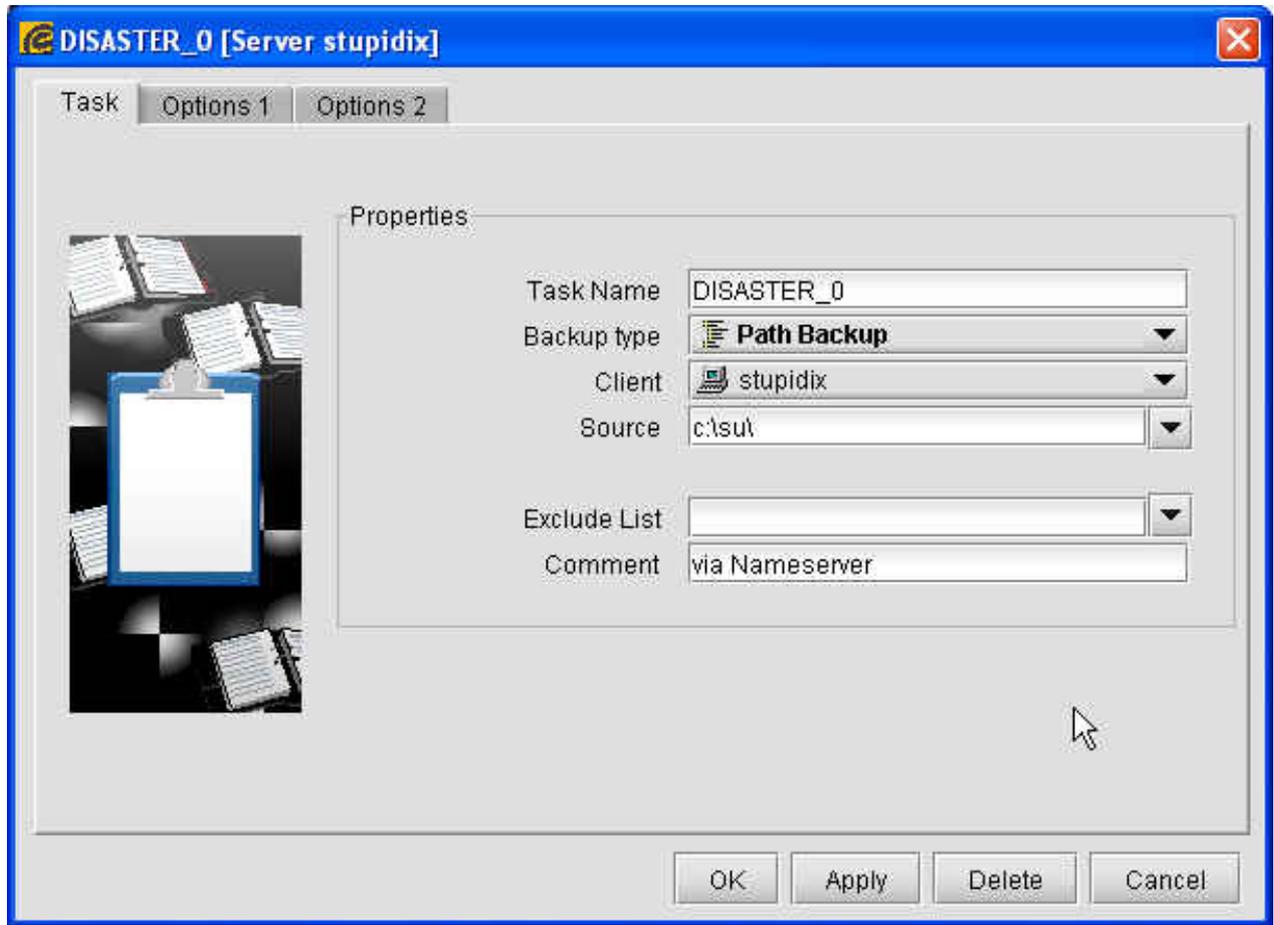
Task Name	user selected identification of a backup task (use digits, letters and underscore (_) only)
Backup Type	type of backup (Path-Backup -> Standard) Path-Backup - Files, Directories (pre-set) Registry (WNT) System state (Win2000) Lotus Notes MS Exchange Server Informix MS SQL Server ORACLE ORACLE7 SAP/R3
Client	selection of a computer from which the backup must be executed Additional TCPIP names related to a special network route can be specified (Client interface)
Source	Disk, directory, files, which should be backed up Multisourcing - additional sources are separated by commas
Exclude List	excludes certain files from the backup (see 8.6.1.1)
Comment	additional information
Ok	Saves the changed task parameters in the database and returns to the start screen
Apply	Saves the changed task parameters in the database. The entry mask can be used for further changes
Delete	removes the dataset from the database and closes the entry mask
Cancel	no action and return to the start screen
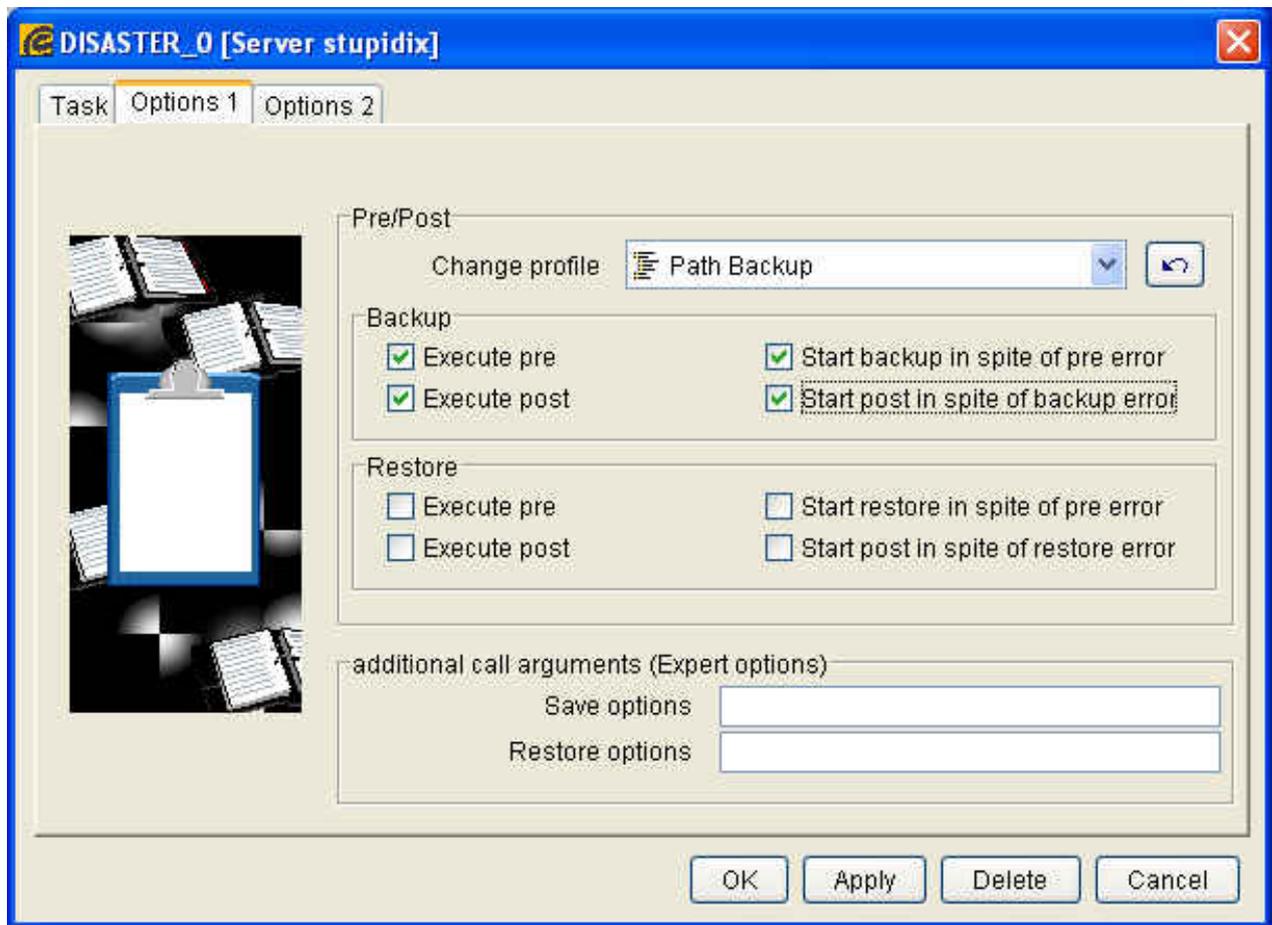
The tab "'Options 1"' enables to select from pre-defined Pre/Post-Options for Backups and Restores.

For a backup/restore a selection can be made in "'Change Profile"' from pre-defined profiles and if necessary a modification can be made by clicking the checkbox.
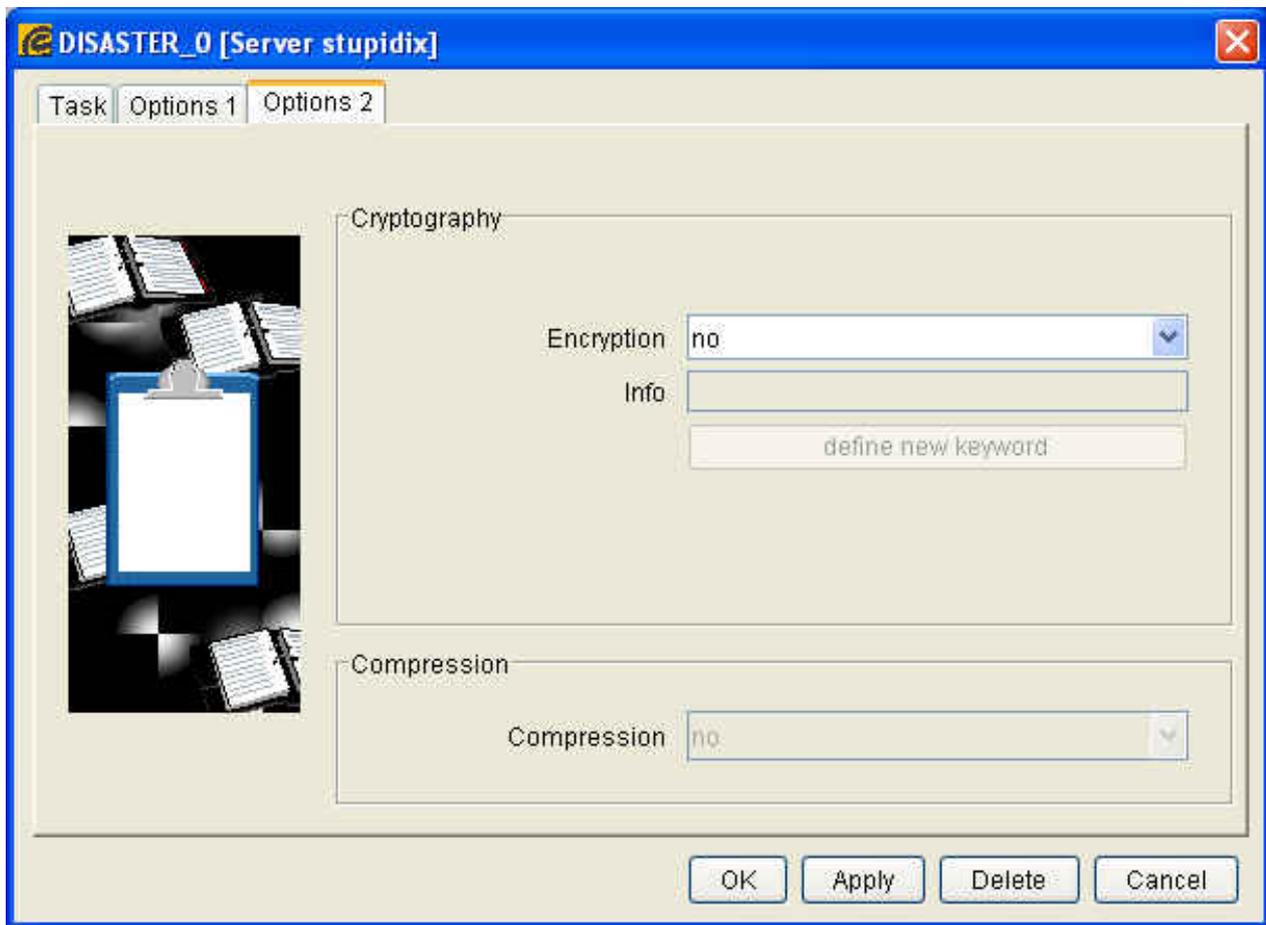
In **Options 2** the settings for compression and encryption are set resp. shown.

8.6.1.1 Exclude list

With the exclude list certain directories and files can be excluded from a backup. The indication takes place with **regular expressions** (see 9.4).

Examples for exclude list

1. Backing up '/var' without '/var/tmp' but with directory '/var/tmp1':
   \./var/tmp/

2. Backing up '/var' without any directory '*/tmp*':
   /tmp

3. Backing up source '/usr' avoiding '*.o', '*.tmp', 'a.out' and 'old*.c' files and all 'old*' directories:
   \.o$, \.tmp$, /a\.out$, /old.*\.c$, /old.*/

4. Backing up '/usr' without '/usr/var/spool' and '/usr/var/log':
   \./usr/var/spool/, \./usr/var/log/

5. Avoid all 'syslog####.log' files:
   /syslog[0-9]*.log

Attention: If you want to exclude a specific path then put entire path in the exclude list. Several excludes require a separation by commas.

8.6.1.2 The special backup types

SEPsesam distinguish between "'path"' backup and special backup types.

The following sources have a special meaning in case of "'path"' backup:

- The backup of a WNT-registry is performed if the entry "'registry"' or "'system_state"' is the only source of a path backup.

- The backup of the Win2000 systemstate is performed if the entry "'system_state"' is the only source of a path backup.

The following special backup types are supported at present:

| Backup type	licence needed	extern	description
Lotus Notes	yes		Source is name of Lotus Notes Databse
MS Exchange Server	yes		Source is name of Exchange Database (often equals name of Windows server)
Informix	yes	*	Source is name of INFORMIX Databse. An INFORMIX task is started externally with ON-BAR on the INFORMIX computer
MS SQL Server	yes		Source is name of SQL Server Database.
MySQL	yes		Source is name of MySQL Database.
ORACLE	yes	*	Source is the ORACLE SID of ORACLE Database. An ORACLE task is started externally with RMAN on the ORACLE computer.
ORACLE7	yes		Source is the ORACLE SID of ORACLE Database. An ORACLE7 task requires SEP sesam2000 client software sbc_ora7. ORACLE7 tasks can be started directly from **SEPsesam**-Server.
SAP/R3	yes	*	Source is the SAP/R3 ID of SAP/R3 Database. An SAP/R3 task is started externally with BR-BACKINT (brbackup/brarchive/brrestore) on SAP/R3 computer.
SLOX	yes		Source for SuSE Linux Openexchange Server is "'all"'.

8.6.2 By Groups

The menu item **Tasks by Groups** permits a review of all tasks defined by the corresponding task groups. Tasks organized in task groups are processed regardless of the corresponding client with one backup appointment.
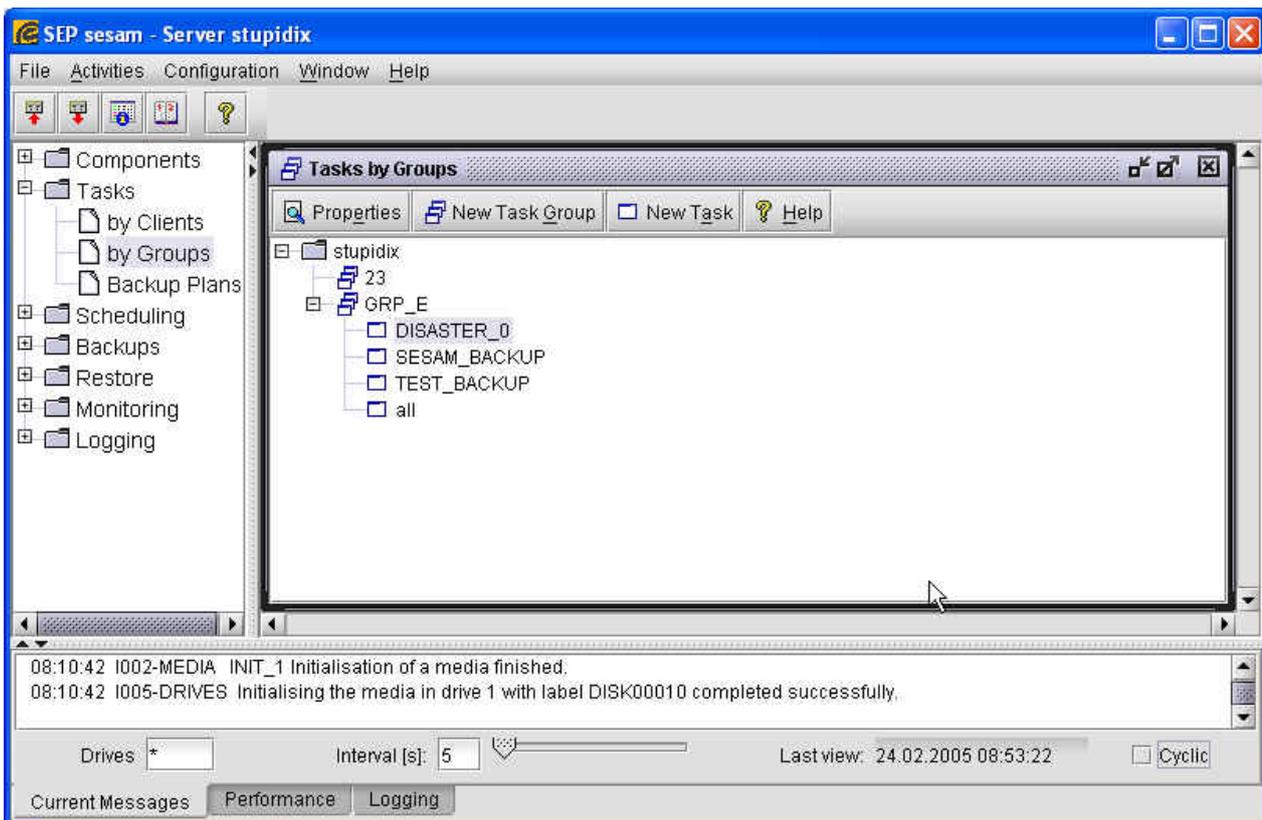
Button Properties Taskgroup

Group Name	name of the task group
Comment	additional information

With the arrow button > the available tasks can be assigned, one at a time, to the selected task group. With >> all available tasks can be assigned to the selected task group. With the arrow buttons < and <<, tasks assigned to the selected task group can be removed from it (deassigned).

8.6.3   Backup Schedules

Review of all defined tasks, task groups and backup appointments related to them. Here, backup appointments can be configured branching to scheduling.

8.7   Scheduling

The chapter about the SEPuler (see 4) describes the time control of textbfSEPsesam.

Here, GUI elements for schedules, appointments and the calendar are explained.

8.7.1 Schedules
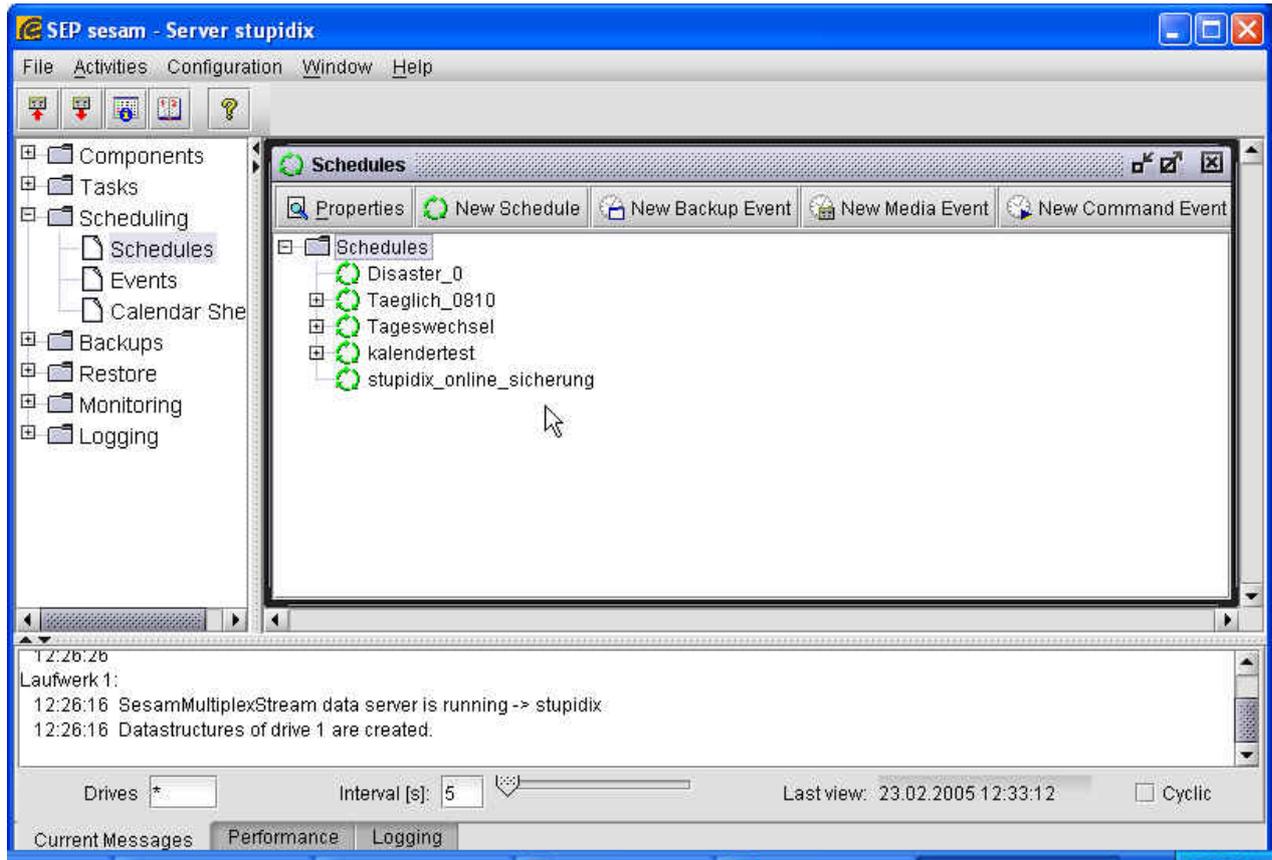
The window shows all configured schedules and their related appointments.

Using the buttons of the toolbar, timing of all activities in **SEPsesam** is configured.
The user can create a new schedule or reuse an existing one. Wihin a schedule a new appointment is created and its task is defined. The task is executed at the requested time, and (according to the schedule) is shifted along in the calendar to the next execution time.

8.7.1.1 Properties Schedule - New Schedule

Name	Identification of the schedule
Execute	(De-)Activation of all appointments using this schedule by the user
Duration	Time interval for the execution of a schedule the date can be entered through a graphical calendar appearing at mouseclick.
Begin	Start time for the repetition cycle. The schedule is valid only after the day for which Begin is specified. The first execution can be performed no earlier than the start time Begin
End	If the checkbox End is activated then the repetition cycle is ended after the selected date, . After the day End no further executions occur. If the checkbox End is not activated, the repetition cycle is unlimited.
Starting Range	Backup task can be started only in this defined period of time
Start	Desired Start of the appointment. The actual start time of the appointment depends on system load. Each appointment is inserted at start time into a waiting queue at start time. Depending on workload and joblimit of this waiting queue and the schedule priority, execution must wait until all current tasks are completed and there are no tasks of higher priority pending. For tasks of equal priority the rule FCFS (first come first serve) is valid .
Duration	The user can set up a Starting Range by defining the duration. If execution cannot start in the duration interval, the job is not started.

A variety of settings is offered for the cyclic behavior of a schedule:

- **one-times** the desired time in the starting range is set

- **daily** specific days or hours or minutes

- **weekly** specific weeks and weekdays

- **monthly** specific months at specific month date

- **monthly** at 1., 2.,3.,4., last day, weekday, weekendday, Mo,Tu,We,Th,Fr,Sa,Su of month (optionally also a daily offset here is possible) these specifications are denoted as relative

- **yearly** similar to monthly; absolute and relative specifications allowed

8.7.1.2 New Backup Event
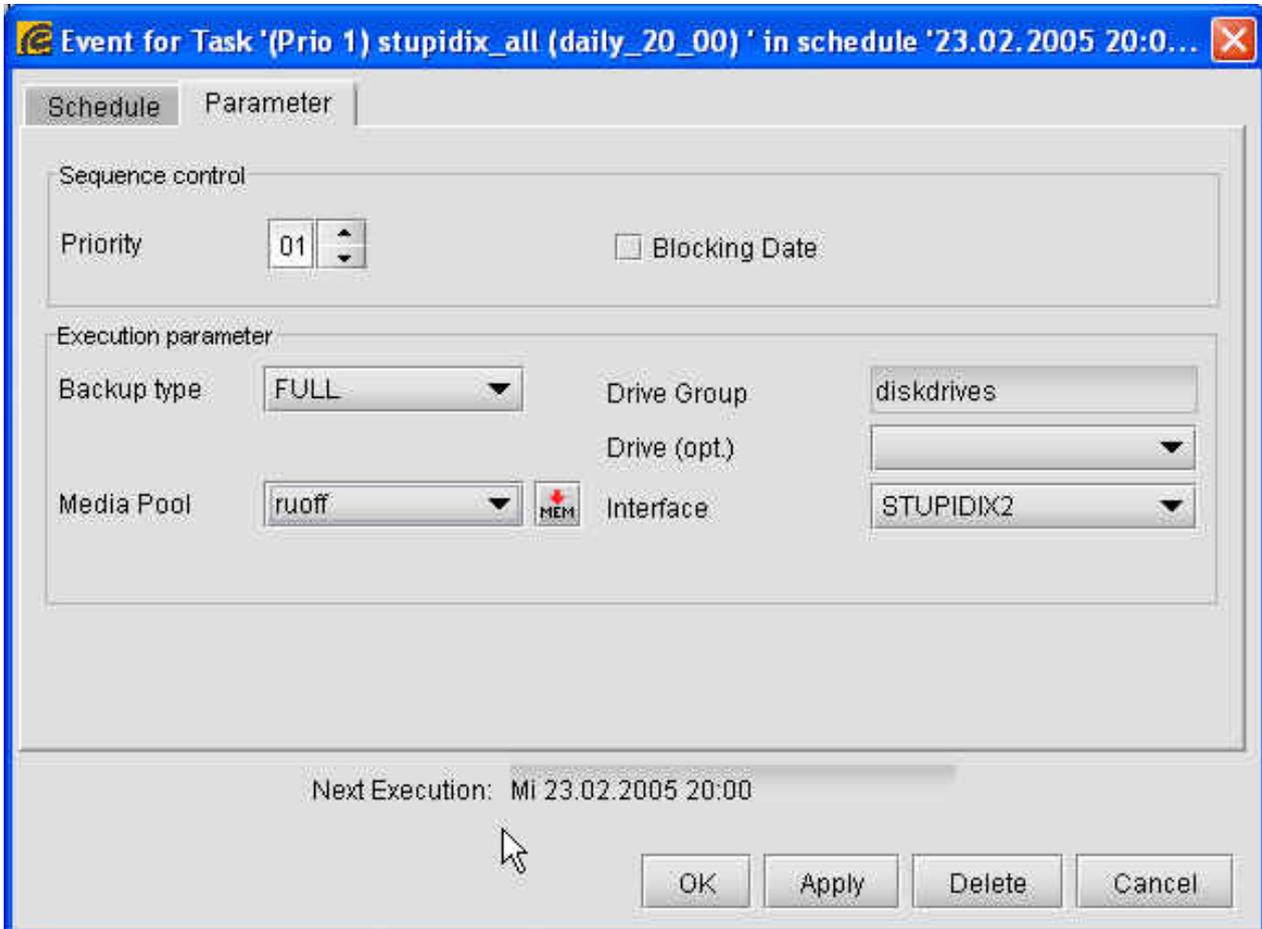
Parameters	Description
Priority	Priority (see Ch.4 Prioritizing)
Backup Type	Selection between the Backup types FULL, DIFF, INC, COPY
Media Pool	Target for the Backup data The exact label of the target media is determined by the last previously executed media appointment
Drive Group	Specified in the media pool drive group (not editable) changes at media pool selection
Drive (opt.)	Selection of a drive from the pre-set drive group
Interface (opt.)	selection of additional configured TCP/IP-Name of the client So the data stream can be directed over a specific network connection permitting undisturbed backup or restore execution without blocking other network activities
Blocking appointment	The appointment is in effect only to block other Backups with the same name when schedules overlap

8.7.1.3   New Media Event
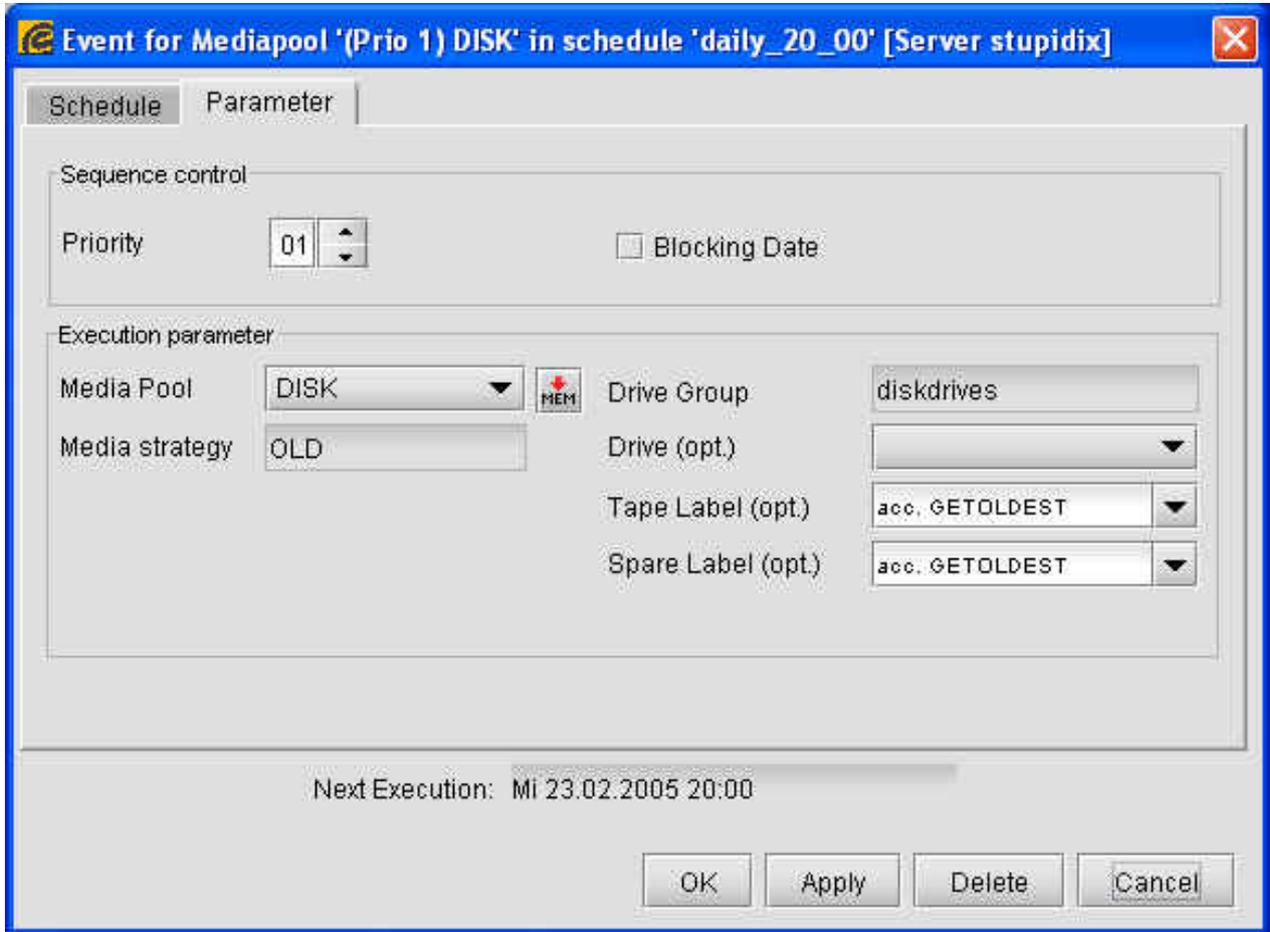
Parameter	Description
Priority	Priority (see Ch.4 Prioritizing)
Drive Group	Drive Selection of a drive group. Advantage: **SEPsesam** uses the drives belonging to a specific group independently
Drive	Selection of a certain drive
Tape Label	selection of a pre-set tape label (tape identification) from the media pool
Spare Label	selection of a pre-set spare label from the media pool
Media Pool	grouping of media by certain criteria (e.g. by types of media etc.)
Media Strategy	indication of strategy OLD defined in the media pool
Blocking appointment	The appointment is only in effect to block other media appointments for the pool when schedules overlap

A media appointment from the point of its activation defines a specific media of a pool onto which the backups write their data.
The contents of the media are deleted by the appointment.

If the expected media is unavailable at the start of a backup or end of media is reached during data-transfer, then **SEPsesam** creates an internal media appointment, which provides the next media for the backup.

If no media appointment is configured in the calendar, then always only the internal one is in effect at EOM.

8.7.1.4 New Command Event

The switch textbfNew Command Event opens following window:
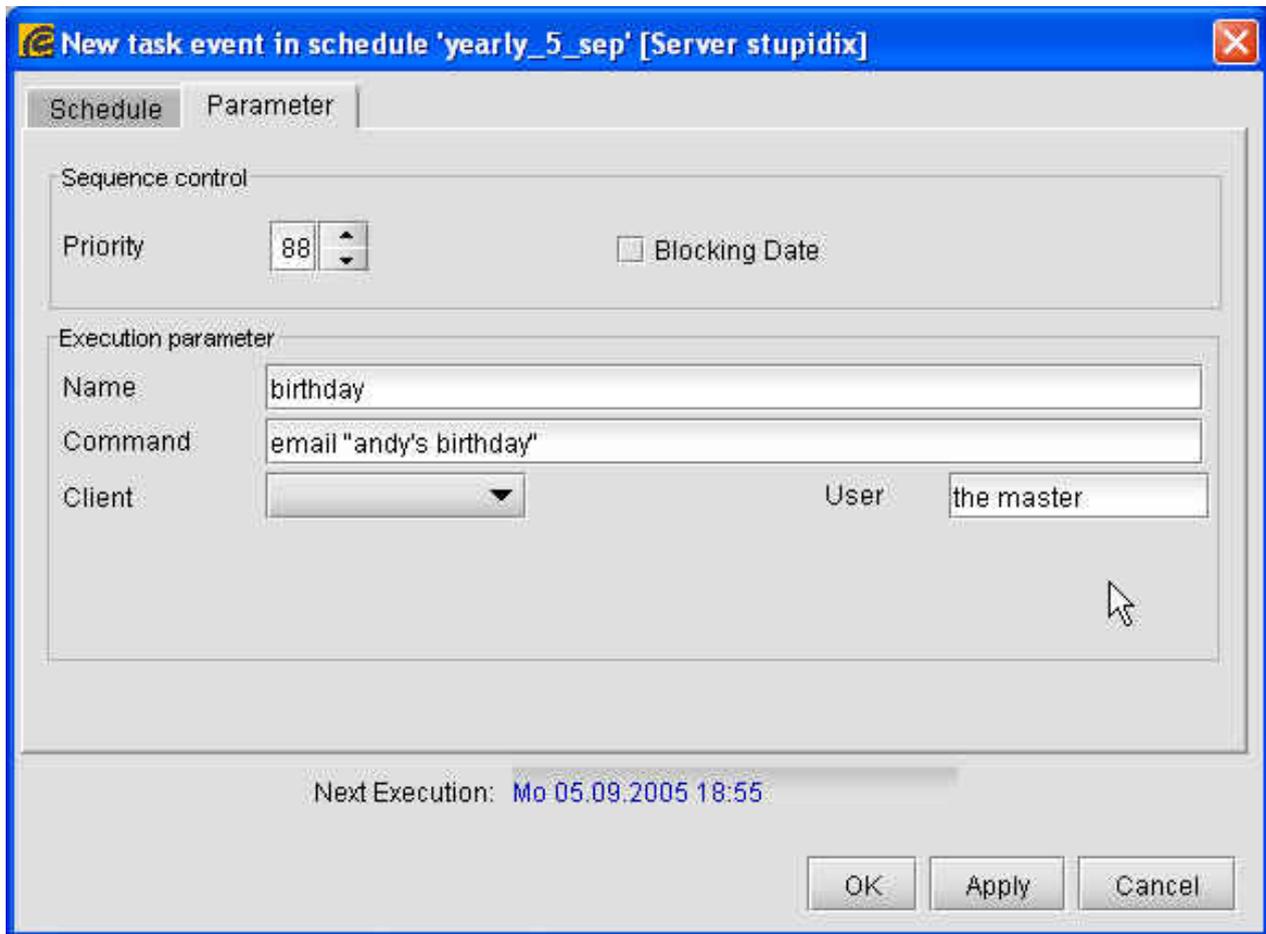
Parameter	Description
Priority	Priority
Name	Identification of the command appointment
Command	complete command
Client	Selection of computer, on which the command should be executed
User	pre-defined user name at the client (access restriction), which may execute this command
Blocking appointment	The appointment is in effect (Prioritising concept) only to block other command appointments with exactly the same command when schedules overlap

Starts any executable command at the configured client.

Since certain security aspects must be respected it is not possible to execute any command by any user at any client computer.

Access restriction of command appointments

UNIX

External commands are executed only when the user name and the command are entered into the file textit/etc/sesam_cmdusers.allow at the client computer.

Format: 'user command—*' (* = all commands)

is started with "'su - user"'

Windows

External commands are executed only when the user and the command are entered in the registry of the client computer, in key textitHKEY_LOCAL_MACHINE/SOFTWARE/SEP Elektronik GmbH/sesam/

HKEY_LOCAL_MACHINE/SOFTWARE/SEP Elektronik GmbH/sesam/CommandEvents/{user}/{command

command	excution	
	all commands	
specific command	this command only	ll
cmd /c	all DOS commands (dir, etc.)	
DOS-Command	this command only	

Additionally on the client computer the entry CTRLD_Path={IV}/bin/sesam;{IV}/bin/sms

in the file {IV}/var/ini/sm.ini in section [CTRLD_Server] must be extended with the directories in which the desired programs reside.

8.7.2 Appointments

Gives an overview of configured backup-, media-, command- and newday-appointments.

Those are the appointments which SEPuler permanently checks and (if starting time is reached) executes.
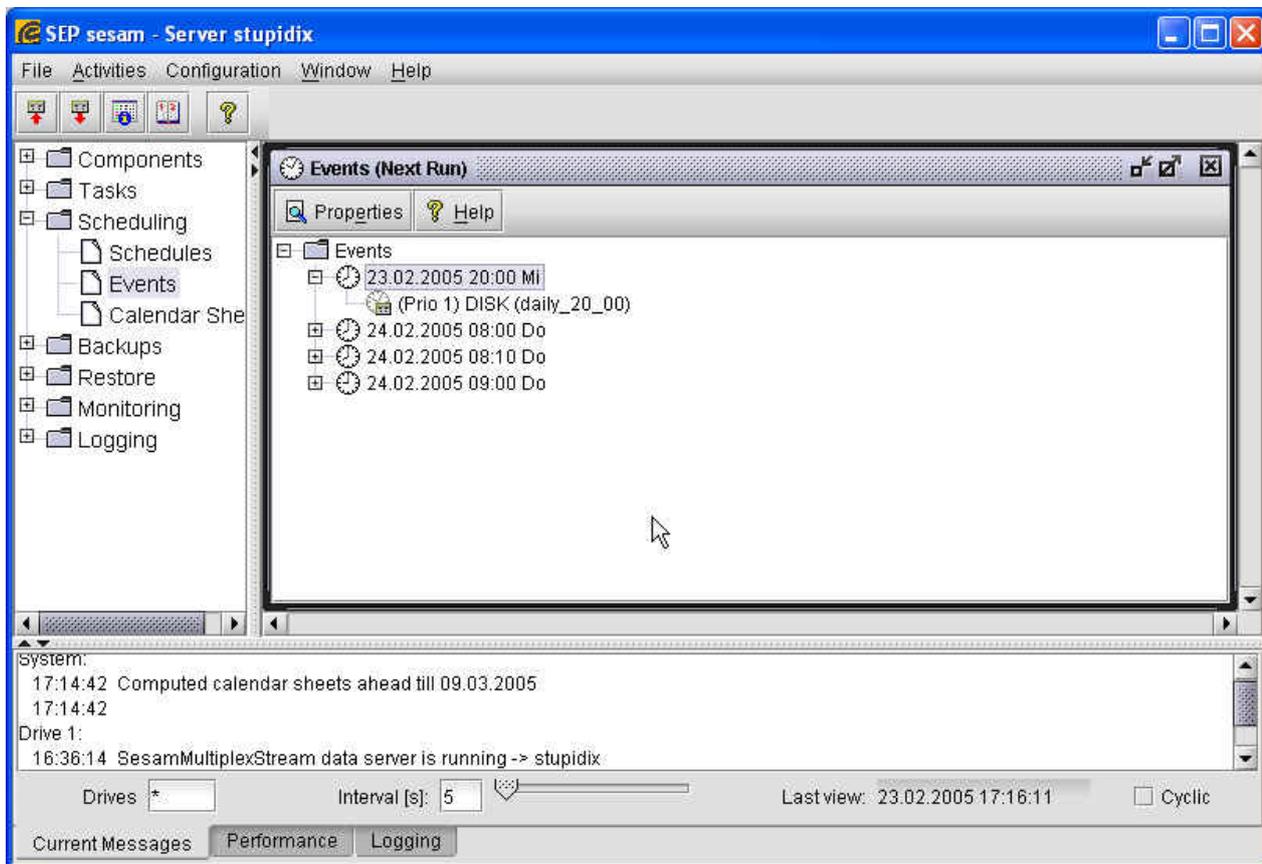
Button **Properties** shows all information about the appointment.

8.7.3 Calendar Sheet

The calendar sheet provides an overview of all appointments and their current states in an hourly grid.
It also provides a convenient and fast overview of what was executed on the system and what is about to run. With a mouseclick on the entries detailed information can be displayed; it corresponds to **GUI:Backups-by Status** (see 8.8.1) .

SEPsesam calculates 14 days offline in advance. This information can be displayed very quickly. Days further out in future are calculated online - this may take a little more time.

Changes in schedules are also updated online, thus the user can immediately see the updated calendar.
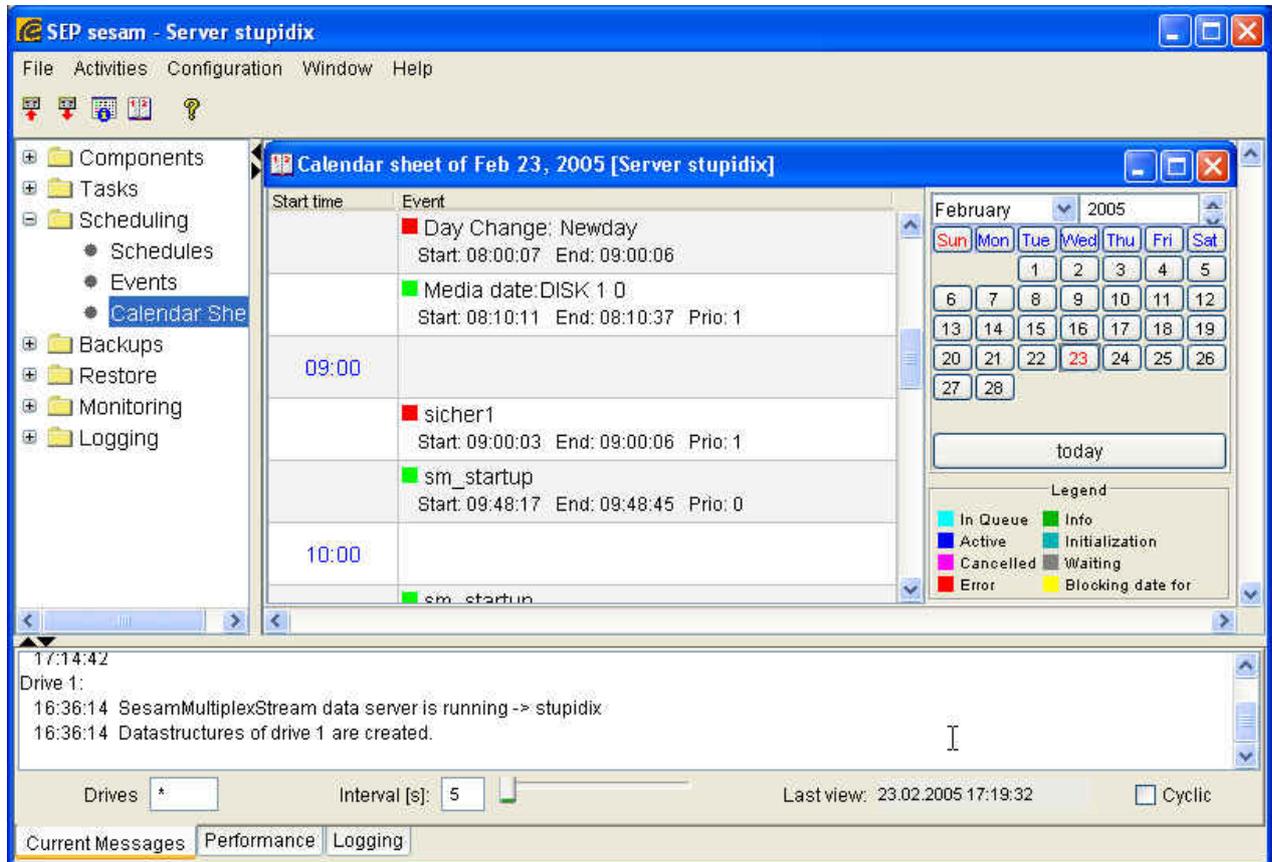
8.8   Backups

This point is part of the **SEPsesam** information system.
Here, backups are shown and a large number of selecting and filtering possibilities are offered.

8.8.1   by State

Overview and filtering of all tasks due to state.

After input of the specifications in the time-, client- and status filters above a mouseclick on the button **Show** displays the desired information.

Hint
Only on MasterSesam the checkbox **Server** is visible.
Thus the informations on backups of a specific **SEPsesam** server can be shown.

By clicking the buttons on top of the columns the display is sorted alphabetically or with respect to time due to selected column.

Status filter

in progress	Task already picked up by SEPuler (see 4)
in queue	The task resides in queue, i.e.the appointment is activated
	by the SEPuler
active	The task is executing
Not restorable	
Cancelled	The Backup task was cancelled during the data transfer
Error	fatal error during execution of the backup task
Restorable	
Successfull	Backup successful
Info	depending on operating system some files are not saved
Partly restore	
Cancelled	The task was cancelled by the user during the execution
	data, that was transferred up to that point in time can be
	restored (last file potentially inconsistent)

By clicking on (marking) a task in the table and activating the button **Properties** detailed data about that task are shown.

Info1
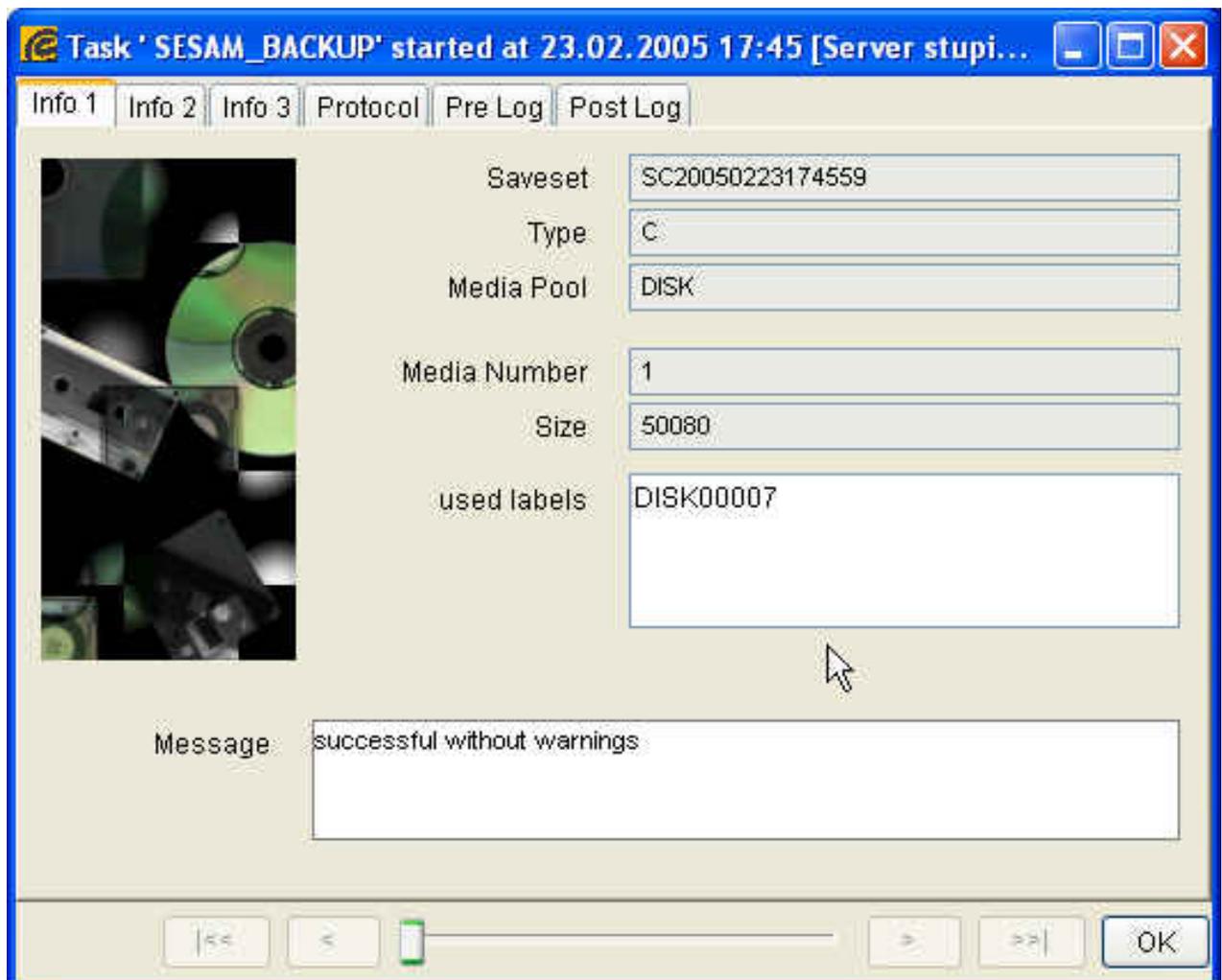
Saveset	Saveset
Type	Backup type (F=Full, C=Copy, I=Incremental, D=Differential)
SMS	SMS (1 = yes, 0 = no)
Media count	Count of media, used for the Backup
Size	of the Backup in Bytes
Used Labels	List of used media
Message	Detailed status information

Info2
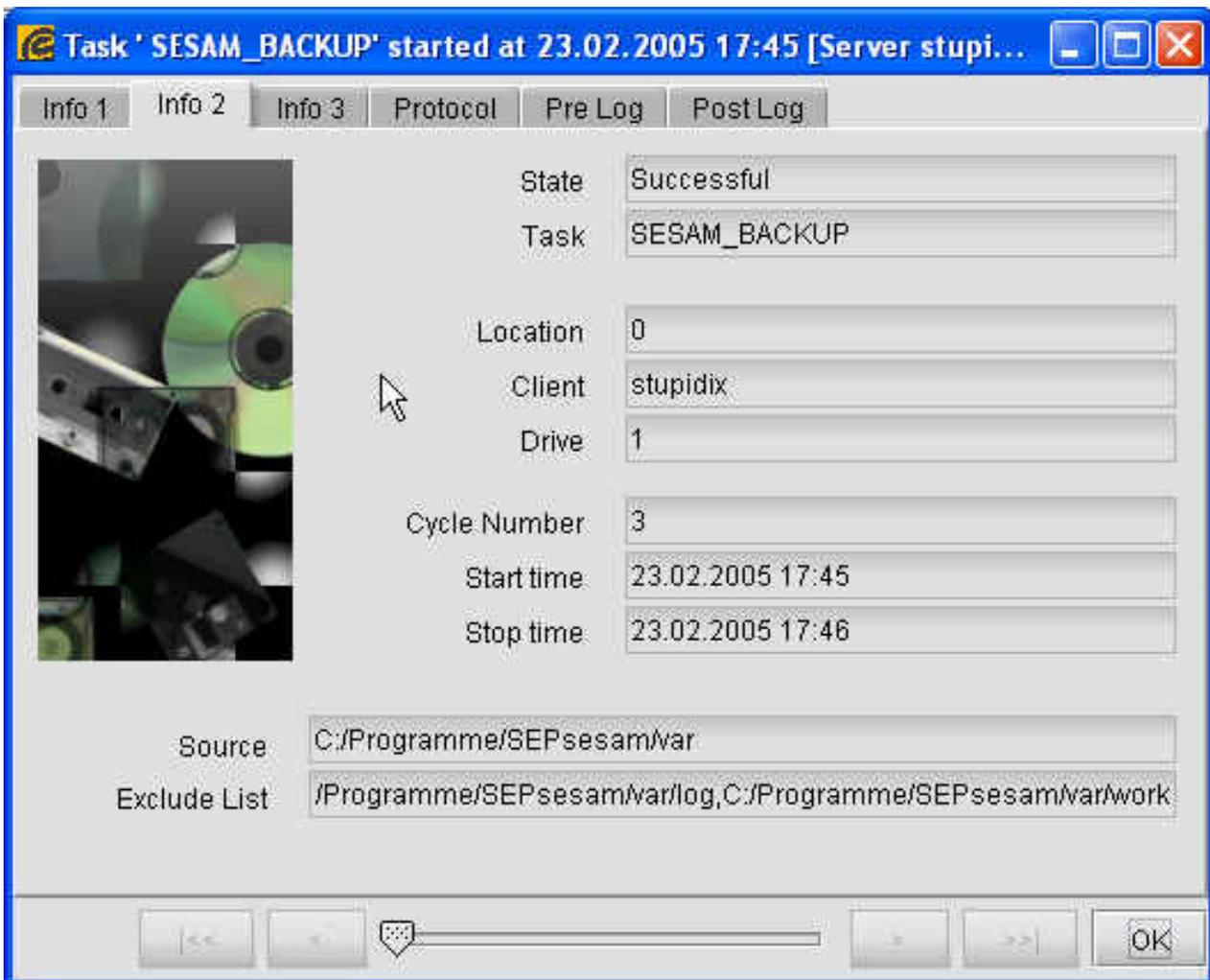
Info3 shows information about encryption and compression.

**Protocol** In the backup protocol messages about backup execution for the selected task are denoted.

PRE-Log

Messages of the Pre-Interface, which was started before the backup execution

POST-Log

Messages of the Post-Interface, which was started after the backup execution

8.8.2 Statistic

Graphical representation of the various states of the selected backup tasks.
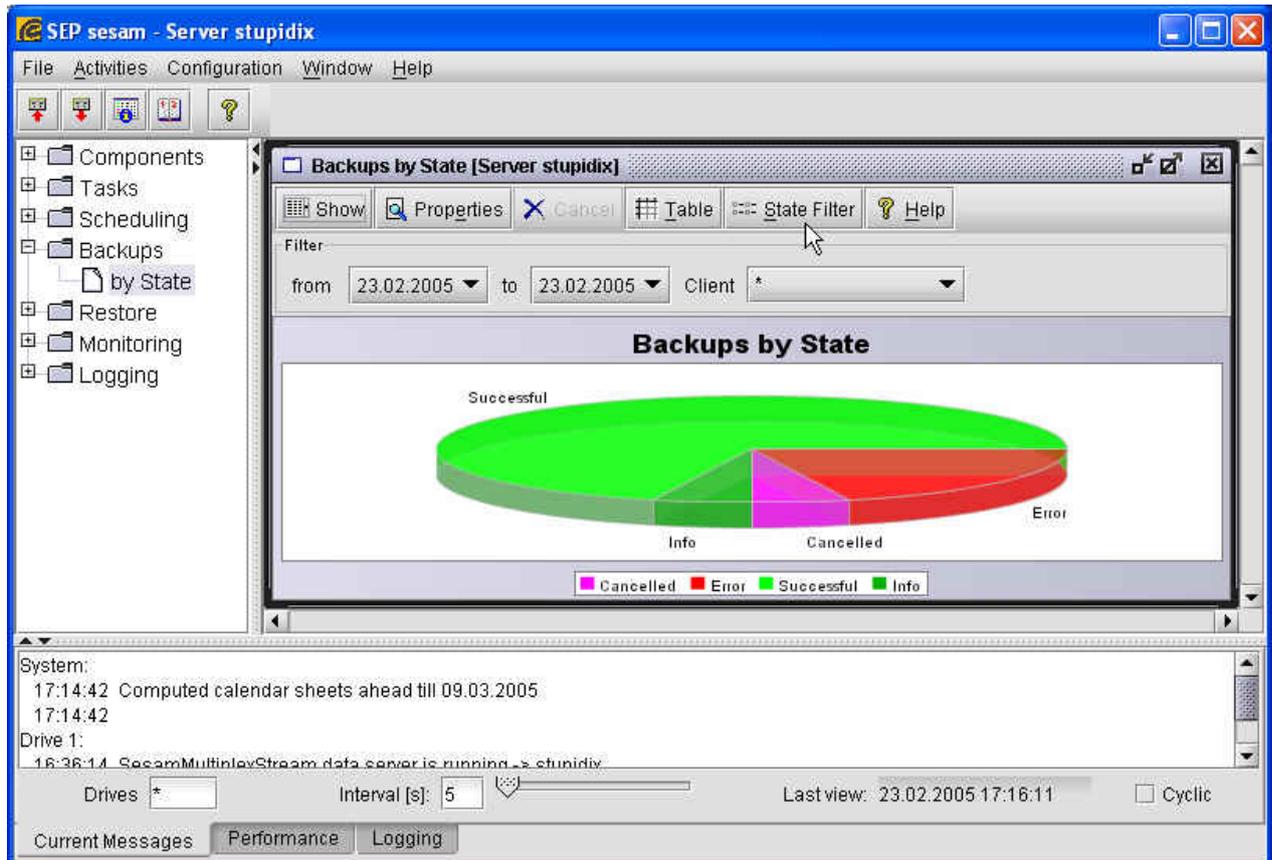

8.9 Restore

8.9.1 by State

Here the information system of **SEPsesam** presents the executed restores with the same filter- and selection possibilities as for backups.

8.10 Monitoring

8.10.1 Processes

Shows the processes and central information of **SEPsesam**.
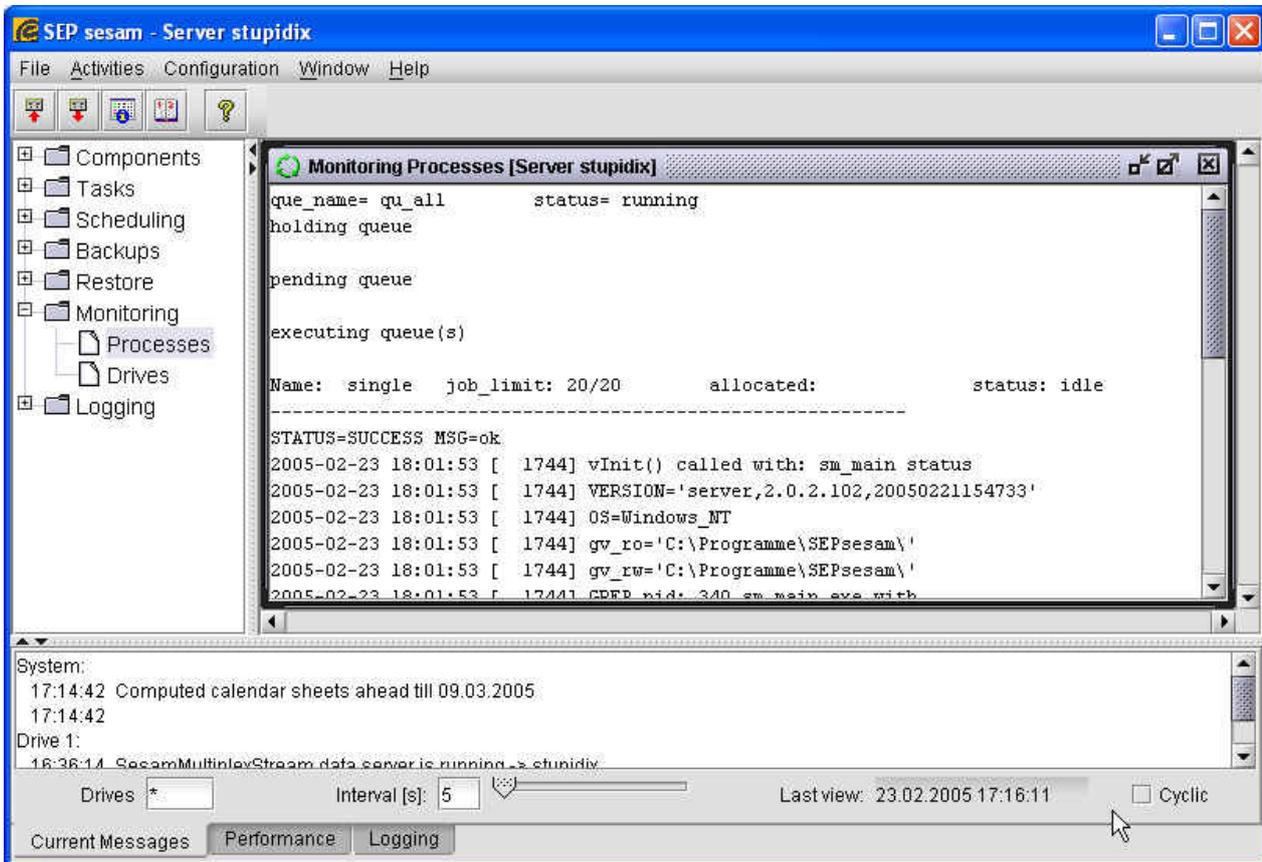
VERSION='server,1.6.3.4,200205021247'	Version number of the Server
OS=Windows_NT	Operating system
gv_ro='C:\su\'	Install directory of read only files
gv_rw='d:\su\'	Install dircetory of read write files
main=654	Process identifiers of **SEPsesam** processes
sepuler=658	
db=669	
qm=667	
rmi=678	
sms=530	
stpd=420	
passd=460	
ctrl=527	
STATUS=ONLINE	

8.10.2 Drives

Shows the queues of the drives.

Having selected all (*) or only a single drive and activating the button **Show**, **SEPsesam** will list the information about the queues.

The queues are managed by the **queuemanager**. It enables to create queues, to which jobs can be submitted for execution at a certain start time. Jobs whose starting time is still not reached, are **holding**, whose time is reached, but can still not run because of the job-limit are **pending**.

One property of queues is the **job-limit** which is the number of jobs simultaneously allowed to be **executing**.

During the configuration of the drives **SEPsesam** creates the necessary queues.
The SEPuler (see 4) and several other internal processes submit their tasks as jobs to the queue manager, which coordinates the execution.
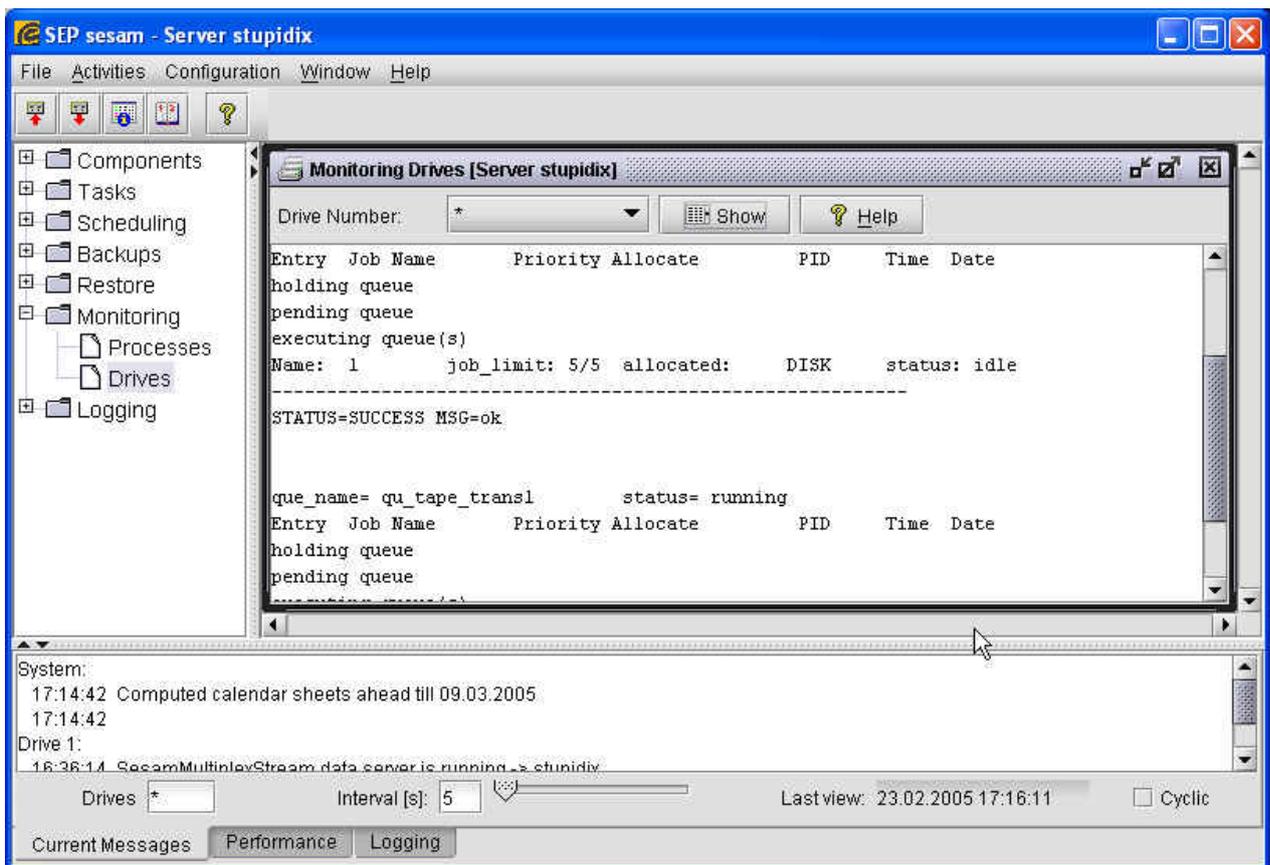
8.11 Logging

SEPsesam creates two protocols for each backup day, the status- and the day-protocol.

These informations are (contrary to the above mentioned displays of backups derived from the **SEPsesam** database) created as files in {ID}/var/prot and can be used for further processing (print, email) if needed.

Attention
A backup day is framed by two NEWDAY-appointments (see 4.4) .

The selection of time interval enables restrictions to output, which is started by clicking button **Show**.

8.11.1 State

SEPsesam creates a status-protocol, where one information row is written for each backup started in chronological order .
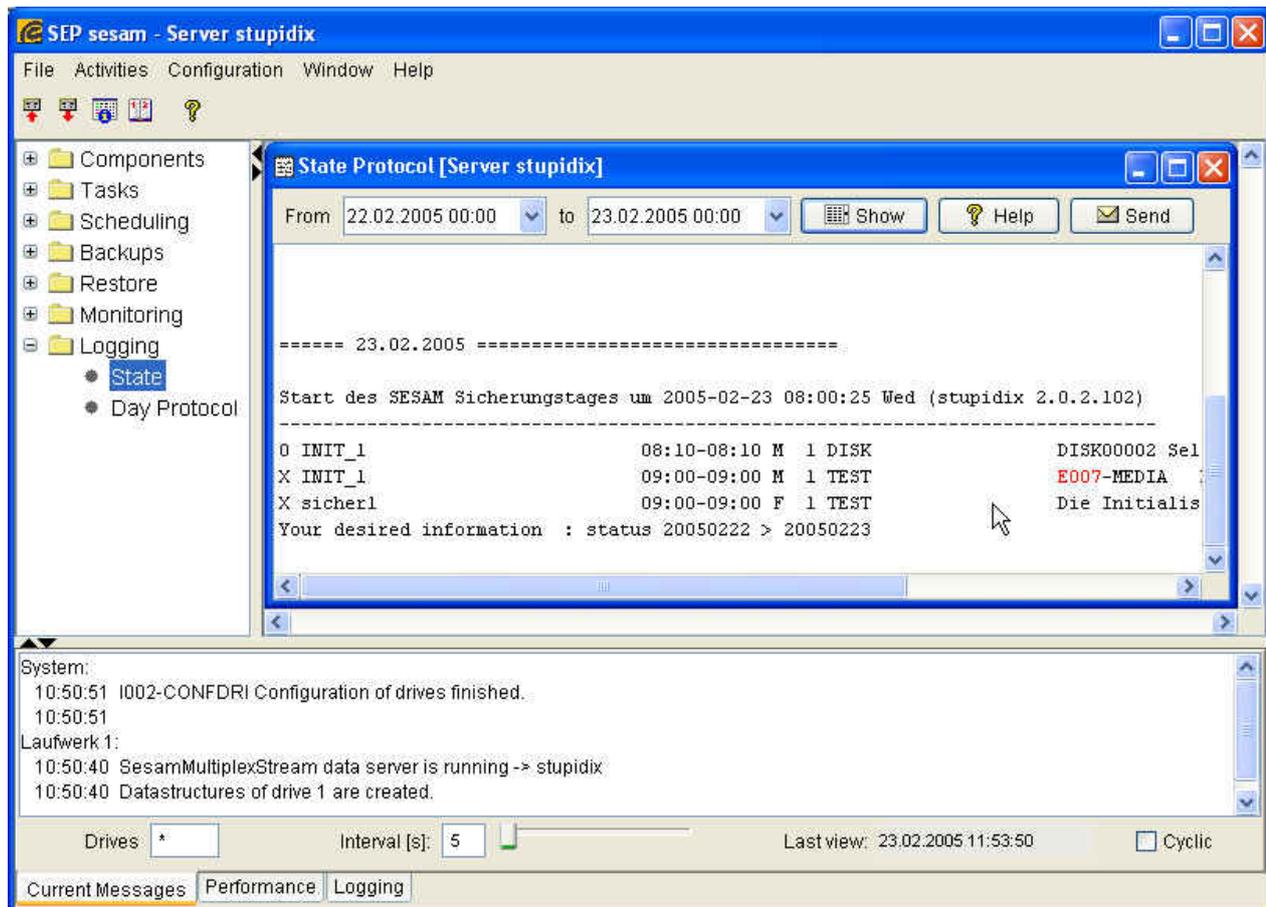

Function of the buttons:

Server	only MasterSesam : view protocol of other **SEPsesam** servers
Show	shows selected interval
Help	Online-Help
Send	sending the protocol-file via an email to **SEP AG** (have to be configured and released (see 8.3.7))
Print	printing the protocol-file to default printer

8.11.2 Daily Protocol

SEPsesam continuously writes a protocol for each backup day. All modules write messages with a time stamp attached to it. Each message contains a unique code consisting of message type (I=information, W=warning, E=error), number and originating module.

These protocols are the first and most important start point for problem analysis.

The user can find detailed help for problems and reuse it for the support message (see 8.3.7).
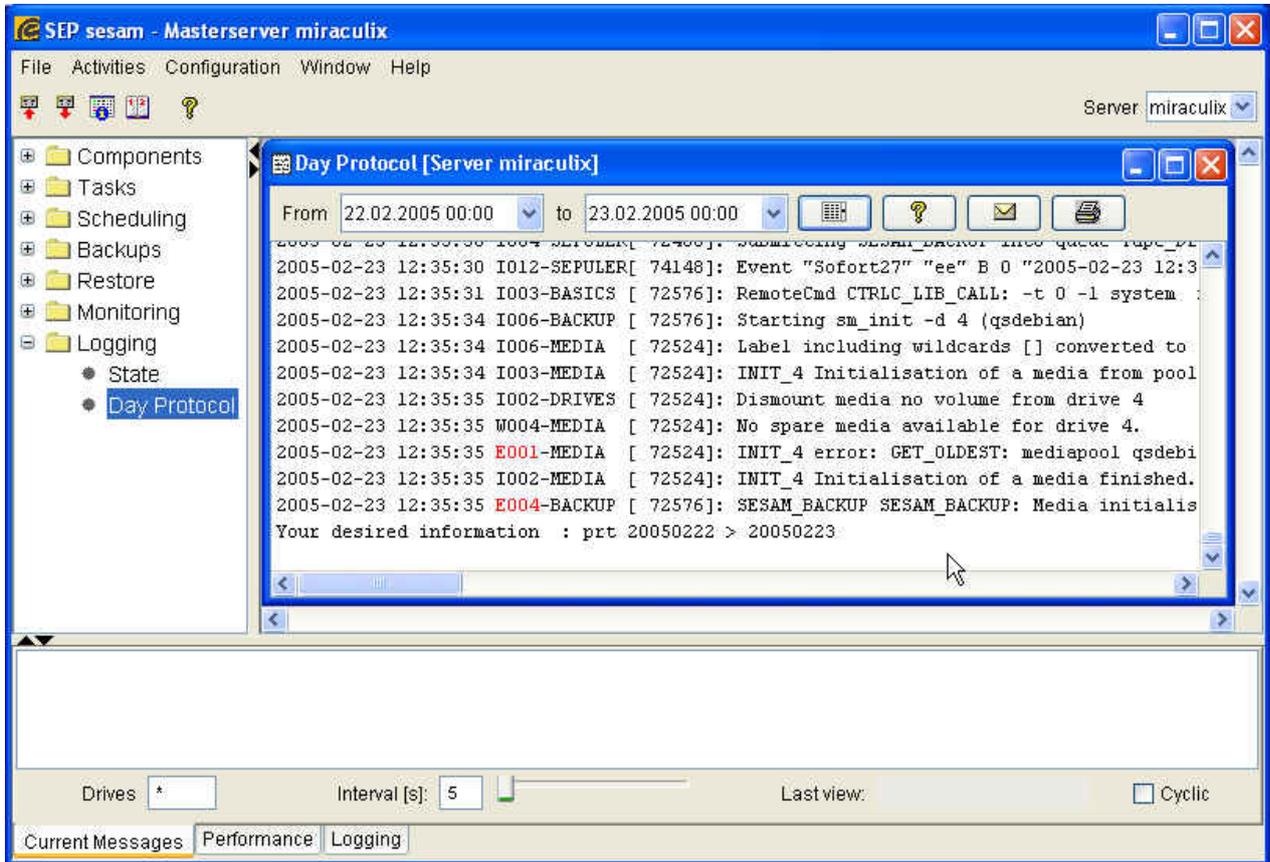
Chapter 9

Appendix

9.1 Exchange 2000 Server

9.1.1 Installation - System pre-conditions

- Exchange Server 2000

- SEPsesam Client (since Version 2.0)

- SBC 2.1 A3 (Jul 11 2002)

9.1.2 Backup
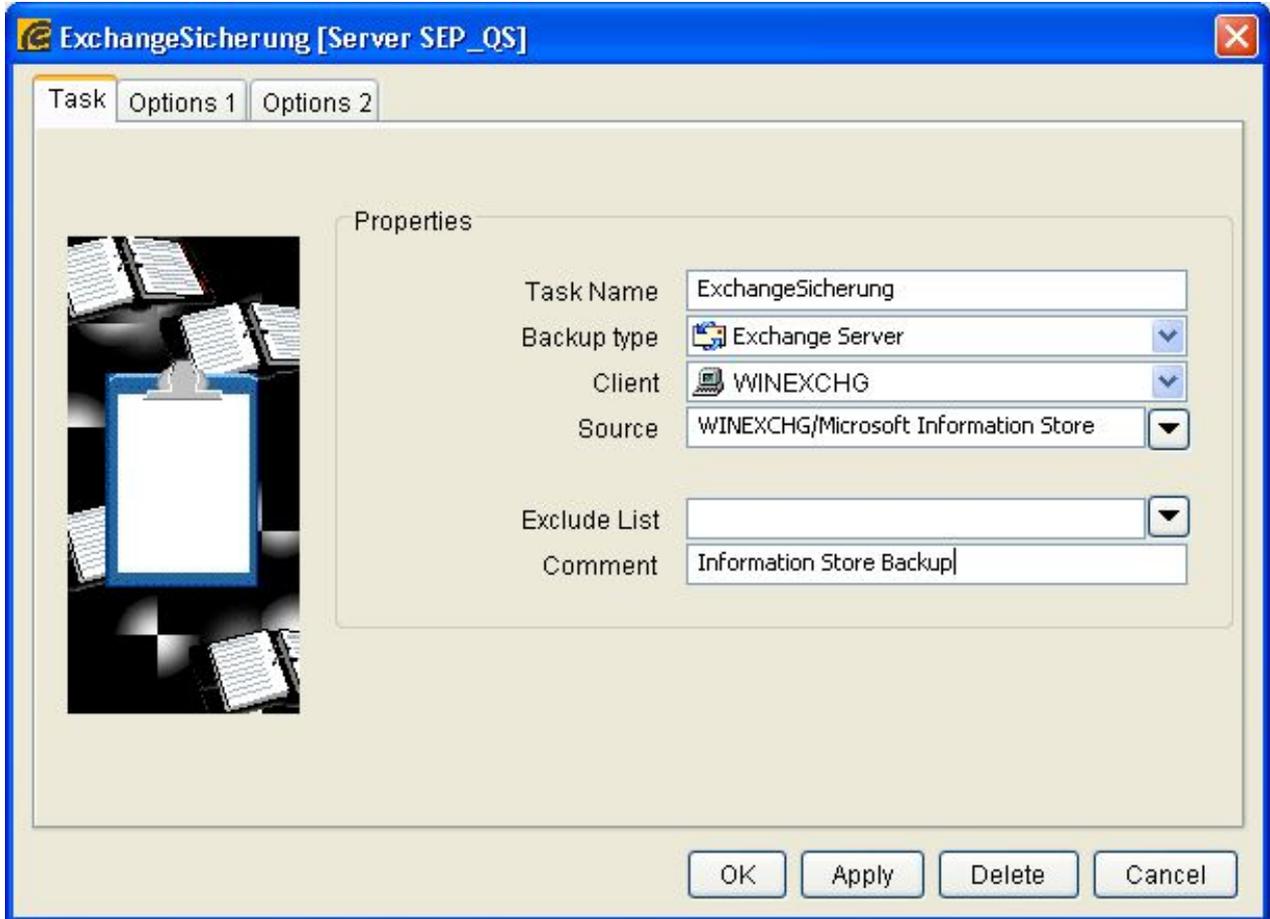
Create a new backup task of type *Exchange Server*.
Input for source may be one of the following:

backup of database
<host>\Microsoft Information Store \Test_GR \Test_DB

backup of a instance
<host>\Microsoft Information Store \Test_GR

backup of a Exchange2000 component
<host>\Microsoft Information Store

backup of full servers
<host>

It's recommended to create a backup-task with source **system_state** for the computer with Exchange Database and let execute it after each backup of Exchange, because the Exchange Server stores its users in systemstate.

9.1.3 Restore

Before starting the restore the appropriate databases of Exchange System Manager have to be set offline.
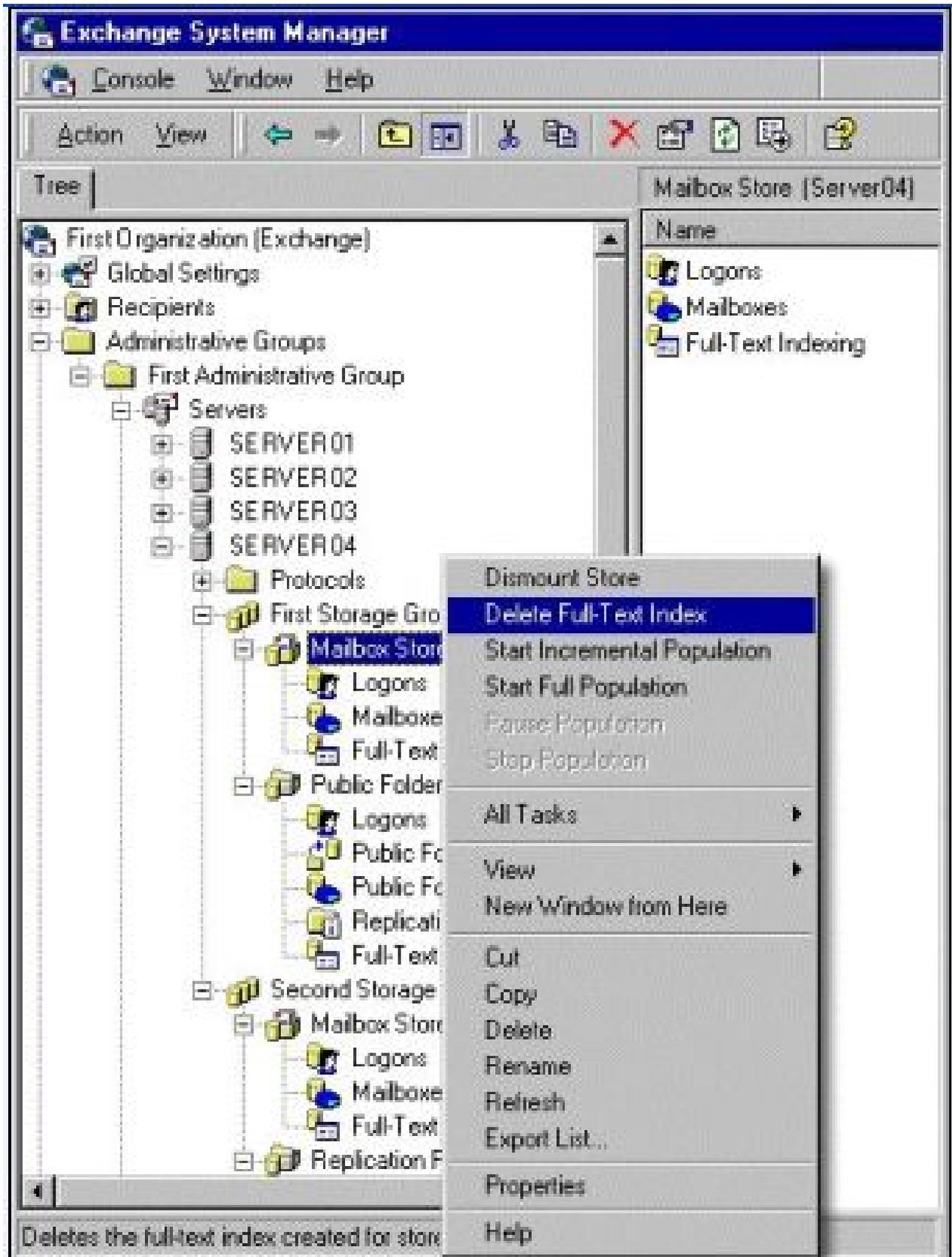
To restore the data of an Exchange backup, the **SEPsesam** restore-wizzard is launched.
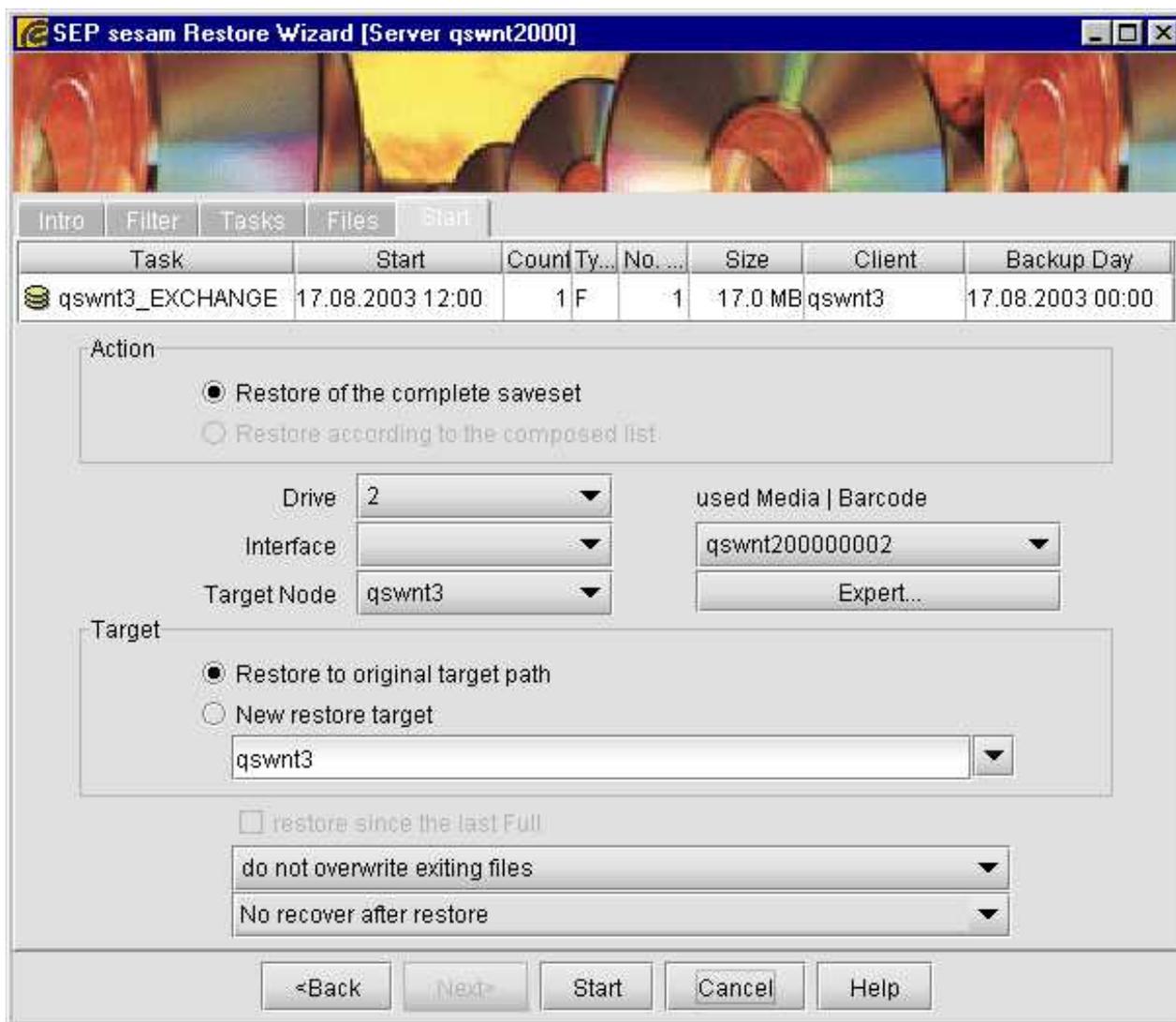
After successful restore, the database of Exchange has to be set online (use system manager of Exchange).

Caution

In case of restore from differential and incremental backups use the generation restore to avoid inconsistent Exchange databases (see 6.3).

9.1.3.1 Restore of an Exchange Instance to another Exchange Server

- The instances and databases must exist on the Exchange Server. If not, they can be created with the System Manager of Exchange.

- Select the database of the instance and click "'properties"'. Go to tab "'database"' and

activate option "'Overwrite database during restore"'.

- Delete all files in directory of instance and set database offline

- Now the instance is ready for restore
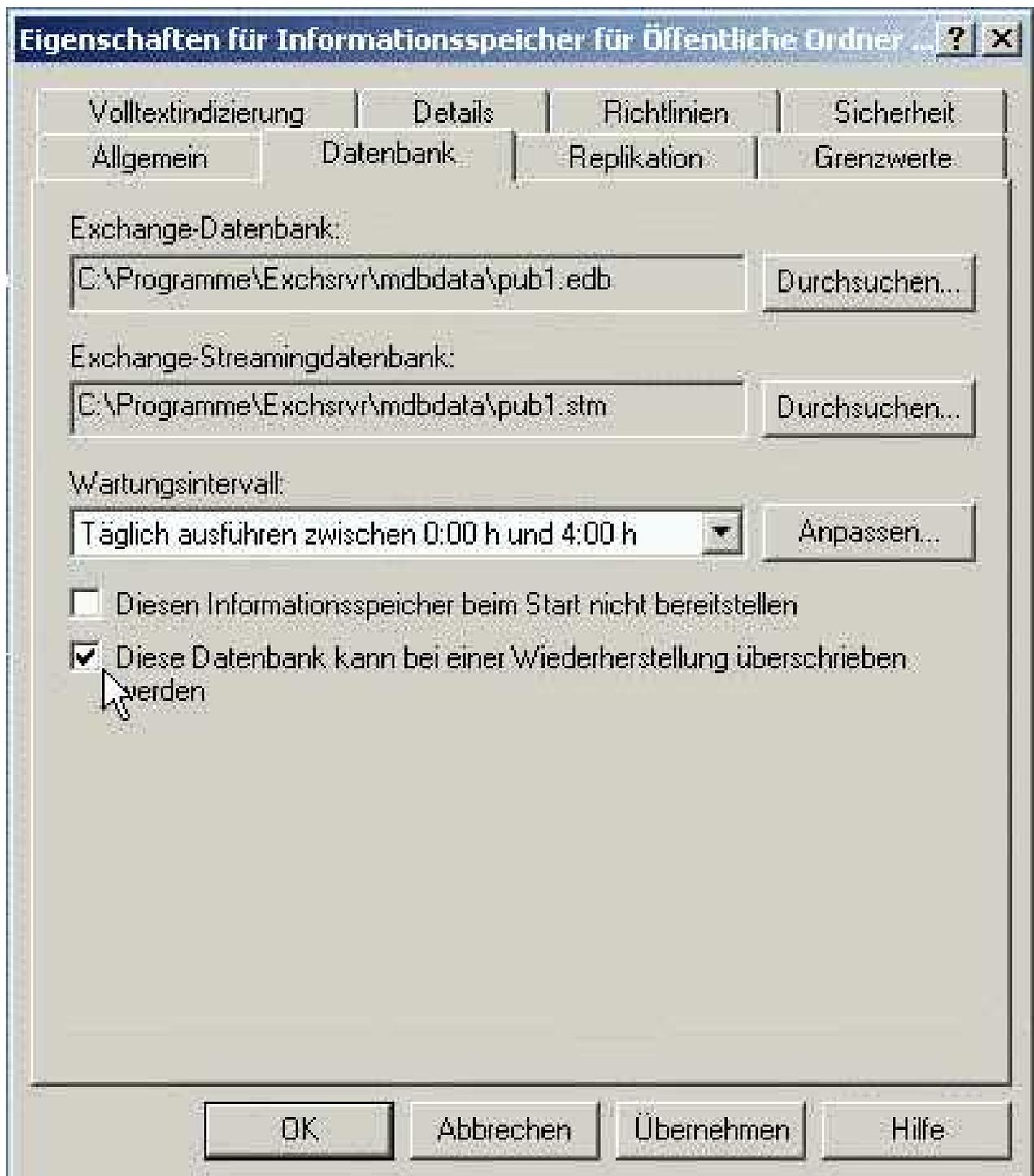
9.1.3.2   Recovery of a corrupted Exchange Database

In order to recover a corrupted database, click with right mouse key on the database in Exchange's system manager.
Go to tab "'database"' and activate option "'Overwrite database during restore"'.
Delete all files within directory of instance (but not the directory itself) and set database offline. Now the instance is ready for restore.
After successful restore, the database of Exchange will have to be set online (use system manager of Exchange).

9.1.4   Single Mailbox

9.1.4.1   Installation - System preconditions

- Exchange Server 2000

- SEPsesam Client (Version 2.0)

- SBC 2.1 A3 (Jul 11 2002)

- SBC Single Mailbox Plug-in 1.1 (esebcli2.dll, ex2k.dll, sbcex2km.ini)

- Microsoft Exmerge (ini, exe, dll)

Installation of Exmerge

In order to backup an Exchange Single Mailbox the additional program **Exmerge** of Microsoft is needed. It must be copied and the according DLL files need to be installed into {ID}/bin/sesam directory at the client.

Adjusting of file {ID}/var/ini/sm.ini
Examples:
[SBC_DATABASE]
DB_CLIENTS = SBCLN:SBCLN.DLL,SBCMSQL:SBCMSQL.DLL,**SBCEX2KM:EX2K.DLLl**

To create file *sbcex2km.ini* please call **sm_setup set_ex2k**.
Check values in sbcex2km.ini !

sbcex2km.ini

[SBC Configuration]
PathToExMergeExecutable = C:\Programme\SEPsesam\bin\sesam\exmerge.exe

[EXMERGE]
LogFileName=C:\Programme \SEPsesam \var \log \ExMerge.log
DataDirectoryName=C:\Programme\SEPsesam\var\EXMERGEDATA

9.1.4.2 Backup

The following input for source creates a backup of the mailbox **Administrator**:
Org1\Test site1\QSWNT2000,Administrator

The following input for source creates a backup of several mailboxes:
Org1\Test site1\QSWNT2000,User1,User2

Several mailboxes can be inserted by separating with a comma.

9.1.4.3 Restore

In order to restore a Single Mailbox use the restore-wizzard and select the task of the corresponding backup.

9.2 MS-SQL Server

Pre-condition: The computer with the MS-SQL-database was configured as **SEPsesam** client (in the example below qswnt400) (see 8.5.1.3).

In order to backup a MS-SQL-database follow these steps:

Create a new task in **GUI:Tasks-by Clients** (see 8.6).
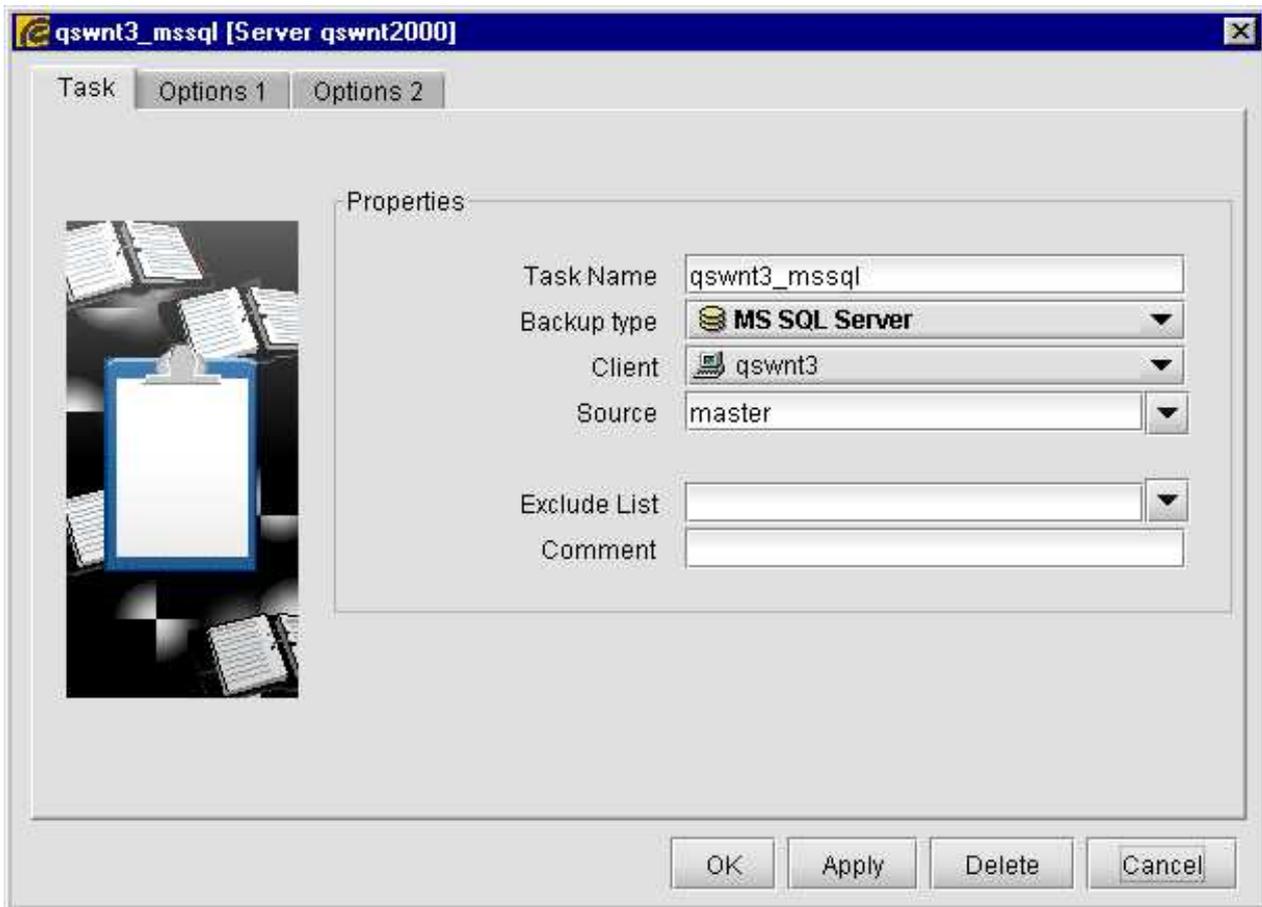
For the task (here qswnt400_msql2) the backup-type **MS SQL Server** is defined and the database client selected (here qswnt400).
Source is the name which is also shown by MS-SQL-Server (here myxxxdb).
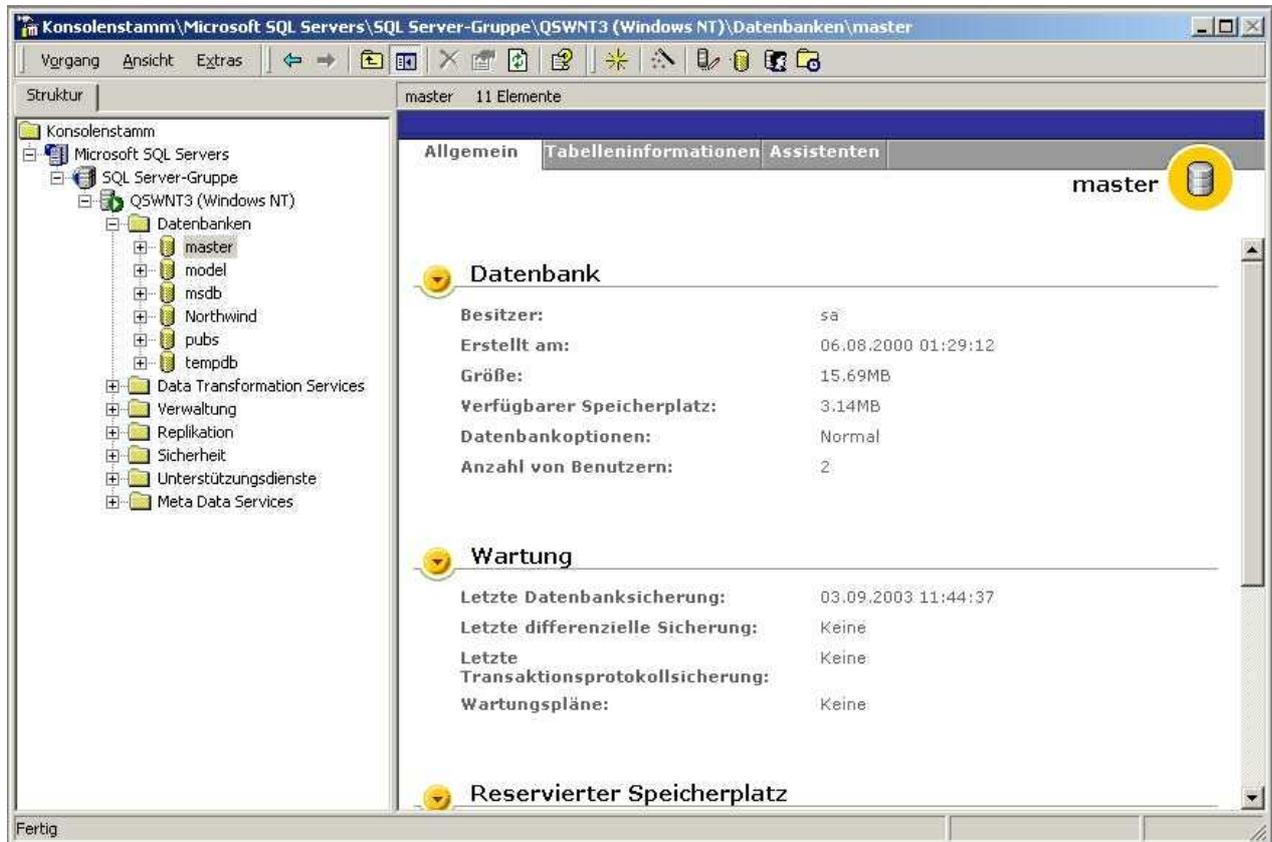
All types of backup (full, differential, incremental) copy the transaction loggings, too. Whereby type incremental only copies those loggings.

Restore of a MS-SQL-Database

Select the name of the desired MS-SQL-backup in *Restore-Wizzard's* dropdown and press button **Next**.
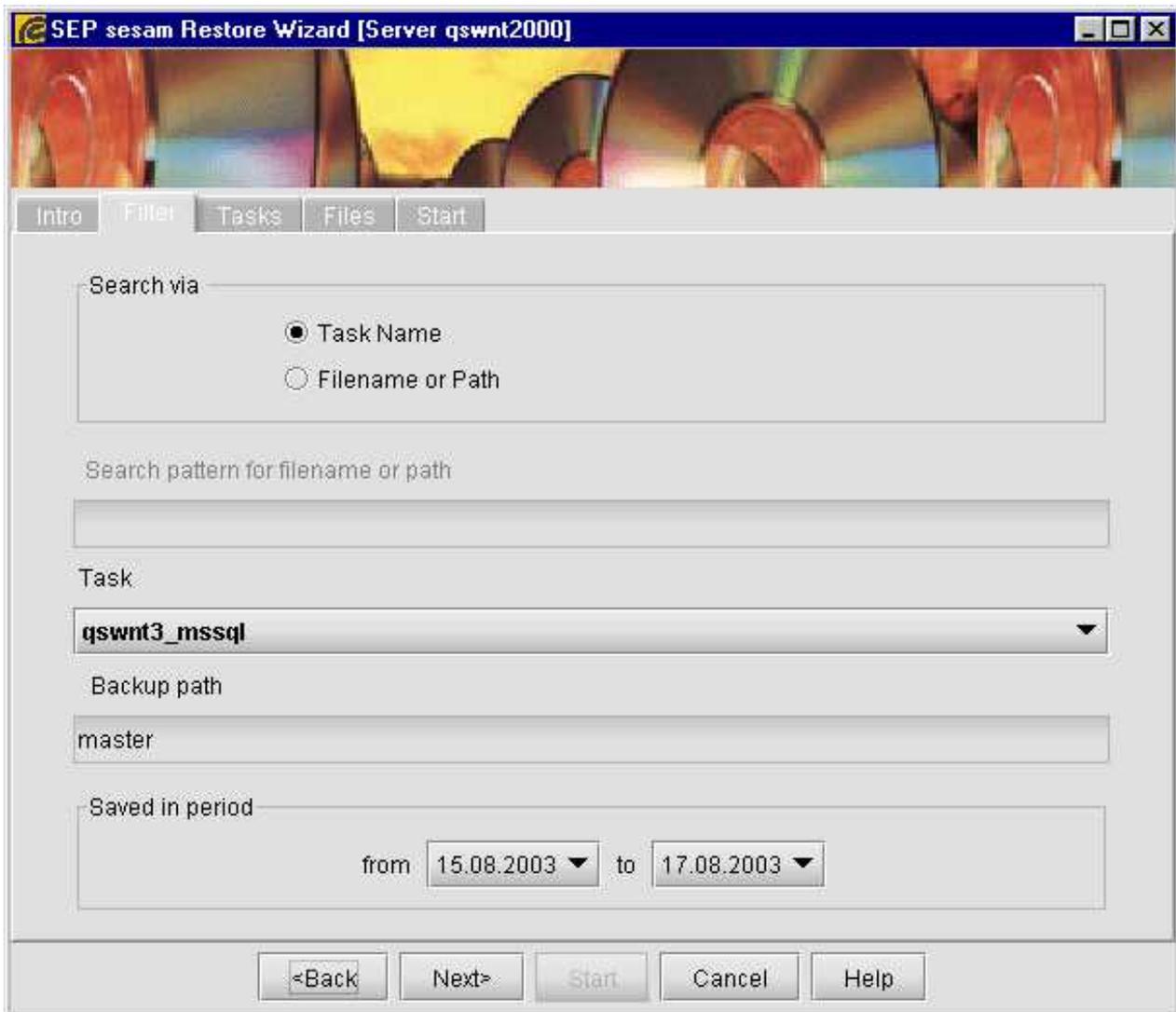
Then select the specific saveset (point-of-time of backup), and activate option **completely restore selected task**.
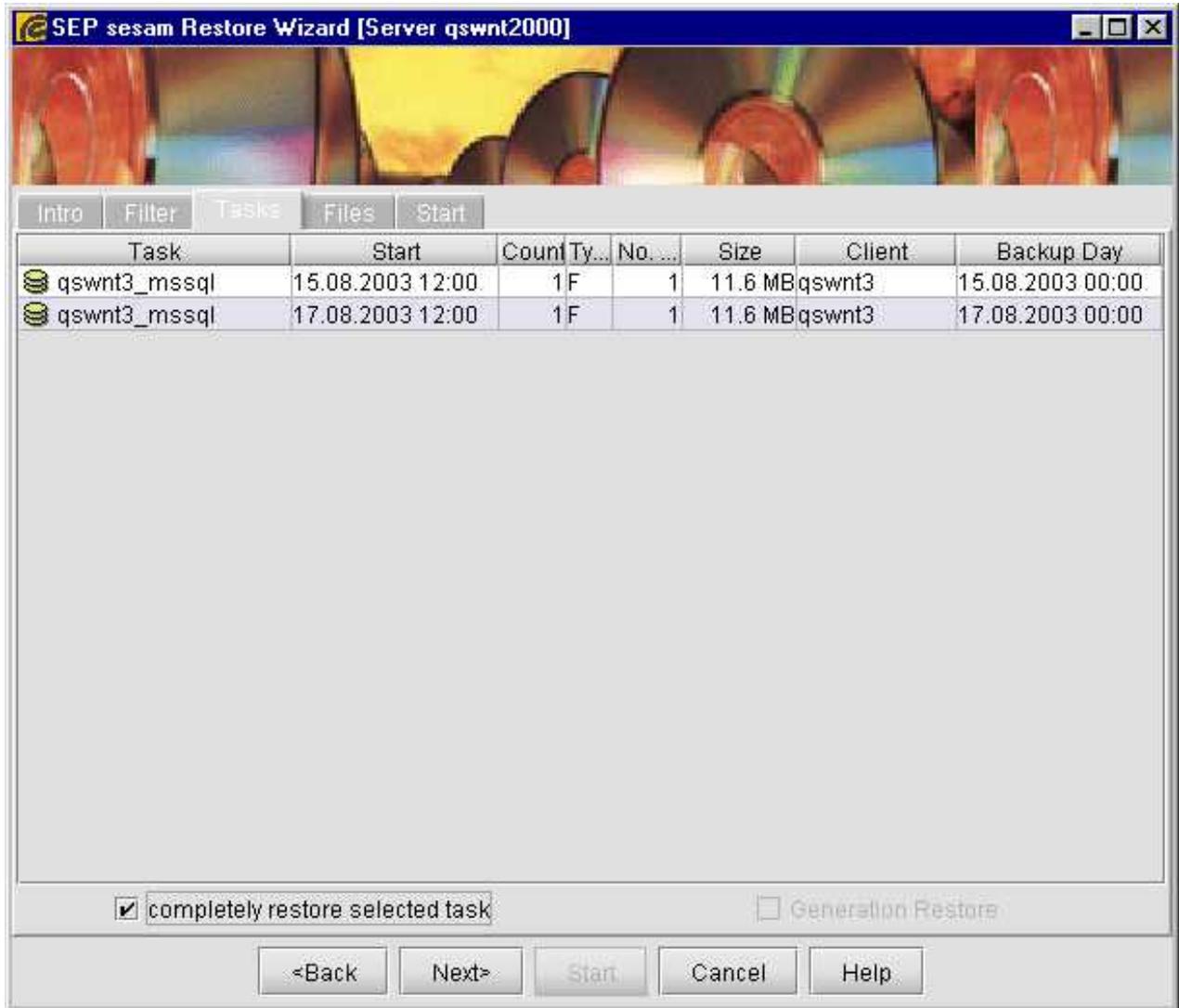
In final screen select **Restore to original target path** and start the restore.
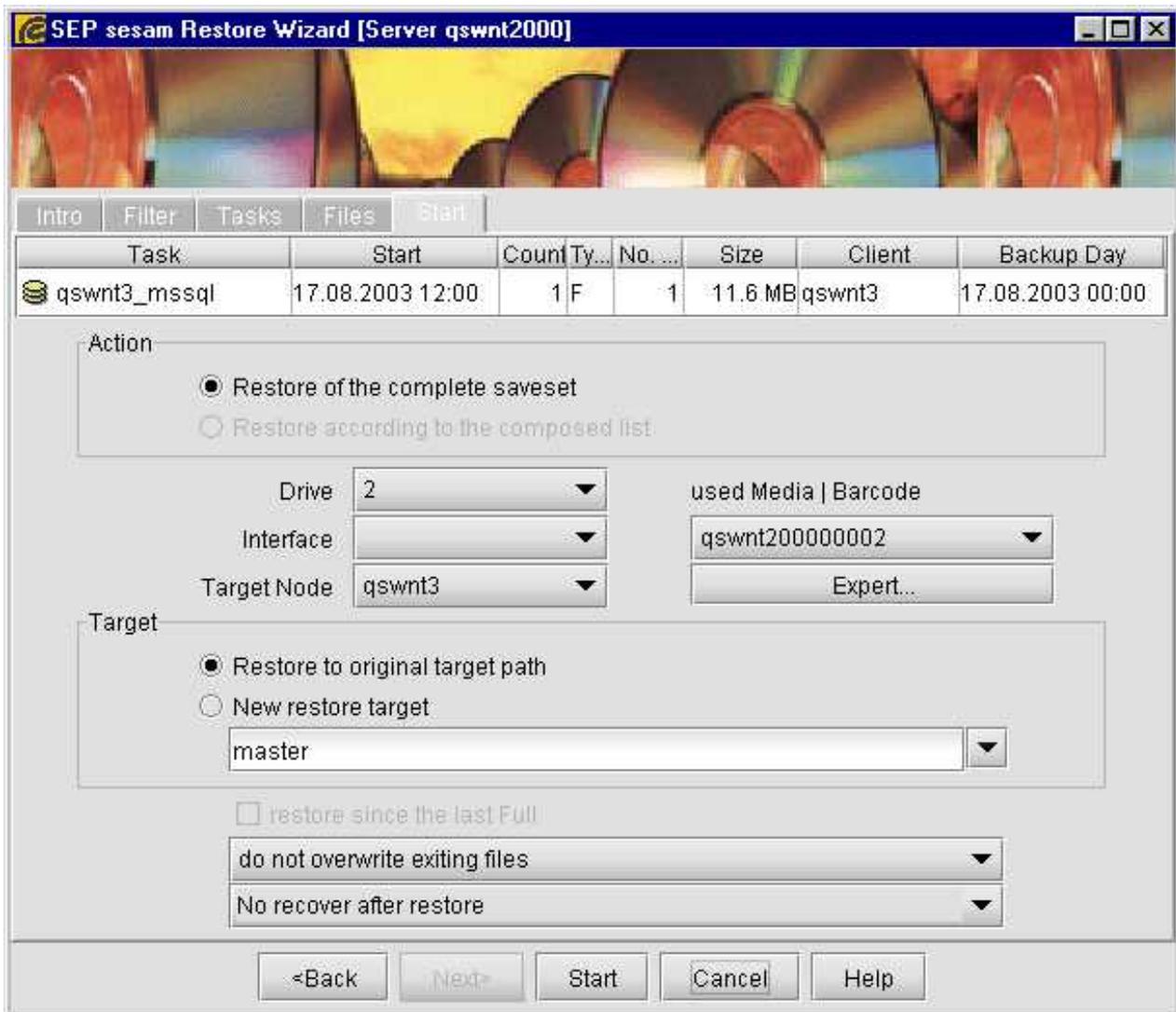
9.3 SuSE Linux OpenExchange Server

9.3.1 Installation - preconditions

- SuSE Linux OpenExchange 4.0
- **SEPsesam** Client (since Version 2.0)

9.3.2 Offline Backup

To start a *SuSE Linux OpenExchange Server* Backup, you have to go through the following steps: Create a new Backup task with Backup type *SuSE Linux OpenExchange Server* (see 8.6.1). If you chose "'all"' as your source, all of the relevant *SLOX* data will be saved offline. To backup specific services you have to use the following keywords:

- "'ldap"', is used for the user access authorization

- ”'mail”', to bakup all mails (postfix, fetchd, cyrus, webmail)

- ”'postgresql”', bakups the groupware database of the *SuSE OpenExchange Servers* (Comfire)

During the Offline - Backup of *OpenExchange Servers* the following services will be stopped:

- ldap

- fetchd

- postfix

- cyrus

- groupware

- webmail

- postgresql

Those Services will start right after the backup in the opposite order.
The following directories will be backuped:

- /etc/

- /var/lib/imap/

- /var/spool/imap/

- /var/spool/postfix/

- /var/lib/ldap/

- /var/lib/pgsql/

- /var/lib/sieve/

- /var/opt/comfire/filespool/

9.3.3   Online Backup

Before   starting   a   SuSE   Linux   OpenExchange   Online   backup,   configurate   the   file
/etc/openldap/slapd.conf at the SuSE Linux OpenExchange Server. Insert those entries:

```
# Access controll
#

access to *
        by peername="ip=127\.0\.0\.1" read stop

# Private AddressBook
access to dn="ou=addr,uid=(.*),dc=sep,dc=de"
by dn="uid=$1,dc=sep,dc=de" write  by * none
```

After modifying, restart the LDAP service with the command *rcldap start*
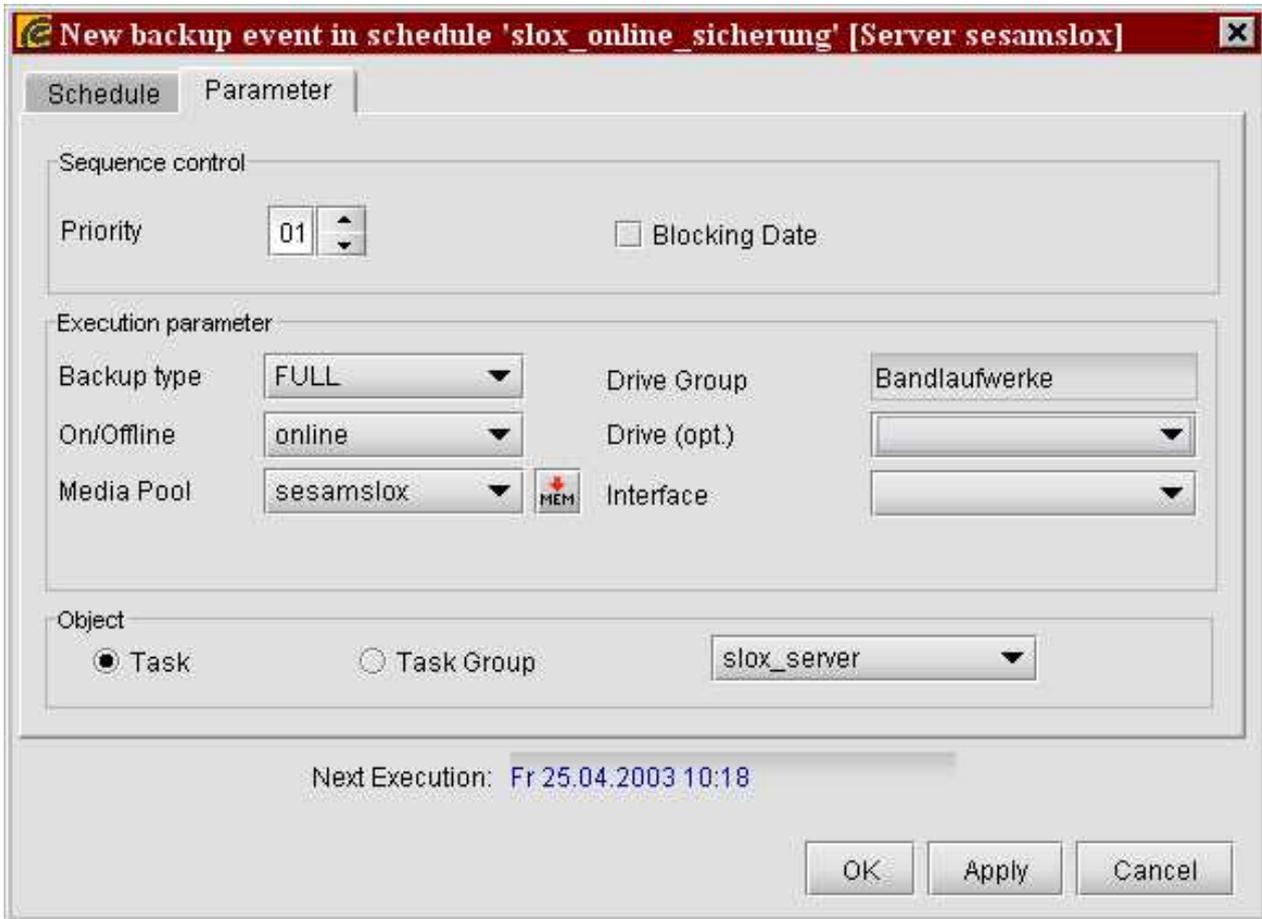
Select under **GUI: Scheduling** > **Schedules** > **New Schedule** a *SuSE Linux OpenExchange Server* task, that you have entered (see 9.3.2). Additionally you can choose the option **Online** resp. **Offline**. If online is chosen, all services will run during the backup, with offline the services will stop (see 9.3.2).

9.3.4 Restore

Select your *SLOX* backup in the first Window of the **Restore-Wizzard** (see 8.2.1) and press **Next**. In the next window choose your specific backupsaveset and mark the option **completely restore selected task**. During the resotre all the services will stop and start right after the Restore.

- Auto recover after restore
  Inserts the database

- Auto online after restore
  Inserts the database and starts the services.

- No recover after restore
  Puts the database in a file, for manual import.

9.3.5   Single Mailbox Restore

In order to restore a Single Mailbox please edit the */<sesam_root>/var/ini/sm_slox.ini.* Insert the
SLOX - Cyrus Password under *cyrus_passwd*=yourPassword To restore complete mailboxes or single
mails of *SLOX* users, select your *SuSE Linux OpenExchange Server* saveset in the Restore Wizzard
and continue with **Next**.
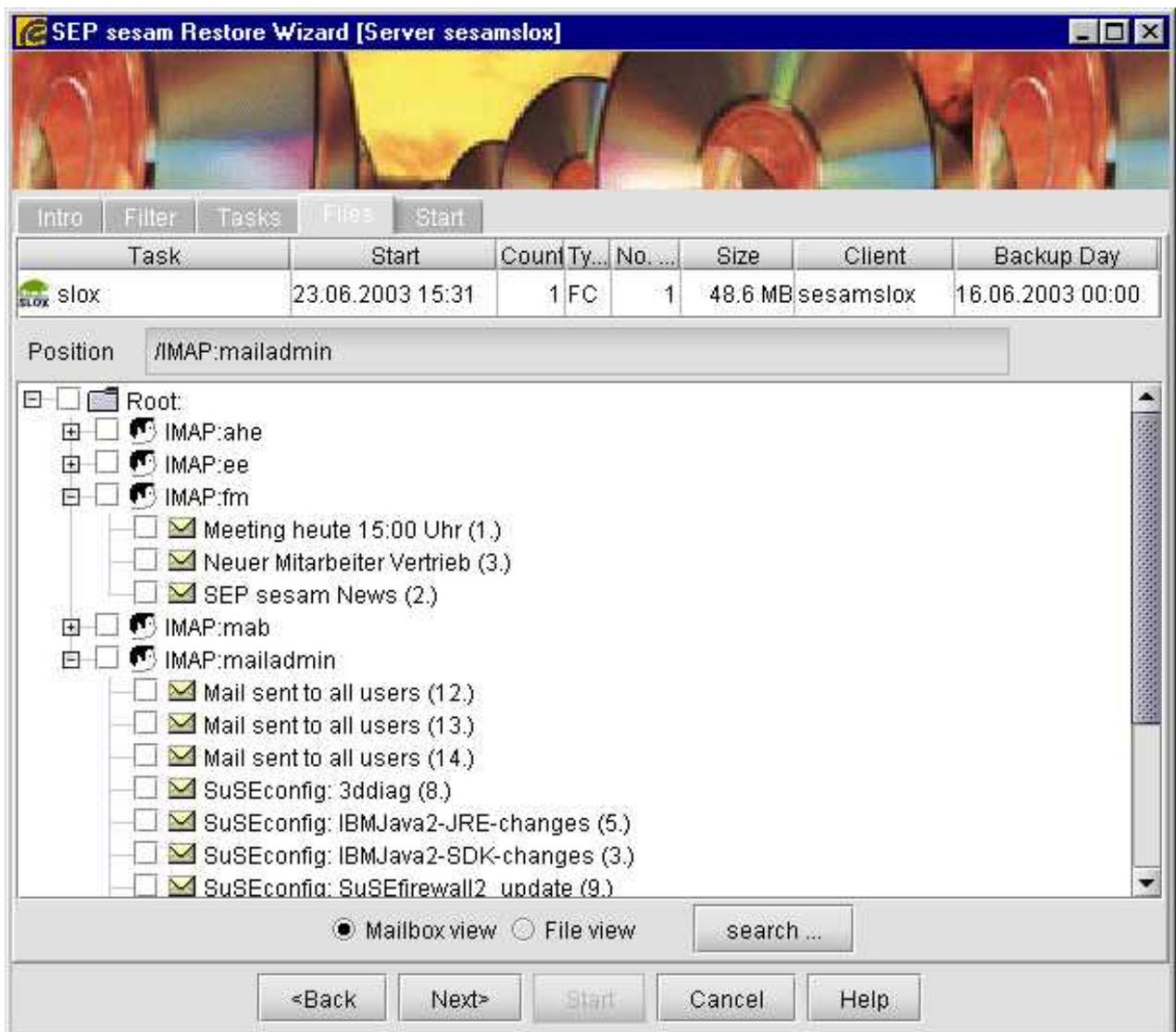
After this select the the mailboxes or mail you want to restore and continue with **Next**.
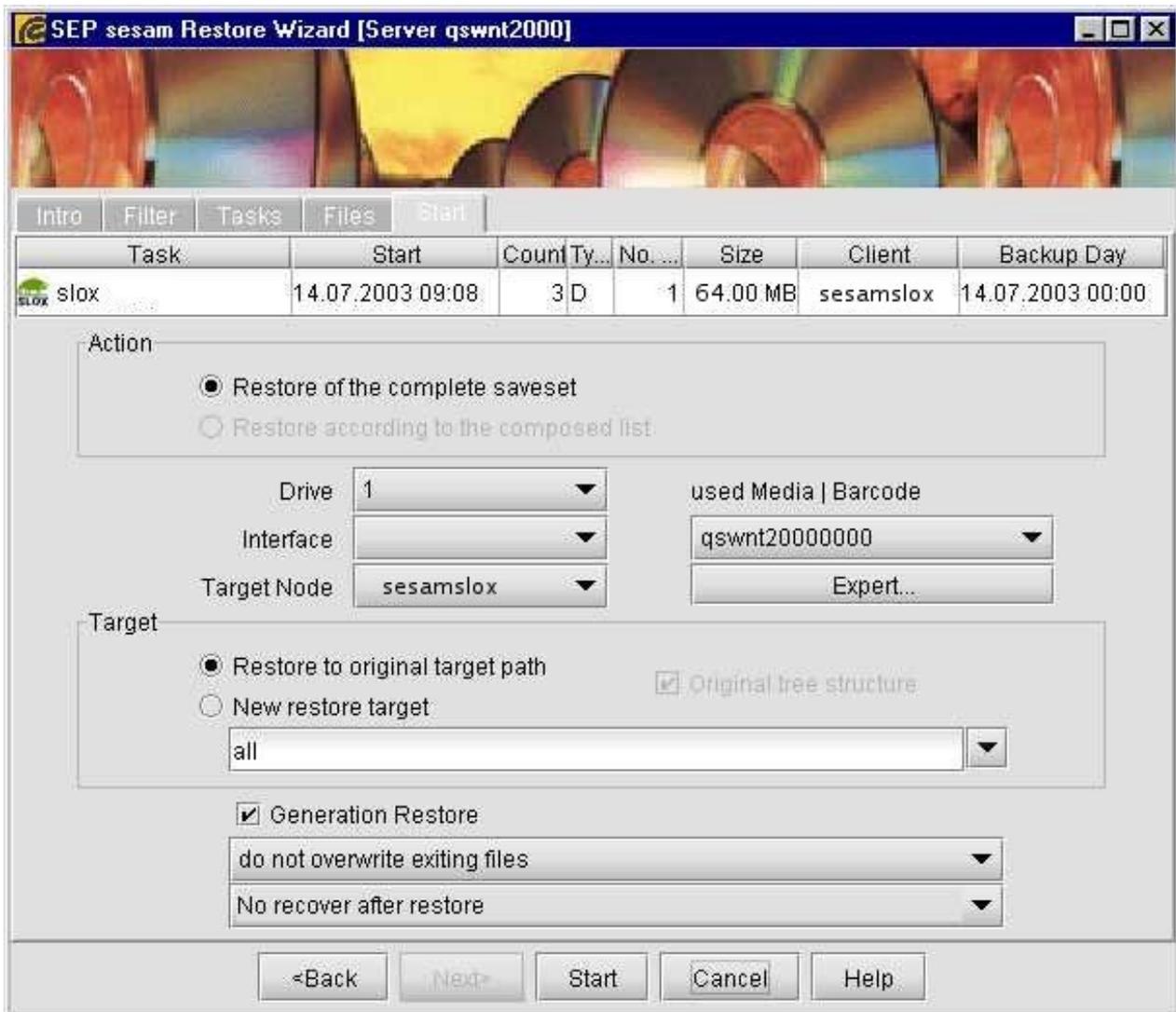
You can choose between four different restore-options.

1. overwrite existing files
   If you select this option, all existing mails in the mailbox will be overwrited resp. replaced.

2. other Mailuser
   If you select this option, the whole mailbox and/or the single mails will be restored in the chosen restore-user. It's possible to use the option "'overwrite existing files"', too.
   Example
   The mailbox of the user will be created in a new mail-user (restore_user).
   restore_user/...
   restore_user/sent-mail/...
   restore_user/drafts/...

3. new restore folder
   With this option the whole mailbox and/or single mails of the user will be restored in its

mailbox in a new subfolder. It's possible to use the option "'overwrite existing files"' too.
Example
The mailbox of the user will create a new subfolder (restore_folder) in the same mailbox.
Benutzer/restore_folder/...
Benutzer/restore_folder/sent-mail/...
Benutzer/restore_folder/drafts/...

4. other mailuser and new restore folder
   Option two and three linked. It's possible to use the option "'overwrite existing files"' too.
   Example
   The mailbox of the user will be created in a new mailboxuser (restore_user) and in a subfolder (restore_folder)
   restore_user/restore_folder/...
   restore_user/restore_folder/sent-mail/...
   restore_user/restore_folder/drafts/...

If your restored mailbox isn't shown in SuSE Linux OpenExchange Webinterface, you have to add it manually. You can do this by *Setup > Folder > Subscribe*, select the folders you have restored and continue with Save. Now you can see the Folder in your webinterface.

9.4 Overview of regular expressions:

Regular expressions define a syntax for search patterns to find matches in an input data stream. There are certain meta characters representing parts of input data or mode of iteration.

The most important are listed below:

```
Meta     description          example    matchings
------------------------------------------------------------------------
.        any single character  .ouse      'house','mouse', but not 'ouse'

*        preceding char. may   Hello*!    'Hell!','Hellooooo!'
         appear 0 or multiple  xx.*yy     'xxyy','xxAyy','xx12345678yy'
         times

?        preceding char. may   Hello?!    'Hell!','Hello!'
         appear 0 or 1 times

+        preceding char. may   Hello+!    'Hello!','Helloooooo!'
         appear 1 or multiple
         times

^        line beginning        ^CWnd      'CWnd ...'

$        line ending           ()$        '... ()'

[]       any char. enclosed    r[oe]+d    'red','reed','rod','rood','reeoood'
         in brackets

[-]      from/to alphabetical  n[0-9]     'n0','n1',..,'n9'
                               G[a-z]+H   'GmbH','GasdH'

[^]      exclude chararcters   n[^0-9]    'na','nA','n_'

()       group characters      (abc)+     'xxabcyy','xxabcabcyy'

{n}      exactly n characters  a{6}       'xx aaaaaa yy'
                               [0-9]{4}   4-digit number

{n,}     at least n chars.     a{4,}      'xx aaaaaaaayy'; not 'xxaaay'

{n,m}    min.n,max.m chars.    a{4,6}     'xx aaaaayy'
                                          not 'xxaaay','qqaaaaaaaa 21'


\        annuls the function   \(abc\)    '(abc)'
         of meta chars.        100\$      100$
```