



# ARKEIA 5 USER MANUAL

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August 2005

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# INTRODUCTION

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Welcome to the Arkeia 5 User Manual!

Thank you for purchasing Arkeia Network Backup, the leading software for backups on networks with mixed operating system clients! We are confident that Arkeia 5 will answer your needs for fast and reliable backup.

This manual will help you install, configure and use Arkeia on the different computers of your network. Arkeia 5 has a broad range of useful features beyond the basic elements, which will make your backup operations easier and more efficient.

If you are reading this manual online in the form of a PDF (*Portable Document Format*) file, the Table of Contents can be displayed as Bookmarks in Adobe Reader. If you cannot see the Bookmarks panel, click Window > Show Bookmarks. Clicking on a Bookmark item will take you to the relevant page of the manual.

This document is *Arkeia 5 User Manual, 6.10*. If it appears to be outdated or incomplete, download the latest version by connecting to the Arkeia Corporation web site, at the following URL:

<http://www.arkeia.com/download.html>

You will notice that this document contains many links like the one above, as well as references to other chapters of the manual. If you click on a link, your PDF viewer should either take you to the correct section of the manual, or the default world-wide web browser of your system should open the correct web page (provided you are connected to the Internet).

Finally, we would like to hear from you! In order to improve the overall quality of the documentation, an email address is available. If you have any remarks or corrections, feel free to send an email to: [doc@arkeia.com](mailto:doc@arkeia.com). Please note that this address is for the documentation-related questions only. All technical inquiries should be sent to the Arkeia Corporation Technical Support staff at:

<http://www.arkeia.com/support.html>

## Who should read this manual?

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This manual is for:

- network and system administrators who have to install, manage and maintain the computers and the networks backed-up by Arkeia; and
- users who wish to set up backup functions on their client computers.

## Administrators

Network administrators will benefit greatly by reading it carefully before any installing and configuring Arkeia. Most problems that occur during the use of Arkeia can be solved by reading the relevant section or chapter of this manual.

## Users

Non-administrator users of Arkeia should read [Chapter 5:Basic concepts](#) on page 57 to understand the main concepts of the software, especially the distinction between a server, a client and an interface. Also of interest to these users are the explanations found in:

- [Chapter 3:First steps](#) on page 37, of the functions offered by the graphical interface, as well as chapters;
- [Chapter 6:Create objects and users](#) on page 69;
- [Chapter 7:Interactive backup](#) on page 105; and
- [Chapter 9:Data restoration](#) on page 131.

## Typographical conventions

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The following typographical conventions are used in this manual to help you quickly recognize different types of information.

### Important Notes for ALL Users



Paragraphs in this style contain important information for all users of Arkeia. It will be necessary to apply the information to your network, server or client setup in order to successfully perform a backup or restoration.

### Important Notes for Some Users



Paragraphs in this style contain information which may be important for your configuration. You should read this information and decide whether it applies to your network, server or client configuration before proceeding.

## Code

This style of paragraph indicates either:

1. information you must type on a command line or into a dialog; or
2. output you should see on your screen as a result of an action.

```
$ ls -Al
drwxr-xr-x  2 root   root       2048 Dec  6 23:03 bin
drwxr-xr-x  3 root   root       1024 Sep  1  1999 boot
drwxr-xr-x  5 root   root      34816 Feb 25 04:02 dev
drwxr-xr-x 31 root   root       3072 Feb 27 17:28 etc
drwxr-xr-x 19 root   root       1024 Feb  7 18:49 home
drwxr-xr-x  4 root   root       3072 Sep  1  1999 lib
drwxr-xr-x  2 root   root      12288 Sep  1  1999 lost+found
drwxr-xr-x  9 root   root       1024 Sep 29 18:26 mnt
```



```
dr-xr-xr-x 61 root    root          0 Feb  6 11:51 proc
drwxr-x---  7 root    root        1024 Nov 29 12:29 root
drwxr-xr-x  3 root    root        2048 Aug  9 2000 sbin
drwxrwxrwt 11 root    root        1024 Feb 28 17:01 tmp
drwxr-xr-x 23 root    root        1024 Nov 23 1999 usr
drwxr-xr-x 18 root    root        1024 Sep  1 1999 var
```

In this example, the command `ls -Al` has been entered in the root directory of a UNIX computer. The lines under the command represent its output, which is displayed on the screen.

## Printed manual

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Finally, if you would like to print this manual or parts of it to keep for a desk reference, please use the `Fit to page` option in your PDF viewer software, if you are not using the standard European DIN A4 printer page format.

## Next

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Now that we have explained who this manual is for, how it works and how you can get further help, it is time to look at your system and verify that it meets the prerequisites to efficiently handle Arkeia 5. The next chapter has that information.



# CHAPTER 1: SYSTEM REQUIREMENTS

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This chapter details the configuration required to install Arkeia 5 on different computers and operating systems. Read this chapter and check that the configuration of your servers matches the requirements of Arkeia to avoid installation problems.

Arkeia is designed to perform backup and restore tasks under numerous operating systems and hardware platforms. New platforms are added regularly, and you may want to check the most recent list, which is available at this internet address:

<http://www.arkeia.com/compatibility/>

## 1.1 Hardware requirements

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Arkeia is designed to work on a network, and therefore requires a certain network and server capacity. (For more information on the Arkeia client/server architecture, refer to *Chapter 3: First steps* on page 37). If your network conforms to the following hardware requirements, Arkeia will operate smoothly.

### Memory

Arkeia uses large amounts of memory, both on the client being backed-up and on the server that controls the backup operations.

A client requires a minimum of 64 Mb of RAM. Better operation will be experienced if more memory, up to 128 MB is installed on the client.

A server, requires a minimum of 128 MB of RAM. Better operation will be experienced if 256 MB of RAM or more is installed, depending on the number of clients.



**An Arkeia server needs a large amount of memory. This amount may vary, according to the number of clients to be backed-up by the server. If your Arkeia server is managing a large network, 256 MB of RAM may be the minimum required for adequate performance.**

### Network bandwidth, configuration and adapters

Arkeia runs exclusively on a network, so the network configuration and the quality of the network adapters has an important effect on Arkeia's performance. It will be useful to check the network configuration and collect some information before installing Arkeia. The following is a checklist of information you will need, and items you should verify to install Arkeia.

- Check the IP addresses of your network, as well as the client computer names.
- Check the entries in the `/etc/hosts` file and in the DNS server.

- Ping several computers from the Arkeia server, using both their IP address and their name. Check the Ping results to make sure the IP addresses and names are correct.
- Check the auto-negotiation, the speed and the duplex configuration of the network adapters as these parameters will influence the overall performance of the network.



**The Arkeia backup server communicates constantly with the clients it is backing-up, so it is essential that the network configuration itself is not a bottleneck in the server's operations**

## SCSI adapters, tape drives and libraries

The typical amount of data processed by an Arkeia backup server requires high-speed connections to both the network and the peripherals used for the backup itself. For this reason, a lot of care should be given to the SCSI configuration, and to the SCSI adapters used on the Arkeia server.

### SCSI Configuration

On an Intel i386 (or compatible) PC-class computer, make sure you have checked the following items in your configuration, and that the options given are set in the BIOS of your SCSI adapter:

- Your tape drive or tape library should be plugged into a separate SCSI controller, and not into the same SCSI adapter as hard disk drives or CD-ROM drives.
- SCSI peripherals connected to a SCSI adapter should be of the same generation.
- Under Linux, if you are using a library that uses multiple LUN, the *Multiple LUN support* option of the SCSI adapter BIOS should be set to enabled.



**Arkeia only supports SCSI tape drives. IDE tape drives are NOT supported. You should also note that Travan™ tape drives have very poor performance during restore operations. This is due to specific features supported only by the manufacturer's drivers and not by Arkeia.**

### Tape drives, libraries and autoloaders

In general, Arkeia uses one device for a standalone tape drive and two (or more) devices for libraries or autoloaders. The main differences between these two types of peripheral are:

- A standalone tape drive is usually controlled through the standard SCSI tape device driver of the Operating System on your server. For example, this device is `/dev/st0` under Linux.
- A library, or autoloader, uses one standard tape device for each tape drive and one generic SCSI device for the library media changer. For instance, this is `/dev/sg0` under Linux.
- The tape drive and the media changer in a tape library have different SCSI IDs, but use the same LUN.

- In most autoloaders, the tape drives and the media changer have the same SCSI IDs, but use different LUNs.

Despite these differences, the tape drives of the libraries and of the autoloader are defined and detected as standalone tape drives.



**Standalone tape drives require that your kernel is configured to support them. On some operating systems this may require recompiling the kernel.**

**Furthermore, media changers within libraries or autoloaders are considered generic SCSI devices, and your kernel should also be configured to support these generic devices.**

**Finally, if you are using a library or an autoloader that supports this function, you should make sure that your kernel is configured to probe all LUNs on a SCSI bus – since your backup peripheral may be using more than one LUN. For more information, refer to the documentation that was supplied with your backup device.**

### Kernel configuration

Make sure the following options are activated in the kernel you are running:

- SCSI tape drives support.
- Generic SCSI support.
- Probe all LUNs support.

For more information about specific configurations and operating systems, refer to the following sections [Mounting and probing tape devices](#) on page 21 and [Library management](#) on page 22.

### Mounting and probing tape devices

For more information on the detection of SCSI tape devices, refer to [Chapter 4:Hardware installation](#) on page 49 of this manual.

A tape device installation is usually simple, provided the kernel used on the system supports such devices. The correct device can be checked (*probed*) by using the following command:

```
mt -f [tape device] status
```

`mt` is an operating system command. For more information on this command, enter `mt --help` or `man mt` at the command line. In this command, the `[tape device]` section depends on the operating system you are using. You will find below a short list of the possible names for a tape device under several operating systems:

*Table 1.1 List of tape devices per Operating Systems*

Operating systems	Tape device
AIX	/dev/rmt.X
Digital UNIX/Compaq Tru64 UNIX	/dev/rmt.Xh

Table 1.1 List of tape devices per Operating Systems

Operating systems	Tape device
HP-UX	/dev/rmt/ <i>X</i> mb (where b = Berkeley mode)
Linux v2.x	/dev/st <i>X</i>
SGI Irix	/dev/rmt/tps <i>X</i> d3
Sun Solaris	/dev/rmt/ <i>X</i> hb (where b = Berkeley mode)
Unixware	/dev/rmt/ctape1

In the table above, the *x* corresponds to the number of the device. Replace this letter with the number of the device you would like to mount or probe.

Below is an example of a correct `mt` command output under Linux:

```
# mt -f /dev/st0 status
SCSI 2 tape drive
File number=0, block number=0, partition=0.
Density code 0x24 (DDS-2).
Soft error count since last status=0
General status bits on (41010000):
BOT ONLINE IM_REP_EN
```

### Library management

The main difference in hardware between a stand-alone tape drive and a library is that a library (or autoloader) contains a robotic arm. This arm is managed as a *generic* SCSI device. In order for this arm to be correctly managed by your system, you should therefore make sure that the generic SCSI devices are correctly supported by your kernel.

You will find below a list of generic SCSI devices under different operating systems:

Table 1.2 List of generic SCSI devices per operating systems

Operating system	Control device for library media changer
AIX	/dev/pthru <i>X</i> (provided by Arkeia Corporation)
Digital UNIX/Compaq Tru64	/dev/b <i>X</i> t <i>X</i> l <i>X</i> (where "b" = bus, "t" = target, "l" = LUN)
HP-UX	/dev/scsi <i>X</i> /dev/scsi/c <i>X</i> t <i>X</i> d <i>X</i> (where "c" = instance, "t" = target ID, d = LUN)
Linux v2.x	/dev/sg <i>X</i>
SGI Irix	/dev/rmt/tps <i>X</i> d3
Sun Solaris	/dev/rsst <i>X</i> (provided by Arkeia Corporation)
Unixware	/dev/passthru0

Note that in the examples above, the *x* should be replaced by the relevant numerical value for the library arm you are trying to probe or control.

For more information on the detection of SCSI tape devices, refer to [Automatic hardware detection: \*arkdetect\*](#) on page 216.

## 1.2 Platform-specific requirements

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Since Arkeia runs several tasks simultaneously on one computer, it may be necessary to optimize the shared memory available, as well as the message queues.

This section details the IPC (Inter-Process Communication) optimization procedures for several operating systems. Using these parameters should enable Arkeia to function properly in a conventional environment.



**The values given in this section are average values, and may be insufficient if the server on which Arkeia is installed is used for tasks other than backup. For instance, if the computer being configured is also used as an Oracle database server, it is recommended that you increase the values given below.**

### Compaq Tru64 UNIX/Digital UNIX DEC OSF

#### How to edit the IPC settings

To modify the IPC settings on a Compaq Tru64 UNIX or a Digital UNIX DEC/OSF computer, follow the steps indicated below:

1. Edit the `/etc/sysconfigtab` file, by entering the following commands:  

```
cd /etc
vi sysconfigtab
```
2. Go to the `ipc` section (create this section if it does not exist in the original file) and enter the following lines:  

```
ipc:
msg-max = 8192
msg-mnb = 65535
msg-mni = 64
msg-tql = 1500
shm-max = 4194304
shm-min = 1
shm-mni = 512
shm-seg = 512
sem-mni = 128
sem-msl = 25
sem-opm = 10
sem-ume = 10
sem-vmx = 32767
sem-aem = 16384
num-of-sems = 60
max-kernel-ports = 22487
port-hash-max-num = 1124350
port-reserved-max-num = 22487
set-max-num = 1029
```

3. **Go to the proc section (create it if it does not exist in the original file) and enter the following lines:**

```
proc:
max-proc-per-user = 64
max-threads-per-user = 256
per-proc-stack-size = 2097152
max-per-proc-stack-size = 33554432
per-proc-data-size = 134217728
max-per-proc-data-size = 1073741824
max-per-proc-address-space = 1073741824
per-proc-address-space = 1073741824
```

### How to change the IPC settings

Certain setting changes do not need the reboot of the computer to take effect. Enter this command instead:

```
/sbin/sysconfigdb -s
```

Otherwise, restart the computer with this command:

```
/sbin/reboot
```

### How to view the IPC and process settings

To view the IPC and process setting on a Tru64 UNIX computer, or Digital UNIX computer, enter the following commands:

To view the ipc configuration, enter the command:

```
/sbin/sysconfig -q ipc
```

To view the process configuration, enter the command:

```
/sbin/sysconfig -q proc
```

## Hewlett-Packard HP-UX

Under Hewlett-Packard HP-UX, the SAM management tool configures IPCs. You can run this utility either in a text or in a graphical mode by entering the:

```
sam
```

### How to access the IPC and process settings via the SAM menu

Message Queue configuration:

```
[Kernel configuration]      [Configurable Parameter]
[msgmap] 102
[msgmax] 8192
[msgmnb] 65535
[msgmni] 200
[msgseg] 2048
[msgssz] 32
[msgtql] 100
```

Semaphore configuration:

```
[Kernel configuration] [Configurable Parameter]
[sema] 1
[semaem] 16384
```



```
[semmap] 66
[semmni] 64
[semms] 200
[semnu] 30
[semume] 10
[semvmx] 32767
```

### Shared memory segments configuration:

```
[Kernel configuration] [Configurable Parameter]
[shmem] 1
[shmmax] 67108864
[shmmni] 200
[shmseg] 120
```

### Number of process configuration:

```
[Kernel configuration] [Configurable Parameter]
[nproc] 316
```

To modify each of these parameters, use the menu: [Kernel configuration] / [Configurable Parameter] / [Action] / [Modify configurable parameter...].

### How to change the settings

To have these settings take effect, use the menu: [Action] / [New Kernel].

The computer will then reboot automatically to execute the new kernel.

### How to view the IPC and process settings

The IPC and process configuration can be viewed under HP/UX by using the SAM management tool.

## IBM AIX

There are no specific IPC or process settings that need to be applied to the AIX operating system (version 3.2 and version 4.1).

## LINUX

There is no specific IPC configuration that should be applied to the versions of Linux using a kernel with a version number smaller than 2.4.x.

However, the following configuration should be applied to systems running a kernel with a version number equal, or greater than, 2.4.



**If the file `/etc/sysctl.conf` does not exist on your system, create it and copy the lines below into it.**

**If this file does exist, then the find lines below and change the values to those listed. If the lines shown below are not in the file, then add them.**

To set the 2.4.x kernel parameters at boot time, follow the instructions below:

You will need to have root user access to your system, and know the root user password. Login as the root user, with the command:

```
su root
```

**Enter the /etc directory:**

```
cd /etc
```

**Edit the sysctl.conf file with the command:**

```
vi sysctl.conf
```

**Enter the following lines in the file and save it:**

```
# Sets maximum number of message queues
# to 200 (by default it is 16)

kernel.msgmni = 200

# Sets maximum size of message queue to 65536
# (by default the size of the message queue is 16348 since 2.2.14)

kernel.msgmnb = 65536
```

**You should then enter the following command to apply the changes to the kernel configuration:**

```
sysctl -p
```

On some distributions, you may need to add the command `sysctl -p` to the system initialization files so that the kernel changes are applied after each reboot. These files are usually named `boot.local` or `rc.local`.

When these changes have been applied, you can check the changes to the IPC configuration by entering the following command:

```
ipcs -l
```

## SGI IRIX

In IRIX Kernel 6.4 and earlier, the settings required by Arkeia can be viewed, modified and applied. In IRIX Kernel 6.5.X, they are modified as explained below

### How to view the IPC settings (IRIX Kernel version 6.4 and earlier)

Enter one of the following commands:

- To view the IPC configuration: `/usr/sbin/systune | grep shm.`
- To view the process configuration: `/usr/sbin/systune | grep proc.`
- To view the semaphore configuration: `/usr/sbin/systune | grep sem.`
- To view the message configuration: `/usr/sbin/systune | grep msg.`

### How to modify the IPC settings (IRIX Kernel version 6.4 and earlier)

The default values are all located in the following *read-only* files:

- IPC configuration: `/var/sysgen/mtune/shm.`
- Semaphores: `/var/sysgen/mtune/sem.`
- Message queues: `/var/sysgen/mtune/msg.`

- Number of processes: `/var/sysgen/mtune/kernel`.

If you need to change these values, create the file: `/var/sysgen/stune` (if it does not already exist), by entering the following commands:

```
cd /var/sysgen
vi stune
```

Insert the following lines (if they do not already exist) to modify the shared memory segments:

```
shmmax=0x20000000
shmmn=1
shmmni=100
sshmseg=512
shmall=512
```

Insert the following lines (if they do not already exist) to modify semaphores:

```
semmni=10
semmns=60
semmnu=30
semmsl=25
semopm=10
semume=10
semvmx=32767
semaem=16384
```

Insert the following lines (if they do not already exist) to modify the message queues:

```
msgmax=8192
msgmnb=65535
msgmni=64
msgssz=8
msgtql=1000
msgseg=1536
```

The configuration processing is automatic.

### **How to apply the new settings (IRIX Kernel version 6.4 and earlier)**

Enter the command: `/usr/sbin/autoconfig`. Then reboot the computer with the command: `reboot`.

### **How to modify the IPC settings (Irix Kernel version 6.5.X)**

For best performance when running local backups, follow the procedure below.

Change the following parameters in the kernel:

```
tcp_recvspace = 184320
tcp_sendspace = 61440
```

These parameters should be entered either in the file `/var/sysgen/master.d/bsd` or in the file `/var/sysgen/mtune/bsd`. It is possible to dynamically list and modify these parameters with the command: `system`.

## Sun Solaris

The configuration settings required by Arkeia on Sun Solaris computers can be viewed, modified and applied.

### How to view the IPC and process settings

Enter the following command: `sysdef -i`.

### How to modify the IPC and process settings

If you need to change the IPC or process configuration, create the file `/etc/system` (if it does not already exist), with the commands:

```
cd /etc
vi system
```

In this file, insert the following lines (if they do not already exist) to modify the shared memory segments:

```
set shmsys:shminfo_shmmax=2097152
set shmsys:shminfo_shmmi=1
set shmsys:shminfo_shmmni=30
set shmsys:shminfo_shmseg=100
```

Insert the following lines (if they do not already exist) to modify the message queues:

```
set msgsys:msginfo_msgmap=500 New
set msgsys:msginfo_msgmax=8192
set msgsys:msginfo_msgmb=65536
set msgsys:msginfo_msgssz=8 New
set msgsys:msginfo_msgseg=8192 New
set msgsys:msginfo_msgmni=100
set msgsys:msginfo_msgtql=500
```

### How to apply the new configuration

Reboot the computer by entering the command: `reboot`.

## 1.3 Next

---

You can now verify that your system is configured for Arkeia, and that installation will run smoothly. Follow the steps in the next chapter to install Arkeia 5.

# CHAPTER 2: INSTALLATION PROCEDURE

---

In this chapter we describe the installation procedure required to install Arkeia 5 on a backup server.



If Arkeia version 4.x is already installed on your backup server, it is possible to migrate this 4.x installation to Arkeia 5. To do this, please refer to [Appendix A: Migrating to version 5](#) on page 247.

## 2.1 Files delivered

---

Under the Linux operating system, Arkeia can be installed in two different ways:

- For Red Hat, Mandrake and SuSE and other RPM-based distributions, Arkeia is supplied as a .rpm file, which can be installed with the rpm utility.
- For Linux systems, (and many UNIX systems) that do not use or support the rpm utility, Arkeia 5 is also available as a standard .tar.gz file, which can be installed with the UNIX utilities tar and gzip, and the installation utility which is contained in the file. If your Linux distribution does not support the rpm utility, refer to [Installation using the tar.gz file](#) on page 31 for the installation procedure using the .tar.gz file.

### Internet delivery

If you have downloaded the Arkeia 5 files from the internet, you should now have one file, which contains the complete Arkeia 5 software. This file could be named, for instance:

```
arkeia-5.0.0-15.i386.rpm; or  
arkeia-5.0.0-15.i386.tar.gz
```

### CD ROM delivery

If you have obtained Arkeia 5 on a CD-ROM, the files above will be available on your CD ROM. To proceed with the installation, you should mount your CD-ROM with the following command (as the root or super-user):

```
su root  
Password: <Enter the root password>  
mount -t iso9660 /dev/cdrom /mnt/cdrom
```

If necessary, replace the device /dev/cdrom with the appropriate Linux device, and /mnt/cdrom with the directory where you want to mount the CD-ROM. For more information on the mount command, refer to the man pages of your Linux system.

On some Linux systems (for instance, Mandrake or Mandriva Linux), the mount operation is automatically performed by a dedicated daemon. For more information, refer to the documentation of your Linux system.

Please note also that the name of the file you have received may differ slightly from the example given above.

For more information on the rpm utility and the different options it supports, please check its manual page, by entering the following command:

```
man rpm
```

For more information on the tar and the gzip (GNU-ZIP) utilities and the different options they support, please check their manual pages, by entering the following commands:

```
man tar  
man gzip
```



**For the latest information on the Arkeia installation, please read the README file that is in the installation directory. This file contains late information that could not be integrated in the manual.**

## 2.2 Installation using the rpm file

---

Installation of Arkeia 5 under Linux, using the .rpm file format is straightforward, to complete this installation, follow the steps outlined below.

### Login as root and install the software

Only the root or super-user can install software on a Linux server using the rpm utility. To do this, enter the following command on a standard Linux shell, followed by the root user password when prompted to do so by the operating system:

```
$ su root  
Password: <Enter the root password>
```

Run the rpm utility, by entering the following command:

```
# rpm --install arkeia-5.0.0-15.i386.rpm
```

If the installation has been completed successfully, you should be able to use Arkeia 5 immediately. If not, try to solve the installation problems by following the suggestions outlined below:

- Make sure you are logged in as root. If necessary, log out of your current session and log again as root. If you cannot login as root, please check with your system administrator that you have the necessary authorizations.
- If necessary, use the -vv and --force options of the rpm utility to display more messages and use these to solve the installation issues. For more information on the options of the rpm utility, refer to its man page.

## 2.3 Installation using the tar.gz file

---

To install Arkeia 5 under UNIX and Linux using the .tar.gz file format, follow the steps below.

### Login as root and install the software

Only the root super-user can install software on a Linux server using the tar.gz package. To do this, enter the following command in a standard Linux shell, followed by the root password when prompted to do so by the operating system:

```
$su root
Password: <Enter the root password>
```

Run the tar utility, by entering the following command:

```
# tar -xvzf arkeia-5.0.0-15.i386.tar.gz
```

The tar utility will create a directory named arkeia-5.0.0-15, which contains the Arkeia 5 software. To complete the installation, enter this directory with the following command:

```
# cd arkeia-5.0.0-15
```

Run the supplied installation utility with the command:

```
#./install
```

The installation procedure will start and ask some questions before proceeding with the installation of Arkeia 5 itself. Below is an example of an install done on a computer running the Slackware 8.0 distribution of Linux. Your installation may give slightly different output.

```
$ su root
Password: <Enter root password, as required by su>
$ ./install
I1800020 main: ***** Start of installation *****
I1800020 distrbininstall: The path is
/home/jack/files/download/arkeia.rpm/arkeia-5.0.2
I1801200 mkplinstall: Installing "arkeia" Version "5.0.2" ("Arkeia")
I1801210 mkplinstall: OS: "Linux" Version "2.2.19"
Q1801002 *** Enter main ARKEIA_DIR directory [/opt/arkeia]? (q to quit)
<Press 'Enter' to accept default install directory>

I1801170 validateknox: Got from user $ARKEIA_DIR='/opt/arkeia'
I1801180 validateknox: Directory $ARKEIA_DIR='/opt/arkeia' OK
Q1801002 *** Enter the temporary directory [.]? (q to quit)
<Press 'Enter' to accept the default temporary directory>

I1801170 validatetmpdir: Got tmpdir = '.'
I1801180 validatetmpdir: Directory tmpdir='.' OK
E1801150 validatetmpdir: Normal end
I1801350 ailchk: tmpspace needed: 50000 KB, available in '/home': 3422128 KB
I1801360 ailchk: arkeiaspace needed: 25000 KB, available in '/': 3971916 KB
Q1800001 *** OK to start installation in '/opt/arkeia' (y/n) [y]? (q to quit)
<Press 'Enter' to launch installation>
```

```

I1802020 untz: Uncompressing and extracting 'arktar.z'...
I1802050 untz: 'arktar.z' extracted successfully
I1802510 arkbootstop: No arkeiad to stop (2: No such file or directory)
I1801080 mkdirknox [L1200]: Directory $ARKEIA_DIR='/opt/arkeia' created
I1801060 mkfsu: /etc/opt/arkeia/ARKEIA_DIR written ('/opt/arkeia')
I1804210 docopy: Installing files...
I1804190 cpltree: Tree './arkeia/arkboot' successfully installed
I1804190 cpltree: Tree './arkeia/arkc/arkc.param' successfully installed
I1804190 cpltree: Tree './arkeia/arkc/arkc.prf' successfully installed
I1804190 cpltree: Tree './arkeia/arkc' successfully installed
I1804190 cpltree: Tree './arkeia/arkeiad' successfully installed
I1804190 cpltree: Tree './arkeia/lang' successfully installed
I1804190 cpltree: Tree './arkeia/log' successfully installed
I1804190 cpltree: Tree './arkeia/server/dbase/f3drv/drvtypes.lst' successfully installed
I1804190 cpltree: Tree './arkeia/server/dbase/f3drv/scsi_detect_drvtypes.lst' successfully
installed
I1804190 cpltree: Tree './arkeia/server/dbase/f3sec/defrole.lst' successfully installed
I1804190 cpltree: Tree './arkeia/server/dbase/f3lib/scsi_detect_libtypes.lst' successfully
installed
I1804190 cpltree: Tree './arkeia/server/dbase/f3lib/libtypes' successfully installed
I1804190 cpltree: Tree './arkeia/server/dbase/f3tape/tptypes.lst' successfully installed
I1804190 cpltree: Tree './arkeia/server/dbase' successfully installed
I1804190 cpltree: Tree './arkeia/server/server.prf' successfully installed
I1804190 cpltree: Tree './arkeia/server/customer/defrole.lst' successfully installed
I1804190 cpltree: Tree './arkeia/server/customer' successfully installed
I1804190 cpltree: Tree './arkeia/server' successfully installed
I1804190 cpltree: Tree './arkeia/xarkeia' successfully installed
I1804190 cpltree: Tree './arkeia/bin' successfully installed
I1804190 cpltree: Tree './arkeia' successfully installed
I1802175 startarkeiad: cp /opt/arkeia/arkboot/sysvinit ->
/etc/rc.d/init.d/arkeia
I1802177 startarkeiad: ln /etc/rc.d/rc0.d/K10arkeia -> ../init.d/arkeia
I1802177 startarkeiad: ln /etc/rc.d/rc1.d/K10arkeia -> ../init.d/arkeia
I1802177 startarkeiad: ln /etc/rc.d/rc2.d/S60arkeia -> ../init.d/arkeia
I1802177 startarkeiad: ln /etc/rc.d/rc3.d/S60arkeia -> ../init.d/arkeia
I1802177 startarkeiad: ln /etc/rc.d/rc4.d/S60arkeia -> ../init.d/arkeia
I1802177 startarkeiad: ln /etc/rc.d/rc5.d/S60arkeia -> ../init.d/arkeia
I1802177 startarkeiad: ln /etc/rc.d/rc6.d/K10arkeia -> ../init.d/arkeia
I1802190 startarkeiad: Daemon '/usr/bin/arkeiad' will start automatically at boot
I1801520 mklusrbin: Created command 'xarkeia' in '/usr/bin'
I1801520 mklusrbin: Created command 'arkc' in '/usr/bin'
arkeiad is starting...
I1800010 myexit: ***** End of installation (0) *****

```

If the installation has been completed successfully, you should be able to use Arkeia 5 immediately. If not, try to solve the installation issues by running the supplied installation procedure again.

## 2.4 Installation check

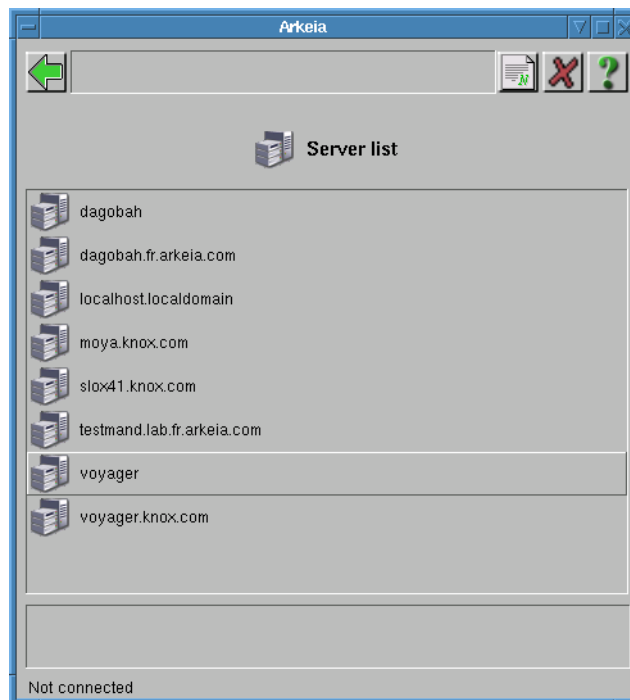
---

To check that your installation has been performed successfully, enter the command to start the GUI for Arkeia in a standard Linux shell:

```
xarkeia &
```



The Arkeia 5 GUI will open at the Server list window.



The Arkeia 5 `tar.gz` package installs the following elements on your computer:

- Client
- Server
- GUI
- Arkeia command line interface `arkc`

Additional packages, options and plugins must be installed separately. Refer to the documentation supplied with your optional Arkeia package for installation instructions.

## Post-installation root password

One very important post-installation configuration that *must* be done to ensure the security of the Arkeia server is to change the default password for the root user.

By default, there is only one user created on a newly-installed Arkeia server: root, and no password is set for this user. For instance, once the installation of the server has been completed, simply hitting the Enter key on the server login screen allows any user to connect to the Arkeia server.



Changing the default root password of a complex system such as Arkeia is the most basic security measure that can be applied, and should be considered mandatory in a production environment.

To change the root password, see [Root Password](#) on page 45.

## 2.5 Installation on a client-only computer

---

By default, the installation procedures of Arkeia 5 install all the components of the software on a given computer. These components are:

- The Arkeia server
- The Arkeia client
- The Arkeia Graphical User Interface (GUI) for X11

This standard installation is correct if the computer is designed to become an Arkeia server. However, running the server on a computer designed to be a client requires that some changes are entered in the Arkeia `admin.cfg` configuration file.

### How to configure an Arkeia client

The file to be modified to declare a client is:

```
/opt/arkeia/arkeiad/admin.cfg
```

To declare a client to a server, this file must be modified to contain the name of the Arkeia server it to which it should connect. For instance, assuming the client computer is named `saturn.sol.com` and the Arkeia server is named `earth.sol.com`. The file: `/opt/arkeia/arkeiad/admin.cfg` of `saturn.sol.com` should contain the line:

```
earth.sol.com
```

If the Arkeia daemon, running on `earth.sol.com`, uses a port other than its default TCP port (617), then the line contained in the `admin.cfg` of the client should be:

```
earth.sol.com:<Port_number>
```

In this line, `<Port_number>` should be replaced, of course, by the number of the port used, on `earth`, by the Arkeia daemon. If the TCP port is different from the default value, you must make sure that the configured TCP port is not currently in use by another service. You can determine which port your server will use by opening the configuration file `/opt/arkeia/arkeiad/arkeiad.cfg`, and finding the line which contains the keyword `PORT_NUMBER`. If this line is *NOT* commented out, then the number in the quotes is the number of the port the server will use.



**It is not possible to declare more than one Arkeia server in the `admin.cfg` file of an Arkeia client.**

**Since the `admin.cfg` file was created during the installation of Arkeia 5, by the user `root`, it is necessary to have the proper access rights and authorizations to be able to edit this file.**

After the `admin.cfg` file has been modified and saved, it is necessary to restart `arkeiad` to allow the client to declare itself to the server. Start `arkeiad` from the command line with:

```
/opt/arkeia/bin/arkboot start
```

entered as the `root`.

## 2.6 Next

---

At this stage, you have installed the Arkeia 5 server and one or more Arkeia 5 clients. You are ready to take the First Steps in using the Arkeia interface. The next chapter describes how to

- start and use the Arkeia 5 graphical interface,
- enter the licenses you have purchased, and
- add or change passwords.



# CHAPTER 3: FIRST STEPS

---

In this chapter, we see how to start and use the graphical user interface to Arkeia 5. In the rest of this manual, we will describe how to run Arkeia through the GUI. Alternatively, you can run Arkeia through the command line interface `arkc`, which is described in [Arkeia 5 Command Line Interface Manual](#).

## 3.1 The Arkeia graphical interface

---

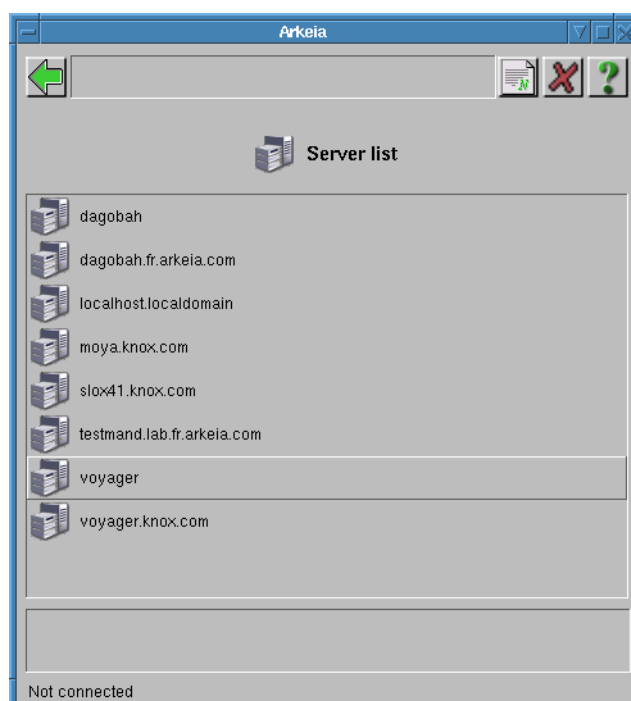
The Arkeia GUI is like a portable control panel. You can open it in any computer on which Arkeia has been installed, then configure, monitor and control Arkeia backup and restore operations throughout the network.

### Start the graphical interface

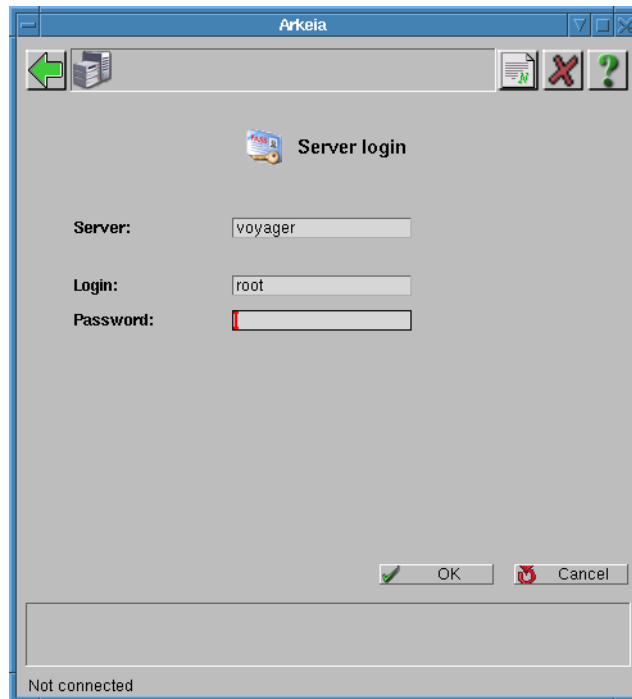
On a command line, login as `root` and enter the command:

```
/opt/arkeia/bin/xarkeia &
```

The Arkeia 5 GUI will open at the `Server list` window.



Now click on the name of the server with which you want to work, and the Server login screen will appear:



### First login to Arkeia

The server name you selected in the last screen is in the **Server:** field. The first time you login, **root** will be the user name in the **Login:** field and the **Password:** field is empty. Arkeia 5 is ready for you to create users. At this stage, leave the **Password:** field blank.

### Normal login

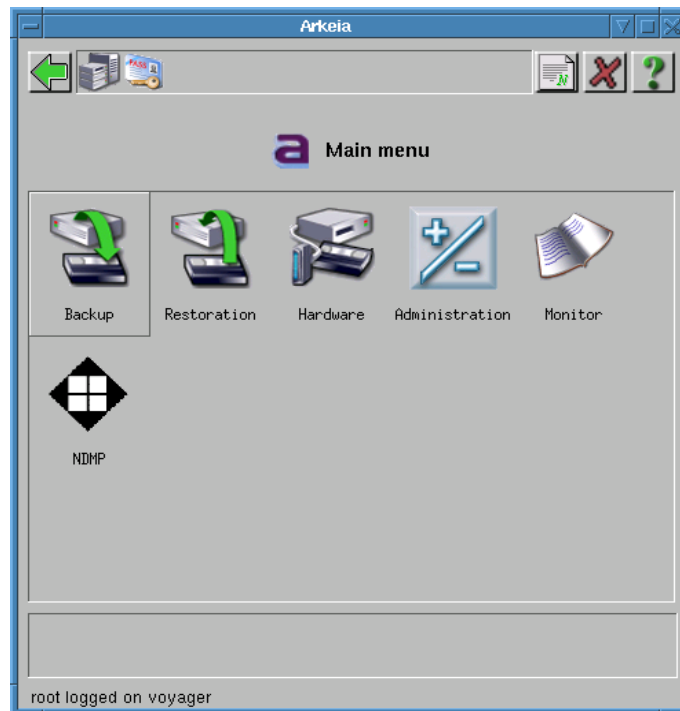
After one or more users have been created, and if there is more than one server on the network:

- a drop-down list of available servers will appear in the **Server:** field, and
- a drop-down list of users will appear in the **Login:** field.

You can choose the server and login identity from these lists.

## The Main menu

Click on OK to bring up the Main menu, from which all of the operations you need to do in Arkeia 5 will be started.



## 3.2 The interface controls

---

The window controls can be divided into two main groups:

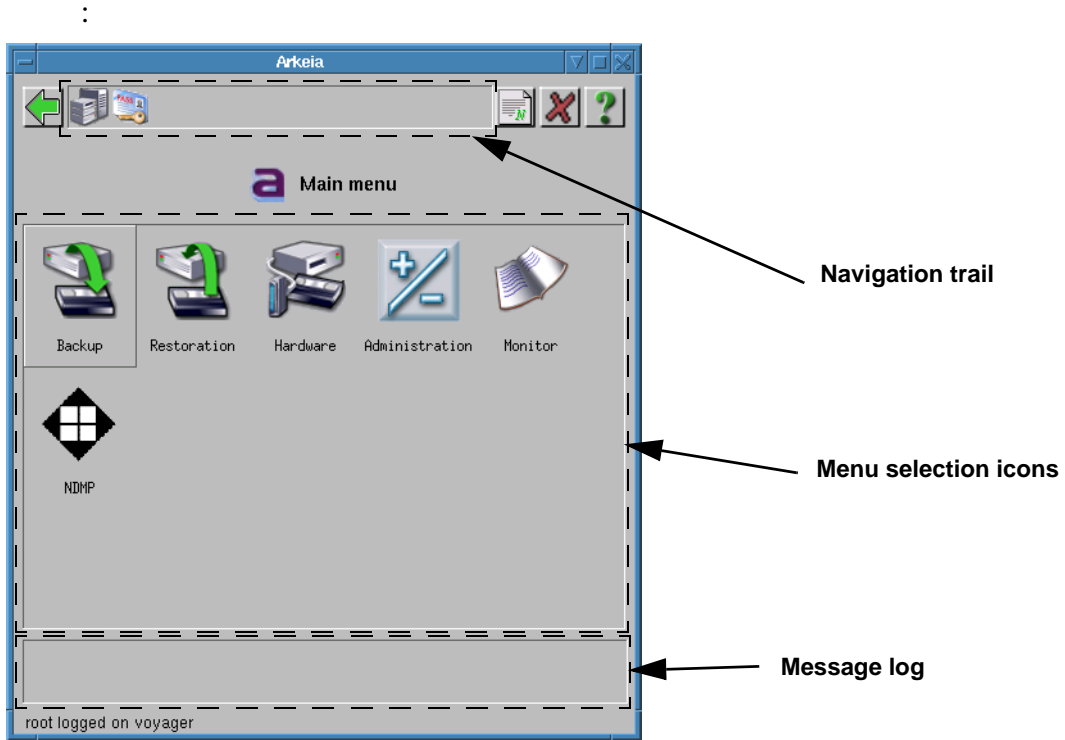
- The fields that display information in the window.
- The functions that control the main window of Arkeia 5.

### Information fields

These information fields are sub-divided into two categories:

- The information fields themselves.
- The function path which provides a quicker way to navigate through the different menus of Arkeia 5.

These different fields are shown in the screenshot below.



Message log displays the most recent Arkeia messages. Click in this zone to open the Status history window and view all the logged messages. There are three types of message:

- Error Error messages are displayed with a red marker;
- Warning Warning messages are displayed with an orange marker.
- Normal Normal messages are displayed with a green marker. They are usually a confirmation that your last action was successful, and a commentary of Arkeia's subsequent actions.

Function path displays icons for the different menus that have been browsed to reach the current menu. Click on each icon to quickly jump back to a previously visited menu, or



to track back along the path you took.

These fields provide convenient short-cuts and ready visibility of Arkeia's status.

## Window controls

The window control buttons are:



New. In this context, creates a second interface.



Quit. Click on this button to close the interface. Arkeia processes running at the time you close the interface will continue to run.





Help. Context-sensitive help.

## Skins

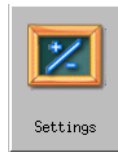
You can change the:

- skin,
- style, and
- language

of the interface in the Settings menu. Click on:



Administration >



Settings

to reach the Settings menu:



Choose your preferred interface appearance from these scrollist:

Skin                    highlight the desired skin.

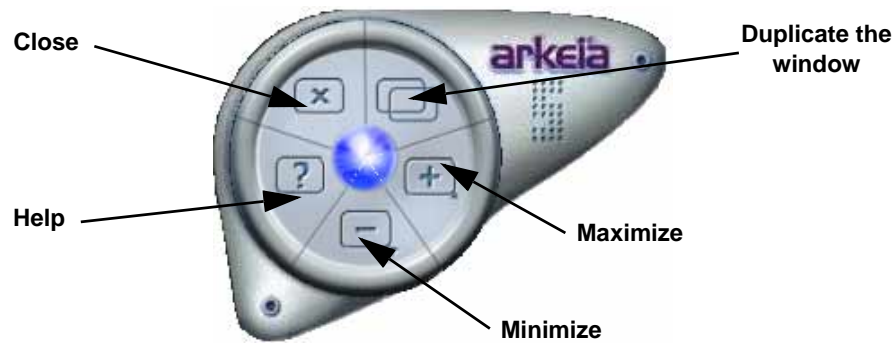
Style                    choose the desired style.

Language                choose the desired language.

Opaque GUI move

The Classic skin is a little different to the usual style of GUI:

The controls are grouped in the wheel, which is located in the upper-left corner:



The following functions are available directly within this wheel:

- Close:** Click on this button to close the Arkeia window (and exit the application immediately if the window being closed is the last one opened by the software).
- Help:** Click on this button to display a short, context-sensitive help message about the function or menu now open in the window.
- Minimize:** Click on this button to reduce the entire Arkeia window to an icon on your desktop (this may vary, depending on the window manager being used).
- Duplicate:** Click on this button to automatically duplicate the main window of Arkeia 5. This allows you to accomplish two different tasks on the same server (for instance: watching over a running backup in one window while creating another task in the other window,) or to work on two different servers at once.
- Maximize:** Click on this window to make the Arkeia 5 large enough to fill the whole screen.

For more control over the size of its window, Arkeia 5 also provides a resize zone in the lower-right corner of its main window:



If the Arkeia window needs to be resized, for instance to make some selection easier, click in this zone and drag the mouse, while keeping the left mouse button pressed.

## 3.3 Arkeia license management

---

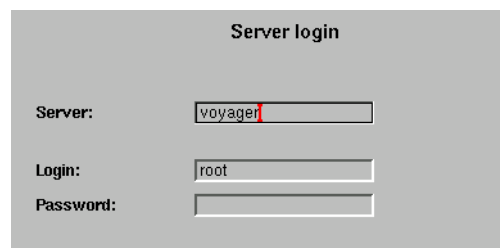
Except for the Arkeia Light version, Arkeia 5 requires a license number to function correctly. This license number is supplied by Arkeia Corporation, and should be entered on the Arkeia server by the system administrator.

The procedure below explains how to enter the license after the installation of Arkeia 5 and how to upgrade the license, if required, to add other functionality.

### Entering the license number through the GUI

To enter the license number in the Arkeia GUI, follow the steps detailed below.

Login, as user root, on the server that will receive the license:

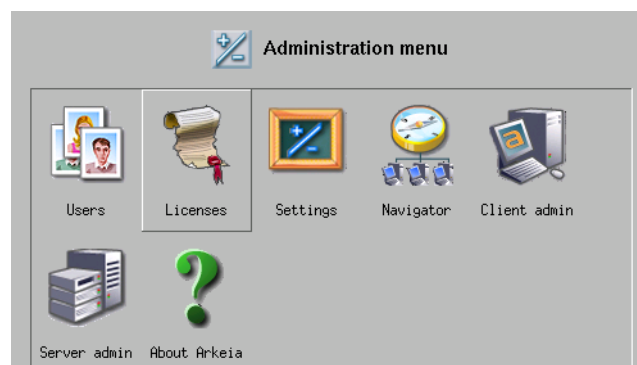


The image shows a 'Server login' window with three input fields. The 'Server:' field contains the text 'voyager'. The 'Login:' field contains the text 'root'. The 'Password:' field is empty.

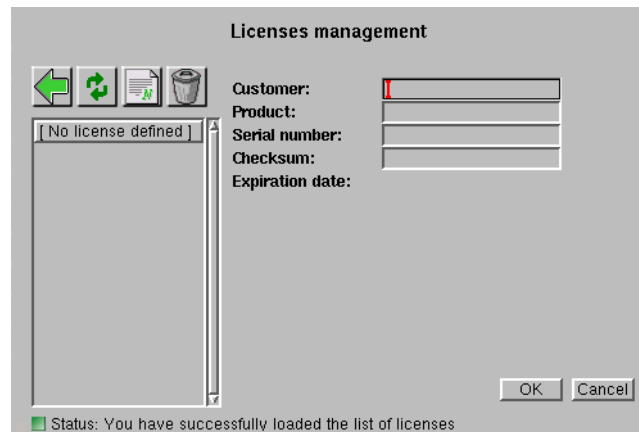
In the Main menu of Arkeia 5, click on the icon labeled Administration:



In the Administration menu of Arkeia 5, click on the icon labeled Licenses:



This opens the Licenses Management menu:



In this screen, enter the

- Customer ID;
- Product ID;
- Serial number; and
- Checksum.

Once it has been entered, click on the OK button to save the license information and compute the Expiration Date. A license with the correct customer ID will then be displayed in the list of licenses, which is in the objects list at the left in the screen shown above.

## Separately licensed functions

Arkeia plug-ins and modules for the following functions require a separate license. Please note that this is not an exhaustive list. For more information, contact the Arkeia sales team at this web page [Arkeia products](http://www.arkeia.com/products.html)<http://www.arkeia.com/products.html>.

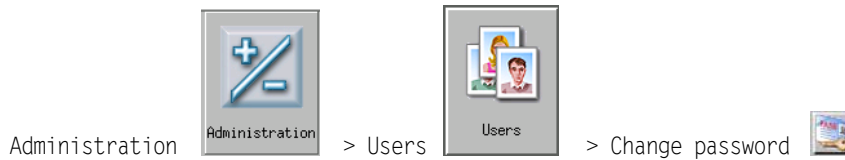
- Tape libraries
- Encryption
- Compression
- Additional flows
- Additional clients
- Plug-ins for hot-backup of applications (for instance: Oracle)
- Disaster recovery

For each of these functionalities, a separate license number will be supplied by Arkeia Corporation and can be entered in the manner described above.


## 3.4 Root Password

---

Later in the manual, we will cover how to add users and their passwords to your Arkeia system. For the moment, we will add a password for the root user, to make the system more secure. In the Main menu , click on:



The Change password screen will appear::



The image shows a 'Change password' dialog box with the following fields and buttons:

Login :	<input type="text" value="root"/>
Old password :	<input type="password"/>
New password :	<input type="password"/>
Confirm password :	<input type="password"/>

Buttons: OK, Cancel

Leave the Login: and Old password: fields unchanged, and type a password into the New password: field, and again into the Confirm password: field. Click on Ok to register the password for root.

The next time you login as root, you will be required to enter this password.

## 3.5 Objects and functions list

---

Arkeia divides all its menus into two separate lists: the object list and the function list.

Objects are the Arkeia entities that are going to be created, modified, deleted, or configured through the list of functions. We are going to use the tape, which is one of the most basic objects of Arkeia, as an example in this section.

Here is the Tapes Management menu of Arkeia, as it is displayed in the main Arkeia 5 window.







This menu is divided into two different zones:

1. the zone on the left is the object list, which contains 8 different tapes, named test01 to test08.
2. The zone on the right of the menu is the function list. All the functions that are listed there can affect all the objects in the object list, or just the objects that have been selected by clicking on the grey check box next to their names.

In the example above, it is possible to recycle a tape by first selecting it, then clicking on the Recycle function. Or, it is possible to recycle all the tapes by clicking on Select all, then on the Recycle function.

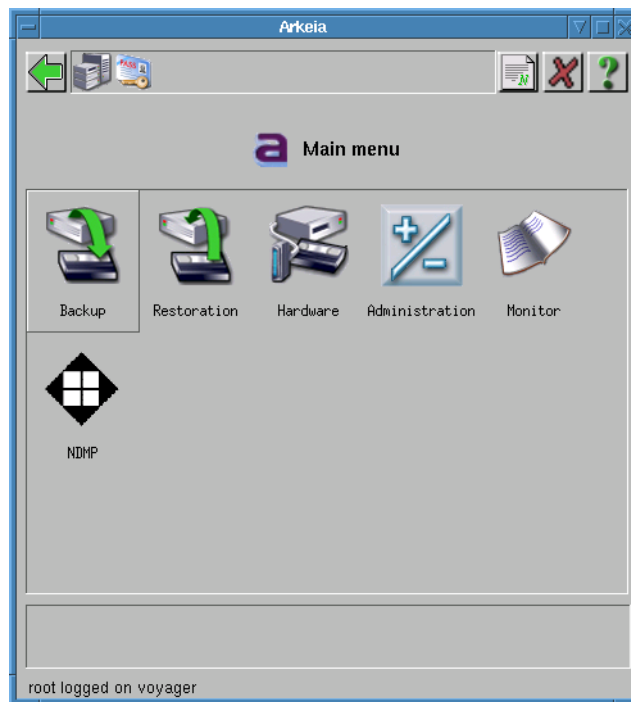
Above the object list, there are buttons for the usual four basic functions that are very useful for quick operations.

- |         |   |  |
|---------|---|--|
| Back    |  | (Green arrow) Click on this button to go back to the previous menu in your path.   |
| Refresh |  | (Dual green arrows) Click on this button to redraw the entire screen.  |
| New     |  | (Document) Click on this button to create a new object. In our example above, this would start the tape creation process.  |
| Delete  |  | (Trash can) Click on this button to delete the objects that have been selected in the list of objects. In the example above, this would delete one or several tapes, depending on the check boxes that have been selected. |

Simply hover the mouse pointer over these buttons for a few seconds to display a short help balloon, which contains a definition of each button function.

## 3.6 Main menu

Here is a short example of the most important functions of the main menu of Arkeia 5.



The Main menu is a starting point for all operations in Arkeia. The functions that can be accessed through a single click on a major button in the main menu are:

Backup	Clicking on this button provides functions to define, configure and launch the backup function of Arkeia, including the Save-packs.
Restoration	Clicking on this button provides functions to define, configure and launch the restoration function of Arkeia 5.
Hardware	Clicking on this button provides functions to define and configure the hardware (drives, tapes, libraries) attached to the Arkeia server.
Running jobs	Clicking on this button displays all the backup or restore tasks currently running on the Arkeia server.
Administration	Clicking on this button provides functions to precisely configure Arkeia.
Monitor:	Clicking on this button provides functions to display the logs of Arkeia activities and alerts sent by Arkeia; and a monitor of currently running jobs.

For example the **Hardware** button opens the **Hardware** menu:



## 3.7 More

---

You have now seen how to:

- start the Arkeia graphical interface,
- enter a license number,
- add and change passwords, and
- manipulate the objects and functions of Arkeia 5

which is everything you need to know before you can create backups and perform restores.

In the next chapter, you will see how to get your hardware working with Arkeia 5.



# CHAPTER 4: HARDWARE INSTALLATION

---

Installing hardware to work under Arkeia is a very easy process. However, caution and planning are necessary to create a stable, high-performance backup configuration. This chapter presents the different points to consider before installing any hardware, and a simple installation example for a single tape drive.

## 4.1 Overview of hardware management

---



Arkeia 5 supports **ONLY SCSI** and hard drive backup devices. All other devices, using any other type of interface (USB, Firewire, IDE, parallel port, etc.) are unsupported at this time. Using these devices with Arkeia will either fail or will severely limit its performances and stability.

### Interface and host adapter supported

IDE devices and devices with interfaces other than SCSI, are not able to support the very high rate of data transfer between the server and the backup device required by Arkeia 5 to perform at maximal efficiency, so they are not supported.

### Supported backup media

The table below lists the most common backup media, its capacity and manufacturer.



If your backup media is not in this table, choose the closest media and try running some limited tests to see if the media itself can be used by Arkeia 5.

Most UNIX operating systems offer utilities to test the SCSI hardware connected to a server. Some of these utilities are briefly described in this chapter. Arkeia 5 contains many utilities that can also provide help in detecting and using SCSI hardware. Most can be found in [Chapter 16:Arkeia Utilities](#) on page 49.

Table 4.1 Backup Media supported by Arkeia.

Name	Capacity (without compression)	Manufacturer
8mm / "Exabyte"	from 2 to 7 GB	Exabyte
4mm / DAT / DDS 1, 2, 3, 4	from 1 to 20 GB	Hewlett-Packard and others
QIC / "Travan"	from 2.5 to 10 GB	Tandberg, Tecmar and others
DLT / DLT1 / SDLT	from 15 to 110 GB	Quantum Technology and others
AIT / AIT 1 / AIT 2 / AIT 3	from 256 to 100 GB	Sony
Mammoth 1 / Mammoth 2	from 20 to 60 GB	Exabyte

Table 4.1 Backup Media supported by Arkeia.

Name	Capacity (without compression)	Manufacturer
LTO (1st generation)	100 GB	Hewlett-Packard and others
9840 "Eagle"	20 GB	Storagetek
SD-3 "Redwood"	from 10 to 50 GB	Storagetek
3570 / 3590 B, E / "Magstar"	from 5 to 10 GB	IBM
VXA 1	12 to 33 GB	Ecrix
DTF 1	from 12 to 42 GB	Sony
SLR 1, 2, 3, 4, 5, 50, 100	from 20 to 50 GB	Tandberg

- The *Manufacturer* column is for guidance only, and may not be up-to-date.
- The capacities given above can be modified by the suppliers. As indicated, the capacity is without compression. Adding compression, through Arkeia or through an internal function of the hardware, may improve this capacity.
- While using the same backup media, backup hardware supplied by different manufacturers can have different characteristics, such as transfer speed and access time.
- Please note that many different formats are actually implied in the table above. For instance, Tandberg's SLR tape format is not just one, but seven different formats (SLR 1, SLR 2, and so on). The capacity indicated is usually the maximum capacity of the latest format.

For more information on the different backup media that exist, Arkeia Corporation recommends the invaluable and exhaustive resources of the following web site:

<http://www.storagemountain.com>

## Supported tape drives

In general, even if you are using a single tape drive whose backup media is not listed in the table above, there is a good chance that this hardware can be supported by Arkeia 5 if it strictly adheres to the SCSI standard.

Arkeia uses advanced SCSI functions to manage operations and SCSI events, and to correctly interpret messages such as the end of a tape. If backup hardware, regardless of the media it uses, complies with the SCSI II standard, Arkeia 5 should be able to manage it.

Unfortunately, while many hardware suppliers claim a strict adherence to the SCSI standard, this is not always the case. Many companies integrate advanced functions in their SCSI drivers, and not in the hardware itself. Some drives or media types that are not listed in the table of the previous page may function perfectly with Arkeia 5, while some others may not.

## New hardware

We strongly recommend that you check the Arkeia 5 compatibility list which can be found at <http://www.arkeia.com/mass.html> when choosing new hardware.

## Handling and replacing backup media

While this may seem obvious, backup media should always be handled with care. Faulty backup media represent a problem, or disaster, which is about to happen. Failure of your backup media during a restoration can negate in an instant the careful work done in establishing and maintaining a backup strategy.

Here are some hints which will help you avoid problems caused by faulty backup media.

- Store the backup media on its side, in a cool dry place.
- Store the backup media away from any magnetic field, especially computer monitors or advanced network equipment. For instance, storing backup media on top of the backup hardware itself is probably not a good idea.
- Label backup media properly, indicating the content and the date of the backup. This is especially important for *Archive*, *Total* and *Disaster Recovery* backups. These are the most important backups that can be performed by Arkeia, and it is crucial to be able to quickly select the correct backup tape.
- Avoid dropping tapes and other backup media. Some tapes and cartridges contain delicate mechanisms that can be badly damaged by shock. If re-used, damaged media can in turn damage the mechanics of its drive. A damaged drive during an important restoration can make a bad situation even worse.
- Respect the media life indications given by the supplier of the backup media itself. This is usually indicated in terms of *passes*. For instance, performing a backup and rewinding the tape after the backup counts as two passes.
- Replace backup media that shows signs of failure. Arkeia backup logs may sometimes indicate that a backup tape has exhibited unusual behavior (such as read/write errors). Such media should always be retired immediately, and the last backup operation it was used for performed again.
- Store the backup media in a safe storage area in accordance with the security policies of your company. A stolen or *lost* backup tape is not just an inconvenience: it could represent an asset to your competitors! Arkeia offers advanced encryption functions that can be very helpful to secure the data on a tape. For more information, please refer to chapter [Chapter 7:Interactive backup](#) on page 105.
- Finally, if the data that was saved on the backup media is considered essential, copies of the media should be made and these copies should be stored off-site. Arkeia 5 has a tape duplication utility which can speed up this process. For more information, please refer to [Chapter 16:Arkeia Utilities](#) on page 213.

## Advanced backup hardware

Apart from the single tape drive — which is useful for a small network, but impractical for large sites — there are three basic types of advanced backup hardware:

- **Stackers.** The original stackers were single tape drives to which a special stack device was added which would simply insert a new tape in the drive every time a tape was ejected. As such, they were sequential, inserting each tape exactly in the order they were found on the stack. Modern stackers are more advanced and offer functions (such as a random access to any tape) which make them similar to simple libraries.
- **Library.** Libraries usually have several internal slots to contain tapes, several drives, and a robotic arm to move the tapes from the slots to the drives and back to the slots. Some libraries offer a gate, a small trapdoor, allowing a tape to be inserted into or ejected from the library after an operation has been completed, without having to stop the entire library.
- **Silo.** These are devices usually connected to large mainframe-class servers and have a capacity of several terabytes. Arkeia 5 does not manage silos and they appear in this list of backup devices only for the sake of completeness.

For more information on how to setup and use a stacker or library, please refer to [Chapter 14: Tape Libraries](#) on page 197.

## 4.2 Basic SCSI configuration

---

This section will detail the different SCSI formats available, and some of the configuration tools that can be used to control these interfaces.

### SCSI interfaces

There are currently three broad types of SCSI interfaces available for computer systems. All of these are managed by Linux and, consequently, by Arkeia 5.

- **SCSI I.** The first standard of the SCSI interfaces, SCSI I was defined in 1986. This standard is now considered as obsolete, as it offers a limited bandwidth (5 MB per second). This first SCSI standard is not supported by Arkeia 5.
- **SCSI II.** This evolution of SCSI I was defined in 1990. It introduced important new functions, such as a command queue and DMA access, while staying backward-compatible with the previous standard. SCSI II then offered an evolution of these features with the *Fast SCSI II* (with a throughput of 10 MB per second) and the *Wide SCSI II* (which can support up to 16 different devices). These two evolutions were soon combined into the *Fast Wide SCSI II*.
- **SCSI III.** This further evolution of the SCSI standard is not, at the time of this writing, completely finalized. It defines new types of interfaces, such as *Fibre Channel* and *Firewire* (which is itself defined in the IEEE 1394 stan-

dard), and many additional SCSI commands, covering functions such as auto configuration and multimedia devices. Many of the devices and adapters available today as *Ultra* SCSI implement a subset of the proposed SCSI III standard. Some of these adapters offer speeds of 80 MB per second or more.

## SCSI device management under Linux

Backup devices attached to computers require device drivers. Some device drivers are supplied with the operating system, others are supplied by the manufacturer of the device. It is often a good idea to check the device manufacturer's web site for the latest version of the relevant device driver for your system, especially if you encounter problems when installing the device.

### *Standard device drivers*

Linux, like most other operating system in the UNIX category, offers these devices to control the SCSI hardware connected to a server:

- `/dev/sgX`: Under Linux, a device with a name such as `/dev/sgX` (where `X` is the device number) is a generic SCSI device. This type of device is used by Arkeia 5 to manage the robotic arm of an SCSI library.
- `/dev/stX`: Under Linux, a device with a name such as `/dev/stX` (where `X` is the device number), is a **rewindable** SCSI device. This type of device is used by Arkeia 5 to read and write to the tapes present in drives.
- `/dev/nstX`: Under Linux, a device with a name such as `/dev/nstX` (where `X` is the device number) is a **non-rewindable** SCSI device.

### *Vendor-supplied device drivers*

Many companies that make backup hardware supply their own device drivers. These drivers may have different names, and may even be just symbolic links to existing devices.

For instance, IBM supplies the following drivers with its LTO library:

- `/dev/IBMtapeX`: for rewindable devices, where `X` is the device number.
- `/dev/IBMtapeXn`: for non-rewindable devices, where `X` is the device number.

For more information on these (possible) drivers, refer to the documentation supplied with your backup hardware.

## Quick SCSI setup and troubleshooting

Whenever a problem is encountered while trying to use SCSI devices, please use the points indicated below as a quick check-list before trying to contact the Arkeia technical support team.

### **Hardware checks**

- Make sure all devices are properly connected. If necessary, check the connecting cable on another correctly working SCSI device, and replace the cable if it is found to be defective.
- Make sure that all SCSI devices connected to the same adapter are of the same type! Mixing SCSI II and SCSI III devices will either block all com-

munications between the devices and the adapter, or slow down the transfer of data from the devices to the server.

- Make sure that all devices are correctly configured within the SCSI chain, especially their device numbers.
- Do not use other SCSI devices, such as a hard disk or a CD-ROM, on the same SCSI adapter as the backup device.

### Software checks

There are several programs and utilities available, under Linux and most UNIX operating systems, that can help with the configuration and troubleshooting of a SCSI chain. Some may be available only from the Internet.

### Detect SCSI peripherals

The first step in a troubleshooting procedure is to make sure that the SCSI peripherals have been correctly identified and detected during the bootstrapping procedure of your computer. To do this, display the messages returned by the system by using the `dmesg` procedure or display the content of the `/var/log/boot.msg` file (or the equivalent on your system). Printed below is a short section of these messages, showing the detection of the SCSI adapters.

```
(scsi0) <Adaptec AIC-7892 Ultra 160/m SCSI host adapter> found at PCI 0/9/0
(scsi0) Wide Channel, SCSI ID=7, 32/255 SCBs
(scsi0) Downloading sequencer code... 392 instructions downloaded
(scsi1) <Adaptec AHA-294X Ultra SCSI host adapter> found at PCI 0/11/0
(scsi1) Wide Channel, SCSI ID=7, 16/255 SCBs
(scsi1) Cables present (Int-50 NO, Int-68 NO, Ext-68 YES)
(scsi1) Downloading sequencer code... 422 instructions downloaded
scsi0: Adaptec AHA274x/284x/294x (EISA/VLB/PCI-Fast SCSI) 5.1.31/3.2.4
<Adaptec AIC-7892 Ultra 160/m SCSI host adapter>
scsi1: Adaptec AHA274x/284x/294x (EISA/VLB/PCI-Fast SCSI) 5.1.31/3.2.4
<Adaptec AHA-294X Ultra SCSI host adapter>
scsi: 2 hosts.

(scsi0:0:4:0) Synchronous at 160.0 Mbyte/sec., offset 63.
Vendor: IBM      Model: DDYS-T09170N    Rev: S80D
Type:   Direct-Access                ANSI SCSI revision: 03
Detected scsi disk sda at scsi0, channel 0, id 4, lun 0

Vendor: QUALSTAR Model: TLS-4210      Rev: 2.09
Type:   Medium Changer               ANSI SCSI revision: 02
(scsi1:0:2:0) Synchronous at 20.0 Mbyte/sec., offset 14.

Vendor: ECRIX    Model: VXA-1          Rev: 2524
Type:   Sequential-Access            ANSI SCSI revision: 02
Detected scsi tape st0 at scsi1, channel 0, id 2, lun 0
(scsi1:0:3:0) Synchronous at 20.0 Mbyte/sec., offset 14.

Vendor: ECRIX    Model: VXA-1          Rev: 2524
Type:   Sequential-Access            ANSI SCSI revision: 02
Detected scsi tape st1 at scsi1, channel 0, id 3, lun 0

SCSI device sda: hdwr sector= 512 bytes. Sectors= 17916240 [8748 MB] [8.7 GB]
sda: sda1
```

### Report of adapters

The second step is usually to launch `lspci`, a utility which finds all the adapters installed in a computer. If the utility `lspci` is not installed on your computer, it can be downloaded from the following URL:

<http://atrey.karlin.mff.cuni.cz/~mj/pciutils.html>

You will find below an example of a normal output from `lspci`. (Note the two SCSI adapters detected in the computer):

```
00:00.0 Host bridge: VIA Technologies, Inc. VT8363/8365 [KT133/KM133] (rev 03)
00:01.0 PCI bridge: VIA Technologies, Inc. VT8363/8365 [KT133/KM133 AGP]
00:07.0 ISA bridge: VIA Technologies, Inc. VT82C686 [Apollo Super South] (rev 40)
00:07.1 IDE interface: VIA Technologies, Inc. Bus Master IDE (rev 06)
00:07.4 Host bridge: VIA Technologies, Inc. VT82C686 [Apollo Super ACPI] (rev 40)
00:09.0 SCSI storage controller: Adaptec 7892A (rev 02)
00:0b.0 SCSI storage controller: Adaptec AIC-7881U (rev 01)
00:0d.0 Ethernet controller: VIA Technologies, Inc. Ethernet Controller (rev 42)
01:00.0 VGA compatible controller: ATI Technologies Inc. 3D Rage P/M Mobility AGP 2x (rev 64)
```

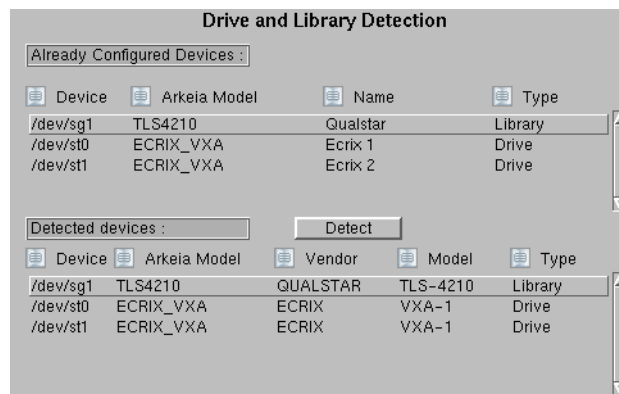
### Autodetect devices

You can use the auto-detect feature of Arkeia 5 to verify that the server is communicating with your hardware devices, and to gather information about the devices

which will be helpful in later configuration. In the Main menu , click on:

Hardware > Detect

to start the detection process, and the Drive and library detection screen will appear:



If no information appears in the Detected devices fields, click on the Detect button next to restart the hardware detection process.

### Communicate with tape drive

A UNIX utility that can be used is the `mt` (which stands for Magnetic Tape) command, and is present on most UNIX systems. For more information on this command, enter the following command on a standard UNIX shell:

```
$ man mt
```

The `man` page for `mt` contains the information needed to use this UNIX utility, which allows you to send commands to a tape drive from a shell.

If you are using the GNU version of `mt` (in Linux), the following command will display the on-line `info` manual of this command:

```
$ info mt
```

## 4.3 Next

---

In this chapter, we saw how to physically connect the hardware on your network to Arkeia. We will show you how to declare the physical objects as logical entities which can be addressed and controlled by Arkeia to make backups and restore data. Before we cover this, it is useful to understand a little of how Arkeia 5 works, and how it handles the objects, such as tapes in tape pools, and drives in drive-packs.

The next chapter explains the most important of these concepts, and explains some of the standard backup strategies and their terminology, so that we can then launch into creating the objects you will need for your backups.



# CHAPTER 5: BASIC CONCEPTS

---

This chapter presents the basic architectural concepts of Arkeia 5. New users will find the information helpful in understanding the procedures to be followed to establish effective backup and restore strategies. Experienced users and system administrators may benefit as well, since some of the concepts presented in this chapter are new to version 5.

Arkeia 5 is a multiple platform client/server backup application. It is capable of multiple simultaneous connections to different clients, and highly customized modes of operation.

Because of the flexibility and the complexity of Arkeia 5, many of the concepts it uses to provide high-performance backup and restoration (such as Savepacks, priorities, flows, etc.) require an explanation, which we provide in this chapter.

The concepts we will describe in this chapter fall in three categories:

- The *architecture* concepts, such as the three-tiers (client/server/interface) and the platforms supported.
- The concepts related to the internal working of the software. These are advanced functions which simplify the configuration and daily use of Arkeia 5, for example Savepacks and Drivepacks.
- Backup strategies and the terminology which describes them, as it is used by Arkeia 5.

## 5.1 Architectural concepts

---

This section details the most important concepts and characteristics of Arkeia version 5, in the context of a general computer LAN (Local Area Network).

### Client/Server architecture

Arkeia uses a *client/server* architecture. This means that a single computer (the *server*) is in charge of all backup and restore operations of several other computers (the *clients*).

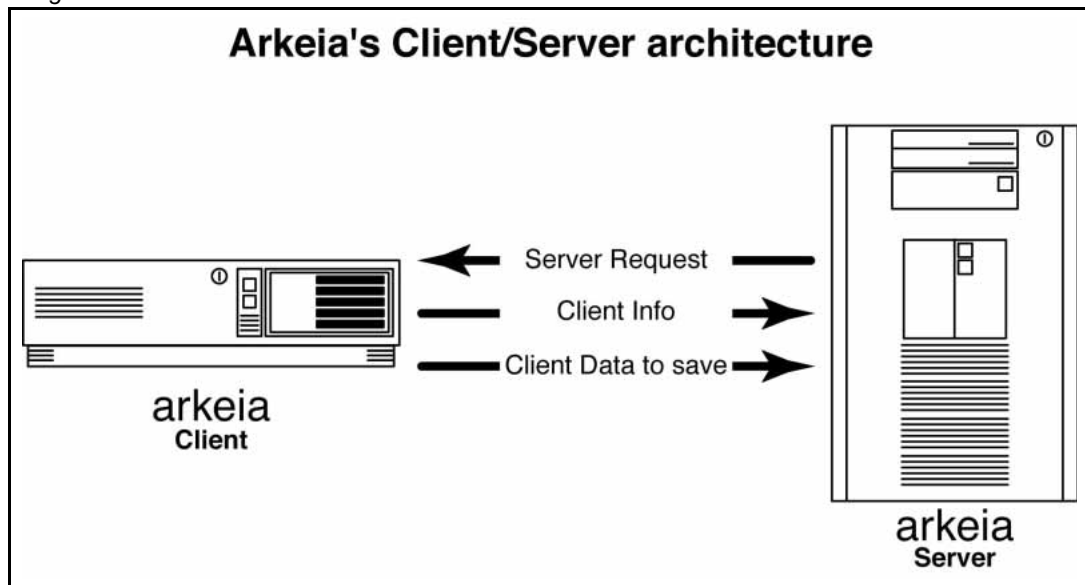
This architecture allows a company, using Arkeia 5, to reduce its investment in hardware: instead of having to buy a backup device for every computer in a company, it is possible to *focus* the hardware investment on the backup server and realize substantial savings, while benefiting from high-performance backup hardware.



**We recommend that you have a server computer dedicated to backup tasks. While it is possible to install an Arkeia server on a computer that performs other tasks, this type of configuration will almost certainly degrade reliability, security and performance.**

A typical client/server architecture under Arkeia is shown in *Fig 5.1*.

*Fig 5.1*



### Three-tier architecture

Arkeia adds another layer to the standard *client/server* architecture by adding an *Interface* level. This layer is particularly important for large and complex networks, with several backup servers.

The *Interface* layer allows the system administrator to install a managing interface on any computer of the network. From this computer, the administrator is then able to configure and control any backup servers present on the network.

This architecture offers a high degree of flexibility to system administrators who are now able to remotely control all the backup and restoration operations performed on their network, by a computer located anywhere on the network. *Fig 5.2* is a graphical representation of this three-tiered architecture.

Another, more realistic representation of this architecture is shown in *Fig 5.3 Example of a Basic Architecture* on page 59.

Fig 5.23-Tier architecture

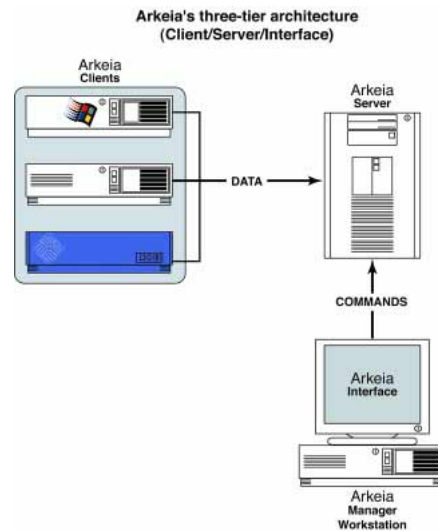
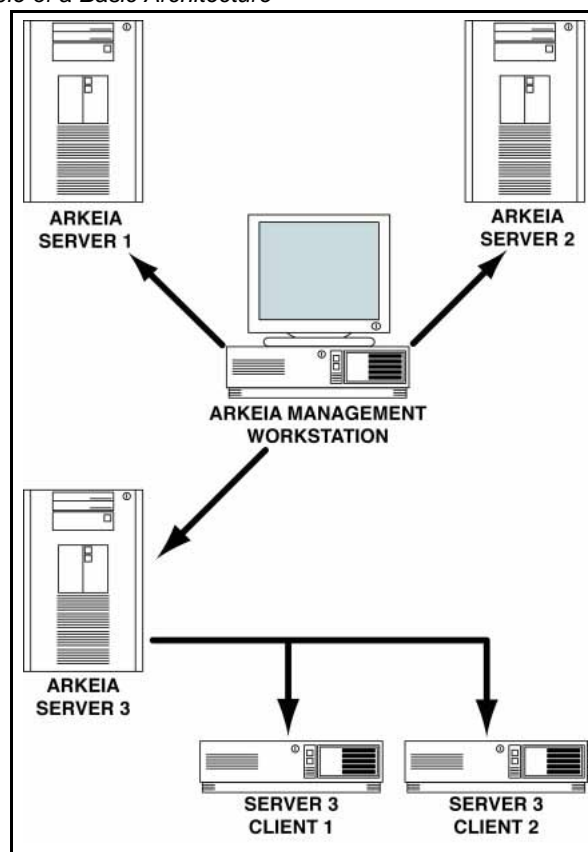


Fig 5.3 Example of a Basic Architecture



In the example above, a single administration workstation is used, with the Arkeia interface, to control several servers. Only two Arkeia clients are represented in the diagram above; on a real network, each Arkeia server could backup dozens, or even hundreds, of different clients.

## Heterogeneous networks.

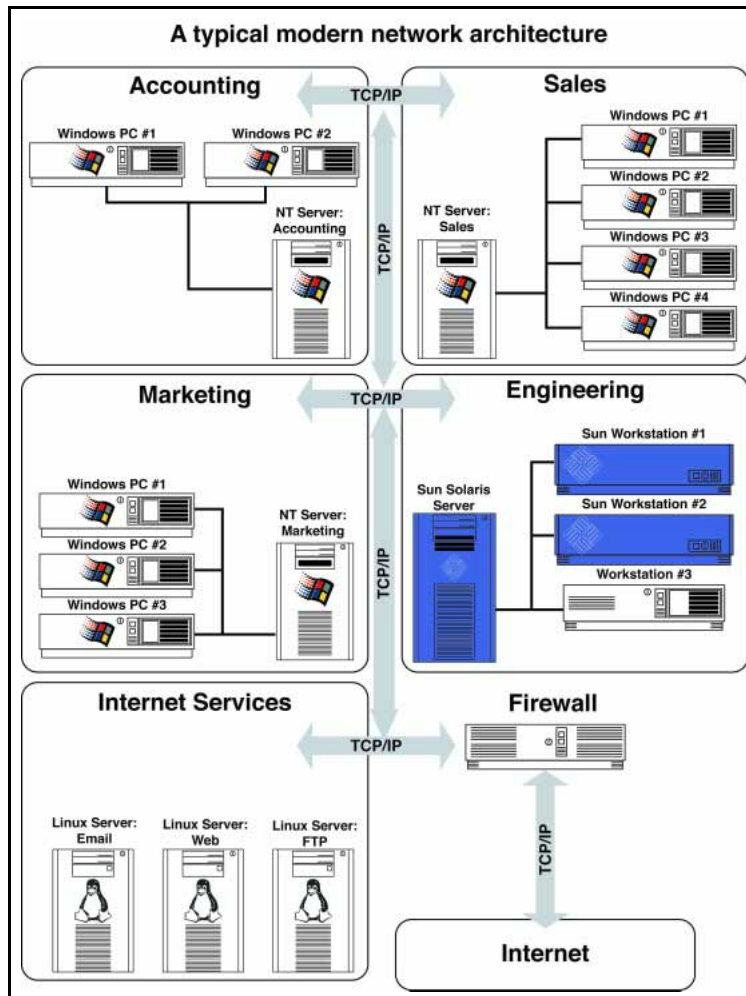
Most companies make extensive use of Local Area Networks (LANs) in their organisation. LANs bring together hundreds, and sometimes thousands, of diverse computers, all communicating together through the use of the TCP/IP protocol.

For instance, a typical company may use a large number of inexpensive PCs running several versions of the Microsoft Windows™ operating system, such as Windows 98 or Windows XP, for tasks ranging from simple accounting to desktop publishing. These microcomputers will, in turn, be connected to one or several local servers running the Windows NT or Windows 2000 operating systems and enterprise software, such as Microsoft Exchange for E-mail.

But the same company may also use UNIX servers and workstations for its engineering and CAD (Computer Assisted Design) departments, using the Sun Solaris™ operating system. Mission-critical 24/7 systems, such as the main accounting and company-wide data center may also be run on these computers which use a number of fail-safe protections (redundant hardware, RAID disk arrays, Uninterruptible Power Supplies, replication, and so on) to make sure these advanced systems are *always* online.

Finally, to maintain its World-Wide-Web and FTP sites, this company may use inexpensive Linux servers, which are known for their reliability and flexibility. Therefore, our example network could very well look like the one shown below.

Fig 5.4



Using computing and data transfer standards such as Ethernet networks and the TCP/IP protocol, all these computer platforms can communicate and work together in a coordinated manner. But communication is only one part of the task: the other, much more difficult part, is saving the data these systems contain.

As one can easily deduce from the maze of different systems, saving the information they contain, in a timely and organized manner is not a simple task. Beyond the communication, most of these computers use different file formats and operating systems, different authorization procedures and different backup methods.

On the other hand, it is unrealistic to ask the network administrators to perform a separate backup operation for every computer used at an organization. Time-consuming, these operations would simply be a duplication of effort and would multiply backup systems, with the associated costs and possible incompatibilities. Another possible problem is the lack of performance of one computer, compared to others: the slowest workstations could tie up the backup of an entire network, including systems that are mission-critical.

If we return to the network example detailed above, it is easy to see how Arkeia is able to cope with a heterogeneous network: it designed from the very beginning to function seamlessly on multiple platforms.

All that is required to back up any network computer, whatever its type, is to have an Arkeia client installed on the computer. Currently, Arkeia servers or clients are available for more than 30 operating systems, including market leaders such as IBM's AIX, Sun Solaris, SGI's IRIX, Hewlett-Packard HP-UX, Linux (on several architectures) and Microsoft Windows 9x, Windows ME, NT, Windows 2000, XP, Mac OS X and Netware.

An Arkeia client, regardless of the platform it is installed on, will be automatically recognized by an Arkeia server. Once recognized, it can be backed up by the server, even if they are not of the same type. For instance, a Sun Solaris or a Windows 98 client can be backed-up by a Linux Arkeia Server.

Because of this architecture, a company is free to use its existing systems as backup servers. In the example detailed above, a logical choice would be to use an Intel-based PC, running the Linux operating system. This would yield two benefits: the network administrators would not have to be trained on a new operating system, and a cheaper PC would mean a larger budget allocation for the backup hardware itself (as we have seen in the section *Client/Server architecture* on page 57).

Advanced benchmarks performed by Arkeia Corporation have shown that an average PC, running under Linux, and connected through a standard SCSI interface to a backup system, can be used to save the critical data of an entire network.

## 5.2 Arkeia Internal Architecture

---

Arkeia's benefits are not limited to its client/server architecture. Many of its functions are optimized to offer users better performance and ease-of-use when backing up or restoring large networks.

## Modular architecture

Arkeia 5 introduces a new modular architecture, with plug-ins. A plug-in provides very specialized functionality, in addition to the standard capabilities of Arkeia. Currently, plug-ins are available for

- making hot-backups of proprietary databases,
- advanced encryption of data in backups,
- system backup and restoration, and
- disaster recovery

Check the Arkeia website at:

<http://www.arkeia.com>

for new Arkeia 5 plug-ins, which are being added continually.

## Multiple data flows

To maintain high performance during backup operations, an Arkeia server is able to process several clients at once, using its multiple data flow architecture. This has two benefits:

- computers with very large amounts of data can open several *flows* of data in parallel to the server to be backed up fast; and
- slower computers can work in parallel to faster computers, so as not to tie up the backup server.

By default, an Arkeia server uses only one flow per client computer. However, the system administrators using Arkeia version 5 can configure multiple data flows toward a single computer when creating a backup.

## Savepacks

Savepacks are an essential feature of the Arkeia technology. A Savepack is a collection of paths and filenames to be included in a backup. After your hardware has been set up and declared as logical objects in Arkeia, the actual work of creating or changing backups reduces to changing your Savepacks. When the time comes to perform a backup, the only thing left to do is to select the Savepack that has been previously defined.

Savepacks can extend over several computers, disks and folders. Complex backup tasks need to be defined once, and only once, making the overall backup tasks much easier, even on large and complex networks.

We show you how to create and modify Savepacks in [Chapter 6: Create objects and users](#) on page 69.

## Tapes

Each *tape* to be used for backup is created as an Arkeia logical object. A logical tape object is a physical tape that has been defined in Arkeia 5 in terms of its type,

size, label and similar properties. You can assign a physical tape to Arkeia, by creating it as a logical tape, while reserving other physical tapes for applications other than Arkeia.

## Tape pools

In the same way that Savepacks allow a system administrator to combine different elements into a single element for ease of use, *tape pools* allow a system administrator to combine different tapes into one *pool* for use by backups and restorations. Several pools can be created, and a pool can be exclusively assigned to a backup, keeping the data tapes of that backup separate from the tapes of other backups.



We recommend that you do not mix tapes of different types within the same Tape Pool. Within a given Tape Pool, all the tapes should be of the same type.

### Scratch Pool

Every Arkeia installation has a default tape pool which is not assigned to a backup, called the *scratch pool*. Tapes which you hold, that are not currently assigned to a backup, can be left in the scratch pool. If a backup you are running uses all the tapes from its own tape pool, further tapes will be drawn from the scratch pool. When you create a new pool, you can move tapes from the scratch pool into this pool.

### Recycle a tape

Any tape used for a certain period of time can be erased and re-used for other backup tasks. This is called *recycling* a tape. You can choose whether a tape is recycled within its own tape pool or dropped back into the *scratch pool*. For more information on tape recycling and tape assignments, refer to [Tapes](#) on page 73.

In its internal database, Arkeia keeps track of all the tapes created, including their location, content and availability for recycling. In addition, Arkeia monitors the condition and life of each tape, and warns when it may be reaching the limit of its reliable life, based on the number of rewind cycles the tape has undergone and reports from the tape drive.

## Drivepacks

A drivepack is one, or several physical tape drives, which you have placed under one name to form a single unit. You can then apply the Drivepack to your backups.

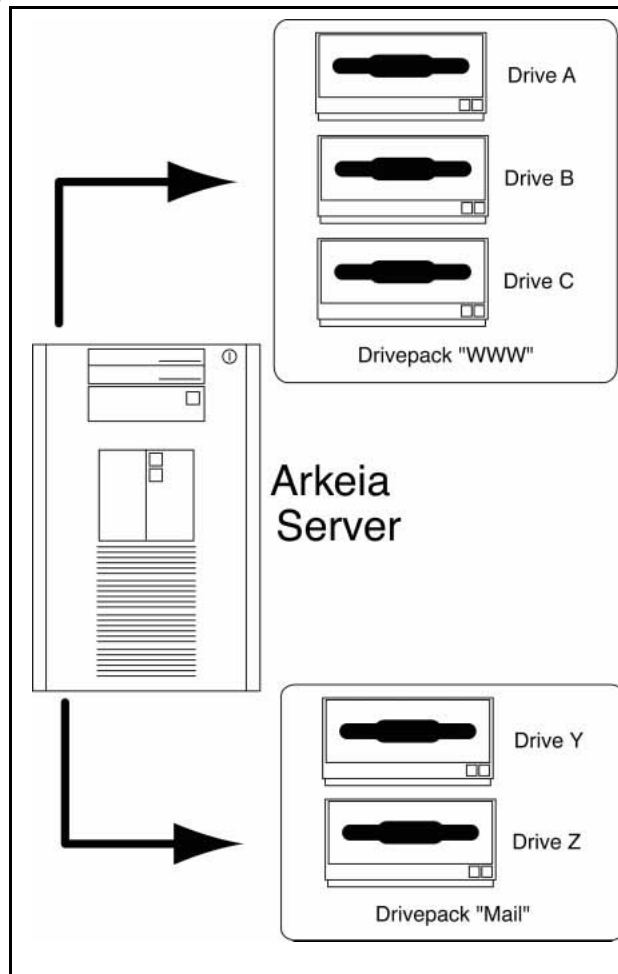
The advantage is that an Arkeia backup server can use several tape drives at the same time and so complete its backup tasks faster. Using Drivepacks, it is also possible to use larger capacity tape drives for the most important tasks, while using tape drives that are slower, or tape drives that have a smaller capacity, for less urgent or smaller backups.



We recommend that you do not mix tape drives of different types within the same Drivepack.

The diagram below shows an example of the use of Drivepacks.

Fig 5.5 Drivepacks



In this example, the tape drives A through C are combined in the Drivepack `WWW` with a large capacity, and are used by Arkeia to backup the web server, while drives Y and Z are combined in the Drivepack `Mail` and used to backup the e-mail server.



It is possible, in Arkeia 5, to create Drivepacks that *share* drives. For example, in the figure above, it would be possible to create a drive named X, that belongs to the `Mail` and to the `WWW` Drivepacks at the same time.

If that is the case, Arkeia 5 will lock the X drive in such a way that it will only be used by one Drivepack or the other, but not by more than one Drivepack at the same time.

For instance, if the Drivepack `Mail` starts using the X drive before the `WWW` Drivepack, the X drive will be assigned to `Mail` and `WWW` will not be able to access it to perform its own tasks.

## 5.3 Backup strategies

The data held in your network of computers is changing, probably daily. Some systems add or change data in large amounts every hour of every day. Other systems may be quieter, changing small amounts of data on workdays, and almost none on weekends.



A backup can only record the data held in a system at one point in time. The aim of any backup strategy is to make sufficiently frequent backups so that if there is a failure, an acceptable minimum amount of data has changed between the last backup and the failure point.

Some DBMS use journaling files to record the input transactions which would change the database, so the database activity can be stopped while it is being backed up, but the database users can continue to make updates. When the backup has finished, the input transactions are "replayed" and the database is updated. Arkeia provides plug-ins specially made for some of these systems, which allow "hot backups" to take place, while the system is in use.

## Backup start

Arkeia provides two methods of choosing when to start a backup:

1. interactive, and
2. periodic (or scheduled).

### Interactive backup

Interactive backups are started by an Arkeia user who has the appropriate authorization, at any time from the graphical interface, or the command line interface. The interactive backup only starts at the user's command, and runs once.

### Periodic backup

Periodic backups start unattended, at a time specified by an Arkeia user with the Administrator authorization. They may be one-time only backups, or backups which repeat at regular intervals of time, as determined by the user who created them.

## The backup cycle

It is not economical or practical to make every backup on new media. Normally, the backup media (usually tapes) are kept for a period of time then recycled by overwriting with a new backup.

An efficient way to minimize the time and memory space used while ensuring data security, is to first back up everything, then at regular intervals backup up the changed data. After a few of these intermediate backups, it is advisable to again back up everything, then again make backups of the changes. This is the *backup cycle*.

## Backup types

Interactive and periodic backups can be one of four types:

1. total,
2. differential, or
3. incremental.

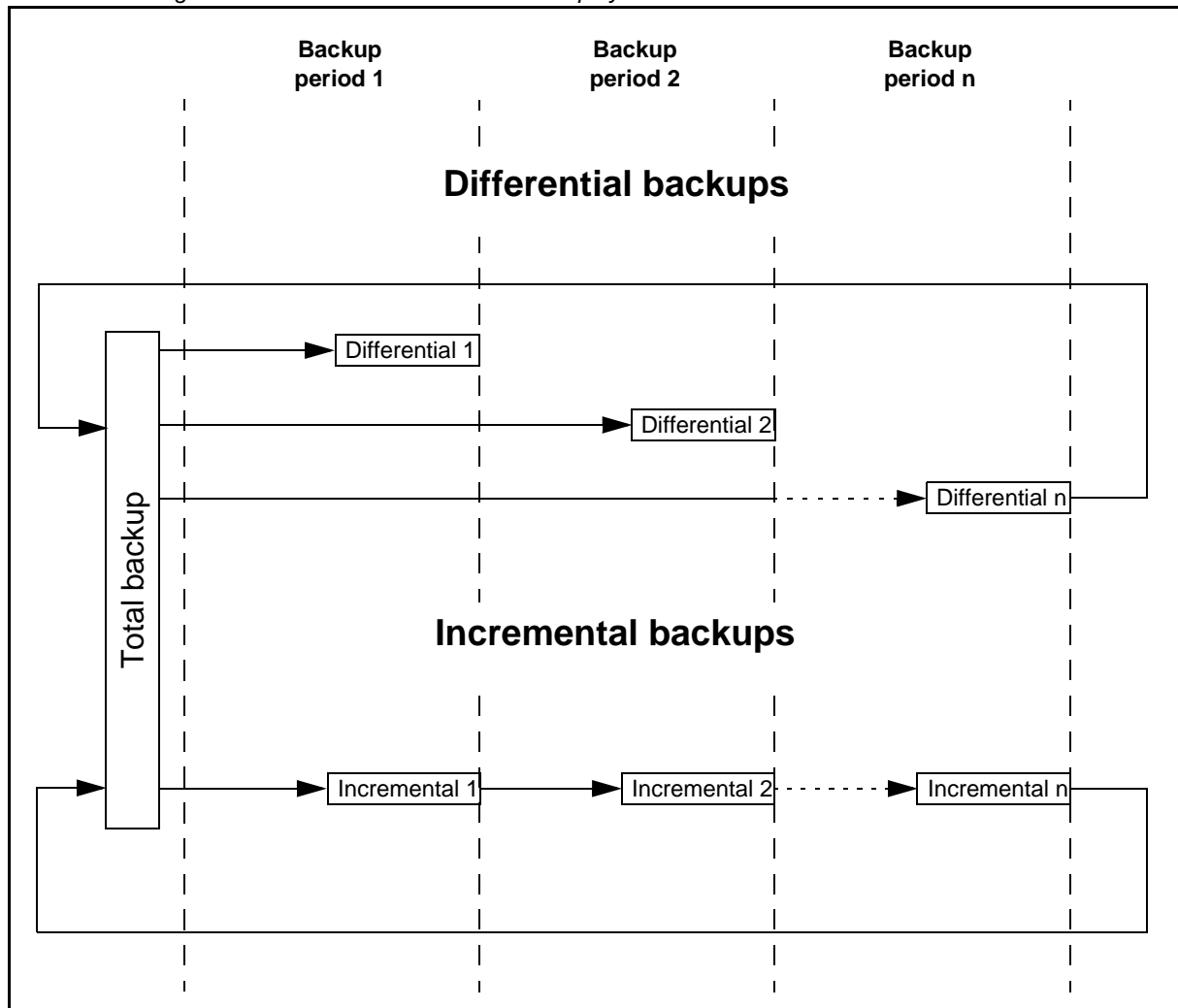
### Total backup

A total backup is a complete backup of all the files included in a savepack, at a given point in time, and is fundamental to all backup strategies. It is required in

conjunction with the other two types of backup strategy. When a total backup is made, the system and various applications whose data is backed up usually reset their records to show that a backup has been made at this particular time, making backups with earlier dates non-current, or archival.

The total backup takes longer to do and requires more storage space than a differential or incremental backup.

Fig 5.6 Differential and incremental backup cycles



### Differential backup

A differential backup is a record of all the changes in data since the last *total* backup. The longer the time since the last total backup, the larger is the size of the differential backup, and the longer it takes to complete. In Fig 5.6, the backup Differential 2 is bigger than Differential 1 because it includes Differential 1, and the changes made since Differential 1.

To restore to a given period in the cycle:

1. the last total backup, and
2. the last differential backup for that period,

are required.

### Incremental backup

An incremental backup records all the changes made since the last backup, whether it is a total backup or an incremental backup. Incremental backups (after the first incremental backup) are usually smaller than differential backups, because they do not include the data recorded in the previous incremental backups.

To restore to a given period in the cycle, it is necessary to have available ALL the incremental backups since the last total backup. For example in *Fig 5.6*, to restore to the state as at Backup period 3, you require:

1. the last total backup,
2. Incremental 1,
3. Incremental 2, and
4. Incremental 3.

## 5.4 Next

---

You have installed Arkeia on at least one server and one client computer in your network, you have obtained the necessary licenses and entered them, and you have an understanding of the basic concepts of Arkeia and of backup strategies in general. Next, we show you how to create the logical backup objects you need to design and implement a backup program. They are:

- Users: the people who have access to Arkeia.
- Tapes: each tape is managed individually by Arkeia.
- Tape pool: a group of one or more tapes which a backup can use to store data.
- Tape drives: the drives Arkeia can use to write tapes.
- Drive pack: a set of drives which a backup can use to write to tapes.
- Savepack: a list of servers, directories and files defined for a backup.



# CHAPTER 6: CREATE OBJECTS AND USERS

---

Before using Arkeia 5, the backup administrator must define these basic objects that will be used by the software:

- Users: the people who have access to Arkeia.
- Tapes: each tape is managed individually by Arkeia.
- Tape pool: a group of one or more tapes which a backup can use to store data.
- Tape drives: the drives Arkeia can use to write tapes.
- Drive pack: a set of drives which a backup can use to write to tapes.
- Savepack: a list of servers, directories and files defined for a backup.

In this chapter you will see how to create and use these objects.



**This chapter only presents the *logical* creation of objects. To install *physical* objects such as drives and libraries, refer to [Chapter 4:Hardware installation](#) on page 49.**

For a discussion on the difference between logical and physical objects, refer to [Chapter 5:Basic concepts](#) on page 57.

## 6.1 Users

---

Since Arkeia is a network client/server backup application, it often has to backup or restore sensitive or confidential data. While it offers advanced encryption function to protect that data, another layer of security can be added by restricting access to certain data (and the backup operations performed on the data) to certain users.

To restrict this access, it is therefore necessary to create different users, who are in charge of different subsets of data on the network computers backed up by Arkeia.



**Changing the default root password of a complex system such as Arkeia is the most basic security measure that can be applied, and should be considered mandatory in a production environment.**

## Arkeia users' categories

There are three main categories of users under Arkeia. The table below describes these three categories and the privileges assigned to each.

Table 6.1 Arkeia User categories

Name	Privileges
ADMINISTRATOR	Can perform all operations. Can create or modify all objects. Can create or modify all users.
OPERATOR	Can perform all operations. Cannot modify the Arkeia objects. Cannot create other users.
USER	Can only restore the files of the computer he or she is currently logged into.

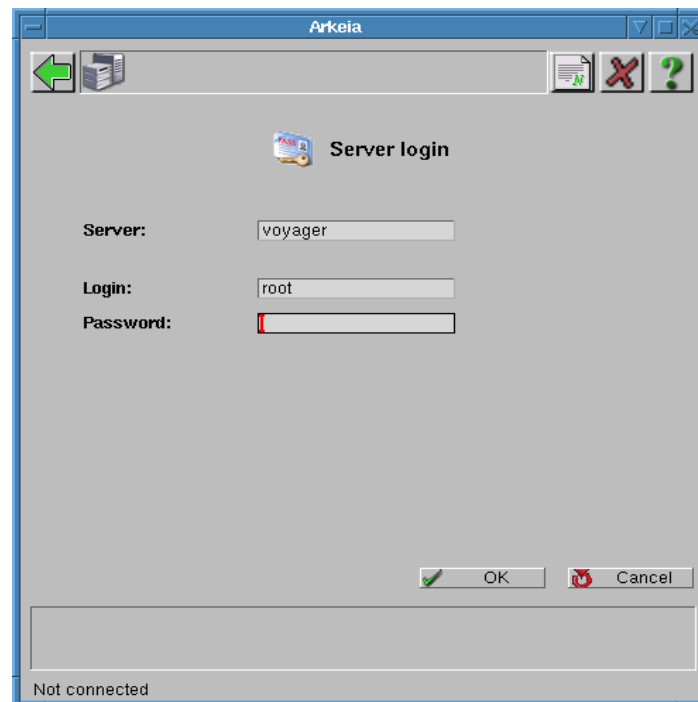
As noted elsewhere in this documentation, the default Administrator is the user named `root`. This user is not necessarily the same as the `root` of a UNIX system.

## How to log on to the Arkeia server

When you start the Arkeia graphical interface, the first screen to appear is the Server list screen:



In this example, we choose the computer named Voyager. To log on to a server, click on its name. Arkeia 5 will then request the user's name and password.




In the example above, we enter the user name `root`, followed by the password. Note that your installation of Arkeia 5 may use different names, and that users with different privileges may create tapes. For more information on users and their different privileges, refer to [Users](#) on page 69. For more information on your local installation of Arkeia, contact your Arkeia system administrator.


Once you have logged on the requested server, the Main menu appears:



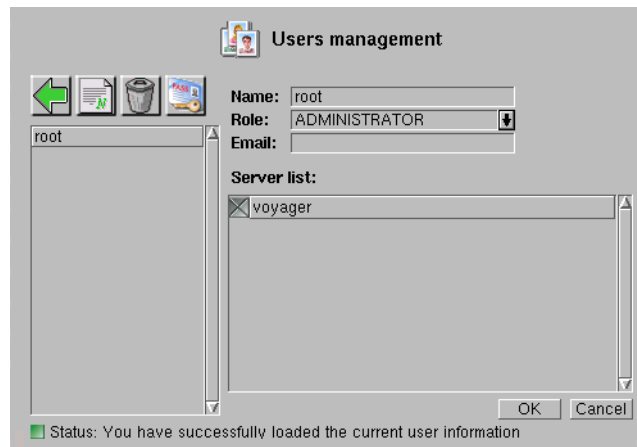
If you need more information on the login procedure, refer to [The Arkeia graphical interface](#) on page 37.

## How to create users

To create a user, log onto an Arkeia server as `root`, and in the Main menu , click on:

Administration > Users > New 

and the Users management screen will appear:



To create, delete and modify users, these buttons are used:

Create user



Click on this option to start the new user creation process.

Delete user



If a user has been selected in the left-hand user list, clicking on this option deletes him or her. Arkeia asks the administrator to confirm the deletion.

Change password



If a user has been selected in the left-hand user list, clicking on this option will change the password assigned to that user.

If the Create user option has been chosen, Arkeia 5 then allows the operator to enter a name, choose a category and configure the email for the user being created. The email entered will be used by Arkeia to send reports on backups to the owner of a backup.

In the example pictured above, the ADMINISTRATOR of Arkeia 5 (by default, the user named root) is creating another Arkeia Administrator named Jack, whose email address is jack.smith@saturn.acme.com.

To create a user, simply enter the relevant information in the fields, right-click to display the exit menu and click on the OK option to confirm the creation of a user. The newly-created user should then be displayed in the list of users, on the left of the Users management menu.



**When a new user is created, no password is assigned to this user. It is recommended that you assign a password to the new user immediately.**



To assign a password to a user, select the name of the user in the list of users and right-click anywhere to display the User management menu. In this menu, click on the Change password option.

This displays the Change password menu in the main window of Arkeia 5.


The old user password must be entered in the relevant field, and the new password entered twice: once in the New password field, and a second time in the Confirm password field to be defined. If the user has just been created, the Old password field should be left blank, as the password of a new user is always blank.

Once the password fields have been filled, right-click anywhere in the Arkeia 5 window to display the exit menu and click on OK to confirm the password assigned to the user.

## 6.2 Tapes

A good starting point is to create tapes within the system in order to be able to backup data. You could start by creating a tape pool, and create tapes as part of that process.

### Tape types

To display the list of tapes supported by Arkeia, in the Main menu , click on:

Hardware > Tape types:

You will see a list of the tape types that can be managed by this version of Arkeia:

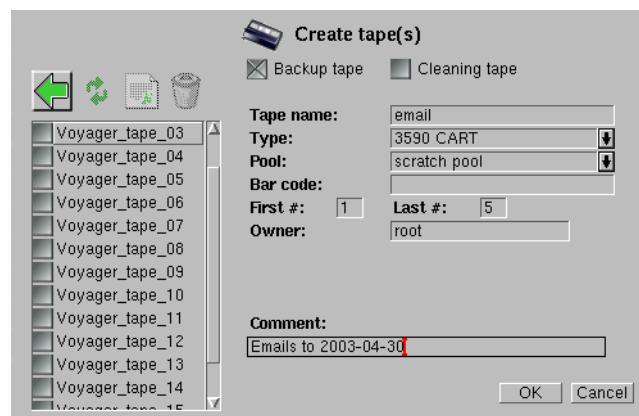
To display more information on a given tape type, click on its name in the scroll list at the left to display a summary of the capacities of the tape, on the right. As you can see above, this example screen applies to the tape type named 3590 CART.

## How to create tapes

To create a tape, in the Main menu , click on:

Hardware > Tapes > New 

This will open the Create tape(s) screen.



Fill in the following fields to create one or more tapes:

- |                      |  |
|----------------------|--|
| Backup/Cleaning tape | Check the box which describes the tape you are creating.   |
| Tape name            | Enter a descriptive name of your choice. Several tapes can be created at the same time. They will have the name you specify here, and a sequence number appended by Arkeia. See <i>First #</i> and <i>Last #</i> below.  |
| Type                 | Click on the drop-down menu to select the type of tape to be created.  |
| Pool                 | Choose the pool the tape will be assigned to. The default pool is the Scratch Pool. The Scratch Pool is used by Arkeia as a reserve of blank tapes. Whenever a backup operation needs tapes to be completed, Arkeia automatically assigns tapes from the Scratch Pool to the task being performed. |
| Path                 | If you selected FILE in the Type field, you are backing up to a HDD rather than tape. Enter the pathname to the directory containing the tape files here. See <a href="#">File Tape</a> below for an additional field in this case.  |
| First # and Last #   | If it is necessary to create several tapes, enter the first tape number and the last tape number in the correspond-  |

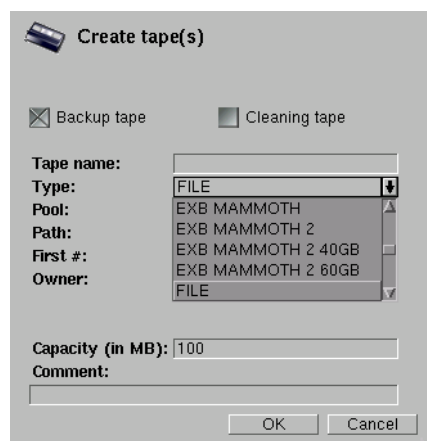
ing fields. For example, to create 5 tapes, enter 1 in the First number field and 5 in the Last number field. Tapes will be created with these numbers appended to the name in the Tape name field.

Owner	Enter the name of the owner (or the creator) of the tapes. Entering a name other than root in this field will give control over the tapes to the user whose name has been entered. If unsure, leave this field as is.
Comment	This field can contain a short descriptive comment about the tape.

When these parameters have been set, click on the OK button at the bottom of the Create tape screen to confirm, and tapes will be created in Arkeia. You will then return to the Tapes management screen.

### File Tape

The tape type listed as File tape in the scroll list is a special type. It is not really a tape at all, but is a simulated tape which exists on an HDD (hard disk drive) accessible to the server. It is useful for testing purposes because it allows you do test backups and restorations without a tape drive or library. It can also be used if you want to keep backups on an HDD.



There is one additional field to fill when you choose Type: FILE

Capacity (in MB):	Enter the disk space in MB you want these tapes to occupy. Each file tape you create will be this size.
-------------------	---

When using a FILE tape, some means of "inserting" a new file tape into the drive is needed. For real tapes, this is done either:

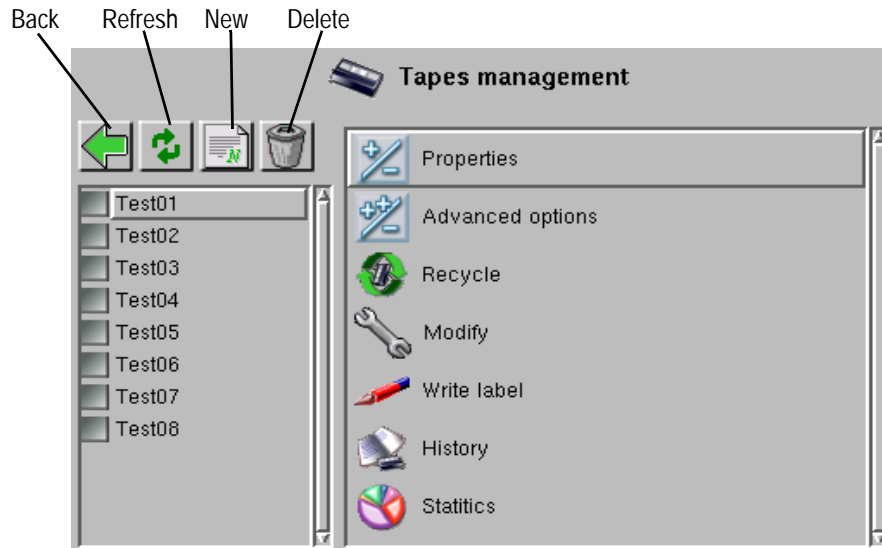
- manually, when Arkeia requests a new tape; or
- by the autoloader in a tape library.

There is no way of manually inserting a FILE tape, so it is necessary to create one or more FILE drives (see [FILE tape drive](#) on page 84) and a FILE tape library which simulates a tape library (see [FILE tape library](#) on page 199), in software.

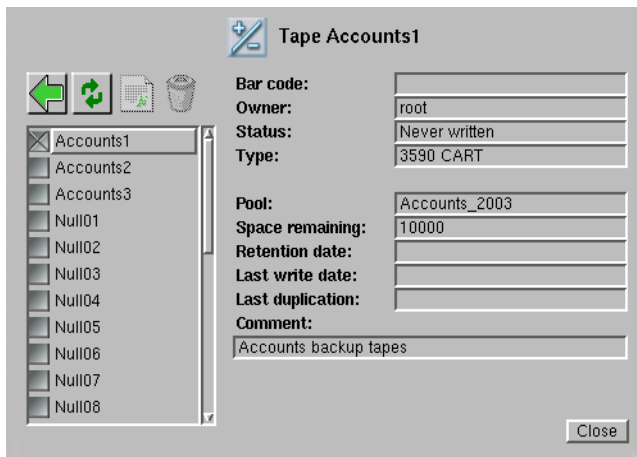
## Tape management

Use the Tapes management screen to make changes to the way Arkeia manages a tape, and to get information about the condition and usage of a tape.

Once the Tapes management window has been displayed, it is possible to create tapes by using the buttons displayed above the main list of tapes, or in the pop-up menu which appears when you right-click, anywhere in the Tapes management window:

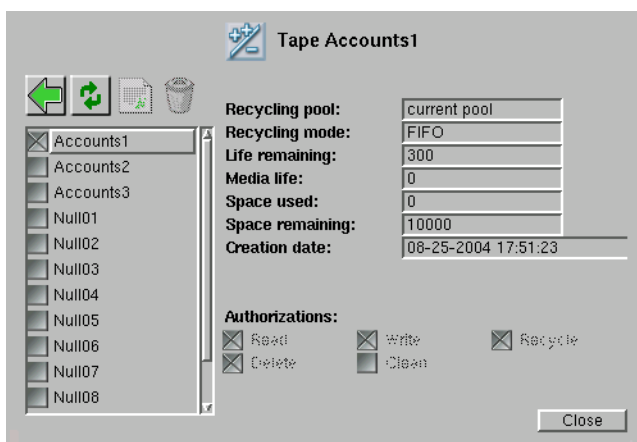


Back	Return to the previous menu (Hardware menu).
Refresh	Refresh the list of tapes and redraw the contents of the screen.
New	Create one or more backup tapes or cleaning tapes.
Delete	Delete one or more tapes. To delete several tapes at the same time, click on the check boxes next to their names.
Properties	Display the current tape's properties. The tape properties can also be displayed by double-clicking on the tape in the list, or clicking on the name of the tape, then on Properties. The Tape properties screen will appear:



- Status: The number of times data has been written to this tape.
- Space remaining: How much space is left on the tape for further data.
- Retention date: This date is calculated from the Valid for time length you entered when creating the backup for this data. After the data retention date the tape is recycled, and the data it contains will be erased in the future by other backups or duplications. If the backup type is set to Archive, the retention date is ignored and the tape is never recycled.
- Last write date: The date on which this tape was last written to.
- Last duplication: The date on which this tape was last duplicated.

Advanced options      Displays detailed properties of the tape selected



Library	Name of the library to which this tape belongs.
Recycling pool	The tape pool into which this tape will go when it is recycled.
Recycling mode	FIFO or LIFO.
Life remaining	The number of times the tape can reliably be used again before it needs to be replaced.
Media life	The total number of times the tape can reliably be used, when new.
Space used	How many MB of data are presently on the tape.
Space remaining	How many MB of data can be put on the tape at present.
Creation date	The date on which the tape was logically introduced into service with Arkeia.
Authorizations	The Read, Write, Delete, Clean and Recycle authorizations of the currently logged on user.

Recycle Reuse the tape from the beginning.



**This function does not erase the data on the physical tape, it only marks the tape as *recycled* in the Arkeia database, making it available for re-use.**

Modify Modify properties of existing tapes.  
To modify a tape:





1. click on the check box next to the tape on the left side of the window,
2. click on the check box of the property you wish to modify, then
3. click on the button to the right of the property and select a value from the drop-down menu, or  
to change an authorization,  
click on the check box of the authorization set or clear, or  
to change a comment,  
click on the `Comment` check box and type your comment into the field.

This function enables you to move a tape to a different pool by choosing a different recycling destination from the drop-down menu, then recycling the tape from the Tape(s) management menu.

Write label Allows the tape labels to be re-written manually.

History	Displays information about the tape usage.
Statistics	Displays relevant usage statistics for the selected tape.

Clicking anywhere in the Tapes management screen with the right mouse button displays this pop-up menu:

 Refresh	Refresh	Redraw the screen to show updated information.
 Create tape(s)	Create tape(s)	Go to the Create tape(s) menu.
 Delete tape(s)	Delete tape(s)	Delete the tapes from the list whose check boxes are selected.
 Previous menu	Previous menu	Go back to the previous menu.

Some options in the Tapes management menu are grayed-out because they:

1. do not apply to existing tapes, or
2. the logged-on user is not authorized to change these options.

## 6.3 Tape pools

---

Tape pools are groups of tapes that are created to perform a well-defined backup/restore task. For instance, an Arkeia administrator can create one tape pool for every server that he has to manage:

- Tape pool: FTP (for the FTP server backups and restorations);
- Tape pool: www (for the World wide web server);
- and so on...

or a tape pool that spans several servers of the same type.





**Tape pools should only contain one type of tape (see *Tapes* on page 62.)**

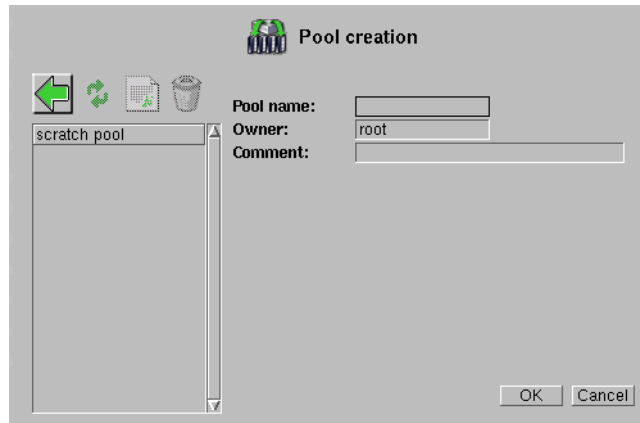
Creating an empty tape pool is a simple task. Later, you can add tapes to it by entering the name of the pool while creating the tape. For more information on how to create a tape, refer to section [How to create tapes](#) on page 74.

To create tape pools, follow the steps detailed below.

### How to create a tape pool

Log on the Arkeia server on which you want to create this tape pool. The login name you use will become the owner of the tape pool you create (refer to [How to log on to the Arkeia server](#) on page 70). If you are already logged onto an Arkeia server, you do not need to log off and on again, unless you would like to create tape pools on different Arkeia server, or under a different login name.

In the Main menu , click on Backup > Pools > New  and the Pool creation screen will appear.



There are three fields:


Pool name: Enter a name for the tape pool you are creating.

Owner: The login name will appear in this field.

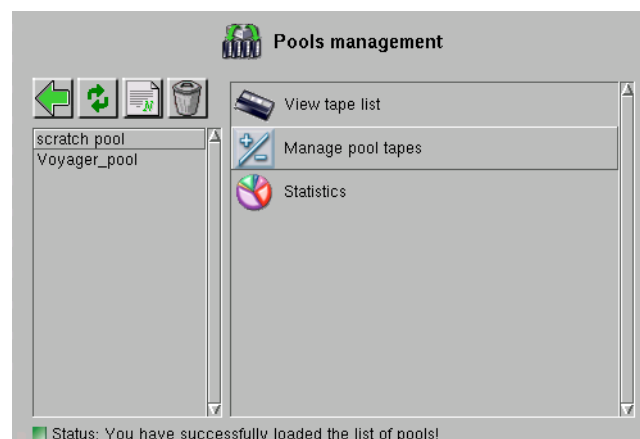
Comment: Enter an informative comment, if required.

Click on OK, and you will return to the Pools management screen.

## Tape pool management

To reach the Pools management screen from the Main menu , click on:

Backup > Pools



The objects list on the left will show the tape pool you just created, and any other tape pools which were created previously. The functions list on the right contains three functions which can be applied to a tape pool highlighted in the objects list.



## Manage pool tapes

Click on **Manage pool tapes** to go to the Tapes management screen, which is described in [Tape management](#) on page 76. There are two additional operations you can perform here which may be useful.

### Create a tape from within a tape pool

To create tapes from within a tape pool, double-click on the name of a tape pool in the Pools Management screen, and click on the **New** button above the tape list. Refer to [How to create tapes](#) on page 74 for more information on the tape creation procedure.

### Create an empty tape pool

It is possible to create tape pools that do not contain any tape. If a tape pool is created empty, it will request free tapes from the Scratch pool when tapes are needed to perform a backup operation. If that is the case, you must ensure the Scratch pool contains enough tapes to supply them when needed.

## View tapes in a pool

To see a list of tapes which have been assigned to the tape pools, click on **View tape list** in the Pools management menu.



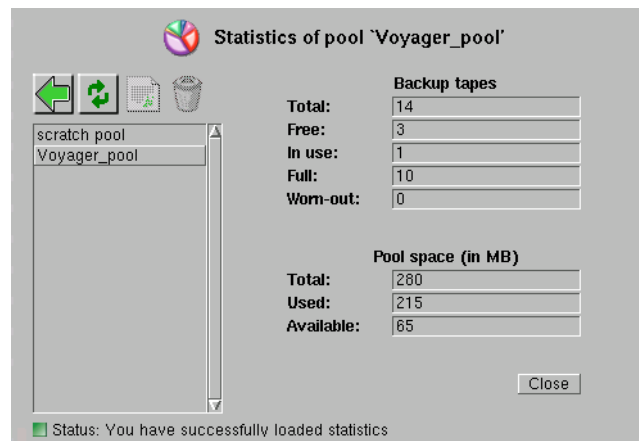
Click on the tape pool in the list on the left side whose tapes you wish to see, and the tapes will be listed on the right side, in three columns.

- Column 1 **Tape name.** The name given to the tape when it was created (see [6.2 Tapes](#) on page 73).
- Column 2 **Thread number.** If the tape pool is used for more than one backup, or in more than one drive for the same backup, Arkeia 5 will assign a thread number to each tape. The thread number designates the order in which the tapes have been used during the backup period. If the tape is not in use for a backup, **free** will appear in place of a thread number.
- Column 3 **Usage order.** The position of the tape within its thread. If a non-free tape has a usage number higher than 00001, it means that the tapes with the same thread number and a lower usage number have been filled.

The usage number of a free tape designates the order in which it will be used when the backup calls for a new tape.

## Check tape pool statistics

You can check on the availability and condition of tapes in a tape pool. To do this, click on the **Statistics** option in the **Pools** management screen. Arkeia will display a screen like the following, which displays the statistics for the tape pool named **Documents**.



On this screen, you can see that tape pool `Voyager_pool` contains fourteen backup tapes, of which:

- 3 have not yet been used,
- 1 is currently in use, and
- 10 are full and have no room for more data.
- None have yet reached the limit of their reliable life.

Displaying tape pool statistics is an easy way to determine if a given tape pool has been created correctly or needs more tapes to perform its functions.

## 6.4 Tape drives

This section will detail the installation of a single drive on an Arkeia server. To install more complex backup hardware, such as libraries and stackers, refer to [Chapter 14: Tape Libraries](#) on page 197.

Follow the steps below to install a single tape drive on a computer running Arkeia 5. We assume that:


1. Arkeia 5 is installed and running correctly; and
2. you are logged in as `root`, or as someone with `root` permissions.

### Auto-detect the drive

A good starting point for a successful installation is the auto-detection function, which is integrated into Arkeia 5. This function is presented in more detail in [Auto-](#)

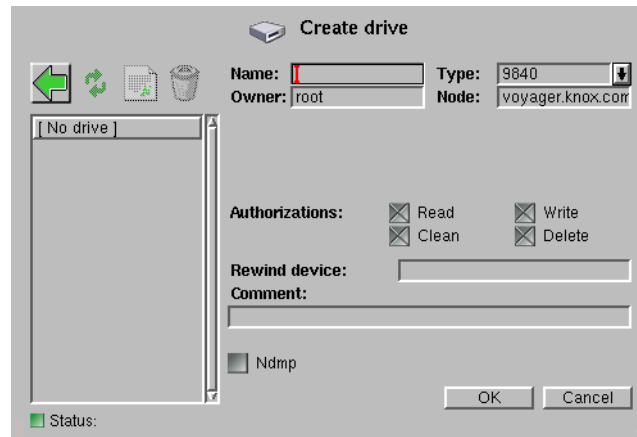
*detect devices* on page 55. The information supplied by the auto detection function will be helpful in the next steps of the installation.

## Create a drive

In the Main menu , click on:

Hardware > Drives > New 

and the Create drive screen will appear.



We create the drive by filling the fields.

**Name:** Enter the name you want to use when referring to this tape drive.

**Type:** Select from the drop-down list the drive type. This information may be available to you from the auto-detect process you ran earlier.

**Owner:** The current login name will appear here, by default.

**Node:** The computer to which the tape drive is attached will appear here, by default.

**Authorizations:** Click on the grey check boxes to set the authorizations for Arkeia, on this tape drive.

**Rewind device:** The UNIX device name which will be used to read and write data on this tape drive. This field will not appear if you have chosen a File tape drive, which is actually a directory on a HDD. The device name for an NDMP-attached tape drive is found in the NDMP scsi information screen:

Main menu  > NDMP menu > NDMP servers> SCSI information

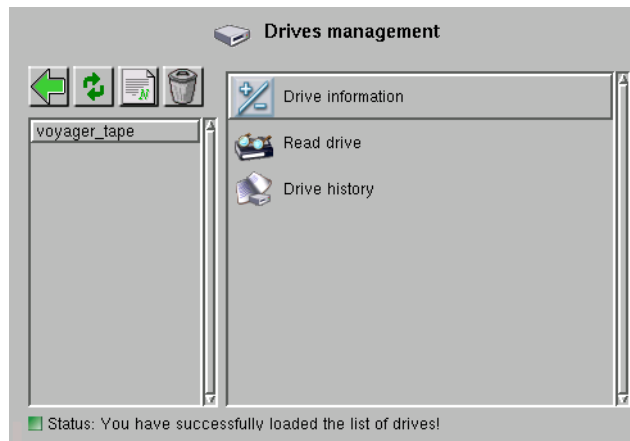
**Comment:** An optional comment to provide more information about the tape drive to users.

NDMP                      If this drive is controlled by an NDMP server, click on the check box. A drop-down list will appear from which you can select the NDMP server.

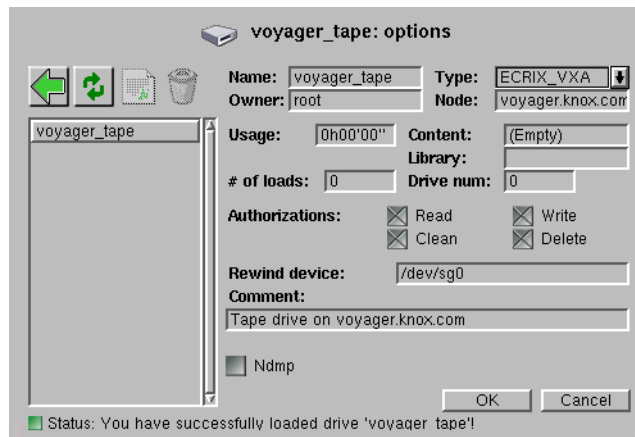
### FILE tape drive

In the Type field, FILE is one of the alternatives in the drop list. A FILE tape drive *must* be created if you will be backing up to an HDD, and have created FILE tapes.

Click on OK to confirm your drive setup, and return to the Drives management menu.



Notice that the drive you just created is in the objects list, on the left. Highlight the drive in the objects list and click on Drive information in the functions list on the right. the drive: options screen will appear.



In addition to the fields you filled in when creating the drive, you will see these fields:

- Usage:                      The accumulated number of hours of if use of the drive.
- Content:                    The tape currently in the drive, if any.
- Library:                    The library to which the tape drive is attached, if any.
- # of loads:                The number of times a tape has been loaded to this tape drive.


Drive num: An identifying number assigned to this tape drive to distinguish it from other drives of the same type.

## 6.5 Drivepacks

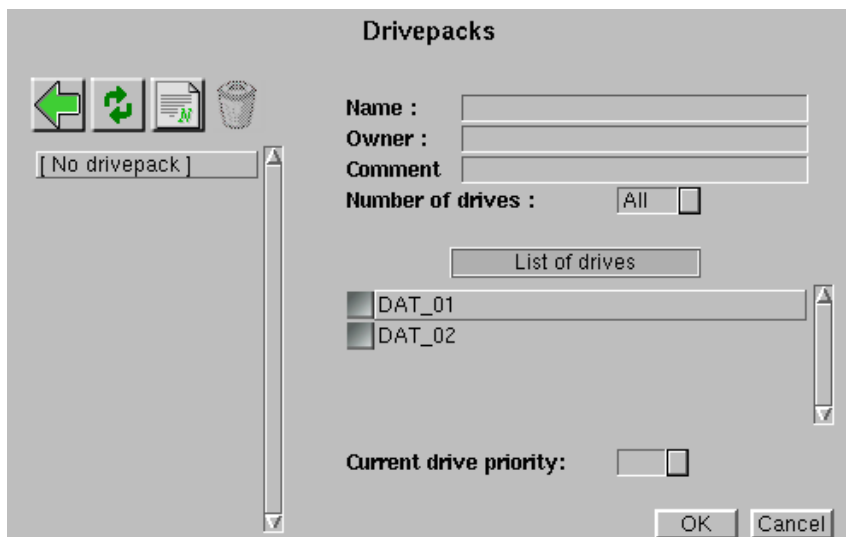
A drivepack is a logical group of tapedrives, which can be managed in Arkeia as a single entity. This section will briefly describe the possibilities and the uses of Arkeia 5 drivepacks.

### How to create a drivepack

In the Main menu , click on:

Backup > Drivepacks > New 

and the drivepacks screen will appear.



This screen contains the following options:

- |                  |   |
|------------------|---|
| Name             | Enter the name of the drivepack in this field.  |
| Owner            | This is the name of the Arkeia user who is creating the drivepack, usually root.  |
| Comment          | If needed, it is possible to enter a descriptive comment in this field.   |
| Number of Drives | This drop-down list allows the system administrator to restrict the number of drives that can be used by the drivepack, <i>at the same time</i> . For instance, if a drivepack contains 6 drives, it is possible to restrict the Number of Drives to 2. In this way, the first backup to use the drive- |

pack will only use the first two drives (for example DAT\_01 and DAT\_02 as above), the second backup to use the drivepack will use the next two drives, and so on until the total number of drives has been exhausted. The drives are chosen (or attributed) based on the Priority (see below) that has been assigned to it.

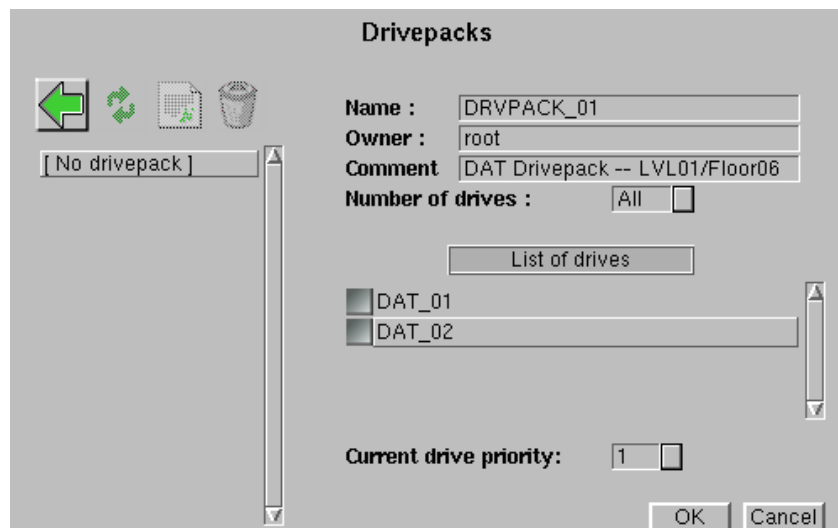
List of Drives

This displays all the drives that have been configured (and are available) to Arkeia 5. To select one or more drives, click on the grey selection box.

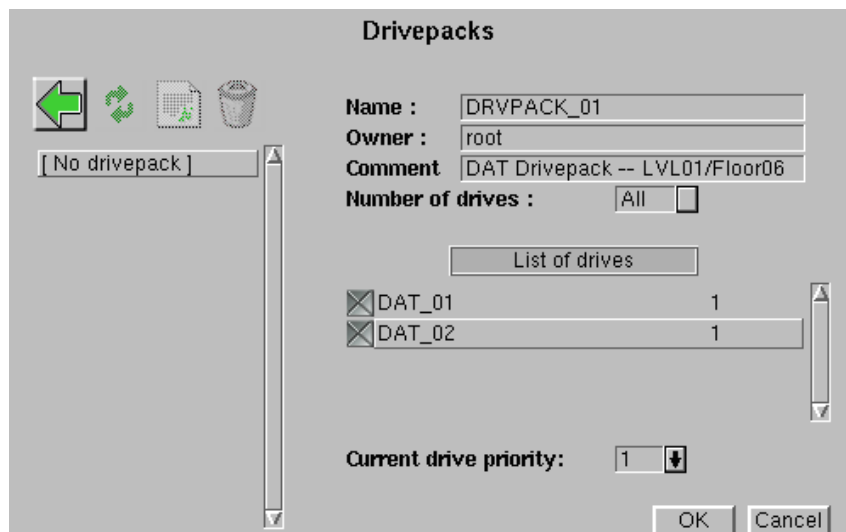
Current drive priority

If a drive has been selected in the List of Drives, it is possible to set its priority with this drop-down box. Setting the priority of a drive configures which drive will receive the data first. A priority of 1 is the highest priority that can be set. By default, all drives receive a priority of 1. Once a drive has been selected, its Priority is displayed to the right of its name.

The screen below presents a typical drivepack configuration



Complete the drivepack configuration shown above by clicking on the grey check-boxes next to the tape drive names, then click on the OK button at the bottom of the screen.



As can be seen above, the drivepack named DRVPACK\_01 is ready to be configured. It contains two drives (DAT\_01 and DAT\_02), with the same Priority of 1. Furthermore, this drivepack is configured to use all the drives that have been attached to it.

Clicking on the OK button at this stage creates the drivepack and displays it in the list of drivepacks, which is on the left of the screen pictured above.

## 6.6 Savepacks

In Arkeia 5, a savepack can be defined as a group of objects to be saved to tape by a backup operation. The objects can be entire disks, directories, individual files or plug-ins. In the Arkeia architecture, a plug-in is treated as a file system.

For instance, in a savepack named Large\_B/U, it is possible to add:

- Six entire disks from a computer named mercury.
- Several directories from a computer named saturn.
- One plug-in from a computer named mars.


Whenever the Large\_B/U savepack is chosen as the target of a backup operation, these diverse objects from the three different client computers will be saved together in one backup under the control of the Arkeia server. The objects to be saved are treated by Arkeia as directory trees.

Furthermore, all the objects can have different options applied to them. For instance, the directories from the computer named saturn can be compressed if they are quite large, while the data from the plug-in on mars could be encrypted to protect its confidentiality. These diverse operations are made possible through the definition of the savepack.

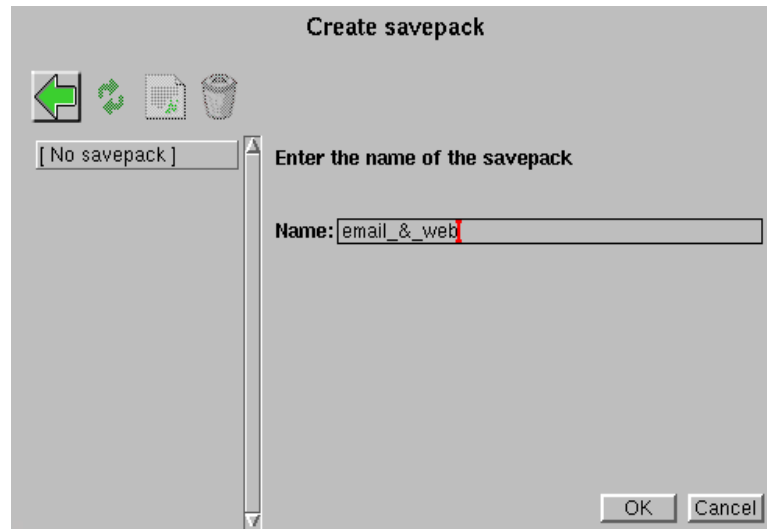
## Create an empty savepack

To create an empty savepack, that will receive trees for backup, in the Main menu

, click on:

Backup > Savepacks > New 

to reach the Create savepack screen.



After entering the name of the savepack, click on the OK button to return to the savepacks management screen. In the example below, a savepack named `email_&_web` has been created.

## Add trees to a savepack

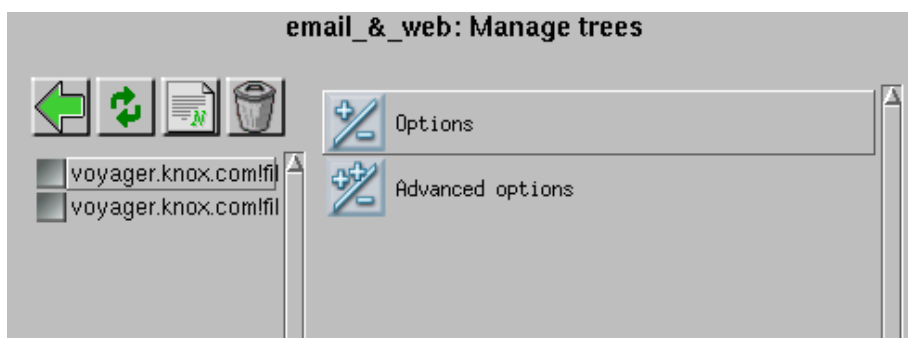
Adding trees to a savepack can be done in two different ways by:

1. entering the complete path to a given object; or
2. choosing the object within the Arkeia browser.

We recommend that you use the browser.

### Add an object path to a savepack

To add an object to a savepack, click on the option named **Manage Trees** in the savepacks management screen. This will open the **Manage trees** window.





In addition to the Back, Refresh, Create and Delete buttons described earlier, the following options are available through this screen:

Options                      This function defines the basic tree options compression, encryption, command to be executed before backup, command to be executed after backup and comment.

Advanced options            Tree advanced options are the same as the Advanced options for savepacks (see page 94). If you set the options in this screen, they will override the savepack advanced options, but only for the tree highlighted in the objects list at the left.

The defaults for these options is As savepack option, with the exception of the filter options, for which the defaults are empty.

There is an additional option for trees in this screen:

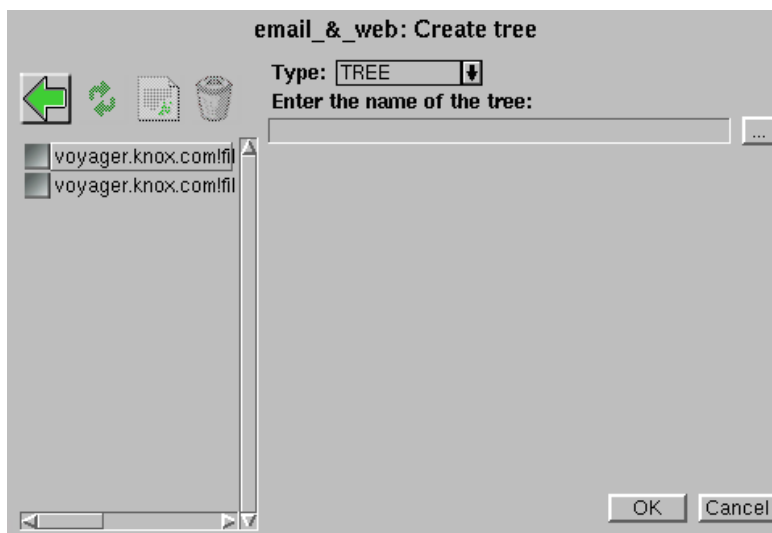
Disaster Recovery info allowed

Check this box if you are making a DR backup.



The options described above apply only to the selected trees that appear in the tree list in the left-hand frame. They do not apply to the savepack as a whole.


Click on the New icon in the Manage trees screen to open the Create tree window. This screen allows a new tree to be created in the selected savepack.



In addition to the Back, Refresh, Create and Delete buttons described earlier, the following options are available through this screen:

Type                      Choose the type of tree you wish to create from the alternatives in the drop-down box.

There are four different types of tree:

**Tree** A tree can be the name of computer, or hostname (to backup an entire computer), or a directory to backup one specific directory, and all the files and sub-directories it contains, or a single file. You can choose the object through the Browser by clicking on the browser button  next to the field under Enter the name of the tree.

**Object** An Object tree will backup and restore the result of commands. The commands are entered in the fields Object backup command and Object restore command. These fields will appear in the Create tree window if you select the Type: OBJECT..

Object backup command:	<input type="text"/>
Object restore command:	<input type="text"/>

The file created by the Object command will not reside on the Arkeia client, but an entry will be created in the Arkeia database to restore the data backed-up. Typically, the tar command is entered here so that when issued, the data archived by tar will be sent to tape, without further intervention by the user. For example:

```
Object backup command: tar -cvzf <filename>
Object restore command: tar -xvzf <filename>
```

**Raw** A Raw tree is either an entire disk or an entire partition. If a Raw tree is to be used, the browser should be used to select the disk, or the partition present in the /dev directory, of the UNIX computer, or the drive designation in Windows of the partition or HDD.

**savepack** A savepack tree appears only if the chosen tree is itself a savepack.

Usually, a tree is added to the savepack in the tree format using the following syntax:

```
computer_name!plugin_name:/path1/path2/.../file
```

For instance, the following paths are considered correct for Linux and UNIX computers:

```
mars.acme.com!file:/home/jack/files/reports/pdf/dfgf2002.pdf
saturn.acme.com!file:/home/tina/Mail/
```

Please note that the full path always uses slash / characters, even if the computer to be backed-up is a Windows computer, which usually uses backslash characters (\) in its path syntax. Windows computers are also a special case, since a path on a Windows computer must indicate which volume/hard disk is being used. A correct path for a Windows computer should therefore be in the form:

```
computer_name!plugin_name:volume_letter:/path1/path2/.../file
```

For instance, the following paths are considered as correct for an Arkeia Windows client:

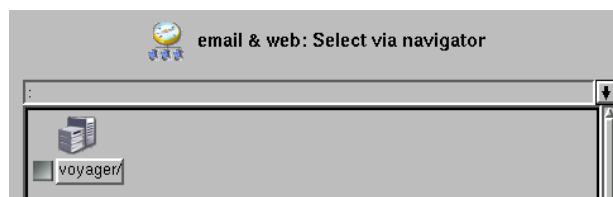
```
jupiter.acme.com!file:c:/my documents/reports/2002/sales_q3.xls
jaguar.vector.com!file:e:/archive/intel/tech/PalladiumTechNotes.pdf
```

Once the path has been correctly defined, click on the OK button to return to the main Manage trees screen.

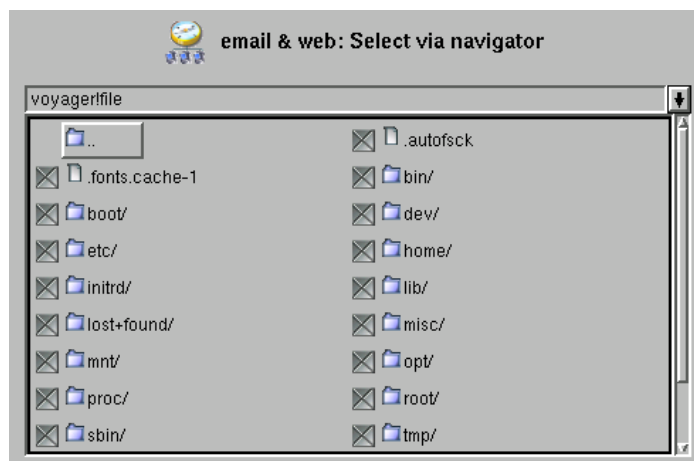
While entering a tree by its complete path/reference can be practical in some instances, (especially when creating RAW trees), creating complex savepacks in this way can be very time-consuming and prone to input errors. To make the creation of a savepack much easier, Arkeia has created the *tree Navigator*. Use this advanced function to rapidly select different trees and incorporate them in the same save-pack.

### Add a tree through the Navigator

To add a tree to a savepack by using the Navigator, click on the Browse trees option, in the main savepacks management screen. This opens the navigator in the main window of Arkeia 5.



All the clients that have been declared on the Arkeia backup server appear in this list. In the example above, there is only one client, named `voyager.knox.com`. To browse the file systems contained in a client, double-click on its name, then on the `file/` directory. The entire disk layout of the client is then displayed within the Navigator.



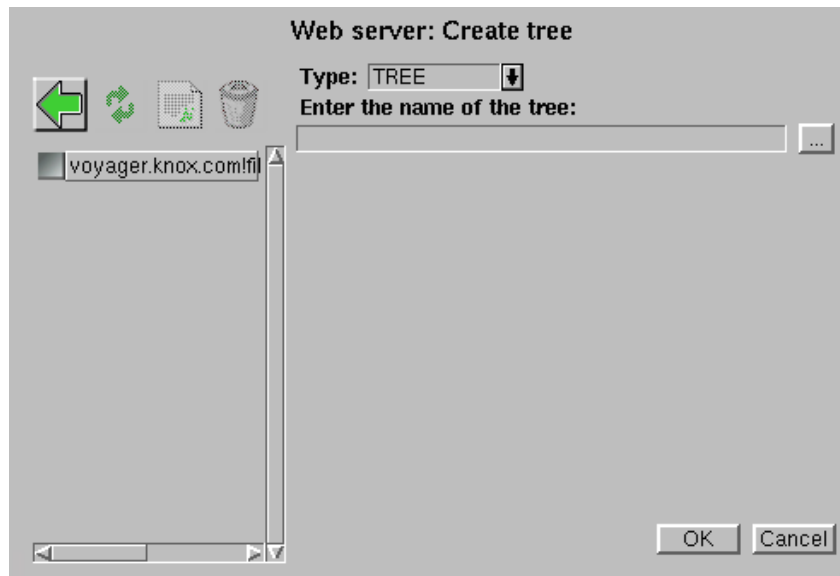
In the example represented above, the entire disk layout of a Red Hat Linux computer is available for backup. To select a single directory (including all its subdirectories), click on the grey check box next to its name. Click on the name of the directory to open it and select individual files or subdirectories.

Once the different trees to be added to the savepack are defined, right-click anywhere in the Navigator window and click on the Validate option to confirm the choices and return to the main savepack menu.

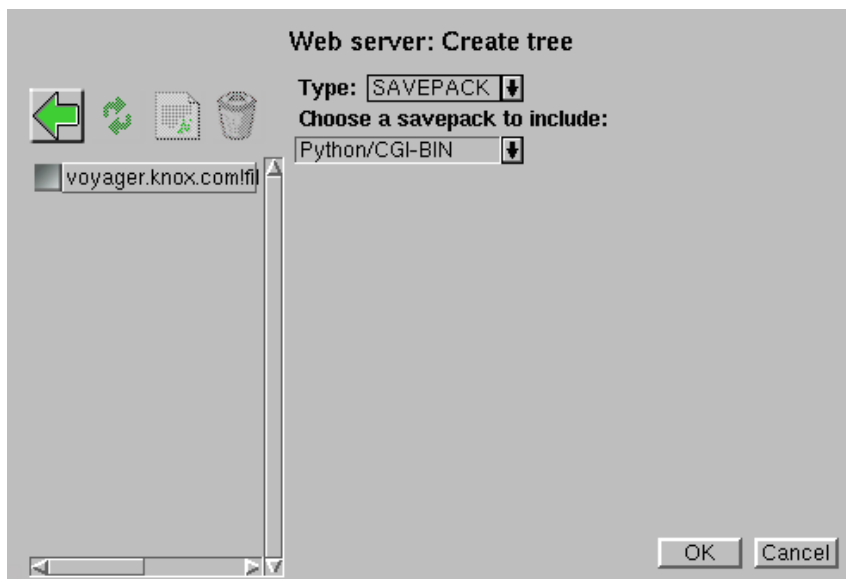
### Add a savepack to another savepack

It is possible to incorporate a savepack into another savepack. This allows complex configuration to be realized in a more simple manner, since each savepack can have its own configuration, and modifying the parameters of one does not mean modifying the entire savepack.

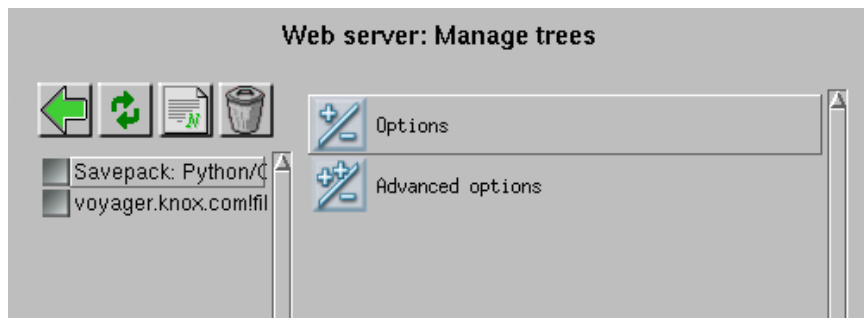
To add a savepack to another savepack, follow the procedures described in the section titled *Add trees to a savepack* on page 88, then choose the savepack option from the Type drop down list in the Create tree screen.



Select the name of the savepack to be included from the drop down list. In the example shown below, the savepack named Web server will receive a secondary savepack named Python/CGI-BIN.



Click on OK to return to the Manage trees menu. This menu displays at left the list of trees to be backed-up, including the savepack that has been added

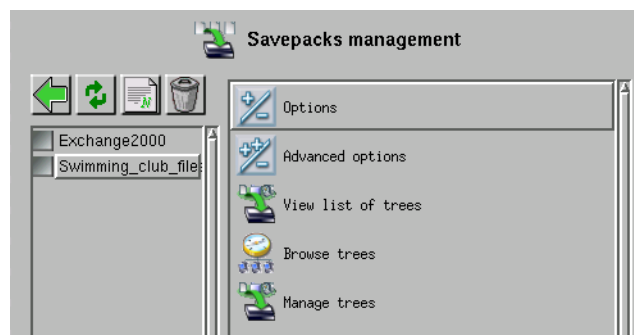


## Manage Savepacks

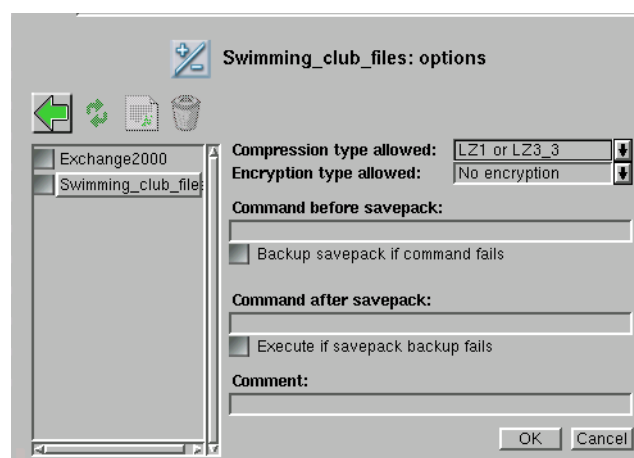
In the Main menu , click on:

Backup > Savepacks

The savepacks management screen will be displayed:

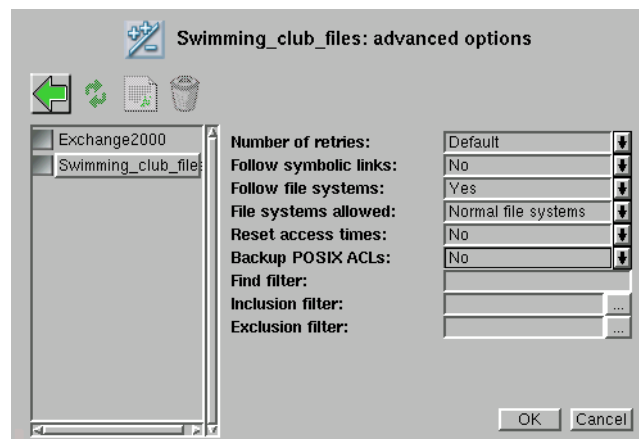


If there are no savepacks defined, Arkeia will display the message: [ No savepack ] in the object list at the left. In the example above, the savepack `Swimming_club_files` is selected. Click on Options to display the savepack : options screen for the selected savepack:



The following functions are available:

- Compression type allowed Choose the compression types, or No compression, from the drop down list.
- Encryption type allowed Choose the encryption type, or No encryption, from the drop down list. The savepack backup will only be encrypted if an encryption keyfile exists and is associated with the directories in the tree.
- Command before savepack: Enter a command to be executed before the savepack is backed up.
- Backup savepack if command fails Check this box if you want the backup of this savepack to proceed, even if the command entered above fails.
- Command after savepack: Enter a command to be executed after the savepack is backed up.
- Execute if savepack backup fails Check this box if you want the command above to be executed if the savepack fails.
- Comment: Enter a descriptive comment for this savepack
- Advanced options This function defines additional options that can be applied to a savepack



Number of retries:

Choose the number of times Arkeia will unsuccessfully attempt to access this savepack before aborting.

Follow symbolic links:

Choose whether Arkeia backs up the files to which symlinks in this savepack refer.

File systems allowed:

Choose which file systems will be backed up, and which will not be backed up.

Reset access times:

Choose whether the access time for files in this savepack is changed as a result of backup or restore operations.

Backup POSIX ACLs:

Choose Yes if you want the file ACLs (Access Control Lists) in this tree to be saved on backup. The value No means that Arkeia will ignore any ACLs when backing up this savepack. Note that the setting of Backup POSIX ACLs in Tree advanced options (see f) can override the setting you enter here.

Backup of POSIX ACLs is supported for most but not all Linux distributions. Please refer to the *Release Notes* included on your distribution media, or at this website: <http://www.arkeia.com/manuals.html> for the list of supported distributions.


Setting POSIX ACL backup to Yes increases the processing overhead for every file, whether or not the file uses ACLs. For this reason, the default is No for ACL backup.




To backup ACLs in other operating systems, see [Access control lists](#) on page 173.

Find filter: Enter the name of a file containing a filter expression you wish to use.

Inclusion filter:

Click on the browser button  and enter a regular expression for the filename criteria you wish to include in this savepack.

Exclusion filter:

Click on the browser button  and enter a regular expression for the filename criteria you wish to exclude from this savepack.

View list of trees

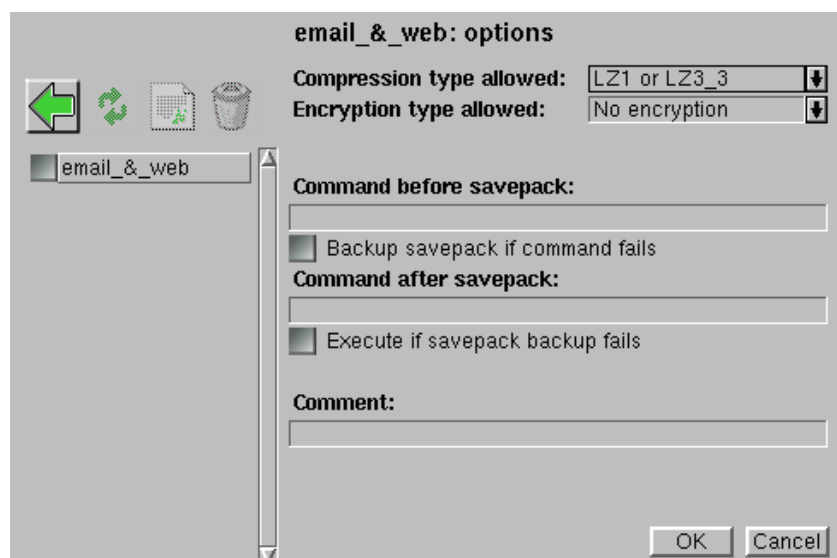
This function displays the list of trees that are contained in the savepack.

Browse trees	This function lets the backup operator select which trees (computers, drives, directories, files and plug-ins) should be included in the savepack. This selection is made through a file system navigator.
Manage trees	This function lets you add and/or delete trees from the savepack in a quicker manner. Within this list, it is possible to configure the options for a specific tree. For example, you can use this function to include or exclude chosen files, or apply a compression strategy to a specific tree, which is different from the overall savepack compression strategy.

## Define options for the savepack

The options that can be applied to a savepack are modified in **Options** and **Advanced options** of the main **Savepacks** management screen, described in [Manage Savepacks](#) on page 93.

Click on the **Options** button to open the **Options** screen.



In the screen shown above, the options chosen will apply *globally* to the entire savepack (in this case: email\_ &\_web). The following options are available in this screen:

Compression type allowed	<p>Click on this drop-down list to select the type of compression that will be applied to the files and directories included in the savepack. Arkeia includes the Lempel Ziv compression scheme to obtain better performance on large files. The types of compression are:</p> <ul style="list-style-type: none"> <li>• Only LZ1 (fast compression, lower compression ratio),</li> <li>• Only LZ3_3 (slower than LZ1 but better compression ratio),</li> </ul>
--------------------------	--



- LZ1 or LZ3\_3 (Arkeia determines which compression scheme is to be used based on a configuration file), and
- No compression.

Encryption type allowed

Click on this drop-down list to select the type of encryption that will be applied to the files and directories included in the savepack. The encryption schemes that are available are:

- Only DES (Data Encryption Standard),
- Blowfish (more advanced than DES, but less standard),
- DES or Blowfish (Arkeia determines the encryption scheme to be used, based on a configuration file), and
- No encryption

To make an encrypted backup of a directory, you must also:

- have entered your encryption license code, obtained from Arkeia (contact [sales@arkeia.com](mailto:sales@arkeia.com));
- create encryption keys for the directory (see *Encryption configuration* on page 178).

Command before savepack

It is possible to enter a command in this field that must be executed *on the client* before the backup of the savepack.



**Arkeia won't perform the backup if the command entered in the Command before savepack field fails and returns a standard error code. For instance, if a tar command should be performed on some files before the backup, and tar returns a standard error code (an error code larger than 0 -- Success, then Arkeia will not perform the backup.**

**If the command did not perform as expected and returned an error code, *but* the backup should be performed nonetheless, click on the check box Backup savepack if command fails below the entry field.**

**A command can be any standard UNIX command, a shell program, a batch file (on Microsoft Windows computers) or any other program that can be launched from a command line. The following commands are valid entries for a Command before savepack:**

```
/home/john/scripts/dump.pl (Perl script)
./zcache -xvz --quiet (local executable)
/opt/tc/tcversion.py (Python script)
```

Command after savepack

In the same way that a command can be entered to be executed before the backup of the savepack, another command can be entered to be executed *after* the backup itself (see above for more details). To allow

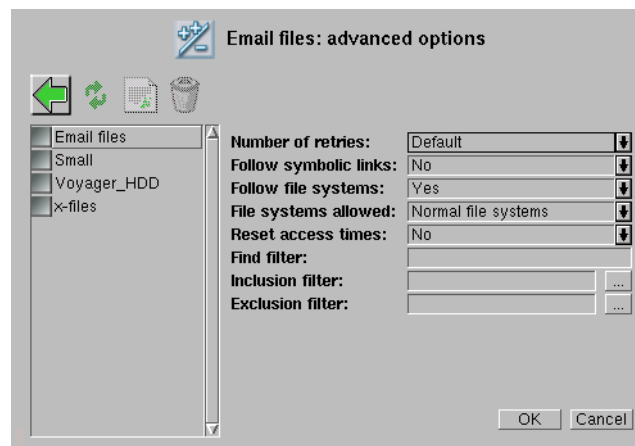
the execution of this command even if the backup itself has failed, click on the `Execute if savepack backup fails` check box below the entry field.

Comment

This field allows a short descriptive comment to be included in every savepack.

When the above options have been configured, click on the `OK` button to confirm the choices and return to the `Savepacks` management screen.

Click on the `Advanced options` function in the `savepacks` management screen to open the second savepack options screen.



Number of retries

Click on this drop-down list to select the number of retries that will be applied globally to the savepack. The default value is 3 and the maximum value is 10. Entering a value of 0 will force Arkeia not to retry the backup of the savepack.

Follow symbolic links

Click on this drop-down list to choose if Arkeia should follow symbolic links or not during the backup of the savepack. The default value is `No`.

Follow file systems

Click on this drop-down list to choose if Arkeia should backup different file systems or not during the backup. The possible values are `Yes` and `No` and the default value for this option is `Yes`.

File systems allowed

Click on this drop-down list to choose which type of file systems will be accepted (and backed-up) by Arkeia. The possible values are:

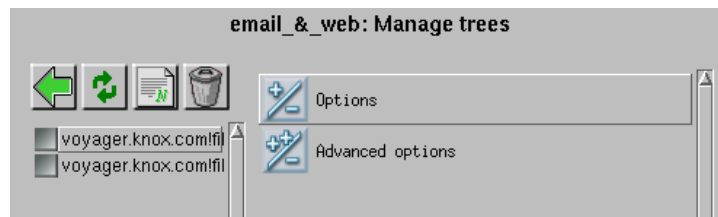
- Normal file systems (excluding CD-ROM file systems).
- All file systems (this includes NFS and CD-ROM file systems).
- All except NFS (this option includes CD-ROM but not NFS file systems).

Reset access times	<p>Click on this drop-down list to choose whether or not Arkeia should reset the access time of the files that are backed-up.</p> <p>Whenever a backup is launched, Arkeia will modify the access time of the files it backups. If this access time should not be modified on the system being backed-up, set this option to Yes.</p> <p>The possible values are Yes and No and the default value is No.</p>
Find filter	<p>This entry field restricts the backup to the files meeting a UNIX find criteria. All files that do not match this criteria are excluded from the backup. For more information on the find command, enter <code>man find</code> at any UNIX prompt. For example:</p> <pre>find saturn.knox.com!file:/source -*\.*jp*</pre> <p>will include all the files:  on the client: saturn.knox.com,  in the directory: /source,  ending in: .jp</p>
Inclusion filter	<p>This entry field restricts the backup to the files matching a UNIX regular expression filter.</p> <p>For instance, the regular expression <code>tcM.*\.*</code> will match any files beginning with the letters <code>tcM</code>, followed by any characters, followed by a <code>.</code> and ending with any characters. All other files would be excluded. Given this example, the following files would be included in a backup:</p> <pre>tcM000006.dat tcM000007.dat tcM_.idx tcM_27.report</pre> <p>While the following files, with the same inclusion filter, would be excluded from the backup:</p> <pre>AAAA.dat M57887786.txt beta0124554.log tcM3696abc</pre>
Exclusion filter	<p>The exclusion filter allows files to be excluded from the backup of the savepack, by using the same UNIX regular expressions that are used by the inclusion filter.</p> <p>For instance, an exclusion filter that contains the regular expression <code>.*\.*jp.*</code> would exclude all files ending with a suffix <code>.jp</code> such as <code>.jpeg</code> and <code>.jpg</code>.</p>

These advanced options apply globally to the selected savepack. It is possible to apply different options to the trees contained in a savepack, by selecting the *Manage trees* option in the main savepacks management menu. Therefore, it is possible to define several parallel trees within the same savepack, for instance one to backup HTML files with a high compression, and one to save the graphical elements of a web site, without compression applied.

## Set tree options

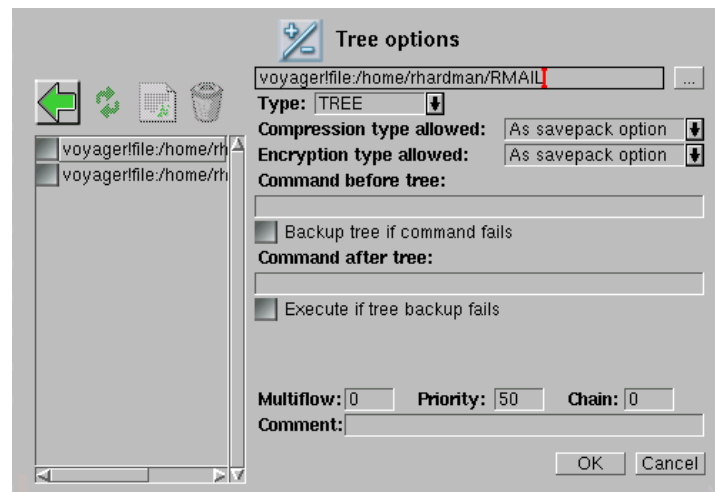
Within a savepack, it is possible to set up backup options for each individual tree. To do this, in the main savepacks management screen (see *Manage Savepacks* on page 93), click on the name of the savepack, then on the *Manage trees* button to open the *Manage trees* menu.



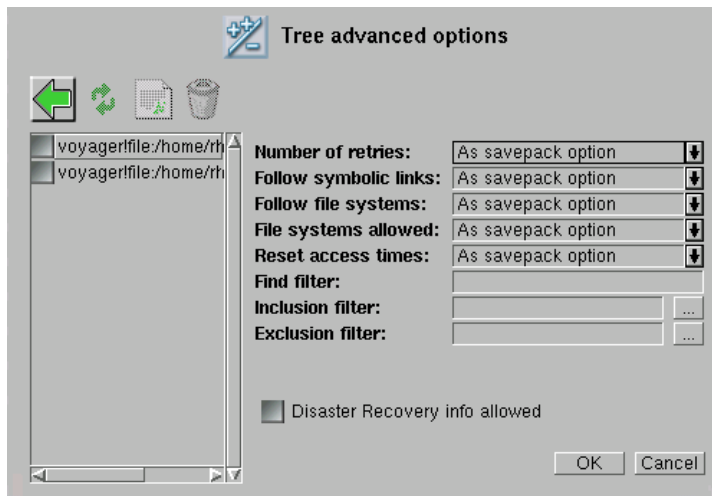
Click on the check box of the tree whose options you wish to modify. There are two option sets you can choose to modify from this menu: *Options* and *Advanced options*.

## Tree Options

To modify the options applied to the tree, click on the check box next to the tree that should be modified and select either the *Options* item (which opens the *Tree options* screen):



Or, click on the name of the tree to be modified, then on the **Advanced options** item to open the equivalent screen (see below):



Several options that are displayed in the **Tree advanced options** screen (see above) are the same as the equivalent savepack options. As such they won't be detailed below. For more information on these options, refer to the section named [Define options for the savepack](#) on page 96.

The following options are available in the tree options screen, and are specific to the tree configuration:

Type	This option determines the type of the tree:
Tree:	A tree can be the name of computer, or hostname (to backup an entire computer), or a directory to backup only this specific directory, and all the files and sub-directories it contains, or a single file.
Object:	An Object tree will back-up and restore the result of a command. This command should be entered in the Path field. Please note that the file created by the Object command will not reside on the Arkeia client, but an entry will be created in the Arkeia database to restore the data backed-up.
Raw:	A Raw tree is either an entire disk or an entire partition. If a Raw tree is to be used, the Arkeia Navigator should be used to select the disk or the partition present in the /dev directory of the UNIX computer, or the drive designation in Windows of the partition or HDD.
-savepack:	A savepack tree appears only if the chosen tree is, itself, a savepack.

**Multiflow** The Multiflow value determines if Arkeia should launch a backup tree with several concurrent data flows.

By default, the value of Multiflow is 0 for all trees, meaning that

Arkeia will use only one data flow between the server and the client, and will backup the trees in a sequential order.

To create more than one data flow (and, therefore, launch parallel backups), a value other than 0 should be entered in this field. For instance, if three trees are contained in a savepack, the following values could be applied:

*Table 6.2 Tree/Multiflow example:*

Tree	Multiflow value
A (sargon:/home/pete/)	1
B (sargon:/home/tina/)	2
C (sargon:/home/www/)	3

In the example above, three trees are created in a savepack, and each of these trees has been assigned a different flow number. When the Arkeia server is going to backup the savepack, it will open three different flows to the computer sargon, one for each of the trees, and backup all the trees at the same time.

If two of these trees are assigned the same Multiflow number, they will be backed-up sequentially, instead of at the same time.

**Priority** This field determines the order in which trees should be backed-up by the Arkeia server. The possible values for Priority range from 1 (highest priority) to 100 (lowest). Trees that have a higher Priority value will be backed-up before the trees that have a lower priority. The default value for all trees is 50. The priority level is only taken into account when trees have the same Multiflow number.

**Chain** This field determines the relationship/dependency between different trees. If two trees have the same Chain value, but different Priority values, the tree with the smallest Priority value will only be backed-up at the end of the other tree backup. For instance:

*Table 6.3 Example of chaining values:*

Tree name	Chain value (Priority value)
A (austin:/home/sal/)	12 (45)
B (abilene:/home/tc/)	12 (50)

In the example above tree A and tree B are chained together, since their Chain value is 12. Since A has a higher priority (45) than B, tree A is going to be backed-up first. The backup of B will start once the backup of A has been completed.

Disaster recovery info allowed

Check this box if you want to include the data required to perform a Disaster Recovery, see the separate [Arkeia Disaster Recovery](#) for

details. The Disaster Recovery plug-in and a separate license are required to activate this feature.

Using the values of the Multiflow, Priority and Chain tree options allow the system administrator of an Arkeia server to control very precisely the order in which the different backups will be performed.

## 6.7 Next

---

Following the instructions in this chapter of the manual, you will have created or declared in Arkeia, as a minimum:

- a user,
- a tape,
- a tape pool,
- a tape drive,
- a drivepack, and
- a savepack

In the next two chapters, we will use these objects to design and run backups. The next chapter explains how to create a backup and run it immediately. The chapter after the next chapter explains how to schedule backups to start and run unattended.





# CHAPTER 7: INTERACTIVE BACKUP

---

Arkeia 5 can start backup operations in two different modes:

- Interactive mode; or
- Periodic mode.

In **interactive mode**, the backup is started by the user from the keyboard. In **periodic mode**, the backup is launched at some scheduled time in the future, with no requirement for an operator to be present.

The **Interactive mode** is best used for backups that are launched and controlled by a system administrator, while **Periodic backups** should be used for regular unattended network backup tasks, that are performed on a regular basis.

This chapter will detail the functions of the **Interactive mode**, and important concepts will be developed here which are useful later in understanding more complicated processes.



**An interactive backup requires several objects to be created before the backup is launched. For more information on how to create logical objects in Arkeia 5, such as Savepacks and Tape pools, please refer to [Chapter 6: Create objects and users](#) on page 69 of this manual.**

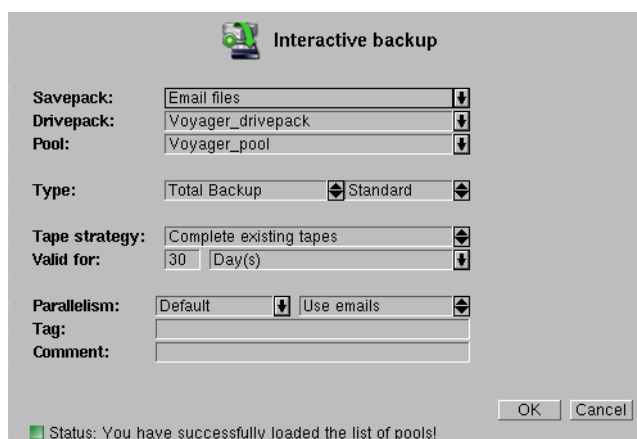
## 7.1 How to access the Interactive backup

---

Log in to the Arkeia server, then in the Main menu , click on:

Backup > Interactive

to display the Interactive backup screen:



**Interactive backup**

Savepack: Email files

Drivepack: Voyager\_drivepack

Pool: Voyager\_pool

Type: Total Backup Standard

Tape strategy: Complete existing tapes

Valid for: 30 Day(s)

Parallelism: Default Use emails

Tag:

Comment:

OK Cancel

Status: You have successfully loaded the list of pools!

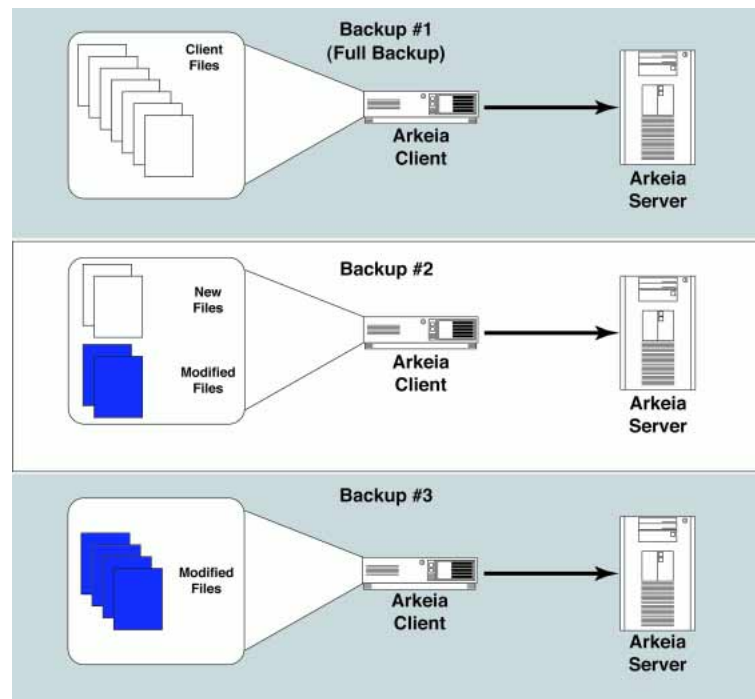
## 7.2 Functions of the interactive backup

---

The following options can be configured through this screen.

- Savepack** Click on this drop-down list to present the different Savepacks that have been defined and can be selected to be backed-up.
- Drivepack** Click on this drop-down list to present the different Drivepacks that have been defined and can be used to perform the backup operation.
- Pool** Click on this drop-down list to present the different Tape Pools that have been defined and can be used to contain the backup data.
- Type** Choose in this field the type of backup that will be started, as well as the completion strategy for a backup. The three different types of backups are:
- Archive** This type of backup is the most simple. An Archive backup, will backup all the files and directories selected in the Savepack (see **Total** below) and will retain the data indefinitely. This prevents Arkeia from recycling the tape automatically, and ensures that the data will remain on the tape as long as necessary. Refer to the **Valid for** parameter below for more information.
  - Total** A Total backup will backup all files and directories defined in the Savepack, while allowing the data tape to be recycled once the **Valid for** threshold of the tape has expired. This type is commonly used for periodic incremental backups.
  - Incremental** An Incremental backup is the most complex backup function of Arkeia 5, but it is also the one that allows you to define the most complete backup strategy. An Incremental backup can be based either on a Total backup or on a previous Incremental backup. When this type of backup is launched, it will create a list of files that have been created and/or modified since the last backup, and it will then backup all files that are on this list. You will find below a graphical representation of an

incremental backup.



In the example above, the first backup (Full backup) is a Total backup, that transfers all the files of the Arkeia client to the Arkeia server, to be saved on tapes. The second backup is a incremental backup, based on the first backup, which saves only the few files that have been modified or created. The third backup is another incremental backup, that saves only the files that have been modified since the second backup.

This type of backup presents two advantages: it reduces the time and the bandwidth necessary for the backup, since the amount of data to be sent to the server is smaller than on the first backup. The disadvantage of the Incremental backups is that the restoration of the data requires you to go through the entire tape set (from Backup #1 to Backup #3 in the example above) in order to restore the data in the exact state it was in when Backup #3 was launched. However, Incremental backups are the only way to backup large amounts of data without tying up the resources of a network.

Each type of backup can be further configured with the following completion strategy:

Standard

The Standard completion strategy completes the backup once all the data contained in the defined Savepack has been sent to the Arkeia server. The backup itself is considered as finished, logged as such in the Arkeia logs,

and all hardware peripherals used by the backup are released by the server and made available for other tasks. This is the default completion, and we recommend that it be used most of the time.

Continuous If a Continuous completion strategy is chosen, once the backup has finished saving the data contained in its Savepack, it stays active and is not considered as completed by Arkeia 5. The hardware used for the backup operation is still considered as reserved by the Arkeia server, and cannot be used for other operations. It is possible to add new Savepacks to the backup, as long as the backup has not been terminated by the user.



**The continuous completion strategy should be used with caution. Some Arkeia plug-ins require it to function properly. In any case, Continuous completion should never be used for unattended (Periodic) backups! For more information, refer [Chapter 8: Periodic backup](#) on page 117.**

Tape strategy This field provides the different strategies that can be used to control the usage of tapes by a backup. There are two different strategies:

- Use new tapes This strategy forces Arkeia to use new tapes every time a backup is started. Use this strategy if you would like to keep the data of a backup on new tapes.
- Complete existing tapes This strategy will fill tapes that have already been used for previous backup.

The strategy used for the tape usage should take into account the amount of data to be backed up, the space remaining on a tape after a Total backup has been performed, the life expectancy and overall performances of the backup media, and the time necessary to perform a complete restoration of the data saved.

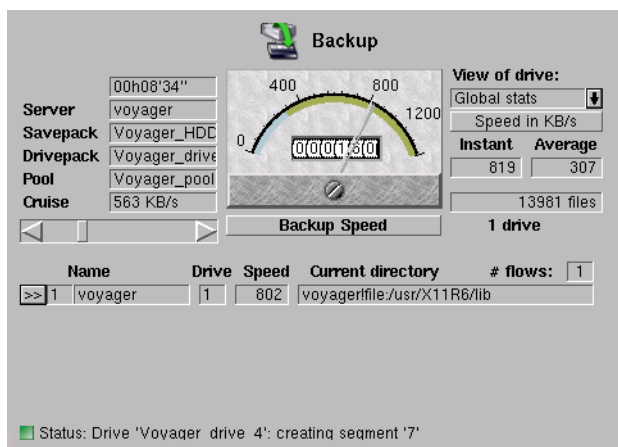
Valid for This field determines the duration of data retention. Once the data retention defined has expired, the tape is recycled, and the data it contains will be erased in the future by other backups. Note that this parameter is modified if the backup type is set to Archive. In this case, the retention data is overridden and the tape is never recycled.

Parallelism This field determines the number of parallel flows that should be open between the Arkeia server and the Arkeia client when performing the backup. For a more detailed explanation of the

Arkeia data flows, refer to [Arkeia Internal Architecture](#) on page 61.

- Use E-mails      This field will determine if Arkeia 5 is to send a confirmation email to the current user once the backup has been completed. The address to which the emails are sent is that defined when the user was first set up, see [6.1 Users](#) on page 69.
- Tag                This field determines a name that can be used to identify the backup. Once this name has been entered, it can be used to identify the backup and all the data it contains when performing a restoration.
- Comment         This field can be used to enter a longer, more detailed description of the backup.

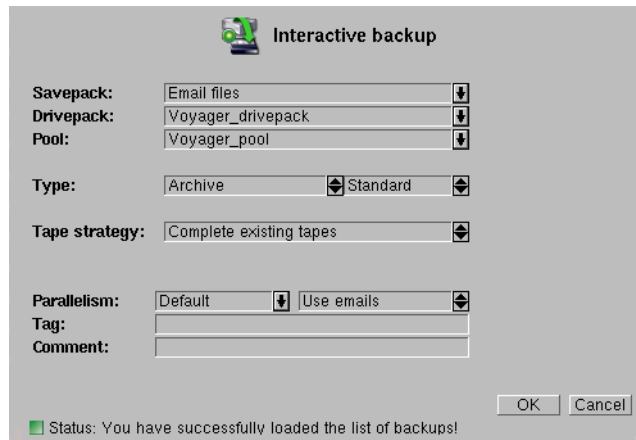
After the Interactive backup has been defined, click on the OK button at the bottom of the window to launch it.



Arkeia displays the main backup window and proceeds with the defined operation. This window, the information it contains and the modifications it allows, is described in [Monitor a running interactive backup](#) on page 111.

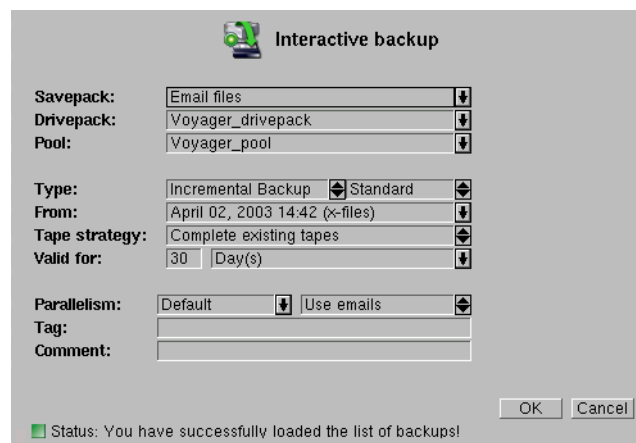
## Interactive archive backup

The Archive backup offers a simplified interface, because it does not allow the tapes it uses to be recycled. The fields available in this screen have already been described. Note the use of the Tag field (to identify the backup later) in this screen.



## Interactive incremental backup

The Incremental backup has a field which is specific to the Incremental functions of Arkeia 5.



The From: drop-down list allows you to choose the previous backup which will be used as a reference by the current backup. Clicking on the arrow next to this list will display the list of the last 10 backups that have been performed on the same Savepack. This allows a quick selection of the reference backup.



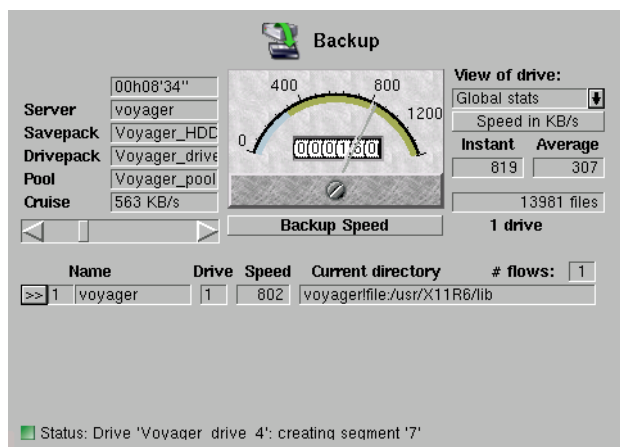
**The reference backup should be a Total backup. It is possible to base an Incremental backup on a previous Incremental backup, but only if this previous backup has been based on a previous Total backup. This point will be treated in more detail in [Chapter 8:Periodic backup](#) on page 117.**

## 7.3 Monitor a running interactive backup

The progress and performance of the backup operation can be monitored through the main screen, or through the list of logged operations.

### Monitor a backup through the main screen

Once it has been launched, an interactive backup can be monitored through the backup information displayed by Arkeia 5.



This screen contains the following information on an Arkeia backup. On the left side of the screen:

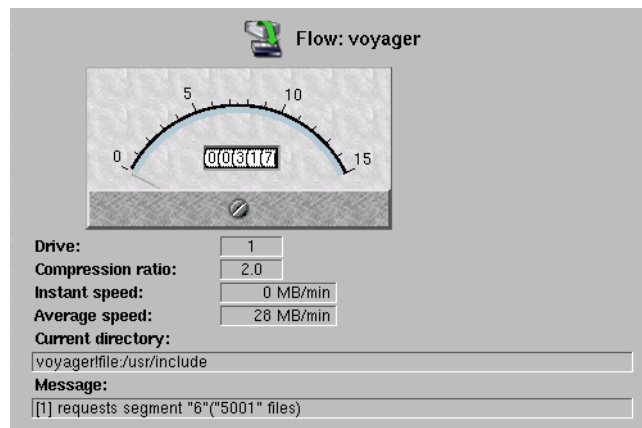
- Elapsed time This is the first field displayed on the left of the running backup window. Its purpose is to display the time elapsed since the launch of the backup.
- Server the name of the server on which the backup is running.
- Savepack the name of the Savepack which is being processed by Arkeia.
- Drivepack the name of the Drivepack that has been chosen to perform the backup operation.
- Pool the tape pool from which tapes are drawn to store the data contained in the Savepack.
- Cruise This slider allows you to control the amount of bandwidth consumed by the backup. If important network functions are sluggish while Arkeia is performing backups, use the Cruise control to reduce the amount of bandwidth used to perform a backup. Obviously, this will slow down the backup operations.

#### *The meter*

In the middle of the screen, a graphical meter displays the instantaneous speed of data transfer (the needle) and the average speed of data transfer for this backup (the color band).

On the right side of the screen, the following fields and drop-down boxes supply additional information on a backup:

- Global** Click on this drop-down list to display all the drives that are used by the backup. This allows you to restrict the display of information to a particular drive.
- Speed in KB/s -- Speed in MB/h** Click on this button to change the type of information that is displayed in the fields below it. Please note that this information is displayed in two separate fields:  
Instant indicates the current speed of the backup and  
Average the overall speed of the backup being performed.
- Backup Speed/Network throughput** Click on this button to change the type of information that is displayed in the fields below it, from the speed of the backup itself to the amount of information transferred by the network.
- >> (View)** Click on this button to display an additional information screen on the different flows that are launched by the Arkeia backup. To return to the main backup screen, press the **Esc** key on your keyboard.



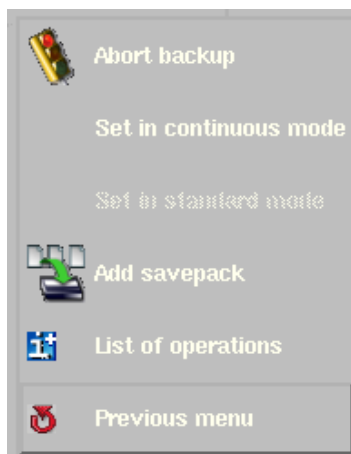
- Drive** This field displays the number of the drive being used by the flow.
- Compression ratio** This field displays the compression applied to the flow.
- Instant Speed** The instantaneous speed of data transfer
- Average speed** The average speed of data transfer in this backup session.
- Current directory** The directory being processed.
- Message** The last message returned by Arkeia 5.



## Monitor a backup through the list of operations

Another way to monitor a running backup is to click with the right mouse button anywhere in the window of a running backup. This displays the backup contextual menu, which you will find below.

In this menu, clicking on the fifth option List of operations, will display a screen



that summarizes the operations and trees that are, or will be, performed by the backup.



In the example above, a backup has been launched that contains four different trees. The following fields offer additional information on tree number 1:

- |             |   |      |   |
|-------------|---|------|---|
| Tree number | Self-explanatory. The trees are displayed (and processed) in the order they have been defined in the Savepack.  |      |   |
| Type        | This field displays the type of tree that has been chosen by the user. The different types of trees are detailed in <a href="#">Add an object path to a savepack</a> on page 88.  |      |   |
| State       | This field displays the current state of the tree that has been selected by the user. The three different states of a tree are: <table border="0" style="margin-left: 20px;"> <tr> <td style="vertical-align: top;">Init</td> <td>the tree is going through an initialization phase within the Arkeia backup subsystem.</td> </tr> </table> | Init | the tree is going through an initialization phase within the Arkeia backup subsystem. |
| Init        | the tree is going through an initialization phase within the Arkeia backup subsystem.   |      |   |

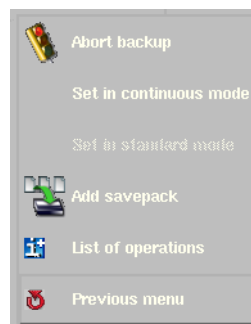
Running	the tree is being processed by the Arkeia backup subsystem.
End of tree	the tree has been backed up by Arkeia and is not processed any longer.
Results	This field displays the results of the backup of the tree.
Retries left	This field displays the number of retries left in case a backup operation failed to run. For example, if a file contained in the tree is locked by the system.

Clicking on any tree with the left mouse button will display its information in the fields of the List of operations.

## 7.4 Modifying a running backup

---

To modify a running backup, all that is needed is to click with the right mouse button anywhere in the backup window. This displays the following contextual menu, which provides options to quickly modify a backup.



The following functions are available in the backup contextual menu:

Abort backup	Immediately stop the current running backup.
Set in continuous mode	Change the running backup to Continuous mode.
Set in Standard mode	Change the running backup to Standard mode.

### How to add a Savepack to a running backup

Adding a Savepack to a running backup is possible, regardless of the operating mode of the backup itself (see below [How to set the operating mode of a running backup](#) on page 115).

To do this, click on the `Add savepack` option in the contextual menu. Arkeia 5 will then ask which Savepack should be added to the running backup by displaying the screen below.



Click on the arrow on the right of the drop-down list to display the list of Savepacks, defined in Arkeia, that can be added to the running backup. Click on the name of the Savepack to select it. Right click anywhere in the Arkeia 5 window and then click on `OK` in the pop-up menu to confirm the operation. You will then be returned to the main `Backup` menu.



**Note:** Unless the backup is set to `Continuous operating mode`, it is not possible to add a `Savepack` after it has completed.

## How to set the operating mode of a running backup

Setting the operating mode of a running backup is possible through the two options (`Set in continuous mode` and `Set in standard mode`) of the contextual menu.

Click on `Set in continuous mode` in the contextual menu to keep the backup task open, even after it has completed the backup of all the trees it was set to process. This allows the backup to accept additional `Savepacks`, even after it has completed all its assigned tasks, but it also ties up the hardware resources used to perform the backup.

Click on `Set in standard mode` to change the `Type` of a `Continuous backup` back to `Standard`. Once the backup is returned to this mode, it will be terminated by Arkeia as soon as its `Savepacks` have been processed. This will free up (or release) the hardware resources that were used and make them available for other operations.



**A backup should normally be run in `Standard mode`. The `Continuous mode` is mostly used for plug-in backups that require the special mode of operation of a continuous backup. For more information, refer to the documentation supplied with the plug-ins installed on your system.**

## 7.5 Disaster recovery

When all the data on a computer, or the computer itself is destroyed, Arkeia Disaster Recovery can rebuild the client or server systems, even the Arkeia backup server, if you have the correct backups. Arkeia Disaster Recovery is a separate product, requiring its own license.

Please go to our [website](#) to buy a license for Disaster Recovery, or to obtain a trial license. Instructions for using Disaster Recovery can be found in: [Arkeia Disaster Recovery](#).

## 7.6 Next

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In this chapter we saw how to create a backup and launch it from the keyboard. Most networks require backups to be run during quiet hours, and at regular intervals. The next chapter explains how to schedule periodic backups which will start and run unattended.

# CHAPTER 8: PERIODIC BACKUP

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Periodic backups are the most frequently employed by system administrators. A periodic backup is a backup scheduled to start at a given time and date, then repeat at regular intervals.

The advantage of periodic backups is that once they are scheduled, they are executed automatically by the software, without further operator or user intervention. The data in a networked computer is therefore copied to backup media at regular, scheduled intervals to ensure a high standard of security.



**A Periodic backup works with Arkeia *objects*. You must define these objects before a periodic backup can be launched. For more information on how to create the required logical objects in Arkeia 5:**

- tapes,
- tape pools,
- drives,
- drive pools and
- savepacks,

please refer to [Chapter 6:Create objects and users](#) on page 69.

## 8.1 How to access the Periodic backup menu

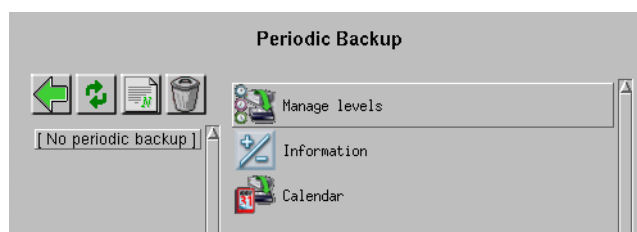
---

In the Main menu , click on:

Backup > Periodic >



The Periodic backup screen is displayed:







The Periodic Backup screen is divided into two parts: in the objects scroll list on the left is a list of backups which have been defined. In the functions scroll list on the right there are icons which lead to more menus for configuring the periodic backup highlighted in the objects list. They are:

Manage levels      Click on this icon to add, configure or remove levels for the selected periodic backup.

- Information      Click on this icon to activate or de-activate the selected periodic backup, and determine if the backup should send an e-mail to report its success or failure.
- Calendar          Click on this icon to display the periodic backups that have been programmed during the current month, in a calendar format.


Above the object list, there are buttons for the usual four basic functions that are useful for quick operations.

- Back               (Green arrow) Click on this button to go back to the previous menu.
- Refresh           (Dual green arrows) Click on this button to redraw the entire screen.
- New                (Document) Click on this button to create a new periodic backup.
- Delete            (Trash can) Click on this button to delete the backups that have been selected in the list of objects.

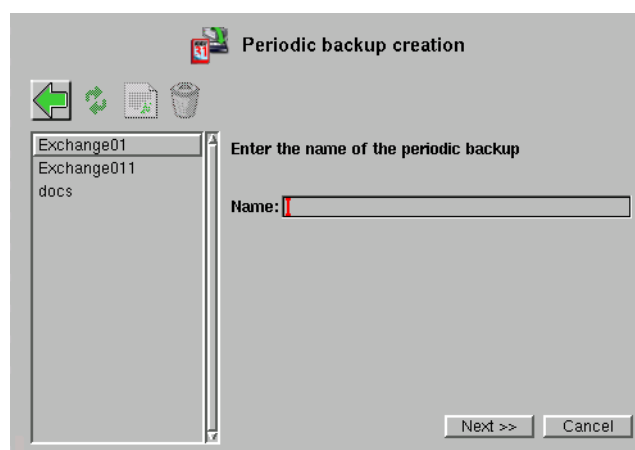
## 8.2 How to create a periodic backup

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In the Main menu , click on:

Backup > Periodic > 

In the Periodic Backup Creation window, enter a name for the new periodic backup being created.



Click on the Next >> button at the bottom of the window to define the first level of the periodic backup. Levels are explained in more detail in [How to combine total, incremental and differential backups](#) on page 122. By default, the backup is initially a Level 1, typically a Total backup. This can be changed, and other levels can be added, later.

## Define the backup periodicity

Main menu: Backup > Periodic > New >

**Repeat at:** enter the time at which the backup should be carried out. The hour is expressed in a 24-hour format.

**every** enter the period between successive backups. For instance, it is possible to repeat the same backup every 3 days, every 5 days, and so on by entering the appropriate number in the field.

**day(s) week(s) month(s) year(s)** choose the unit of time of the backup period. Click the checkbox of the unit you want, and a further set of options will appear below this line. These options are defined below. If you have selected **day(s)** as your unit, no further options are necessary.

### Daily Backup Cycle

When **Daily** periodicity checkbox is selected, the backup is launched by Arkeia 5 either every day, or every X days, depending on the value which is entered in the field **every** \_\_\_\_.

For instance, if the **Daily** checkbox is selected and 3 is entered in the **every** \_\_\_\_ field, the current level of the Periodic backup will be launched every three days.

Click on the **OK** button to return to the **Manage Levels** menu of your currently selected Periodic backup.

## Weekly Backup Cycle

Main menu: Backup > Periodic > New > Next > Week(s)

Click on the checkbox next to the day of the week you want this backup to be launched. You can choose more than one day. In the example above, the backup will be launched every Tuesday, at 10 minutes past 7P.M.

Enter a number in the every \_\_\_\_ field to schedule the backup to run with that number of weeks between each backup. For instance, in the screen above, entering 2 in this field would launch the backup level every two weeks, on Tuesday night.

Starting on: Set the start date. Click on  to choose the date from a calendar.

Repeat until: Enter an end date or number of repeats to limit the number of times this backup runs. Click on No ending date to keep the backup cycling forever.

Click on the OK button to return to the Manage levels menu of your currently selected Periodic backup.

## Monthly Backup Cycle

Main menu: Backup > Periodic > New > Next > Month(s)

Choose the options for this backup by filling the following fields.



on the \_\_\_\_\_ th day of the month

Enter a number in this field to determine on which day of a given month the level backup will be launched by Arkeia. In the screen pictured above, the backup will be launched on the 13th day of the month, regardless of the day itself.

on the \_\_\_\_\_ th day before the last day of the month

This field is the equivalent of the previous field, but it uses the last day of the month to determine when the backup should take place. For instance, entering 10 in this field would carry out the backup either on the 20th or the 21st, depending on whether the current month has 30 or 31 days (on 18th or 19th of February).

on the \_\_\_\_\_ th \_\_\_\_\_ of the month

This field and drop-down box provides a way to choose the day of the backup in a more precise manner. Clicking on one of the drop-down box provide the different choices. The example above shows the first Thursday of the month as a default, but the day of the month box is checked and will determine the periodicity of this backup.

Starting on:

Set the start date. Click on  to choose the date from a calendar.

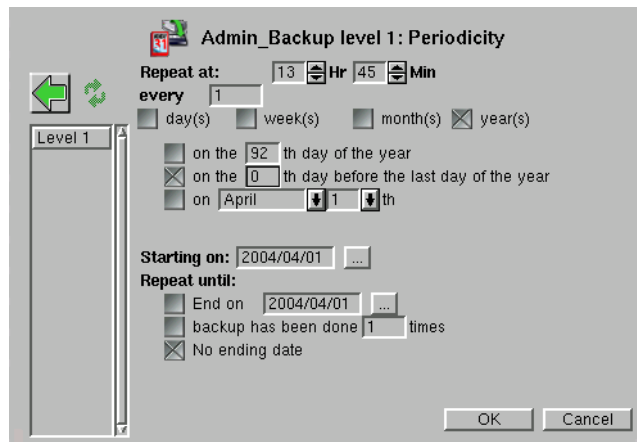
Repeat until:

Enter an end date or number of repeats to limit the number of times this backup runs. Click on No ending date to keep the backup cycling forever.

Click on the OK button to return to the Manage levels menu of your currently selected Periodic backup.

### Yearly Backup Cycle

Main menu: Backup > Periodic > New > Next > Year(s)



Choose the options for this backup by filling the following fields.

on the \_\_\_\_\_ th day of the year

Enter a number in this field to define the day of the year on which Arkeia will perform the backup level.


on the \_\_\_\_\_ th day before the end of the year

Enter a number in this field to define the day on which Arkeia will perform the backup level, starting from the end of the year. This field is the inverse of the previous field, as it counts from the end (as opposed as counting from the beginning) of the year. In the example above, the backup will start on the last day of the year.

on <month> <date> th

Click on these drop-down boxes to select a precise date in the year for the execution of the backup level.

Starting on:

Set the start date. Click on  to choose the date from a calendar.

Repeat until:

Enter an end date or number of repeats to limit the number of times this backup runs. Click on No ending date to keep the backup cycling forever.

Click on the OK button to return to the Manage Levels menu of your currently selected Periodic backup.



**Whenever Arkeia encounters an incorrect date within the planning of a Periodic backup, the operation scheduled is *not* carried out. For instance, if a backup has been planned for the 5th Sunday of a month that only has 4 Sundays, the operation will not be executed.**

**This limitation is valid for all the Recurrence types in Arkeia 5.**

## How to combine total, incremental and differential backups

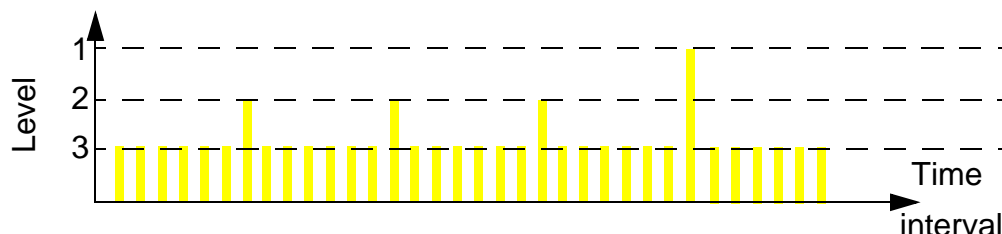
To automate a backup program, we need to schedule a series of Total backups with Incremental or Differential backups between them. This is a standard backup pattern which is managed by assigning *levels* to backups.

Each Periodic backup you create can have up to three levels, numbered 1 to 3. Within this hierarchy, the Level 1 backup will replace or override the Level 2 backup, which will in turn replace or override the Level 3 backup. If we make our Total backup the Level 1, then make the Differential backups Level 2, we can be sure that on the days a Total backup is done, Arkeia will not also run an Incremental or Differential backup.

It is important to determine at the beginning of the configuration procedure when each level should be performed, and what will be the extent of the backup performed by each level

As an example, a typical scheme for a client with a moderate amount of changed data per month might be:

- Level 1: Total backup, once per month
- Level 2: Differential backup, once per week
- Level 3: Incremental backup, every night.



You can make the structure and scope of each Level whatever you want it to be. The Level 3 backup in this example could be deleted. Although partially redundant, it could be used to:

- recover data which is created and deleted in between Differential backups, or
- roll back the system to a day in the middle of the week.

By default, Level 1 is assigned to every backup at the time you create it. At this point you can:



- change the periodicity of Level 1, and
- add another one or two levels.

You can do this at any time in the future, too.

### How to add or change a level


When we *add a level* to a backup, we are actually adding another periodicity to the backup. The priority of an added periodicity over the existing periodicities is strictly enforced by the level number, 1 is the highest priority and 3 is the lowest priority.

In the Main menu , click on:

Backup > Periodic > [your backup's name] >  Manage levels >  New

The periodicity screen will appear. Now follow the same steps to set the Level 2 periodicity that you followed when you first created the backup. See [Define the backup periodicity](#) on page 119.

To change the periodicity of a level, in the Main menu , click on:

Backup > Periodic > [your backup's name] > Manage levels >  Periodicity

Enter the changes in the same way you did when first creating the backup.

At this point, you have created an automated backup scheme which will make:

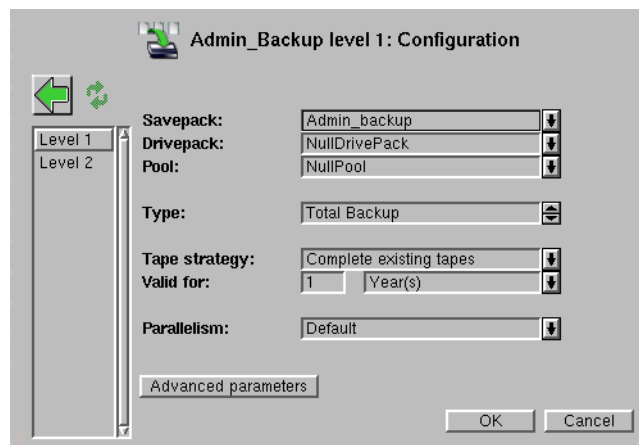
- Total backups regularly; and
- Incremental or Differential backups in between the Total backups

It is now necessary to tell Arkeia 5 what data will be backed up in this scheme.

## How to include data in the backup

From the Main menu , click on:

Backup > Periodic > [*your backup's name*] > Manage levels >  Backup Configuration



You will have already created one or more Savepacks which encapsulate data you want to backup (see [Savepacks](#) on page 87). You now choose the Savepack to include in this backup scheme. In addition, you will use these items you have previously created:

- Drivepack (see [How to create a drivepack](#) on page 85).
- Tape pool (see [How to create a tape pool](#) on page 79 *How to create a tape pool*)
- Tapes (see [How to create tapes](#) on page 74.)

Select the Level of backup you are configuring, from the objects list on the left, then configure the Level with the data, drive and tapes to be used.

Savepack	Choose the Savepacks to be included in this backup from the drop-down list.
Drivepack	Choose the Drivepack to be used by this backup from the drop-down list.
Pool	Choose the Tape Pool which will contain the data from this backup from the drop-down list.
Type	This field allows you to choose the type of backup that will be started, as well as the completion strategy for a backup. A more

detailed explanation of backup types can be found in [Chapter 5: Basic concepts](#) on page 65. The four different types of backups are:

Archive	This type of backup is the most simple. An Archive backup, will backup all the files and directories selected in the Savepack (see Total backup below) and will retain the data indefinitely. This prevents Arkeia from recycling the tape automatically, and ensures that the data will remain on the tape as long as necessary. Refer to the Valid for parameter below for more information.
Total	A Total backup will backup all files and directories defined in the Savepack, while allowing the data tape to be recycled once the Valid for threshold of the tape has expired. This type is commonly used as the basis for periodic differential and incremental backups.
Differential	A Differential backup will save only the files in the Savepack which have changed since the last Total backup.
Incremental	An Incremental backup is the most complex backup function of Arkeia 5, but it is also the one that allows the system administrator to define the most complete backup strategy. An Incremental backup can be based either on a Total backup or on a previous Incremental backup. When this type of backup is launched, it will create a list of files that have been created and/or modified since the last backup, and it will then backup all files that are on this list.

Each type of backup can be further configured with the following completion strategy:

Standard	The Standard completion strategy completes the backup once all the data contained in the defined Savepack has been sent to the Arkeia server. The backup will be logged as <i>finished</i> in the Arkeia logs, and all hardware peripherals used by the backup are released by the server and made available for other tasks. This is the default completion, and we recommend that it be used most of the time.
Continuous	If a Continuous completion strategy is chosen, once the backup has finished saving the data contained in its Savepack, it stays active and is not considered as completed by Arkeia 5. The hardware used for the

backup operation is still considered as reserved by the Arkeia server, and cannot be used for other operations. It is possible to add new Savepacks to the backup, as long as the backup has not been terminated by the user.



**The continuous completion strategy should be used with caution. Some Arkeia plug-ins require it to function properly. In any case, Continuous completion should never be used for unattended (Periodic) backups!**

#### Tape strategy

This field provides three different strategies to control the usage of tapes by a backup.

##### Use new tapes

This strategy forces Arkeia to use new tapes every time a backup is started. Use this strategy if you would like to keep the backup physically separate. Please note that the Complete existing tapes strategy will be used if there are no tapes available.

##### Complete existing tapes

This strategy will fill tapes that have already been used for previous backup.

##### New tape at level break

This strategy fills up the tapes if the backups performed are of the same level. Otherwise, it uses a new tape each time the level is different. For instance, consider the case where there are two backups, one at Level 1, the other at Level 2, and the Level 1 backup is performed first. Arkeia will use a new tape for this backup and complete it twice, using the same tape. However, when the Level 2 backup is performed, Arkeia will use a new tape, specifically for the backups of that level. Every Level 2 backup will then be stored on the same tape, until the tape has been filled-up and a new one has to be used.

The strategy for tape usage should take into account the amount of data to back up, the space remaining on a tape after a Total backup has been performed, the life expectancy and overall performance of the backup media, as well as the time necessary to perform a complete restoration of the data saved.

#### Valid for

This field determines the duration of data retention. Once the data retention defined has expired, the tape is recycled, and the

data it contains will be erased in the future by other backups. Note that this parameter is modified if the backup type is set to Archive. In this case, the retention variable is overridden and the tape is never recycled. Careful consideration should be given to the level of the backup when choosing the period of validity, so as not to allow the tape to be recycled if it would be needed to restore current data.

Parallelism This field determines the number of parallel flows that should be open between the Arkeia server and the Arkeia client when performing the backup. For a more detailed explanation of the Arkeia data flows, refer to *Arkeia Internal Architecture* on page 61.

For more information on how to create logical objects such as Savepacks and Tape pools, in Arkeia 5, please refer to [Chapter 6: Create objects and users](#) on page 69.

Once this step is completed, you have created a periodic backup, for the level highlighted. The backup would normally be scheduled on at least two levels, to provide the Total backups and the intervening Incremental or Differential backups. Click on the next level of backup in the objects list on the left of the screen, then configure this level, as above. The first three items will not normally need to be changed.

When all the levels have been configured, click on the OK button in the lower part of the window to return to the main Periodic backup menu.

## 8.3 How to define exceptions

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You can make these minor changes to the backup scheme you have configured:

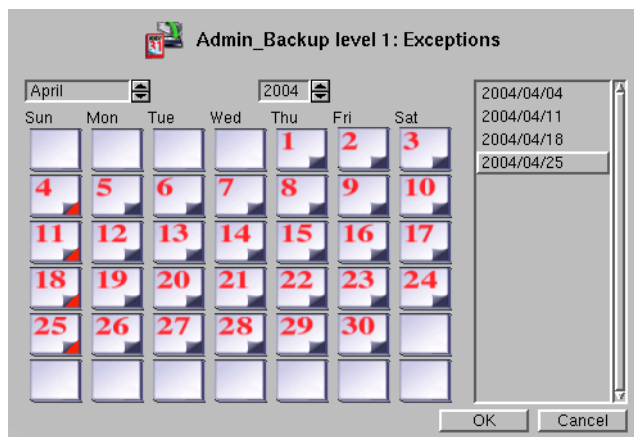
- cancel scheduled backups on specific days,
- exclude a directory from a backup.

## Cancel the backup on a date

If you need to prevent a backup from launching on a specific day or days, in the

Main menu , click on::

Backup > Periodic > [your backup's name] > [Level] > Manage levels >  Exceptions



To mark a day on which this backup level should not run, click on the day in the calendar. A red triangle appears in the bottom right corner of days which have been excepted, the their date appears in the list on the right.

In the example above, four days have been selected as exceptions, their dates appear as well on the right of the calendar.

Click on the OK button to confirm the exceptions and return to the Level management menu.



**All exceptions must be *explicitly* defined for each level. This means that if, for instance, Sundays are considered permanent exceptions to backups, every Sunday in every month should be selected in such a way.**

## Exclude a directory

Exclude a directory from a backup operation by placing an empty control file in it. The presence of this file is a signal to Arkeia 5 *NOT* to backup this directory. The name of the file depends on the version of Arkeia and the operating system of the *client*. Note that the Arkeia 5 Server can accept all versions of the control file name.

**Arkeia 4 UNIX client and an Arkeia 5 server:** the empty control file is named `.OPB_NOBACKUP`. This file should be created *on the client*, in the directory to be excluded from all backup operations.

**Arkeia 5 UNIX client and an Arkeia 5 server:** the empty control file is named `.ARK_NOBACKUP`. This file should be created *on the client*, in the directory to be excluded from all backup operations.



**Arkeia 5 Windows or Netware clients:** the empty control file is named NOBACKUP.ARK. This file should be created *on the client*, in the directory to be excluded from all backup operations.

In UNIX, create a control file can be created by entering the command:

```
touch <name of the control file>
```

In other operating systems, create an empty file with a standard text editor (such as the Windows Notepad) and to save this file in the correct directory.




**This functionality should be used with caution, as putting a control file in a directory excludes all the content of this directory from all Arkeia backup operations – including all subdirectories.**

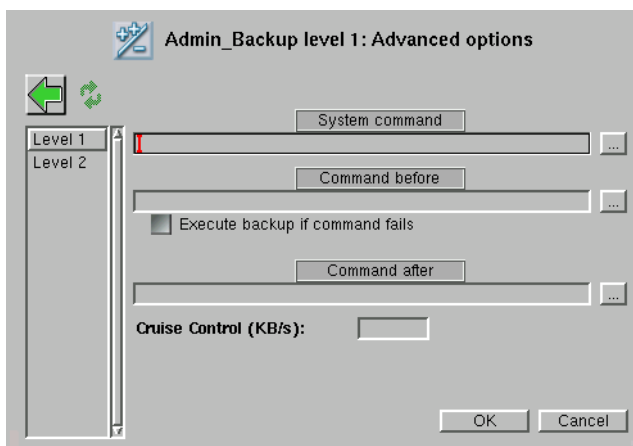
If a directory that contains a control file is encountered by Arkeia 5 during a backup operation, an entry is made in the Arkeia backup logs.

## 8.4 Commands before and after backup


You may want to execute a system command, or run a script before or after the backup. For example, if your backup includes data generated by a running program, you will want to stop the program just before the backup launches, and then re-start the program when the backup has finished.



In the Main menu , click on:

Backup > Periodic > [your backup's name] > [Level] > Manage levels >  Advanced options



Enter the commands for each level of the backup. If you want the same command to run with a Level 1 backup and a Level 2 backup, they must be entered for each level.

System command      Enter a shell script command, or click on  to choose a shell script command in the navigator to run on the backup server before starting the backup, loading tapes or making connections.

- Command before Enter a shell script command, or click on  to choose a shell script command in the navigator to run on the backup server before the backup starts.
- Execute backup if command fails By default, the backup will not start if the Command before fails. Click on this box if you want the backup to run even if the Command before fails.
- Command after Enter a shell script command, or click on  to choose a shell script command in the navigator to run on the backup server after the backup.

## Data transfer rate

Enter a value for the upper limit of the data transfer rate. This is useful if you do not want the backup to monopolize the network bandwidth. You can leave this field blank.

## 8.5 Disaster recovery

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When all the data on a computer, or the computer itself is destroyed, Arkeia Disaster Recovery can rebuild the client or server systems, even the Arkeia backup server, if you have the correct backups. Arkeia Disaster Recovery is a separate product, requiring its own license.

Please go to our [website](#) to buy a license for Disaster Recovery, or to obtain a trial license. Instructions for using Disaster Recovery can be found in: [Arkeia Disaster Recovery](#).

## 8.6 Next

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We have seen how to design and run backups both manually (interactive) and unattended (periodic). Next we will learn how to recover data which we have backed up.

# CHAPTER 9: DATA RESTORATION

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Restoration of backed-up data is a critical operation, often done under stressful circumstances. In Arkeia 5, restoration performed through the familiar Arkeia graphical interface can be basic, or enhanced with options such as:

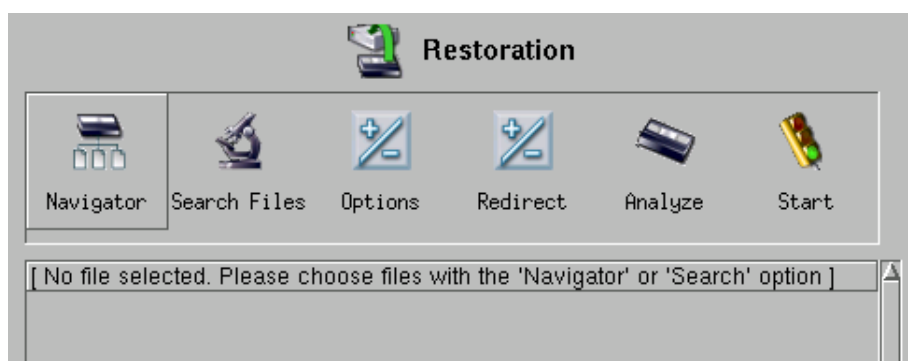
- file property modification;
- verification of restored files;
- redirected restoration, which restores files to a different directory in the same client computer, or to a different computer than the computer from which the backup was taken; and
- tape analysis, to help find the correct tape.

## 9.1 How to access the Restoration menu

---

Start Arkeia 5 and login to the backup server from which the files are to be restored.

In the Main menu , click on Restoration. The Restoration menu is then displayed.



## 9.2 The restoration functions

---

The Restoration menu contains the following functions.

- |              |  |
|--------------|--|
| Navigator    | Click on this button to open the Database Navigator window, a small browser that allows you to select files to restore based on the time and date they were backed up by Arkeia 5.                       |
| Search files | Click on this option to select the files that should be restored, based on the path they occupied at the time the backup was performed.  |
| Options      | Click on this option to select the different options that should be applied to the Restoration operation being defined. They are described in detail in <a href="#">Restoration options</a> on page 138. |

- Redirect** Click on this option to redirect the files that are going to be restored to another path or computer. This, in turn, allows the restored files to be compared to their copies, in case you suspect either the backup or the existing files to be corrupted.
- Analyze** Click on this option to force Arkeia 5 to open its database, search for the files that have been selected using the other options, and display the tapes on which these files were backed-up. This option can save a lot of time if, for instance, some backup tapes are kept off-site in a storage facility.

The list under the main options of the **Restoration** menu displays all the files that have been selected, or (as is the case in the screen pictured above), a short message indicating that no files have been selected.

Regardless of its size, a restoration is always performed in the same manner:

1. File selection.
2. Restoration options.
3. Redirection options.
4. Tape analysis (optional)
5. Launch the restoration.

You will be able to select **Verification in place of Restoration** if you wish to check the data integrity of the backed up files, without restoring them. Do this in the **Options** menu.

## 9.3 How to select files to restore

---

Selecting files for Restoration can be accomplished in three different ways within Arkeia 5:

- the Database Navigator (time-based file selection),
- the Database search engine (file name selection), or
- the complete path and name of the file.

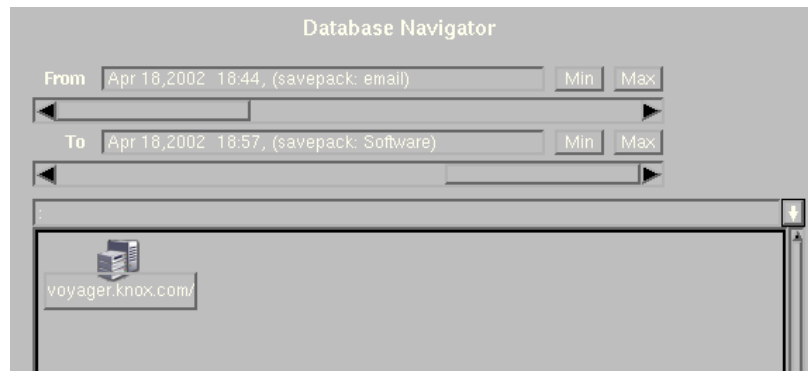
### How to select files with the Database Navigator

This function provides an easy way to explore the Arkeia database and select the files that should be restored. This function should be used when you know which files should be restored, and at which date and time they have been backed-up.



To access the Database Navigator click on the Navigator button in the main Restoration menu.

The Database Navigator window is then displayed in the main Arkeia window.



**If several backups have been performed on the same computer (for example a Total backup followed by several Incremental backups), it is possible to select the date of the Total backup with the From slider and the date of the last Incremental backup in the To slider.**

**Selecting the client to be restored with the sliders in the correct positions means that the client will be completely restored, as the data from the first, Total, backup will be restored first, and the later Incremental backups will then be restored.**

The following functions are available in the Database navigator menu:

From and To

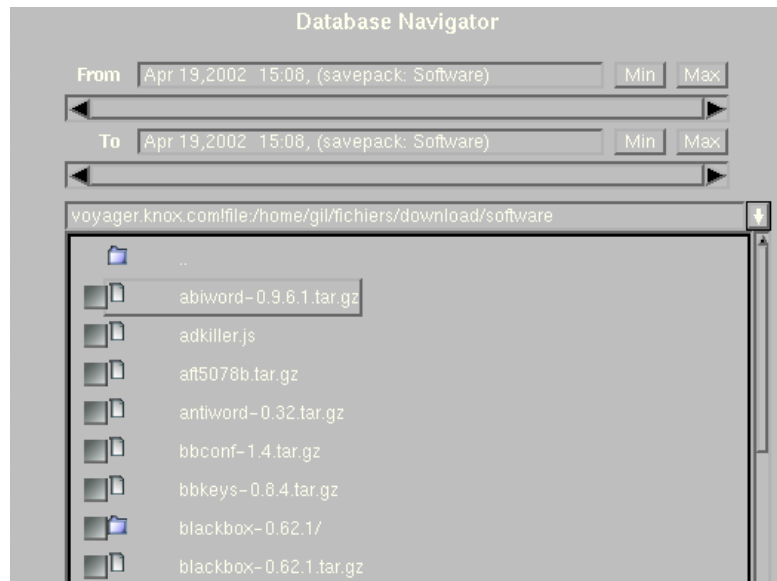
Click on these sliders to limit the restoration to the files that have been backed up by Arkeia between the two dates they define (See the important note above).

In the screen shown above, the only entries in Arkeia database are two backups that were performed on April 18th, 2002, with different Savepacks and hours. We recommend that you limit the amount of data displayed from an Arkeia server that has been in use for a long time, using the sliders.

Database Navigator

In this window, Arkeia displays the files, directories and computers that have been backed up between the two dates defined with the sliders. Only the files backed up will be displayed. If a computer, or a directory does not appear in this Database Navigator window, it means it has not been backed up between the two chosen dates.

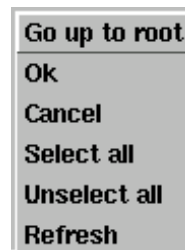
Use the Database Navigator window to browse the Arkeia database and search for the directories and the files that should be restored.



To select an entire directory and all the files and sub-directories in it, click on the checkbox next to the directory name.

To select some files within a directory, double click on the name of the directory to open a list of its files and sub-directories. Click on the checkbox next to the names of the files you wish to select.

Right click anywhere in the Database Navigator window to show the file selection pop-up menu:



**Go up to root** Click on this to return to the root of the current directory tree, from where you can descend to other sub-directories to add files and directories to your selection.

**Ok** When you have finished selecting files and directories, click on Ok to confirm your selection.

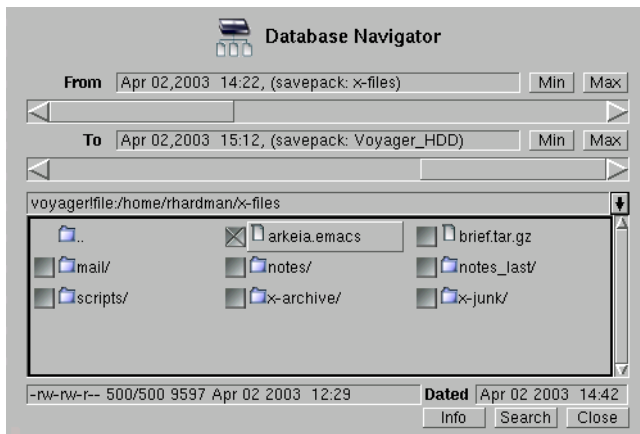
**Cancel** Click on this to abort the current file selection operation.

**Select all** Click on this to select all the files and directories in the current Database Navigator window. An X will appear in all the checkboxes.

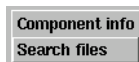
Unselect all      Click on this to clear all the checkboxes currently crossed in the Database Navigator window.

Refresh            Click to redraw the screen and show an update of your selections.

In the screen shown below, a single file has been selected to be restored. This file is named `arkeia.emacs` and is in the directory: `/home/rhardman/x-files` of the computer named `voyager`.

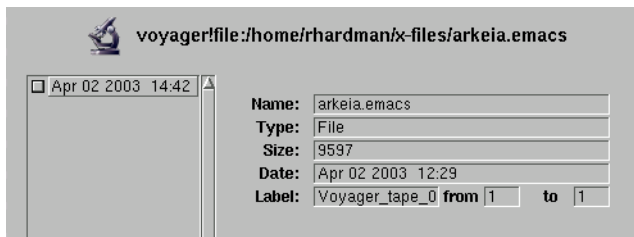


Right click anywhere in the Database Navigator window to display this pop-up menu:



Component info      click to display information about the file or directory currently selected in the Database Navigator window. The selected component is highlighted in the window as a raised button containing its name.

The information displayed includes the component:  
 name;  
 type, whether a file or directory;  
 size in MB; and  
 date it was last saved.



In addition, the following items of information are displayed:

Label            the label of the tape pool which contains the backup of this component.  
 from\_to\_        the tapes in the tape pool which contain the backup of this component.

The list at the left shows the dates and times this component was backed up.

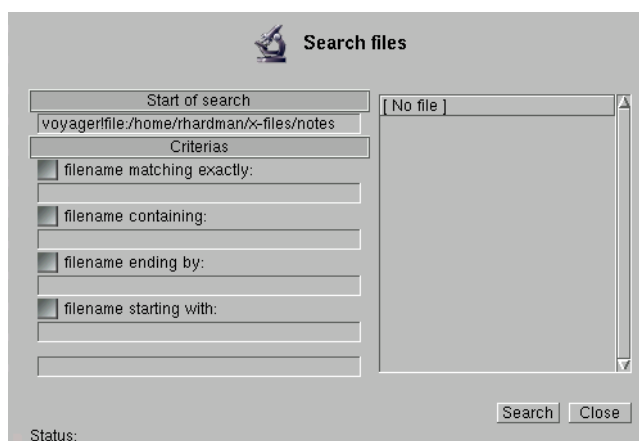
Search files click on this menu item to go to the Search files window, from which you can search for files, in the selected directory, by entering search criteria. See [How to select files with File Search](#) below for details.

## How to select files with File Search

While the Database Navigator of Arkeia 5 is a very practical way to select files to be restored, it can be tedious to browse the database tree to restore only one file or one directory. In many instances, it is better to be able to select several files or directories at once.

To do this, Arkeia has a Search files function, which can be accessed by:

- clicking on the Search button at the bottom of the Database Navigator window,
- clicking the Search files button in the Restoration window, or
- clicking on the Search files button in the pop-up menu, as described above.



In the Search files window, the following functions are available:

Start of search	This field contains the path which is going to be used as the basis for the search. By default, this path is the root path of the Arkeia database of the computer currently selected. The fields detailed below contain the different search criterion that will be used by Arkeia to select the files to be restored from its database.
filename matching exactly	Enter the filename to be searched <i>exactly</i> as is in the database. Click on the field check box to apply this criteria to the search.
filename containing	Enter a portion of the file name to be searched for by Arkeia in its database. Click on the field check box to apply this criteria to the search.



filename ending with                      Enter the end of the file name to be searched for by Arkeia in its database. Click on the field check box to apply this criteria to the search.

filename starting with                      Enter the start of the file name to be searched for by Arkeia in its database. Click on the field check box to apply this criteria to the search.

The last field displays the concatenated search criterion.

When all the search criteria have been entered, right click anywhere in the Restoration options window to obtain the Ok / Cancel pop-up menu. Click:

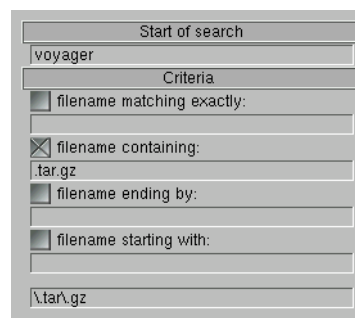
- Ok to confirm the options you have selected, or
- Cancel to clear your selections,



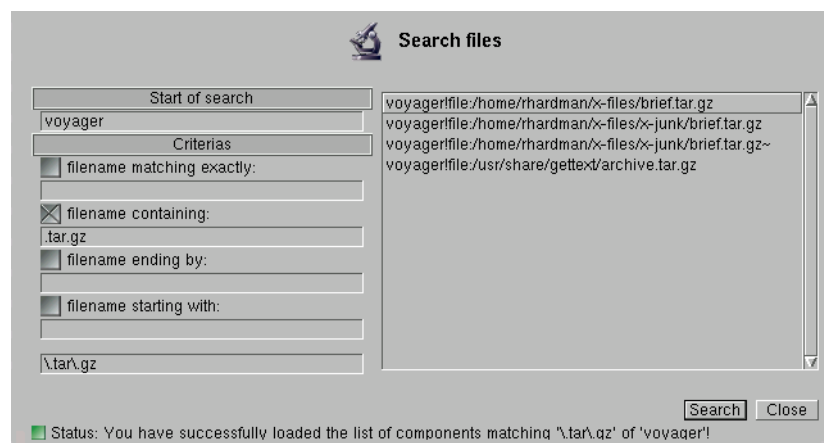
and return to the Restoration menu window.

### Example

If the files to be restored all end with the .tar.gz extension, enter the following information in the Search files window:



Click on the Search button at the bottom of the window to display the files found which match the criteria.




Click on the Close button to return to the main Restoration menu.

## 9.4 Restoration options

The options for restoration of files by Arkeia 5 are in two main categories:

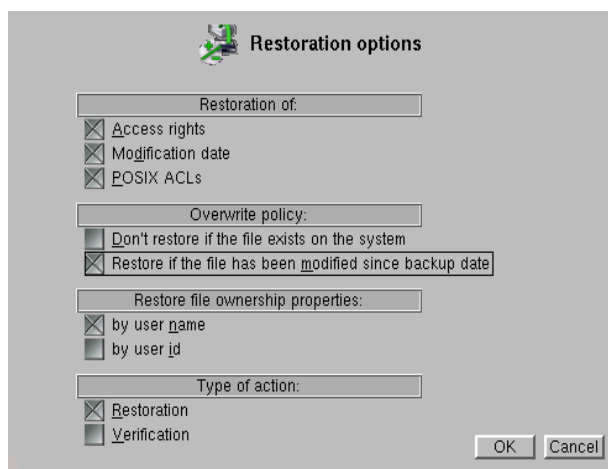
- file characteristics; and
- redirected restoration

### How to access the restoration options

In the Main menu , click on:

Restoration > Options

The main Restoration options screen is then displayed:



Click on the check box next to the restoration option you wish to select to activate it.

### File property restoration options

The first group of options available in the Restoration options screen deals with the file properties of the files being restored:

- |                                  |  |
|----------------------------------|--|
| Access rights                    | Click on this option to restore all the original access rights of the files. If left unchecked, this option will simply restore the current access rights.   |
| Modification date                | Click on this option to restore the original date of the file. If this option is left unchecked, Arkeia will replace the original date and time of the file with the date and time at which the restoration is taking place. |
| Files modified since backup date | Click on this option to replace all existing files by the restored files. This means an existing newer version of the restored files will be deleted and replaced by the older, backed-up, version.                          |

POSIX ACLs      Click on this option if you want ACLs restored. This will only restore ACLs if they were backed up. The default is to NOT backup ACLs. See *Manage Savepacks* on page 95.

Backup of POSIX ACLs is supported for most but not all Linux distributions. Please refer to the *Release Notes* included on your distribution media, or at this website: <http://www.arkeia.com/manuals.html> for the list of supported distributions.

## Restoration rules

Don't restore if the file exists on the system  
Click on this option if you do not want existing files overwritten during the restoration, even if the existing files are older than their backup copies.

Restore if the file has been modified since backup date  
Click on this option if you want to overwrite existing files only if they are older than their backup copies.

## File ownership property restoration options

By user name      Click on this option to force Arkeia to search the `/etc/passwd` file for the user ID that matches the owner of the files being restored.

By user ID      Click on this option to force Arkeia to use the original user ID of the files being restored, regardless of the entries in `/etc/passwd`.

## Verification options

Restoration      Click on this option to toggle file restoration. The backed-up files will be restored when this box is checked.

Verification      Click on this option to toggle file verification. The files in the selected backup will be read on the tapes, to verify that they are not corrupted. Two levels of verification are available:

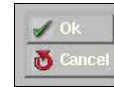
High      Select this level of verification for the highest degree of confidence that the restored files are not corrupted. Individual file checksums are computed and compared with those of the files in the backup. It will take longer to verify at this level than at the Standard verification level.

Standard      Select this level to verify, at a lower level of confidence, that restored files are not corrupted. The files are checked for readability at this level of verification. This will be quicker than verification at the High level.

## How to apply the options to the Restoration

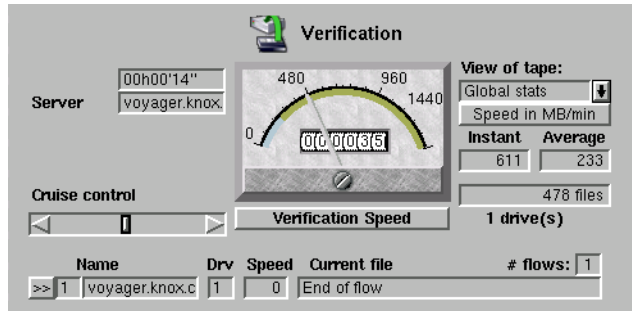
Click on the **Ok** or **Cancel** buttons at the bottom of the window, or right click anywhere in the Restoration options window to obtain the **Ok** and **Cancel** pop-up menu. Click:

- **Ok** to confirm the options you have selected, or
- **Cancel** to clear your selections,



and return to the Restoration options window.

Arkeia then opens the main Verification screen and performs the verification:



The items available in this window to monitor a running verification are:

- Elapsed time** Displays the time elapsed since the launch of the verification.
- Server** This is the name of the server on which the verification is running.
- Cruise control** This slider allows the system administrator to control the amount of bandwidth consumed by the verification. If important network functions are sluggish while Arkeia is performing verifications, use the **Cruise control** to reduce the amount of bandwidth used to perform a verification. Note that this will also slow down the verification operation.

In the middle of the screen, a graphical meter displays the amount of data being transferred between the client and the server. The button below the meter face toggles between **Verification Speed** and **Network Throughput**. Click on this button to change the type of information that is displayed on the dial and in the fields below, from the speed of the verification itself to the amount of information being transferred by the network.

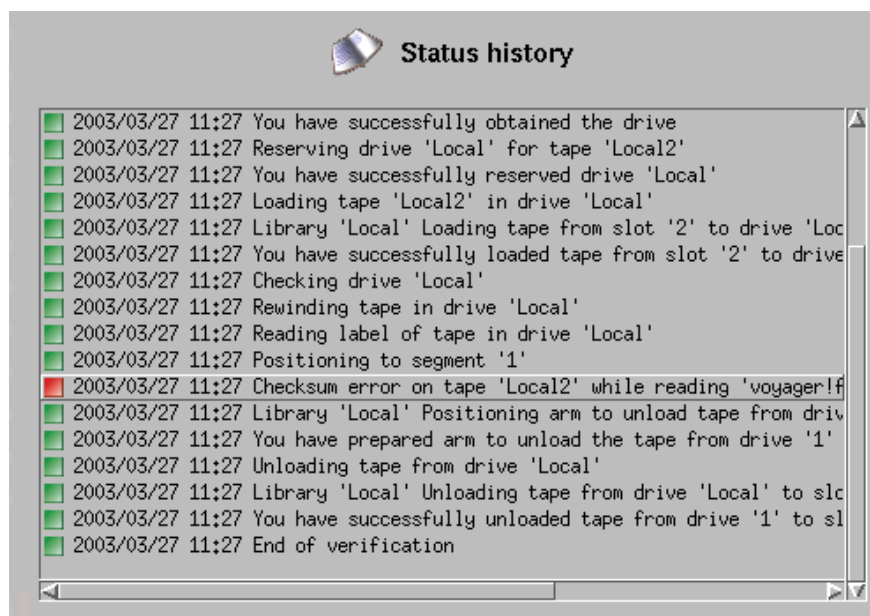
- Verification Speed** The speed at which the verification is happening.
- Network Throughput** The rate in of data transmission through the network in: **KB/s** (Kilobytes per second), **MB/h** (Megabytes per hour), or **MB/min** (Megabytes per minute) indicated on the dial.

On the right side of the screen, the following fields and drop-down boxes supply additional information on a verification:

View of tape	Clicking on this drop-down list displays a list of the drives that are used in this verification. Select the particular drive you want to monitor from this list, or select <i>Global</i> stats to monitor the verification globally, over all the drives in use.
Speed in...	Click on this button to change the units of data transfer speed displayed on the dial, and in the <i>Instant</i> and <i>Average</i> fields below it. <i>Instant</i> indicates the current speed of the verification and <i>Average</i> the overall speed of the verification. The units available are: KB/s (Kilobytes per second), MB/h (Megabytes per hour), or MB/min (Megabytes per minute)

Once a verification has been completed, Arkeia displays a message indicating the overall results of the operation. Checking this message is important, as it may provide crucial information in case the verification failed.

End of verification will appear in the *Status* line at the bottom of the Arkeia window when the verification operation has terminated. Click on the *Status* line to open the *Status history* window. If verification found a problem, it will be listed in the *Status history* log, with a red box at the left side of the status line.



Click on the line in the *Status history* log which contains the verification error to see more information about the error.

Right click anywhere in the *Status history* window to access the *Previous window* button. Click this button to clear the *Status history* window and return to the *Restore* window.

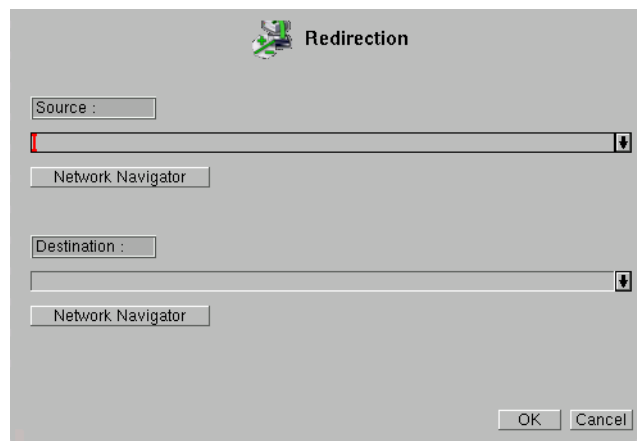
## 9.5 Redirecting a restoration

---

An important function of restoration in Arkeia is the ability to restore backed-up files from an original path to a different path, or to a different computer than the one where the backup was originally made. This is useful, for instance, if the original computer was lost in a disaster.

### How to access the redirection menu

In the Main menu , click on Restoration > Redirect. The Redirection menu is then displayed in the main Arkeia window:



### Redirection options

The following options are available within the Redirection menu.

- |                   |   |
|-------------------|---|
| Source            | Click on this drop-down list to display files that have been selected with one of the different selection functions in Restoration.   |
| Destination       | Click on this drop-down list to modify the path that will be used to restore the file chosen in the previous list.  |
| Network Navigator | Click on either of these buttons to choose the Source and Destination paths in a network browser. This solution may sometimes be more convenient than entering the path and file names by hand. |

For instance, if a file named `abiword-0.9.6.1.tar.gz`, which was originally contained in the directory `/download/software/` should be restored to the path `/download/rst/`, the following information should be entered in the Redirection screen:

The screenshot shows a graphical user interface for file redirection. It features two main sections: 'Source' and 'Destination'. Each section has a text input field and a 'Network Navigator' button below it. The 'Source' field contains the path `voyager.knox.comfile:/home/gil/fichiers/download/software/abiword-0.9.6.1.tar.gz`. The 'Destination' field contains the path `voyager.knox.comfile:/home/gil/fichiers/download/rst/abiword-0.9.6.1.tar.gz`. Both fields have a small icon to the right of the text, likely for file selection or refresh.

Please note that the paths above respect the standard Arkeia syntax, which is different from the Linux and UNIX hierarchical syntax. The Arkeia syntax will be explained in the following section.

The redirection works by replacing the Source path by the Destination path whenever restoring a file. For instance, if the original file is `/home/jack/doc-31.txt`, and the file `doc-31.txt` should be restored instead as `/home/jill/restore/doc-31.txt`, the following paths should be entered in the fields detailed above:

```
Source:      /home/jack/
Destination: /home/jill/restore/
```

The rest of the syntax is detailed below.

## Arkeia path syntax

Arkeia 5 backs up file systems which reside on many different clients in a network. The file systems are created on clients independently, so it is possible, even probable, that the same pathnames will be found on more than one computer. To avoid clashes between pathnames on different client computers in a local area network, Arkeia uses a special path syntax. When Arkeia is requesting a path to be entered in an entry field, in the Redirection menu or anywhere else in the program, the path and file name entered use the syntax described below.

```
FQDN_computer_name[!plugin_name]:/path01/.../pathX/filename
```

Here is a detailed explanation for all the parts of this syntax:

FQDN_computer_name	This is the Fully Qualified Domain Name (FQDN) computer name. This means that Arkeia 5 accepts names such as <code>zap.foo.com</code> , where <code>zap</code> is the name of the client, and <code>foo.com</code> the name of the domain which contains the computer named <code>zap</code> . Please note that an exclamation mark <code>!</code> should separate the <code>FQDN_computer_name</code> from the plug-in name (see below).
!plug-in_name	This is the name of the plug-in which is used by the Arkeia server to perform the backup and restoration operation. In

the example screen above, the plug-in name is the default **plug-in, file**, which is used for all normal *file system* operations. Future plug-ins may be named, for instance `oracle`, `mysql` for plug-ins specialized in database backup and restoration. Please note that the plug-in name should be separated from the path by colon:.

`/path/.../filename` This is the path and the name of the file on which the operation should be performed.

Here are a few examples of correct paths/file names, which will be accepted by Arkeia as valid:

```
zap.foo.com!file:/home/jack/cad-files/DCCF_0124122589.dat
zip.foo.com!file:/home/tina/docs/pdf/arkeia/man_arkc.pdf
email01.neon.com!file:/etc/mail/statistics/
```



**This syntax is valid whether the computer is a Windows or a UNIX computer. Arkeia uses slash characters / for paths on all operating systems.**

**The only difference in syntax between the Windows and the UNIX Arkeia client is that Windows computers require the volume letter to be inserted before the path and file name.**

Therefore the following paths are correct *only* for Windows computers:

```
bilbo.shire.org!file:c:/files/docs/linux/pdf/LinuxFromScratch.pdf
gandalf.mordor.com!file:d:/patrick/meeting/Conference2002.ppt
```

## How to apply the redirection

Click on the **Ok** or **Cancel** buttons at the bottom of the window, or right click anywhere in the Redirection window to obtain the **Ok / Cancel** pop-up menu. Click:

- **Ok** to confirm the options you have selected, or
- **Cancel** to clear your selections,



and return to the Restoration window.

## 9.6 Tape analysis

---

Finding the right tape to perform a restoration can sometimes be difficult, especially if the tapes have been moved from the backup device to a storage facility.

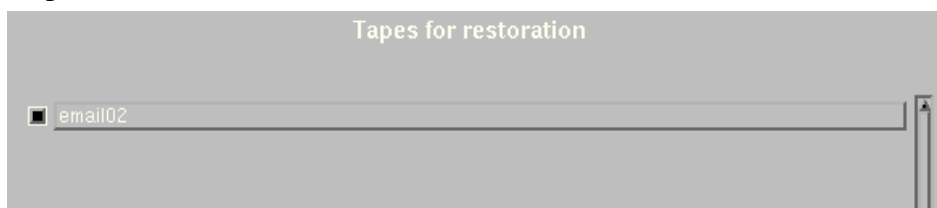
The Arkeia 5 tape analysis utility will search the database for the selected files and display the tapes that will be required by to perform the restoration correctly.

### How to access the tape analysis menu

When you have selected the file or files you wish to restore, they will be listed in the Restoration screen. Highlight the file you wish to restore and click on **Restoration > Analyze**.



Arkeia 5 then performs a database analysis and displays immediately the list of tapes that will be needed for the restoration:



In the example above, only one tape, called `email02`, will be needed. If necessary, retrieve the tape from its location and make sure it is inserted in the backup device that will be used for the restoration of the selected files.


## 9.7 How to launch the restoration

The steps required to restore files from a backup are:

1. Select files to restore.
2. Set restoration options.
3. Set redirection options.
4. Perform tape analysis (optional).
5. Launch the restoration.

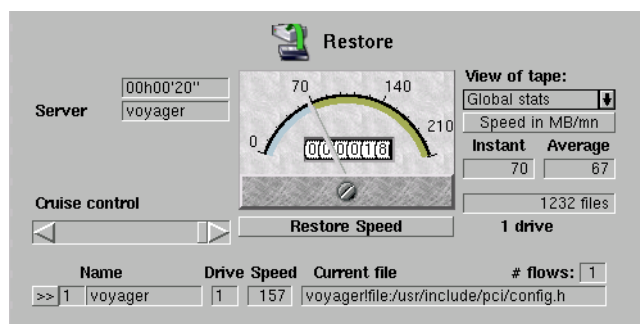


If you checked the **Verification** box in the **Restoration** menu (see [Verification options](#) on page 139), the files selected in the navigator will be verified only, NOT restored.

To launch a restoration or verification, click on the **Start** icon  in the main Restoration menu.

If the Arkeia server uses only a stand-alone tape drive, Arkeia 5 will display a message asking the system administrator to select the drive that should be used by the restoration, and to confirm that choice by clicking on **Ok**.

Arkeia then opens the main Restore screen and performs the restoration as configured by the user:



The functions available when monitoring a restoration are described in [Monitor a running restoration](#) on page 186.

## 9.8 Disaster recovery

---

When all the data on a computer, or the computer itself is destroyed, Arkeia Disaster Recovery can rebuild the client or server systems, even the Arkeia backup server, if you have the correct backups. Arkeia Disaster Recovery is a separate product, requiring its own license.

Please go to our [website](#) to buy a license for Disaster Recovery, or to obtain a trial license. Instructions for using Disaster Recovery can be found in: [Arkeia Disaster Recovery](#).

## 9.9 Next

---

So far, we have seen how to make backups and restore the backed up data. The remaining chapters in this manual cover extra functionality which will help you to efficiently design and manage your backup programs, and to debug them if they are not working as you intended.

# CHAPTER 10: NDMP SERVER BACKUP

---

Arkeia Network Backup can manage backups and restorations of NAS (network attached storage) devices which are NDMP-compliant (network data management protocol compliant). Most NAS devices do not permit the installation of software, so the Arkeia client (or any other client) cannot be installed on them. Backup and restoration of NAS data is managed by an NDMP server on the NAS device. Arkeia controls the NAS backup by sending commands to the NDMP server. An NDMP backup differs from the Arkeia data backup implementation in these areas:

- The tape drives and libraries where the NDMP backup data is stored are directly connected to the NDMP server (NAS device).
- The type of backup which can be done depends on the NDMP server. For example, if the NDMP server is limited to a *tar* of files or *dump* of a file system on the NAS, only total and archive backups can be made.

These limitations require NDMP backups to be handled separately to regular Arkeia backups:

- NDMP tapes - only one type of backup, either NDMP or Arkeia normal, can exist on a tape at a time. After a recycle, the tape can be re-used for either type of backup.
- NDMP Savepacks - a Savepack must not contain a mix of NDMP trees, whose data stream flows directly from the NAS to the tape drive, and normal Arkeia trees, whose data stream flows via the network.

NDMP Savepacks are created in a separate NDMP section of the Arkeia interface, and cannot be mixed with normal Arkeia backups.

Other limitations in the current implementation are:

- Only interactive backups can be done.
- Only one NAS can be backed up at a time, so multi-flow NDMP backups are not possible.
- Limiting the bandwidth of the data flow, normally done with the `Cruise control` in Arkeia, is not possible, nor is it necessary since the tape drive is directly connected to the NAS device.

Arkeia supports NDMP Version 3.

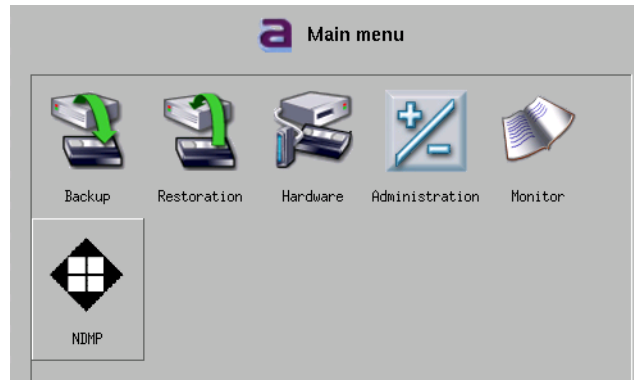
This chapter tells you how to create and run an NDMP backup in Arkeia, and how to restore data from an NDMP backup.

## License

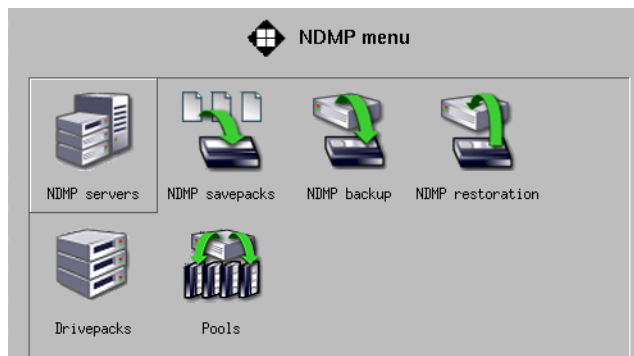
You will need to purchase a license before you can run an Arkeia NDMP backup, or obtain a demonstration license for a limited trial. Contact [sales@arkeia.com](mailto:sales@arkeia.com) to obtain your full license, or demonstration license.

## NDMP Menu

NDMP operations in Arkeia are done through the NDMP menu. In the Main menu



click on NDMP to reach the NDMP menu.

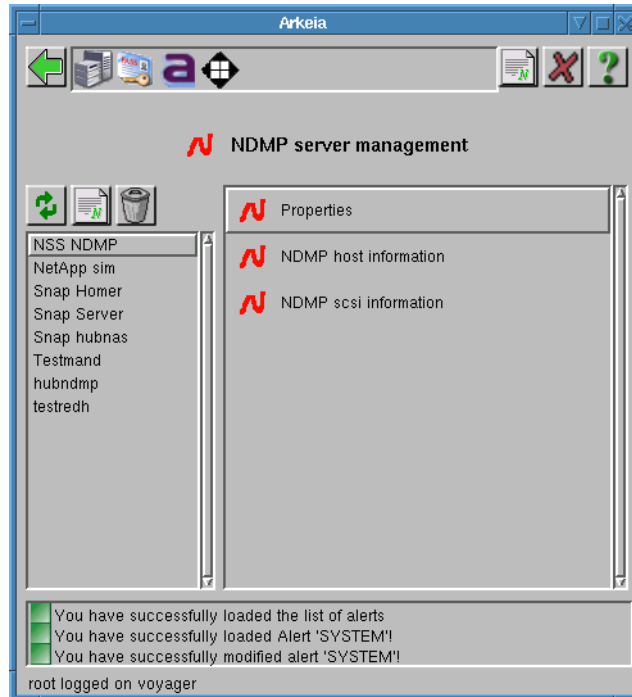


The objects which must be created for an NDMP backup are the same as for a normal Arkeia backup, however the non-NDMP Savepacks for normal Arkeia backups will not appear when you are in the NDMP environment.

## 10.1 Create the NDMP server

NDMP servers are managed by Arkeia in the NDMP server management screen. To reach this screen, from the NDMP menu click on NDMP servers



(Main menu  > NDMP menu > NDMP servers):

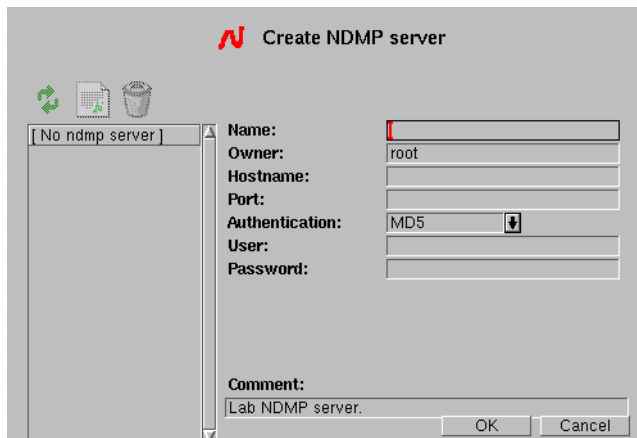


Arkeia communicates with the NDMP server to:

- start and stop NDMP backups and restorations,
- collect index and catalog data about the files and directories backed up, and
- control the directly attached tape drives and libraries.

The NDMP servers which we want to use for backups must be added to the list of NDMP servers managed by Arkeia, and this is done in the Create NDMP server screen.

To reach this screen from the NDMP server management screen click on New  
(Main menu  > NDMP menu > NDMP servers> New :)



The basic details required to allow Arkeia to communicate with the NDMP server are entered in the NDMP server management screen. To declare a new NDMP server to Arkeia, ensure that the NAS device hosting the NDMP server is online, and enter its details in the fields on this screen:


- Name: A name for this NAS in Arkeia.
- Owner: The creator of the NAS in Arkeia. By default, this is the login name for the session in which the NAS is declared to Arkeia. It cannot be changed in this screen.
- Hostname: The FQDN of the server host device on the network.
- Port: The port used by the NDMP daemon on the NAS. This is 10000 by convention, but check the NDMP server configuration to make sure.
- Authentication: How the NDMP server checks logins.
- User: The name of an NDMP server user. This is defined in the configuration of the NDMP server on the NAS device, not by Arkeia.
- Password: The NDMP server login password.

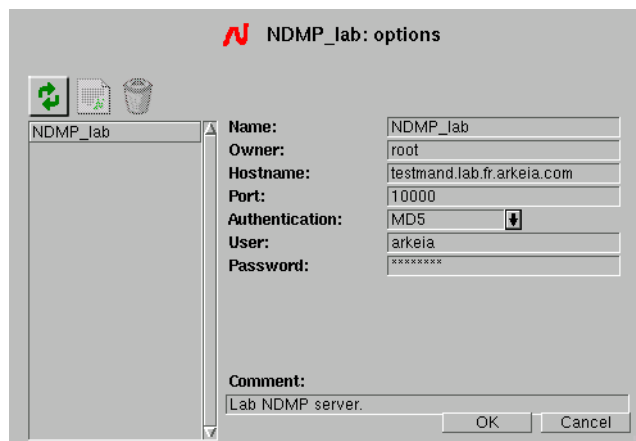
Click on OK to confirm the details of the NDMP server, and it will be entered in the objects list on the left, if Arkeia was able to communicate with it. You will be returned to the NDMP server management screen.

### Change an NDMP server

To view or change the details of an existing server, in the NDMP server management screen first highlight the name of the server in the functions list, then click on Prop-

erties

(Main menu  > NDMP menu > NDMP servers> Properties):



In this screen, you can change all the fields except Name and Owner. Click on OK or Cancel to return to the NDMP server management screen.

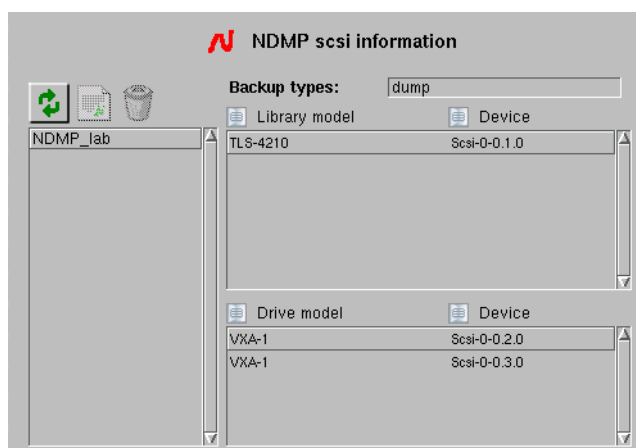
### NDMP host information

In the NDMP server management screen, click on NDMP host information to get details of the host. These details are set in the host configuration, and so cannot be changed in Arkeia.

### SCSI information

In the NDMP server management screen click on SCSI information to get details of SCSI controllers for the devices managed by an NDMP server

(Main menu  > NDMP menu > NDMP servers> SCSI information).



The devices are usually a tape drive, and a tape library. Highlight the server in the functions list on the left, if there is more than one server, to see the device model designation and its device controller. To configure a device in Arkeia, double-click on its entry in the functions list, and the relevant device creation screen will appear.

- Tape library creation, see [Create an NDMP library](#) on page 155.
- Tape drive creation, see [Create a Drivepack for NDMP](#) on page 154.

Backup types shows the types of backup supported by the NDMP server.

This information is read by Arkeia from the NDMP server, and cannot be modified. Click on Close to return to the NDMP server management screen.



## 10.2 Arkeia NDMP backup

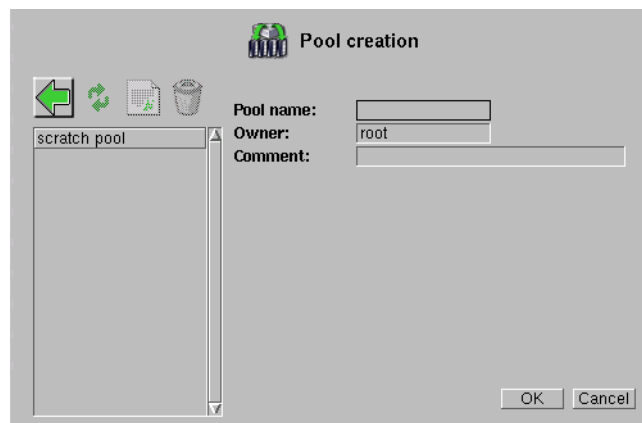
---

The steps required to create an NDMP backup are the same as for a normal Arkeia backup, except that they are done in the NDMP environment of the Arkeia interface:

1. Create a tape pool.
2. Create a Drivepack containing the NDMP drive.
3. Create an NDMP Savepack.
4. Add the NAS data required in the backup to the Savepack.
5. Launch the backup

### Create a tape pool

First, create an empty tape pool, then add tapes to the pool. In the Main menu , click on NDMP > Pools > New  and the Pool creation screen will appear.



Pool name: Enter a name for this tape pool.

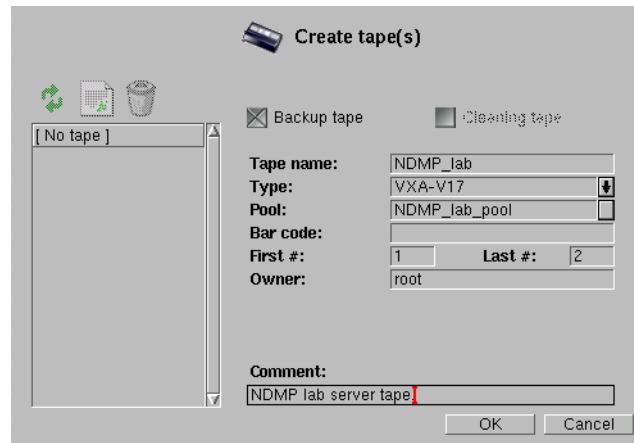
Owner: The Arkeia login name for this session will appear here.

Comment: Enter an optional useful comment here.

Click OK to confirm and return to the Pools management screen.

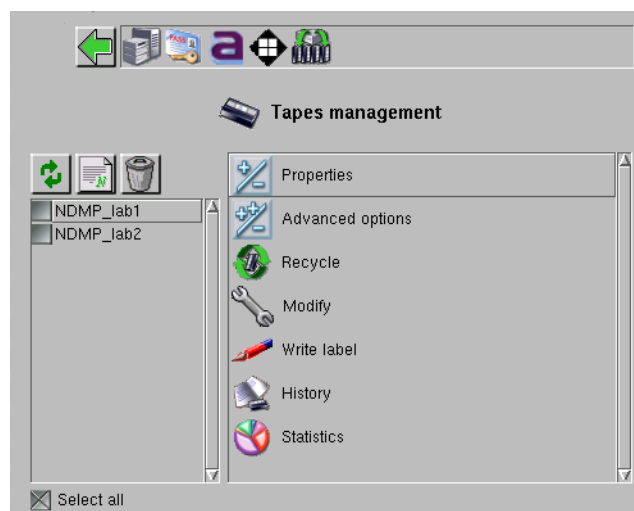


Next, tapes must be entered in the tape pool. Click on Manage pool tapes, and the Tapes management screen will appear



- Tape name: Enter a name for this series of tapes.
- Type: Choose the type of tape from the drop list.
- Pool: Choose the tape pool in which these tapes will be placed.
- Barcode: If the tape is used in a tape library equipped with a barcode reader, the bar code is read and automatically assigned by the tape library the first time the tape is inserted in the library.
- First #: The number of the first tape in the series you are creating, normally 1, unless you are adding tapes to the tape pool.
- Last #: The number of the last tape in this series.
- Owner: The login name for this Arkeia session will be placed here.
- Comment: Enter an optional useful comment here.



Click on OK to create the tapes, and return to the Tapes management screen.



The tapes just created will appear in the objects list on the left. The tape management functions appear in the functions list on the right. These functions are the same as for non-NDMP tapes, see [Tape management](#) on page 76 for an explanation of how to use them.

At this point, a tape pool has been created and tapes added to it for the NDMP backup. If the tapes are contained in a tape library, it may be necessary to read them and assign them to slots. See [Chapter 14: Tape Libraries](#) on page 197 for instructions on how to do this.

Next, we will create a Drivepack and drive for the NDMP backup.

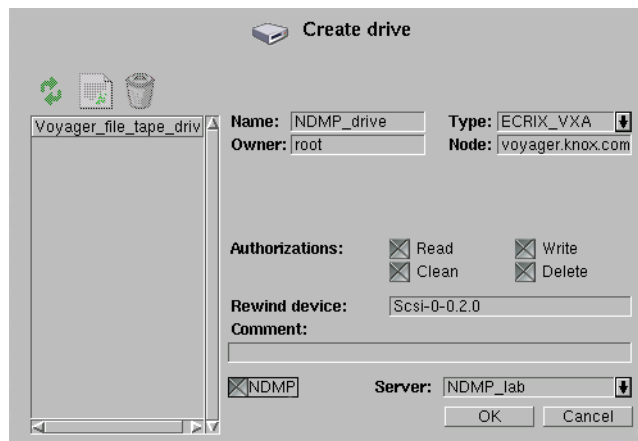
Click on the back button  in the navigation bar until the NDMP menu reappears, or just click on the NDMP icon  in the navigation bar to return to the NDMP menu.


## Create a Drivepack for NDMP


If the NDMP tape drive was not created during hardware installation, go to the section which describes how to add a tape drive [Create a drive](#) on page 83 and create the NDMP tape drive. The Rewind device: name can be found in the NDMP SCSI information screen (see [SCSI information](#) on page 151 above).

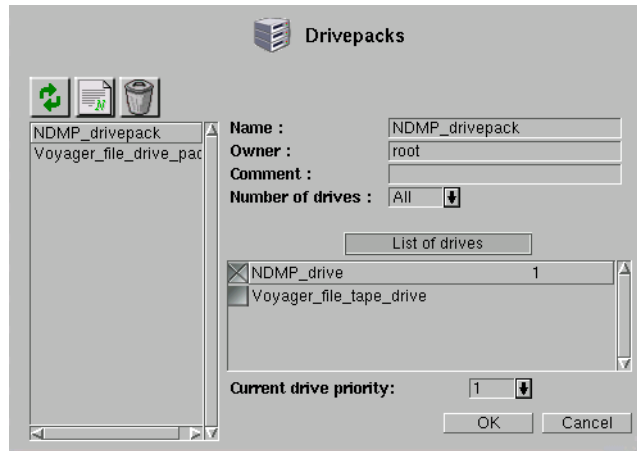
You can also reach this screen from the NDMP scsi information screen, by double-clicking on the device driver name in that screen.

Be sure to check the NDMP box and select the controlling NDMP server from the Server: drop list.



To create a Drivepack, in the Main menu , click on:

NDMP > Drivepacks > New  to reach the Drivepacks screen:

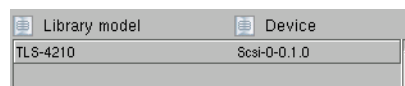


Go to the section which describes how to create a Drivepack [How to create a drivepack](#) on page 85 to see how to create the Drivepack. Be sure to select an NDMP tape drive from the List of drives for this Drivepack. As this will be a Drivepack containing the NDMP tape drive, it would be useful to give it a name which makes this obvious, for example: NDMP\_drivepack.

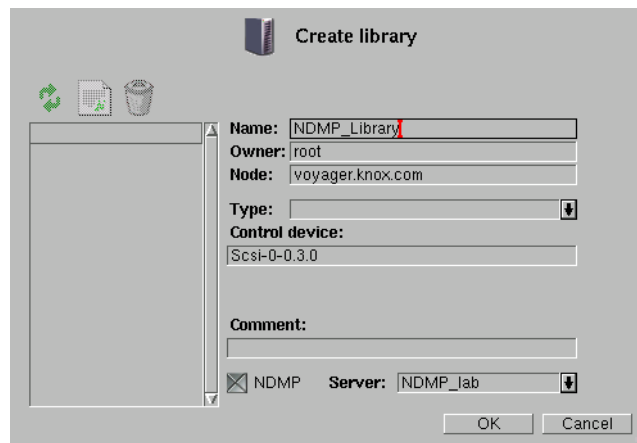
You are now ready to create the Savepack which will contain the NAS directory and file names to be saved in this backup.

### Create an NDMP library

If your NAS device has a tape library attached to it, Arkeia will have found the device controller on the NDMP server, and displayed it in the NDMP scsi information screen:



Double-click on this entry to reach the Create library screen:



In this screen, the following configuration values can be set:

Name	Enter a name for the library in this field. This name will then be used in the different logs of Arkeia 5. It will be helpful to identify this tape library as an NDMP-controlled device in the name you choose.
Owner	Arkeia will enter the login name for this session as the Owner.
Node	Arkeia will enter the name of the computer from which the library is being created.
Type	This drop-down menu is a list of all supported libraries. To navigate more quickly in this list, it is possible to type the first letters of the library type required. Please note that most libraries also require an additional license to be managed by Arkeia 5.
Control device	Enter the name of the device driver used to control the library medium changer. Arkeia will supply the device driver name it read from the NDMP server.
Comment	Enter a descriptive comment, such as the physical location of the library or some other information, in this field. An entry in this field is optional.
NDMP	Ensure this box is checked before leaving this screen.
Server	Select the NDMP server from the drop list, if it is not already displayed in this field.

Click on OK to configure and start the tape library, and return to the previous screen.

Now configure the NDMP tape library by following these steps:

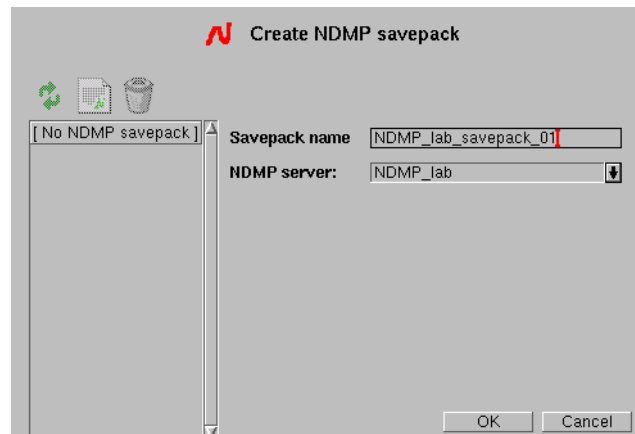
- Add the NDMP tape drive: see [Add drives to a tape library](#) on page 200.
- Assign tapes to slots: see [Add tapes to a library \(slot assignment\)](#) on page 201.

See also [How to start and stop a tape library](#) on page 203 for instructions about starting and stopping the library in Arkeia..

## Create an NDMP Savepack

NDMP Savepacks are created in the NDMP environment. First, create an empty Savepack, then add the NAS file and directory names which contain the data to be backed up in that Savepack.

In the Main menu , click on: NDMP > NDMP savepacks> New  to reach the Create NDMP savepack screen:

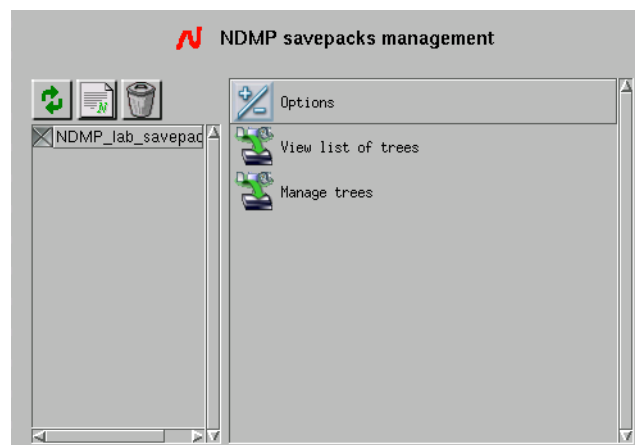


Create a Savepack by filling in the following fields:

Savepack name: Enter a name for this NDMP savepack which will distinguish it from other NDMP savepacks you may create.


NDMP server: Choose the NDMP server which manages the NAS containing the data to be backed up.

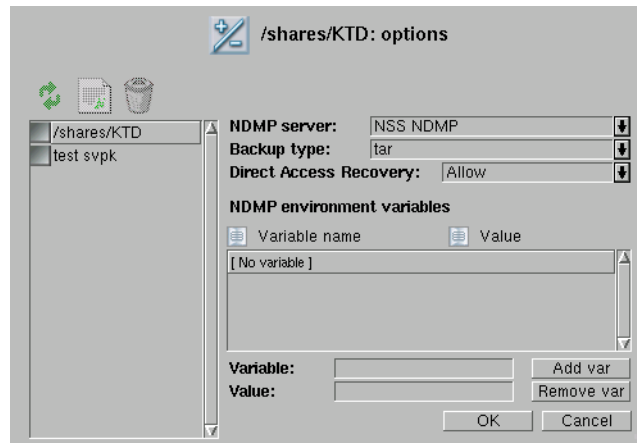
Click on OK to confirm and return to the NDMP savepacks management screen.



### NDMP Savepack options

Options and environment variables can be set for the Savepack. They will apply for all the trees in the Savepack, but may be overridden for individual trees through the Tree options menu (see [NDMP tree options](#) on page 159).

In the Main menu , click on:  
 NDMP > NDMP savepacks > [*Savepack name*] > Options



NDMP server:           Select the server from the drop list of server names.


Backup type:           Select from the drop list.

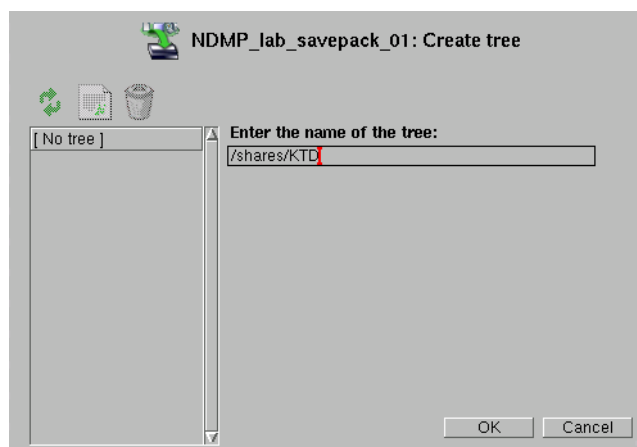
Direct Access Recovery:

Choose Allowed or Disabled from the drop list. The default is Allowed. When DAR is enabled, backup history information for each file is stored in the Arkeia database. This enables faster restoration, but when there are many relatively small files, the backup may be slow. In this case, you may wish to choose Disable, and avoid recording individual file history. The penalty will be increased restoration time. This setting can be overridden for individual trees in the Savepack.

### Add files to the NDMP Savepack

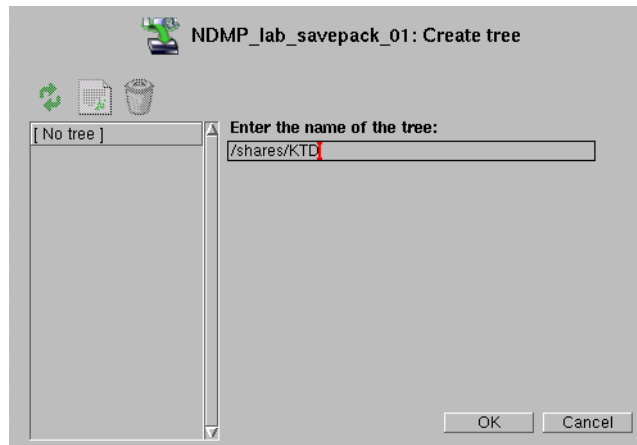
Now add the NAS file and directory names to be backed up in this Savepack. In the

NDMP savepacks management window, click on Manage trees > New  to reach the NDMP Create tree screen:



The Arkeia navigator is not available for searching the NAS device, so it is necessary to find the path names for the trees in this Savepack by other means on the

network. Enter the file or directory name and click on OK to confirm. Add other file or path names by repeating this process.



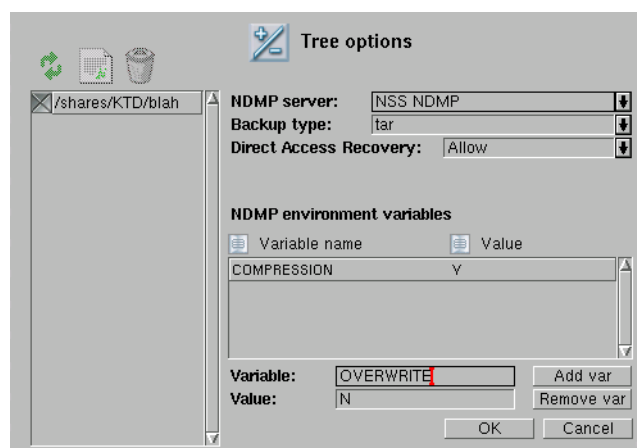
Note that some NAS devices prevent the backup of certain data that they contain. Refer to the documentation of your device for this information.

### NDMP tree options

Some NDMP servers allow environment variables to be set or changed before a backup. The documentation for your NAS device NDMP server will contain this information. If you want to set an environment variable specific to a backup tree, use the Tree options menu. Variables set for a tree override variables set for a Savepack.

In the Main menu , click on:

NDMP > NDMP savepacks > [*Savepack name*] > Manage trees > [*tree name*] > Options



The options for the tree checked in the objects list on the right can be added or changed by entering choices in the fields on this screen:

Name of tree: Enter the pathname for the tree here.

Backup type: Choose the backup type from the drop list.

Direct Access Recovery:

Select Allow, Disable or As savepack option from the drop list. The default is As savepack option. See [NDMP Savepack options](#) on page 157 for more details.

NDMP environment variables:

The list of environment variables currently set in Arkeia for this tree, and their value. To remove a variable, highlight it and click on the Remove var button.

Variable: Enter the name of a variable you wish to set for this tree.

Value: Enter the value for the variable here. Click on the Add var button to add it to this tree.


Click on OK to confirm the options for this tree. When a backup is launched using this Savepack, the environment variables listed will be set before the backup commences.

## Create an NDMP backup

When a tape pool, Drivepack and Savepack have been defined for the NDMP server, a backup can be launched.



**Only interactive backups are possible in this version of Arkeia. The backups of data in a NAS device can be made only by the NDMP server on that device, and can be written only by a tape drive attached to that device.**

In the Main menu , click on: NDMP > NDMP backup to open the Interactive NDMP Backup screen.

Fill in the fields on this screen to create the backup:

NDMP Savepack Click on this drop-down list to present the different Savepacks that have already been defined and can be selected to be backed-up.

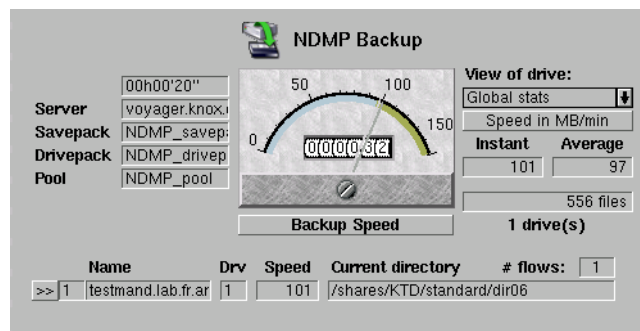


Drivepack	Click on this drop-down list to present the different Drivepacks that have been defined and can be used to perform the backup operation. A Drivepack containing the NDMP drive attached to the NAS being backed up must be chosen.				
Pool	Click on this drop-down list to present the different Tape Pools that have been defined and can be used to contain the backup data. A pool containing tapes created for the NDMP must be chosen. Tapes written on by a non-NDMP device cannot be used until they are recycled.				
Type	Choose in this field the type of backup that will be started, as well as the completion strategy for a backup. The two possible types of NDMP backup are: <table> <tr> <td>Archive</td> <td>An Archive backup, will backup all the files and directories selected in the Savepack and will retain the data indefinitely. This prevents Arkeia from recycling the tape automatically, and ensures that the data will remain on the tape as long as necessary. Refer to the Valid for parameter below for more information.</td> </tr> <tr> <td>Total</td> <td>A Total backup will backup all files and directories defined in the Savepack, while allowing the data tape to be recycled once the Valid for threshold of the tape has expired. This type is commonly used for periodic incremental backups.</td> </tr> </table>	Archive	An Archive backup, will backup all the files and directories selected in the Savepack and will retain the data indefinitely. This prevents Arkeia from recycling the tape automatically, and ensures that the data will remain on the tape as long as necessary. Refer to the Valid for parameter below for more information.	Total	A Total backup will backup all files and directories defined in the Savepack, while allowing the data tape to be recycled once the Valid for threshold of the tape has expired. This type is commonly used for periodic incremental backups.
Archive	An Archive backup, will backup all the files and directories selected in the Savepack and will retain the data indefinitely. This prevents Arkeia from recycling the tape automatically, and ensures that the data will remain on the tape as long as necessary. Refer to the Valid for parameter below for more information.				
Total	A Total backup will backup all files and directories defined in the Savepack, while allowing the data tape to be recycled once the Valid for threshold of the tape has expired. This type is commonly used for periodic incremental backups.				
Tape strategy	Choose a strategy to control the usage of tapes by a backup. There are two different strategies: <table> <tr> <td>Use new tapes</td> <td>This strategy forces Arkeia to use new tapes every time a backup is started. Use this strategy if you would like to keep the data of a backup on new tapes.</td> </tr> <tr> <td>Complete existing tapes</td> <td>This strategy will fill tapes that have already been used for a previous backup.</td> </tr> </table> <p>The strategy used for the tape usage should take into account the amount of data to be backed up, the space remaining on a tape after a Total backup has been performed, the life expectancy and overall performances of the backup media, and the time necessary to perform a complete restoration of the data saved.</p>	Use new tapes	This strategy forces Arkeia to use new tapes every time a backup is started. Use this strategy if you would like to keep the data of a backup on new tapes.	Complete existing tapes	This strategy will fill tapes that have already been used for a previous backup.
Use new tapes	This strategy forces Arkeia to use new tapes every time a backup is started. Use this strategy if you would like to keep the data of a backup on new tapes.				
Complete existing tapes	This strategy will fill tapes that have already been used for a previous backup.				
Valid for	This field determines the duration of data retention. Once the data retention defined has expired, the tape is recycled, and the data it contains will be erased in the future by other backups.				

Note that this parameter is modified if the backup type is set to Archive. In this case, the retention data is overridden and the tape is never recycled.

Use E-mails	This field will determine if Arkeia 5 is to send a confirmation email to the current user once the backup has been completed. The address to which the emails are sent is that defined when the user was first set up, see <a href="#">6.1 Users</a> on page 69.
Tag	Enter a name to be used to identify the backup and all the data it contains.
Comment	This field can be used to enter a longer, more detailed description of the backup. A comment is optional.

When all the fields are ready, click on OK to launch the backup. The NDMP backup monitor will appear:



For information on this screen, see [Monitor a running interactive backup](#) on page 111.

## 10.3 Restore from an NDMP backup

To restore NAS data backed up via an NDMP server, it is necessary to:

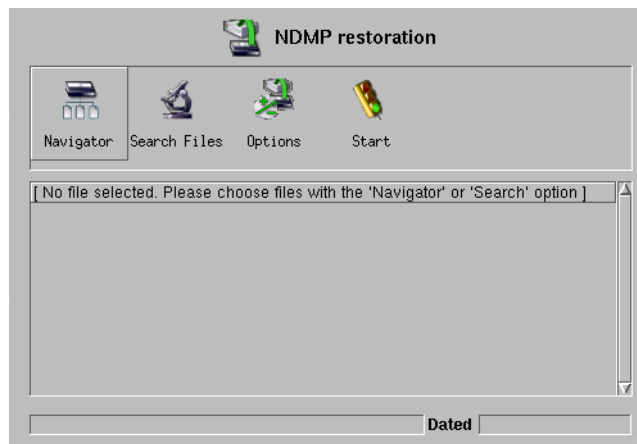
1. Find the backup date to be restored.
2. Find the directories of files to be restored.
3. Launch the restoration.

To start a restoration, in the Main menu , click on:

NDMP > NDMP restoration

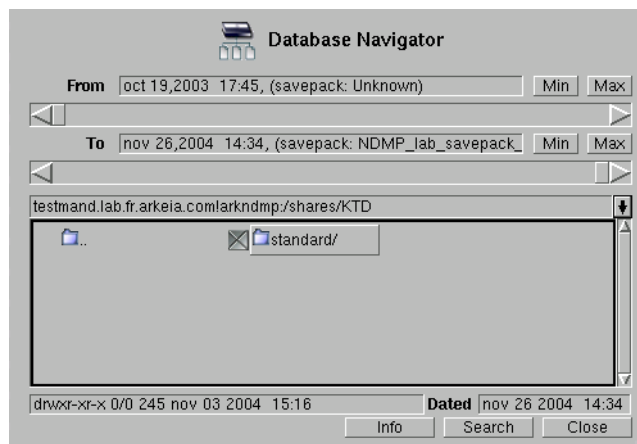
If DAR (Direct Access Recovery) is supported by the NDMP server, and you did not disable it when making the backup, Arkeia will use this feature to speed up the process when only parts of a backup need to be restored.

to reach the NDMP restoration screen:



## Navigator

Click on the Navigator button to reach the Arkeia backup Database navigator:



The Database navigator enables you to select:

- a backup made on a specific date from all the backups currently available;
- individual directory trees to restore; and
- individual files to restore.




**Only data for which backup information is available can be restored. This data is shown for the highlighted tree, in the line above the Info Search and Close buttons.**


NDMP backup data is identified in Arkeia with the prefix `arkndmp:.` before the directory or file name. In the example above, is identified by:

1. the NDMP server name `testmand.lab.fr.arkeia.com`
2. the separator and prefix `!arkndmp:`
3. the NDMP server path `/shares/KTD`
4. the checked box next to the sub-directory to be restored `standard/`

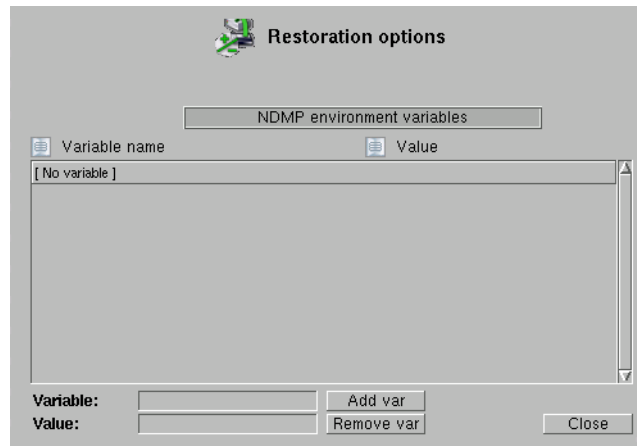
See [How to select files with the Database Navigator](#) on page 131 of the User Manual for details on how to use the Database navigator.

## NDMP restoration options

If it is necessary to set or clear NDMP environment variables for this restoration, you can do it in the Restoration options screen. In the Main menu , click on:

NDMP > Restoration > Options 

and the Restoration options screen will appear.



NDMP environment variables:

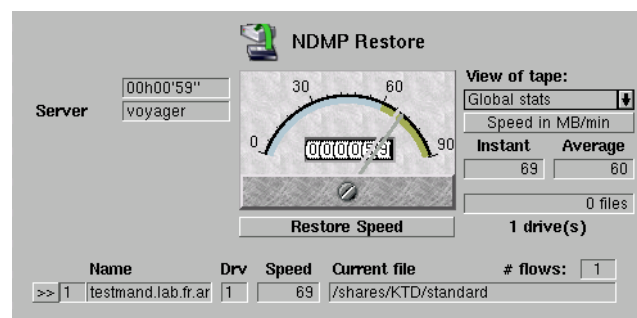
The list of environment variables currently set in Arkeia, and their value. To remove a variable, highlight it and click on the Remove var button.

Variable: Enter the name of a variable you wish to set for this restoration.

Value: Enter the value for the variable here. Click on the Add var button to add it for this restoration.

## Restore NDMP data

When the files to be restored have been selected, and any required environment variables set or cleared, in the NDMP restoration screen, click on the start button to launch the restoration.



The NDMP restore monitor screen will appear, and the restoration will begin. The following items are available in this window to monitor a running restoration:

Elapsed time	Displays the time elapsed since the launch of the restoration.
Server	This is the name of the Arkeia server on which the restoration is running.

In the middle of the screen, a graphical meter displays the amount of data being transferred. The button below the meter face toggles between *Restore Speed* and *Network Throughput*. Click on this button to change the type of information that is displayed on the dial and in the fields below, from the speed of the restoration itself to the amount of information transferred by the network.

Restore Speed	The speed at which the restoration is happening.
Network Throughput	In an NDMP restoration, this is the same as <i>Restore Speed</i> above, because data does not pass through the network.

On the right side of the screen, the following fields and drop-down boxes supply additional information on a restoration:

View of tape	The alternatives for this field are not relevant in an NDMP restoration because only one tape drive can be used.
Speed in...	Click on this button to change the units of data transfer speed displayed on the dial, and in the <i>Instant</i> and <i>Average</i> fields below it. <i>Instant</i> indicates the current speed of the restoration and <i>Average</i> the overall speed of the restoration. The units available are: KB/s (Kilobytes per second), MB/h (Megabytes per hour), or MB/min (Megabytes per minute)

Once a restoration has been completed, Arkeia displays a message indicating the overall results of the operation. Checking this message is important, as it may provide crucial information in case the restoration failed. Click on the *Status* message line at the bottom of the window to see the message log.



# CHAPTER 11: REMOTE CLIENT ADMINISTRATION

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Use the `Client` admin tool in the Administration menu, to:

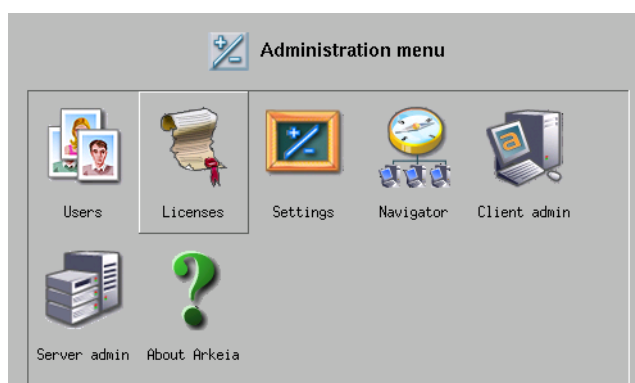
- view the configuration of Arkeia client computers on the network,
- view the configuration of the Arkeia daemon `arkeiad` running on client computers,
- view the configuration of plugins installed on client computers,
- make changes to these configurations,

from an Arkeia server on the network.




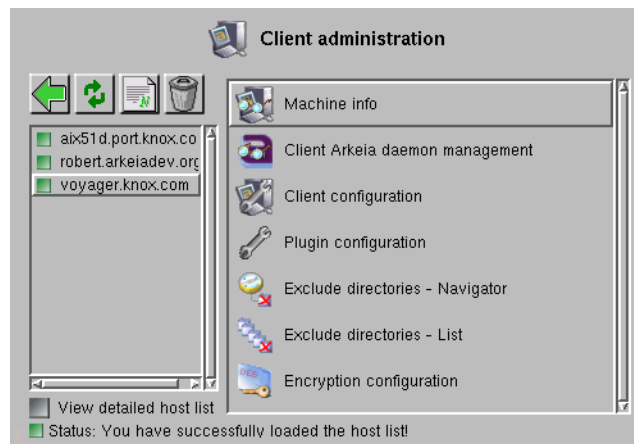
**Remote client administration works only on clients running Arkeia version 5.1 and above. It is not possible to use remote client administration with Netware clients.**

Click on Administration in the Main menu to go to the Administration menu



Start Arkeia and log in to a server which communicates with the client you wish to manage. The client computer you manage with `Client` administration must already have Arkeia client software installed on it. If this is not the case, see [Installation on a client-only computer](#) on page 34 for instructions on how to install Arkeia on a client.

Main menu  > Administration menu > Client admin



The panel on the left lists the clients which this server can backup, and the plugins installed on the client.


To view these additional details for each client:

- IP address
- Port
- Arkeia software version

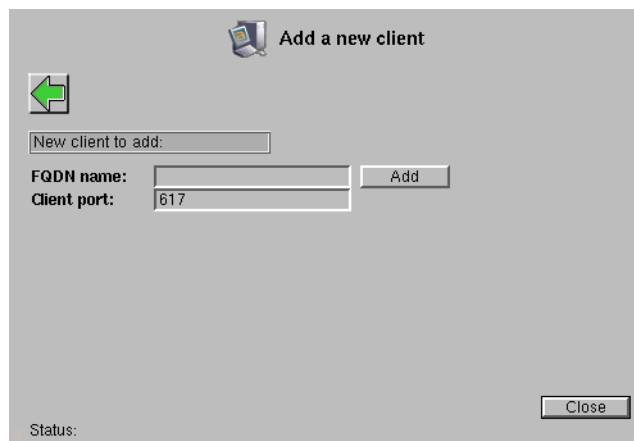
click on the button below this list labeled View detailed host list.

The panel on the right lists the functions available for remote administration of clients.

## 11.1 Add a new client

Main menu  > Administration menu > Client admin > 

In the Client admin menu, click on the New button. The Add a new client screen will appear:





This procedure will add a new client computer to the list of clients managed by the server into which you are currently logged. The client you add must already have Arkeia installed on it.

To add an Arkeia client, fill in the fields in this screen.



FQDN Fully Qualified Domain Name of the client computer (see [Arkeia path syntax](#) on page 143 for a explanation of FQDN).

Client port Accept the default unless the Arkeia daemon of the client computer you are about to add has been configured to use a different TCP port. Enter the different port number used by the Arkeia daemon, if necessary.

Click on **Add** to add this computer as a client to the Arkeia server, then add another or click on **Close** to finish and return to the Client administration menu. The newly added clients will appear in the list of clients displayed in the Client admin screen.

You may have to click on the  Refresh button to see them.

## Remove a client

Main menu  > Administration menu > Client admin > 


To remove a client, click on its name in the objects list on the left, then click on the delete button. The client will be removed from the list of clients managed by the current server. The Arkeia client software will remain on the client computer.



Removing a client does not remove previous backups of that client from this server, and does NOT free a license. It just removes the client from the list of clients known to the server.

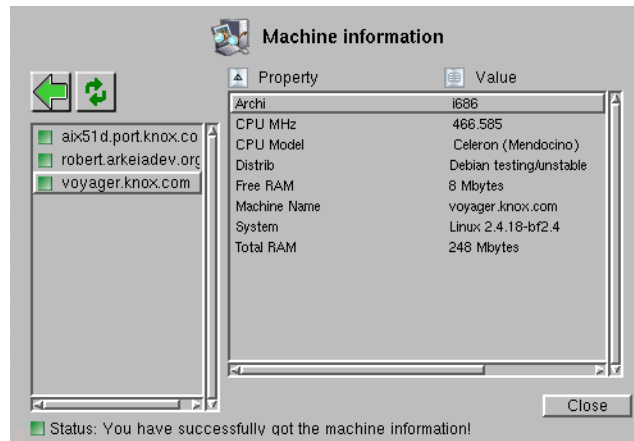
## 11.2 Machine information

---

Main menu  > Administration menu > Client admin > Machine information

Select the client from which you wish to retrieve system information, then click on Machine information in the panel on the right. The Machine information screen will

appear, displaying the available system information for the selected client computer.




The information displayed will differ from one client computer operating system to another. The screenshot above is an example of Machine information for a Linux computer. Different information will be displayed for a client with another operating system. The minimum information displayed is the computer name and the operating system type (for example Solaris, IRIX, AIX and so on...)

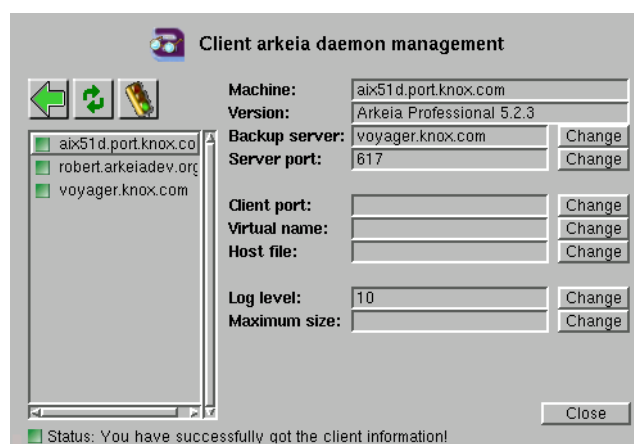
## WMI (Windows Management Instrumentation)



Click on this button to get the detailed information supplied by the Windows Management Instrumentation function on Windows clients. The button will only appear when you have selected a client computer which runs a version of Windows supporting WMI.

## 11.3 Arkeia daemon management

Main menu  > Administration menu > Client admin > Client Arkeia daemon management



Use this screen to re-configure the Arkeia daemon running on client computers. The Arkeia daemon runs in the background on Arkeia servers and clients, and han-

dles communication of Arkeia requests and data between them. You can change the:


- backup server of the client computer,
- port number used by arkeiad on the client computer,
- virtual name of the client computer,
- level of detail in the log generated by arkeiad on the client computer,
- size of the log files generated by arkeiad.

Select the client on which you wish to change the Arkeia daemon, from the objects list in the panel on the left. These fields are available on the right:

Machine: Displays the FQDN of this client computer.

Version: Displays the Arkeia software version currently running on this computer.

The next two fields, Backup server and Server port, are normally changed together to specify a new backup server. After you do this, you should:

- restart arkeiad on the client, by clicking on  the Restart arkeiad button.
- remove the client from its previous backup server (see [Remove a client](#) on page 169).

Backup server: Enter the name of a different backup server on the LAN with which you want the Arkeia daemon on this client to communicate. Click on the Change button to confirm the new backup server. The current backup server is displayed by default, and will remain the backup server for this client until the Arkeia daemon on the client is restarted.

Server port: Enter the TCP port number which the server is configured to use for Arkeia. 617 is the default, if you select a different port number, you must ensure that it is not being used by another service.

Client port: Enter a new port number for the client. An empty field means the default port 617 is active for this client. Click on the Change button to confirm the new value, and restart arkeiad on the client to activate the new port..

Virtual name: Enter a computer name that Arkeia will substitute for the name returned by the hostname command. The default is no host name. Click on the Change button to confirm the new value.


Host file: Enter the name of the file containing the addresses of hosts known to Arkeia. Arkeia will search the addresses entered in this file first and then, if it cannot find the computer in question, it will request the local system name resolution configuration, unless Arkeia is configured to use only its own hostfile (see [How to set up NLP\\_HOSTFILE and NLP\\_ONLYHOSTFILE](#) on

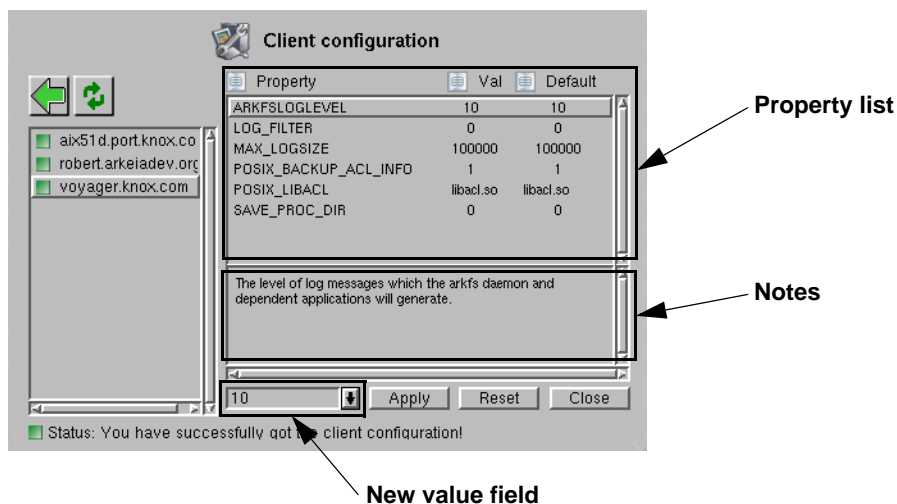
page 240). The default is no host file. Click on the Change button to confirm the new value.

Log level: Enter a number from 10 to 80 (typical values are 10, 20,...70, or 80) to change the level of detail in the Arkeia logs. An empty field defaults to the minimum level of detail, which is 10. Click on the Change button to confirm the new value.

Maximum size: Enter the maximum size, in bytes, of the log files `arkeia.lg1` and `arkeia.lg2`. An empty field defaults to a size of 100,000 bytes. When the current log file reaches the maximum size, it will be closed and the other log file will be overwritten with the new log messages. Click on the Change button to confirm the new value.

## 11.4 Client configuration

Main menu  > Administration menu > Client admin > Client configuration



Use this screen to view or change elements of the configuration which control backup operations on the selected client. The elements accessible vary with the operating system of the client computer. On the right side at the top, there is a scrollable frame containing the accessible configuration properties of the client which is highlighted in the objects list at the left.

Below the configuration properties list is a scrollable frame containing notes about the property highlighted in the frame above. Below the notes frame there is a *new value* field into which you can type a new value for the highlighted property. This field will also take the form of a drop-down list or check boxes, as appropriate to the property being changed.

Apply Click this button to apply the new value you have typed or selected in the new value field. If you do not click this button before changing to

another property or closing the menu, the change you entered will not apply.

- Reset Click this button to reset the value for this property to its default.
- Close Click this button when you have finished changing the client configuration. You will return to the Client administration menu.

## Access control lists

ACLs (Access Control Lists) define who can read, edit and execute each file, sub-directory and directory. You can determine whether or not ACLs are backed up and restored by changing configuration variables.



It is important to review the ACL configuration variables because they can change the security and accessibility of data stored in backups, and restored data.


Configuring variables for ACL handling is slightly different in each operating system.

### Linux POSIX ACLs

ACL treatment for Linux POSIX ACLs can be set at three levels:

- savepack level (see [Backup POSIX ACLs](#) on page 95),
- tree level (see [Add a tree through the Navigator](#) on page 91), and
- client administration, described below.


The ACL set in Client administration overrides the ACL set at savepack tree level. The ACL set at savepack tree level overrides the ACL set at savepack level. To set the ACL variable in Client administration, click on:

Main menu  > Administration menu > Client admin > Client configuration > *clientname*  
> POSIX\_BACKUP\_ACL\_INFO

```
POSIX_BACKUP_ACL_INFO      1      1
```

and set this variable to true.

Next, click on:

Main menu  > Administration menu > Client admin > Client configuration > *clientname*  
> POSIX\_LIBACL

```
POSIX_LIBACL              libacl.so  libacl.so
```


Type the name of the ACL shared library in the new value field, then click on the Apply button. Some distributions install libacl.so.1 instead of the default for this variable.

Backup of POSIX ACLs is supported for most but not all Linux distributions. Please refer to the *Release Notes* included on your distribution media, or at this website:

<http://www.arkeia.com/manuals.html>  
for the list of supported distributions.

### UNIX ACLs


The default behaviour is to *NOT* backup UNIX ACLs. To change UNIX ACL backup behaviour, click on:

Main menu  > Administration menu > Client admin > Client configuration > *servername*

then select `XXXX_BACKUP_ACL_INFO` from the list of variables, where `XXXX` is the operating system of this client computer. To set this variable to true, check the true checkbox, then click on Apply.

### Windows NT security information

To change the Windows NT backup behaviour, click on:

Main menu  > Administration menu > Client admin > Client configuration > *WinNTservername*

<code>WNT_BACKUP_SECURITY_INFO</code>	7	7
<code>WNT_RESTORE_SECURITY_INFO</code>	7	7

There are five levels of security information specific to Windows NT files, each one corresponding to a bit position in a 4-bit byte.

Binary	Decimal	Security information backed up
0000	0	No security information backed up
1000	1	Owner identifier backed up
0100	2	Primary group identifier backed up
0010	4	Discretionary ACL backed up
0001	8	System ACL backed up

To set the level of security information backed up on this Windows NT server:

1. highlight `WNT_BACKUP_SECURITY_INFO` in the scroll list of functions,
2. choose the number corresponding to the security information backup level you require in the new value field, then
3. click on the Apply button.


Combinations of security levels are set by adding their individual decimal labels.

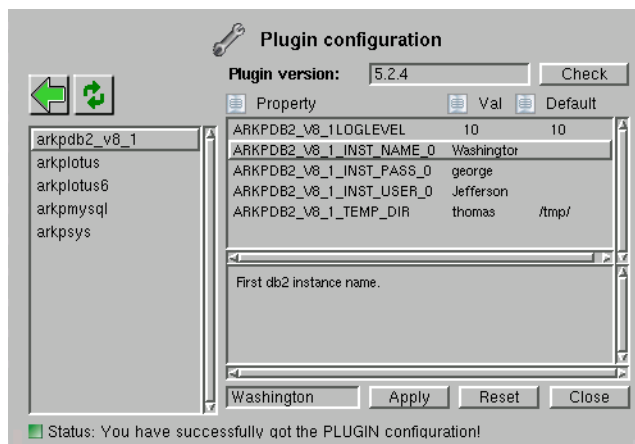
In the example above:

Owner identifier + Primary group identifier + Discretionary ACL = 1 + 2 + 4 = 7

Highlight `WNT_RESTORE_SECURITY_INFO` in the scroll list of functions and set which security information you want restored, in the same way.

## 11.5 Plugin configuration

Main menu  > Administration menu > Client admin > Plugin configuration

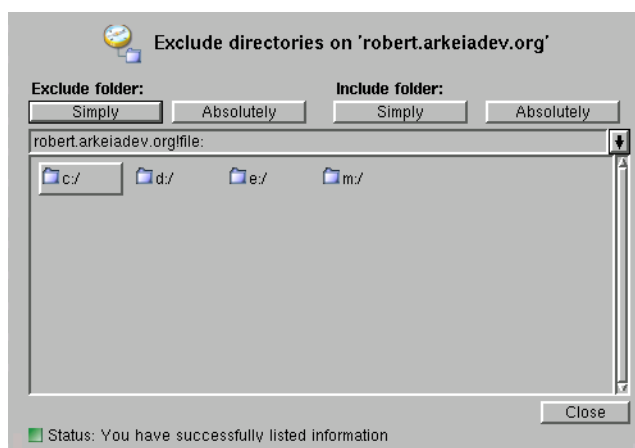


Use this menu to change the configuration of plug-ins you have installed on the selected client computer. The procedure for plugin configuration is the same as [Client configuration](#) above.

Check button: Click on the Check button to verify the configuration of the plugin highlighted in the list at the left. If a problem is detected during the check, a message will be displayed in the status bar. The check button will not appear for all plugins.

## 11.6 Exclude directories - Navigator

Main menu  > Administration menu > Client admin > Exclude directories - Navigator



If you want to exclude some directories (also called *folders*) on the client computer from being backed up, or you want to make some currently excluded directories available for backup, do it in this menu.

## Exclude directory

An excluded directory in a savepack is one which will not be backed up during a backup operation.

### Simply exclude

If you exclude simply a directory, a sub-directory directly selected in the savepack will itself be backed up. The folder symbol to the left of the directory name will be colored orange if that directly is simply excluded.

### Absolutely exclude

If you exclude absolutely a directory, no sub-directories will be backed up, even if they are directly included in a savepack. The folder symbol to the left of the directory name will be colored red if that directly is simply excluded.

## Include directory

You can re-include a previously excluded directory with these buttons. If the directory is simply excluded (orange), click on Include folder: Simply to re-include it in the backup. If the directory is absolutely excluded (red), click on

Include folder : Absolutely to re-include it in the backup.

## Exclude directory menu

Click on the directory you wish to exclude (or re-include) in the navigator window. Double-click on a directory to reach the directory structure one level below. When a directory is highlighted, the buttons above will have these effects:

Exclude folder:

Simply        The highlighted folder will not be backed up. Sub-directories of the highlighted folder which have been directly included in a savepack *will* be backed up.

Absolutely    The highlighted folder will not be backed up. Sub-directories of the highlighted folder will not be backed up, even if they have been directly included in a savepack.

Include folder:

Simply        Re-include a folder you previously excluded simply.


Absolutely    Re-include a folder you previously excluded absolutely.

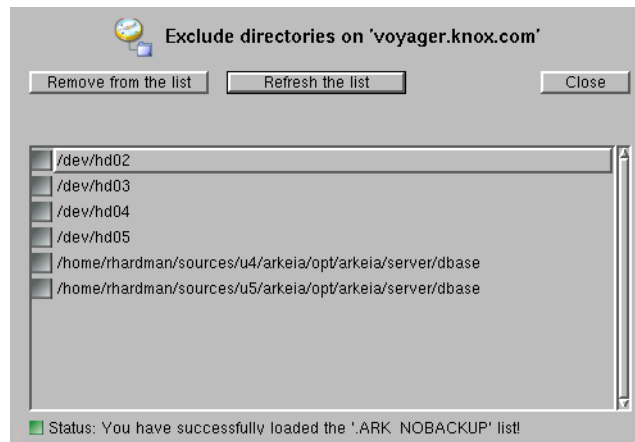
Click Close to confirm your changes and return to the Client administration menu.



## 11.7 Exclude directories - List

---

Main menu  > Administration menu > Client admin > Exclude directories - List




Use this list view of simply excluded directories to quickly see all the directories on the selected client which have been simply excluded, and to cancel one or more exclusions.

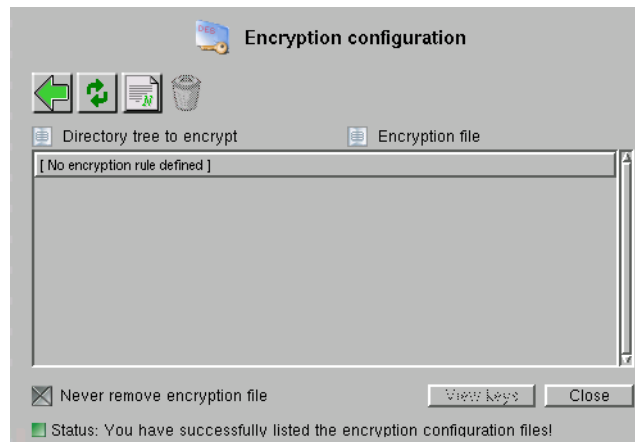
**Remove from the list** Click the checkbox next to any directories in the list which you want to re-include, then click on this button to remove them.

**Refresh the list** Click this button to have Arkeia check the client and make a list of excluded directories. This could take several minutes, depending on the size of the file system on the client computer.

**Click on Close to return to the Client administration menu.**

## 11.8 Encryption configuration

Main menu  > Administration menu > Client admin > Encryption configuration



To make an encrypted backup of a directory, you must:

- have entered your encryption license code, obtained from Arkeia (contact sales@arkeia.com);
- set the Encryption type parameter in of the savepack (see [Manage Savepacks](#) on page 94); and
- create encryption keys for the directory.

Use this menu to create and associate encryption keys for your file system.



The backups for directories you select to be encrypted will only be encrypted if they are associated with an encryption key, otherwise the backup files will be unencrypted.


Note also that you require a special license from Arkeia to make encrypted backups. Contact sales@arkeia.com for details.

Never remove encryption file

Check this box to ensure that encrypted key files remain in the system.

View keys

Click on this button to view the DES or Blowfish public encryption keys.

Click on the **New** button  to associate an encryption key with a directory:



**View encryption keys**

 The directory to encrypt: /ftp/Dev\_docs

The file storing the keys: /tmp/keys

Keys:

DES key: abdgsrqu4907nemww

Blow Fish key:

Apply Close

The directory to encrypt: Enter the pathname of the directory whose backup you want encrypted. This directory must have previously been chosen for encryption when it was included in the savepack.

The file storing the keys: Enter the path and file name which will be created to contain the private encryption key.

DES key: Enter the public key for DES encryption.

Blowfish key: Enter the public key for Blowfish encryption.




The encryption system key, DES or Blowfish, must correspond to the type of encryption selected for the directory when it was included in the savepack. If for example, a key is entered for DES encryption, but Blowfish only was the encryption method selected for this directory, its backup files will not be encrypted.

Click on **Apply** to confirm encryption of the directory entered, then enter a new directory to be encrypted, if necessary. Click on **Close** when you have applied encryption to all the necessary directories.



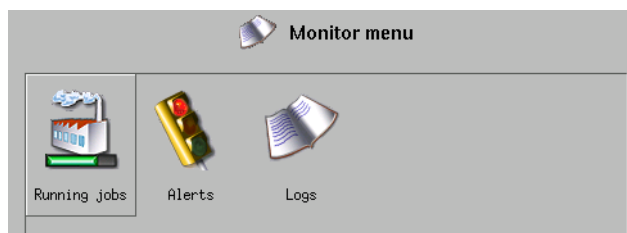
# CHAPTER 12: MONITOR BACKUPS AND RESTORES

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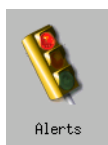
To access the Monitor screen from the Main menu , click on Monitor menu **will appear:**



and the



Click this button to see a list of currently running jobs, from which you can choose the job to monitor.




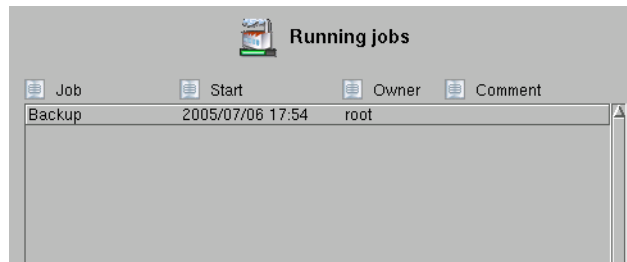
Click this button to configure the alert messages generated by Arkeia, and to review alerts raised during past jobs. Alerts are explained in [Chapter 13:Alerts](#) on page 191.



Click on this button to view the logs of activity.

## 12.1 Connect to a running job

Click on Main menu  > Monitor > Running jobs to see the list of jobs running currently:



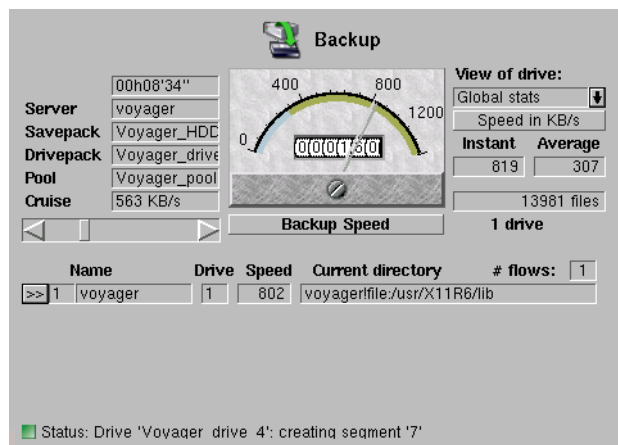
Double-click on the job you want to monitor, and the Backup or Restore monitor screen will appear, depending on the type of job.

## 12.2 Monitor a running backup

The progress and performance of the backup operation can be monitored through the main screen, or through the list of logged operations.

### Monitor a backup through the main screen

Once the backup has been launched, progress information is displayed by Arkeia 5.



You can return to this screen, or change to another backup running concurrently, through the Monitor menu, explained in [Connect to a running job](#) on page 182. This screen contains the following information about an Arkeia backup. On the left side of the screen:

Elapsed time This is the first field displayed on the left of the running backup window. It displays the time elapsed since the launch of the backup.

Server the name of the server on which the backup is running.

Savepack	the name of the Savepack which is being processed by Arkeia.
Drivepack	the name of the Drivepack that has been chosen to perform the backup operation.
Pool	the tape pool from which tapes are drawn as needed to store the data contained in the Savepack.
Cruise	This slider allows you to control the amount of bandwidth consumed by the backup. If important network functions are too slow while Arkeia is performing backups, use the <code>Cruise</code> control to reduce the amount of bandwidth used to perform a backup. Obviously, this will slow down the backup operations, but free up bandwidth for other important network functions.

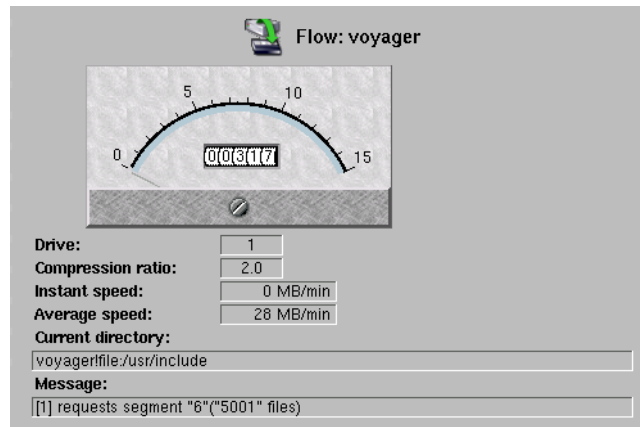
### *The meter*

In the middle of the screen, a graphical meter displays the instantaneous speed of data transfer (the needle) and the average speed of data transfer for this backup (the color band).

On the right side of the screen, the following fields and drop-down boxes supply additional information about a backup:

Global	Click on this drop-down list to display all the drives that are used by the backup. This allows you to restrict the display of information to a particular drive.
Speed in KB/s -- Speed in MB/h	Click on this button to change the type of information that is displayed in the fields below it. This information is displayed in two separate fields: Instant indicates the current speed of the backup and Average the overall speed of the backup being performed.
Backup Speed/Network throughput	Click on this button to change the type of information that is displayed in the fields below it, from the speed of the backup itself to the amount of information transferred by the network.
>> (View)	Click on this button to display an additional information screen on the different flows that are launched by the Arkeia

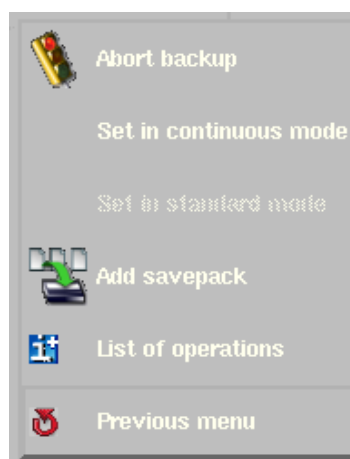
backup. To return to the main backup screen, press the Esc key on your keyboard.



- Drive This field displays the number of the drive being used by the flow.
- Compression ratio This field displays the compression applied to the flow.
- Instant Speed The instantaneous speed of data transfer
- Average speed The average speed of data transfer in this backup session.
- Current directory The directory being processed.
- Message The last message returned by Arkeia 5.

### Monitor a backup through the list of operations

Another way to monitor a running backup is to click with the right mouse button anywhere in the window of a running backup. This displays the backup contextual menu.





Click on the fifth option `List of operations`. A screen will appear which summarizes the operations and trees that are, or will be, performed by the backup.



In the example above, a backup has been launched that contains four different trees. The following fields offer additional information on the tree number indicated:

**Tree number** The trees are displayed (and processed) in the order they have been defined in the Savepack.

**Type** This field displays the type of tree you have chosen. The different types of trees are detailed in [Add an object path to a savepack](#) on page 88.

**State** This field displays the current state of the tree that has been selected by the user. The three different states of a tree are:

- Init** the tree is going through an initialization phase within the Arkeia backup subsystem.
- Running** the tree is being processed by the Arkeia backup subsystem.
- End of tree** the tree has been backed up by Arkeia and processing has finished.

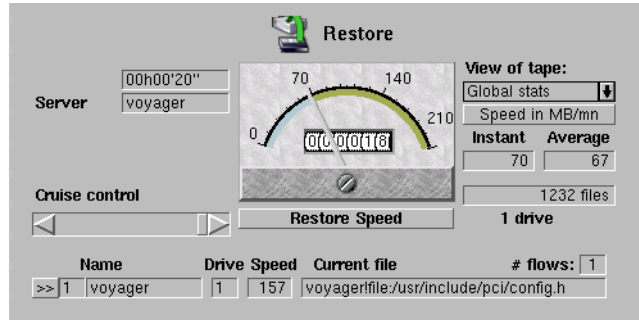
**Results** This field displays the results of the backup of the tree.

**Retries left** This field displays the number of retries left in case a backup operation failed to run, for example, if a file contained in the tree is locked by the system.

Clicking on any tree with the left mouse button will display its information in the fields in `List of operations`.

## 12.3 Monitor a running restoration

You can return to this screen, or change to another backup or restoration running concurrently, through the `Monitor` menu, explained in [Connect to a running job](#) on page 182. When you select a running restoration, Arkeia opens the main `Restore` screen:



The following items are available in this window to monitor a running restoration:

Elapsed time	Displays the time elapsed since the launch of the restoration.
Server	This is the name of the server on which the restoration is running.
Cruise control	This slider allows the system administrator to control the amount of bandwidth consumed by the restoration. If important network functions are too slow while Arkeia is performing restorations, use the <code>Cruise control</code> to reduce the amount of bandwidth used to perform a restoration. Note that this will also slow down the restore operation.

In the middle of the screen, a graphical meter displays the amount of data being transferred between the client and the server. The button below the meter face toggles between `Restore Speed` and `Network Throughput`. Click on this button to change the type of information that is displayed on the dial and in the fields below, from the speed of the restoration itself to the amount of information transferred by the network.

<code>Restore Speed</code>	The speed at which the restoration is happening.
<code>Network Throughput</code>	The speed of data transmission over the network
<code>Restore Speed</code>	The rate of data backup in: KB/s (Kilobytes per second), MB/h (Megabytes per hour), or MB/min (Megabytes per minute) indicated on the dial.
<code>Network Throughput</code>	The rate in of data transmission through the network in: KB/s (Kilobytes per second), MB/h (Megabytes per hour), or


MB/min (Megabytes per minute)  
indicated on the dial.

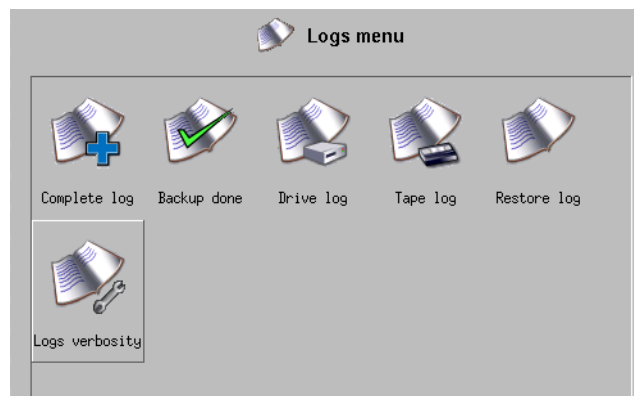
On the right side of the screen, the following fields and drop-down boxes supply additional information on a restoration:

View of tape	Clicking on this drop-down list displays a list of the drives that are used by the restoration. Select the particular drive you want to monitor from this list, or select <i>Global stats</i> to monitor the restoration globally, over all the drives in use.
Speed in...	Click on this button to change the units of data transfer speed displayed on the dial, and in the <i>Instant</i> and <i>Average</i> fields below it. <i>Instant</i> indicates the current speed of the restoration and <i>Average</i> the overall speed of the restoration. The units available are: KB/s (Kilobytes per second), MB/h (Megabytes per hour), or MB/min (Megabytes per minute)

Once a restoration has been completed, Arkeia displays a message indicating the overall results of the operation. Checking this message is important, as it may provide crucial information in case the restoration failed. Click on the *Status* message line at the bottom of the window to see the message log.

## 12.4 Activity logs

Click on Main menu  > Monitor > Logs to see a menu of available logs:



Logs are kept of messages concerning:

- backups completed,
- tape drives, and
- tapes.

The messages in these logs can all be viewed together in one log, the *Complete log*.

## Logs verbosity

Messages generated by Arkeia come from the Arkeia:

- system program arkpsys,
- client, or
- backup server.

Individual messages can be configured to appear at High, Medium or Low levels of log verbosity, which you normally set when configuring tape drives and tapes in Arkeia.


Main menu > Hardware > Tapes > History

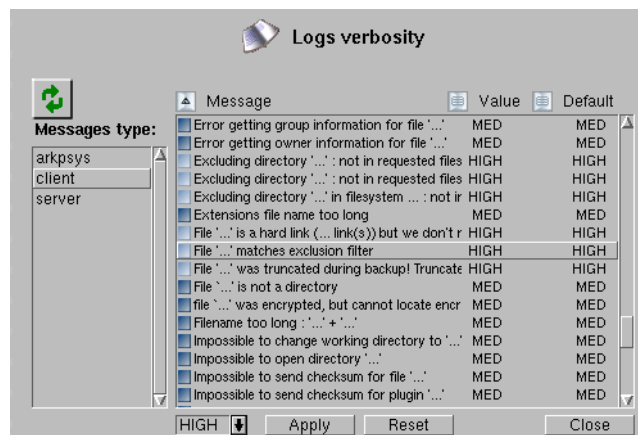
to change the tape log verbosity.

Main menu > Hardware> Drives > History

to change the tape drive log verbosity.

There are default values that control which messages appear at what verbosity levels, and these will be adequate under normal conditions, but you may wish to change the level at which one or more messages appear, for debugging purposes. You can do this in the Logs verbosity menu. To reach this menu, click on:

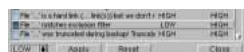
Main menu  > Monitor > Logs verbosity to see:



You may have set a verbosity level of Low for a tape but want to verify, for example, that a particular file is being caught by the regular expression in your exclusion filter. In the Logs verbosity menu, the message:

File "... " matches exclusion filter

is set to display in High verbosity logs by default, so this message will not appear when you have set the verbosity level to Low for the tape pool containing this backup.



1. Select the Message type in the objects list on the left.

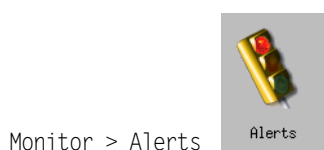
2. Select the message in which you are interested from the message list on the right.
3. Change the verbosity level of that message in the drop-down menu below, then click on *Apply* to confirm.



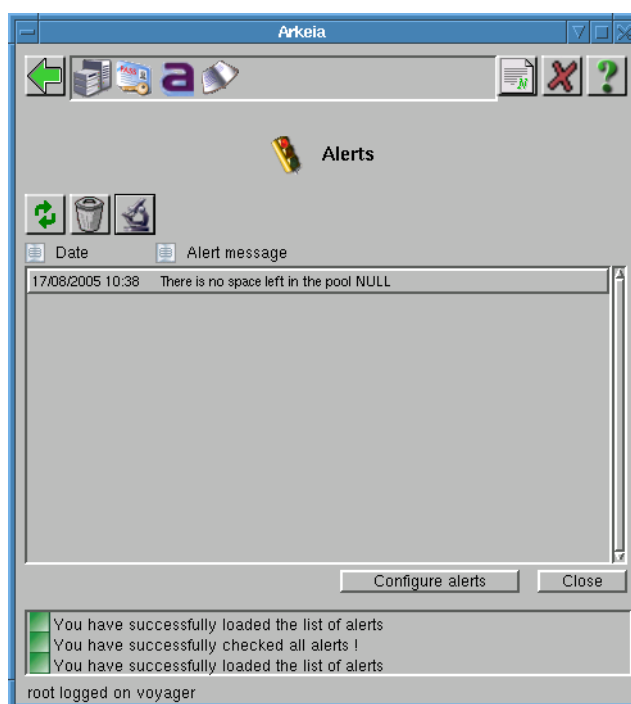
# CHAPTER 13: ALERTS

---

To access the Alerts screen from the Main menu , click on:



and the Alerts screen will appear:



Alerts are messages generated by Arkeia 5 if it discovers something that could cause a backup to fail. A log of raised alerts is kept and can be viewed, and alerts can optionally be sent as emails to a designated Arkeia user, or a user and one other person.

An alert is raised if an abnormality is found in:


- a tape drive;
- a periodic backup configuration;
- a tape pool configuration;
- a savepack configuration; or
- the system on which the Arkeia server is running.

This screen displays the list of all alerts logged by Arkeia. You can change the types of alert logged in the `Configure alerts` menu.

## 13.1 Check the system

---

Arkeia checks for abnormal conditions every hour and if it finds one, adds an alert to the list of raised alerts and emails the alert message to designated recipients, if you have chosen these options in the **Configure alerts** menu.

Click on the **Check now** button  if you want to check your system now, without waiting for the next hourly update.

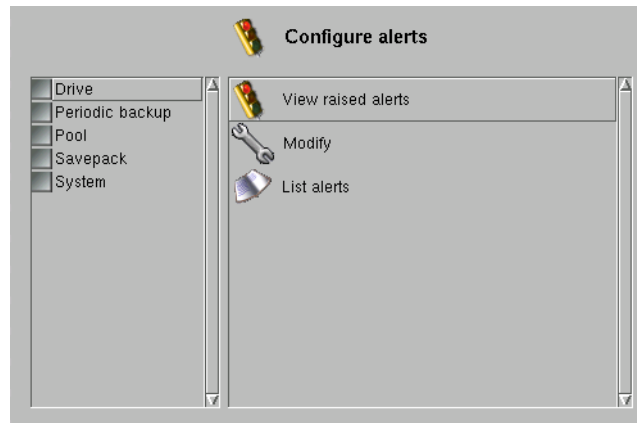
## 13.2 Configure Alerts

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The types of alert raised by Arkeia can be configured by clicking on the

 **Configure alerts** button.

The **Configure alerts** menu will appear:



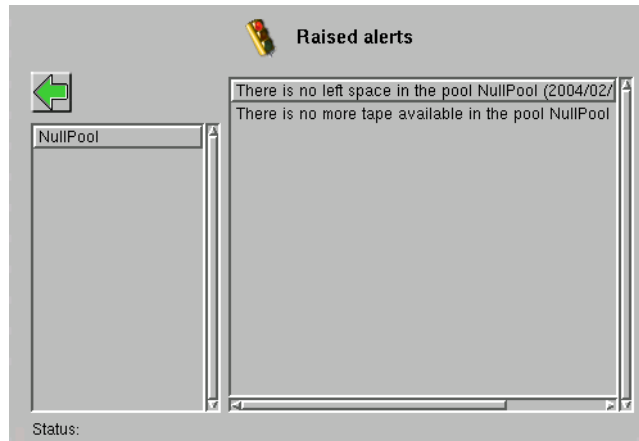
Alerts can be viewed and configured for any item in the objects list in the left panel, through the functions listed in the right panel.

### See raised alerts

To see alerts which Arkeia has raised for an object, first choose the category of object from the object panel at the left, by clicking on its checkbox. You can select one or more categories at the same time.




Now click on View raised alerts  in the functions panel on the right, and you will see a list of alerts raised for the selected object category.

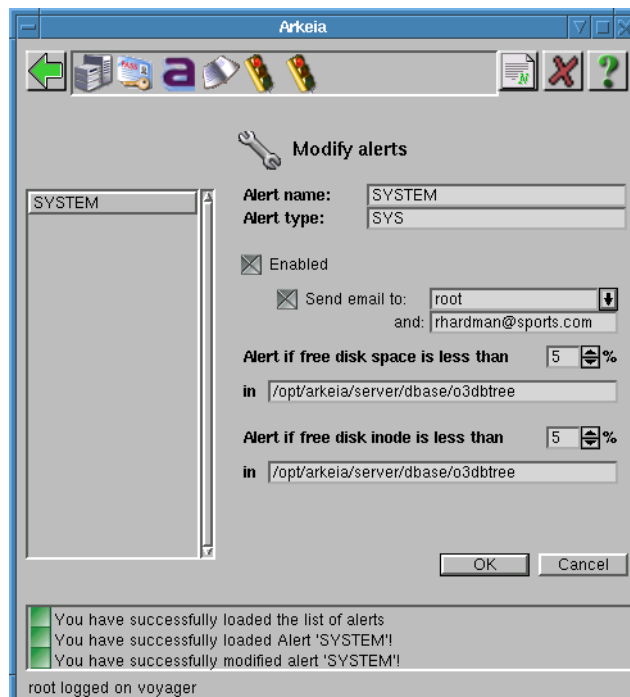


## Modify alerts

The alert for any particular object you have created in Arkeia 5 can be enabled or disabled. If alerts are enabled, email notification can be turned on or off, and a user, or a user and one other email addressee can be nominated to receive the alert emails. Only the alerts you have enabled will be monitored by Arkeia.

To enable an alert, first choose the category of object from the panel at the left, by clicking on its checkbox. You can select one or more categories at the same time.

Now click on Modify  in the functions panel on the right, and a Modify alerts screen will appear. This screen will be slightly different for each category of object. In the example below, all object categories were checked before clicking on Modify alerts.



In this case, the scroll list on the left contains all the objects we have created, and the first object in the list, a periodic backup, is highlighted. The alert configuration shown on the rest of the screen applies to whatever object is highlighted in the objects list.

### Turn an alert on or off

Alerts for all objects are turned on or off in the same way:

Alert name: Exchange01  
 Alert type: PER  
 Enabled  
 Send email to: root  
 and:

In the Modify alerts window, select the object whose alert you wish to change. Click in the checkbox labeled Enabled to toggle the alert between Enabled and Disabled. If enabled, click on the Send email to: checkbox if you want to email the alert messages raised for this object, as well as listed in the Alerts screen. Click on the dropdown button to select a previously registered user as recipient of the emails. Add another email address in the and: field, if you wish. The other fields in this section of the screen are:

Alert name: same as the name of the object for which the alert is set.

Alert type: the category of the object, alert types are:

DRV	tape drive
POOL	tape pool
PER	periodic backup
SPK	savepack
SYS	system

The alerts for each category are different, and are listed below the email fields.

Click on Ok to confirm changes you have made, or click on the Back button to abandon the changes. You will be returned to the Alerts window.

### Tape drive alerts

The possible alerts for a tape drive are:

- the drive needs to be cleaned;
- a hardware failure is predicted;
- the drive temperature is outside the normal range.

Not all tape drives can provide the level of monitoring information required for these alerts. For example, the last two in the above list require tape drives which support Quantum DLTSage™. Your tape drive documentation will tell you if an alert in the above list is supported.

### Tape pool alerts

The possible alerts for a tape pool are:

- There is no space left in the pool: all the tapes in the pool are filled.
- There is less than a percentage of space free. You can enter the percentage of free space left which will trigger this alert. The default is 80%.
- There is less than a number of tapes left. You can enter the number of free tapes left which will trigger this alert. The default is 1 tape.

### Periodic backup alerts

The possible alerts for a periodic backup are:

- A savepack included in this periodic backup no longer exists.
- A drivepack used by this backup no longer exists.
- A tape pool used by this periodic backup no longer exists.

### Savepack alerts

There is one alert for savepacks:

- No license exists to backup a savepack you have included in a backup.

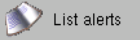
### System alerts

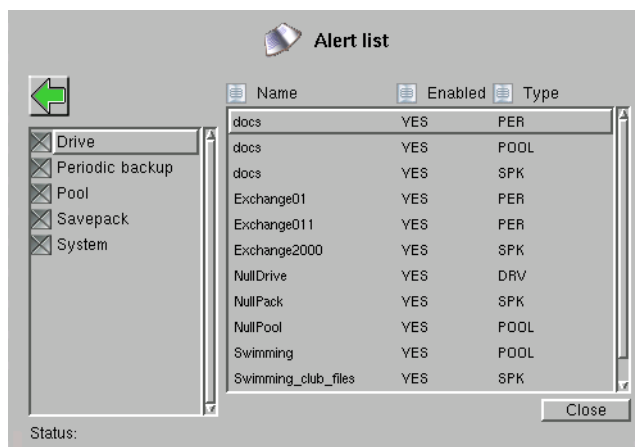
There are two system alerts:

- Disk space too low.
- inode space too low.

## List alerts


List alerts allows you to see if an alert is set or not set for each object in your backup system. First choose the category of object from the panel at the left, by clicking on its checkbox. You can select one or more categories at the same time.

Now click on List alerts  in the functions panel on the right, and you will see a scrollable list of named objects you have created, whether they are enabled or not, and their category.



In our example, we selected all the categories of objects, so all the alerts will appear in the list at the same time.

## Delete an alert

Alerts raised remain in the list until you delete them. To delete an alert, go to the Alerts screen: Main menu > monitor > Alerts, highlight the alert to be deleted and click on the delete button  .

# CHAPTER 14: TAPE LIBRARIES

---

Tape libraries, also known colloquially as *jukeboxes* and *tape changers*, are advanced backup devices that combine a number of tapes into a single physical unit to provide a large amount of accessible data storage space. They allow backup tasks to be completely automated and to run unattended on an Arkeia server.



**To use a tape library with Arkeia 5, you need a separate license. Contact [sales@arkeia.com](mailto:sales@arkeia.com) to obtain a tape library license.**

## 14.1 Tape library characteristics

---

Libraries usually contain one or more of the following components:

- Robotic arm     This device transfers tapes to and from the tape slots to the tape drives. They are also called *medium changers* or *robots* and, in the rest of this chapter, these terms will be used interchangeably.
- Tape slots     Tape slots contain tapes that will be used for backup and restoration operations. A typical library can hold dozens of tapes, each in its own separate slot.
- Drives         A typical library contains usually two or more tape drives.
- Gates          A library gate is used to eject a tape without having to open the entire library. Tapes inserted in the gate are then moved to free tape slots by the robotic arm. In the same way, tapes can be moved from their slots to the gate, for instance to be placed in off-site storage. A library without a gate has to be opened for a tape to be removed or added and usually, the library must be taken off-line to do this, which interrupts the backup operations.

The precise configuration of a library can vary between models and manufacturers. Always refer to the documentation supplied with the library for more information.

There is a much longer discussion on backup devices in [Chapter 4:Hardware installation](#) on page 49. Also, chapter [Chapter 1:System Requirements](#) on page 19 contains additional information which may be useful during the configuration of a library.

### Libraries managed by Arkeia

The list of libraries managed by Arkeia contains more than 300 devices. It is available online, at this page:

<http://www.arkeia.com/mass.html>

It is highly possible that a library device which is not listed at the web page indicated above will be supported. For more information, please contact [sales@arkeia.com](mailto:sales@arkeia.com).

## 14.2 How to create a tape library

Creating a library under Arkeia 5 is a simple process, when carried out through the GUI. However, it is important to follow a definite order:


1. Create the drives that will be added to the library.
2. Create the tapes that will be added to the library.
3. Create the library itself, including its robotic arm and its slots.
4. Add the drives to the library.
5. Assign the tapes to the slots of the library.

Before proceeding with tape library creation, you may want to refer to:

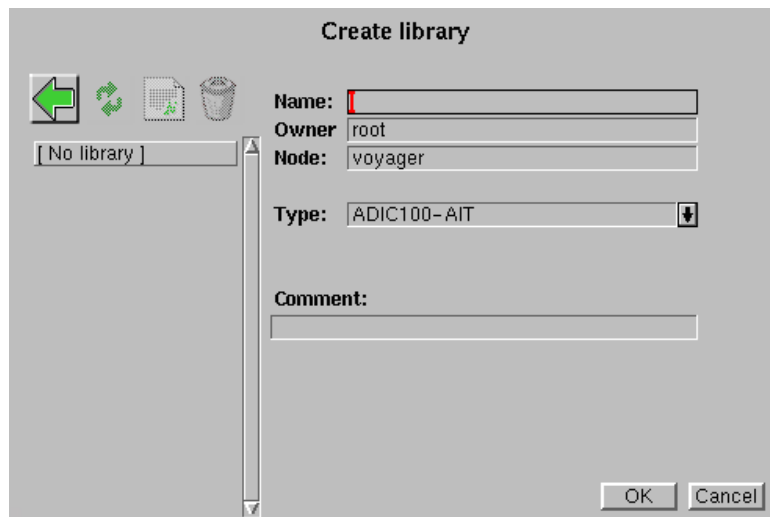
- [Chapter 6: Create objects and users](#) on page 69 for information on the creation and configuration of tapes and drives.
- [Chapter 4: Hardware installation](#) on page 49 for information on how to detect, install and manage backup devices.

### Create tape library menu

In the Main menu , click on:

Hardware > Libraries > New 

The Create library menu will then appear.



In this menu, the following functions are available:

Name	Enter a name for the library in this field. This name will then be used in the different logs of Arkeia 5.
------	--

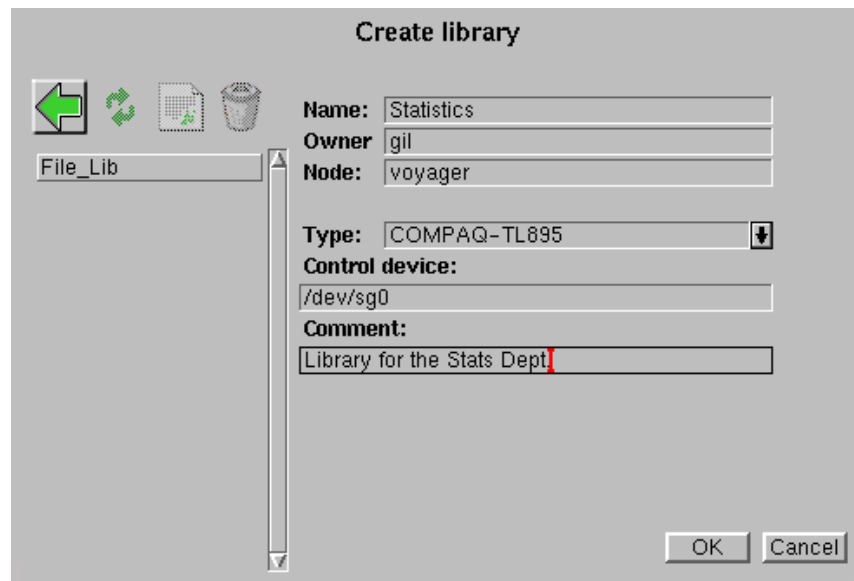
Owner	Enter the name of the owner of the library in this field. By default, the user who opened Arkeia 5 and created the library is the owner of the hardware device. This name can be changed to restrict the usage of the library to a specific user, which may be appropriate if several libraries are connected to a single Arkeia backup server.
Type	This drop-down menu is a list of all supported libraries. To navigate more quickly in this list, it is possible to type the first letters of the library type for instance, typing F while this menu is active will move automatically to FALCON-1530, which is the first library type whose name begins with F. Please note that most libraries also require an additional licence to be managed by Arkeia 5.
Control device	Enter the name of the device driver used to control the library medium changer. For instance, under Linux, such a device driver could be /dev/sg0. This field will only appear if it is required by the given library type.
Comment	Enter a descriptive comment, such as the physical location of the library or some other information, in this field. An entry in this field is optional.

### **FILE tape library**

In the **Type** field, **FILE** is one of the alternatives in the drop list. A **FILE** tape library *must* be created if you are backing up to an **HDD** or similar online storage device. There is no means of manually inserting a **FILE** tape, when Arkeia calls for it, so a file tape library and one or more file tape drives must be created. See [File Tape](#) on page 75 and [FILE tape drive](#) on page 84.

When the library configuration is finished, click on the **OK** button at the bottom of the menu to create the library and return to the main **Libraries** management menu. In

this menu, the library you created will appear in the list of libraries on the left-hand side.



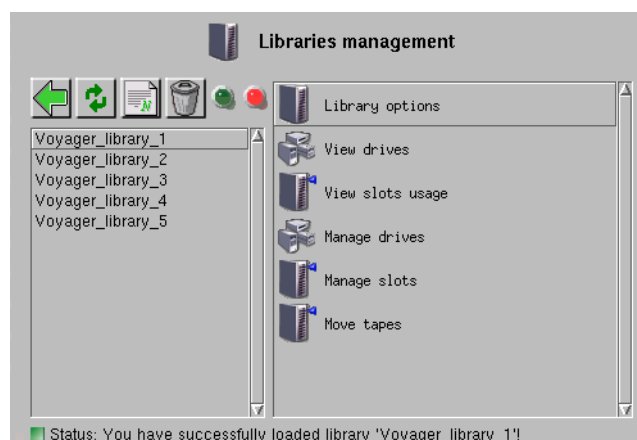
In the example above, we have created a Compaq-TL895 library, named Statistics. It is owned by gil, and is controlled from the server on the computer named Voyager. This library is controlled, under Linux, by the device /dev/sg0. The exact control device may vary, based on the operating system used.

### Add drives to a tape library

Note that drives must be created before being added to a library. If you have not yet created one or more drives, you will not be able to go any further in the library creation process. Refer to *Tape drives* on page 82 for instructions on how to create tape drives.

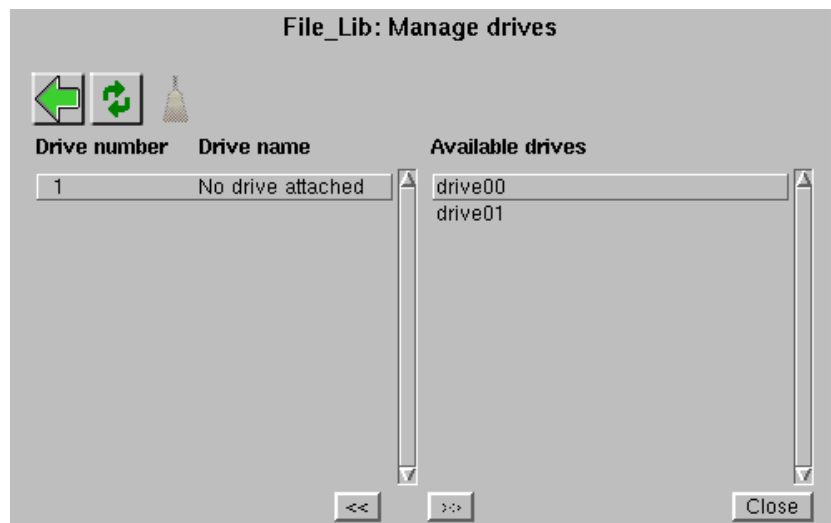
To add existing drives to a library, follow the steps outlined below:

In the main Libraries management menu, click on the option Manage drives (refer to the screen pictured below):






The Manage drives menu is then opened:



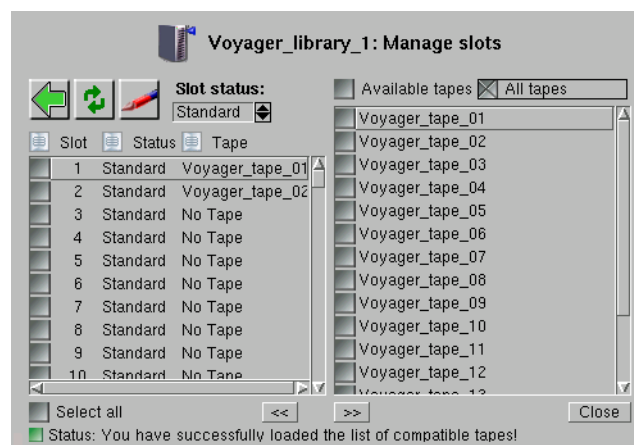
This menu is divided into two lists: on the left is the list of drives positions within a library, and, on the right, the list of available drives. The << and the >> buttons allow you to attach and detach drives easily. In the example above, two drives drive00 and drive01 can be assigned to the current library.

Select a drive position, then select an available drive, and click on the << button to attach the drive to the library. Or, select a drive position, then a drive, and click on the >> button to detach the drive from the library. Once the library configuration is finished, clicking on the Close button records the drive assignments and returns to the main Libraries management menu.

 Also of interest in the Manage drives is the broom (Clean drive) button. To clean a drive, simply select the drive in the library, and click on the broom button. This will launch the cleaning process. During this process, Arkeia will transfer a cleaning tape from its slot (see below) into the selected drive and clean it automatically.

## Add tapes to a library (slot assignment)

To add existing tapes to a library, you have to assign these tapes to one of the internal slots of the library. To do this, in the main Libraries management screen, click on the option named Manage slots. The slot management screen will be displayed:



This screen, like the `Manage drives` described above, is divided into two parts: the left-hand part is the list of slots within the library, while the right-hand is the list of available tapes.

To assign a given tape to a library slot, select both the tape and the slot by clicking on the grey check box next to their names, and click on the << (assign) button. To un-assign a tape from a library slot and make it available again, select the library slot where the tape is stored and click on the >> (un-assign) button.

Other items in the `Manage slots` menu are the `Slot status`, `Write label`, `Available tapes` and `All tapes` buttons.

`Slot status` This spin box provides a quick way to change the status of the selected slot. The status can be:

Normal	the slot can be used by Arkeia for backup and restore operations.
Reserved	the slot cannot be used as it is saved for another application. It can be used for tape duplication.
Cleaning	the slot must contain a Cleaning tape. Self-explanatory.



Clicking on the `Write label` button will force Arkeia 5 to write a new label on the selected tapes. While this may be useful in certain cases, Arkeia automatically writes a label to the tape during the first backup, so this operation should be considered as *optional*, especially if the library already has a bar code reader, which is recognized and used by Arkeia 5.



**When you write a label to tape the tape name is changed. Arkeia will then be unable to match the tape to its database records. Use this function with extreme caution, on tapes that do not contain important data, and only when directed to do so by an Arkeia Technical Support Specialist.**

`Available tapes` Click on this checkbox to restrict the list of tapes to those which have not yet been assigned to a slot.

`All tapes` Click on this button to list all tapes, those which have been assigned and those which have not been assigned to slots.

When the configuration is complete, click on the `Close` button to save the slot status and return to the main `Libraries` management screen.

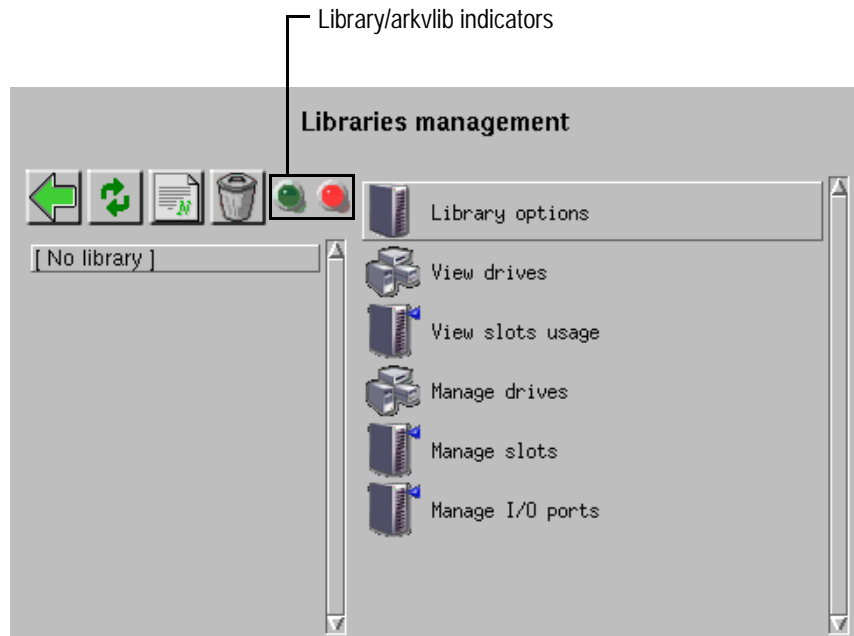
## 14.3 How to operate a tape library

After a library has been configured in Arkeia 5, its operation is largely transparent. Backup and restore operations address the drives and tapes within the library directly. The main function of the library is to insert tapes into, and remove tapes from their associated tape drives, under the control of the backup server, so remov-

ing the need for human intervention and allowing large backups to proceed automatically.

## How to start and stop a tape library

The first task that should be undertaken, before using a library, is to make sure that `arkvlib`, the Library manager of Arkeia 5 is running correctly. To do this, check the indicators that are between the library list buttons and the Library options item:



To start the library manager (or make sure it is already running), click on the green indicator. To stop the `arkvlib` library manager, click on the red indicator. Moving the mouse pointer over the indicators displays the current status, as returned by Arkeia 5.

There are three possible states:

Green light      **Started and ready.**

Red light        **Stopped.**

Yellow light    **Initializing exploration.**

When started, `arkvlib` first checks the tapes that are in the library. This is the exploration phase. If the library has a barcode reader, this operation is quite fast because the information has already been read from the barcodes by the library. If the library has no barcode reader, `arkvlib` must load each tape into a drive and read the label to identify it. This phase can take several minutes, and is indicated by the yellow light. During the exploration phase, you will not be able to carry out any other library operations.

## Using a library for a backup

There is no need to declare a library for a backup operation. To use an existing, configured, library in a backup operation, simply define a Drivepack (refer to [Drivepacks](#) on page 85 for more information) that contains the drives in the library.

Whenever a backup is launched, the Drivepack that contains the drives of the library will be selected. Arkeia 5 will then transparently manage the backup, using the library drives and the advanced functions of the library.

## Library tape operations

When the library has one or more tapes assigned to slots, create a tape pool (see [Tape pools](#) on page 79) that contains the library tapes. When configuring the backup operation which is to use the library (see [Chapter 7:Interactive backup](#) on page 105 and [Chapter 8:Periodic backup](#) on page 117), select this tape pool as the target media, and Arkeia 5 will then transparently use the library tapes and the SCSI robot device to change the tapes in the library drives, when needed.

## A special case: the file libraries

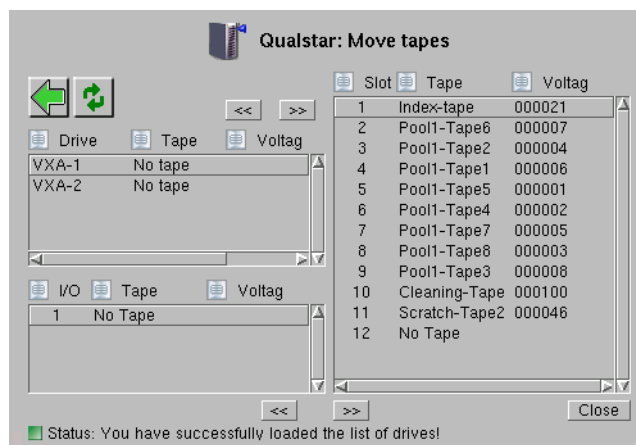
File libraries are a special case: they do not use physical tapes, but save the data to files which simulate tapes, on a disk. This is useful for testing purposes, and to get a better sense of how Arkeia uses libraries in general.

File libraries are configured exactly the same as normal libraries, except that file tapes should be assigned a path during their creation (see [How to create tapes](#) on page 74). Also, File libraries cannot contain more than one drive, and should not be assigned any device controller.

We recommend that you test the facilities of Arkeia 5 tape library control using file tapes, before installing and configuring a real library. The behavior of a file library is exactly the same as a normal library.

## How to move tapes in the library

Click on the Move tapes icon in the Libraries management menu to access the following screen:



**Move to another slot**

Use the << button at the top to load the highlighted tape on the right to the highlighted drive on the left. The >> button does the reverse.

**Remove to or insert from the library**

Use the << button at the bottom to move the highlighted tape on the right to the highlighted port or gate on the left, from where it can be removed physically from the library. The >> button will take a tape placed in the port, and insert it into a highlighted No tape slot. If a slot which already contains a tape is highlighted, an error message will appear.



# CHAPTER 15: IMPROVING PERFORMANCE

---

Arkeia 5 will usually give satisfactory performance in its default configuration. Most networks will benefit from some performance-tuning that can be done to decrease the time taken to do various backup tasks. In this chapter, we revisit some of the previous configuration settings to make adjustments which will maximize the productivity of Arkeia 5.

## 15.1 Optimization

---

The goal of Arkeia 5 optimization is to maximize the performance of network backup operations by moving data as fast as possible from the disk drives to the tape drive.

From this point of view, the weak spot in a backup chain is often the tape drive. For efficient operation:

- the drive must be correctly fed with data, to prevent it from having to rewinding very often; and
- the SCSI bus must be saturated, to make sure that the tape drive always has sufficient data to write continuously.

On a Fast-Ethernet network of 100 Mbps, meaning 12.5 MB/sec bandwidth, a single flow will not saturate a 20 MB/sec SCSI bus. Moreover, latencies in the network and delays in the clients can cut the data transfer rate even more, resulting in lower performance.

Arkeia 5 allows the simultaneous backup of multiple sources, using several interlaced flows of data to make sure the SCSI bus is saturated as much as possible. Indeed, the total performance of the backup system can actually be higher if you backup three clients simultaneously, instead of one at a time.

The idea of this section is to show you how to use this multi-flow feature to maximize the performance of your backup system.

### Average network performance

On a 100 Mbps network, you can expect backup speed anywhere from 300 – 1000 Mbps per minute. Backup speed will depend on the client, server, network and tape drives or library configurations, as well as data compression. 10 Mbit networks are proportionally slower. Faster networks are proportionally faster. If the actual performance does not reach this level, it might be necessary to check if your network is setup properly.

The average backup speed on the client side is 0.83 MB/sec, with a 100 Mbps Ethernet network, it gives 12.5 MB/sec of theoretical traffic, meaning 7 to 8 MB/sec of real throughput.

## 15.2 Using multiple flows

---

Arkeia's performance is also based, in part, on the number of simultaneous backup flows that are active at anytime. Each flow represents a client computer or a disk drive of a client computer.

Parallel backup, or multi flow, increases backup speed and reduces the overall time required to backup a group of networked computers by interleaving the data from several clients and disks at the same time.

This allows for optimum network and tape drive usage even when the client computers are on different network loops and have different speed disk drives.

The backup can be configured to use one flow per disk drive in the file servers and 1, 2 or n flows for the entire group of desktop computers. This will backup the file servers very quickly and also backup the desktop pool in a reasonable period of time. When there are more clients or disks than flows, Arkeia uses a round robin strategy, which can be modified, to complete the backup. As one client or disk completes its backup, the next available client or disk is started.

### Parallelism of a single computer and of multiple computers

By default, Arkeia backs up multiple computers using one flow per computer. The parallelism is automatically configured and performance is optimum.

Also by default, Arkeia uses a sequential procedure to back up the trees selected on a single computer (same flow: 0, see [Multiflow](#) on page 101). To run parallel backups, the trees from a single computer are separated into several groups via number changes made in the Multiflow field. In other words, giving each tree a different number will ensure all trees will be backed up simultaneously (provided you have enough available flows). Each number approximates to a flow number.

Then trees with the same Multiflow number are backed up sequentially.

## 15.3 How to limit backup speed

---

By default, Arkeia tries to use as much bandwidth as possible to run its backup. However, you may want to save some network bandwidth for others jobs. You may also have some network problems as some parts of your installation may be slower than others.

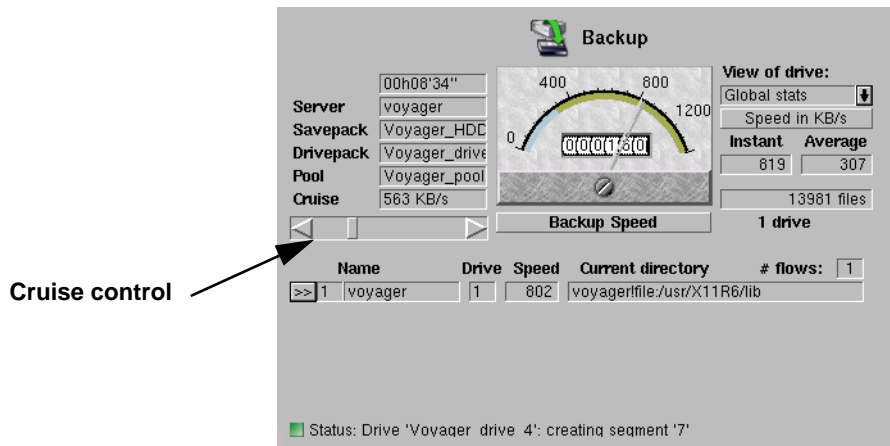
In this case, it can be useful to control the backup speed, thus making sure that your network will not be completely saturated.

### The graphical cruise control

In the Arkeia 5 graphical interface, you can limit the backup speed by using the cruise control slider.



In the Backup window, use the slider to change the backup speed.



## Default backup speed limitation

Usually periodic backups are running during night time. It may not be convenient to manually modify the cruise control. The easiest way to do this is then to set the `SOCK_SPEED` preference.

Add the following preference in the file:

```
/opt/arkeia/arkeiad/arkeia.prf
SOCK_SPEED [value]
```

The [value] is the number of KB/sec per tape drive. For instance:

```
SOCK_SPEED 2048
```

means a throughput limit of 2048 KB/s, (approximately 120 MB/minute).

If  $n$  tape drives are available, this value should be divided by  $n$ . For instance, if there are two tape drives available, the above setting limits the speed of each drive to 1024 KB/sec.

Once this value has been defined, all the backups will default to this speed, though you can still use the cruise control from the GUI to change the current speed of a specific backup.

## 15.4 How to set tree priority

You may want to backup various trees in a specific order. For instance, you may want to assign a higher priority to the backup of a heavily-used server to make sure it will be backed up during the night, and to let the other computers be backed up later, during the day if necessary.

The Priority feature of Savepacks is used for this, combined eventually with the Chaining command.

Priority is set between trees within the same flow. Trees backed up by different flows are saved simultaneously.

In the Tree Options, for each tree of the Savepack (see the Priority option under *Tree Options* on page 102), it is possible to add a Priority field according to needs.

By default, all trees have a Priority of 50. To set a higher priority, lower the number (the highest priority is 1). To lower the priority, increase the number (the lowest priority is 100)

Trees will then be processed from the highest priority down to the lowest.

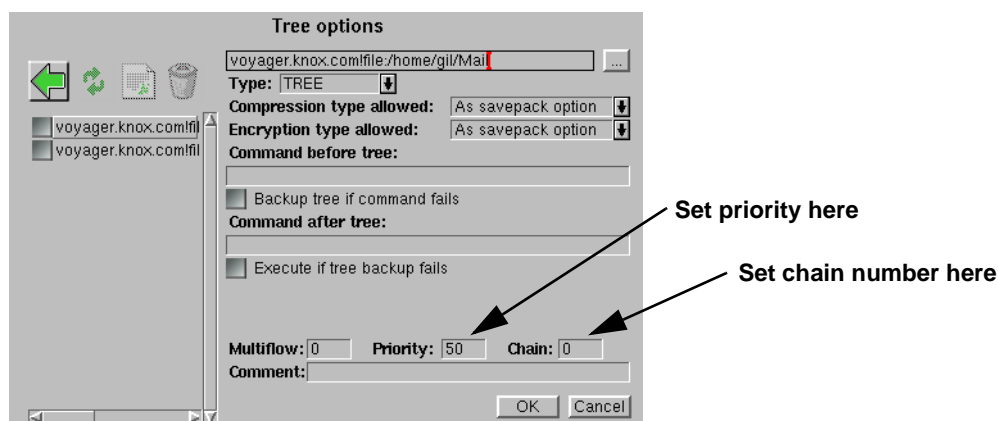
The value of Priority is only used when considering trees saved in the same flow. It can only influence backups of trees on the same computer or for computers backed up by the same flow, which is allowed if backup is restricted to the use of one flow. As this may not be an optimum solution, the concept of Chaining is necessary.

## 15.5 How to chain trees

Setting Priority to organize backups on a specific computer can be useful, it is more important to be able to set an order for the backup of various computers, while still using multiple flows.

Chaining creates a link between several trees of various computers. All the trees on the same Chain number will be processed in order of priority, effectively allowing order control while keeping multiflow.

In the Tree Options, for each tree of the Savepack, it is possible to set a Chain value (0 by default, meaning no chaining). Trees with the same value of chaining will be linked and processed according to their Priority.



Chaining is always used with the Priority function. They have little effect when set alone.

## 15.6 How to configure compression

---

By default, Arkeia always compresses the data it backs up. This is done on the client itself to allow an optimal network throughput. By default, the compression algorithm is LZ1 (Lempel - Ziv Algorithm).

You may want to increase compression, or adjust it according to the type of file being backed up.

### Set savepack compression

Set a specific compression method by using the graphical interface and modifying the option in the Savepack Option screen or in the Tree Option screen. See [Define options for the savepack](#) on page 96.

### Set client default compression

It is possible to set a specific default compression algorithm that will replace the other settings. Arkeia will then apply this configuration instead of the Savepack settings.

To specify a default compression algorithm, add the following line to the file `/opt/arkeia/arkeiad/arkfs.prf`

```
PREFERRED_COMPRESSION [value]
```

Where [value] can be: 0, 1 or 2. This code corresponds to the following compression methods:

*Code compression algorithm*

Value:	Compression;
0	No compression
1	LZ1, fast compression
2	LZ3, maximum compression ratio (slower)



# CHAPTER 16: ARKEIA UTILITIES

---

Arkeia 5 provides a set of utilities to help with administration. These utilities apply only to Arkeia server installations on the computers indicated in the *Server* column of the operating systems compatibility table, which is available at this internet address:

<http://www.arkeia.com/compatibility/os/anb/>

The utilities are:

- arkrstdb    rebuilds the Arkeia database index of your backed-up data.
- arkdetect    retrieves information about backup hardware attached to the Arkeia server.
- arkc        a command line interface, not really a utility.
- chknlp     checks connections between the Arkeia server and clients.
- arkmvhost    updates the Arkeia server database if clients' names are changed.
- arkrmhost    deletes a client.
- arkdbchk    checks the integrity of the Arkeia database index.
- arkboot     controls which Arkeia services are started and stopped at any given time.
- verify      checks and reports on the data integrity of files in a backup tape.

## 16.1 Extract data from a tape: readarkeia

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The `readarkeia` program will extract files from a tape created by Arkeia, without the need of licenses or even the need to install Arkeia. As Arkeia uses a specific format for its backup, there may be cases when this extracting utility will be your last chance to get a file back, after a crash of your database or in case of errors while writing the tape.

`readarkeia` is an emergency tool only: it does not consider backup history or user rights.

### How to get `readarkeia`

A version of `readarkeia` is installed in the directory: `/opt/arkeia/bin`, which is the default Arkeia installation directory.

Alternatively, a small C source code is written at the beginning of each tape used by Arkeia. This is the source code of `readarkeia` that can be extracted and compiled with any standard C compiler. You can also find the complete C source code in the following directory:

```
/opt/arkeia/server/readarkeia.c
```

To extract the C code, first rewind the tape by using the `mt` command which is applicable to the rewindable device defined in chapter [Mounting and probing tape devices](#) on page 21 of this manual.

For example, for Linux:

```
mt -f /dev/st0 rewind
```

Then extract the C source using the following `dd` command:

```
dd if=/dev/st0 of=readarkeia.c bs=64k
```

Next, edit the file named `readarkeia.c` file and delete the first line (it is actually the tape label). Replace the very first space character of the file by a `/` character.

Then compile the file `readarkeia.c`, using the following command:

```
cc readarkeia.c -o readarkeia
```

## How to use `readarkeia`

The `readarkeia` utility is used like a limited `tar` command. It uses the same basic syntax, though fewer options are actually implemented:

```
readarkeia [-l<loglevel>] x|t|i [mfv] [evice|-] [filename1 filename2...]
```

### Options available for `readarkeia`

The following options are available:

- l Change the verbosity level. Use it to obtain detailed information on what is really on the tape. Value can be from 10 to 80. Note this character is the lower case letter L.
- x Extract the named files from the tape. If no files are specified, all the files on the tape are extracted.
- t List the table of contents of the tape.
- i Get information about the tape.
- m This option tells `readarkeia` that we are in the middle of the tape. (There is no label to read).
- f Use the next argument as the name of the device. If device name is given as `-` `readarkeia` reads the tape data from the standard input.
- u This option updates the file being restored to the newest version found on a tape. Without using this option, if several versions of the same file are found

on the same tape, all versions are restored with a different numerical extension — for example `foo.1`, `foo.2`, `foo.3`, and so on. When the `-u` option is specified, only the newest version of `foo` is be restored.

`-v` Verbose.

## How to list the contents of a tape

To list the files present on a tape, type:

```
./readarkeia tvf /dev/st0
```

## How to extract all the files on a tape

To extract all the files present on a tape, type:

```
./readarkeia xvf /dev/st0
```



`readarkeia` **extracts data locally and creates a subdirectory for each host backed up.**

`readarkeia` **scans a tape completely. This operation can take some time, especially if the tape to be read has a large capacity.**

## How to extract a specific file

To extract a specific file available on a tape, type:

```
./readarkeia xvf /dev/st0 [computer_name]/[path]/[file_name]
```



`readarkeia` **scans a tape completely, even if the requested file is at the beginning of the tape itself. Therefore, this operation can take some time, especially if the tape has a large capacity.**

### Example

If you want to extract a file named: `/usr/src/kernel/make` from a computer named `ariane`, you have to type (under Linux):

```
./readarkeia xfv /dev/st0 ariane/usr/src/kernel/make
```

## 16.2 Recover the Arkeia database: `arkrstdb`

---

If your backup server crashes, the Arkeia database may be corrupted. In order to be able to use your backup history again, you may have to rebuild the index, based on the files and directories that have been backed-up on tapes. This is the purpose of the `arkrstdb` utility.



**This restoration is a long process, since `arkrstdb` needs to read all the tapes contained in the tape pools to completely rebuild the Arkeia database**

## General usage and syntax

The following is the correct syntax is:

```
arkrstdb -d{rewindable device} -t{tape type} -r{drive type}
[-D {database}] [-p(pool)] [-v(voltag)] [-s(silent)] [-l <Loglevel>] [-j(journal)]
```

## Options

The following are the available options of *arkrstdb*:

- d This option specifies the rewindable device of the drive as you entered it in drive management.
- t This option specifies the tape type.
- r This option specifies the drive type.
- D This option specifies the database name (optional).
- p This option specifies the pool name (optional).
- v This option specifies the `voltag` (tape ID) of your tape (optional).
- s This option runs *arkrstdb* in silent mode (optional).
- l This option specifies the log level. Increase the log level to obtain more information on the operation of *arkrstdb*. The possible values of this option are 10, 20, 30, 40, 50, 60, 70, 80, with 10 being the smallest log level (terse) and 80 being the highest log level (verbose). (optional).
- j This option specifies the log file in which *arkrstdb* will save the information on the current operation.

### *Example*

You plan to restore the content of a DLT tape, from a DLT drive, to the Arkeia database. To launch this operation, enter the following command:

```
/opt/arkeia/bin/arkrstdb -d/dev/st0 -t"DLT 4000" -rSTD_DLT
```

## 16.3 Automatic hardware detection: *arkdetect*

---

The program *arkdetect* is designed to quickly retrieve as much information as possible about the back-up hardware attached to the Arkeia server. Use *arkdetect* to:

- select the correct backup hardware attached to the Arkeia server;
- check that the configuration created in the GUI is correct; and
- check that the hardware attached to the server works properly.

By default, *arkdetect* is installed in the `/opt/arkeia/bin/` directory, with the rest of the programs of Arkeia 5.




## How to run `arkdetect`

To run the utility `arkdetect` enter the command at any command line. However, please note the following important information:

- The utility `arkdetect` should always be run as root (the super-user of the Arkeia server).
- The back-up hardware should not be in use (by Arkeia or by any other program) while `arkdetect` is running.

## How to stop a library from the Arkeia GUI

To make sure that Arkeia and its different components cannot use the library before launching `arkdetect`, from the Main menu , click on:

Hardware > Libraries

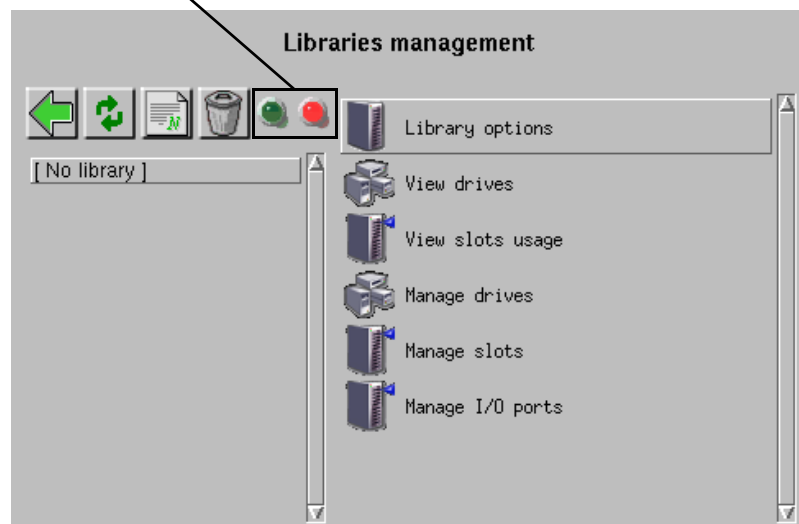


**Even though the Hardware menu of Arkeia 5 contains an option named `SWDetect`, the `arkdetect` utility displays much more information than the function integrated in the GUI.**

**For this reason, if a problem is encountered with the backup hardware used by Arkeia, it is recommended to use `arkdetect` rather than the detection functions of the Arkeia GUI.**

In the Libraries management screen, clicking on the red and green indicators allow you to stop or start the library selected in the left-hand list of libraries.

Activity indicators



Click on the red light to send the Stop Library command which forces Arkeia to stop the relevant services and consider the library as inoperative. Arkeia should then return the following message (in this example, the library is named `BigFileLib`):



Once every library has been stopped in the manner described above, *arkdetect* can be run to analyze and detect the hardware attached to the Arkeia server.

## How to analyze the results of *arkdetect*

The best way to analyze the results returned by *arkdetect* is to save its messages into a file, by entering the following command at any prompt:

```
./arkdetect > results.txt
```

This will save all the *arkdetect* messages into the file named `results.txt`. It is then possible to look at the results by opening the file in a text editor or by entering the command:

```
less results.txt
```

### Example: Hardware not found

The *arkdetect* utility starts its hardware detection procedure by listing the possible backup devices contained in the `/dev` directory of the Arkeia server it is installed on. This is indicated by the following lines in the *arkdetect* output:

```
Linux Temple Of Hate 2.2.19 #93 Thu Jun 21 01:09:03 PDT 2002
```

```
-----
|                               DRIVE AUTODETECTION                               |
-----
```

```
arkdetect: Find tape device files...
```

```
Entering...
Scanning for tape devices...
File '/dev/st0' is good!
File '/dev/st1' is good!
File '/dev/stderr' is good!
```

The first line of this output displays the operating system used by the Arkeia server where *arkdetect* has been launched. It then launches its single drive auto detection procedure.

To do this, the utility first checks the presence of several devices and reports a cheerful message (File `'/dev/st0'` is good!) if it has found the expected devices.

After this potential device detection, *arkdetect* will then try to connect to each device and query it to see if there is any backup hardware attached:

```
arkdetect: detect devices by mtio...
Entering for device: /dev/st1
error opening /dev/st1
bad end

arkdetect: detect devices by mtio...
Entering for device: /dev/st0
error opening /dev/st0
bad end
```

In the example above, *arkdetect* tried to connect to `/dev/st1` and `/dev/st0`, only to discover there were no hardware present, which it reports with a couple of error messages: `error opening /dev/stX` and `bad end`.

After trying to detect the single devices attached to the Arkeia server, *arkdetect* then tries to detect libraries, which is shown by the following lines:

```

-----
|                               LIBRARY AUTODETECTION                               |
-----

arkdetect: Find library device files...

Entering...
Scanning for library devices...
File '/dev/sga' is good!
File '/dev/sgb' is good!
File '/dev/sgc' is good!
File '/dev/sgd' is good!
[etc...]
```

After checking the existence of the potential devices, and indicating what it has found, *arkdetect* then proceeds to scan the devices themselves and reports its discoveries with the same messages used for the single drive detection:

```

arkdetect: detect devices by inquiry...
Entering
Trying to open device '/dev/sg2's_open('/dev/sg2') ERROR

bad end

arkdetect: detect devices by inquiry...
Entering
Trying to open device '/dev/sg1's_open('/dev/sg1') ERROR

bad end

arkdetect: detect devices by inquiry...
Entering
Trying to open device '/dev/sg0's_open('/dev/sg0') ERROR

bad end
```

As can be seen above, *arkdetect* will simply report an error if no device is present to answer its queries.

Finally, *arkdetect* will print a summary of its detection operation. In this case, of course, the summary will be empty:

```

-----
|                               DRIVES DETECTED                               |
-----

none...
```

```

-----
| LIBRARIES DETECTED |
-----

none...

arkdetect: normal end

```

After this somewhat discouraging example, the rest of this section will detail what are the messages returned by arkdetect if it detects backup hardware connected to the Arkeia server.

### Example: Hardware found

The results shown below were obtained on an Arkeia server, to which an Autopak library has been attached. That library contained two VXA tape drives.

```

Linux gabriel 2.4.3-20mdk #1 Sun Apr 15 23:03:10 CEST 2002
-----
| DRIVES DETECTED |
-----

New elem: -----
PROP: 'COMMENT'      'VAL: 'ECRIX VXA-1'
PROP: 'ARK_MODEL'    'VAL: 'ECRIX_VXA'
PROP: 'MODEL'        'VAL: 'VXA-1'
PROP: 'VENDOR'       'VAL: 'ECRIX'
PROP: 'DEVICE'       'VAL: '/dev/st0'

New elem: -----
PROP: 'COMMENT'      'VAL: 'ECRIX VXA-1'
PROP: 'ARK_MODEL'    'VAL: 'ECRIX_VXA'
PROP: 'MODEL'        'VAL: 'VXA-1'
PROP: 'VENDOR'       'VAL: 'ECRIX'
PROP: 'DEVICE'       'VAL: '/dev/st1'

```

In the lines above (which contain only the arkdetect summary report), we can see a detailed report on the two VXA drives that have been found. The following values are reported by arkdetect:

- COMMENT      This line is an informative string, returned by arkdetect, based on the information returned by the backup hardware when it has been queried (see MODEL/VENDOR below).
- MODEL/VENDOR      These lines contain the information returned by the backup hardware, when queried by arkdetect.
- ARK\_MODEL      This line indicates the configuration that should be selected, within the Arkeia GUI, to correctly manage the backup device.

DEVICE This line contains the UNIX device to be used to access the tape drive. For instance, the first VXA drive in the example shown above is accessed through the /dev/st0 device.

The following information is returned by `arkdetect` when it has found library-class devices connected to the Arkeia server:

```

-----
|                               LIBRARIES DETECTED                               |
-----

New elem: -----

PROP: 'COMMENT           'VAL:'Spectra Logic SL 2000'
PROP: 'ARK_SUGGEST       'VAL:'SL2000-15'
PROP: 'ARK_SUGGEST       'VAL:'SL2000-30'
PROP: 'ARK_SUGGEST       'VAL:'AUTOPAK'
PROP: 'MODEL             'VAL:'215'
PROP: 'VENDOR            'VAL:'SPECTRA'
PROP: 'DEVICE            'VAL:'/dev/sga'

arkdetect: normal end

```

Each library is separated from the other by the `New elem: -----` line.

The fields `COMMENT`, `MODEL`, `VENDOR` and `DEVICE` have been documented above, but this output introduces a new value field:

ARK\_SUGGEST This field is a suggestion by `arkdetect`, in the case where it has not been able to determine precisely the model of library it has detected. If this is the case, `arkdetect` will return the closest models it can find in its internal database.

In the rare case where `arkdetect` cannot find any device that matches the information returned by the hardware, it will print `ARK_MODEL : unknown`.

As can be noted above, `arkdetect` was not able to guess the model correctly and returned several suggestions for the library named Spectra Logic SL 2000.

## 16.4 Duplicate a tape


---

In versions prior to Arkeia 5.2, tape duplication was done from the command line with the function:

```
arkc -duplication
```

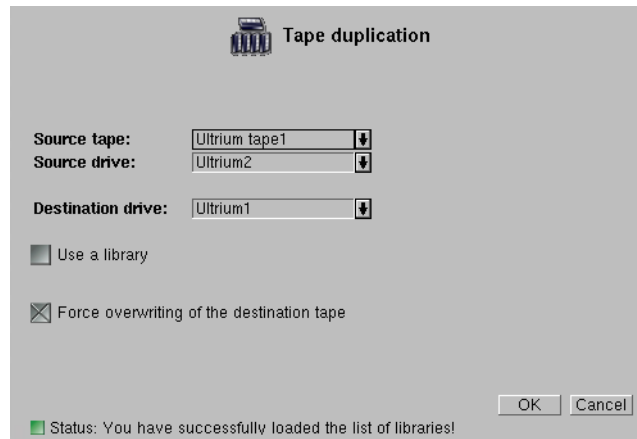
This command is deprecated in Arkeia 5, and it is replaced by:

```
arkc -tapeduplication -<action>
```

Tape duplication can be performed through the GUI. In the Main menu , click on:

Hardware > Tape duplication

The Tape duplication menu will appear.



Fill in the following fields on this screen.

**Source tape** Select the tape to be copied from the drop-down list. Obviously, it must be a tape that you have already declared in the Tape creation process, and used in Arkeia.

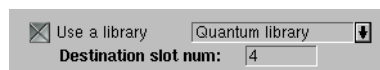
**Source drive** Select the drive which will contain the tape to be copied from the drop-down list.



**The source and destination tapes and drives must be of a compatible types. See [Tape and drive compatibility](#) below for an explanation of the compatibility issues.**

**Destination drive** Select the drive which contains the tape onto which the copy will be written.

**Use library** Click on this box if you wish to copy the source tape to a destination tape contained in a library. A drop-down list of tape libraries will appear.



Select the library to use from the drop-down list. This library must contain the tape drive selected for the destination tape above.

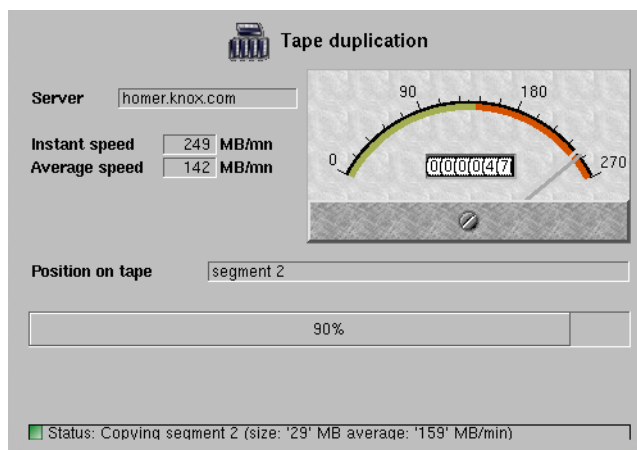
**Destination slot num:** Enter the number of the slot which contains the destination tape. The destination slot must be a reserved slot. See [Add tapes to a library \(slot assignment\)](#) on page 201.

**Force overwriting of the destination tape**

If the label of the destination tape is *NOT* the same as the label of the source tape, the duplication will be stopped, to prevent other data being unintentionally lost.

Click on this box to cancel the default behavior and overwrite the destination tape.

Click on *Ok* to start the tape duplication process. A duplication progress and rate monitor screen will appear.



When duplication is complete, the tape drives will be released.

## Tape and drive compatibility

The goal of tape duplication is to create a clone which can be substituted for the duplicated tape. The process requires two separate tape drives, one for the source tape and one for the destination tape, so careful attention should be given to compatibility issues. If the duplication must be usable in the same drive as its source, then the two drives must either be identical, or the tape in the destination drive must be compatible with the source drive.

### Example

Here is an example of a possible situation where two tape drives are available, DriveA and DriveB. They are both made by the same manufacturer and accept tapes of the same form factor, however DriveB is a later model than DriveA, and tapes for DriveB cannot be read with the earlier DriveA model, but tapes for DriveA can be read with DriveB.

The source tape to be duplicated was written some time ago in the earlier model DriveA, and the duplicate of this tape is required to be read in DriveA.

In this situation, the source tape **MUST** be placed in DriveB, and the destination tape in DriveA, to guarantee that the duplicate will work in DriveA, as required.

## 16.5 Test server connectivity: *chknlp*

Networking issues are the most frequently encountered problems when first configuring Arkeia. Most of these networking issues come from a badly configured network, failing DNS or misspelled computer names. Those problems are not always trivial to solve.

For this class of problem, Arkeia provides *chknlp*, a utility to check the correct connectivity between the backup server and its clients. It tests all connections, the presence of all needed services and all of Arkeia's parameters. The *chknlp* utility can therefore help you find the weak spots in your network.

The *chknlp* program is a binary provided with client and server to check network connectivity between client computer and backup server. You must have *root* (Super User) access to use this command.

To start *chknlp*, type the following command:

```
/opt/arkeia/bin/chknlp -pause
```

The *chknlp* utility then runs four tests, and a fifth test only on the backup server.

## chknlp Test 0 - Arkeia directory

The *chknlp* utility first tries to locate the Arkeia directory. The directory itself is stored in the system variable named `$ARKEIA_DIR`.

If this test fails, an installation problem has occurred: try to reinstall the software. An example of a correct output is shown below:

```
>>> chknlp 4.3.20 <<<
>>> TEST FOR CERTIFICATION LEVEL ONE <<<
*** TEST 0 IN PROGRESS...
>>> Getting ARKEIA variables:
  ARKEIA_DIR = /opt/arkeia
  NLPDIR = /opt/arkeia/arkeiad
  DIRAPPLIC = /opt/arkeia/chknlp
  PATHAPPLIC = /home/gil/.chknlp:/opt/arkeia/chknlp/chkn-
  lptx:/opt/arkeia/chknlp:/opt/arkeia/gui:/opt/arkeia/arkeiad
*** TEST 0 OK
```

## chknlp Test 1 - Network preferences

During Test 1, the *chknlp* utility will attempt to retrieve network preferences like:

- the port number used for communications (`PORT_NUMBER`). the port number is not displayed,
- the backup server name (`ADMINSERVER`),
- the Internet address of the backup server (Internet address),
- the local host name (`HOSTNAME`), and
- the local address (Internet address for local HOST).

If the *chknlp* utility cannot reach the `ADMINSERVER` during this test, check that the file `/opt/arkeia/arkeiad/admin.cfg` contains the name of the backup server.

If the *chknlp* utility cannot obtain the Internet address, a network configuration problem has occurred. You should add the backup server in your host file. If you are using a Domain Name Server, check that the backup server is listed and check that the local computer access to the DNS. To be sure, ping the backup server with its host name.



If *chknlp* cannot reach your local host name or local address, check the network configuration.

An example of a correct output is shown below:

```
*** TEST 1 IN PROGRESS...
>>> Testing variables in configuration file
   Internet address for Licence server `voyager' = 192.168.7.139
   Internet address for local HOST `voyager.knox.com' = 192.168.7.139
*** TEST 1 OK
```

## **chknlp Test 2 - Arkeia daemon**

This test checks that the local daemon or service is running correctly.

If this test fails, the local daemon or service is not running correctly, or does not accept connection to port 617. You should then restart the daemon with the *arkboot* command (see below) or restart the *arkeiad* daemon.

An example of a correct output is shown below:

```
*** TEST 2 IN PROGRESS...
>>> Testing local (voyager.knox.com) ARKEIAD daemon
      Message from arkeiad daemon:      Test OK
*** TEST 2 OK
```

## **chknlp Test 3 - Network addresses**

This test checks the network addresses of the client and the backup server, as seen by each other, and compares both.

If this test fails, it is quite common to configure the *ADMINSERVER* as the backup server, although this can be configured differently.

To do this configuration, the host name of the *ADMINSERVER* on the local computer (in the *admin.cfg* file) must be the name of your Arkeia *ADMINSERVER*. This computer is typically the backup server.

If the “*ADMINSERVER*” IP address on the local computer is different than the *ADMINSERVER*’s true IP address, check the IP address of the *ADMINSERVER* on both computers. If you ping the *ADMINSERVER* when logged onto the local computer you should get the same IP address as you get when pinging the *ADMINSERVER* while logged onto the *ADMINSERVER*.

If the local host name is different on the *ADMINSERVER*, check the IP addresses of the local host on both computers.

If the local host address is different on *ADMINSERVER*, check the IP addresses on both computers.

If you got the message: name & address of local host are not on the licensed Server list, the local host has not successfully been declared to the *ADMINSERVER*.

An example of a correct output is shown below:

```

*** TEST 3 IN PROGRESS...
>>> Connection test between LOCALHOST and ADMIN SERVER
>>> Accessing to ADMIN SERVER services
Remote host 'jupiter.knox.com' is Admin Server
Admin Server name on Local Host is jupiter.knox.com
on Admin Server is jupiter.knox.com
Admin Server address on Local Host is 192.168.8.22
on Admin Server is 192.168.8.22
Local host name on Local Host is jupiter
on Admin Server is jupiter
Local host address on Local Host is 192.168.8.22
on Admin Server is 192.168.8.22
>>> Name & Address of Local Host are already in License Server List
*** TEST 3 OK

```

## chknlp Test 4 - Backup servers

This test only runs on the server side. It checks the network addresses of all the clients listed in the `/opt/arkeia/arkeiad/rhosts.lst` file, and of the backup server as seen by each other.

If this test fails, the parameters to be checked are basically the same as those in Test 3, (see above) though you should have a complete set of information about your network in this way.

As `chknlp` stops at each error, it should be executed again after resolving an issue, to make sure there are no other problems with another computer.

An example of a correct output is shown below:

```

>>> TEST FOR CERTIFICATION LEVEL TWO <<<
*** TEST 4 IN PROGRESS...
>>> Testing connection between the local host and all known clients
>>> Connecting to: Host = c4 Internet address = 89.0.0.5
Connection to host is OK
>>> Connecting to: Host = c6 Internet address = 89.0.0.8
Connection to host is OK
>>> Connecting to: Host = bindernt2 Internet address = 89.0.0.20
Connection to host is OK
>>> Connecting to: Host = c1 Internet address = 89.0.0.1
>>> Name & Address of Local Host are already in License Server List
*** TEST 4 OK

```

## 16.6 Rename servers or clients: arkmvhost

---

Arkeia 5, as this manual has described, is able to manage a large number of computers, both clients and servers. It is possible that within a network, some computers will change names. This usually creates configuration problems ranging from the trivial to the difficult, particularly if additional information has been lost along the way.

Arkeia 5 manages this issue by assigning a unique computer ID to each computer it is installed on, when this computer attempts to declare itself to the Arkeia server.

On an Arkeia client, the update is then automatic: if the computer name is changed, for instance from `foo.acme.net` to `bar.acme.net`, this change is automatically taken into account and the new name is sent to the Arkeia server indicated in the file `/opt/arkeia/arkeiad/admin.cfg`.

However, the server database then needs to be updated so that the server Savepacks (and other items) can be automatically updated. This is done by the `arkmvhost` utility.

## Syntax of `arkmvhost`

The following syntax is accepted by `arkmvhost`:

```
arkmvhost --usage
arkmvhost --list
arkmvhost --allhosts [--no_confirm|--keep_info] [options]
arkmvhost --host <old_name> --newhost <new_name> [options]
```

To use `arkmvhost` to update the server database, you must be logged on the server as root (Super User). To start the update process, it is necessary to enter the following command:

```
#!/opt/arkeia/bin/arkmvhost
```

To have a brief reminder of the options detailed below, the following command can be entered:

```
arkmvhost --usage
```

## How to list all the modified clients

To list all the clients that are present in the database of an Arkeia 5, that have a modified name, use the following option:

```
arkmvhost --list
```

This options lists all the clients which have been detected as modified and exits immediately. This is useful to force the Arkeia server to display which clients have a changed name and so may require an update.

## How to do a complete update

To do a complete update of the Arkeia database, use the following `arkmvhost` syntax:

```
arkmvhost --allhosts [--no_confirm|--keep_info]
```

This mode updates the entire Arkeia 5 client database. Only the computers detected by the server as having a modified name are going to be updated. To obtain a list of these computers, see the option `--list`, detailed above. All the computers which do not have a changed name are left intact in the database.

In this mode of operation, the following options are accepted:

```
--no_confirm    Update all the clients of the Arkeia 5 server without confirmation.
```

`--keep_info` A copy of the client-related information is kept intact in the database. This allows a modification to be performed in several separate stages (for instance, modifying only the backup index, then the Savepack, and so on.).

For instance:

```
arkmvhost --allhosts --no_confirm
```

The command above would update the entire Arkeia 5 database, without asking the user to confirm every modification.

## How to rename a single client

It is possible, instead of updating the entire Arkeia database, to update one client. To do this, use the following syntax of `arkmvhost`:

```
arkmvhost --host <old name> --newhost <new name>
```

Specify which client should be renamed in the Arkeia 5 database in this mode. For instance:

```
arkmvhost --host foo.acme.com --newhost bar.acme.com
```

The command above renames the client named `foo.acme.com` into `bar.acme.com` in the Arkeia 5 database.

## Common options of `arkmvhost`

The following options can be used in all modes of operation (except the `--list` mode detailed above):

- `--index` This option updates the backup index.
- `--savepack` This option updates the list of savepacks.
- `--device` This option updates the list of devices (libraries, drives).
- `--user` This option updates the list of users.

If the options above are not specified on the command line, the default behavior of `arkmvhost` is to update all the items listed above.



**When running the utility `arkmvhost`, the only Arkeia process running should be the `arkeiad` process, which will update the Arkeia database with the new name.**

**To list all the running Arkeia processes, use the `ps` or the `top` commands as `root`. To stop and restart Arkeia processes, see the `ark-boot` utility see [Stop and start Arkeia: \*arkboot\*](#) on page 231.**

## 16.7 Remove a host: `arkrmhost`

---

It may be useful to quickly delete a client (or host) from the Arkeia backup database. This functionality is provided by the `arkrmhost` utility, which is part of the standard Arkeia 5 package.

If `arkrmhost` is not available in your installation or Arkeia, please upgrade to Version 5.0.12 or higher. For more information about the upgrade possibilities, please contact Arkeia through its web site, at the following address:

<http://www.arkeia.com>



**Use `arkrmhost` with extreme caution!**

**If a client has been deleted from the Arkeia backup database, there are two very serious consequences:**

1. **The client will be unreachable from the Arkeia server and will not appear in the list of possible clients within the Arkeia Navigator.**
2. **Since all references to the client are deleted from the Arkeia database, this prevents Arkeia from restoring the client data from the tapes! The only solution to restore previously saved data is to use the utility `arkrstdb`, also described in this chapter – but this may create additional problems if the client name has been changed before its final deletion.**

### Syntax of `arkrmhost`

The syntax of `arkrmhost` is quite simple:

```
arkrmhost <host name>
```

Where `host name` is the name of the host to be deleted from the Arkeia backup database. For instance, the following command will delete the Arkeia client named `fubar.acme.com` from the Arkeia database:

```
arkrmhost fubar.acme.com
```



**`arkrmhost` must be able to communicate with `arkeiad`. Therefore, `arkeiad` *must be running* in order to carry out the deletion of a client computer with `arkrmhost`.**

## 16.8 Database integrity check: `arkdbchk`

---

It is possible for the Arkeia database index to become damaged in the event of a system crash. The Arkeia index database is a list of all the operations performed by Arkeia. It is used by Arkeia to rapidly retrieve the information about a specific backup operation. The database integrity checks are performed by the `arkdbchk` utility.



**The usage of `arkdbchk` may have serious consequences on the database index file. This utility should be strictly in accordance**

**with this documentation, and in consultation with the Arkeia Technical Support.**

## Usage and syntax

Enter the following at the command line, when logged in as root (super user):

```
#!/opt/arkeia/bin/arkdbchk
```

The standard syntax for the `arkdbchk` is:

```
arkdbchk [-p|r|m|b|D<database>] [-s] [-l<log level>] [-j<file>]
```

The options to modify the `arkdbchk` execution are:

- m check the master Arkeia index. It also lists its contents. The master database index is usually `/opt/arkeia/server/dbase/f3bkb/bkmaster`.
- r remove corrupted entries (also called `o3_cpnt`) that can be found within the Arkeia database index. This operation will usually recurse the directories of the Arkeia database and Arkeia index. The index can be specified with the use of the `-D` option (see below).
- b rebuild the Arkeia database index, based on the information that can be found in the Arkeia database. Unless the `-D` option is used to specify a path, the master index is used.
- p purge the database index of the unnecessary information. This option will reduce the number of inodes used by the index itself. A path can be specified with the `-D` option.
- D<database> indicate which part of the Arkeia database index will be the target of `arkdbchk`. Its value, which should be a path pointing to the desired part of the Arkeia database index, will be used by the three options detailed above (`-r`, `-b` and `-p`).
- s force `arkdbchk` to be executed in silent mode (no messages).
- l<log level> accepts value ranging from 10 to 90. It determines the number of messages returned by `arkdbchk` during its execution, with 10 being the tersest level (few messages) and 90 being the most verbose. The default value is 10.
- j<journal> forces `arkdbchk` to store its messages in a separate log/journal file. Replace `<journal>` with your own filename.

## Examples

Displaying the content of the Arkeia database index, with a high level of verbosity:

```
/opt/arkeia/bin# ./arkdbchk -m -l90
```

```
I1132150 main [L114]: ***** Start of database checking *****
D2702040 df3_init: entering
```

```

V2709010 db3_gendirs: Entering (/opt/arkeia/server/dbase/f3tmp,-1) (2: No such file or
directory)
V2709060 db3_gendirs: Normal end (/opt/arkeia/server/dbase/f3tmp)
D2702040 df3_set_dbtree: entering
V2709010 db3_gendirs: Entering (/opt/arkeia/server/dbase/o3dbtree,-1)
V2709060 db3_gendirs: Normal end (/opt/arkeia/server/dbase/o3dbtree)
D2702050 df3_set_dbtree: return "/opt/arkeia/server/dbase/o3dbtree"
D2702050 df3_init: return "/opt/arkeia/server/dbase"
D2804010 dc3_load_bkm: Entering, mode=00
V2801010 dc3_open: Entering, name=/opt/arkeia/server/dbase/f3bkp/bkmaster, dc3_mode=1
V2801010 dc3_open: Continuing with name=/opt/arkeia/server/dbase/f3bkp/bkmaster
V2801020 dc3_open: Normal end
V2804020 dc3_load_bkm: reading `2' records
D2804030 dc3_load_bkm: Normal end
D2804160 dc3_list_bkp: Normal end
V2301180 display_list: Entering
I2301190 display_list: ----- Content of list '': Bkmaster -----
V2301120 display_local_props: Entering
V2301140 display_elem: Entering
I2301150 display_elem: ITEM {
I2301160 display_elem: PROPERTY 'DATE' ALFA '1019221687'
I2301160 display_elem: PROPERTY 'BKSID' ALFA '3cc016b7'
I2301170 display_elem: }
D1132180 main: normal end
D1132130 myexit: entering, exit code is `0'
I1132140 myexit: ***** End of database checking *****

```

As can be noted in the example above, the Arkeia index only contains two items (indicated above in the {ITEM... } lines, that are related to a single backup performed with Arkeia 5. Please note as well that there is no space between the -l option and its value.

Removing corrupted entries in the Arkeia database, with a low verbosity:

```

# ./arkdbchk -r -l20
I1132150 main [L114]: ***** Start of database checking *****
I1132050 check_o3cpnt: Component file of "/opt/arkeia/server/dbase/o3dbtree/omega.vertex.net/file/home/jack/Mail/trash" is empty
I1132050 check_o3cpnt: Component file of "/opt/arkeia/server/dbase/o3dbtree/omega.vertex.net/file/home/jack/Mail/draft" is empty
I1132050 check_o3cpnt: Component file of "/opt/arkeia/server/dbase/o3dbtree/omega.vertex.net/file/home/jack/Mail/queue" is empty
I1132050 check_o3cpnt: Component file of "/opt/arkeia/server/dbase/o3dbtree/omega.vertex.net/file/home/jack/Mail/outbox" is empty
I1132050 check_o3cpnt: Component file of "/opt/arkeia/server/dbase/o3dbtree/omega.vertex.net/file/home/jack/Mail/inbox/Ref" is empty
I1132050 check_o3cpnt: Component file of "/opt/arkeia/server/dbase/o3dbtree/omega" is empty
I1132140 myexit: ***** End of database checking *****

```

Please note that, in the example given above, the database did not contain any corrupted entries.

## 16.9 Stop and start Arkeia: arkboot

---

Arkeia 5 has to perform many operations before it can be safely launched or stopped. Since Arkeia 5 also has a modular architecture, this means that several Arkeia modules can be stopped and started in a completely independent manner.

These operations are controlled by the `arkboot` utility, which gives the system administrator the capacity to control precisely which Arkeia services are launched and executed at any given time.

The `arkboot` utility can only be launched by `root` (the super user) of the Arkeia server.

## Usage, configuration and syntax

The utility `arkboot` is configured with `arkboot.cf`, an XML file, which is contained in the directory `/opt/arkeia/arkboot`. The name and the location of this file can be modified by editing the relevant entry (the variable named `ARKBOOTFILE`) in the file `arkeia.prf`.

The content of this file are as follows:

```
<?xml?>

<arkml:boottable>

  <arkml:bootentry id="617" owner="arkeiad" startprio="-1000"
stopprio="1000" startcmd="/opt/arkeia/bin/arkeiad" stopcmd="/opt/arkeia/bin/arkeiad
stop"/>

  <arkml:bootentry startcmd="/opt/arkeia/bin/arkvlib -i 3cbef720" id="3cbef720"
owner="arkvlib" startprio="50" stopprio="50" stopcmd="kill 5864"/>

</arkml:boottable>
```

As can be seen in the file above, every program that can be launched has its own line in the configuration file, enclosed within the XML tag: `<arkml:bootentry... />`. Each program is then assigned a unique ID and a name, as well as a start command to be executed.

As can be noted, the file above contains only two entries, one for `arkeiad`, which is the main Arkeia UNIX daemon and one for `arkvlib`, which is the Arkeia Library Manager daemon. These two daemons are able to control most of Arkeia operations.



Depending on the configuration of the Arkeia server, there can be several more entries in the `arkboot.cf` file. For more information on these entries, please refer to the documentation of the different Arkeia modules.

The standard syntax for `arkboot` is:

```
# arkboot [-start|-stop]
```

There are only two options `-start` and `-stop` which are self-explanatory.

For instance, the following command will request `arkboot` to stop the entire Arkeia server, *once all pending operations have been completed*:

```
#arkboot -stop
```




## 16.10 Backup file verification

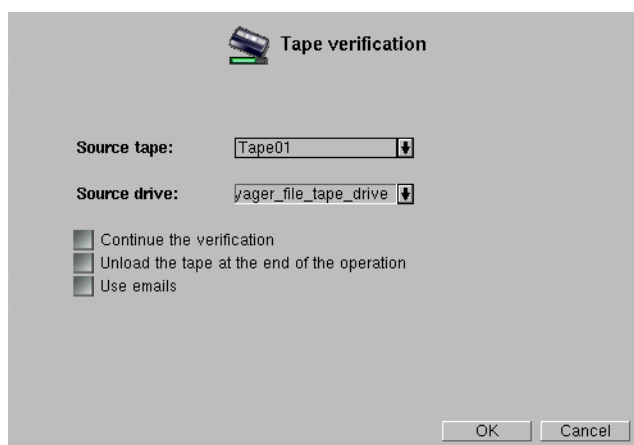
A utility to verify the data integrity of existing backup files on tapes can be found in the Restoration menu:

Main menu > Restoration > Restoration options > Verification  
see [Verification options](#) on page 139 for details.

## 16.11 Tape verification

A utility to verify that all the data on a tape is readable is available in the Hardware menu. The tape verification utility will check the entire tape and detect errors. If an error is found, it will be reported in a log message. To do a tape verification, from

the Main menu , click on: Hardware > Verification and the Tape verification menu will appear:



Source tape: Select from the drop down list the tape you want to verify. Only tapes created in Arkeia will be listed.

Source drive: Select the tape drive in which you want to verify the tape.

Continue the verification

If you are checking a tape on which a previous verification was started then interrupted, check this box to resume the verification from the point at which the previous verification was stopped.

Unload the tape at the end of the operation

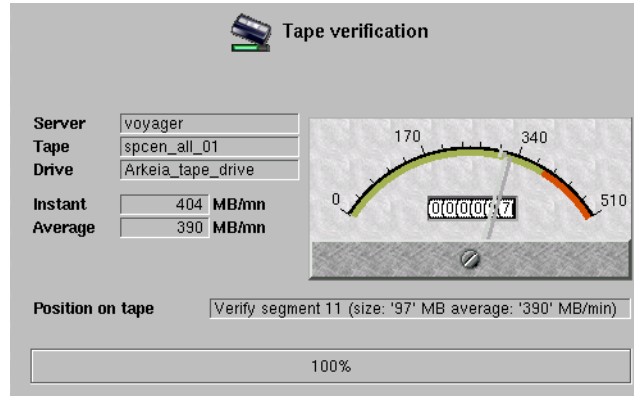
Check this box if the drive you are using is in a tape library, and you want the tape to be returned to its library slot after verification.

Use emails

Check this box if you want the results of the tape verification emailed to the addresses stored for the current user. (See [How to](#)

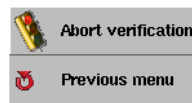
[create users](#) on page 71, and [Modify alerts](#) on page 193 for details about how to enter the email address for a user).

Launch the verification by clicking on **Ok**, a screen with information about the progress of the verification will appear



The results of the verification are written in the Tape Log, see [Activity logs](#) on page 187.

To stop a verification before it has finished, right click anywhere in the Tape verification screen:




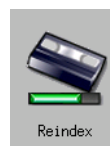
and click on **Abort verification** in the floating menu. The tape verification will stop, and the drive will be released for other uses. To continue verifying the tape later in the session, restart the verification with the **Continue the verification** checkbox filled. The verification will continue from the point at which the first verification was interrupted, rather than starting from the beginning of the tape.

## 16.12 Reindex a tape

A utility to reindex a tape is available in the Hardware menu. If you lose a tape index due to computer failure, or you find an Arkeia backup tape of unknown origin, the tape reindex utility will re-create the index, making the backup data on the tape available for restoration. Either a known tape or an unknown tape can be reindexed

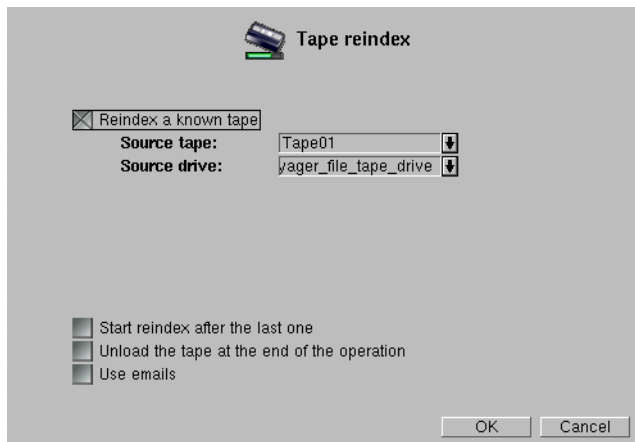
To reindex a tape, click on:

Main menu  > Hardware > Reindex  
and the Tape reindex menu will appear.



## Reindex a known tape

Click on the Reindex a known tape checkbox if you know that the tape contains a backup created by the current Arkeia backup server:



To start the tape reindex, insert it into a drive managed by your Arkeia backup server, and fill in these fields:

Source tape:      Select the tape to be verified from the drop list of Arkeia tapes.

Source drive:     Select the drive to be used from the drop list of tape drives managed by Arkeia.

Start reindex after the last one

If you started to reindex this tape, then interrupted the process before it was completed, check this box to re-start the index from the point at which the previous reindexation was stopped.

Unload the tape at the end of the operation

If the drive you are using is in a tape library, the tape will be returned to its library slot after reindexation.

Use emails

Check this box if you want the log messages from the tape reindexation emailed to the addresses stored for the current user. (See [How to create users](#) on page 71, and [Modify alerts](#) on page 193 for details about how to enter the email address for a user).

Click on OK to start the tape reindexation.

To stop a reindexation before it has finished, right click anywhere in the Tape reindex screen:



and click on **Abort reindex** in the floating menu. The tape reindexation will stop, and the drive will be released for other uses. To continue reindexing the tape later in the session, restart the reindexation with the **Start reindex after the last one**

checkbox filled. The reindexation will continue from the point at which the first reindexation was interrupted, rather than starting from the beginning of the tape.

## Reindex an unknown tape

Clear on the Reindex a known tape checkbox if the tape you are reindexing was made during a backup by a different Arkeia backup server to the one on which the current session is running:

Fill in these fields in addition to the fields required to index a known tape, described above:

Source tape type: Select the type of tape from the drop list of tape types.

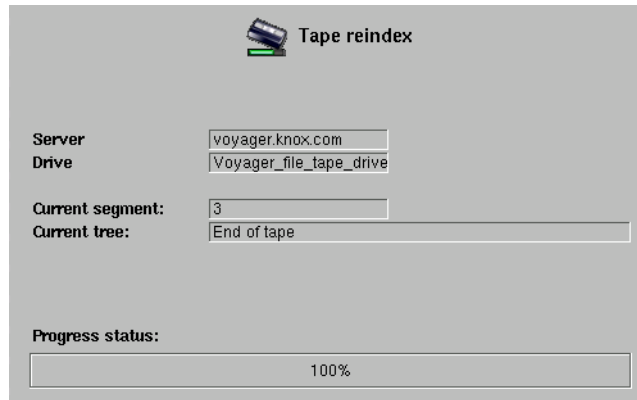
Use a library: Check this box if the drive you are using is in a tape library.

Library: Select the tape library from the drop list of tape libraries managed by Arkeia.

Tape slot num: Enter the number of the tape slot in the library which contains the tape to be reindexed.

The remaining fields are the same as those in the reindex screen for known tapes. Click on OK to start the reindexation. You can interrupt the reindexation process in the same way as for reindexing a known tape. A log message will be written when the indexation is complete.

During the reindexation, a screen will show the current progress:





# CHAPTER 17: ADVANCED NETWORK CONFIGURATION

---

This chapter details some of the advanced network configuration that may be required to allow Arkeia 5 to function properly in specific network environments. For instance, this chapter will cover:

- Arkeia servers with multiple network interface cards (NICs);
- using different TCP ports;
- how to backup Arkeia clients from behind a firewall
- Using DHCP

## 17.1 Multiple NICs

---

This section explains how to use the `NLP_HOSTFILE`, `NLP_ONLYHOSTFILE`, and `NLP_HOSTNAME` parameters to configure the Arkeia network architecture. These parameters can be used to specify which network interface card should be used, if several NICs are installed in a computer.

By default, the Arkeia name resolution is based on the local name resolution configuration. Computers are usually configured to use the local hosts file, and Arkeia always uses either DNS or the local name resolution. If your computer can resolve a name request and return the corresponding IP address (and vice-versa), Arkeia will be able to connect to the remote computer. If not, the connection problem is not a name resolution issue.

However, if Arkeia needs a specific network configuration, it is possible to separate the local network configuration and Arkeia's own name resolution process.

### Configure a client

On the client, the backup server name must be entered in the following file:

```
/opt/arkeia/arkeiad/admin.cfg
```

This is usually the host name of the backup server. The IP address of the Arkeia backup server is usually located in the file:

```
/etc/hosts
```

### Configure a server

Each client is declared in the following file on the Arkeia backup server:

```
/opt/arkeia/arkeiad/rhost.lst
```

This file contains the computer name that will be shown in the navigator. The computer name in this file must be known by the backup server through its own name resolution configuration, as described in the introduction section.

Arkeia updates this information automatically. You should not have to update this file, except to possibly delete duplicate entries.

## Hosts file used by Arkeia

By default, name resolution is based on the local system configuration. Generally, the resolution is done with:

- the local host file (`/etc/hosts`)
- the DNS (Domain name server)

Check `/etc/nsswitch.conf` (and, on Linux, `/etc/hosts.cfg`) to see the order used by your backup server.

### Arkeia hosts file

You can set a specific Arkeia name resolution configuration. Two different methods are possible:

- Arkeia will use a specific hosts file first. (In this case, you need to set the `NLP_HOSTFILE` preference, see below). This file, like most host files, contains links between computer names and IP addresses. If a computer cannot be found, Arkeia looks for the local system resolution.
- Arkeia will use *only* its own host file. If the search fails, then network connection is aborted. To set this you have to add `NLP_ONLYHOSTFILE` parameter.

## How to set up `NLP_HOSTFILE` and `NLP_ONLYHOSTFILE`

On the Arkeia backup server and Arkeia clients, you must configure the `NLP_HOSTFILE` variable with the name of the Arkeia hosts file, for example: `/opt/arkeia/arkeiad/hosts.cfg`, in the following file: `/opt/arkeia/arkeiad/arkeiad.cfg`. For instance:

```
NLP_HOSTFILE "/usr/knox/nlp/hosts.cfg"
```

Arkeia will search the addresses entered in the `NLP_HOSTFILE` first and then, if it cannot find the computer in question, it will request the local system name resolution configuration.

To exclusively use the `NLP_HOSTFILE` hosts, you must set the `NLP_ONLYHOSTFILE` variable to 1. For instance:

```
NLP_ONLYHOSTFILE "1"
```

### Syntax of the Arkeia-specific hosts file

The hosts file must contain all computer names in lower case. Do not use upper case names in this file. Additionally, the IP address must be surrounded by quotes. For instance:

```
"193.90.5.234" "hp_test.acme.com"
```



### Usage of NLP\_HOSTNAME

If the NLP\_HOSTNAME variable is un-commented, it contains the computer name that Arkeia will substitute for the name returned by the hostname command.

This variable can be found in the following file:

```
/opt/arkeia/arkeiad/arkeiad.cfg
```

As part of the hostname substitution process, Arkeia performs a consistency check between the name specified by the NLP\_HOSTNAME parameter and the name returned by the gethostname system call. It is possible to associate different IP addresses with a specific computer:

- If the name returned by the gethostname system call is different from the name defined on the NLP\_HOSTNAME parameter, then the IP addresses must be identical.
- If the name returned by the gethostname system call and the name specified on the NLP\_HOSTNAME parameter are identical then the IP addresses can be different.

The hostname command returns the host portion of the fully qualified name exactly as specified in the /etc/hosts file.

## How to configure Arkeia not to use FQDN

By default, Arkeia uses Fully Qualified Domain Names (FQDN) for its client/server communications.

If it is necessary not to use FQDN computer names, follow the procedure detailed below:

1. Add (or un-comment) the following STRIP\_DOMAIN parameter in the /opt/arkeia/arkeiad/arkeiad.cfg file, on the backup server as well as on the client computers:  
STRIP\_DOMAIN "1" (Strip domain name)
2. Restart arkeiad on all backup server and client modules with the following command, entered as root:  
# arkeiad restart
3. Use the GUI to open the navigator, and check that all the clients appear without a complete domain name.
4. Make sure the Arkeia database is correctly updated by using the utility arkmvhost. For more information on this program, please refer to the section titled [Rename servers or clients: arkmvhost](#) on page 226.
5. Try a small backup, including a directory of each client computer.

## 17.2 How to use different TCP ports with Arkeia

---

By default, Arkeia uses the TCP port 617. However, this can create some problems if another process tries to reserve the same port on your client.

The port used can be modified in the following file *for client computers*:

```
/opt/arkeia/arkeiad/arkeiad.cfg
```

The `arkeiad.cfg` contains many comments that can be used to obtain more information.

If the computer to be re-configured is the Arkeia *server* itself, the procedure is the same, but the file to be modified is:

```
/opt/arkeia/arkeiad/admin.cfg
```

In the files listed above, un-comment (or add) the line `PORT_NUMBER` and set it to the right port as shown below:

```
PORT_NUMBER "[New port number]"
```

Before modifying one of the files listed above, enter the following command as root to stop the `arkeiad` Arkeia UNIX daemon:

```
# arkeiad remove
```

After one of the files detailed above has been modified, restart the `arkeiad` process, using the following command, entered as root:

```
# arkeiad start
```



**If you plan to change the port value, you will also have to change it in the file named `admin.cfg`.**

If a backup fails (due to a network problem, for example), Arkeia will try to recover and continue the backup operation by trying the other ports available from 1024 and upward (1025, 1026, and so on).

## 17.3 How to use Arkeia behind a firewall

---

If a firewall is present between an Arkeia 5 server and a client computer, many problems can ensue, since most firewalls will, likely, block the ports used by Arkeia 5 to establish a communication between two computers.

This section explains how to establish correct communications between Arkeia servers and their clients, even through a firewall.

### Standard configuration using port (617)

The easiest way to configure Arkeia to work through a firewall is to allow connections on the 617 TCP port to and from the Arkeia client and the Arkeia server. This means that your firewall should allow data to transit through its 617 port.

### Using a different TCP port

Of course, this port can be changed easily by following the information detailed in [How to use different TCP ports with Arkeia](#) on page 241. This means that, on the

Arkeia server and on the Arkeia client, the `PORT_NUMBER` variable should be changed in the file `/opt/arkeia/arkeiad/arkeiad.cfg`, to another value.

For instance, here is an example taken from a modified `arkeiad.cfg` file:

```
(previous lines deleted)

# The following field can be used to reconfigure the port
# number used by the Arkeia network programs as it known
# to the tcp/ip system and as, notably, it should be entered
# in /etc/services.
# Caution ! Do not modify this field unless you are absolutely
# sure you need to, and if so make sure that you attribute the
# same value to this port number on all hosts within the
# network which are to communicate using Arkeia services.

PORT_NUMBER    "500"
```

(following lines deleted)

In the case described above, all the computers that need to use Arkeia must have the same port modification (from port 617 to port 500) applied to them, which can be tedious to set up.

Before modifying `arkeiad.cfg`, enter the following command, as the super user `root`:

```
./arkeiad remove
```

Once the file has been modified with a new port number, enter the following command as `root`, to restart `arkeiad` with the new port number:

```
./arkeiad start
```

Finally, another possibility is to use the port range management of Arkeia 5, which is detailed below.

## Using the port ranges

Arkeia 5 manages all data exchange through three different ranges of TCP ports. These ranges are usually limited to values higher than 1023, since ports numbered smaller or equal to that limit are reserved by the system (see below).

The Arkeia TCP port ranges are the following:

- **Listening ports:** TCP Ports that are listening do just this – they allow an application to listen on them and wait for a connection to be established. In the Arkeia 5 architecture, this usually means the processes that manage tape libraries. They can also be named *input ports*, because they receive, but do not send, data.
- **Normal ports:** TCP ports that are normal are output ports – as opposed to the listening ports described above – meaning, they send data over the network to another computer. The difference between normal and reserved ports (see below) is that normal ports are assigned to normal users and applications, while reserved ports are assigned to `root` (the UNIX super user) and the applications `root` has started.

- **Reserved ports:** TCP ports that are reserved can only be used by the `root` user and the programs started by this user. Like the normal ports, they are output ports, meaning they transmit – over the network – the data they receive from applications. In the Arkeia 5 architecture, the processes that use these ports are the most important processes of Arkeia, including `arkeiad`, the Arkeia UNIX daemon.

### Control variables for port ranges

Arkeia 5 provides several port management variables, that can be used by both client and server to use ports other than port 617 to connect to each other and transfer data. This port management uses control variables to define which addresses can be used to establish communication between client and server.

The different ranges detailed above are controlled by the variables indicated below.

- **Listening ports:** This port range is controlled by `NLP_LISTEN_MIN_PORT` (for the minimum value) and `NLP_LISTEN_MAX_PORT` (for the maximum value). These two variables should be entered in the following file, for both the client and the server:

`/opt/arkeia/arkeiad/arkeiad.cfg`

Please note that this configuration is *optional*, since the ports that are really needed for client/server communications are the *reserved* and the *normal* ports.

- **Normal ports:** This port range is controlled by `NLP_NORMAL_MIN_PORT` (for the minimum value, the default value being 1024 under Linux) and `NLP_NORMAL_MAX_PORT` (for the maximum value, the default value being 32000). These two variables should be entered in the following file, for *both* the client and the server:

`/opt/arkeia/arkeiad/arkeiad.cfg`

- **Reserved ports:** This port range is controlled by `NLP_RESV_MIN_PORT` (for the minimum value, the default value being 512) and `NLP_RESV_MAX_PORT` (for the maximum value, the default value being 1023 under Linux). These two variables should be entered in the following file, for both the client and the server:

`/opt/arkeia/arkeiad/arkeiad.cfg`

Whenever a particular port, specified in these variables, is not available, Arkeia will try to use the next port in the range, until it finds a port which is both open and available.

You'll find below some examples of configuration for these variables:

```
NLP_RESV_MIN_PORT "768"
NLP_RESV_MAX_PORT "800"
NLP_NORMAL_MIN_PORT "1024"
NLP_NORMAL_MAX_PORT "1048"
```

## SSH configuration

Another option, if you want to increase security, is to use SSH to tunnel the port securely through the firewall. Enter the following line on the client computer:

```
ssh -g -C -L 617:[backup_server]:617 [firewall_address]
```

This redirects local port 617 to the remote port specified above. Then all you need to do is start the Arkeia GUI and login to localhost. If you want to apply this setting automatically when the server computer is booted, add the above command to the file /etc/ssh/ssh\_config.

### Sample configuration

Here's how an external Arkeia server (192.168.1.50) is set to backup an internal Arkeia client (111.222.111.222) through a Linux firewall (eth0=111.222.111.2 and eth1=192.168.5.254):

- Allow connections on port 617 from the client to the backup server:

```
/sbin/ipchains -A input -d 111.222.111.2 -p tcp -s 111.222.111.222 -j ACCEPT ipmasqadm portfw -a -P tcp -L 111.222.111.222 617 -R 192.168.1.50 617
```

- Allow connections on port 617 from the backup server to the client:  
/sbin/ipchains -A forward -s 192.168.1.0/24 -i eth0 -j MASQ
- Add an entry in /etc/hosts on the Arkeia Server:  
111.222.111.222 myclient.extdomain.com myclient
- Duplicate a block entry for myclient on the Server in /opt/arkeia/arkeiad/rhost.lst using its expected IP of 111.222.111.222
- Restart arkeiad on the backup server
- Remove the bogus entry for myclient in rhost.lst, as another should have been added that represents the real computer.
- Restart arkeiad
- Remove [1] from /opt/arkeia/arkeiad/auth\_ARKFS.cfg on the client:  
ARKFS.\* ALLOW \* \*

Run Arkeia on the client, connect to the firewall computer and authenticate as if you were connected to the Arkeia server on myserver.intdomain.com.

It will appear as if your Arkeia server is now residing on the firewall, but the packets for port 617 are actually being forwarded to the internal Server port 617 (myserver.intdomain.com with the IP of 192.168.1.50). Any reverse traffic via port 617 is done through the generic internal-to-external MASQUERADING.

## 17.4 How to use Arkeia and DHCP

---

An Arkeia 5 server assigns a name to each of its client, based on its FQDN host name and on its IP address. Since DHCP assigns a new IP address to each computer, this name assignment may fail with the result that the Arkeia server becomes hopelessly confused.

However, Arkeia 5 provides a simple way to manage the changes of IP address that are the result of the use of DHCP on a network.



**The Disaster Recovery function of Arkeia does not manage DHCP. Normal backup and restore operations are able to manage DHCP.**

## Using the variable `VIRTUAL_HOSTNAME`

To properly manage DHCP and its attendant IP address changes, all that is needed is to enter the variable `VIRTUAL_HOSTNAME` in the `arkeia.cfg` file of the *client* computers.

This variable should contain the name of the client. This name will then be used by the Arkeia server to identify the client, store information in its logs and its backup database and display the client name in its network navigator.

For instance, the following lines define two different clients that will be named: `fubar.acme.com` and Jack's server, respectively, for the Arkeia 5 server it will connect to:

```
VIRTUAL_HOSTNAME "fubar.acme.com"  
VIRTUAL_HOSTNAME "Jack's server"
```



**This type of configuration should *never* be used on an Arkeia server! Arkeia clients need to know the name of their server. Changing this name will prevent the clients from connecting to their server.**

Of course, this procedure is useless and not recommended if the DHCP server assigns static IP addresses to the Arkeia clients.

# APPENDIX A: MIGRATING TO VERSION 5

---

The Arkeia migration tool will ease the transition from Arkeia version 4 to Arkeia 5, while retaining the backup information, index and database necessary to recover the data already saved to tape.

This utility is designed to transfer as much information and configuration parameters as possible, in order to allow all system administrators to transfer their existing 4.2.x configuration to the new architecture of Arkeia 5.

Applying the migration tool to an existing Arkeia 4.2.x server allows the administrator to transfer the following information to the Arkeia version 5 server:

- Tape and Tape Pool configuration.
- Backup device (drive/library) configuration.
- User configuration.
- Backup configuration (except *Periodic* backups).
- Database, backup history and index. These items are necessary for restoration.
- Partial network configuration.



**This migration tool applies only to Arkeia servers, NOT to clients. See *Migrating a client computer*, on page 250 for information on how to migrate Arkeia clients to Arkeia 5. Further information concerning migration issues can be found on the Arkeia web site <http://www.arkeia.com>.**

## A.1 Obtaining the migration tool

---

It is possible to obtain the Arkeia migration tool from the following sources:

- The Arkeia Corporation web site, at the following URL:  
<http://www.arkeia.com>
- The Arkeia 5 CD-ROM distribution also contains the migration tool. It can be found in the following directory: `/opt/arkeia/bin/migration`.

The `arkmigrate` utility is installed by default along with the Arkeia server.



**The Arkeia 4.2.x license should be upgraded to an Arkeia 5 license or the migration tool will not be able to work properly. Please contact the Arkeia Sales Team for more information.**

## A.2 Running the migration tool on a server

---



**The `arkmigrate` utility actually creates a symbolic link from the Arkeia 5 location (`/opt/arkeia/server/dbase/o3dbtree`) to the**

version 4.2.x index, which is kept in its original directory (Please refer to the sections above for more information). A backup copy of the version 4.2.x index should be made before launching the `arkmigrate` procedure, since it will deeply modify the index to put it into the version 5 index format.

Keeping a backup of the original allows you to roll back the version 5 installation to the previous version 4.2.x installation if need be.

## Keep a copy of the Arkeia 4.2 configuration

If you have made some changes to the configuration of your Arkeia 4.2.x computer, make sure you keep a copy of these modifications! Some modifications may not be taken into account by the migration tool from the version 4.2 to Arkeia 5.

## Required operations before the migration



The following operations should ALWAYS performed BEFORE attempting the migration of an Arkeia 4.2.x server to Arkeia 5.x. If you do not perform these steps, the migration tool may fail and all your previous backup data could become inaccessible.

Step 1: *Stop all the Arkeia 4.2.x processes*

1. Stop all backup/restore operations.
2. Stop the `md1` library processes.
3. Quit the Arkeia 4.2.x GUI (no `odts` processes should be left running).
4. Stop the `nlservd` process by entering the command `NLSERVD stop`.
5. Remove the `ARKPER` entry in the root `crontab`.

Step 2: *Rename the Arkeia directory and make a backup*

1. The Arkeia 4.2.x directory should be renamed from `/usr/knox` to (for example) `/usr/knox-4.2`
2. Make a complete backup of this directory to a tape in order to keep a copy of the Arkeia database and index, if necessary.



If you installed the Arkeia 4.2.x using the `tar.gz` package, you can safely disregard the next step. However, if you used an `.rpm` package, the next step is mandatory, otherwise subsequent `rpm` commands may fail, or delete important files that are required during the migration.

Step 3: *Remove the references to Arkeia 4.2.x in the rpm database (only .rpm files)*

If you have used `.rpm` packages to install Arkeia 4.2.x, please un-install Arkeia version 4.x with the following commands (entered as root):

```
rpm -e --justdb arkeia-server
rpm -e --justdb arkeia-client
rpm -e --justdb arkeia-gui
rpm -e --justdb arkeia-arkc
```

## Install Arkeia 5 (only .rpm)

If you are using the `tar.gz` package, install Arkeia by using the procedure detailed in [Installation using the tar.gz file](#) on page 31.



If you are using the RPM package, install Arkeia 5 by entering the following command as root:

```
rpm -Uvh arkeia-5.0.2-1.i386.rpm
```



**The version numbers in your RPM file may be different from the example given above.**

**Step 4:** *Stop Arkeia 5*

1. Arkeia 5 must be stopped *before* the migration tool can be started. To do this, enter the command indicated below as root:  
`/opt/arkeia/bin/arkboot stop`
2. Check that all the Arkeia processes have been stopped by entering the following command as root:  
`ps -faxuw | grep ark`

## Run the migration tool

To run the migration tool, enter the following command as root:

```
/opt/arkeia/bin/migration/arkmigrate [options]
```

The following options must be supplied on the command line:

- `--oldname [VALUE]`: Arkeia 4.2.x server name.
- `--fqdn [VALUE]`: Arkeia 5 FQDN server name.
- `--path42 [VALUE]`: Arkeia 4.2.x root directory. (For example: `/usr/knox`).
- `--path50 [VALUE]`: Arkeia 5 root directory. (For example: `/opt/arkeia`).

For example, the following command, entered as root, would perform a valid migration from the Arkeia 4.2.x foobar to the new Arkeia 5 foobar.acme.com:

```
/opt/arkeia/bin/migration/arkmigrate --oldname foobar  
--fqdn foobar.acme.com --path42 /usr/knox-4.2 --path50 /opt/arkeia
```

(For readability reasons, the options above appear on different lines – they should, of course, be entered on the same line as the command itself).

The migration tool automatically performs the tasks described in the section below. Follow the instructions which appear on the screen to complete the migration.

## Tasks performed by the migration tool

The `arkmigrate` procedure does the following:

- Make a backup copy of the version 5.x database directory for reference.
- Copy and change the version 4.2 `/usr/knox/nlp` configuration files to the appropriate version 5.x directory (`/opt/arkeia/arkeiad`).
- Copy and change the Arkeia 4.2.x `dbase/f3` directories (*except* for the Periodic backup configuration).
- Copy and rename the Arkeia journal.

- Change the backup server name to its FQDN value. For example: as we have seen above the server `foobar` becomes `foobar.acme.com`.
- Migrate the version 4.2.x index to reflect the version 5.1 structure.



We recommend that you to test the Arkeia 5 server using the migrated information (see the section [Test the migrated information](#) on page 250). If the server seems to be working correctly, the converted index can be moved and the symbolic link: `/opt/arkeia/server/dbase/o3dbtree` updated to reflect this change.

A complete log of the operations of the `arkmigrate` utility is kept in the following file:

`/opt/arkeia/log/arkmigrate.log`

If the migration tool fails to perform correctly, it should be restarted from the beginning, meaning a backup of the version 4.2.x index and a new installation of Arkeia 5. If the migration tool fails, please contact the Arkeia Technical Support for more information.

## Tasks to be performed after the migration

Do not forget to install the version 5 license using the Arkeia GUI (Graphical User Interface).

As noted above, Arkeia 5 should be restarted and tested thoroughly. The index, if correct, can then be moved from its original directory to another location *if* the symbolic link is updated accordingly.

The entire Periodic Backup configuration should be done again, but the Arkeia version 5 GUI makes this operation much easier.

## Test the migrated information.

To test the Arkeia 5 server using the migrated information, follow the steps below:

*Step 1: Library inventory*

Exchange two tapes within a library, then stop and restart the library processes and check that Arkeia 5 reflects the changes you have just made.

*Step 2: Restoration from version 4.2 tapes*

Check that you can restore files from tapes that were created with Arkeia 4.2.

*Step 3: New backup/restore using the Arkeia 5 server*

Perform a small backup and restoration operation using the migrated Arkeia 5 backup server.

## A.3 Migrating a client computer.

---

There is no need to migrate immediately the client to Arkeia 5, an Arkeia 5 server is backward-compatible and can backup and restore data to version 4.2.x clients.

However, it is recommended that you migrate the clients to version 5 as soon as it is convenient.

To do this, follow the steps indicated below.

1. Stop Arkeia 4.2.x on the client computers.
2. Make a backup copy of the configuration files.
3. Un-install Arkeia 4.2.x.
4. Install Arkeia version 5.
5. Make sure that the `admin.cfg` file contains the FQDN name of the backup server.
6. Restart Arkeia (`arkeiad` on UNIX computers, or Arkeia Service on MS Windows computers).
7. On the Arkeia server, stop the library processes with the following commands (entered as root):  
`/opt/arkeia/bin/arkboot stop`
8. Once the library processes have been stopped, restart the `arkeiad` process by entering (as root):  
`/opt/arkeia/bin/arkeiad`
9. Update the backup server configuration with the FQDN names for the upgraded clients by entering the following commands as root  
`/opt/arkeia/bin/migration/arkmvhost`  
`--allhosts`  
(to upgrade all modified clients)  
`/opt/arkeia/bin/migration/arkmvhost`  
`--host old_name`  
`--newhost new_name`  
(to upgrade the client `old_name` to `new_name`)
10. Once the backup server configuration has been updated, restart the library processes with the command  
`/opt/arkeia/bin/arkboot start`



**Note:** You will find a complete description of the `arkmvhost` command in [Rename servers or clients: arkmvhost](#) on page 226. Typing this command with the option `--usage` displays the options that it can accept.

**After performing the operations described above, do not forget to restart the library processes if the Arkeia server uses one to perform its backups!**

#### **Known problems and issues**

The following problems and issues are known to exist with the current version of the migration tool:

- The `arkmigrate` procedure does manage the configuration of Periodic backups. We recommend that you re-configure your Periodic backups under Arkeia 5, and start a new cycle of Periodic backups with a new Total backup. See [Chapter 8:Periodic backup](#) on page 117 for more information.
- In the case of Windows or Novell clients, `arkmigrate` only manages the normal files, not special files such as Novell's NDS or the Windows Registry. It is possible to backup these files through the Arkeia 5 plug-ins. Please contact Arkeia Corporation for more information.

- Special network configurations for the version 4.2.x, such as:  
Arkeia servers with several network cards,  
Backups through firewalls, and  
Authentication and proxies configuration  
are *not* migrated by `arkmigrate`. These configurations should be completely re-done. Please contact the Arkeia Technical Support Team for more information.
- At the time of this writing, the Arkeia 5.1 GUI does *not* support the `roles` configuration. This could be a problem if several different users and roles have been defined on a (migrated) Arkeia v4.2.x server.

## Recommended tape changes



The tapes should not be modified, **UNLESS** these modifications have been specifically recommended by the Arkeia Technical Support Team. A short list of the tape changes recommended by the Technical Support for Arkeia 4.2.x is given below.

In the files named below, make the changes indicated.

`f3drv/drvtypes.lst`      AIT-2 drive: variable tape block size.  
LTO drive: 1024 tape block size (This value is the new default for Arkeia 5).

`f3tape/tptypes.lst`      AIT-2 drive: enter the property `USE_CAPACITY`.  
Create a new `FILE` tape type with a size of 1000 MB.

`f3lib/libtypes`            Enter the property `LOCK_STK` to prevent inventory problems with some Autoloaders.  
Increase the number of slots in the `FILE` library.



**Do not use the utility `arkrstdb` to transfer the information contained on a v4.2.x tape back into an Arkeia 5 database.**

**Unfortunately, a bug prevents the `arkrstdb` utility from updating the Arkeia 5 index when processing tapes created with Arkeia v4.2.x. This problem could create license issues.**

**A solution to this problem is to use the `readarkeia` utility instead of the `arkrstdb` utility. Please contact the Arkeia technical Support Team if you have problems with this utility, or for more information on the availability of a correction.**

If you have ANY problem with the configurations detailed above, please contact the Arkeia Technical Support Team.

## A.4 Obtaining help with the migration tool

---

For any and all problems and issues regarding the migration tool from Arkeia 4.2.x to Arkeia 5, please contact the Arkeia Technical Support Team. The web page for the Technical Support Team is:

<http://www.arkeia.com/support.html>



# APPENDIX B: SYSTEM SECURITY

---

This appendix describes what you need to do to secure Arkeia 5 against system-level intrusion. If you are looking for information about data security, or how to encrypt the data Arkeia puts onto backup tapes, please see these references:

- *Define options for the savepack* on page 96;
- *Encryption configuration* on page 178

## B.1 Client security

---

To achieve the best security on an Arkeia client computer, you need to prevent:

- the client from being used as a server,
- access to the client from non-authorized backup servers, and
- access to configuration files.

This section explains how to secure an Arkeia client.

### Deny server functions on a client

Arkeia 5 consists of three main functional packages:

- backup server,
- client, and
- graphical interface.

To simplify installation, all three packages are installed every time. When the installation is on a platform which can be either an Arkeia server or client, there is a risk that an intruder who hacks into the client computer could turn it into a backup server.

To prevent this you can deny access to the server functions on a client computer in the *authorization configuration files* (auth\_ files). Auth\_ files are named using this convention:

```
ARKEIA_DIR/arkeiad/auth_<PROCESS_NAME>.cfg
```

To deny access to a process, change the active line in the authorization configuration file from ALLOW to DENY:

```
<PROCESS_NAME>.* DENY * *
```

For example:

```
ARKBKP.* DENY * *
```

The server auth\_ files to change to DENY are:

- a. auth\_ARKBKP (Backup)

- b. auth\_ARKDUP (Tape duplication)
- c. auth\_ARKLIB (Tape library management)
- d. auth\_ARKNAV (Navigation)
- e. auth\_ARKRST (Restoration)
- f. auth\_ARKTRANS (Transaction)

## Secure access to clients

On most networks, it is advisable to deny backup access to clients, except from the intended Arkeia server (or servers). This is also done in the `auth_` files. The format to restrict access to a given backup server is:

```
<PROCESS_NAME>.* ALLOW <backup_server_FQDN> *
```

For example:

```
ARKADMIN.* ALLOW mercury.arkeia.com *
```

The client `auth_` files to change are:

- a. auth\_ARKADMIN (Client administration)
- b. auth\_ARKFS (client backup, restore, navigation)

## Plug-ins

Plug-ins are generally forked by the local client, but it is also advisable to restrict access to the local computer. The format to limit access is:

```
ARKP<PLUGIN>.* ALLOW <local computer FQDN> *
```

For example:

```
ARKMYSQL.* ALLOW mercury.arkeia.com *
```

## Further access limitation

You can further tighten client access by requiring a connection on a reserved port, and using a root account. The format to limit access is:

```
<PROCESS_NAME>.* ALLOW <backup_server FQDN>[1] root
```

For example:

```
ARKADMIN.* ALLOW mercury.arkeia.com[1] root
```

## Secure configuration files

Various Arkeia configuration files contain information such as passwords and encryption keys, which should be restricted to prevent unauthorized access. The best way to do this is to make these files root read-only. In a shell, run the following command:

```
chmod 600 <filename>
```

The files to restrict are:

- a. \$ARKEIA\_DIR/arkc/arkc.param
- b. \$HOME/.arkc/arkc.param
- c. \$ARKEIA\_DIR/arkobk/arkobk.param (RMAN agent installed)



- d. \$ARKEIA\_DIR/arkeiad/cryptree.ark
- e. \$ARKEIA\_DIR/arkeiad/admin.cfg
- f. \$ARKEIA\_DIR/arkeiad/AUTH\_\*.cfg
- g. \$ARKEIA\_DIR/arkeiad/PROXY\_\*.cfg
- h. path-to/<global encryption file>

## B.2 Server security

---

To achieve the best security in an Arkeia server,

- restrict access to the Arkeia backup server functions from remote computers,
- reserve sensitive operations such as backup creation for an Arkeia Administrator role, leaving daily operations to an Arkeia Operator role,
- secure the server configuration files, and
- secure by encryption the data stream between the Arkeia server and clients.

### Secure access

You are able to manage backups and restores from any computer on the network. As backup administrator, you would normally do this from the server computer or your own computer, so it is advisable to restrict Arkeia backup control to these computers.

On an Arkeia server, you can control access through the `auth_` files, in the same way you controlled access to Arkeia clients (see [Secure access to clients](#) on page 256). The format to limit access is:

```
<PROCESS_NAME>.* ALLOW <list of allowed hosts> *
```

For example:

```
ARKADMIN.* ALLOW mercury.arkeia.com|earth.arkeia.com *
```

Note that each allowed host FQDN is separated by a "|" (vertical broken bar).

The server process authorization configuration files in which to list the authorized hosts are:

- a. `auth_ARKBKP` (Backup)
- b. `auth_ARKDUP` (Tape duplication)
- c. `auth_ARKLIB` (Tape library management)
- d. `auth_ARKNAV` (Navigation)
- e. `auth_ARKRST` (Restoration)
- f. `auth_ARKTRANS` (Transaction)

### Roles

Once you have configured Arkeia to work the way you want it to, changes to the configuration will be very rare. It is advisable to create an accounts with OPERATOR

and USER permissions for the daily management of backups and restorations. See [Users](#) on page 69 for further information on creating roles for Arkeia users.

## Secure configuration files

For the same reasons as client configuration files, server configuration files should be restricted to prevent unauthorized access. The best way to do this is to make these files root read-only. In a shell, run the following command:

```
chmod 600 <filename>
```

The files to restrict are:

- a. \$ARKEIA\_DIR/arkc/arkc.param
- b. \$HOME/.arkc/arkc.param
- c. \$ARKEIA\_DIR/arkobk/arkobk.param (RMAN agent installed)
- d. \$ARKEIA\_DIR/arkeiad/cryptree.ark
- e. \$ARKEIA\_DIR/arkeiad/admin.cfg
- f. \$ARKEIA\_DIR/arkeiad/AUTH\_\*.cfg
- g. \$ARKEIA\_DIR/arkeiad/PROXY\_\*.cfg
- h. path-to/<global encryption file>
- i. \$ARKEIA\_DIR/server/dbase/f3sec/\*

## Port forwarding

By default, communications between Arkeia backup server and Arkeia backup clients is unencrypted. You can use SSH to secure the data stream between the server and the client. On the server computer, enter this command as root:

```
ssh -g -L 617:<backup_server_hostname>:619 <client_hostname>
```

When Arkeia connects to port 617 on a client, the data is forwarded over the secure channel to `client_hostname`, port 619. You must change the Arkeia backup client port to 619, see [Arkeia daemon management](#) on page 170 for instructions on how to do this.

For example:

```
ssh -g -L 617:earth.arkeia.com:619 mercury.arkeia.com
```

Data will now pass by an encrypted channel between port 617 on the backup server `earth.arkeia.com` and port 619 on the client `mercury.arkeia.com`.

If you want to apply this setting automatically when the server computer is booted, add the above command to the file `/etc/ssh/ssh_config`.

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