Time Navigator Troubleshooting Guide
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Welcome to Time Navigator.

Time Navigator is a high-performance Backup, Archiving and Restore solution designed to meet the most demanding data protection needs of enterprise customers with multiple servers, large databases and advanced storage architectures.

Time Navigator Troubleshooting Guide is a reference for partners and customers for dealing with incidents on their Time Navigator installations.

About this guide

The present guide is structured as follows:

- Chapter 1 details where you can find information on specific problems in existing Time Navigator documentation.
- Chapter 2 gives instructions for using Atempo’s Web site and details the range of Web based services that can be accessed.
- Chapter 3 details the tools and utilities either present in Time Navigator or available from Atempo Support.
- Chapter 4 instructs you in a range of techniques for diagnosing your problem.
- Chapter 5 outlines a general methodology of problem solving in Time Navigator and provides five concrete applications of this.
- Chapter 6 instructs in the procedure for calling Atempo Support, and especially in the use of the utility tina_env_report, the output of which will be needed by the Support team to help you solve your problem.
Conventions

This guide uses conventions to make information easy to access and understand.

- Text in **Time Navigator** graphical application windows is displayed in the following font:
  
  Window text.

- **Time Navigator** commands and scripts related to the different operating systems (Unix, Windows, etc.) are displayed in the following font:
  
  scripts and commands.

- Cross-references to further information are indicated by the ☞ symbol.

- Procedures indicating the steps to follow to perform an action with **Time Navigator** are presented as follows:

  ➤ Procedure title

  1. First step.

  2. Next step, etc.

- Command syntax is presented as follows:
  
  - Square brackets [ ] indicate an option.
  
  - The - sign refers to a parameter. The parameter is either followed by the type of information to provide, or is self-sufficient.
  
  - The | sign indicates a choice between several parameters.

Your Comments are Welcome

We value and appreciate your opinion as a **Time Navigator** user and reader of our documentation. As we write, revise and evaluate our guides, your comments are the most important input we receive. Please do not hesitate to send us any remarks you have to the following address: documentation@atempo.com
In this Chapter, we will provide an overview of the full range of resources available to you from *Time Navigator* documentation. These resources fall into five main classes:

- PDF Guides
- Tutorials
- Online Help
PDF guides exist for the full range of Time Navigator modules and products. You should consult these first in the event of an issue, insofar as there is a good likelihood that it is already covered.

You will find PDF guides for all modules relating to your version of Time Navigator on the distribution CD-ROM.

Alternatively, they may be downloaded from the Web Support zone of the Atempo website. Follow this URL

http://www.atempo.com/support/web_support.php
Make sure you have your login and password. If you do not, and are under an active Maintenance Contract with Atempo, you may obtain them by filling in an online request form.

The Guides are organized by **Time Navigator** version and under headings, as follows (may vary with version):

- **Release Related Information**
  - Release Notes
  - Time Navigator Bug Fixes and Known Issues
- **Reference Guides**
  - Atempo License Manager
  - Time Navigator Getting Started Guide
  - Time Navigator Installation Guide
  - Time Navigator Administration Guide
  - Time Navigator Restore Guide
  - Time Navigator Web Interfaces
- **Online Connect Suite:**
  - Time Navigator for Oracle
  - Time Navigator for Oracle on NetApp
  - Time Navigator for R/3
  - Time Navigator for MS-SQL Server
  - Time Navigator for MS-Exchange
  - Time Navigator for Lotus Domino
  - Time Navigator for DB2
  - Time Navigator for DB2
  - Time Navigator for Sybase
  - Time Navigator for MS-SharePoint Portal Server
- **Options**
  - Time Navigator Archiving Server
  - Time Navigator ASR for Windows 2003 and Windows XP
  - Time Navigator Disaster Recovery for Windows (Powered by WinPE)
  - Time Navigator Library Sharing Manager
Detail of Principle Guides for Troubleshooting

Below, we will summarize the contents of some of the most useful guides for troubleshooting purposes in greater detail.

Reference guides are all available in Windows and Unix versions.

**Time Navigator Installation Guide**

- Installation of Servers
- Installation of Agents under
  - Unix
  - Windows
  - Mac OS X
  - VMS
  - NetWare
- Upgrade and Component Addition
- Uninstalling
- Configuration of:
  - Catalog
  - Devices
  - Advanced Parameters
- Dedicated Networks
  - Backup Dedicated
  - Partially Dedicated
  - One Server, Several Networks
  - Networks with Different DNS
  - NDMP
- Configuration Files
  - Catalogs file
  - Parameters File
  - Hosts File
  - Logs File
  - Alarms_filer File
  - Domains File
- Installing in Batch mode under Unix and Windows

**Time Navigator Administration Guide**

- General Concepts
- **Time Navigator Administration Console** in Detail
- Creation and operation of Catalog
- Configuration, operation, maintenance, diagnosis of
  - Hosts
  - Libraries
  - Drives
  - Cartridge Pools
  - Strategies
  - Classes
Applications

Users and Access Rights

Operations, Maintenance and Information on Cartridges

Macro-multiplexing

Cache Space Management

Virtual Library System

SAN Environments

Catalog Backup & Restore

Configuration, Operation, Maintenance of Agents under

Windows

Unix

Linux

Mac OS X

Monitoring Tools - Detailed Analysis of

Time Navigator Event Manager

Time Navigator Job Manager

Time Navigator Task Viewer

Time Navigator Media Request Console

Time Navigator Agent Job Viewer

List Application

Mapped Network Drives

Net Disk Application

Filesystem Application

**Time Navigator Restore Guide**

Detailed use of Time Navigator Restore & Archive Manager

**Time Navigator Bug Fixes and Known Issues**

This important guide contains a complete list of Time Navigator limitations. Bug fixes are documented in relation to the previous version.
Tutorials

Flash-based tutorials, designed to quickly teach you the basics of backing up and restoring data with **Time Navigator**, are available on our Web site at the following link:


They can also be accessed from **Time Navigator Administration Console** or **Time Navigator Restore & Archive Manager**, via the menu **Help - Tutorial**.

All these tutorials require Macromedia Flash Player and a 1024*768 minimum screen definition.

**Backup Tutorial**

Shows you how to define the parameters required to configure an automatic backup. The parameters represent the answers to the following questions: where, how, when and what data should be backed up?
Restore Tutorial

Shows you how to restore missing files or previous versions of existing files whether or not you know their exact name and location.

Monitoring Tutorial

Shows you how to monitor your backups using the Time Navigator Administration Console (daily monitoring and problem analyzing) and presents an overview of the Atempo Web Support.

Architecture Tutorial

Shows you how Time Navigator can be integrated with various architectures (Client/Server, Multi-site, Secured, Firewall and SAN Architectures).

Archiving Tutorial

Shows you how to manage archive folders and archives, archive directories and files, and restore archived directories and files.
Online Help

Within **Time Navigator** itself, extensive online help is available via the **Help** menu of each of the major interfaces.

Help is context-specific to the interface from which it is summoned.

In addition, there is a contextual **Help** button at lower right on most configuration and dialogue windows.
Technical Notes

Compatibility Guides in PDF format detail the broad range of servers and client operating systems as well as a wide range of media and devices for Time Navigator.


They can be downloaded from:

http://www.atempo.com/products/timeNavigator/compatibilityguide.asp

In the context of Troubleshooting, we invite you to consult the Compatibility Guides to check that your configuration is sustained by Atempo.


CHAPTER 3

Atempo Web Support

The Web Support Zone

Web Support Users

The Web Support Zone is a password-protected area which gives access to our customers and partners to a wealth of information about Time Navigator.

You can read the latest documentation and the product release notes and get access to the database of patches and updates to see if there are any available for your Time Navigator product. You can also search Atempo’s Knowledge Base to help solve any technical issues you may be experiencing with Atempo's products.

To arrive directly in the Atempo Web Support Zone, use the URL

http://support.atempo.com

Atempo Web Support is open to

- Certified Partners
- End-Users
  - Any customer having bought a license for Time Navigator may request a Web Support Login
  - All Customers will have access to the Atempo Knowledge Base
  - Customers who have a maintenance subscription, either in the form of a contract or of tickets, as for Business Edition, will also have access to Inquiry Tracking

If you do not have access to Web Support, please ask for an account name and password at the address:
http://support.atempo.com/customer_access/custaccess_request.php

If you have lost your account name and password, please post a request to the address:

http://www.atempo.com/partners/forgot_password.php
Accessing Web Support

You have three access options when you arrive on the Web Support Page:

- You are already a Registered User: click on the Registered User button and enter your login and password in the fields provided.
- You are a Registered User but have forgotten your password: click on **Forgot your password** and enter your name and e-mail on the form that now appears. Atempo will check these details against our Customer base and return your password to you by email.

- You do not yet have a login: click on **Request a login?** and enter your details in the form that appears. All fields marked with asterisks are mandatory.
Installing the Java Runtime Environment

As uploading is based on a Java applet, the Java Runtime Environment must be installed. The installation of the Java Runtime requires a reboot of the system. Thus, if you do not already have it installed, downloading and installing the software is a pre-requisite to using Web Support. The software is available at the following link:

http://www.java.com/en/download/download_the_latest.jsp
Knowledge Database

The knowledgebase is a collection of technical documentation, information of the published patches available, and technical notes.

This base is constantly being updated and expanded. Do not hesitate to consult it frequently.
Searching for Information

You can run a simple search by entering a search term in the field provided and clicking on the arrow.

To access Advanced search facilities, click on the word **Advanced**. This will call up an interface in which we can search for specific documentation by keywords, and filter by:

- **Time Navigator** Version
- Operating System
- Functionalities
- Domains

We can also search within the following databases, which are:

**Technical Notes**

Atempo maintains an extensive collection of Technical Notes. These notes deal with technical issues and configurations that are too specific to go into general documentation. Consult these for very detailed information about specific setups.
Patches

You may consult a full list of patches and their description on Atempo Web Support. However, this is not a site for the downloading of patches. If you think you need a patch, log your request as an Inquiry.

Known issues

Known issues are limitations to a given version and patch level of Time Navigator that have not been resolved.

They may be the subject of a bug fix in a later patch.
Another function offered by Atempo Web Support is that you can ask for a new License Key or modify your existing key for versions of **Time Navigator** up to 3.7.
This feature cannot be used for Time Navigator version 4.1 or higher, the licensing system having changed with the implementation of Atempo License Manager. For information on how to obtain a license for these versions, consult the documentation for Atempo License Manager.

When you click on License Key Request in the menu bar, a form appears allowing you to fill in the details of your configuration and the changes you would like to have implemented in your License Key.

Be ready to provide the following details:

- **Time Navigator Version**
- **Host ID**: (The getsysID utility, located in the Time Navigator installation/Bin directory will provide the Host ID). If you do not have it, you may also download this utility.
- **Catalog Name**
- **Atempo Ref**: (4-digit minimum number, required in case of upgrade or Add-on. Located on Delivery Document.)
- **Previous Key**: Required in case of upgrade or Add-on. Provide the result file from the Time Navigator Environment Reporter option (required in case of upgrade). Use the option generate a report with configuration only. You may also download the tina_env_report utility if you do not have it. See section ....for more information on using tina_env_report.
- **Customer name**
- **Permanent Key or Temporary Key**: Toggle the option for the kind of key you want. If you select a Temporary Key, you will be asked to select an End Date.
- **GENERAL INFORMATION**: How many of the following items would you like to be included in your new license? Fill in the quantities:
  - Agents
  - Storage Nodes
  - NAS/NDMP
  - Drives
  - Disk Drives
  - VLS Drives
- **APPLICATIONS**: How many of the following Application modules would you like to be included in your new license? Fill in the quantities
  - Oracle
  - Informix
  - MS-Exchange
  - Lotus Notes
  - MS-SQL Server
  - Sybase
  - DB2
  - MS-Sharepoint Portal Server
  - SAP R/3 on Oracle
  - Unix Cluster
  - Windows Cluster

- **OPTIONS**
  - Shared Drives
  - Disaster Recovery
  - This key is needed due to New license OR Upgrade

- **Comments**
Logging and Tracking Inquiries

Inquiries

Atempo encourages you to use the Web Support Inquiry Tracking feature to:

- Report incidents, request product evolutions, view bug fixes, submit wishes in Atempo central repository
- Ask for information
- Upload files (if needed) associated to the inquiry
- Add a diary to an existing inquiry. A diary is a text related to an inquiry that is entered by the customer or the partner. A diary can also be referred to as a "comment".
- Review the history of your inquiries and dialogue with Atempo Support
- Change the status (open or close) your inquiries

To access, click on Inquiry Tracking, in the menu at left.
A list of all sites corresponding to your Maintenance Account appears. Most Customers will have only one site. Next to the site list is a brief summary of the status of its Inquiries, the number of Inquiries logged with Critical and High priority, the number Open, and the Total.

Click on the site for which you wish to log an Inquiry.

On the window that now opens, a list of options in the upper left corner lets you

- Open Inquiries
- Close Inquiries
- New Inquiry
Logging a New Inquiry

Inquiries logged via this interface are sent in real-time to Atempo's Support Interface, a central repository of all Customer Calls for support. A support technician will respond to your entry as soon as possible.

When you click on the **New Inquiry** option, a new interface appears which offers you a range of choices.

**Inquiry Type**

Select here between:

- **Information**: You would like some information on an Atempo product or module, or you have a question about functioning.
- **Evolution**: You would like to suggest an improvement of the product, a new feature, or request a bug fix.

- **Incident**: Use this option to report problems in the functioning of your **Time Navigator** installation.

### Select your Priority Level

For calls regarding Incidents, select between **Low**, **Medium**, **Critical** and **High**. See the next section for guidelines on how to define the Priority Level of a Call.

### Technical Category

- The obligatory Tina field offers you a pull-down list to select the exact version and patch level of the **Time Navigator** installation for which you are making the call. You can find this information in **Time Navigator Administration Console**, under the menu Help About…

- The obligatory **Functionality** field offers a pull-down list with different **Time Navigator** functionalities such as Administration, Archiving, Backup, with different levels of refinement. Pick the one that most closely describes the subject of your call.

- The optional **Domain** field provides a pull-down list of **Time Navigator** applications, such as Catalog, List Oracle or Lotus Notes.

### Inquiry Information

- Next to **Contact**, a pull-down list offers a selection of all the Contact names that have been associated with the site and account for which the Inquiry is being logged.

- The field **Your Inquiry ID** is for your own reference, in the event that you have a classification system or database to track all the inquiries that your Company emits.

- **Details** is of course the most important field here. Enter as precisely as possible a description of the incident that has occurred, or of your request for evolution.

### Select Your Contact Mode

Select the means by which you wish the Atempo Support Technician to contact you in response to your Inquiry. You have the choice between **Email** and **Phone**.

Click on **Validate** when you have finished entering the fields.
How to Define the Priority of an Incident Call

The next set of options allows you to set the priority of your call for support.

**Critical:**

The system is not functioning or is performing so badly that it is blocking production. A stopgap workaround to this condition could not be found or proposed. Immediate and sustained assistance is required.

**High:**

The system is working very badly and production is blocked. Stopgap workarounds could not be proposed.

**Medium:**

The system is not working or is performing badly, but without blocking production. Alternatively, this is a critical or high priority problem for which a temporary workaround has been found.
When you click on **Validate** in the interface where you define your Inquiry parameters, before your Call is logged in Atempo’s database, a search is run of the Knowledge Base on all Technical Notes, Known Issues or Patches that are already present in the base for the parameters you indicated.

It is possible that one of these previous entries contains information that can help you solve your problem. Atempo invites you to consult the list of entries.

Clicking on the Id of the entry will open a window with complete information associated with it.

If you can find nothing to help you in the **Search Results**, click on the **Log Inquiry** button to send your information to the Atempo Helpdesk.

A window with a summary of your call details now appears. If everything is correct, click on **Submit Inquiry**.
Uploading Attachments Related to the Inquiry

In the interface that now appears, you are given the possibility of establishing an FTP connection with Atempo in order to upload any files which may be relevant to your Inquiry and help us analyze the problem more quickly. A typical file for uploading would be a tina_env_report.

Installing the FTP software

If this is the first time you are using the web ftp, you will have to install the software to make it run.

1. Click on the Java Button Automatic Install.
2. You will get a page informing you that the Ftp software is being downloaded and installed to your system, and then an announcement that the installation is complete. At that point, you should reboot your system.
Uploading Procedure

Uploading

1. When you have clicked on the Submit Ftp button, a Java applet opens with images of your source file-tree and the destination file-tree at Atempo. Browse the source tree to find the file(s) you wish to upload. The >> button allows you to upload the file.

2. A group of buttons below each of the file-trees gives you the option to create a new directory (Mkdir), Rename or Delete a file or Refresh the file-tree.

3. Option buttons at the center of the screen also let you determine whether to upload the file as plain Ascii or as a binary.

Follow-Up Actions on an Open Inquiry

Two actions are possible on an Open Enquiry.
Add a comment

Comments, also called Diary Entries, can be added to Open Inquiries. Notification

As describe on the workflow, we notify the partner and Atempo main contact when a comment has been added. An example of the email sent is below.

A new "Comment" information was added to the Support Inquiry ID 82975
***** Owner PARTNER-1ST LEVEL
***** Priority Low
***** Sujet : Web support Add a comment test
***** Detail :
***** Web Update from Thursday 9 June 2005 16:40:30
   Sender : Monsieur Partner test - Atempo Partner Test Account ()
   I've added a comment on this inquiry.
.........................................................................................
Enabling Information Lifecycle Strategies
Discover the Time Navigator Web Support http://support.atempo.com
Request your login here : http://support.atempo.com/customer_access

Close the inquiry

The interface is identical, except that the word Close appears under the Diary Type heading instead of Comment.
This Chapter introduces some Atempo tools and shows how they can be used to diagnose problems:

- Distributed Tools
  - tina_env_report - overview
  - qcdiag Utility
  - tina_cache
  - tina_config
  - tina_ping
tina_env_report

This is the most comprehensive tool for debugging and troubleshooting purposes. It generates a complete report of your Time Navigator configuration. Atempo encourages you to generate and send a tina_env_report whenever you log an inquiry.

The report is formatted in such a way that it can be rapidly machine-read and databased at Atempo Support.

Confidentiality

Atempo undertakes to preserve the confidentiality of any information collected by tina_env_report, and not to divulge such information to any other party.

Information Collected by tina_env_report

For all operating systems, tina_env_report will collect:
- At the root:
  - Summary.txt file
  - tina_config_'name_of_catalog'__Summary.txt file
- in System_Information
  - All OS dependent files
- in tina_conf
  - All useful files in Conf directory
- in tina_adm
  - All useful files in Adm directory
- in tina_information
  - All the results of information collection concerning catalogs

Operating System Information

In keeping with your operating system, tina_env_report will collect the following configuration information:

For all operating systems:
- host_name
- host_manufacturer
- host_os_system_name
- host_os_release
- host_memory_size; inMB
- host_swaps_nb
- host_swap1:swap_location
- host_swap1:swap_size; MB used:"minmax"
- host_processors_nb
- host_Proc1:proc_type
- host_networks_nb
- host_network1:network_ip
- host_network1:network_type
- host_timezone

For Windows:
- host_CrashDumpNotification
- host_DrWatson.log
- host_user.dump
- information displayed only in event of error:
  - host_RemovableStorageManager
  - host_RSM_StartType
  - host_Robot_driver

Files Generated

Depending on your Operating System, tina_env_report will also generate the following files:
- W2K, via the command msinfo32:
  - System_Information\msinfo32_ComponentsNetwork.txt
  - System_Information\msinfo32_ComponentsStorage.txt
  - System_Information\msinfo32_SWEnvEnvVars.txt
  - System_Information\msinfo32_SystemSummary.txt
- NT4, via the command winmsd
  - System_Information\MachineName.txt
- Windows
  - System_Information\drwatson.log (if it exists)
  - System_Information\Reg_Enum_SCSI.txt
  - System_Information\Reg_SCSI.txt.txt
  - System_Information\Application.evt
  - System_Information\Application.txt
  - System_Information\Security.evt
  - System_Information\Security.txt
  - System_Information\System.evtx
  - System_Information\System.evtx
  - System_Information\System.txt
  - System_Information\hosts
  - System_Information\services
  - System_Information\List_Scsi.txt
- All
- System_Information\List_Process.txt
- System_Information\Crontab.txt
- System_Information\Env.txt
- System_Information\Etc\filesystems
- System_Information\Etc\fstab
- System_Information\Etc\inittab
- System_Information\Etc\mtab
- System_Information\Etc\services
- System_Information\Etc\Atempo\*
- System_Information\Local_-a.txt
- System_Information\ypcat_services.txt

- Linux
- System_Information\conf_drv_qc0.conf*/
- System_Information\conf_drv_qc.txt
- System_Information\devices.txt
- System_Information\dev_qc.txt
- System_Information\messages
- System_Information\Mii-Tools.txt
- System_Information\qc_stinit.txt
- System_Information\redhat-rc.local
- System_Information\scsi_list.txt
- System_Information\sg_list.txt

**Time Navigator Information**

tina_env_report then goes on to collect information on your **Time Navigator** configuration:

**General Time Navigator Information**
- tina
- tina_home
- tina_service_name
- tina_domainname_registry_key
- tina_version
- tina_host_name
- tina_host_id
- tina_ModulesChecked
- tina_ModulesCompleted

**Catalog-Related Information**
- catalogs_known_nb
- catalogs_local_nb
- catalogs_local_started_nb
For each catalog identified:
- catalog_name
- catalog_activity
- catalog_state

From here, we can have:
- Catalog removed from selection by user.
- Information displayed only in event of error:
  - catalog_permission
- And in all cases:
  - licence=license_key_value
  - NbFullWithDoubleWritting
  - NbIncrWithDoubleWritting
  - NbStorageNode
  - NbLanFree
  - NbStratWithMMX
  - nb_host_type_8(TypeIBMAIX)
  - nb_host_type_29(TypeNetWare)
  - nb_appl_type_12(TypeCatalog)
  - nb_appl_type_13(TypeNovellSMS)
  - NbLocalArchive
  - NbCentralArchive
  - NbBRBACKUPVASAPArchive
  - NbBRARCHIVESAPArchive
  - catalog_superuser
  - catalog_size
  - catalog_free
  - catalog_cache_mem_size
  - catalog_cache_disk_size
  - catalog_nb_objects
  - catalog_nb_instances
  - catalog_nb_jobs
  - cache_nb
  - cache1:info
  - robots_nb

Library-Related Information

For each library in each catalog:
- robot_info
- robot_type
- robot_shared
- robot_cleaning
drives_nb

**Drive Related Information**

For each drive in each library:
- drive_info
- drive_connection1
- drive_type
- drive_robot
- drive_cleaning

**Files Generated**
- System\Information\Reg_Software_Atempo.txt
- System\Information\Reg_QC.txt
- System\Information\Reg_OC.txt
- System\Information\Reg_Service_ "nomduservice" .txt*///for all services

if the catalog is selected:
- Tina\Information\tina_cache_ 'catalogname'.txt
- Tina\Information\key_ 'catalogname'.txt
- Tina\Information\tina_config_ 'catalogname'.txt
- Tina\Information\mini_ 'catalogname'.cod
- Tina\Information\cartridges_ 'catalogname'.txt
- Tina\Information\tina_stat_ 'catalogname'.txt

only since version 3.7 of **Time Navigator**:
- Tina\Information\tina_config_ 'catalogname' _crypted.txt

even if the catalog is not selected:
- tina_config_ 'catalogname' _summary.txt

from:
- Conf/*.txt,
- Conf/brand*
- Conf\*.txt
- Conf\VTL\*
- Bin\*.cmd
- Conf\LSM\*
- .tina.*

in:
- Tina_Conf\
from:
  ■ Adm\event.*
  ■ Adm\error
  ■ Adm\log
  ■ Adm\log.*
  ■ Adm\ndmp_evt.*

in:
  ■ Tina_Adm\

ps: event and ndmp_evt are renamed with 'name'_'date'.tne
  ■ Tina_Information\Directories_information.txt
  ■ Tina_Information\qcdiag_'devicename'.txt
  ■ Tina_Information\qc.sys_info.txt

Information Collected by Time Navigator Perl Engine (TPE)

The **Time Navigator** Perl Engine (TPE) extracts further information on configuration from the mailboxes and then uses them to update Summary.txt once more:

**Files Generated**

  ■ System_Information\Reg_Software_Atempo.txt
  ■ System_Information\Reg_Service_'TPEservicename'.txt
  ■ TPE_Information\get_tpe_info.txt
  ■ TPE_Information\local_product.txt
  ■ TPE_Information\session.txt
  ■ TPE_Information\semaphore.txt
  ■ TPE_Information\ping_'server'.txt
  ■ TPE_Information\Task.txt
  ■ TPE_Information\Sql_Query_Tables.txt
  ■ TPE_Information\Sql_Query_CATALOG.txt
  ■ TPE_Information\Sql_Query_DFM_CARTRIDGE.txt
  ■ TPE_Information\Sql_Query_DFM_CARTRIDGE_MIG.txt
  ■ TPE_Information\Sql_Query_CARTRIDGE.txt
  ■ TPE_Information\Sql_Query_LOT.txt
  ■ TPE_Information\Sql_Query_LOCALISATION.txt
  ■ TPE_Information\Sql_Query_LIBRARY.txt
  ■ TPE_Information\Sql_Query_LIBRARY_SPLIT.txt
  ■ TPE_Information\Sql_Query_TEMPLATE.txt
  ■ TPE_Information\Sql_Query_DFM_TARGET.txt
  ■ TPE_Information\Sql_Query_DFM_TARGET_ARCHIVE.txt
  ■ TPE_Information\Sql_Query_DFM_FILTER.txt
  ■ TPE_Information\Sql_Query_USER.txt
from:
Conf/*,
except Conf/mess*
Bin\*.cmd
in:
-Tina_Conf\
from:
Tpe/Conf/*,
ext except Tpe/Conf/mess*
Tpe/Bin\*.cmd
in:
-Tina_Conf\Tpe\

from:
Adm/*
in:
-Tina_Adm\
from:
Tpe/Adm/*
in:
-Tina_Adm\Tpe
ps:tpe_event is renamed with tpe_event_’name’_’date’.tpe

Summary File Updated with:

The following information is returned to the Summary.txt file by the Time Navigator Perl Engine:
- tpe_home
- tpe_network_service
- tpe_hostname
- tpe_server
- tpe_installation_type
- tpe_current_access_user

Downloading and Installing tina_env_report

Tina_env_report should be present on your Time Navigator distribution cd-rom. At installation, it is automatically placed by default in the bin subdirectory of your Time Navigator installation directory.

It is not normally necessary to download and reinstall it unless you have reason to believe that your version of this tool is not sufficiently recent. You can download the file from Atempo’s ftp site.
Unix

1. Download **Time Navigator Environment Reporter** from:


2. Install the file on the **Time Navigator** server in $TINA_HOME (**Time Navigator** installation directory).


Windows

1. Download **Time Navigator Environment Reporter** from:


2. Install the file on the **Time Navigator** server in %TINA_HOME% (**Time Navigator** installation directory).

Launching tina_env_report under Unix

To launch tina_env_report

Run **Time Navigator Environment Reporter** from a shell on the server.

# $TINA_HOME/tina_env_report.sh

Configuring the Report

Under Unix, tina_env_report does not have a graphic interface. When you launch the shell, a list of options (present to their defaults) appears as follows:

```
[root@csc-linux1 csc_exploit]# ./tina_env_report.sh -help
Time Navigator Environment Report Script 1.4.1.0 build 1

Using tina : EE Version 4.1.0 SP1 P1703 Jun 10 2005
Check access to catalog "test"             : OK

1) generate config only: No
2) include .cod file: Auto ( only if lower than 1024 Kb)
3) generate a compressed file: Yes ( using gzip )
4) uuencode the result(s): No ( uuencode is not found )
5) split the resulting file after 1900Ko: No
6) collecte only last 1000 last lines: No
7) Catalog(s) selection: 1 / 1 selected
8) Catalog(s) permissions: 1 / 1 are ok
0) run tina_env_report !

your choice (0)
```

**Option 1: Generate Configuration Only**

If you enter
at the prompt, only files related to the system configuration are collected. No information on Time Navigator is collected.

**Option 2: Include .cod File**

This option toggles between two values, Auto and Yes. It allows you to decide whether you want the .cod file, created by a catalog backup, to be included in the report. If you leave it on Auto, the file will only be included in the report if it is smaller than 1024 KB. If you toggle it to Yes, it will be included no matter what its size.

**Option 3: Generate a Compressed File**

This option, set by default at Yes, causes the Environment Report to be compressed on generation. This reduces its size significantly.

**Option 4: Uuencode the Result**

Uuencoding is a utility that transforms files into text, for copy-pasting directly into the body of an e-mail. This option is useful if your mailer does not accept attachments.

**Option 5: Split the Resulting File**

If your file is so large that you need to send it in several parts, set this option. It will split the Environment Report into segments of 1900 KB.

**Option 6: Collect Only Last 1000 Lines**

**Option 7: Catalog Selection**

If you select this option, here is what happens:

your choice (0)

Catalog List :
1: baklavaSelected
2: davinciSelected

98 : Select All
99 : Unselect All
0 : Continue

Under Catalog List, you see a numbered list of catalogs, with their selection status. To select all the catalogs, enter the value 98. To deselect all the catalogs, enter the value 99. To toggle the selection of a catalog in particular, enter its number:
98 : Select All
99 : Unselect All
0 : Continue

your choice (0)1

Catalog List :
1:baklavaNot Selected
2:davinciSelected

Option 8: Catalog Permissions

If you run tina_env_report and this line changes from something similar to:

8) Catalog(s) permissions: 2 / 2 are ok

to something similar to

8) Catalog(s) permissions: 0 / 2 are ok

this means that a connection to one or more catalogs has failed, and could be due to catalog permissions. Possibly you are not logged in with the user and password necessary to connect to the catalog. Run Option 8 to check and modify permission status:

your choice (0)8

Catalog List :
1:baklava:Using no specific identity
99 : Change Global User Access
0 : Continue

your choice (0)1

Please enter the catalog "baklava" identity with the format "user":"password" :
Check access to catalog "baklava":KO : Rights Not Sufficient To Access At The All Archive Folder
( Need "Archiving administrator rights" )

Catalog List :
1:baklava:Using no specific identity
99 : Change Global User Access
0 : Continue

your choice (0)

In this example, when the user selects by number the catalog baklava, we find that this user does not have Archiving Administrator Rights on this catalog. He or she must enter another identity with sufficient rights using the format as indicated in this example.

Please enter the catalog "baklava" identity with the format "user":"password" :tina:tina

If the connection has been successful with this user, the terminal returns:

Check access to catalog "baklava":OK

To modify access permissions to all the catalogs at once (using one global identity) enter the option 99.
Generating and Sending the Report under Unix

After configuring tina_env_report, start generation by entering option 0 at the choice prompt:

your choice (0)0

As the Report is generated, the list of files being collected and copied scrolls to screen.

Finally, you will see a message similar to the one below:

Created file size is 60448 KB,
Please, send the following files at the email address "support@atempo.com":

//opt/tina4/Adm//tina_env_report_2005Aug26_10h54.tar.gz (size : 60448 KB)
( don't forget to specify your call number )

At this point, you may manually email the specified file(s) to Atempo as an attachment, or include it directly in the body of your mail if you have chosen the uuencode option.
Launching *tina_env_report* under Windows

To launch *tina_env_report* under Windows:

On the **Time Navigator** server, select the **Start menu, Programs -> Time Navigator -> Utilities -> Environment Reporter**

Or

Double-click on the *tina_env_report.exe* file to run **Time Navigator Environment Reporter**.

**Configuring the Report**

The **Time Navigator Environment Reporter** interface appears on the screen.
1. If you have several **Time Navigator** services, select the one for which you wish to generate the report in the list at top left.

2. The catalogs associated with that service now automatically appear in the middle list. Select the catalog for which you wish to generate the report.

3. If you are not logged in as the privileged user of that catalog, you may have to **Change Access User**. Click on the button at lower left.

4. An interface now appears allowing you to enter the **Name** and **Password** of the privileged user of the catalog.

5. When all these elements have been configured, click on the **Generate Report** button in the lower middle of the screen.

6. Notice the path in the **Read Only** field at the bottom of the interface. This is the path where you will be able to find the reports once they have been generated.

---

**Generating and Sending the Report under Windows**

[Image of the interface showing the report generation process]
The window that now appears is an extended progress report of *Time Navigator Environment Reporter*’s file generation. As each part of the report is generated, you will see it announced with a counter which will go from ... to a sixty second countdown to **OK** when the generation is finished.

---

**Note** If your catalog is large, some parts of this operation may take some time.

---

When the report generation is finished, a message box appears to the screen with a list of the names and paths of the generated files and instructions for various methods of sending them to Atempo.

Remember that you may also upload these files by ftp when you open an inquiry in Atempo Web Support, as described on page 40 of this manual.
The qcdiag Utility

This section presents the basics needed to run and use the library diagnostic tool: qcdiag.

The "qcdiag" tool has been created to test the qc library driver or the library itself, independently of the Time Navigator environment.

This command can be run in interactive mode or in batch mode. The batch mode runs a sequence of commands listed in a text file, which is an easy way to perform automated tests on libraries.

**Warning**
1. If the library is already used by Time Navigator, you must stop the Time Navigator daemon or service on the server in order to avoid any concurrent access on library and drives.
2. Moving cartridges in the library may result in a "silo inconsistency" in Time Navigator if you do not put the cartridges back in their original location, or launch a library reinitialization after restarting the Time Navigator qcdiag daemon or service.

Run "qcdiag" in interactive mode

The binary is installed in the "Bin" directory with all the Time Navigator standard binaries.

On Unix systems, find it at:

$TINA_HOME/Bin/qcdiag

On Windows systems, find it at:

%TINA_HOME%/Bin\qcdiag.exe

Once started, you get the prompt:

(qcdiag)

you can then enter the needed command after the prompt.

First of all, you have to open a library before you can diagnose it: use the "open" command on the library "Device Descriptor" (as defined in Time Navigator Administration Console).
Example

On Windows NT/2000 (qcdiag) open C1B0T6L0
On Unix (qcdiag) open /dev/qc0,0

You can then print the status of the library (usually the first command to be run after an "open" command to test the communication with the library):
(qcdiag) status

The most interesting commands to test a library are:

■ geo: (geometry) which returns a table with general information on the library (number of slots, number of drives, addresses of objects ...).

■ init-elt-status: checks the presence or absence of cartridges in every library location. May check the barcodes if the library can read them.

■ read-elt-status: displays the contents of the library (but you need to run a init-elt-status first).

You can also test drives:
use the "define-tape" and "open-tape" commands on the drive "Device Descriptor"
(qcdiag) define-tape d0 /dev/rmt/0cn
(qcdiag) open-tape d0

or move cartridges
- from slot to slot:
(qcdiag) move s0 s1
- from slot to drive:
(qcdiag) move s1 d0

Basic qcdiag commands

In order to … use the command …
list all commands help
get information on a specific command help <command_name>
quit qcdiag quit
open a library open <device_descriptor>
close the opened library close

Run "qcdiag" in batch mode

Run "qcdiag" command with a script filename as parameter.
Example:

```
# qcdiag move_medium
```

Example of "move_medium" script:

```
' open library device
open /dev/qc0,0

' open tape device
define-tape d0 /dev/rmt/0cn
open-tape d0

' move medium from slot 0 to drive 0 and back
move s0 d0
move d0 s0
```

**Identifying a Drive Logical Index**

A drive logical index is a number that identifies the drive location inside the library. You will need it when declaring the drive in *Time Navigator*.

---

**Note**  
The first location in the library corresponds to logical index 0.

---

The qcdiag tool can help you determine the logical index of a drive in a library.

➤  **To identify a drive logical index via qcdiag**

1. Run the qcdiag tool in interactive mode.
2. Associate the device descriptor of each drive with any drive identifier, using the `define-tape` command:

   ```
   define-tape drive_id device_descriptor
   ```

   Where:
   - `drive_id` is the drive identifier: d0, d1, d2, etc.
   - `device_descriptor` is the drive device descriptor (ex: c2b0t3l0 or /dev/rmt/01cn).

   **Example**  
   If you have two drives, d0 and d1, enter the following commands:

   ```
   define-tape do c1b0t4l0
   define-tape d1 c1b0t5l0
   ```

3. Enter the `learn` command:

   ```
   learn drive_name drive_name ...
   ```

   Where:
   - `drive_id` is the identifier you previously defined the drives with.

   **Example**  
   learn d0 d1
4. If the result (result A) shows that the first drive is associated with logical index 0, the second drive with logical index 1, the third drive with logical index 2 etc., you can easily match the logical indexes with the device descriptor.

**Example Result A**

```
1: d1
0: d0
```

It means that drive `d0` with device descriptor `c1b0t410` is associated with logical index 0, and drive `d1` with device descriptor `c1b0t510` is associated with logical index 1.

If the result (result B) shows the drives with mixed up logical indexes, the logical indexes are reversed.

**Example Result B**

```
1: d0
0: d1
```

It means that the logical indexes are reversed: drive `d0` with device descriptor `c1b0t510` is associated with logical index 0, and drive `d1` with device descriptor `c1b0t410` is associated with logical index 1.

**Troubleshooting Using qcdiag**

**Basic Operation to Obtain Status of a Drive**

The library is opened with the command `open <device descriptor>`

```
(qcdiag) open c?b?t?l?
```

An attempt is made to open a drive named `drive1`, known to be in this library. The drive needs to be defined before it can be opened. This involves creating an association between the drive name and its device descriptor. However, even after it is defined, it still cannot be opened because we learn that it is not online:

```
(qcdiag) open-tape drive1
Error: mag_tape_open.2: open-tape: `drive1' drive is not defined. Use `define-tape' before.
```

```
(qcdiag) define-tape drive1 c2b0t410
```

```
(qcdiag) open-tape drive1
Warning: mag_tape_open.12: drive1: drive not online.
```

```
(qcdiag) tape-status drive1
Error: assert_current_tape.2: tape-status: `drive1' drive is not open.
```

```
(qcdiag) set-tape drive1
```

```
(qcdiag) tape-status drive1
Error: assert_current_tape.2: tape-status: `drive1' drive is not open.
```

```
(qcdiag) open-tape drive1
Warning: mag_tape_open.12: drive1: drive not online.
```
A similar series of manipulations with the drive named drive2 permits running of the command tape-status <drive_name>

(qcdiag) define-tape drive2 c2b0t5l0
(qcdiag) open-tape drive2
(qcdiag) tape-status drive2
online: yes
write-protected: no
flags = 0x61
blksz = 0

Identification of Logical Indexes

Problem:

The content of a library can be viewed, and it may even possible to move a cartridge from a slot to another one. But when a cartridge mount is attempted, the tape drive is disabled, and a critical alarm is raised:

This robot requires manual intervention : library and drive status mismatch

Usually, this means the logical index is incorrect.

In fact, in the library, the drive that is physically first is listed on the library panel as "D0"; the physically second drive is listed as "D1", and so on until the last drive.

When you declare the tape drive in Time Navigator, you must follow the same order of logical index, meaning:

  logical index 0 <--> Drive D0
  ...
  logical index N <--> Drive DN

But it can be difficult to know which is the D0 tape drive on the server.

Manual Method for Identification of Logical Index

You can mount a cartridge on the first tape drive (physically), and try to access each tape drive, until you access the drive that has the cartridge in it:

1. Be sure every other tape drive is empty apart from the first.
2. Run the qcdiag command.
3. Open the library device descriptor.
4. Get the library content.
5. Move a cartridge into the "d0" drive (without opening the drive). (The "d0" drive is always the first drive physically in the library).
6. In **Time Navigator Administration Console**, declare all tape drives as manual tape drives.

7. Identify the content of all drives until you arrive at the one you are seeking (with a **right-click -- Identify**). You will know it is the first physical drive, with a logical index 0.

Do the same for next tape drive.

**Method Using the "Learn" Option of qcdiag**

```
learn [-picker picker] [-no-unload] location drive [drive]...
```

Identify drives logical index in the library using the media located in the LOCATION slot. Drives must be empty.

If PICKER is not specified, use the first one.

-no-unload: Don't explicitly unload the drive before move.

Location could be a library address or a symbolic address: TYPE and INDEX.

TYPE character could be 's' slot, 'd' drive,'p' picker and 'm' mailslot.

INDEX is a number starting from zero.

**Checking Drive Rate via the qcdiag Tool**

You can check the rate of your drives using the qcdiag tool.

**Pre-requisites**

- A spare cartridge must be mounted in the drive.
- The device descriptor must be known.

**Procedure**

- Run the qcdiag executable located in $TINA_HOME/Bin
- Run the following commands:
  1. Associate a logical name to the drive device descriptor.
     ```
     (qcdiag) define-tape <log_name> c?b?t?l?
     ```
  2. Open the drive in writing mode.
     ```
     (qcdiag) open-tape -write d0
     ```
3. Write 1 block of 1024 bytes to simulate a cartridge label. This step is mandatory.

\[(qcdiag)\text{ write random 1024 1}\]
\[\text{write 1/1 blocks of 1024 bytes (157 ms)}\]

4. Write a file mark.

\[(qcdiag)\text{ wfmk 1}\]

5. Write 10 000 blocks of 64 KB to check the drive native writing rate (with no data compression)

\[(qcdiag)\text{ write random 65536 10000}\]
\[\text{write 10000/10000 blocks of 65536 bytes (15.54M/s)}\]

6. Write a file mark.

\[(qcdiag)\text{ wfmk 1}\]

7. Rewind the tape.

\[(qcdiag)\text{ rewind}\]

8. Skip the pseudo-label.

\[(qcdiag)\text{ fsf 1}\]

9. Read 10 000 blocks of 64 KB to check the drive native reading rate (with no data compression)

\[(qcdiag)\text{ read null 65536 10000}\]
\[\text{read 10000/10000 blocks of 65536 bytes (14.75M/s)}\]

In the above example, the writing rate is 15.54M/s and the reading rate is 14.75M/s.

**Label Mismatch**

The \textit{qcdiag} utility can be used to solve Cartridge Label Mismatch problems. We will see more of these in Chapter General Methodology of Troubleshooting and Examples on page 64.

**Case where the Library is on the Same Controller as the Disks**

If you encounter problems declaring a library in \textit{Time Navigator Administration Console}, use \textit{qcdiag} to see if it reports any anomalies with its status option:

\[\text{qcdiag log:}\]
\[(qcdiag)\text{ open qc0}\]
\[(qcdiag)\text{ status}\]

\[\begin{array}{|c|c|}
| \text{scsi19776} | \text{ } | \\
| \text{slot[0]} | \text{ } | \\
| \text{scsi53272} | \text{ Full Access Except} | \\
\end{array}\]
These messages may indicate a scsi connection anomaly between the library and server.

Verify the messages in the /var/log/messages directory. Some may confirm that there is a connection problem:

status byte = 29
Internal error scsi_obsolete.c 520
status byte = 29
scsi : aborting command due to timeout : pid 0, scsi0, channel 1, id 0, lun 0 0x2a
00 00 12 10 a7 00 00 88 00
Internal error scsi_obsolete.c 520
status byte = 29
Internal error scsi_obsolete.c 520
status byte = 29
Internal error scsi_obsolete.c 520
status byte = 29
Internal error scsi_obsolete.c 520
status byte = 29
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status byte = 29
Internal error scsi_obsolete.c 520
status byte = 29
Internal error scsi_obsolete.c 520
In this case, The physical disk, library and drives are all connected on the same controller.

The library and drives, however, should be connected to a standalone controller, separate from the disks. It is not at all recommended to connect slow peripherals such as libraries with boot peripherals such as disks.
The solution is to connect the library on a standalone scsi controller.

status byte = 29
Internal error scsi_obsolete.c 520
status byte = 29
The tina_cache Utility

The tina_cache command allows you to view the cache axis occupation and to edit the cache configuration.

**Note** Only the user root (Unix) or an administrator (Windows) can use this command.

**Syntax**

```bash
```

- **[-scan]** Scans cache axis for all types of jobs (default)
- **[-incl job_type]** Specifies job type to be included: BCKP SYNT ARCH REST DUPL XSRC XDST (X stands for export)
- **[-excl job_type]** Specifies job type to be excluded: BCKP SYNT ARCH REST DUPL XSRC XDST (X stands for export)
- **[-interval <freq>]** Specifies an interval of time in second between each display of cache scan
- **[-info]** Cache axes and catalog information
- **[-path <p>]** Specifies the absolute path where to move or rename a cache file
- **[-enable <n>]** Enables axis number <n>
- **[-disable <n>]** Disables axis number <n>
- **[-move <n>]** Moves axis number <n>. Can be used only if option(s) `-path`, `-type`, `-size` is(are) used
- **[-rename <n>]** Renames axis number <n>. Can be used only if option(s) `-path`, `-type`, `-size` is(are) used
- **[-display_states]** Displays all possible statuses of jobs, streams and sessions.
- **[-catalog catalog]** Specifies the working catalog name.
- **[-jobs_to_stderr]** This option can only be used with the `-scan` option. It specifies to print the job information found by the `-scan` option to the error output.

On the following page, you will find a sample of the output from the tina_cache utility. It shows three jobs of which only one, job 62 is active. The active job is using the container [0,20], i.e. the 20th container of the sole cache axis 0.
<table>
<thead>
<tr>
<th>CACHE STATES</th>
<th>JOB STATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>new: cache being</td>
<td>1: Job running, sessions are not created.</td>
</tr>
<tr>
<td>created</td>
<td>2: Job running, sessions are ready.</td>
</tr>
<tr>
<td>NEW: cache has</td>
<td>3: Job running, suspended on request, sessions are ready.</td>
</tr>
<tr>
<td>been created, never</td>
<td>4: Job running, automatically suspended, sessions are</td>
</tr>
<tr>
<td>used</td>
<td>ready.</td>
</tr>
<tr>
<td>off: cache being</td>
<td>5: Job running, resources running.</td>
</tr>
<tr>
<td>moved or closed</td>
<td>6: Job running, suspending on request.</td>
</tr>
<tr>
<td>OFF: cache closed</td>
<td>7: Job running, suspending to ready state.</td>
</tr>
<tr>
<td>on: cache being</td>
<td>8: Job running, suspending automatically.</td>
</tr>
<tr>
<td>opened</td>
<td>9: Job stopping because of tina_stop.</td>
</tr>
<tr>
<td>ON: opened cache</td>
<td>10: Job stopping because of an error.</td>
</tr>
<tr>
<td>del: cache being</td>
<td>11: Job stopping because of an abort request.</td>
</tr>
<tr>
<td>deleted</td>
<td>12: Job stopping because of a suspension request.</td>
</tr>
<tr>
<td>DEL: deleted cache</td>
<td>13: Job terminated because of tina_stop.</td>
</tr>
<tr>
<td></td>
<td>14: Job terminated because of an error.</td>
</tr>
<tr>
<td></td>
<td>15: Job terminated because of an abort request.</td>
</tr>
<tr>
<td></td>
<td>16: Job terminated because of a suspension request.</td>
</tr>
<tr>
<td></td>
<td>17: Job is terminated successfully.</td>
</tr>
<tr>
<td></td>
<td>18: Job restarting.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STREAM STATES</th>
<th>SESSION STATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Inactive stream.</td>
<td>1: Inactive session.</td>
</tr>
<tr>
<td>2: Transfer in</td>
<td>2: Transfer in progress.</td>
</tr>
<tr>
<td>progress.</td>
<td>3: End of stream occurred in virtual session, no write</td>
</tr>
<tr>
<td></td>
<td>performed.</td>
</tr>
<tr>
<td>3: Transfer completed.</td>
<td>4: End of stream occurred in virtual session.</td>
</tr>
<tr>
<td>4: Abort in progress.</td>
<td>5: End of tape occurred in virtual session (set by client).</td>
</tr>
<tr>
<td>5: Aborted stream.</td>
<td>6: End of tape occurred in virtual session (acknowledged by server).</td>
</tr>
<tr>
<td>6: Closed stream (with OK status)</td>
<td>7: Transfer completed in virtual session (set by client).</td>
</tr>
<tr>
<td></td>
<td>8: Transfer completed.</td>
</tr>
<tr>
<td></td>
<td>9: Abort in progress.</td>
</tr>
<tr>
<td></td>
<td>10: Aborted session.</td>
</tr>
<tr>
<td></td>
<td>11: Closed session (with OK status).</td>
</tr>
</tbody>
</table>
The tina_config Utility

The `tina_config` command helps to identify problems in **Time Navigator** configuration. The results of this command are collected by `tina_env_report`

The `tina_config` command allows you to extract information concerning a server configuration and backup schedule from the catalog.

**Note** Only users with the **Time Navigator General Task (Use Time Navigator Administration Console, Alarms, Jobs)** permission can execute this command.

**Syntax**

```
```

- **Without options** Display the configuration of the catalogs used by the host where the command is executed.
- **[-encode file]** Creates a file describing the catalogs on the **Time Navigator** Server. This file is intended to be used by the Atempo maintenance teams.
- **[-decode file]** Decodes a file created with the **-encode** option.
- **[-html]** Displays the result of the **-decode** option in HTML format.
- **[-catalog catalog]** Specifies the working catalog. This parameter is **mandatory** if there are several catalogs.
- **[-identity user:password]** The **-identity** parameter allows you to specify a username and password to connect to the **Time Navigator** catalog with an identity different from that of the user launching the command. The format of the value given to this parameter is `username:password`. This parameter is mandatory if the user launching the command does not have the necessary permission to access the catalog functionalities required to use the command.
  
  For instance, with the `tina_catalog_ctrl` command, used to access a remote catalog, the **-identity** parameter must provide the distant catalog privileged user login.

  For the commands that launch a graphical interface, if this parameter is not used, the catalog connection identity is requested when the application starts.

**Example**

Sample output of the `tina_config` command:

```
Time Navigator Enterprise Edition

CONFIGURATION

Date: Thu Oct 16 17:40:46 2003
  1 : avila

+---------------------------------------------------------------------+
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>---------------------------------------------------------------------</td>
</tr>
</tbody>
</table>

CATALOG

Name: avila
Server: namvan
Privileged User: root

+---------------------------------------------------------------------+
Init time: Wednesday 15 October 14:42:41 2003
Save time: Wednesday 15 October 14:42:41 2003
Check time: Wednesday 15 October 14:42:41 2003
Restore time: Wednesday 15 October 14:42:41 2003

HOST(S)

+---------------------------------------------------------------------+

------
HOST: dardar  [Network Appliance ]
------
  - Software Version: Unknown
  - Protocol:
    NDMP 4.0
    User: root
  - Use : Disabled
  - Storage Node: No
  - Report host unavailability: Yes
  - Drive(s)
    DLT0 (nrst0a) (type: DLT 7000)
  - Strategy(ies)
    No strategy
  - Backup class(es)
    No backup class
  - Backup master: server
  - Hosts mastered: none

------
HOST: namvan  [Linux]
------
  - Software Version: 3.8.0.0 P0
  - Protocol:
    TiNa 3.8.0
  - Use : Disabled
  - Storage Node: Yes
- Report host unavailability: Yes
- Drive(s)
  No drive
- Strategy(ies)
  No strategy
- Backup class(es)
  No backup class
- Backup master: none
- Hosts mastered: 
  . dardar

+---------------------------------------------------------------------+
| APPLICATION(S)                                                      |
+---------------------------------------------------------------------+

---------
APPLICATION: dardar.ndmp  [NDMP]
---------

- Host: namvan
- Use          : Enabled
- User name: root
- NDMP Server: dardar
- Environment variables:
  . NDMP_VERSION=4
  . NDMP_SNAPSHOT=Y
  . NDMP_TRACE_DEBUG=7
- Strategy(ies)

  Strategy A
  unknown format
  LAN Free: No
  NFS: disabled
  Wait for end of writing on cartridges: No
  ACL Backup: No
  Relaunch until platform is reachable: No
  Multiplexed Sessions: disabled
  Before backup command: none
  After backup command: none
  Retry on incident: 0 with a 0 - minute interval
  Fastrax serverless backup mode: No

  Full backup (disabled)
  Synthetic backup: disabled
  Cartridge pool(s): DAR
  Every 1 week(s), on Monday, at 23H00
  Since week 42, of year 2003
  Date of next full backup: Mon Oct 20 23:00:00 2003

  Incremental Backup (disabled)
  Cartridge pool(s): DAR
/vol/vol1/home/qnt/resto

Strategies: A - - -
Selection : *
Rejected :
Compressed : NO
Encoded : NO
Max size : Infinite
Phases : 00-01 01-02 02-03 03-04 04-05 05-06 06-07 07-08 08-09 09-10 10-11 11-12 12-13 13-14 14-15 15-16 16-17 17-18 18-19 19-20 20-21 21-22 22-23 23-00

APPLICATION: namvan.cat [Catalog]

- Host: namvan
- Use : Disabled

- Environment variables:
  . (TINA_SDB_BOOT_PATH)=(boot catalog file path)
  . TINA_SDB_BOOT_HISTORY=7
  . (TINA_SDB_MIRROR_PATH)=(path)
  . (TINA_SDB_SAVE_PATH)=(path)
  . TINA_SDB_SAVE_HISTORY=3
  . (TINA_SDB_CATALOG)=(catalog name)
  . (TINA_SDB_EMAIL)=(my_name@my_site.com)
  . (TINA_SDB_MAIL_CMD)=echo Subject: %s > /tmp/odb_mail_%d; echo %s >> /tmp/odb_mail_%d; cat %s | uuencode %s >> /tmp/odb_mail_%d; mail %s < /tmp/odb_mail_%d; rm /tmp/odb_mail_%d
  . TINA_SDB_RECOVER=yes
  . (TINA_SDB_RESTORE_PATH)=(default in ${TINA_HOME}/Bin)
  . (TINA_SDB_SERVICE_NAME)=(tina)
  . (TINA_SDB_HOME)=(home path)
  . (TINA_SDB_TINA)=(tina)
  . (TINA_SDB_TINA_USER)=(tina)
  . (TINA_SDB_SAVE_EVENTS)=(yes)

- Strategy(ies)
  No strategy

- Backup class(es)

+---------------------------------------------------------------------+
GROUP(S)
+---------------------------------------------------------------------+

------
GROUP: DAR
------

- Type: cartridge pool
- Cartridge policy
  Extensible mode with automatic labelling
- User(s)
  qnt_
Cartridge(s)
gnt_00001 (--------) [DLT 7000] DLT0

- Drive(s)
  DLT0

-------
GROUP:  lost+found
-------

- Type: cartridge pool
- Cartridge policy
  Extensible mode with automatic labelling

- User(s)
  lost+found
    Cartridge(s)
      No cartridge

- Drive(s)
  DLT0

-------
GROUP: spare
-------

- Type: cartridge pool
- Cartridge policy
  Extensible mode with automatic labelling

- User(s)
  spare
    Cartridge(s)
      No cartridge

- Drive(s)
  DLT0

-------
GROUP: system
-------

- Type: user group

- User(s)
  root
    Cartridge(s)
      No cartridge

- Drive(s)
  No drive

+---------------------------------------------------------------------+
USERS PROFILES
+---------------------------------------------------------------------+

------------------------------------------
ADMINISTRATION
------------------------------------------

  General Tasks (Use tina_adm, Alarms, Jobs)
    | Platforms (create, edit, delete)
    | . Drives (create, edit, delete)
    | . . Cartridge pools (create, edit, delete)
    | . . | Library (create, edit, delete)
    | . . | . User group management
default - - - - - -
root    X X X X X X
--------
CARTRIDGES
--------
Accessible Cartridges: All
   Accessible Cartridges: User's only
      . Mount request operator
      . . Drive use
      . . | Library use
default  - - - - -
root     X X X X X
--------
BACKUPS
-------
Strategy A Accessible
   Strategy B Accessible
      . Strategy C Accessible
      . . Strategy D Accessible
      . . | Strategies (edit, delete)
      . . | . Classes (edit, delete)
      . . | . . Platform use (start backups)
      . . | . . | Restore Backed up Data
      . . | . . | . Choose the destination directory
default  X X X - X - X X
root     X X X X X X X X
-------
ARCHIVES
-------
Archiving allowed
   Archive administrator (access to all folders)
      . Create local archive folders
      . . Create archive folders
      . . | Edit folders
      . . | . Delete folders
      . . | . View folders
      . . | . | Restore archives
      . . | . | . Archive files
      . . | . | . | Create archives
      . . | . | . | . Edit archives
      . . | . | . | . | Delete archives
default  X - X - X X X X X X X
root     X X X X X X X X X X
-------
OTHERS
------
Run **Time Navigator Restore & Archive Manager**
   Connect to any platform via **Time Navigator Restore & Archive Manager**
      . Open backup folders
      . . Forbidden Menus Hidden
      . . | Forbidden Menus Dimmed
default  X - - X -
root     X X X - X

+---------------------------------------------------+

ARCHIVE FOLDER(S)

+---------------------------------------------------+

No archive folder
Troubleshooting Using tina_config

Example 1: The Backup of a Machine is Launched, but Nothing is Backed Up

There is an incompatibility between the time-period activated for the class and for the strategy. The results of tina_config, under the Backup section, show that the backup of the class is programmed for 16:30.

```
Incremental Backup (enabled)
  Cartridge pool(s): BCK
  On: Mon Tue Wed Thu Fri --- ---
  At: --- --- --- --- --- --- --- --- --- --- --- --- --- ---
  --- --- --- --- --- --- --- --- 16h30 --- --- --- --- ---
```

But in the section showing the configuration of the strategy, no backup launch time is programmed.

```
- Backup class(es)

  / Strategies: A B C D
  Selection : *
  Rejected :
  Compressed : NO
  Encoded : NO
  Max size : Infinite
  Phases : --- --- --- --- --- --- --- --- --- --- --- --- --- ---
  --- --- --- --- --- --- --- --- --- --- --- --- --- ---
  --- --- --- --- --- --- --- --- --- --- --- --- --- ---
  --- --- --- --- --- --- --- --- --- --- --- --- --- ---
  --- --- --- --- --- --- --- --- --- --- --- --- --- ---
```

The corresponding logs are:

```
Le log correspondant est :
Info         tina_backup       Wed Aug 24 16:30:00 2005 vm-jla-ubuntu
Triggering backup on "vm-jla-ubuntu", strategy A
Acct 102    tina_backup       Wed Aug 24 16:30:01 2005 vm-jla-ubuntu
Start incremental backup, strategy A, folder host.vm-jla-ubuntu, job_id 102
Maj A 102    tina_backup       Wed Aug 24 16:30:01 2005 vm-jla-ubuntu
Job 102: No backup class was found for strategy A (check the class name
or the time phases)
Maj A 102    tina_backup       Wed Aug 24 16:30:02 2005 vm-jla-ubuntu
Job 102: No backup class was found for strategy A (check the class name
or the time phases)
Warn 102    tina_backup       Wed Aug 24 16:30:06 2005 vm-jla-ubuntu
Job 102 stopped, status=14
```

Example 2: The Cartridge Pool Used by the Backup Strategy Is Not Associated to a Drive

```
tina_config outputs as follows for Strategy A. As we can see, this strategy is
associated with a backup pool called BCK.

- Strategy(ies)

  Strategy A
  TiNa format
  LAN Free: No
  Nfs: disabled
  Wait for end of writing on cartridges: No
```
ACL Backup: No
Relaunch until platform is reachable: No
Continue Backup if one of the Multiple Writing Sessions fails: disabled
Multiplexed Sessions: disabled
Pre-processing command: none
Post-processing command: none
Retry on incident: 2 with a 10 - minute interval
Fastrax serverless backup mode: No

Full backup (enabled)
Synthetic backup: disabled
Cartridge pool(s): BCK
Every 1 week(s), on Monday, at 23H00
Since week 34, of year 2005
Date of next full backup: Mon Aug 29 23:00:00 2005

Incremental Backup (enabled)
Cartridge pool(s): BCK

However, in the section of the output which describes this cartridge pool BCK, we can see that it has no association to a drive:

--------
GROUP: BCK
--------
- Type: cartridge pool
  - Cartridge policy
    Extensible mode with automatic labelling
  - User(s)
    BCK
  - Cartridge(s)
    No cartridge
- Drive(s)
  No drive

The corresponding logs are:
Info  tina_backup       Wed Aug 24 16:35:00 2005 vm-jla-ubuntu
Triggering backup on "vm-jla-ubuntu", strategy A
Info  tina_job          Wed Aug 24 16:35:01 2005 vm-jla-ubuntu
Starting "tina_job" based on "#(®)GNU/LessTif Version 1.2 Release 0.89.0 (Patch QUADRATEC 07/07/2000)" on display "csc-jla:0" with the X server "Hummingbird Ltd. 10000"
Acct  103    tina_backup       Wed Aug 24 16:35:02 2005 vm-jla-ubuntu
Start incremental backup, strategy A, folder host.vm-jla-ubuntu, job_id 103
Acct  103    tina_backup       Wed Aug 24 16:35:02 2005 vm-jla-ubuntu
Start back up class "/"
Maj A 103    tina_daemon       Wed Aug 24 16:35:02 2005 vm-jla-ubuntu
Job 103: Unable to start Backup job (id: 103): no drive associated to cartridge pool "BCK"
Info  103    tina_daemon       Wed Aug 24 16:35:05 2005 vm-jla-ubuntu
Terminating current job
Error 103    tina_backup       Wed Aug 24 16:35:05 2005 vm-jla-ubuntu
Error backing up object "/dev/isdn3"
Example 3: The User user1 cannot launch Time Navigator Administration Console. 
tina_config shows that user1 does not have rights to launch it

The tina_config output shows that user1 does not possess the right to run General 
Tasks, including the launch of tina_adm (Time Navigator Administration Console).

```
-------------
ADMINISTRATION
-------------
General Tasks (Use tina_adm, Alarms, Jobs)
| Platforms (create, edit, delete)
| . Drives (create, edit, delete)
| . . Cartridge pools (create, edit, delete)
| . . | Library (create, edit, delete)
| . . | . User group management
default  X X X X X X
user1    - - - - - -
```

There are no corresponding logs.
The tina_ping Utility

The tina_ping command allows you to test whether a Time Navigator service or daemon is started on a machine.

Note Any user can execute this command.

Syntax

tina_ping -host host [-tina_service_tcp_num tcp_port_number] [-tina_service_name service_name] [-help]

-host host Specifies the system where the test is performed.

[-tina_service_tcp_num tcp_port_number] Specifies the TCP port number associated to the tested service or daemon.

[-tina_service_name service_name] Specifies the name of the service tested on the targeted machine.

This command is useful in diagnosing network and connection problems.

System Ping and tina_ping

The familiar ping command found in Windows and Unix operating systems serves to test whether a remote machine is operational by connecting to its network layer, using the network name as specified in its IP address.

In Time Navigator, however, a machine has two names which may or may not be identical: its true machine name and the name it uses on the network, which may be an alias. The associations between the real machine names and network names are defined in the file /Conf/hosts.

The tina_ping command thus differs from the system ping insofar as it consults the name definitions in the Conf/hosts file and accesses the true machine name. The information it returns is specific to the operational status of Time Navigator, as opposed to the general operational status of the remote machine.
Qualifying a Technical Incident

Categories

There are two main categories which must be completed in order to qualify a call, they are known as 'Functionality' and 'Domain'.

This information is useful for two reasons:

- It provides a synthetic review of the nature of the problem
- It optimizes research into similar problems
Standard Information Required

In order to fully analyze any particular technical incident it is advisable to collect all the relevant log files as outlined above.

The standard information to gather about an operation is the following:

- Name of the **Time Navigator** Catalog
- **Time Navigator** Logs
- System Logs on the Server
- **Time Navigator** Server Version and Patch Number
- Operating System Version of the Server
- **Time Navigator** Version and Patch of the malfunctioning machines
- Version of the Operating Systems on the malfunctioning machines

---

**Note** All this information is collected by the `tina_env_report` tool. Atempo recommends using it for collecting information with maximum efficiency.

---

The version of **Time Navigator** on a UNIX or Windows system is returned by the Command "tina_daemon -version". To get the version of a UNIX system, refer to the List of Commands.
State of Time Navigator Operations

Time Navigator Monitoring Tools

The Time Navigator monitoring utilities were explored in the Standard Administration Course. We will give a brief presentation of them here from a Troubleshooting perspective. They include:

- Time Navigator Administration Console.............................................page 83
- Time Navigator Job Manager..........................................................page 85
- Time Navigator Task Viewer...........................................................page 87
- Time Navigator Media Request Console............................................page 89
- Time Navigator Event Manager.......................................................page 92

Time Navigator Administration Console
Launching Time Navigator Administration Console (tina_adm)

The name of the binary that launches **Time Navigator Administration Console** is `tina_adm`. This is the name to use when launching from the **Time Navigator Command Line Interface**, or from a script.

**Windows:**

- Start menu: **Start - Programs - Time Navigator (Service Name) - Administration Console**

Or

- In **Time Navigator Command Line Interface**, run the command `tina_adm`.

You will be asked to select a catalog and then to enter user and password details for this selection.

**Unix:**

1. Open a terminal window. Make sure you are in the **Time Navigator** home directory.
2. Set the **Time Navigator** environment:
   3. `.tina.sh`
3. Make sure **Time Navigator** service is running
4. `tina_daemon`
5. Launch the **Time Navigator Administration Console** binary
6. `tina_adm -language [francais/english] &`
7. If you do not set the `-language` option, the default set in the parameters file will be used. The `&` at the end of the command will allow you to run other commands from the same terminal.
8. You will be asked to select a catalog and to enter user and password details for that catalog.

**MacIntosh:**

1. Make sure that the **Time Navigator** daemon is running.
2. Click on the **Finder** and choose **Applications-Atempo**.
3. In the Atempo folder, open the folder of the **Time Navigator** environment you want to use.
4. Double-click on the icon of `tina_adm`. 
Points to Watch in Time Navigator Administration Console

The first points to watch for are the following:

- The cache
  - Cache occupancy in Time Navigator Administration Console indicator window.
  - Cache state when it is reset by restarting of the program.
- The Catalog
  - Catalog occupation in Time Navigator Administration Console indicator window.
  - Catalog Backup, tina_odbsave
- The Library and Drives
  - The Library is not requesting re-initialization
  - The drives are all enabled.

Time Navigator Job Manager
Launching Time Navigator Job Manager (tina_job)

The name of the binary that launches Time Navigator Job Manager is tina_job. This is the name to use when launching from the Time Navigator Command Line Interface, or from a script.

If Time Navigator Administration Console is open on your terminal, choose the menu Monitoring-Time Navigator Job Manager. Alternatively:

**Windows:**

- Start menu: Start - Programs - Time Navigator (Service Name) - Monitoring - Job Manager

Or

- In Time Navigator Command Line Interface, run the command tina_job.

You will be asked to enter your Windows network name and password.

**Unix:**

If Time Navigator Administration Console is open, just launch the Time Navigator Job Manager binary in the terminal window.

tina_job

If not, set the environment and launch the daemon as described on page 84.

**MacIntosh:**

1. Make sure that the Time Navigator daemon is running.
2. Click on the Finder and choose Applications-Atempo.
3. In the Atempo folder, open the folder of the Time Navigator environment you want to use.
4. Double-click on the icon of tina_job.
Time Navigator Task Viewer

Launching Time Navigator Task Viewer

The name of the binary that launches Time Navigator Task Viewer is tina_sched. This is the name to use when launching from the Time Navigator Command Line Interface, or from a script.

If Time Navigator Administration Console is open on your terminal, choose the menu Monitoring-Time Navigator Task Viewer. Alternatively:

**Windows:**

- Start menu: Start - Programs - Time Navigator (Service Name) - Monitoring - Task Viewer

Or

- In Time Navigator Command Line Interface, run the command tina_sched.
You will be asked to enter your Windows network name and password.

Unix:

If Time Navigator Administration Console is open, just launch the Time Navigator Task Viewer binary in the terminal window.

tina_sched

If not, set the environment and launch the daemon as described on page 84.

MacIntosh:

1. Make sure that the Time Navigator daemon is running.
2. Click on the Finder and choose Applications-Atempo.
3. In the Atempo folder, open the folder of the Time Navigator environment you want to use.
4. Double-click on the icon of tina_sched.

Points to Watch in Time Navigator Task Viewer

Simultaneous Backups

The Simultaneous Backups feature allows you to view backups performed or planned simultaneously at any given point in time.

This option is very useful if you are working with a large number of platforms. It will point out the low and high usage point. You can then modify your strategies accordingly to optimize Time Navigator usage and spread out network traffic over time.

Backup Evolution

A contextual menu provides information on the evolution of the backups performed in terms of time and volume (the history part of the main tina_sched window), for a platform, a strategy and a type of data backup. In the main area of this window you will see details on:

- The backup starting date and time.
- The backup duration in hours, minutes, and seconds. They appear in the form of a horizontal histogram bar in the corresponding column of the table. The bar scale depends upon the longest duration and the biggest backup volume displayed in the window.
- The backed up volume in bytes with the number of processed objects in parenthesis.
- The backup rate in megabytes per hour (MB/H).
- The job identification number (ID) corresponding to the one displayed in **Time Navigator Job Manager**.

---

**Time Navigator Media Request Console**

**Launching Time Navigator Media Request Console**

The name of the binary that launches **Time Navigator Media Request Console** is **tina_operator**. This is the name to use when launching from the **Time Navigator Command Line Interface**, or from a script.

If **Time Navigator Administration Console** is open on your terminal, choose the menu **Monitoring - Media Request Console**. Alternatively:
Windows:

- Start menu: Start - Programs - Time Navigator (Service Name) - Monitoring - Media Request Console

Or

- In Time Navigator Command Line Interface, run the command tina_operator.

You will be asked to enter your Windows network name and password.

Unix:

If Time Navigator Administration Console is open, just launch the Time Navigator Media Request Console binary in the terminal window.

tina_operator

If not, set the environment and launch the daemon as described on page 84.

MacIntosh:

1. Make sure that the Time Navigator daemon is running.
2. Click on the Finder and choose Applications-Atempo.
3. In the Atempo folder, open the folder of the Time Navigator environment you want to use.
4. Double-click on the icon of tina_operator.

Points to Watch in Time Navigator Media Request Console

Request Handling

When a request is created, it appears in the upper section of the main window of Time Navigator Media Request Console.

The request can be handled at any time - or not handled - during an initial period of 30 seconds:

If the request is handled during this period, a dialog box appears offering several choices.

If it is not handled during this period (after a timeout): it is moved to the list of processed requests, with the status "Timeout for request handling".
Note  A tunable exists to change the default timeout of 30 seconds. Edit the parameters(.txt) file (or use Time Navigator Configurator) to include the tunable:OP_REQ_TIMEOUT_HANDLE=value in seconds.

Request Handling Window

When the request is handled, a dialog box appears and the request goes into the acknowledgement phase.

This phase, which lasts 10 minutes, corresponds to the period during which it is possible to perform the operations requested.

Acknowledgement of Requests

Once the operation (here tape insertion) has been performed, the operator must acknowledge the request.

If the request is not acknowledged before expiry of the timeout of 10 minutes, it is placed in the list of process requests with the status "Request handling timeout".

Suspension of Requests

If the operator thinks the period of 10 minutes is too short to respond to the request, he/she can suspend it.

A third, longer timeout is initiated.

On expiry of this timeout, if the request has still not been acknowledged, it is placed in the list of processed requests with the status "Security timeout".

Rejection of Requests

If the operator considers that the action requested is impossible to accomplish, he/she can reject the request.
Time Navigator Event Manager

Launching Time Navigator Event Manager

The name of the binary that launches Time Navigator Event Manager is tina_event_viewer. This is the name to use when launching from the Time Navigator Command Line Interface, or from a script.

If Time Navigator Administration Console is open on your terminal, choose the menu Monitoring - Event Manager. Alternatively:

Windows:

- Start menu: Start - Programs - Time Navigator (Service Name) - Monitoring - Event Manager

Or

- In Time Navigator Command Line Interface, run the command tina_event_viewer.

You will be asked to enter your Windows network name and password.
Unix:

If you already have Time Navigator Administration Console open, just launch the Time Navigator Event Manager binary in the terminal window.

tina_event_viewer

If not, set the environment and launch the daemon as described on page 84.

MacIntosh:

1. Make sure that the Time Navigator daemon is running.
2. Click on the Finder and choose Applications-Atempo.
3. In the Atempo folder, open the folder of the Time Navigator environment you want to use.
4. Double-click on the icon of tina_event_viewer.

Points to Watch in Time Navigator Events

Centralization of Logs

Time Navigator Events (or Time Navigator logs) are produced by Time Navigator processes (running on the client or server) and are transmitted to the server by the UDP protocol. The ensemble of Time Navigator Events are centralized in an Event Log on the server ("Adm/event" on UNIX, "Adm\Event.txt" on Windows).

GMT Date

The date registered for each event corresponds to the date in Universal Time (GMT) on the broadcasting machine. The dates are then interpreted by the log viewer (generally Time Navigator Administration Console or Time Navigator Event Manager) in relation to the time zone configured on the monitoring machine (the machine where the viewer is run).

"Log" Files and "log.name_of_catalog"

The mechanism of log management in Time Navigator rests on the tina_daemon Process which is parent to both the server and the client. In the event that these processes are unavailable, the Events are recorded in the "log" and "log.name_of_catalog" files.
Example: Using the command "tina_cart"

The binary tina_cart only works in **Disconnected** mode. It writes its events in the "log" file.

---

**Note**  
Logs are local to the client

When a connection to the **Time Navigator** server cannot be made, the client process traces its events in the "Event" or "log" files local to the client.

Local logs are collected at the start of the hour following the reestablishment of connection to the network.

### Format of a Time Navigator Event

The Event File registers **Time Navigator** Events using the rough format (one log per line, with the fields separated by pipe characters, "|").

The viewing tools supplied with the **Time Navigator** product are **Time Navigator Administration Console** and **Time Navigator Event Manager**. There are also two external tools supplied by Atempo Support: "**Time Navigator Event**" (a formatting utility under Microsoft Excel) and "**Event Viewer**".

All these utilities rest on the "Rough Event" format described below.

**Rough Event:**

```
4097|4|start_archiver[5]|-|1|5|991919153|133|tina_backup|tournesol|NT AUTHORITY\SYSTEM|zembla|zembla|Start full backup, strategy A, folder host.tournesol, job_id 100|100|
```

**Formatted Event:**

```
tournesol NT AUTHORITY\SYSTEM zembla zembla 100 Start full backup, strategy A, folder host.tournesol, job_id 100
```

<table>
<thead>
<tr>
<th>Description</th>
<th>Rough Value</th>
<th>Formatted Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log* Version</td>
<td>4097</td>
<td></td>
</tr>
<tr>
<td>Package</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
Diagnosing Your Problem

* Log Version:
  - 1 log without job ID
  - 4097 logs with job ID

** Severity:

1 : Fatal
2 : Error
3 : Warn
4 : Info
5 : Debug
6 : Acct
7 : Minor Alarm
8 : Major Alarm
9 : Critical Alarm

<table>
<thead>
<tr>
<th>Description</th>
<th>Rough Value</th>
<th>Formatted Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function (of source)</td>
<td>start_archiver</td>
<td></td>
</tr>
<tr>
<td>Log No. of Function</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Object</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Event Class</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Severity**</td>
<td>5</td>
<td>Acct</td>
</tr>
<tr>
<td>GMT Date</td>
<td>991919153</td>
<td>06/07/01 15:05:53</td>
</tr>
<tr>
<td>Process PID</td>
<td>133</td>
<td>133</td>
</tr>
<tr>
<td>Processes</td>
<td>tina_backup</td>
<td>tina_backup</td>
</tr>
<tr>
<td>Broadcasting Machine</td>
<td>tournesol</td>
<td>tournesol</td>
</tr>
<tr>
<td>User Process</td>
<td>NT AUTHORITY\SYSTEM</td>
<td>NT AUTHORITY\SYSTEM</td>
</tr>
<tr>
<td>Name of Tina Server</td>
<td>zembla</td>
<td>zembla</td>
</tr>
<tr>
<td>Name of catalog</td>
<td>zembla</td>
<td>zembla</td>
</tr>
<tr>
<td>Message</td>
<td>Start full backup, strategy A</td>
<td>Start full backup, strategy A</td>
</tr>
<tr>
<td>ID of Job</td>
<td>100</td>
<td>1</td>
</tr>
</tbody>
</table>

**Seriousness of Alarms**

The following table presents the list of levels of seriousness and their meaning.

<table>
<thead>
<tr>
<th>Seriousness</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting</td>
<td>beginning or end of an operation on data (backup, archiving, etc.)</td>
</tr>
<tr>
<td>Seriousness</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>Information</td>
<td>beginning or end of operation</td>
</tr>
<tr>
<td>Warning</td>
<td>signals an action that failed (e.g.: a locked file that was not backed up)</td>
</tr>
<tr>
<td>Error</td>
<td>Recoverable Error</td>
</tr>
<tr>
<td>Fatal</td>
<td>Irreversible Error, fatal to running processes</td>
</tr>
<tr>
<td>Debug</td>
<td>Debug logs, normally very rare as standard binaries (uncompiled binaries in Debug mode)</td>
</tr>
<tr>
<td>Minor Alarm</td>
<td></td>
</tr>
<tr>
<td>Major Alarm</td>
<td></td>
</tr>
<tr>
<td>Critical Alarm</td>
<td></td>
</tr>
</tbody>
</table>
Binary to Format the Events file

A binary, which formats an Events file into Excel format, can be requested from Atempo Support.

We can use the features of Excel to search for specific items, such as job id or a specific process.

Installation of the Binary

The Binary, called ConvertEventToExcel.exe is supplied in the form of a zipped package, tne.zip, containing the following files:

- ConvertEventToExcel.exe
- MFC71.dll
- mfc71d.dll
- msvcp71.dll
- msvcp71d.dll
- msvcr71.dll
- msvcr71d.dll
- msvcr.dll

1. Create a directory Program Files\Time Navigator Event
2. Extract the zipped package tne.zip into this directory
3. Double-click on the binary ConvertEventToExcel.exe and select an extension to associate with the converted Events file (the standard extension used by Atempo for this purpose is .tne).
4. The binary is now installed. It will execute itself on any Events file which has been renamed to have the extension you selected in step 3 (e.g..tne). To use it, rename your Events.txt file to Events.tne and open it.
5. The first time you open the file, it is possible that Excel will raise an exception concerning security levels. In this case, modify the Security level under the menu Tools - Macros - Security.

Analysis of Event Log - Key Points

Here are the main points to observe in a Time Navigator Event Log.
Client -Server Operations

During the running of a client-server operation (backup, restore, administration, etc.), several processes are interconnected. If one of these processes fails, the others are interrupted upon a Network Error.

Significant Logs

During the analysis of Time Navigator Events following a problem observed on the Operating System, it is particularly important to be able to find the logs that are significant (generally only between one and three of them). These logs often reveal the cause of the failure, or at least constitute the main clue for diagnosing the incident.

The logs we call "significant" are the first error logs (Warning, Error, Fatal or Debug) that appeared when the operation failed. Network errors are not usually significant, since they arise from the loss of the connection with the process that failed.

Client or Server Problem

Check the name of the machine, together with the provenance of the log (client or server).

Note
Be wary of dissimilarities in dates - GMT times on client and server systems are not necessarily in synchronization. It is possible that for the same job, significant logs were preceded by network errors.

First Occurrence

When an incident happens repeatedly, it is useful to know the date it occurred for the first time. This date can indeed be recovered in relation to maintenance operations (in Time Navigator or on the system), or other striking occurrences that appeared during operations.

Time Navigator Return Codes

Three kinds of return codes can be distinguished in Time Navigator:

- Return Codes of the Time Navigator application (values 0 to 77)
- Return Codes of the Time Navigator API (values 0, 231 to 255).
System Return Codes

Event Error Codes of the Time Navigator Application

These event error codes are sent by the standard binaries of the application: "tina_daemon", "tina_backup", "tina" and "tina_adm".

The event error codes and their descriptions are provided in the following table:

```c
#define OK 0  /* Request executed*/
#define TN_ERR_REQ_INCONS 1 /* Inconsistent request parameters */
#define TN_ERR_PROCESS 2 /* No more slots for the process*/
#define TN_ERR_PORTAB 3 /* Error linked to the application’s portability */
#define TN_ERR_OBJ_INEX 4 /* The specified object does not exist */
#define TN_ERR_OS_INCONS 5 /* The operating system indicates an error that should never happen */
#define TN_ERR_COMM 6 /* Error in the network link */
#define TN_ERR_SERV 7 /* The server could not perform the request due to abnormal operation */
#define TN_ERR_REQ 8 /* The request is formally consistent but defines an impossible operation */
#define TN_ERR_FATALE 9 /* Serious inconsistency forcing the system to stop */
#define TN_ERR_DISK 10 /* Disk I/O error */
#define TN_ERR_ODB 11 /* Serious error in ODB, ODB inaccessible (catalog) */
#define TN_ERR_MEM 12 /* Out of memory */
#define TN_ERR_REMOTE 13 /* Operation cancelled by request of the remote application */
#define TN_ERR_PROG_INCONS 14 /* Inconsistency due to software error */
#define TN_ERR_NOT_NODE 15 /* Object found but it is not a node */
#define TN_ERR_ODB_RESS 16 /* Resource limit reached in ODB */
#define TN_ERR_CONFIG 17 /* Error in environment configuration */
#define TN_ERR_FNF 18 /* File not found */
#define TN_ERR_CONNECT_SERV 19 /* The server does not accept the connection */
#define TN_ERR_SERV_RESS 20 /* The request cannot be performed due to a lack of resources on the server */
#define TN_ERR_X11_RESS 21 /* X11 resource inaccessible */
#define TN_ERR_CN_SERV_X 22 /* The X11 server does not accept the connection */
```
#define TN_ERR_PERM 23 /* The request cannot be performed due to authorization problems */
#define TN_ERR_EXISTE_DEJA 24 /* The specified object cannot be created as it already exists */
#define TN_ERR_FS_FULL 25 /* The filesystem is full */
#define TN_ERR_QUOTA 26 /* The user quota has been reached */
#define TN_ERR_BC 27 /* Error in performing the backup selection */
#define TN_ERR_STALE 28 /* The handle is dissociated from its object */
#define TN_ERR_MAG_PHYS 29 /* Physical I/O error on drive */
#define TN_ERR_MAG_EOF 30 /* End of file reached */
#define TN_ERR_MAG_EOT 31 /* End of tape reached */
#define TN_ERR_CACHE_FAULT 32 /* The block is not in the cache */
#define TN_ERR_BUSY_W 33 /* The folder is already opened for writing */
#define TN_ERR_ALLOC 34 /* The resource is already allocated */
#define TN_ERR_NOLABEL 35 /* The cartridge has no label */
#define TN_ERR_DEJA_LABEL 36 /* The cartridge is already labelled */
#define TN_ERR_MAG_FMT 37 /* Cartridge format error */
#define TN_ERR_MAG_NOT_READY 38 /* Drive not ready or cartridge missing */
#define TN_ERR_MAG_CART_PROT 39 /* Cartridge write protected */
#define TN_ERR_ABORT 40 /* Cancellation requested by user */
#define TN_ERR_TIMEOUT 41 /* Return on timeout expired */
#define TN_ERR_SUSPEND 42 /* Return on suspend in progress */
#define TN_ERR_CONNECT_REM_MAG 43 /* Connection error to remote server drive */
#define TN_ERR_FATALE_X11 44 /* Error X caused system to stop */
#define TN_ERR_FORMAT_TAR 45 /* tar header/trailer format error */
#define TN_ERR_FORMAT_CPIO 46 /* cpio header/trailer format error */
#define TN_ERR_BCNF 47 /* Backup selection not defined on object */
#define TN_ERR_L64 48 /* 64-bit operation error */
#define TN_ERR_SHUTDOWN 49 /* Cancellation resulting from system shutdown */
#define TN_ERR_CONNECT_REM_ROB 50 /* Connection error to the remote robot of the server */
#define TN_ERR_ROB_NOT_READY 51 /* Library is not ready */
#define TN_ERR_ROB_RESS 52 /* Resource unavailable (picker, mail…) */
#define TN_ERR_ROB_REQ 53 /* Request cannot be performed */
#define TN_ERR_ROB_PHYS 54        /* Physical I/O error on library */
#define TN_ERR_MOUNT_ABORT 55     /* Mount request cancelled */
#define TN_ERR_NO_FS_INFO 56      /* Impossible to determine the object file system */
#define TN_ERR_ROB_INCONS 57      /* Inconsistency detected in the library content */
#define TN_ERR_ROB_SRC_VIDE 58     /* Source for displacement is empty */
#define TN_ERR_ROB_DST_PLEIN 59    /* Destination for displacement already filled */
#define TN_ERR_MAG_NODEV 60       /* Device not seen or inaccessible */
#define TN_ERR_MAG_BUSY 61        /* Device already taken */
#define TN_ERR_ROB_DRV_INCONS 62  /* Inconsistency between the library status and the drive status */
#define TN_ERR_INSTALL 63         /* Installation error */
#define TN_ERR_EOF 64             /* Error on end of file */
#define TN_ERR_SIGNAL 65          /* Interruption by received signal */
#define TN_ERR_ODB_FULL 66        /* Catalog full */
#define TN_ERR_ROB_AGAIN 67       /* Request accepted but impossible to satisfy for the moment */
#define TN_ERR_BNFS 68            /* Access blocked during an NFS mount */
#define TN_ERR_NOT_INIT 69        /* Package/resource not initialized */
#define TN_ERR_FILTERED 70        /* Filter element (of a list, a tree) */
#define TN_ERR_CONNECT_APP 71     /* Application connection error */
#define TN_ERR_APP_INCONS 72      /* Application indicating an error that should never occur */
#define TN_ERR_READ_FILE 73       /* Error while reading a disk file */
#define TN_ERR_WRITE_FILE 74      /* Error while writing a disk file */
#define TN_ERR_MAG_EOS 75         /* Segment maximum size reached */
#define TN_ERR_MOUNT_RESS 76      /* Mount resource unavailable */
#define TN_ERR_CONFLICT_RESS 77   /* Conflict in access to the same resource */
#define TN_ERR_SYNTAX 78          /* Syntax error */
#define TN_ERR_DEADLOCK 79        /* Catalog deadlock */
#define TN_ERR_MAG_EMPTY 80       /* Tape drive empty */
#define TN_ERR_ROB_UNIT_ATTENTION 81 /* A library peripheral requires your attention */
#define TN_ERR_ROB_NODEV 82       /* Such a device does not exist */
#define TN_ERR_RANGE 83           /* Value error (but syntax correct) */
Return Codes of the Time Navigator API

The majority of the binaries in Time Navigator Command Line Interface are based on the Time Navigator API. All these binaries return the same return codes as the Time Navigator API.
These return codes are sent up after a call to a system function by **Time Navigator** (e.g.: function "read", to read a file). These codes are tracked in the Events utility when a system call fails.

Under UNIX, they appear with the Format "errno=XX". In theory, they are standard to all UNIX systems, but some codes are specific to a given Operating System. It is recommended to consult the list of system return codes in the Operating System that is implicated in the error, in the file "/usr/include/sys/errno.h".

Under Windows, System Return Codes are tracked with the Format "E=XX". The command "net helpmsg XX" returns the error message for a given error number.
Tracking Return Codes

Running a **Time Navigator** command returns a code. This return code is at 0 if the command executed correctly. It is different from 0 if the command failed or generated errors.

Tracking and logging these return codes is a valuable practice, as they supply the preliminary information concerning an incident and serve to direct the remainder of the analysis.

To display the return code after a command has run, do as follows, in function of the shell you are using:

- under UNIX, with sh or ksh, use the command: `echo $?`
- under UNIX, with csh, use the command: `echo $status`
- under NT, use the command: `echo %ERRORLEVEL%

Return Codes can equally be tracked in **Time Navigator Event Manager**, notably in the case of processes triggered by mechanisms internal to the software (e.g.: ERR_DISK).
System Messages - Other Operating Systems

It can be useful to consult system messages to check if the robots or the hardware is not involved when an incident occurs. In relation to **Time Navigator**, the available information can include the following:

- Date and time of a reboot on the server
- Errors writing to the hard disk
- Read / write errors on the tape
- SCSI sequencing errors on the robots.

Where to Look for System Messages?

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUN Solaris</td>
<td>/var/adm/messages</td>
</tr>
<tr>
<td>IBM AIX</td>
<td>Command `errpt -A</td>
</tr>
<tr>
<td>Linux</td>
<td>/var/log/messages</td>
</tr>
<tr>
<td>DEC Alpha OSF1</td>
<td>Command `uerf -R</td>
</tr>
<tr>
<td>True64</td>
<td></td>
</tr>
<tr>
<td>SGI Irix</td>
<td>/var/adm/SYSLOG</td>
</tr>
<tr>
<td>HP-UX</td>
<td>/var/adm/syslog/syslog.log</td>
</tr>
<tr>
<td>Windows NT</td>
<td>in the Events Observer</td>
</tr>
<tr>
<td>Windows 2000</td>
<td>in the Events Observer</td>
</tr>
<tr>
<td>Novell NetWare</td>
<td>in the file SYS:\system\abend.log</td>
</tr>
</tbody>
</table>

See Appendix II for a range of system messages.

**SUN Solaris: /var/adm/messages**

**Drive Head is Dirty**

Dec 18 10:32:25 backup-2 Unix: WARNING: /pci@1f,4000/scsi@4/st@3,0 (st31):
Dec 18 10:32:25 backup-2 Unix: Requested Block: 1 Error Block: 1
Dec 18 10:32:25 backup-2 Unix: Vendor: EXABYTE Serial Number: 8E000137
Dec 18 10:32:25 backup-2 Unix: WARNING: /pci@1f,4000/scsi@4/st@3,0 (st31):
Dec 18 10:32:25 backup-2 Unix: Periodic head cleaning required

**SCSI Bus Reset**

Dec 18 07:41:28 backup-2 Unix: glm4:  Cmd (0x61384760) dump for Target 3 Lun 0:
Dec 18 07:41:28 backup-2 Unix: glm4:  cdb=[ 0x10 0x0 0x0 0x0 0x1 0x0 ]
Dec 18 07:41:28 backup-2 Unix: glm4:  pkt_flags=0x0 pkt_statistics=0x61 pkt_state=0x7
Here are the principal observations to be effected on the system:

**UNIX System**

**List of Processes**

The Command "ps" lists the set of processes running on the system. We use the following options on UNIX system V (all UNIX systems except Linux):
On UNIX system IV (Linux) we use the options 'aux', "ps aux".

Example: of a list of processes on a server:

```bash
# ps -ef | grep tina
UID PID PPID C STIME TIME CMD
root 1447 1444 2 16:05:06 0:05 /usr/tina/Bin/tina_daemon -catalog batman -td_op 7 -td_ac_job 52499
root 1450 1447 4 16:05:21 0:05 /usr/tina/Bin/tina_daemon -catalog batman -td_op 8 -td_ac_job 52499
root 1410 1344 0 16:04:26 0:05 /usr/tina/Bin/tina_daemon -td_op 2 -td_fnet 7 -td_snet 9 -td_reason
root 1444 1435 1 16:04:54 0:05 /usr/tina/Bin/tina_daemon -catalog batman -td_op 6 -td_ac_job 52499
root 1435 1 1 16:04:43 0:05 /usr/tina/Bin/tina_daemon -catalog batman -td_op 5 -td_delay 0 -tin
root 1446 1344 2 16:05:03 0:05 /usr/tina/Bin/tina_daemon -td_op 2 -td_fnet 7 -td_snet 9 -td_reason
root 1356 1441 1 16:00:32 0:07 /usr/tina/Bin/tina_daemon -td_op 2 -td_fnet 7 -td_snet 9 -td_reason
root 1462 1450 16 16:05:58 0:05 /usr/tina/Bin/tina_backup -p1 25 -p2 4 -p3 5249248 -p4 0 0
root 1392 1344 0 16:04:13 0:05 /usr/tina/Bin/tina_daemon -td_op 2 -td_fnet 7 -td_snet 9 -td_reason
root 1463 1344 17 16:06:03 0:04 /usr/tina/Bin/tina_daemon -td_op 2 -td_fnet 7 -td_snet 9 -td_reason
```

Example: of list of processes on a client:

```bash
# ps -efl | grep tina
UID PID PPID C PRI NI ADDR SZ WCHAN TIME CMD
root 1344 1 0 51 20 f5d861d8 1765 f5d243f6 0:05 /export/home/tina3501/Bin/tina_daemon -td_op 1
root 1476 1 12 40 20 f608b208 1421 f5fe5366 0:05 /export/home/tina3501/Bin/tina_backup
```

Note: The size in memory (SZ) is indicated as a number of pages. A page of memory occupies 4.8 or 16 KB in function of the UNIX system (see "man ps", description of the field "SZ").

In this example, the Command was launched on a Solaris system. The size of the memory pages is 4096 bytes (the value indicated by the command "pagesize" on Solaris), thus the tina_backup occupies a space in memory of 1421*4 KB = 5684 KB.

Machine Load

Check the state of the swap, the load on the CPU, using specific system commands indicated in the Chapter "List of System Commands".

Here is an indicative list of the commands available on most UNIX systems:

- "top": Dynamic view of the CPU and memory load and of the list of processes sorted by CPU consumption
- NB: The command "top" is not systematically installed on the system.
- "uptime": displays the current time, the interval since the system started working, the number of users currently connected and the average system load for the past 1.5 and 15 minutes.
- "xload": graphic utility for viewing the CPU load.

**Windows System**

The list of processes running and the machine load can be viewed using the Windows Task Manager.

**System Logs**

Hardware errors can be detected using the System Logs.

- Network
- Hard disks
- Tape Drives and Robots.

**Breakdown of the Processes running on the Server and Client**

<table>
<thead>
<tr>
<th>Server Processes</th>
<th>Client Processes</th>
<th>Other Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>tina_daemon</td>
<td>tina_daemon</td>
<td>tina_daemon (listener)</td>
</tr>
<tr>
<td>tina_init</td>
<td>gui</td>
<td>tina_cart (does not need catalog access)</td>
</tr>
<tr>
<td>tina_odbsave</td>
<td></td>
<td>tina_event (just needs to access the raw text file)</td>
</tr>
<tr>
<td>tina_listcart</td>
<td>tina_start_backup</td>
<td></td>
</tr>
<tr>
<td>tina_cache</td>
<td>tina_restore</td>
<td></td>
</tr>
<tr>
<td>tina_del</td>
<td>tina_alpha</td>
<td></td>
</tr>
<tr>
<td></td>
<td>tina_config</td>
<td></td>
</tr>
<tr>
<td></td>
<td>tina_acct</td>
<td></td>
</tr>
</tbody>
</table>
Useful System Commands

Netstat

---

System Command netstat

Command used to check the connections in progress or to analyze a connection malfunction

**Command netstat -a**

```
server# netstat -a | grep tina
UDP
   Local Address          Remote Address          State
   *:*                     *:*                             Idle
TCP
   Local Address          Remote Address          State
   *:*                     *:*                             Idle
   server.tina            client.2967               32120              34752            0 ESTABLISHED
   server.tina            client.2968               31856              34752            0 TIME_WAIT
   server.tina            client.3033               32120              34752            0 TIME_WAIT
   server.27136            client.tina               32120              0                0 ESTABLISHED
   server.27137            client.tina               32120              33580            0 ESTABLISHED
```

**Command netstat -an**

```
server# netstat -an | grep 2525
   172.16.75.1:2525 172.16.75.2:2967 32120              34752            0 ESTABLISHED
   172.16.75.1:2525 172.16.75.2:2968 31856              34752            0 TIME_WAIT
   172.16.75.1:2525 172.16.75.2:3033 32120              34752            0 TIME_WAIT
   172.16.75.1:37136 172.16.75.2:2525 32120              0                0 ESTABLISHED
   172.16.75.1:37137 172.16.75.2:2525 32120              0                0 ESTABLISHED
```

---

Here are some commands useful to the analysis and diagnostics of problems linked to the network connection.

This command displays a range of information on the activity in progress on the network. The option `-a` lists all the active sockets (all the connections in progress). Use the option `-n` to view the IP addressed and the port numbers.

**Example: of the command netstat -a under Windows:**

```
C:\>netstat -a | find "tina"
TCP  zembla:tina  zembla:0  LISTENING
TCP  zembla:1388  senechal:tina  ESTABLISHED
UDP  zembla:tina-msg  *:*  ESTABLISHED
```

You can see here the two sockets of the parent tina_daemon (the TCP socket as LISTENING and the UDP socket) and the connection active towards the server called senechal.
Example: of the command `netstat -an` under Windows:

```
C:\>netstat -an | find "2525"
TCP 0.0.0.0:        2525 0.0.0.0:0         LISTENING
TCP172.16.120.42:1388 172.16.51.1:2525    ESTABLISHED
```

Here we see the same connections again, with the IP addresses and port numbers.

**ftp Command**

The `ftp` command is used to measure the network transfer rate or to show up a network malfunction (such as a random power-cut).

Under Windows, the `ftp` command is rarely available, since the server is not installed by default. Use the copy/paste function on the network disk mounted between the **Time Navigator** server and the client via the Windows Explorer. It is generally enough to time the transfer on a watch to reveal that the transfer rate is slow.

For this test, use preferably a large file (around 500 MB) and do a systematic transfer both ways between the **Time Navigator** server and the malfunctioning client.

Example: of the `ftp` command:

```
# ftp daredevil
Connected to daredevil
220 daredevil FTP server (SunOS 5.7) ready.
Name (daredevil:root): root
331 Password required for root.
Password:
230 User root logged in.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> cd /tmp
250 CWD command successful.
ftp> bin
200 Type set to I.
ftp> ls
200 PORT command successful.
150 ASCII data connection for /bin/ls (172.16.140.51,1501) (0 bytes).
total 848488
-rw-r--r-- 1 root other 434199221 Jul 6 2000 catalog_save1.cod
226 ASCII Transfer complete.
ftp> get catalog_save1.cod
local: catalog_save1.cod remote: catalog_save1.cod
200 PORT command successful.
150 Binary data connection for catalog_save1.cod (172.16.140.51,1502) (434199221 bytes).
226 Binary Transfer complete.
434199221 bytes received in 126 secs (3.4e+03 Kbytes/sec)
ftp> put catalog_save1.cod
local: catalog_save1.cod remote: catalog_save1.cod
200 PORT command successful.
150 Binary data connection for catalog_save1.cod (172.16.140.51,1504). 434199221 bytes.
226 Transfer complete.
434199221 bytes sent in 175 secs (2.4e+03 Kbytes/sec)
```
We can observe a transfer rate of 3.4 MB/s in one direction (get) and of 2.4 MB/s in the other direction (put). These two transfer rates are on a network of 100 Mbps.
Introduction

This chapter falls into three sections.

- The first, “General Methodology”, page 114, details three fundamental principles for good Troubleshooting practice:
  - Principle 1: Identify the Perimeter of the Problem
  - Principle 2: Go to the Simplest Not Working Configuration
  - Principle 3: Decompose into Elementary Phases

- The second section, “Qualification of Simple Problems”, page 116, applies the first of these principles to specific Time Navigator situations, providing detailed checklists for identifying the perimeter of the problem.

- The third section, “Examples of Complex Problems”, page 140, shows these basic principles in action for the troubleshooting of more elaborate scenarios. Four typical scenarios are presented:
  - Example 1: Network Problems,
  - Example 2: Cartridge Label Mismatch
  - Example 3: Analysis of a Backup Bottleneck
General Methodology

Principle 1: Identify the Perimeter of the Problem

In order to diagnose a problem, you first need to isolate the precise circumstances under which it occurs.

Example1: "The backup of the Host "HOST001" fails",

You should determine:
- Can backups be performed successfully on other hosts?
- On "HOST001", do all backup strategies fail, or just a selection?
- At what point in time did the backup start failing?

Example2: "I cannot connect to the library"
- When did it become impossible to connect the library?
- Does a bar code reinitialization work?
- Does a drive/identify work?
- If not, try to reduce the configuration that does not work to its simplest form. By removing element after element until it works, you isolate the item that causes the failure.

Principle 2: Go to the Simplest Not Working Configuration

This is similar to the first principle. Implementing this principle requires a very good internal knowledge of Time Navigator.

As a matter of fact, you need to know Time Navigator architecture and internal processes very well to be able to propose how to simplify the configuration.

Example1: If an SQL backup fails, you should ask the customer to run a manual independent backup

Of course, you can also simply investigate the problem by removing Time Navigator from the configuration if needed to assert whether the problem has anything to do with it.

Example2: "I cannot connect to the library"
- Can you access it by interrogating the driver directly?
- Check with qcdiag:
  Qcdiag > open c6b0t010
  Qcdiag > status
- If not, decompose into elementary Phases (next section)
Principle 3: Decompose into Elementary Phases

When you have reduced the problem to its simplest form, you need to identify the sequence that led to the problem.

Each operation can be decomposed into sub-operations. However, you might find that the sub operations cannot all be run independently.

In this case, you must try to find out at which step the problem occurred.

Example 1: If the problem is a library diagnosis problem, check if the blank cartridge is mounted, check if the drive shows any activity.

Example 2: If a backup fails, you should check whether the cartridge has been mounted, whether any data has been written.

Of course there are tools that you can use to get this information.

For backups, for instance, a `tina_listjob (4.1)` or `tina_listcart` can be used to have a list of backed up objects.

Example 3: "I cannot connect to the library"

Do you see the devices at the system level?

For example, in the windows `tina_env_report`, you should have a file "System_Information\ListScsi.txt" with contents similar to:

```
Driver: adpu160m
Device: c6b0t010
Type: MediumChangerPeripheral
Inquiry: EXABYTE Exabyte X200 3.02
```

Example, on AIX, when you run `lsdev -C`, you will see:

```
smc0 Defined 10-70-00-6,0 IBM 3583 Library Medium Changer
```

After this, you should check if the Atempo driver is loaded

Example, on windows under the file "System_Information\Reg_QC.txt", You should see the qc service:

```
[HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\qc]
"Type" = dword:00000001
"Start" = dword:00000002
"ErrorControl" = dword:00000001
"ImagePath" = "\??\C:WINNT\System32\drivers\qc.sys"
```
Qualification of Simple Problems

The purpose of this section is to supply a non-exhaustive list of:
- Questions to raise to identify the perimeter of a problem
- Files to collect to continue investigations
- Typical examples of problems

This content helps to implement Principle 1 of our Methodology, "Identify the Perimeter of the Problem".

The areas that will be covered are:

- **Qualifying an Installation Problem** .............................................page 116
- **Qualifying a Backup Problem** .............................................page 118
- **Qualifying a Restore Problem** .............................................page 125
- **Qualifying a Library or Media Management Problem** ...............page 129
- **Qualifying a Catalog Problem** .............................................page 133

Qualifying an Installation Problem

**Identify the Perimeter of the Problem**

**Installation Type**
- Server?
- Agent?
- Library Driver (QC)?

**Reason for Installation**
- New Installation?
- Update with a Patch Version?

**Type and Version of Platform**
- Unix?
  - AIX 4.2
  - AIX 4.3
  - HP UX 1020
  - HP UX 11
General Methodology of Troubleshooting and Examples

- SOLARIS 2.6, 2.7
- SOLARIS 8
- DEC ALPHA (OSF1) V4, V5;
- Linux (kernel version)
- Windows?
- NT
- 2000
- XP

Installation Mode
- Graphic Interface?
- Manual? (Unix only)

Files to be Collected

Ideally, the output from tina_env_report.

Failing that, you must collect at least:
- Event file from the Time Navigator Server and Agent
- Setup Log:
  - Windows: %TEMP%\InstTina<process_number>\log_setup
  - Unix: /tmp/InstTina<process_number>/log_setup

Typical Installation Problems

Windows Installation Problems

How to install Time Navigator on a Windows Terminal Server Edition Agent:

See Technote Ref:

I cannot start the service:

Modify the DomainName key that is found in the directory
[HKEY_LOCAL_MACHINE\SOFTWARE\Atempo\tina]
"DomainName"="Machine_Name"

The value of the variable should be the name of the machine.

How to check the installation after the initial setup:

See Technote Ref:
Unix Installation Problems

Linux

Make sure you have selected the right Time Navigator binary libc6X when you update a Linux setup.

See Technote Ref:

Install.sh failed to complete the setup on a Linux server

See Technote Ref:

Time Navigator (Lesstif) does not support UTF-8 localizations

See Technote Ref:

AIX

Which binaries to install on AIX platforms?

See Technote Ref:

Qualifying a Backup Problem

Identify the Perimeter of the Problem

The Backup Problem Concerns What Type of Host or Application?

- The Time Navigator Server
- A Time Navigator Agent
- A Storage Node
- An Application Module:
  - Catalog Application
    See the script for qualifying Catalog incidents
  - Filesystem Application
  - List Application
  - System State Application
    See the script for qualifying System State incidents
  - Lotus Domino Application
    See the script for qualifying Lotus Domino incidents
- MS-Exchange Application
  See the script for qualifying MS-Exchange incidents
- MS-SQL Server Application
  See the script for qualifying MS-SQL Server incidents
- Sybase Application
  See the script for qualifying Sybase incidents
- SMS - NetWare Application
  See the script for qualifying NetWare incidents
- NDMP Application
  See the script for qualifying NDMP incidents
- Don't Know

If the Problem Concerns an Agent, Storage Node, Filesystem or List Application
- What is the Operating System on the concerned system?
  - Windows NT4, 2000 (+ service pack)
  - Linux : Red Hat, Mandrake, SuSE
  - AIX
  - Tru64
  - HP-UX
  - Irix
  - Solaris
  - Unix, unknown: find the version using the command `uname -A`
  - VMS
- What is the name of the concerned system?

What Version of Time Navigator is on the Server?

What is the Patch Level?
- Don't know
- Is a Time Navigator graphical interface active?
  - Yes: See the patch indicated under the Help menu of Time Navigator Administration Console
  - No: Run
    `$TINA_HOME/Bin/tina_daemon -version`

What is the Type and Version of the Operating System on the Server?
- Windows NT4, 2000 (+ service pack)
- Linux : Red Hat, Mandrake, SuSE
- AIX
- Tru64
- HP-UX
- Irix
- Solaris
Unix, unknown: find the version using the command `uname -A`

**What Type is the Time Navigator Instance?**
- Production
- Test

**What sort of Problem is It?**

**Case1: Backup Failure or Error Messages during Backup**

a. At what date did the problem appear?
b. Does it appear systematically?
   - Yes:
     - On a new system?
       - Yes,
       - No
   - No

c. Was it a scheduled backup?
   - No: what command line was used?
   - Yes
     - Scheduled within **Time Navigator**? State of the job:
       - Terminated
       - Suspended:
         - on request,
         - on error
       - Stopped:
         - on request,
         - on error,
         - after a tina_stop
       - In Progress:
         - session active,
         - session not active
       - Job Manager not available
   - Backup scheduled in another scheduler?
     - Name of the scheduler:
       - crontab (Unix)
       - AT (Windows)
       - Other (Which?)
     - Content of the script or command line used
d. Nature and content to the **Time Navigator** alarm
   - Critical: red
   - Major: orange
   - Minor: yellow
   - No alarm

e. Was there an anomaly or unexpected event on the **Time Navigator** server?
   - Sudden reboot
   - Power outage
- System hang
- Nothing
- Don't know

f. Has **Time Navigator** been updated
   - On the **Time Navigator** Server
   - On the concerned system

**Case 2: Backup Fails to Start**

a. At what date did the problem appear?

b. Does it appear systematically?
   - Yes:
     - On a new system?
       - Yes,
       - No
     - No

c. Is a job created?
   - No
   - Yes

   - Nature and content of the **Time Navigator** alarm?
     - Critical: red
     - Major: orange
     - Minor: yellow
     - No alarm

d. Was the backup launched manually?
   - No
   - Yes

e. Was it an incremental backup?
   - No
   - Yes

   - Had files been modified since last Full backup?
     - Yes
     - No

f. Does the problem concern a **Time Navigator** agent or server?
   - **Time Navigator** server
   - **Time Navigator** agent

   - On a new post?
     - No
     - Yes: On a defined class? Yes, No

   - Was the **Time Navigator** daemon or service started on the agent?
     - Yes,
     - No

   - Was the correct catalog file used?
     - Yes,
     - No

   - Communication between server and agent:
• ping from agent to server
• ping from server to agent
• ping both ways
• no ping

- **Time Navigator Restore & Archive Manager**
  • Can be launched correctly?
  • Cannot be launched correctly?

**Case 3: Problems in Backup Performance**

a. At what date did the problem appear?
b. Does it appear systematically?
   - Yes:
     - On a new system?
       - Yes,
       - No
   - No
c. What volume of data is backed up?
   - A few dozen MB
   - A few hundred MB
   - A few dozen GB
   - A few hundred GB
d. What quantity of objects is backed up?
   - A few dozen large files (such as databases)
   - A few hundred medium-sized files
   - A few thousand or tens of thousand small files
e. Does the backup concern the **Time Navigator** server?
   - Yes
   - No
   - What is the network configuration?
     - network card, c (tT **Time Navigator** server)
       - 100 MB card
       - 1 GB card
       - FC: Configuration
         Full duplex
         Half Duplex
         Auto negotiate
     - network card, c (tT **Time Navigator** agent)
       - 100 MB card
       - 1 GB card
       - FC: Configuration
         Full duplex
         Half Duplex
         Auto negotiate
f. Has **Time Navigator** compression been activated?
   - Yes
   - No
g. **Time Navigator** cache configuration
Memory cache
  ■ Yes
  ■ No

Disk Cache
  ■ Yes
  • Are the cache files on the same disk as the catalog?
    • Yes
    • No
    • Don’t know
  ■ No

Drive functioning
  ■ normally
  ■ intermittently
  ■ don’t know

Case 4: Problems in Backup Parameters

Files to be Collected

Ideally, the output from tina_env_report.

Failing that, you must collect at least:
  ■ tina_config, for the configuration of strategies and classes
  ■ Event file, for exact identification of error messages
  ■ System logs or Windows event logs, to identify problems linked to the system

Typical Problems

Errors during Backup

- Backups Fail on q_path_elem_change_encoding function

- Server/Agent Connection Loss causing Backups to Fail on True64

- Error FFFDFFB1: Insufficient Privilege Error When Attempting to Back up NDS

- Redhat Linux Server Freezes during Backup Operation on Kernel higher than 2.4.18-5

- Unable to back up applications installed on mastered agents
The Volume of Backed up Data is Null

Backing up very large files (greater than 255 GB)

Backups are Queuing in the Cache, No Activity

Errors on Launch of Backup

Unable to Start a Backup Job on a SMS application

Backups do not start

Backups Start but are Stopped Immediately or Nothing Happens

Backups End on Error

Problems in Backup Performance

Improving Backup Performances on Windows systems

How to test Windows Backup Performances with a Unix Server Independently of Time Navigator

Lookupd process impact on backup performances on MacOs

Time Navigator uses a non-dedicated backup network

Backup Improvement in backup master mode
Qualifying a Restore Problem

Identify the Perimeter of the Problem

What is the version of Time Navigator?

What type of platform do you want to restore?

Unix or Windows?

Is the data to be restored compatible with the operating system?

What kind of restore?

Classic or cross-restore?

Are you using Time Navigator Command Line Interface or a graphical interface?

Can you connect to the backup directory?

Are you restoring to a local or a remote machine?

What kind of data are you restoring?

A filesystem or an application?

Have you observed any error messages?

Is this a Restore Test?

Does the restore launch properly?

Are cartridges mounted?

Have you launched Time Navigator Media Request Console?

Are there any requests for cartridges to be put online?

Has a restore job been created in Time Navigator Job Manager?

If so, what is the job number?
Is the restore job suspended or stopped on error?

Are you restoring to the original directory or to another location?

Are you restoring with all rights? With no rights?

Can the cartridge be read?

Have you tried to read the cartridge manually using tina_cart?

Is the library working correctly?

Files to be Collected

Ideally, the output from tina_env_report.

Failing that, you must collect at least:
- tina_config, for the configuration of strategies and classes
- Event file, for exact identification of error messages
- System logs or Windows event logs, to identify problems linked to the system

Typical Problems

  Problem of Communication between Server and Agent
  a. Can you do a ping using hostname from server to agent and from agent to server?

In one known case it was possible to connect to the agent’s backup directory but the restore did not launch because the agent did not recognize the server.

b. Can Time Navigator Restore & Archive Manager be launched on the server and on the agent?

Sometimes communication is only possible in one direction. This could also be due to an incorrect entry in the catalogs(.txt) file of the agent.

c. Can the names of the concerned machines be checked with the hostname command?

This command will allow you to check whether an alias is being used or whether the DNS (Domain Name Server) is working correctly on the agent.

  Administration Problem
  a. Has a restore previously been performed on this agent?
It can happen that the user of the agent is new to **Time Navigator**, has not had training or has not read the documentation.
b. Is the data to be restored compatible with the Operating System?

Sometimes the agent tries to restore data from a Unix to a Windows machine. Data can only be restored between operating systems of the same type.

**Hardware Problem: Library Arm or Media**
a. Is the library working correctly?

Check on the agent that there are no error messages coming from the library. It could simply be a hardware problem and the user should contact hardware maintenance.
b. Are cartridges being mounted?

The library arm may not be working or there could be a cartridge stuck in the library.
c. Can the cartridge be read?

In some cases it may be preferable to use another instance of the file, present on another cartridge. To identify another instance, connect to the backup directory, select a file to restore, right click and select **Information** to have the list of instances and especially the list of cartridges where the instances are to be found.

**Unacknowledged Cartridge Mount Request Problem**
a. Is the cartridge in the library?

Check for the presence of a cartridge in the appropriate slot.
b. Is **Time Navigator Media Request Console** running?

It is important to know that this interface lets your view all requests for cartridge mounts. If this interface is not running the user cannot know whether there have been requests for cartridges to be put online.

**Problem of Positioning on Media for Restore**
a. Have cartridge mounts been performed?
b. Problem reading label

It is quite common to have error messages regarding cartridge mismatches or incoherent labels, in which case **Time Navigator** cannot read the cartridge. See “Example 2: Cartridge Label Mismatch”, page 150, for solutions.
c. Error of positioning of file on cartridge

The catalog may think that the file is positioned at a specific numbered segment but when **Time Navigator** tries to restore it finds that the segment’s number does not correspond. In this case use the tunable `fsb_by_read=yes`. 
d. Have you tried to read the cartridge manually using `tina_cart`?

The command `tina_cart -list` lets you check, not only that the cartridge label can be read but that there is data on the cartridge. The command `tina_cart -extract` permits restore of the file.

**Restore methods available depending on the backup format**

**Restore Destination Problem**
a. Are you restoring to the original directory or to another place?

If to the original directory, check that this has not been moved or that it is not full. Also take care over the choice of restore options for files that already exist.

Identify the nature of the destination directory to ensure that the reason for the failure is not related to the directory itself. For example, check the compatibility of the Operating System; the availability of sufficient space; or special restrictions such as a limit to the number of a given file type in the filesystem.
b. What kind of restore is it?

Is it a classic or a cross-restore?

**Problems of Rights**
a. Does the user have rights to do restores under Time Navigator?
b. Does the user under whom you are connected have write-access to the restore destination directory?

**Unidentified Problems, Configuration Problems and Bugs**

How to Restore a Backed up File with a Hole (Sparse File under NT)?

Cartridge locked during failed restore

Access Right Problems for Restore

Skeleton Restore Error

Unable to Restore a Mac File on NSS Volume with FFFDFFB7 Error

Unable to restore split files in LAN-free mode

Problem with storage node restore

Restoring Data Backed up on 32 bit platform onto a 64 bit platform

Restoring 3.6 Backups with Higher Versions of Time Navigator

Qualifying a Library or Media Management Problem

Questions

Time Navigator Software Environment

Backup Server Environment

Make and Model of the Library

Library Slots

- Total Number
- Mailbox
- Cleaning
  - Managed by Time Navigator
    - In a reserved slot
    - Number of cleanings
    - Lifespan
  - Managed by the Library
    - In a reserved slot
- Does the Library read barcodes?

Library Connection Type

- SCSI
- SAN (Fiber Channel)
- NAS (NDMP Tape Server)

Library Firmware Version

Library Sharing Module

- Yes
  - Number of catalogs
  - Number of Storage Nodes
  - Format of split
- No

Make and Model of Drives

Number of Drives

Type of Drive Connection
- SCSI
- SAN (Fiber Channel)
- NAS (NDMP)

Drive Firmware Version

Make and Model of Media
- Do the cartridges have barcodes?

Age of Hardware
- Library
- Drive
- Media

Generic Questions
- Did this configuration work previously?
  - Never
    - New installation
    - Test
  - For how long?
- When did the problem appear?
  - Date
  - Time
- Have modifications been made recently?
  - Software
    - Update of Time Navigator version
    - Update of Qc
  - System
    - Update of Operating System
  - Hardware
    - on Library
      - Firmware update
      - Repair
      - Exchange
    - on Drive
      - Firmware update
      - Exchange
    - on Server
  - What is the current state of the hardware?
- Are there error messages on the Library display panel?
- Installation and update of qc under Unix, Windows, Linux
- Drive configuration

**Questions on User Tests**
- Reinitialization
- Barcode
- Label
- Drag & Drop
  - Slot to slot
  - Slot to drive
  - Slot to mailbox
- Qcdiag
  - Open
  - Status
  - Move
- Drive diagnostic
- Reboot after power cut
  - Library
  - Server
- Check
  - **Time Navigator**
    - Device descriptor
    - Library
    - Drive
    - Library Properties
    - Logical Index of Drive
- Operating System
  - Driver
  - Device

- Test of reading and writing onto the drive with system commands such as `tar`, `dd`, `cpio`.

**Files to be Collected**

Ideally, the output from `tina_env_report`.

Failing that, you must collect at least:
- `tina_config`, for the configuration of strategies and classes
- Event file, for exact identification of error messages
- System logs or Windows event logs, to identify problems linked to the system
Typical Problems

Library
- Not recognized
- Reinitialization Error
  - Barcode
  - Label
- **Time Navigator Library Manager**
  - Slots
    - Missing
  - Drives
  - Mailbox
    - Grayed out
  - Cartridge
    - Reserved (locked)
- Error in Qcdiag
- Hardware
  - Power supply not working
  - Arm
  - Barcode reader
  - Slot access
- Door
  - Display panel

Drive
- Not recognized
- Disabled
- Unavailable
- Reading/writing of Label
- Error in Diagnostic
- Error in Cleaning
- Hardware
  - Power supply not working
  - Insertion impossible
  - Ejection impossible
  - LED flashing

Media
- Label mismatch
- Barcode share
- Hardware
  - Damaged tape

Library - Technical Notes
Declaring Several Libraries with Identical Device Descriptors  

Problem Attaching a Library with qc Driver when Installing Time Navigator 3704, SP1  

Pass-through Library Driver (qc) on SUN Solaris  

Pass-through Library Driver (qc) on Windows  

Unable to Create a Library ( FC Connection )  

Installing two libraries with the same target on two controllers  

Sharing an ATL GBe library between two Time Navigator servers  

Qualifying a Catalog Problem

Questions

What is the version of the Time Navigator Server?
- 3.5.0.1
- 3.5.0.7
- 3.5.0.8
- 3.6.0.1
- 3.6.0.2
- 3.7.0.0
- Don't know

What is the Patch Version?
- Don’t know
  - Is there a Time Navigator window active?  
    • Yes: read the version indicated in Time Navigator Administration Console, under Help  
    • No: run /Bin/tina_daemon -version
- Type and version of Server Operating System
  - Windows NT4, 2000 (and service pack)
  - Linux: Red Hat, Mandrake, SuSE
  - AIX
  - Tru64
  - HP-UX
Irix
Solaris
Unix, unknown: find version with command `uname -A`

What basic type of Time Navigator installation (to determine priority)
- Production
- Test

If there are several catalogs, name(s) of the catalog(s) causing problems

Nature of the problem
- Catalog backup problem: see Case 1
- Poor performance of catalog backup: see Case 2
- Catalog restore problem, see Case 3
- Problem of catalog configuration: see Case 4
- Other technical issues (procedures, configuration, installation, etc.) See

Case 1: Catalog Backup Problem
a. At what date did the problem appear?
b. Does it appear systematically?
   - Yes:
   - No

c. Was it a scheduled backup?
   - No: what command line was used?
   - Yes

   Scheduled within **Time Navigator**? State of the job:
   - Terminated
   - Suspended:
     - on request,
     - on error
   - Stopped:
     - on request,
     - on error,
     - after a tina_stop
   - In Progress:
     - session active,
     - session not active
   - Job Manager not available

   Backup scheduled in another scheduler?
   - Name of the scheduler:
     - crontab (Unix)
     - AT (Windows)
     - Other (Which?)
   - Content of the script or command line used

d. Nature and content to the **Time Navigator** alarm
   - Critical: red
Major: orange
Minor: yellow
No alarm
e. Is the server in a cluster?
No
Yes

On what resource or node are the binaries installed?
On what resource or node is the catalog installed?
Don’t know

f. Backup failure with Critical Alarm
Was there an anomaly or unexpected event on the Time Navigator server?
Sudden reboot
Power outage
System hang
Update of Server Operating System
Did the problem arise after the server was updated?
Update of Time Navigator
Did the problem arise after the update?
Has a user name been defined in the Catalog Application?
Yes
No
No but the cursor passed into the User zone

Backup to disk?
Yes
No

Location of the backup files
bootXXXX.cod files
saveXXXX.cod files
Available space on filesystem where .cod files are located
Sufficient
Insufficient
Available space on filesystem of directory /temp (Windows) or \tmp (Unix)
Sufficient
Insufficient
If the operating system is Linux Kernel of a version less than 2.4: size of backup file
Greater than 2 GB
Less than 2 GB

The command /Bin/tina_config displays on screen:
A rolling list with a part for "Archive folders" at the end
A rolling list without a part for "Archive folders" at the end
Nothing

Case 2: Poor Performance of Catalog Backup
a. Current duration of the backup?
b. Initial duration of the backup?
c. Number of instances
■ If you don’t know: read the number of instances in **Time Navigator Administration Console**

d. Has there been a progressive deterioration of performance or was backup always slow?
■ Progressive
  ■ Date of last restore of catalog
  ■ Frequency of cartridge recycling or deletion
■ Always slow
  ■ Is the backup file on the same partition as the catalog?
    • Yes
    • No
    • Don’t know
  ■ Is the swap on the same partition as the catalog?
    • Yes
    • No
    • Don’t know

**Case 3: Catalog Restore Problem**
a. Was **Time Navigator** stopped?
■ No
■ Yes: check
  ■ Windows: service stopped and no **Time Navigator** processes in the Task Manager?
  ■ Unix: absence of the **Time Navigator** demon?

b. What user was used?
■ Windows: User must belong to Local Administrator group
■ Unix: User must be root

c. What command was used for the restore?
■ Interactive tina_init
■ tina_init -file
■ tina_init -boot
  ■ Was the cartridge containing the backup file present in the library?

d. Is the backup file of the catalog correct (except for tina_init -boot)?
■ What is the size of the file as compared with previous version?
■ What is the job corresponding to this backup file? Is it without error?
  ■ Yes
  ■ No
  ■ Don’t know

e. Have restores been attempted with other backup files?
■ Yes
■ No

f. What information is returned by the command tina_cache -info?
■ Gather the following information
  ■ Size of disk cache
• 0 MB: availability of space to store cache file(s)
  • Sufficient
  • Insufficient

  ▪ Date of last catalog backup
  ▪ No information
  ▪ Is there any disk cache?
    • No
    • Yes
      ▪ Size of disk cache
      ▪ Availability of space to store cache files: Sufficient? Insufficient?

  ▪ Presumed date of last valid backup of catalog

  g. Where are catalog files (.odb) physically located?
  ▪ Under /Data
  ▪ Another path, defined by a symbolic link (Unix)
  ▪ Another path, defined by the ODB_TRANSLATION_PATH_n tunables (in the parameters file of the Time Navigator server)

**Case 4: Problem of Catalog Configuration**

a. Does it concern **Time Navigator** cache?
  ▪ Is the cache active after startup of the **Time Navigator** service or demon?
    • Yes
    • No: see script on backups
  ▪ Is there a disk cache?
    • No
    • Yes
      ▪ Are the cache files located in the specified place?
        • Yes
        • No
        ▪ If you don’t know: what location is returned but the command tina_cache -info?

  ▪ Do the cache creation and modification functions work?
    • Yes
    • No
      ▪ Does the path indicated for creation or modification exist?
        • Yes
        • No
        ▪ If you don’t know, look for it in the Windows Explorer or use the command `ls` in Unix
          ▪ Is there sufficient space at the indicated location to store the cache file(s)?

b. Does it concern the License Key?
  ▪ Change of key, new key not valid
    ▪ How many hosts are currently declared in the catalog?
      • Unix hosts
      • Windows hosts
      • VMS hosts
      • NetWare hosts
      • NDMP hosts
    ▪ How many applications are currently declared in the catalog?
      • Lotus Domino applications
• MS-Exchange applications
• Oracle applications
• Informix applications
• MS-SQL Server applications
• Sybase applications

How many hosts and applications are allowed by the new key?

Does it concern an Environment Variable of the Catalog Application?

Does sending the boot catalog by e-mail work?

Yes
No

Is the variable TINA_SDB_EMAIL between parentheses?

Yes
No: is the e-mail address specified correct?

In Unix, is the variable TINA_SDB_MAIL_CMD between parentheses?

Yes
No: is the specified command line correct?

In Windows, is the variable TINA_SDB_MAIL_SERVER between parentheses?

Yes
No: is the name of the specified SMTP server correct?

Is the Catalog Backup file created on the disk?

Yes
No

Is the variable TINA_SDB_SAVE_PATH between parentheses?

Yes
No: is the specified path correct?

Files to be Collected

Ideally, the output from tina_env_report.

Failing that, you must collect at least:

• tina_config, for the configuration of the Catalog Application
• Event file, for exact identification of error messages
• System logs or Windows event logs, to identify problems linked to the system
• Catalog boot file (bootXXXX.cod)
• File catalog_save1.cod
• Result of the command tina_odbsave -dir_dest -folder folder_name

Typical Problems

Catalog Backup Error (Critical Alarm)

Administration Object not Backed up During Catalog Backup
Catalog Backup Problem

Catalog backup time deteriorates quickly

Catalog backup takes very long

Catalog Configuration Problems

Modification of tina_cache not taken into account

Message "Failure of server modification" while modifying Time Navigator cache

Message "Invalid license" when entering definitive License Key

The backup file of the catalog is not created on disk

The function for sending the boot catalog by e-mail does not work.

Catalog Configuration

How to choose a specific location for catalog files

Using memory cache under Solaris

Environment Variables of the Catalog Application

How to configure the sending of the Boot Catalog by e-mail

Catalog Operations

How to Restore a Catalog

How to Restore a Catalog from a Tape

How to Separate Data from One Catalog into Two Catalogs
Examples of Complex Problems

This section illustrates troubleshooting methodology by investigating more complex problems. The examples included are:

Example 1: Network Problems ..............................................page 141
Example 2: Cartridge Label Mismatch ...............................page 150
Example 3: Analysis of a Backup Bottleneck.......................page 155
Example 1: Network Problems

Network Connection Theory

Presentation

The **Time Navigator** software rests on the TCP/IP protocol for transferring data on the network. The configuration of the **Time Navigator** network is based on two main elements: Services (TCP and UDP) and IP addresses.

**TCP/IP Communication Ports**

TCP/IP services are set in the `services` file local to the system (`/etc/services` under UNIX, `%SystemRoot%\system32\drivers\etc\services` under Windows) or sometimes at the level of the NIS under UNIX.

The set of systems included in a **Time Navigator** architecture uses the same TCP and UDP port numbers (generally 2525/tcp and 2526/udp).
IP Address

The resolution of names (recovery of the IP Address of a system from its name) is done at two levels:

- at the Time Navigator level with the systems file (conf/systems under UNIX, conf\systems.txt under Windows)
- at the System level, with the range of mechanisms for managing IP addresses:
  - Unix: The system hosts file, DNS, NIS
  - Windows: the System hosts file, DNS, WINS.

Names Resolution

System Hosts File

The hosts file on the system (/etc/hosts under UNIX, SystemRoot%\system32\drivers\etc\hosts under Windows) contains a list of IP addresses using the format:

XXX.XXX.XXX.XXXnetwork_name

Configuration for DNS
The DNS (Domain Name System) is a dynamic system for the resolution of names. A main DNS server centralizes the set of IP addresses of a domain; one or more secondary servers synchronize their list of IP addresses in relation to the main server and ensure the availability of the DNS.

If there is a doubt on the DNS configuration, the command `nslookup` lets you test for correct functioning.

**Usage:**
`nslookup network_name`

The DNS configuration is validated if this command returns the IP address of the machine concerned.

**Configuration for NIS (Unix)**

The NIS (Network Information Server) is a centralization system for UNIX system files (passwd, services, hosts, etc.).

In case of a doubt on the configuration of an NIS, you can check the domain name and the NIS server name using the commands `domainname` and `ypwhich`.

To validate the IP address of a system at NIS level, use the command `ypcat hosts` which lists the set of network names, at NIS level and under the same format as the system `hosts` file.

**Search Order (Unix)**

The search order of network names is defined in the file `/etc/nsswitch.conf` on most UNIX systems (Linux, Solaris, Hp-ux, IRIX). This file defines, for each type of resource (hosts, services, passwd, etc.) the search mechanisms to be used and their order of precedence.

**Example: of configuration "nsswitch.conf" for the network names.**

```
hosts: files dns nis [NOTFOUND=return]
```

The keyword `files` means: search in the system `hosts` file, then on the `dns`, then on the `nis`.

**Time Navigator Functions**

**Network Connection**
The network connections between **Time Navigator** processes are effected using the **Time Navigator** functions `Vos:winapi32_connect` or `Vos:unix_connect`. It is these functions that generate Events in case of a problem with the connection.

These **Time Navigator** functions call the system function `gethostbyname` for resolving the names (i.e. obtaining an IP address from the network name). It is this function which rests on the mechanism described in the previous paragraphs.

**Network Transfer**

The **Time Navigator** functions `Vos:unix_read_net` and `Vos:unix_write_net` (for Unix) or `Vos:winapi32_read_net` and `Vos:winapi32_write_net` (for Windows) affect the transfer of data between **Time Navigator** processes on the Network.

When a network connection is broken (through a halting of a remote process or a network malfunction) it is these functions that generate Events of the type **network disruption detected** or **connection reset by peer**.

**Firewall Case**

**Principle of the Firewall**

The firewall is a protection system placed between the internal network and the outside (the Web). The mechanism is based on connection authorizations in function of the protocol used, the communication ports (services) on the broadcasting machine and on the target machine.

**Configuration of a Backup Agent through a Firewall**

To configure the backup of a system through a firewall, you should authorize at firewall level the connection of the **Time Navigator** server to the agent (from inside the firewall to outside), since the backup sever is placed in the internal network, You should also configure the Backup Tutor on the agent, from **Time Navigator Administration Console**. This ensures security, since there is no port open from outside into the internal network.

**The Backup Master**

In standard operations (not using a Backup Tutor), a backup is effected by the client process (`tina_backup`), which initiates a connection towards the server. However, in the case of a backup done through a firewall, for security reasons, the connection is allowed in one direction only, from the inner network towards the outside. It is thus impossible for the client to initiate a connection inwards toward the server.
In Backup Tutor Mode, the Backup process (tina_backup) runs on the Tutor, and it is this that opens the connection towards a tina_daemon on the client, through the firewall. The Backup mechanism runs on the Tutor. The client tina_daemon serves as a kind of "letterbox" to for list the contents of the directories and send data.

How to Troubleshoot Initial Connection Problems

Scenario: **Time Navigator** Server A; **Time Navigator** Client B

Checking that Services are Running

- Make sure that **Time Navigator** Server software is started on A.
- Make sure that **Time Navigator** Client software is started on B.
- Make sure that the clock running on A and B are synchronized.
- Verify that A and B are listening on the same set of TCP/UDP ports for **Time Navigator** (Default is 2525/2526)
One way to check **Time Navigator** ports for Windows is to look at the Path to executable value set in Services.

**For Windows, also check the file:**

C:\Winnt\system32\drivers\etc\services

**For Netware, also check the file:**

Sys:\etc\services

**For Unix, also check the file:**

/etc/services

```plaintext
...  
nfsd   2049/udp  nfs   #NFS server
knetd  2053/tcp  #Kerberos de-multiplexor
man    9535/tcp  #Remote Man Server
tina2525/tcp # Time Navigator® Enterprise Edition (tina)
tina-msg2526/udp# Time Navigator® Enterprise Edition (tina)
achille2525/tcp#achile prototype protocol (c)quadratec-software.com
tina372527/tcp# Time Navigator(r) Enterprise Edition (tina37)
tina37-msg2528/udp# Time Navigator(r) Enterprise Edition (tina37)
```

**Netstat, Version Checks and tina_ping**

- Run the `netstat -a` command to see list of used ports
- Verify that **Time Navigator** Server is running a version of **Time Navigator** with a higher patch than the **Time Navigator** Client. If not, re-install **Time Navigator** Server with newer software.
- Verify IP address of A and B from the DNS entries.
- Make sure that A and B can ping each other by hostname.
- For Netware, make sure that the file `sys:\system\tina.hom` exists and it contains the path to the **Time Navigator** home directory (i.e. `sys:\tina\`)
Run the `tina_ping -host <hostname>` command to verify that tina service is running correctly on a certain host using the appropriate ports. This command is very useful in troubleshooting communication problems between a server and a client.
Time Navigator Events

In a situation where you have more than one interface and hostname on a server, you can check the **Time Navigator** events to verify which hostname is being recognized by the **Time Navigator** software.

**Catalogs(.txt) File Checks**

- Verify **catalogs(.txt)** file located on B and make sure that hostname and catalog name for the **Time Navigator** Server A are specified correctly.
  - For Windows, it is located at:
    
    ```
    C:/$TiNa_Home\Conf\catalogs.txt
    ```
  - For Unix, it is located at:
    
    ```
    $TiNa_Home\Conf\catalogs
    ```

**Note**  
Make sure that there is a carriage return at the end of the file.

```python
catalog:
  name= test1,
  server= "A",
  comment= "".

catalog:
  name= test2,
  server= "A",
  comment= "".
<carriage_return here>
```
- Verify on the server side that the file `$HOME_TINA/tina/Conf/hosts.txt` under Windows or `HOME_TINA/tina/Conf/hosts` under UNIX does not define localhostname. If so, the identity of your server is the alias used for localhostname and the server on the client side should be defined with the alias in the client `./tina/Conf/catalogs.txt`

- Verify on the client side that the file `$HOME_TINA/tina/Conf/hosts.txt` under Windows or `HOME_TINA/tina/Conf/hosts` under UNIX does not define localhostname. If so, the identity of the client is the alias used for localhostname and the client definition on Time Navigator Administration Console of the server should also use that alias.
Example 2: Cartridge Label Mismatch

The cartridge label contains information concerning the cartridge:

<table>
<thead>
<tr>
<th>Information</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>inc00023</td>
</tr>
<tr>
<td>Creation Date</td>
<td>Thu Dec 9 03:02:22 2004</td>
</tr>
<tr>
<td>Description</td>
<td>MyCartridge</td>
</tr>
<tr>
<td>Label Format</td>
<td>V5</td>
</tr>
<tr>
<td>Recycle Date</td>
<td>Tue Jan 4 03:02:19 2005</td>
</tr>
<tr>
<td>Owner</td>
<td>inc</td>
</tr>
</tbody>
</table>

It is stored both in the catalog and on the first block of the cartridge. The label is updated each time a cartridge is recycled.

A Cartridge Label Mismatch incident is characterized by an alarm of type **Label Mismatch/Label incoherent**. It signifies a discrepancy between the information contained in a cartridge label and the corresponding information in the catalog.

The name or the recycling date are not the same in the label and in the catalog, so **Time Navigator** cannot correctly identify the cartridge.

**Possible causes for this anomaly:**

**The cartridge was moved:**

In a library without bar codes, cartridges were moved manually without **Time Navigator** being notified.

**Other software:**

Software other than **Time Navigator** was used to access the drives, leaving no trace in the catalog.

**SAN access:**

A machine with access to the drives in a SAN configuration was rebooted.
Catalog restore with `tina_odbsave` and `tina_init`:

The catalog was restored from a catalog backup performed prior to a recycling of the cartridge. Consequently, the recycling date in the catalog does not match the date on the label.

These mismatches are of three different types.

**Cartridge with the Same Label**

Although the label is the same on the cartridge and in the catalog, the recycling date on the label does not correspond to the one on the cartridge.

*Illustration - How the Problem was Produced*

Given a catalog with a library `lib1` and a cartridge pool `pool1`:

1. Run some backups on `pool1`.
2. Close the cartridge `pool1_0001`.
3. Backup the catalog.
4. Recycle the cartridge `pool1_0001`.
5. Run a `tina_init`.
6. Reinitialize the labels.

*Associated Logs:*

**Cartridge Has No Label**

This can happen when the cartridge associated with a label in the catalog has been made ->Spare.

*Illustration - How the Problem was Produced*

Given a catalog with a library `lib1` and a cartridge pool `pool1`:

1. Run some backups on `pool1`.
2. Close the cartridge `pool1_0001`.
3. Backup the catalog.
4. Make the cartridge `pool1_0001` ->Spare.
5. Run a `tina_init`.

*Associated Logs:*
Cartridge with Another Label

The incoherence arises from the fact that the cartridge associated to a label in the catalog is physically found with a different label.

Illustration - How the Problem was Produced

Given a catalog with a library lib1 and cartridge pools pool1 and pool2:

1. Run some backups on pool1.
2. Close the cartridge pool1_0001.
3. Backup the catalog.
4. Make the cartridge pool1_0001 ->Spare. Leave it in the drive.
5. Run a backup using cartridge pool2.
6. Run a tina_init.

Associated Logs:

Troubleshooting Cartridge Label Mismatch Incidents

Is it a hardware issue?
■ Check whether there are errors of type ERR_MAG_PHYS preceding the Label mismatch alarm.
■ Check whether there are system logs.

Is it repeatable?
1. Enable the drive.
2. Empty the drive.
3. Clean the drive.
4. Bring a cartridge into the drive and identify it.

If the same problem keeps happening, move on to the next test

What does the cartridge contain?

Basic Test

Run the tina_cart command to check the cartridge contents.
**Example:** `tina_cart -type "Exabyte Mammoth 2" -device /dev/rmt/c1b0t3u0n -list -skip 0`

The cartridge label should be displayed.

If the `tina_cart` command fails, run the advanced test below.

**Advanced Test**

**Unix:**

Bring a cartridge into the drive and run the following commands:

```bash
mt -f /dev/XXXX rewind
mt -f /dev/XXXX status
dd if=/dev/XXXX bs=1024 of=MyCartridge.dump
```

Ask for the `MyCartridge.dump` file.

**Windows:**

Bring a cartridge into the drive and run the following commands:

```bash
C:\Program Files\Atempo\tina\Bin>qcdiag
(qcdiag) define-tape d0 c3b0t210
(qcdiag) open-tape d0
(qcdiag) tape-status
(qcdiag) rewind
(qcdiag) read c:\test.dump 1024 1
```

**Note**  The version of qcdiag must be 3.7 or higher.

Ask for a copy of the screen.

(The `c:\test.dump` file is not generated)

**How to interprete the result?**

**Unix**

Open the file via a hexadecimal editor (Visual Studio for instance).

**Windows**

1. Open the screen shot.
2. Check whether you can find the following strings:

   - **Time Navigator:** This is a label
   - **TiNa5:** This is a tape file
   - **Neither one:** Can be TiNa, sidf, cpio tape file
The two latter cases indicate a serious problem.

If the cartridge contains a tape file, the cartridge was overwritten. Remove it from the Time Navigator catalog, give the inquiry the Critical status and notify a technical support manager.

On Windows, check that the system driver is disabled.
Example 3: Analysis of a Backup Bottleneck

General Analysis

Seven distinct components can be defined in respect to Time Navigator Backup Architecture and all the processes involved in a backup:

- On the server
  - Time Navigator cache
  - Time Navigator catalog
  - Network
  - Tape Drive
  - Operating system
  - Server load

- On the agent
  - Network
  - Operating system
  - Hard drive
  - Agent load

Thus, when problems arise in backup performance, many components can be involved. Components that can have an influence on backup throughput can be classified as follows:

Analysis of Server Components

Time Navigator Cache

Time Navigator processes access the cache (memory or disk) in write and read mode:

- Write mode when tina_daemon reads data on the network and writes it on the cache (and sends it via the agent)
- Read mode when tina_daemon reads data on the cache to write it on the drive.

The action plan to define if the cache is the bottleneck will gather information about cache activity.

Time Navigator Catalog

The catalog is the heart of the product and many processes write data to it. Catalog bottlenecks can arise from:

- The catalog structure itself (fragmentation, size)
- The hard drive on which the catalog is located.

The action plan will check:

- If there is a disk IO limitation that can explain bad performances throughput
• If catalog fragmentation can be a reason.

**Network**

The network is the basic component in a client/server architecture. **Time Navigator** uses it for local and remote communication processes such as:

• Requesting data from an agent
• Sending meta data lists to define data to be backed-up.

The action plan will check:

• Remote network communication between client/server
• Local network communication
• TCP/IP configuration details such as name resolution, network bloc size, etc.

**Operating System**

In case of a throughput issue the server load can cause problems. The action plan should check if this is the cause of backup slowdown.

**Tape Drive**

The tape drive is the last element in the backup to check as it contains the data after the backup is finished. **Time Navigator** can of course have disk drives as well as tape drives.

The action plan will have to check:

• If the drive is working properly.
• If the hardware chain (motherboard bus, SCSI adapter) allows the required throughput

**Analysis of Agent Components**

**Network**

The network is the basic component in a client/server architecture. **Time Navigator** uses it for local and remote communication processes such as:

• Requesting data from an agent
• Sending meta data lists to define data to be backed-up.

The action plan will check:

• Remote network communication between client/server
• Local network communication
• TCP/IP configuration details such as name resolution, network bloc size, etc.
Operating System

The operating system can be involved in throughput problems in several ways:
- Server load when server is not dedicated
- Filesystem that cannot be accessed

Tape Drive

On the agent there can be throughput problems with the drive when the LAN free option is selected.

The tape drive is the last element in the backup to check as it contains the data after the backup is finished. Time Navigator can of course have disk drives as well as tape drives. The action plan will have to check:
- If the drive is working properly.
- If the hardware chain (motherboard bus, SCSI adapter) allows the required throughput

Action Plan

Introduction

All of the action plans proposed below are the fruit of personal experience. Different support technicians may have other suggestions for analysing throughput issues.

The basic method for solving a problem is to start from the simplest configuration and work up to the more complicated. Attempts are also made to reproduce the problem with system tools to check whether it is linked to Time Navigator or coming from somewhere else. If it is linked to an Atempo product, it is necessary to identify exactly which part of it is causing the problem. As there are many components involved in throughput issues, the action plan needs to check each one of them in turn. It should use a combination of internal tools, system tools and commands to gather information about the behavior of the components under test.

It is also necessary to determine the maximum throughput of the component in question and to explain the results to users.

Time Navigator Cache

Analysis of Cache Activity

The command tina_cache can be used to gather information on cache activity. It will provide much information on every category of process (restore, normal backup or synthetic backup, duplication, archiving and export).
If the customer is just using memory cache, \texttt{tina\_cache} will help to determine which process is involved in the problem:

- \texttt{tina\_daemon} reading data from the network and writing it to the cache (and sending it via the agent)
- Read mode, when \texttt{tina\_daemon} reads data from the cache to write it to the drive.

\textbf{Analysis of Device Used for Time Navigator Disk Cache}

Bottlenecks arising from cache are usually linked to disk cache and to IO limitations on the hard disk. To test whether the problem comes from IO limitations, the command \texttt{sar} can be used.

\textit{Example: output of sar command}

\begin{tabular}{llrrrrrr}
  device & \%busy & avque & R+w/s & Blks/s & avwait & avserv \\
  09/09/2004 20:00 & c50t0d0 & 0.31 & 11.34 & 5 & 77 & 6.74 & 2.06 \\
  09/09/2004 20:10 & c50t0d0 & 30.36 & 8.1 & 346 & 24209 & 10.72 & 8.22 \\
  09/09/2004 20:20 & c50t0d0 & 91.68 & 9.97 & 1036 & 72005 & 12.63 & 8.43 \\
  09/09/2004 20:30 & c50t0d0 & 25.73 & 2.61 & 423 & 24867 & 7.56 & 4.56 \\
  09/09/2004 20:40 & c50t0d0 & 44.29 & 9.83 & 628 & 38939 & 12.21 & 6.34 \\
  09/09/2004 20:50 & c50t0d0 & 82.29 & 8.21 & 909 & 66362 & 12.04 & 8.18 \\
  09/09/2004 21:00 & c50t0d0 & 29.3 & 5.45 & 506 & 29454 & 9.45 & 4.99 \\
  09/09/2004 21:10 & c50t0d0 & 80.91 & 93.69 & 1158 & 63969 & 83.63 & 9.39 \\
\end{tabular}

We can see that the disk c50t0d0 is 91% occupied and has a maximum throughput of 72005 Blk/s. As the unit is 512 bytes per block, we have a maximum throughput of 36MB/s for this disk. Theoretical throughput should be compared to real throughput.

These IO limitations can be improved by modifying:

- The filesystem used
- The SCSI adapter
- The hardware configuration.
- The disk architecture

\textbf{File System Recommendations}

Atempo does not recommend the use of journalized file systems for disk cache. It is thus not advised to configure cache on \texttt{xvfs}, \texttt{ext3}, \texttt{jfs}, \texttt{jfs2}, \texttt{reiserfs}, etc.

- Disk cache and the catalog must be on separate disks.
- Disk cache must not be on the same disk as Pagefile (in Windows environments) or swap partitions (in Unix environments).

\textbf{SCSI Adapter}
On many RAID SCSI adapters, a memory card can be added to improve IO.

**Hardware and/or Disk Configuration**

A lot of components can be modified:
- Disk cache should be defined on different disk axes. There should be at least two. Atempo recommends using 4 disks configured on RAID 0 hardware
- Disk cache can be configured in RAID1, RAID0, RAID0+1. It cannot be configured in RAID 5

**Time Navigator Configuration**

If RAID 0 is used, add in the **Time Navigator parameters** file the following tunable:

```plaintext
parameter:disable_axe_lock=yes
```

**Time Navigator Catalog**

The catalog is the central component of **Time Navigator** and many processes write data to it. Potential bottlenecks arising from the catalog may concern:

- the catalog structure
- the hard drive on which the catalog is located.

The action plan will check:
- whether IO limitations on the disk is diminishing throughput performance
- whether the catalog is fragmented

**Network**

The action plan is to check:

- Remote network communication between client/server
- Local network communication
- TCP/IP configuration details such as name resolution, network bloc size, etc.

**Operating System**

**Analysis of Server Load**

**Analysis of File system**

During a backup, data is read from the hard drive and sent to the tape drive. The operating system and/or the file system can be involve in the problem. As **Time Navigator** reads data at Operating System level (**Time Navigator** does not read data at filesystem or inode level), we can simulate backup with system commands like `tar` and `dd`.
If the customer performs a backup of the file system /my_directory, the results of the following command should be analysed.

```
time tar cvbf 256 - /my_directory | dd of=/dev/my_drive_device bs=128k
```

Why these values?:
- **Time Navigator** reads a 128Kb bloc of data on the hard drive.
- Tar uses 512b blocs by default.
- **Time Navigator** writes a 128Kb bloc of data (minus the label) onto the tape.

The result gives us a basis for **Time Navigator** tests.

**Tape Drive**

**Time Navigator** allows the drive to be connected to the **Time Navigator** server and/or to a storage node agent. Throughput problems can be linked to hardware or system configuration issues.

**Unix Hardware Problem**

We first have to check if the drive can be used at the nominal throughput value.

This can be checked under unix using the following command.

```
time dd if=/dev/zero of=/dev/rmt/0mn bs=128k count=8000
```

This can provide a result like the one below:

```
ROOT:hostname:/tmp > time dd if=/dev/zero of=/dev/rmt/0mn bs=128k count=8000
8000+0 records in
8000+0 records out
dd if=/dev/zero of=/dev/rmt/0mn bs=256k count=4000 0.04s user 2.55s
system 7% cpu 34.629 total
```

Subtracting the time needed to start and stop the command, we have a throughput of 30s for 1GB, so 34MB/s

For an LTO2 drive this is the nominal value with no compression.

With this command we write 1Gb of data. As the device /dev/zero is not linked to the filesystem or the operating system, the time will be very representative of the possible nominal throughput. If the result is below the nominal value, the Operating System parameters should be checked.

**Windows Hardware Problem**

To test the drive, use the Atempo tool qcdiag.
See the example below:

```
f:\Atempo\tina_exploite\Bin>qcdiag
(qcdiag) define-tape drv c0b0t6l0
(qcdiag) open-tape -write drv
(qcdiag) help write
write file block-size count
Write COUNT block of size BLOCK-SIZE from file FILE to media.
Predefine files are available:
- zero file is a source of zeroed unnamed memory (scsi perf.)
- random file is a random number generator (drive perf.)

(qcdiag)
(qcdiag) write zero 1024 1
write 1/1 blocks of 1024 bytes (15 ms)
(qcdiag) write zero 128k 1000
write 1000/1000 blocks of 131072 bytes (3.78M/s)
(qcdiag)
(qcdiag) write random 128k 1000
write 1000/1000 blocks of 131072 bytes (0.75M/s)
```

**Explanation of the result:**
- The connected tape drive was an ARCHIVE Python 06408
  - Normal throughput : 2.75 MB/s
  - Compressed throughput : 5.5 MB/s
- StorageWorks Library and Tape Tools downloaded from HP

**Common Operating System Problems**

On all Operating Systems the following drivers should be checked:
- Scsi/FC adapter driver
- Scsi/FC adapter firmware
- Tape firmware
- Scsi cable

**Appendix**

**Tape Drive Throughput Information**

<table>
<thead>
<tr>
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<th>Native Capacity &amp; Transfer Rate</th>
<th>Compressed Capacity &amp; Transfer Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SDLT 600</strong></td>
<td>300GB at 36MB/s</td>
<td>600GB at 72MB/s</td>
</tr>
<tr>
<td><strong>SDLT 320</strong></td>
<td>160GB at 16MB/s</td>
<td>320GB at 32MB/s</td>
</tr>
<tr>
<td><strong>SDLT 220</strong></td>
<td>110GB at 11MB/s</td>
<td>220GB at 22MB/s</td>
</tr>
<tr>
<td><strong>DLT 8000</strong></td>
<td>40GB at 6MB/s</td>
<td>80GB at 12MB/s</td>
</tr>
<tr>
<td>DLT Tape Drives</td>
<td>Native Capacity &amp; Transfer Rate</td>
<td>Compressed Capacity &amp; Transfer Rate</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>DLT1</td>
<td>40GB at 3MB/s</td>
<td>80GB at 12MB/s</td>
</tr>
<tr>
<td>DLT-VS160</td>
<td>80GB at 8MB/s</td>
<td>160GB at 16MB/s</td>
</tr>
<tr>
<td>DLT-VS80</td>
<td>40GB at 3MB/s</td>
<td>80GB at 6MB/s</td>
</tr>
<tr>
<td>DLT 7000</td>
<td>35GB at 5MB/s</td>
<td>70GB at 10MB/s</td>
</tr>
<tr>
<td>DLT 4000</td>
<td>20GB at 1.5MB/s</td>
<td>40GB at 3MB/s</td>
</tr>
<tr>
<td>DLT 2000XT</td>
<td>15GB at 1.25MB/s</td>
<td>30GB at 2.5MB/s</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LTO Drives</th>
<th>Native Capacity &amp; Transfer Rate</th>
<th>Compressed Capacity &amp; Transfer Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTO Tape Drives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HP Ultrium 460</td>
<td>200GB at 30MB/s</td>
<td>400GB at 60MB/s</td>
</tr>
<tr>
<td>HP Ultrium 230</td>
<td>100GB at 15MB/s</td>
<td>200GB at 30MB/s</td>
</tr>
<tr>
<td>IBM LTO-2</td>
<td>200GB at 35MB/s</td>
<td>400GB at 70MB/s</td>
</tr>
<tr>
<td>IBM LTO-1</td>
<td>100GB at 15MB/s</td>
<td>200GB at 30MB/s</td>
</tr>
<tr>
<td>Seagate LTO-1</td>
<td>100GB at 16MB/s</td>
<td>200GB at 32MB/s</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AIT Drives</th>
<th>Native Capacity &amp; Transfer Rate</th>
<th>Compressed Capacity &amp; Transfer Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIT-3</td>
<td>100GB at 12MB/s</td>
<td>260GB at 31.2MB/s</td>
</tr>
<tr>
<td>AIT-2</td>
<td>50GB at 6MB/s</td>
<td>130GB at 12MB/s</td>
</tr>
<tr>
<td>AIT-1</td>
<td>35GB at 4.0MB/s</td>
<td>90GB at 10.4MB/s</td>
</tr>
<tr>
<td>SAIT</td>
<td>500GB at 30MB/s</td>
<td>1.2TB at 78MB/s</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9X40 Drives</th>
<th>T9840 and T9940 Tape Drives</th>
</tr>
</thead>
<tbody>
<tr>
<td>T9840</td>
<td>HVD/ FC</td>
</tr>
<tr>
<td>T9840B</td>
<td>E/ FC/ FICON</td>
</tr>
<tr>
<td>T9840C</td>
<td>E/ FC/ FICON</td>
</tr>
<tr>
<td>T9940A</td>
<td>HVD/ E/ FC</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Drive Type</th>
<th>Cartridge Capacity Native / Compressed</th>
<th>Drive Throughput Native / Compressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>T9940B</td>
<td>FC/ VSM 200GB @ 30MB/s</td>
<td></td>
</tr>
</tbody>
</table>

### SLT Drives

#### SLR Tape Drives

<table>
<thead>
<tr>
<th>Drive Type</th>
<th>Native Capacity &amp; Transfer Rate</th>
<th>Compressed Capacity &amp; Transfer Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLR100</td>
<td>50GB at 18GB/hr</td>
<td>100GB at 36GB/hr</td>
</tr>
<tr>
<td>SLR60</td>
<td>30GB at 14GB/hr</td>
<td>60GB at 28.8GB/hr</td>
</tr>
<tr>
<td>SLR50</td>
<td>25GB at 7.2GB/hr</td>
<td>50GB at 14.4GB/hr</td>
</tr>
<tr>
<td>SLR7</td>
<td>20GB at 10.8GB/hr</td>
<td>40GB at 21.6GB/hr</td>
</tr>
<tr>
<td>SLR5</td>
<td>4GB at 380KB/s</td>
<td>8GB at 560KB/s</td>
</tr>
<tr>
<td>SLR4</td>
<td>2.5GB at 300KB/s</td>
<td>2.5GB at 600KB/s</td>
</tr>
<tr>
<td>SLR3</td>
<td>1.2GB at 300KB/s</td>
<td></td>
</tr>
</tbody>
</table>

### VXA Drives

#### VXA Tape Drives

<table>
<thead>
<tr>
<th>Drive Type</th>
<th>Native Capacity &amp; Transfer Rate</th>
<th>Compressed Capacity &amp; Transfer Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>VXA-2</td>
<td>80GB at 21GB/hr</td>
<td>160GB at 42GB/hr</td>
</tr>
<tr>
<td>VXA-1</td>
<td>33BG at 10GB/hr</td>
<td>66BG at 20GB/hr</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drive Type</th>
<th>Cartridge Capacity Native / Compressed</th>
<th>Drive Throughput Native / Compressed</th>
<th>Data Buffer_MB</th>
<th>File access time_seconds</th>
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<tbody>
<tr>
<td>LTO-2*</td>
<td>200 / 400 35 / 70</td>
<td>64</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>LTO-1*</td>
<td>100 / 200 15 / 30</td>
<td>32</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>SDLT 320</td>
<td>160 / 320 16 / 32</td>
<td>64</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>SDLT 220</td>
<td>110 / 220 11 / 22</td>
<td>32</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>DLT 8000</td>
<td>40 / 80 6 / 12</td>
<td>8</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>AIT-3</td>
<td>100 / 260 12 / 31</td>
<td>18</td>
<td>27</td>
<td></td>
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<tr>
<td>AIT-2</td>
<td>50 / 130 6 / 15.6</td>
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<td>27</td>
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</tr>
<tr>
<td>3590 H1A</td>
<td>60 / 180 14 / 42</td>
<td>16</td>
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<table>
<thead>
<tr>
<th>SCSI Type</th>
<th>Bus Speed. MB/sec.</th>
<th>Bus Width</th>
<th>Max Bus Length (meters)</th>
<th>Max. Devices Supported</th>
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<tbody>
<tr>
<td>Narrow</td>
<td>5</td>
<td>8</td>
<td>6</td>
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</tr>
<tr>
<td>Fast</td>
<td>10</td>
<td>8</td>
<td>3</td>
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</tr>
<tr>
<td>Fast Wide</td>
<td>20</td>
<td>16</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Ultra</td>
<td>20</td>
<td>8</td>
<td>1.5</td>
<td>-</td>
</tr>
<tr>
<td>Ultra</td>
<td>20</td>
<td>8</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Wide Ultra</td>
<td>40</td>
<td>16</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wide Ultra</td>
<td>40</td>
<td>16</td>
<td>1.5</td>
<td>-</td>
</tr>
<tr>
<td>Wide Ultra</td>
<td>40</td>
<td>16</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Ultra2</td>
<td>40</td>
<td>8</td>
<td>-</td>
<td>12</td>
</tr>
<tr>
<td>Wide Ultra2</td>
<td>80</td>
<td>16</td>
<td>-</td>
<td>12</td>
</tr>
<tr>
<td>Ultra160</td>
<td>160</td>
<td>16</td>
<td>-</td>
<td>12</td>
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<td>Ultra320</td>
<td>320</td>
<td>16</td>
<td>-</td>
<td>12</td>
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### Ultra DMA Throughput

<table>
<thead>
<tr>
<th>UDMA Mode</th>
<th>MBs</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode 0</td>
<td>16.7</td>
<td>ATA/ATAPI-4</td>
</tr>
<tr>
<td>Mode 1</td>
<td>25.0</td>
<td>ATA/ATAPI-4</td>
</tr>
<tr>
<td>Mode 2</td>
<td>33.3</td>
<td>ATA/ATAPI-4</td>
</tr>
<tr>
<td>Mode 3</td>
<td>44.4</td>
<td>ATA/ATAPI-5</td>
</tr>
<tr>
<td>Mode 5</td>
<td>100.0</td>
<td>ATA/ATAPI-5</td>
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</tbody>
</table>

### SCSI and ATA Comparisons

<table>
<thead>
<tr>
<th></th>
<th>Parallel ATA</th>
<th>USB 2.0</th>
<th>FireWire 800 IEEE 1394</th>
<th>Serial ATA</th>
<th>SCSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectivity</td>
<td>Internal</td>
<td>External</td>
<td>External</td>
<td>Internal</td>
<td>Internal</td>
</tr>
<tr>
<td>Market</td>
<td>storage</td>
<td>storage</td>
<td>storage</td>
<td>and</td>
<td>and</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>External</td>
<td>storage</td>
</tr>
<tr>
<td>Cost comparison</td>
<td>Base</td>
<td>&gt; Parallel</td>
<td>&gt; Parallel</td>
<td>= Parallel</td>
<td>&gt; Parallel</td>
</tr>
<tr>
<td>Speed</td>
<td>100</td>
<td>60</td>
<td>100</td>
<td>150</td>
<td>160</td>
</tr>
<tr>
<td>Bootable (Win)</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Parallel ATA</td>
<td>USB 2.0</td>
<td>FireWire 800 IEEE 1394</td>
<td>Serial ATA</td>
<td>SCSI</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------</td>
<td>---------</td>
<td>------------------------</td>
<td>------------</td>
<td>------</td>
</tr>
<tr>
<td>Bootable (OS X)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Hot Pluggable</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Cable Lgth (m)</td>
<td>.45</td>
<td>6 (per link)</td>
<td>4.5 (per link)</td>
<td>1</td>
<td>12</td>
</tr>
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</table>
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CHAPTER 8

Calling Customer Support

Atempo Support Coverage

Atempo Technical Support offers 3 levels of support:

- Standard support (9am - 6 pm local time)
- Extended support (7am - 8 pm local time)
- 7 x 24 global support

These services are extensively described in the support agreement each customer has signed with Atempo.

Support services are either provided directly by Atempo or through partners that have been certified by Atempo. You can get information on your support provider by calling either Atempo or your partner.
Maintenance Agreements

As soon as a customer is covered by Atempo support, either directly or from its partner, the following services are available:

- **Time Navigator** Software updates and maintenance releases
- Access to Atempo Web support (http://support.atempo.com/) for which you have or will receive a login and password
- Access to **Time Navigator** Release Notes
- Access to Atempo hotline
- Access to **Time Navigator** patches
How to Contact Atempo Technical Support

Method 1: Open an Inquiry with Atempo by Email

**US:**

Email information to

[techsupport@atempo.com](mailto:techsupport@atempo.com)

Attach the results of the command `tina_env_report.sh` to the email.

**Asia and Europe:**

Email information to

[support@atempo.com](mailto:support@atempo.com)

Attach the results of the command `tina_env_report.sh` to the email.

Method 2: Open an Inquiry with Atempo by Phone:

Call Atempo support via phone

**US and Canada, Americas:**

+1 866 417 0200 "Press 3" for Support Menu

**Asia:**

+ 1 866 417 0200 "Press 3 for the support menu

**Europe:**

+33 1 64 86 83 83

Please have the following information ready:

- **Time Navigator** version (e.g. 3.7.0.3 P 1270)
- Type of system (IRIX, Linux …)
- Time Navigator Environment Report (generated by the tina_env_report.sh script)

Method 3: Open an Inquiry with Atempo via the Web

**Note** This method is required for First Level 1 partners.

1. Go to Atempo Support website at

   http://www.atempo.com/support/web_support.php

2. Enter your username and password.
   If you do not yet have a username and password, go to

   http://support.atempo.com/customer_access/custaccess_request.php

   and fill out the request form.

3. Follow the on-screen prompts.
4. Select Inquiry Tracking
5. Select your company name
6. Select New Inquiry

**Please have the following information ready:**

- Time Navigator version (e.g. 3.7.0.3 P 1270)
- Type of system (IRIX, Linux ...)

Refer to document Web Support Guide for Partners for a complete description.
What Technical Information to Send to Atempo for Reporting a Problem

Atempo provide you a tool **Time Navigator Environment Reporter** designed to help you collect technical information on your backup architectures. In order to improve the processing time of your calls to the Support Department, we recommend you use this tool each time you open a new request.

This tool gathers all required technical data in one file that can then be sent to the email indicated above.

You can find the latest version of **Time Navigator Environment Reporter** at the following ftp address:

**Unix:**


**Windows:**


Please refer to the procedure at the following address:


The use of **Time Navigator Environment Reporter** is described in this document as well (refer to Atempo Troubleshooting Tools, “tina_env_report”, page 44).
Appendix A SOFTWARE LICENSE AND MAINTENANCE AGREEMENT

This Software License and Maintenance Agreement n° …………………………. is entered into by and between:

Atempo SA, a French société anonyme, whose registered office is located at Les Boréales, 2 avenue de Laponie, 91951 Courtaboeuf Cedex, France, represented by ________, in his capacity as _____________ ("Atempo"),

And

Licensee, as described and defined in the Order ("Licensee")

THE PARTIES HAVE AGREED AS FOLLOWS:

SECTION 1 - DEFINITIONS

"Additional Services" means services which Licensee may choose to order, as described in Section 5 below and Appendix 2 to this Agreement.

"Agreement" means this Software License and Maintenance Agreement including all appendices thereto and all Orders referring to the Software License Agreement.

"Documentation" shall mean a functional description of the Software, directions for installation, verification of installation and use of the Software, and any other explanatory material necessary for a user to perform all of the functions of the Software.

"Maintenance Services" means the maintenance and support services provided by Atempo, as described in Section 4 below and Appendix 1 to this Agreement.

"Order" means any order issued by Licensee in the form provided for in Appendix 4 to this Agreement and indicating the licensed Software and Maintenance Services and/or of Additional Services (if any).

"Software" means (a) Atempo software products, in object code form only, listed in the applicable Order under this Agreement and for which the fees have been paid by Licensee, (b) any error correction and update provided by Atempo hereunder, and (c) related Documentation. The Software requires a valid license key, which is available only from Atempo.
SECTION 2 - PURPOSE

Atempo grants and provides to Licensee, which accepts, a limited right and license to use the Software under the conditions and within the limits specified under Section 3 hereof and related Maintenance Services, subject to Licensee’s compliance with the terms and conditions of this Agreement.

SECTION 3 - LICENSE GRANT

3.1 License Grant. Atempo grants to Licensee a personal, non-exclusive, non-transferable license, without the right to sublicense, to use the Software only for Licensee’s internal use. This license to use the Software is expressly limited to those hardware and software platforms, number of processors, hardware and software architectures, functionalities, storage capacities, and servers specified in the Order issued by Licensee and accepted by Atempo. Licensee acknowledges and agrees that its license to use the Software is also limited to that part of the Software that is accessible through the license key.

3.2 License Restrictions. The rights of Licensee in the Software are limited to those expressly granted in Section 3.1 below. Atempo reserves all other rights, title and interest in and to the Software which are not expressly granted to Licensee under this Agreement. In particular, Licensee shall have no right to: (i) reproduce the Software, except for one (1) back-up copy, which may not be used unless the version from which it was copied is damaged or destroyed; (ii) assign, transfer, sublicense or otherwise distribute the Software to any third party; (iii) correct, modify, adapt or translate the Software; (iv) provide the Software or make its functionalities available to third parties as an application services provider or service bureau, or by hosting, time sharing or providing similar types of services; or (v) develop its own license keys or attempt to bypass or otherwise defeat the license keys for the Software.

3.3 Ownership of Software. The Software and all intellectual property rights therein are and will remain the sole and exclusive property of Atempo and its licensors. Licensee will reproduce the intellectual property rights notices of Atempo and its licensors on any copy of the Software, and shall not alter, remove or obscure such notices.

3.4 Source Code. Licensee does not acquire any right to source code of the Software. Subject to the provisions of Article L. 122-6-1 of the French Code of Intellectual Property, Licensee agrees not to disassemble, decompile or reverse engineer the Software, or otherwise attempt to gain access to the source code of the Software, or permit any third party to do so.

SECTION 4 - MAINTENANCE SERVICES

Atempo shall provide Maintenance Services to Licensee as specified in the applicable Order. Access to Maintenance Services and applicable service levels requires that Licensee has signed an Order accepted by Atempo before Licensee starts using the Software. Service levels are described in Appendix 1.
4.1 Maintenance Services.

Maintenance Services shall include:

a) Maintenance of the Software in substantial compliance with the Documentation. Atempo shall make its reasonable endeavors to achieve such compliance through implementation of a workaround, temporary or not, or by advising Licensee of the conditions and restrictions applicable to the use of the Software;

b) Access to Atempo technical personnel to respond to Customer reported Problems with the Software;

c) Correction, to the extent commercially reasonable, of any material bugs or failures by offering patches or maintenance releases;

d) Supply of upgrades of the Software to Licensee, provided however (i) that Licensee is responsible for ensuring that said upgrades and/or new releases are compatible with its software and its environment, and (ii) migration services to implement the upgrades and new versions are provided separately and not included within Maintenance Services.

All contact persons of Licensee accessing the Maintenance Services must have followed the training course relating to the use of the Software at Atempo premises. These services are available from Atempo upon request.

4.2 Exclusions.

Any problems and questions related to the following are expressly excluded from the Maintenance Services:

a) With respect to the use and operation of the Software:
   - alteration of the Software by any person other than Atempo and its designated representatives;
   - use of obsolete versions of the Software (meaning any version of the Software that is not referenced in the then current version of the Atempo compatibility guide) in the configuration (the product, the library, the drives and non-supported operating system or non-available applications, etc.);
   - use of equipment or accessories not listed in the Documentation;
   - use or operation of the Software not in compliance with the specifications set out in the relevant Documentation;
   - use or operation of the Software in an environment different from that set out on the Order and/or in the Atempo compatibility guide then in effect;
   - repair of damage resulting from accident, negligence, failure of related equipment or from any other cause not attributable to Atempo.

b) Services carried out outside access times selected by Licensee.

c) Maintenance of Software if the version in use is not in the Atempo compatibility guide then in effect;
d) Provision of services ordered under a separate agreement or of Additional Services;

e) Migration services from a prior version of the Software to the current version of the Software;

f) Supply of new features that are provided with a new version of the Software;

g) Eradication of problems, bugs or errors caused by alteration of the Software by Licensee or by a third party without Atempo having expressly and specifically approved said alteration;

h) The consequences of breakdowns, critical situations, blockages and loss of operating time attributable to Licensee, in particular as regards accidental loss of files or data, or in relation to the operation of the system. Licensee shall be responsible for taking such steps and safeguards for the avoidance of any data, file or program loss as are required (including regular back-ups), taking into account the value attributed to such data, file or program and the potential cost of reconstruction of the same.;

i) In general, all services not described herein (e.g., any adaptations, extensions or improvements of the Software that may be desired by Licensee).

**SECTION 5 - ADDITIONAL SERVICES**

Atempo may provide Additional Services to Licensee as described in Appendix 2 upon issuance by Licensee of an Order to that effect. Additional Services may include any of the following:

- installation services related to the implementation of the Software or of new features;
- training services relating to the use of the Software;
- technical assistance;
- on-site maintenance services;
- consulting services;
- customer service account management (CSAM);
- migration services from prior version of the Software to the current version.

**SECTION 6 - ORDERS AND ACCEPTANCE**

Licensee orders Software licenses or Maintenance Services or other services under this Agreement by submitting an Order to Atempo. All Orders shall be subject to Atempo acceptance. Atempo may manifest its acceptance by signing the applicable Order, by shipping the Software or delivering a license key to the Software, or by delivering the ordered services. All Orders under this Agreement are firm and may not give rise to cancellation, return, refund or offset unless the parties specifically agree otherwise in writing.
SECTION 7 - FEES - PAYMENT TERMS

The applicable fees, payable by Licensee to Atempo, are set forth in Appendix 3. All fees are tax exclusive and do not include any applicable shipment, delivery, installation, traveling, accommodation or other costs or expenses, which will be invoiced separately.

Payments shall be made within thirty (30) days as from the date of invoice and must, for Maintenance Services, be paid before the new maintenance period starts. Any amounts unpaid when due will automatically as of right bear late interests at a rate of 1% per month. In addition, Licensee agrees to pay all costs of collection.

SECTION 8 - AUDIT

Upon at least thirty (30) days notice, Atempo may audit Licensee during regular business hours to confirm that Licensee's use of the Software is in compliance with the terms of this Agreement.

SECTION 9 - CONFIDENTIALITY

Licensee acknowledges that it will receive information and materials (including the Software) from Atempo and that all such information and materials, including, without limitation, the existence and content of this Agreement, are and will be confidential and proprietary information of Atempo ("Confidential Information"). However, Confidential Information will not include any information that (i) is received by Licensee from a third party without restriction on use or disclosure, (ii) Atempo gives to third parties without restriction on use or disclosure, (iii) is already in the public domain, or (iv) is previously known to the Licensee or independently developed by Licensee without reference to or use of Atempo Confidential Information and without breach of any confidentiality obligation.

For the term of this Agreement and ten (10) years following termination or expiration of this Agreement, Licensee agrees to hold all such Confidential Information in confidence, and not to disclose it to others or use it except for the purposes of this Agreement.

SECTION 10 - WARRANTY

10.1 Limited Warranty. Atempo warrants to Licensee that, for a period of ninety (90) days following delivery of the Software to Licensee, the Software will perform in all material respects in accordance with its published Documentation. Licensee shall report any warranty claims to Atempo during such ninety-day period. Atempo and its licensors disclaim all other express or implied warranties and representations relating to the Software. In particular, Atempo and its licensors do not warrant that the Software will be error free or will meet Licensee’s needs.
10.2 Exclusive Remedies. As Licensee’s sole and exclusive remedy under this warranty, Atempo will, at its option and expense: (i) promptly replace or correct any defective Software or media; or (ii) furnish Licensee with a reasonable procedure to circumvent the defect; or (iii), if Atempo is unable to do either of the foregoing, refund to Licensee the license fees paid by Licensee for the defective Software, provided Licensee returns such defective Software to Atempo within the warranty period.

10.3 Exclusions. These limited warranties shall not apply if (i) the Software is licensed under an evaluation license; (ii) the Software is used in conjunction with hardware or software other than those specified in the Documentation; or (iii) Licensee is not using the most current version of the Software. No warranties whatsoever are made by Atempo to any third party.

SECTION 11 - INFRINGEMENT INDEMNIFICATION

Atempo will defend at its own expense any action brought against Licensee which is based on a claim that the Software infringes or violates any intellectual property right of any third party, and will pay all costs and damages finally awarded against Licensee in any such action or agreed by Atempo in any settlement, provided however that Licensee (i) promptly notify Atempo in writing of the claim; (ii) grant Atempo sole control of the defense and settlement of the claim; and (iii) provide Atempo, at Atempo’s expense, with all assistance and information reasonably required for the defense and settlement of the claim.

Should the Software give rise, or in Atempo opinion be likely to give rise to any such claim, Atempo shall, at its option and expense, either:
(i) procure for Licensee the right to continue using such Software, or
(ii) replace or modify the Software so that it becomes non infringing, or
(iii) terminate all or part of this Agreement with respect to such Software and refund to Licensee an amount equal to the unamortised portion of the license fees paid by Licensee to Atempo for such Software, based upon a five (5) years straight-line depreciation with a commencement date as of the respective delivery date of the applicable copy of the Software.

Any indemnification by Atempo under this Section is excluded if the claim is based upon a modified version of the Software or its combination, operation or use with software not furnished by Atempo. The foregoing is subject to the provisions of this Agreement and states the entire liability of Atempo and the exclusive remedy of Licensee with respect to such infringement of third parties’ intellectual property rights.

SECTION 12 - LIMITATION OF LIABILITY
Neither Atempo nor any Atempo licensor shall be liable for any indirect damage or loss suffered by the other party, nor for any intangible loss, or consequential, special or punitive damages such as loss of profits, loss of benefits, loss of use, loss or corruption of data, loss of clientele, or costs of procuring substitute products or services arising out of, or in connection with this Agreement or the use or performance of the Software or Maintenance or Additional Services. In no event will the aggregate liability of Atempo under this Agreement exceed the payments actually received by Atempo for the Software during the twelve (12) months prior to the date of the event giving rise to such liability.

Licensee acknowledges that in case of an infringement of the intellectual property rights of Atempo licensors on the Software, including without limitation any breach of the license granted under this Agreement, Atempo licensors may directly bring claims against Licensee.

SECTION 13 - RESTRICTIONS ON EXPORT

Licensee will comply with all applicable export and import control laws and regulations in its use of the Software and, in particular, Licensee will not export or re-export the Software without all required government licenses. Licensee will defend, indemnify, and hold harmless Atempo from and against all fines, penalties, liabilities, damages, costs, and expenses incurred by Atempo as a result of any violation of such laws or regulations by Licensee or any of its agents or employees.

SECTION 14 - TERM AND TERMINATION

14.1 Term of the Software License. Each Software license granted hereunder shall come into effect at the date of execution of the relevant Order by the parties and remain in effect for the time period specified in the Order (except if terminated by Atempo for a breach of the Agreement by Licensee).

14.2 Term of the Maintenance. The Maintenance Services shall come into effect at the date of execution of the relevant Order by the parties for an initial term of one (1) year, tacitly renewable for successive one (1) year periods. Either party may terminate all or part of the Maintenance Services upon three (3) months notice at each anniversary date of this Agreement. Any termination of the Maintenance Services shall not affect the term of this Agreement with respect to the Software license.

14.3 Termination for Cause. Either party may terminate this Agreement or any Software License automatically as of right and immediately if the other party breaches any material term of this Agreement (including without limitation any term relating to the grant of license, payment or confidentiality), if such breach is not cured within thirty (30) days from the receipt of a written notice to that effect.
14.4 Consequences of Termination. Upon any termination of this Agreement by either party: (i) all Software licenses granted by Atempo hereunder will automatically cease; (ii) Licensee will immediately stop using the Software and will promptly return to Atempo all copies of the Software and all related Documentation; and (iii) each party will promptly return to the other all of the other party’s Confidential Information in its possession or control and permanently erase all electronic copies of such Confidential Information. Termination of Maintenance Services does not terminate whole agreement.

SECTION 15 - GENERAL PROVISIONS

15.1 Non-solicitation. Neither party shall, directly or indirectly, solicit for employment any employee of the other party, during the performance of this Agreement and for one (1) year following termination or expiration of this Agreement. Any breach to this provision shall entitle the payment of an indemnity to the injured party, which shall not be inferior to one (1) times the gross annual salary of the solicited employee.

15.2 Assignment. Licensee may not assign or transfer this Agreement, in whole or in part, by operation of law or otherwise, without the express prior consent of Atempo.

15.3 Severability. If for any reason a court of competent jurisdiction finds any provision of this Agreement invalid or unenforceable, such provision will be enforced to the maximum extent and the other provisions of this Agreement will remain in full force and effect.

15.4 Notices. All notices required or permitted under this Agreement will be made in writing and delivered by courier, overnight delivery services or by registered mail with acknowledgement of receipt.

15.5 Entire Agreement. This Software License and Maintenance Agreement (including its Annexes) and the Order (together the "Agreement") together constitute the complete and exclusive understanding and agreement between the parties regarding its subject matter and supersedes all prior or contemporaneous agreements or understandings, written or oral, relating to its subject matter. This Agreement will supersede any click-wrap license and maintenance agreement relating to the Software, that Licensee may have accepted prior to or after the execution of this agreement in order to be able to use the Software. Any waiver, modification or amendment of any provision of this Agreement will be effective only if in writing and signed by duly authorized representatives of each party. In the event of a dispute regarding the interpretation, enforcement, or performance of the Agreement, the Order will prevail upon the Software License and Maintenance Agreement.

SECTION 16 - GOVERNING LAW AND JURISDICTION

This Agreement is governed by and construed in accordance with the laws of France. Any dispute or action arising under this Agreement will be brought exclusively before the Paris courts, notwithstanding plurality of defendants or introduction of third parties.
Appendix 1: MAINTENANCE SERVICES

1. Access Methods and Timetable for Atempo Maintenance Services

- Accessing Maintenance Services

1) Atempo Website: http://support.atempo.com

2) Atempo European support center:
   • By telephone: + 33 (0) 825 800 996
   • By mail: support@Atempo.com

- Timetable for telephone support

<table>
<thead>
<tr>
<th>Description</th>
<th>Reference Item</th>
<th>Access time to engineers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Services</td>
<td>EH0</td>
<td>Monday - Friday 9 a.m.-6 p.m. CET</td>
</tr>
<tr>
<td>Extended Services</td>
<td>EH1</td>
<td>7 days - 7 a.m.-8 p.m. CET</td>
</tr>
<tr>
<td>Premium Services</td>
<td>EH2</td>
<td>24x7</td>
</tr>
</tbody>
</table>

CET refers to Central European Time

2. Service Levels

a) Definitions
An "Action Plan" shall mean a plan that identifies the Licensee, contains a problem statement (including a clear description of the problem the Licensee has encountered), describes the impact of the problem to the Licensee, and clearly defines the goals, actions, time frames and responsible individuals to deliver a Problem Resolution.

A "Problem Resolution" shall mean any of the following:

- the reported problem is corrected by replacing the malfunctioning Software;
- a solution has been generated in the form of a tested "patch" or a new image or a new revision that corrects the problem without causing additional problems, the solution was delivered to the Licensee, was successfully installed, the solution is working, and the call closed;
- the problem and its cause has been identified, however, a correction was not generated because Licensee and Atempo have agreed that a preliminary analysis of the correction indicates that a correction may cause unknown and/or serious regressions or subsequent problems due to constraints in the design and/or implementation of the affected Software;
- Licensee and Atempo agree that the Software conforms in material respects to design specifications or the Documentation and need not be changed;
- the Software conforms in material respects to design specifications or the Documentation, and Licensee and Atempo jointly agree that the problem report will be treated as a request for new features, functionality or enhancements and will be considered for future implementation;
- the Software conforms to design specifications and will not be changed, but the problem exists in the Documentation and the appropriate Documentation will be clarified;
- the problem has only occurred once and the Licensee agrees that adequate time and effort has been expended and that the problem could not be reproduced;
- a workaround is delivered to and accepted by the Licensee as a final solution and the call closed;
- Licensee and Atempo agree that Atempo will correct the problem in a future release of the Software when Licensee and Atempo have determined that the problem cannot be economically or feasibly resolved and requires a redesign of the Software or rewrite of the segment of code or image and the Licensee has been notified of this action;
- Licensee and Atempo jointly concur that further effort is not warranted; or
- Licensee and Atempo agree that the Software does not cause the problem.

a) Priorities

In order to be solved under the Maintenance Services, a problem shall be reproducible at the time Licensee reports the problem by telephone.

Priorities are defined jointly between Licensee and Atempo.

The actions and level of effort are associated to the access time subscribed to. For instance, what is referenced as a continuous effort in the rest of the text means continuous effort within the access time; in the case of standard services, continuous effort will apply to the period 9am - 6pm CET.

All time periods run from the moment the matter is first reported by telephone.
i) Critical: A Critical problem is a problem that severely impacts the Licensee's ability to conduct business. This means that the Licensee's systems and/or the Software are down or not functioning and no procedural workaround exists.

Atempo's support organization will respond directly to the Licensee’s service delivery organization within one (1) hour following receipt of the call from the Licensee’s service delivery organization. Atempo and Licensee will develop an Action Plan within four (4) hours following receipt of the call.

When working on a Critical problem, the objective is to get the Licensee back on line by whatever means within 24 hours and to downgrade the problem severity accordingly. Efforts to isolate, diagnose, and deliver a work-around or repair to a Critical problem shall require continuous presence and feedback from the Licensee. Continuous phone contact and progress updates are part of the action plan. These progress updates should be according to the Action Plan until the problem severity is reduced. When the severity level has been changed to Major or Medium, the appropriate guidelines should be followed.

ii) Major: A Major problem is a high-impact problem in which the Licensee's operation is disrupted but there is capacity to remain productive and maintain necessary business-level operations. The problem may require a fix be installed on the Licensee’s system prior to the next planned commercial release of the Software.

Atempo support organization will respond to the Licensee service delivery organization within four (4) hours following receipt of the call from the Licensee service delivery organization during normal business hours otherwise on the next business day.

Efforts to isolate, diagnose, and deliver a work-around or repair to a Major problem shall be continuous during business hours (Monday through Friday, 9am - 6pm). Specific implementation should be agreed between Licensee and Atempo on a case-by-case basis and documented in an Action Plan within 12 hours measured in access time after receipt of the call by Atempo. The frequency that Atempo shall provide status updates shall be as mutually agreed. The objective is to have a solution and/or fix to the Licensee within an average of 20 days.

iii) Medium: A Medium problem is a medium impact problem that involves partial loss of non-critical functionality. The problem impairs some operations but allows the Licensee to continue to function. This may be an issue with limited loss or no loss of functionality or impact to the Licensee’s operation. This includes Documentation errors.

Atempo support organization will respond to the Licensee service delivery organization within eight (8) hours, measured in access time, after receipt of the call by Atempo.

When working a Medium problem, the objective is to get the Licensee a fix to the problem in the next release or a statement describing the disposition of the problem. Action should be appropriate to the nature of the escalation. Efforts to isolate and resolve the problem shall be as agreed to in the Action Plan or a minimum of Monday through Friday during normal business hours (9am - 6pm CET).
iv) Low: The designation Low problem or No Impact will be assigned to general usage questions, or to modifications and calls that are passed to Atempo for information purposes. There is no impact on the quality, performance or functionality of the Software.

Atempo’s support organization will respond in a manner appropriate to the nature of the call.

If Licensee’s sole reason for making a Low Problem/No Impact call is to submit a draft symptom/solution article for consideration by Atempo, Atempo will respond to the submission and, if appropriate, will provide a reviewed and edited copy of the submission and a recommendation for its disposition.

c) Response time matrix

<table>
<thead>
<tr>
<th>Severity Level</th>
<th>ATEMPO Response Requirements</th>
<th>Joint ActionPlan</th>
<th>Status Update</th>
<th>Interim FixTarget</th>
<th>ResolutionTarget</th>
<th>Level of Effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical</td>
<td>Within 1 hour</td>
<td>Within hours</td>
<td>4 Per Plan</td>
<td>Action</td>
<td>Within 24 hours,</td>
<td>Continuous effort until Interim Fix</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>fix problem or provide workaround. Work to downgrade to severity Major</td>
<td></td>
</tr>
<tr>
<td>Major</td>
<td>Within 4 hours local time; otherwise next business day.</td>
<td>Within hours</td>
<td>12 Per Plan</td>
<td>Action N/A</td>
<td>Provide a solution/fix within an average of 20 days</td>
<td>As agreed to in Action Plan or a minimum of local time continuous effort</td>
</tr>
<tr>
<td>Medium</td>
<td>Within 8 hours local time Mon-Fri (9am-6pm CET) or otherwise next business day.</td>
<td>Within 10 hours</td>
<td>10 Per Plan</td>
<td>Action N/A</td>
<td>Next release or a statement regarding the disposition of the problem</td>
<td>As agreed to in Action Plan or a minimum of Mon-Fri 9am-6pm CET</td>
</tr>
<tr>
<td>Low/No Impact</td>
<td>Engineering reviews and provides response within 30 days of the escalation.</td>
<td>N/A</td>
<td>Within an average of 30 6pm CET days, provide a statement regarding disposition of the problem</td>
<td>Mon-Fri 9am-6pm CET</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(*) Time frames defined are desired goals based on Atempo commercially reasonable best efforts and are initiated upon receipt of the escalation by Atempo.

The periods specified in hours and level of effort are associated to the access times subscribed to, except for the Medium and Low priorities, which in all cases correspond to standard times. All time periods run from the moment the matter is first reported by telephone.
Appendix 2: ADDITIONAL SERVICES

1. The following Additional Services may be provided to Licensee:

a) Installation Services

[TO BE COMPLETED IF NECESSARY - description, man-days, price, location,…]

b) Training Services

[TO BE COMPLETED IF NECESSARY - description, man-days, price, location,…]

c) Technical Assistance

[TO BE COMPLETED IF NECESSARY - description, man-days, price, location,…]

d) On-Site Maintenance Services

[TO BE COMPLETED IF NECESSARY - description, man-days, price, location,…]

e) Consulting Services

[TO BE COMPLETED IF NECESSARY - description, man-days, price, location,…]

f). Customer Support Account Management (CSAM)

[TO BE COMPLETED IF NECESSARY - description, price, location,…]

g). Migration services between major versions of the Software

[TO BE COMPLETED IF NECESSARY - description, man-days, price, location,…]

2. Intellectual Property

If Licensee requests modifications, changes or updates to the Software from Atempo, Atempo may implement such requests in its sole discretion and shall own all rights in the resulting developments. Such specific developments will be invoiced separately.
3. Atempo Personnel

The personnel of Atempo allocated to carry out the services on Licensee’s premises shall adapt to the reasonable working hours, internal policies and procedures and to the health and safety rules in effect on Licensee premises.

Atempo personnel allocated shall, in all cases, remain under the hierarchical and disciplinary authority of Atempo. Atempo undertakes to comply with applicable laws.

Appendix 3: PRICE LIST

Software

[TO BE COMPLETED]

Maintenance

<table>
<thead>
<tr>
<th>Description</th>
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</tr>
<tr>
<td>Premium Services</td>
<td>EH2</td>
<td>24x7</td>
</tr>
</tbody>
</table>

Standard Services: 15% of the list price of the licenses
Extended Services: 20% of the list price of the licenses
Premium Services (24x7): 25% of the list price of the licenses
Appendix 4: ORDER FORM

This Order is issued and governed by the terms and conditions of the Agreement n° ............
This Order is issued to Atempo by:

___________, a _________ company with a share capital of __________, registered with the
Trade and Companies Register of _______ under number ________, whose registered office
is located at __________,b represented by __________, in his/her capacity as
______________ ("Licensee")

SECTION I - SOFTWARE

This Order for Software License and Maintenance Services covers the following Software (restrictively):

- Name of Software:

- Version:

- Number of licences:

- Geographical Site(s) of use:

- Term of License:

- Perimeter of License: (Users, CPUs, Data volume, time, other, …)

- License Fees:
SECTION II - MAINTENANCE ACCESS TIMES SUBSCRIBED BY LICENSEE

- Access times chosen by Licensee (see Appendix 1)- Tick the box:

  • $\text{Standard Services [ref. EH0]} \quad 0$
  • $\text{Extended Services [ref. EH1]} \quad 0$
  • $\text{Premium Services [ref. EH2]} \quad 0$

SECTION III - ADDITIONAL SERVICES SUBSCRIBED BY LICENSEE

- Additional Services chosen by Licensee (see Appendix 1)- Tick the box:

  • $\text{Installation Services} \quad 0$
  • $\text{Training Services} \quad 0$
  • $\text{Technical Assistance} \quad 0$
  • $\text{On-Site Maintenance Services} \quad 0$
  • $\text{Consulting Services} \quad 0$
  • $\text{[Others]} \quad 0$

Made in two original counterparts

This Agreement may be executed in counterparts, including exchange of counterparts by facsimile, each of which will be deemed an original, but all of which together will constitute one and the same instrument.

Atempo SA: Licensee:

Signature: ____________________________

Name: _______________________________

Title: ________________________________

Signature: ____________________________

Name: _______________________________

Title: ________________________________
Atempo SA:
Date:

Licensee:
Date: ________________________________
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