Enterprise Rewinder™

Enterprise Rewinder User Guide

Change History

- 6/10/05
  - Initial release in new format with new product name (formerly known as *Enterprise DataRewinder User Manual)*.
- 8/31/05
  - Rolled old chapter 8 (*Installing*) into Chapter 1 (*Getting Started*).
- 10/18/05
  - Editorial changes.
- 2/27/06
  - Added *Supported configurations* to Chapter 1 and expanded *Server and Database Compatibility* in Chapter 2.
- 7/22/06
  - Editorial changes.
- 3/15/07
  - Added *Appendix A: Disk I/O Best Practices*.

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Chapter 1: Getting Started

This guide describes how to configure, initiate, record, and rewind using the Enterprise Rewinder application.

Enterprise Rewinder Solution contains important general information about the Enterprise Rewinder product, including a list of its key features.

To get up and running quickly, it is recommended to begin with *Setting Up Rewind Scenarios* and continue reading through to the end of *Monitoring Recording and Rewinding*.

Note: This manual covers Enterprise Rewinder Server, Enterprise Rewinder Exchange, and Enterprise Rewinder SQL (see *Server and Database Compatibility*). Throughout this document, the term Enterprise Rewinder refers to all products, unless otherwise specified.

Terms

The following terms are used throughout this document.

Term	Definition
Data rewind	Rewinding data to a former state, at a previous point in time, according to time-stamped checkpoints. Note, that all the data that is backtracked to the rewind point will be lost, since any data after the rewind point will be overwritten with new data.
Point	A point in time where an event has occurred. Essentially a marker or checkpoint that can be rewound to, if needed. (See also *Rewind point*). Each event in the system creates a new point.
Rewind point	A selected point in time where an event has occurred. This point has been chosen as the point to rewind to. (See also *Point*).

Term	Definition
Root directory	Each directory selected for Enterprise Rewinder protection. The rewind process can be applied to any combination of files and subdirectories and their files (all or selected) of each root directory specified in a scenario.
Scenario	A scenario is composed of the host, directories, and files targeted for Enterprise Rewinder protection, and the configuration parameters of the rewind process. Scenarios are stored in XML files that contain all the information necessary to perform the rewind and all its procedures.

Supported Configurations

Enterprise Rewinder supports the following configurations on Windows 200/2003 (for more details, see *Server and Database Compatibility*):

- Exchange 2000/2003/5.5
- SQL 7/2000
- Oracle 8i/9i/10g
- File Server

Install Enterprise Rewinder

Installing the Enterprise Rewinder components is simple and straightforward. The installation package contains a file, Setup.exe, that runs a standard MSI wizard.

- The installation is a soft installation which does not require a reboot
- The required level of INSTMSI.EXE is 2.0.2600.2 or higher (Otherwise, Enterprise Rewinder installation upgrades the Windows installer and this requires a reboot)
- The Enterprise Rewinder (ER) engine must be installed on the server participating in the rewind process
- The Enterprise Rewinder Manager can be installed on any computer that is used as a device to monitor and manage the server on which the ER engine is running
- The default installation directory (INSTALLDIR) is: *\Program Files\XOsoft\Enterprise Rewinder*
- All executables, DLLs, and configuration files are located in *INSTALLDIR*

Note: A Windows user running the Enterprise Rewinder Manager requires Read-Write rights to the installation directory.

The service logon account of the executing Enterprise Rewinder Engine requires Read-Write rights to the installation directory.

Upgrade an Installation

There is no major difference between a new installation and an update to an existing installation. The setup executable automates most of the work and the MSI wizard upgrades the application.

Uninstall Enterprise Rewinder

Uninstalling Enterprise Rewinder is performed using the operating system's Add/Remove Programs utility in the Control Panel.

Chapter 2: Enterprise Rewinder Solution

The following sections cover the scope of the Enterprise Rewinder solution, and general information on the module features.

About Enterprise Rewinder

Enterprise Rewinder is a business continuity solution that ensures integrity of business-critical information resources by protecting against data corruption.

Enterprise Rewinder is a highly cost-effective solution, providing true data protection by means of data rewind (rewinding data to a former state, at a previous point in time, according to time-stamped checkpoints and user-defined bookmarks).

Enterprise Rewinder makes it possible to overcome data corruption and restore the file to a previous valid state by rewinding it back in time as if it were a tape.

Enterprise Rewinder can be compared to the Undo feature of Microsoft Office where user actions can be retracted sequentially, step by step, thus bringing the file to a previous state in time.

Enterprise Rewinder is based on rewind journals that store file system I/O operation information that result in altered files. Using the rewind journal, it is possible to undo I/O operations, thus rewinding the file to a previous point in time, supposedly to a valid, non-corrupted state. To create the rewind journals, Enterprise Rewinder records all I/O operations performed on the protected file system.

Enterprise Rewinder allows for rewinding to user-defined bookmarks and database checkpoints, and also facilitates carrying out database log file rotations.

Important!
Enterprise Rewinder rewinds one way – there is no replay forward. After rewind, all data subsequent to the rewind point will be lost, since data after the rewind point will be overwritten with new data.

A database that is rewound is not guaranteed to be in a stable state. A further rewind may be required.

Server and Database Compatibility

Enterprise Rewinder comprises a comprehensive suite of data rewind solutions, including:

- **Enterprise Rewinder Server**. For increased integrity and availability of file servers and/or application servers of any type, including open files and system settings. Enterprise Rewinder Server secures entire mail, Intranet and other application servers. It records all changes performed, enabling data to be rewound to any point in time.
- **Enterprise Rewinder Exchange.** The Enterprise Rewinder solution for Microsoft Exchange is integrated with all aspects of the Exchange application on the server, including event logging and checkpoint setting. Supports Exchange 2000/2003 and 5.5.
- **Enterprise Rewinder SQL**. For easy rewinding of entire databases.

  An automatic mapping of all database components enables effortless replication setup. It is integrated with all aspects of the application on the server. Supports SQL 7 and 2000.
- **Enterprise Rewinder Oracle**. The Enterprise Rewinder solution for Oracle is integrated with all aspects of the application on the server. Supports Oracle 8i/9i/10g.
- **Enterprise Rewinder File Server.** The Enterprise Rewinder solution supports the File Server application.

Operating System and File System Compatibility

Enterprise Rewinder runs on Windows NT4/2000 (it can rewind both NTFS and FAT32 file systems) and as a daemon on UNIX. Enterprise Rewinder communicates via TCP port 25000 by default. The port can be changed to any unused TCP port.

Software Modules

Enterprise Rewinder includes the following software modules:

- **Enterprise Rewinder Engine**. Installed on the server whose data are to be protected.

  Platforms: Windows NT4/2000 (runs as a Windows service), Solaris 7, 8 (runs as daemon).

- **Enterprise Rewinder Manager**. Installed on any workstation that has a network connection to the participating servers.

  Platforms: Windows NT4/2000.

Each of the Enterprise Rewinder software modules is described below.

Enterprise Rewinder Engine

The Enterprise Rewinder Engine is the executable service/daemon that lies at the heart of the Enterprise Rewinder system. It is installed on the server that needs to be protected against data corruption, and must be running before the rewind scenario can begin.

Enterprise Rewinder Manager

The Enterprise Rewinder Manager is a GUI application that manages the data rewind process for the server (definition, configuration, monitoring and running). Offline operation consists mainly in the definition of scenarios. Once a scenario is sent to the server, the manager also provides the means for online control (start/stop, rewind, etc.) and monitoring (i.e., scenario status, log files, etc.). The Enterprise Rewinder Manager may be operated from any PC with connections to Enterprise Rewinder servers, and can manage any number of servers from a single location.

The non-enterprise version of the Enterprise Rewinder Manager has all the capabilities of the Enterprise Manager, but can manage only a single Enterprise Rewinder server scenario.

The Manager connects as a TCP client to the host defined in the scenario. Once a process is running, the manager is no longer required for the process to continue.

Enterprise Rewinder

Enterprise Rewinder ensures that your data protection needs are fully met with maximum ease and simplicity, preserving and insuring your data's integrity.

Following is a list of features built into the product:

Data Rewinding	Description
Data integrity preservation	Data integrity is preserved at all times during rewind. This is important for transactional systems such as databases and application servers.

Data Rewinding	Description
Non-intrusiveness	Installation and activation of Enterprise Rewinder does not require stopping applications or rebooting servers.
Bookmarking	Just before proceeding with operations that might damage the data, it is recommended to mark the point in time when data is known to be valid. This is called setting a bookmark. In case of data corruption, the data can then be rewound to any bookmark.
Database-down detection	Automatically detects when SQL, Oracle or Exchange database is offline, indicating potential corruption or other problem.
Database Auto-Management	Automatically unmounts SQL, Oracle or Exchange databases before rewind (requires SQL, Oracle or Exchange version of product).
Backup Integration	Captures backup start/end events from Veritas Backup Exec for Exchange 2000/2003.

Reporting	Description
Events handling	All events are reported in real-time to the Enterprise Rewinder Manager and can be integrated into the OS event logging system.
Live statistics	Detailed real-time statistics are provided during the recording and rewinding process.

Chapter 3: Setting Up Rewind Scenarios

Enterprise Rewinder is a powerful, easy-to-use, data protection software. It allows repairing corrupted files by rewinding them as if they were on a tape.

Enterprise Rewinder monitors your file system online, and intercepts and records all I/O operations in rewind journals, enabling you to rewind any of your files to any point.

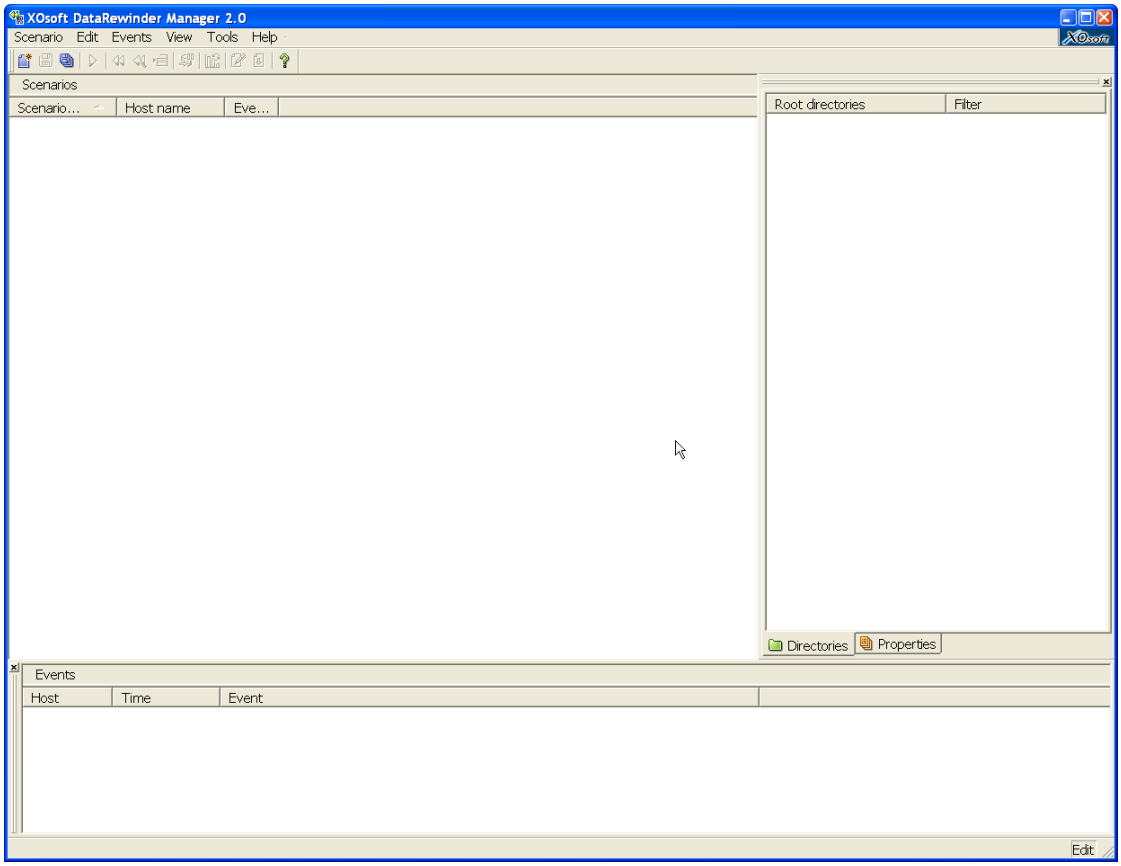
Enterprise Rewinder does this in the context of user-defined scenarios. A scenario defines a host and all its files or directories that need to be protected.

The user friendly GUI enables you to rapidly learn and control a rewind scenario. If you have purchased the Enterprise Rewinder license, any number of scenarios on any number of servers may be managed and run.

Note: In order for a rewind to succeed in a given scenario, verify that the user under which the rewind service is running, has permission for each defined root directory.

Enterprise Rewinder Manager Screen

When the application is first run, the Enterprise Rewinder Manager screen is called up (note that if you do not have the Enterprise Rewinder license, the scenario pane on the left side of the following figure will not appear).



The screen is divided into several areas, as follows:

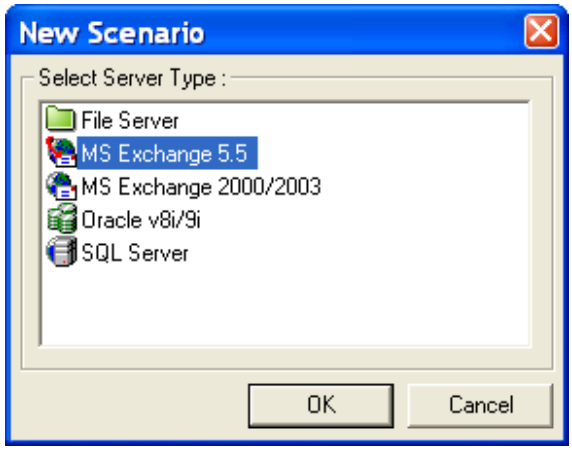
- The application's name (Enterprise Rewinder Manager <version#>); the menu line, and the toolbar — take up the topmost area of the screen
- The Scenarios area (the main window)
- The configuration tabs in the top right corner
- The Events window in the bottom third of the screen
- The bottommost line is the Status bar

The following sections deal with creating a scenario, selecting and filtering the root directories and the files in the subdirectories, and setting the scenario properties.

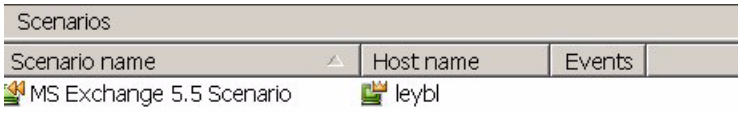
Create a Scenario

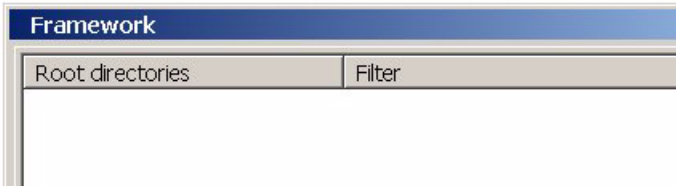
To create a scenario:

1. Begin the session by opening the Enterprise Rewinder Manager application: Click on its icon. The Enterprise Rewinder Manager screen opens (see *Enterprise Rewinder Manager Screen*).
2. Click the New icon on the toolbar (Alternatively, type ctrl+N, or from the menu, select Scenario > New, or place the mouse cursor in the Scenarios window and press the keyboard's Insert key, or right click and select New).
3. The Server type window will appear. The list of server types will depend upon the specific type of license purchased. If your license is for a single server type, this step is skipped.



4. Select the relevant server type from among those displayed.
5. Here, MS Exchange 5.5 was selected.
6. Click OK.
7. Selecting the server type creates a new scenario.
8. In this example MS Exchange 5.5 is displayed as the server. No directories have yet been selected.

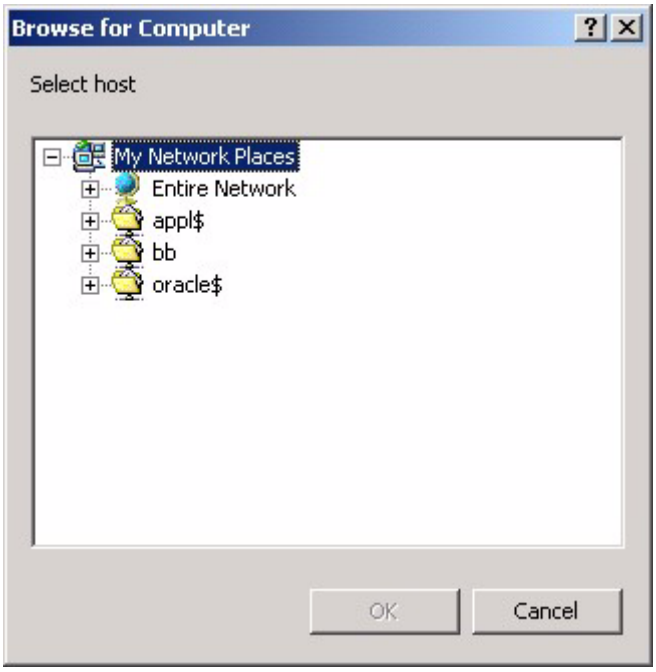




Define Host Server

To define the host computer:

1. Go to the Scenarios window. Double click the text: Enter host here. This opens the Browse for Computer window.



Note: If the Browse for Computer window does not open, check the server's location and IP address and make sure that the Enterprise Rewinder service on that server is up and running, and that Enterprise Rewinder Manager has a working TCP connection to the server.

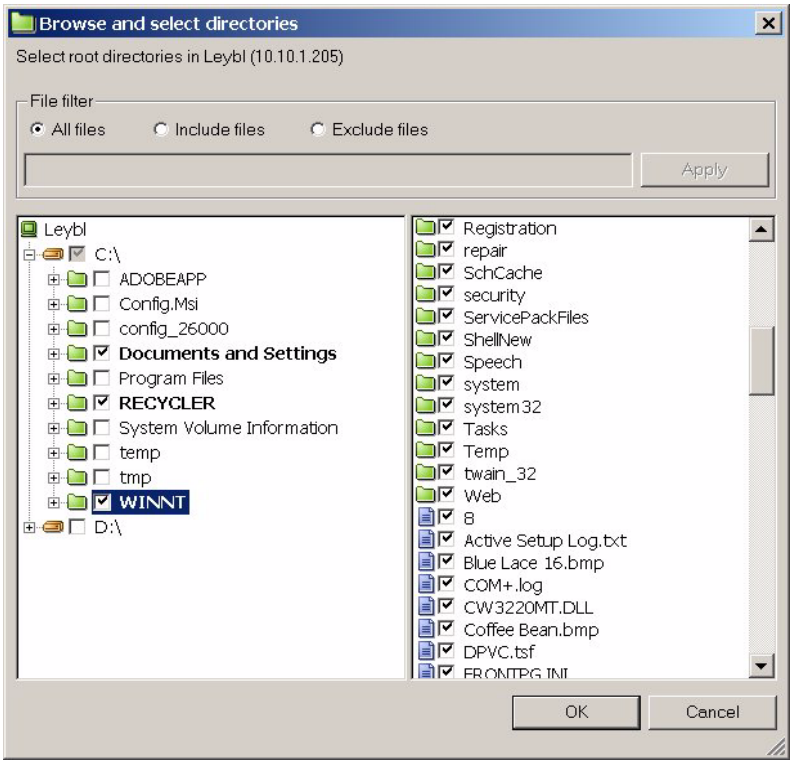
2. Browse through the directories until you locate the computers in your system. Select the desired computer. Its name will appear in place of the text Enter host here.
3. Alternatively you can:
   - Right click on the Enter host here text, and select Rename.
   - Clear the Enter Host Here text. Enter the server name or IP address of the host. Press Enter on your keyboard, or click anywhere outside of the text field. Enterprise Rewinder immediately tries to locate the computer with that name. If it cannot be located, an error message appears: *Cannot resolve host name*. Try again, or ask your system administrator for assistance in locating the proper computer.

Select Root Directories and their Contents

To select directories and files for future data rewind:

1. Select the host in the Scenarios window.
2. In the Framework window, click the Directories tab at the bottom. The directory information appears in the window.
3. Double click the root directory named Directories. The Browse and select directories window appears.

   Alternatively, right click anywhere in the window, and select Browse and select directories.

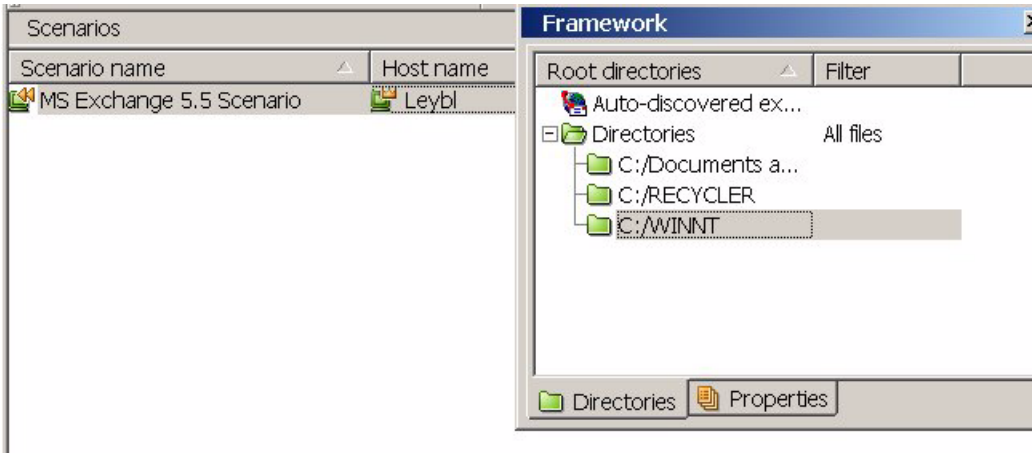


Note: Working with the Browse And Select Directories is possible only if the Enterprise Rewinder Engine is installed and running on the host. If data rewind of the scenario is running, an error message appears. Stop journaling by clicking Run/Stop on the toolbar.

Mark and Unmark Directories and Files

To mark and unmark directories and files:

1. The Browse and select directories window has two areas, similar to the Microsoft Explorer browser window. The left-hand area shows only directories (and subdirectories). The right-hand area shows both directories (and subdirectories), and files in those directories. The check boxes are for you to mark or unmark. When marked, those directories or files are selected. Those not marked are ignored.
2. In the window's left-hand area, mark the directories that are to participate in the data rewind scenario, by clicking on the relevant check boxes. These are the root directories. The checkbox is marked, and the directory name is bold.
3. If a root directory is a sub-directory, it remains bold and marked, and its parent directory is marked with a grayed check mark.
4. All files and subdirectories belonging to the directory that is highlighted in the left-hand area, are displayed in the right-hand area.
5. You may unmark right-hand area subdirectories and specific files. They are then ignored.
6. If you unmark all the right-hand area subdirectories and files, they are ignored, but the root directory is still marked with a grayed check mark.
7. Click OK, when you have finished choosing all your directories and files.
8. The directories selected now appear in the Enterprise Rewinder Manager's framework window, under the Root directories column.



Edit Directory Name

1. Select the directory and enter a new name using Windows conventions;
2. Or, right click and select Rename from the pop-up menu;
3. Or, from the menu bar, click Edit > Rename.

Remove Root Directories

To remove root directories, right click a directory entry and select Remove Directory from the pop-up menu, or select Edit > Remove directory.

Filter Root Directories

To filter root directories:

- The filtering options do not mark (or unmark) items in the window. That has to be done manually. Instead they provide two key functions:
- All, Include, and Exclude provide a visual interface for you to mark/unmark items.
- Anything that is not visible (has been filtered out), whether it has previously been marked or not, is ignored as if it is unmarked.
- Enterprise Rewinder filters use standard wildcards. A question mark selects any single character of all types; a pound sign selects any numeric digit; an asterisk selects any number of characters of all types. Entering other characters selects for those specific characters (one or many).

A given filter selection applies to all files in all directories in a scenario:

1. Double click on any of the selected directories to re-open the Browse and select directories window.
2. Select the desired directories.

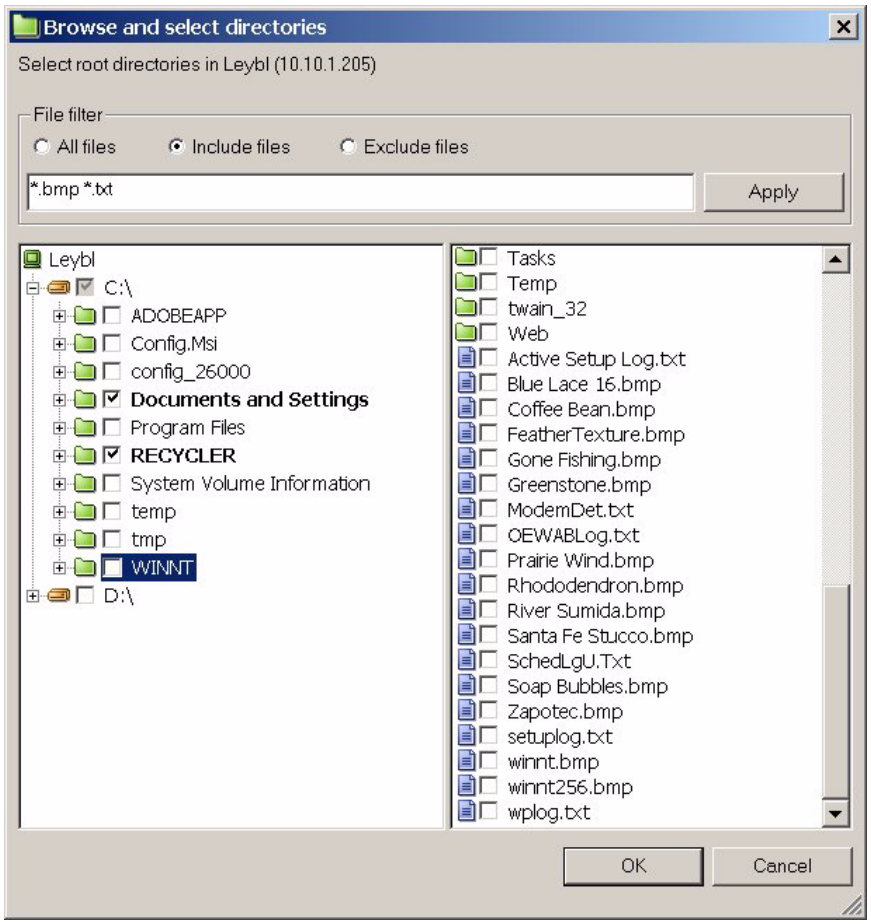
   In the figures below, the directories, subdirectories and files belonging to the object highlighted in the left-hand area, are displayed in the right-hand area.
3. Choose the appropriate file filter (All files, Include files, Exclude files) and follow the directions in the following pages to select the desired files and subdirectories:
   - Click All files to select all files in the selected directories. This is the default. Instructions are as per section on Marking and Unmarking Directories and Files.
   - Click Include files to include only the selected files or file types. The filter text entry box will open. Enter the appropriate filtering characters (characters, strings, wildcards, file names or extensions, etc.). Instructions are as per section on Including Files.
   - Click Exclude files to exclude only the selected files or file types and to include all others. The filter text entry box will open. Enter the appropriate filtering characters (characters, strings, wildcards, file names or extensions, etc.). Instructions are as per section on Excluding Files.

   Note: Filtering is possible only if there is TCP/IP connection between the host and manager.

Include Files

To include files:

1. Click the Include files radio button at the top of the Browse and select directories window. This activates the text entry field. The text entry box opens with an asterisk wild card.



2. In the above figure, *.bmp and *.txt were entered as the Include files parameters. Clicking the Apply button carries out the filtering. Here, the only files now displayed on the right-hand side are those that have the BMP or TXT extensions. Note, that the subdirectories are also shown.

   You can enter more than one file or file-type into the text entry field. Use a *blank space* to separate the names. Do NOT use a comma, or semicolon, etc. If a file name includes blanks, enclose the complete file name between quotation marks (“”).

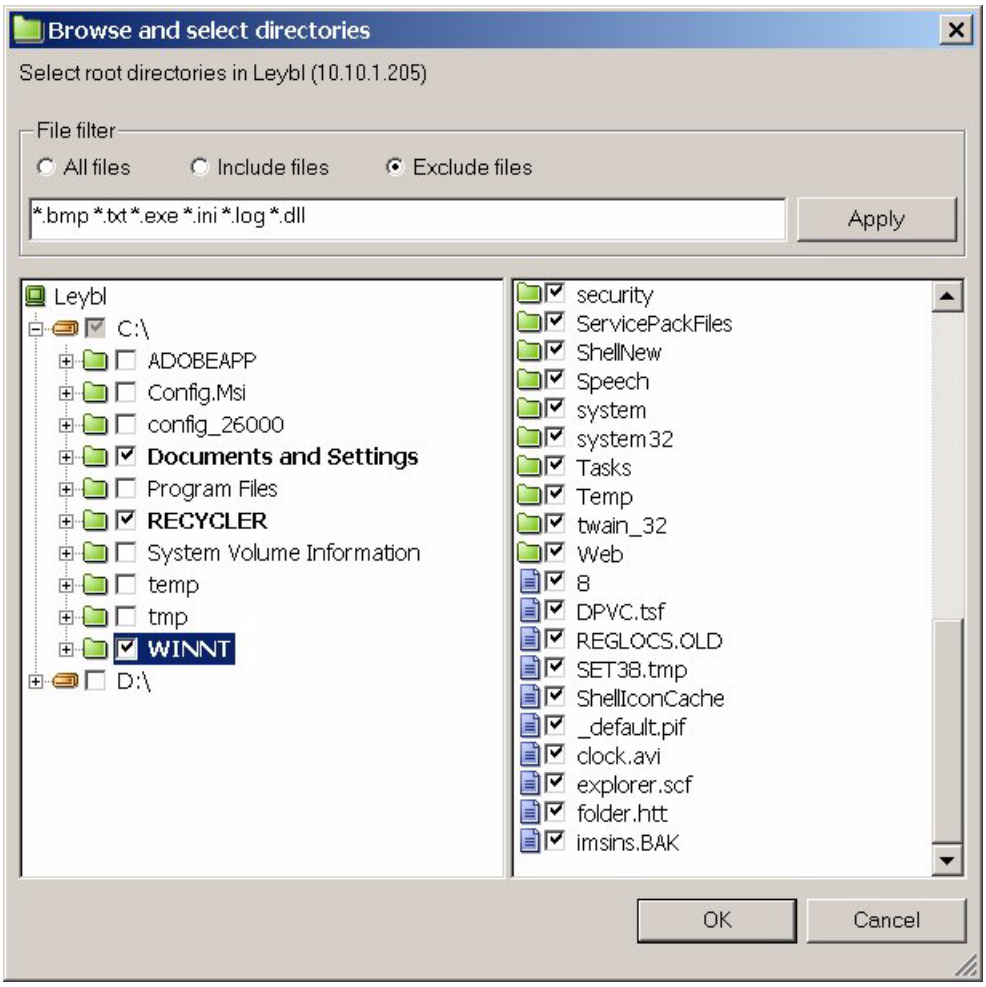
   Note: When using Include files, only the files or file types entered into the include text entry field will be included in the rewind scenario, and only if marked (checked off).

Exclude Files

To exclude files:

1. Select the Exclude files radio button and enter a value. In the following figure we use the parameters *.bmp, *.txt, *.exe, *.ini, *.log and *.dll. Click the Apply button.

   Now, all files with those parameters are excluded. Marking the root directory on the left hand side, also marks all the right hand side subdirectories and the files matching the exclude criteria.



2. You can unmark any number of individual files or subdirectories by removing the check mark next to their names. Manually unmarking a file overrides All files and the Include filter.
3. When a file is unmarked, the include check marks next to its path become gray instead of black.

Autodiscover Database Files for All Databases

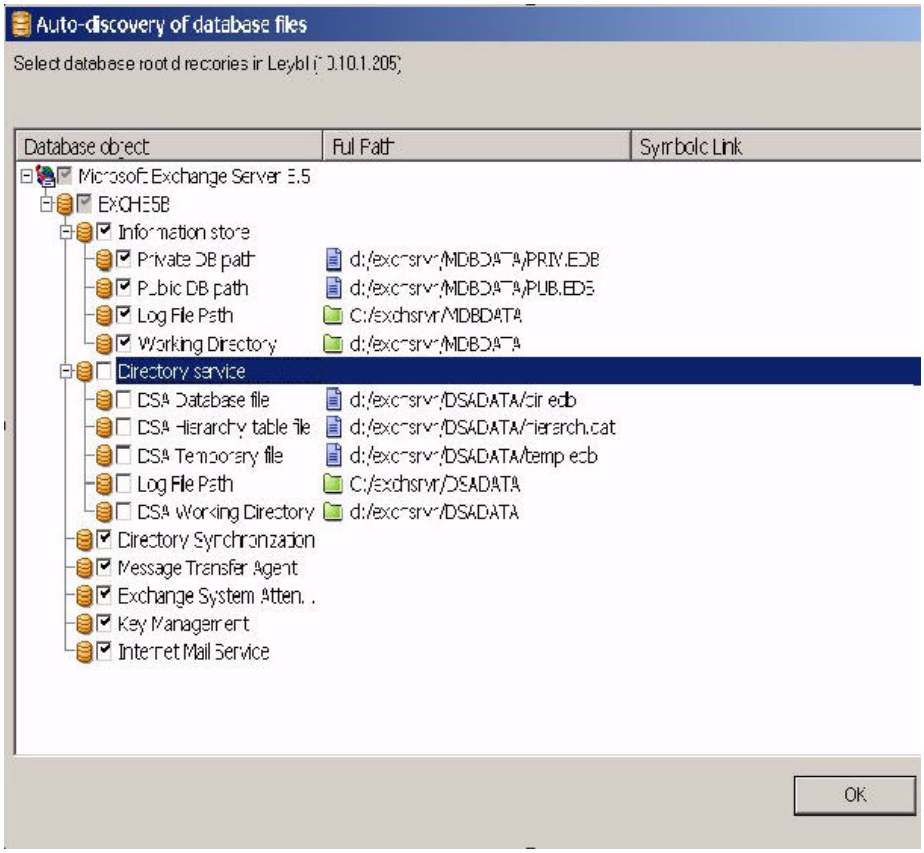
To facilitate easy directory selection for standard databases supported by Enterprise Rewinder, database directories and files are identified in the scenario host by using database APIs. Thus, Enterprise Rewinder displays the structure of the database and simplifies selection by allowing users to check/uncheck objects for protection. These directories behave as any other root directory.

The Enterprise Rewinder autodiscovery function automatically discovers all database objects, related files and directories on your database or mail server — whether local or on a network. This function is available only for MS Exchange 200x, Oracle, and MS SQL v7 and 2000.

To autodiscover database files:

1. When creating a new scenario, if you choose the Exchange, Oracle, or SQL server type, the autodiscovered database files icon appears in the Root directories column of the Framework window. Its exact name is an amalgam of the text autodiscovered, and the specific server type name (see *Autodiscovering Servers* for a details on specific databases).
2. To open the Autodiscovery of Database Files window, double click the autodiscovered icon in the Root directories column of the Framework window. Then start autodiscovery of database files. (Autodiscovery is possible only if the Enterprise Rewinder Engine is installed and running on the selected server.)

The Autodiscovery window opens, displaying all database directories and files.

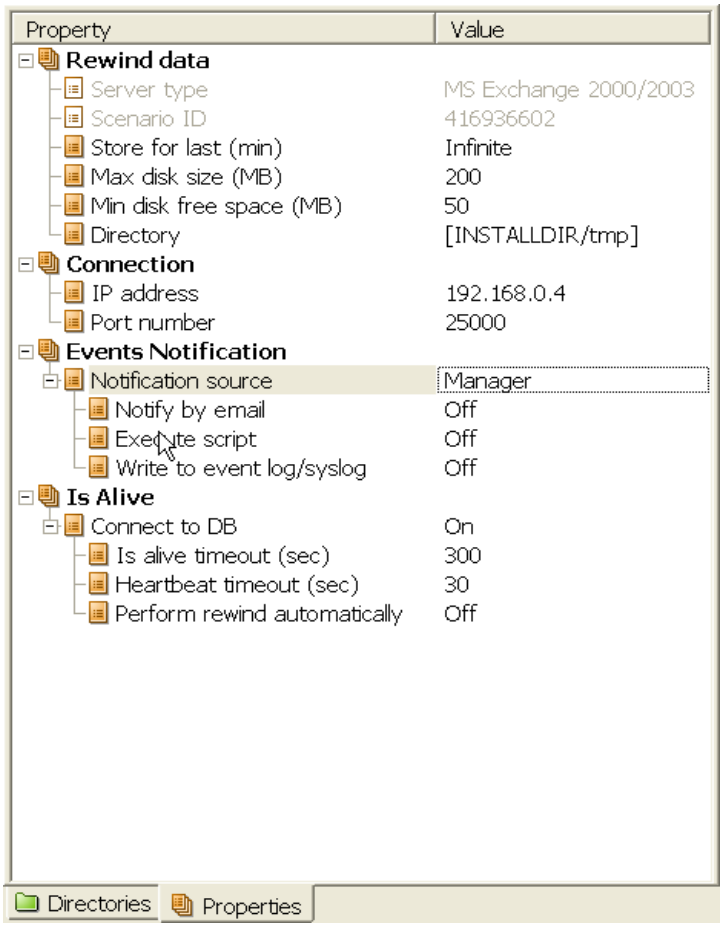


3. Select the database directories and files you require.
4. Click OK to place them into the scenario.

Set Scenario Properties

The properties values determine the rewind configuration for the scenario:

1. Select the scenario and click the Properties tab at the bottom of the top right window. The Properties area will open, and display the configurable properties and available values.



2. Select or enter the appropriate values. Some values must be manually entered in an edit box field, while other values can be selected from a combo box or menu by clicking the default value.

   Note: The Statistics (on a running scenario), Directories, and Properties tabs are context sensitive and will change whenever you highlight a different scenario.
   A running scenario has a gray background, and scenarios that are not running have a white background.

3. The rewind properties, corresponding values and brief explanations are listed in the following tables.

Rewind Data Values Table

Property	Explanation
Store for last	Enter the length of time (in seconds) for which the rewind journal stores the recorded I/O operations. After this time, rewind journal entries are discarded as new entries are recorded, in a first-in-first-out sequence (default is infinite).
Max disk size	Enter the rewind journal size threshold (the default is 200 Mbytes). This is the point at which the system will begin overwriting old data that is in the storage stack.
Min disk free space	When this size is reached (the default is 50 Mbytes), the system will issue a warning.
Directory	The directory to be used to hold the rewind data. The default directory is */tmp* on Solaris servers and Enterprise Rewinder *Installation directory**tmp* on Windows. The default Solaris directory */tmp* is a swap directory located in the memory. It provides better performance. However, DO NOT use it for large journals!

Connection Values Table

Property	Explanation
IP address	Displays the host IP address. If host name is changed, the IP address is updated. Entering a different IP address in this field can also change the host.
Port number	25000 by default. This is the incoming port used for TCP/IP communications. It can be changed to any unused port.

Event Notification Source Table

When an event occurs, it is possible to set the system to run a script or send an email notification. In order for this to work, the correct notification source must be specified.

Notification Source	Explanation
None	Default

Notification Source	Explanation
Manager	The Enterprise Rewinder Manager notifies on events.
Engine	The Enterprise Rewinder Engine notifies on events.

Event Notification Values Table

If a notification source (see *Event Notification Source Table*) other than None has been selected, then the properties defined in the following table can be set to activate when an event occurs.

Property	Explanation
Notify by email	Specifies whether or not to notify by email when above events occur.
Mail Server	Enter the email server;
Email address To	Destination email address; and
Email address From	Source email address for sending notification via email.
Execute script	Choose the action for Enterprise Rewinder to initiate whenever it notifies due to an event.
Script name	Enter script name to process notification via a script.
Write to event log/syslog	Writes the events to Windows event log or UNIX system log.

Is Alive Values Table

When the Connect to DB property is set to on, the Enterprise Rewinder engine will periodically check to ensure that the database being protected is mounted and running (this option will not appear in a file server scenario). The parameters controlling how the checking is performed and what actions are taken if a problem is encountered are as follows:

Property	Explanation
Heartbeat Timeout	Frequency (in seconds) with which the database status is checked.
IsAlive Timeout	The number of seconds of failed DB checks before database is assumed to be down.

Property	Explanation
Perform rewind automatically	Off by default. If this is on, Enterprise Rewinder will automatically recover the database to the latest valid checkpoint. In the case of Exchange, it will unmount the database before and re-mount after rewind. In the case of Oracle or SQL, Enterprise Rewinder will stop database services before the rewind and restart after.

Suspend Is Alive Checking

It may be desirable to suspend database monitoring in order to perform routine system maintenance without stopping the scenario. This may be done with Suspend Is Alive Check in the Tools menu or the corresponding button on the toolbar. This button works like the Pause button on a video player – pressing once will suspend monitoring, pressing a second time will resume. In both cases a warning message will be displayed and you will be asked to confirm the action.

Scenario Operations

This section describes various scenarios.

Save a Scenario

There are two methods of saving, either per scenario, or a global save, of all scenarios:

1. Click the Save icon or select Scenario > Save.
2. Click the Save All icon or select Scenario > Save All, to save all scenarios on the Enterprise Rewinder Manager.

Export a Scenario

To export a scenario:

1. Select Scenario > Export. This opens a standard Save As window. Name and save the desired scenario.
2. The scenario will be saved as a *.XMC file.

Import a Scenario

To import a scenario:

1. Select Scenario > Import. This opens a standard Open browse window. Locate the desired scenario and clickOpen.
2. The manager will import the scenario from the Enterprise Rewinder scenarios directory and open it.

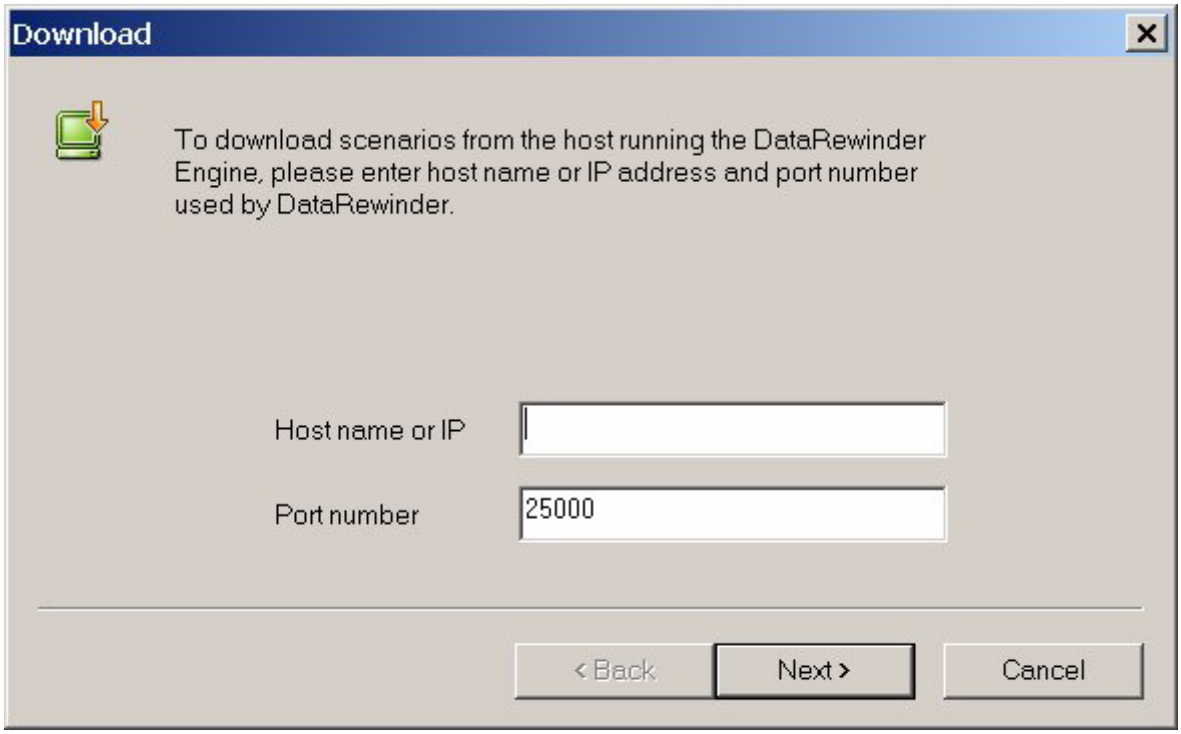
Download a Scenario

The Enterprise Rewinder Manager can download existing scenarios from any server running the Enterprise Rewinder Engine. This option is useful when installing Enterprise Rewinder Manager on a new machine, or when scenario files on the Enterprise Rewinder Manager machine have been lost.

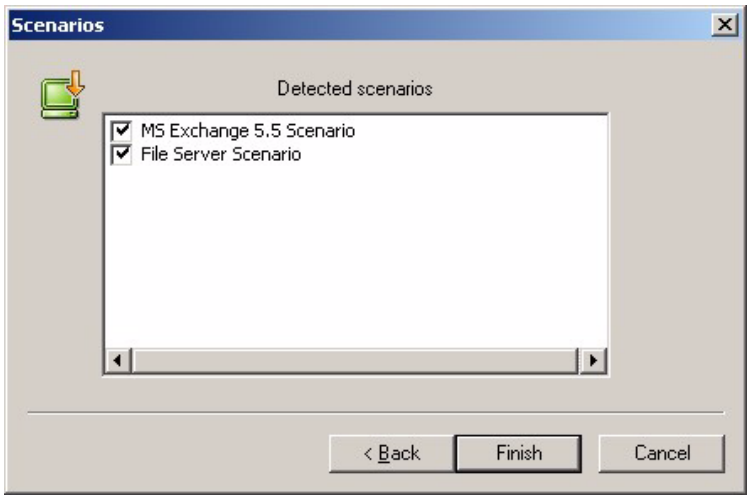
Note: When recording is initiated for the first time on machines running the Enterprise Rewinder Engine, they will receive a copy of the scenario in which they participate. These scenarios can then be downloaded.

To download a scenario:

1. Select Scenario > Download. The Download window appears.



2. Enter the host name or the IP address of the server to which you want to connect, and then click Next. Enterprise Rewinder Manager will attach to that machine and locate any scenarios that may be found there.
3. All detected scenarios are presented in the list of the Scenarios window. Select the desired scenario and click Finish. The scenario will then download to the Enterprise Rewinder Manager.



4. If a downloaded scenario conflicts with an existing scenario on the Enterprise Rewinder Manager machine, you are prompted with the question *Replace scenario localhost?* Click OK to replace existing scenario with the downloaded one or click Cancel to cancel the download.

Chapter 4: Recording and Rewinding

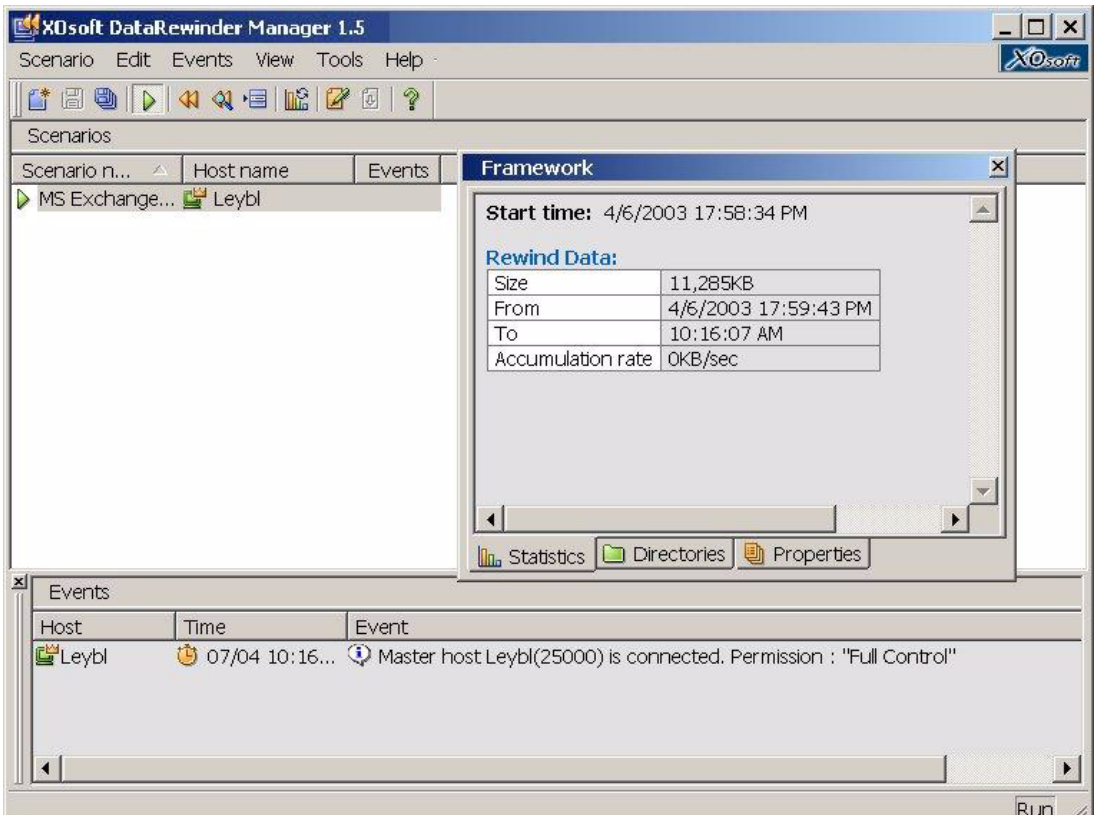
Recording can be initiated once the scenario has been defined. The rewind scenario configuration file is first sent to the host, and then recording can commence.

Once the recording process is initiated, the Enterprise Rewinder Engine continuously monitors the master root directories at the file system level for any modification, and builds rewind journals to enable data rewind at any time, and back to any point in time, following the initiation time.

Initiate Recording

To initiate recording, click Run on the toolbar or select Tools > Run.

While a scenario is running, the Enterprise Rewinder Manager screen becomes gray. No configuration changes or editing are possible at this time (for the scenario that is running). Rewind data statistics are shown in the Framework window. Events are recorded in the Events window at the bottom.



Change Configuration During Run

It is not possible to make changes to the scenario configuration, files or directories while the scenario is running.

To make changes to the scenario configuration, files, or directories:

1. Stop recording by clicking the Run icon. The Enterprise Rewinder Manager screen background will return to its normal color and the functions of the Properties and Directories tabs will again become active.
2. Make all necessary changes, and click the Run icon again. Recording will restart.

Stop and Start the Enterprise Rewinder Manager

After the scenario has been defined, and recording has started, the Enterprise Rewinder Manager can be closed. It must remain open only for real-time monitoring of the process. Closing the manager *does not* stop the running scenarios. When it will again be opened, it will automatically load all the saved scenarios and display their status.

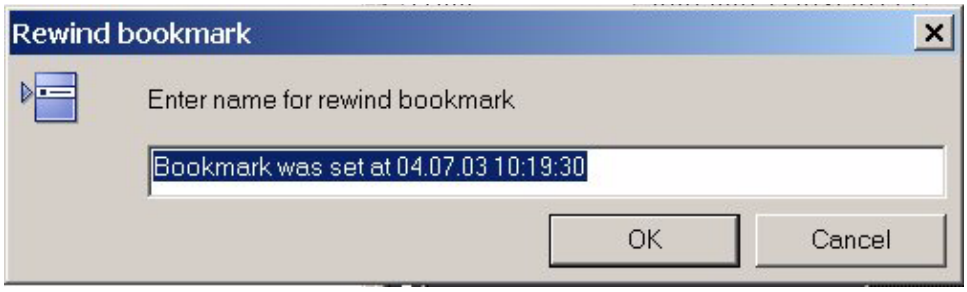
Note: Even when the Enterprise Rewinder Manager is closed, it is possible to get notifications by mail or run user-defined scripts when important events or errors occur (see *Event Notification Source Table* and *Event Notification Values Table*).

Set Bookmarks

Important points in time, when data is known to be valid, can be marked using bookmarks. This is recommended practice, just before any activity that may cause data to become unstable. Bookmarks are set in real-time, and not for past events.

To set a bookmark:

1. Click the Set Rewind Bookmark icon or select Tools > Set Rewind Bookmark. The Rewind bookmark window opens.
2. Enter a name for the bookmark (the default name includes date and time) and click OK.

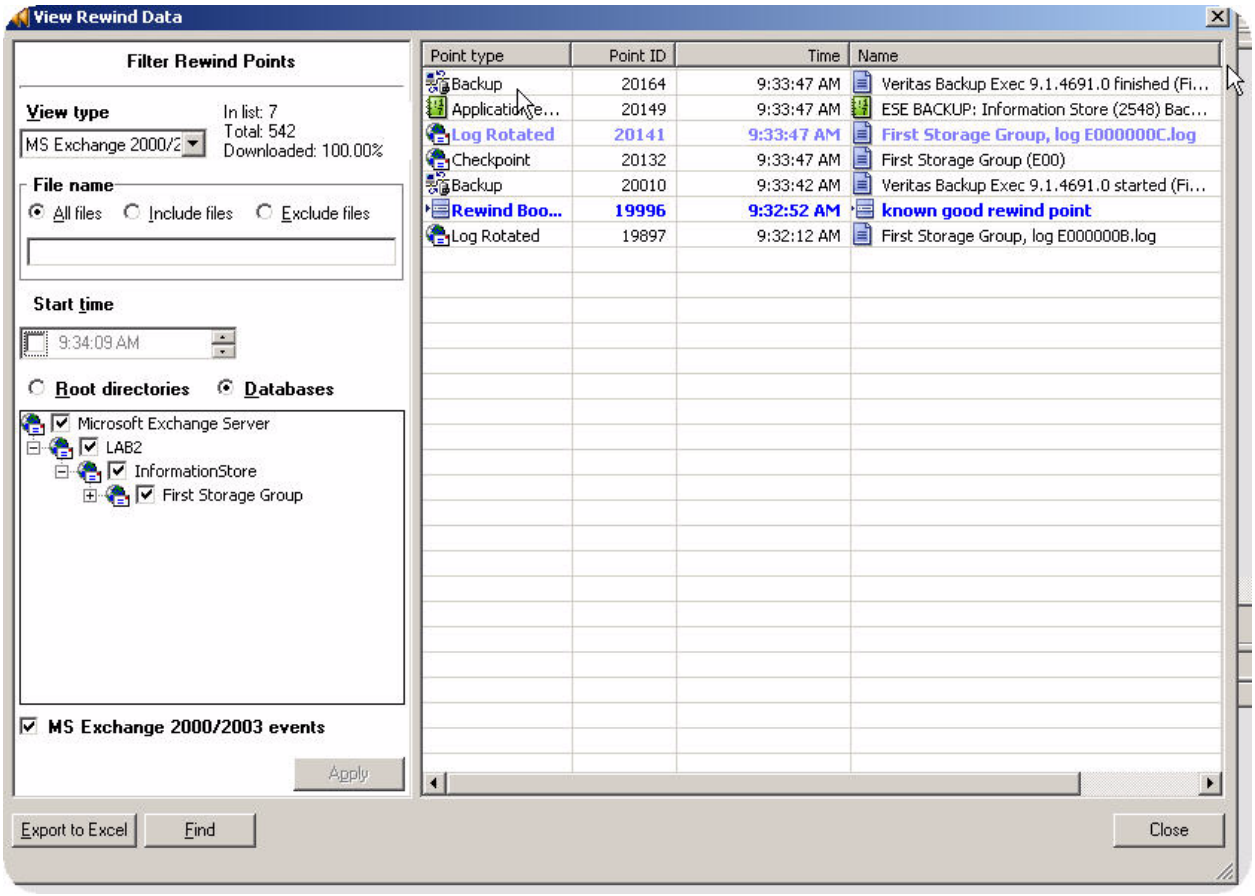


View Rewind Data

To view rewind data:

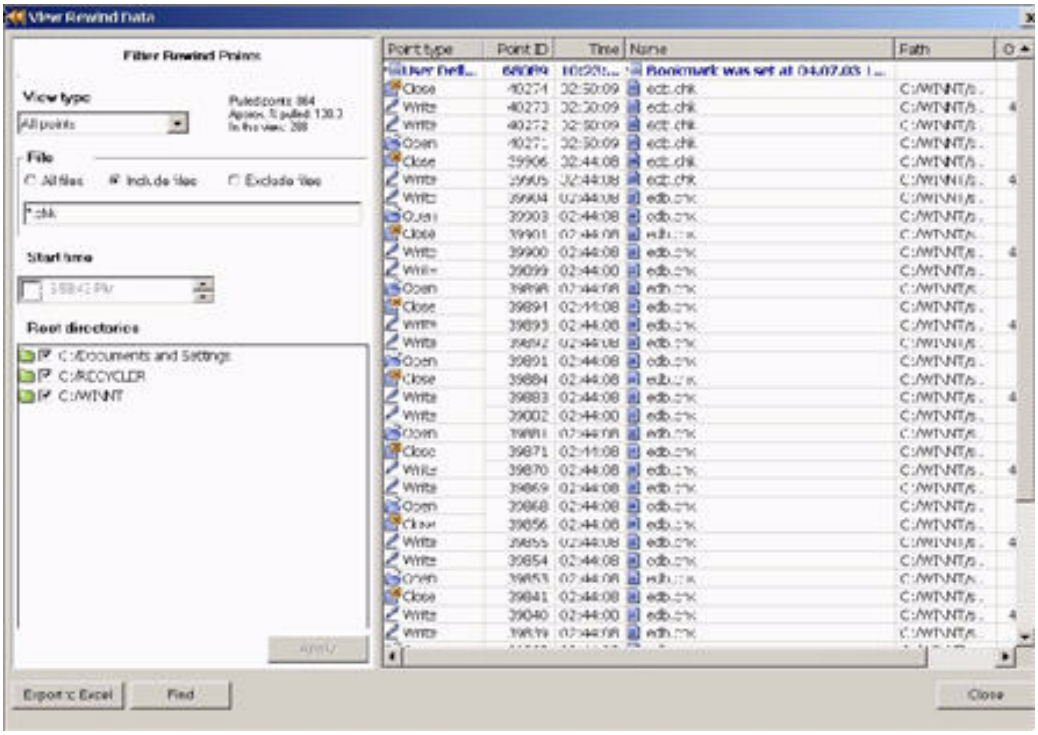
1. Click View Rewind Data icon, or select Tools > View Rewind Data.

2. The View Rewind Data window opens. This window contains a list of all rewind points. These are file modifications, removals, database events, etc., as a function of time. Note that, for Exchange 2000/2003, events include backup start and finish for Veritas Backup Exec. Bookmarks that were set will also appear in this list, as well as selected events from the Application Log. Additionally, the entire list can be exported to an Excel file by clicking the Export to Excel button.



3. To view only certain files, you can apply the same filtering options as for filtering root directories (see *Filter Root Directories*). Click Apply to implement the filtering.

4. Click Find to see the rewind points of the filtered files.

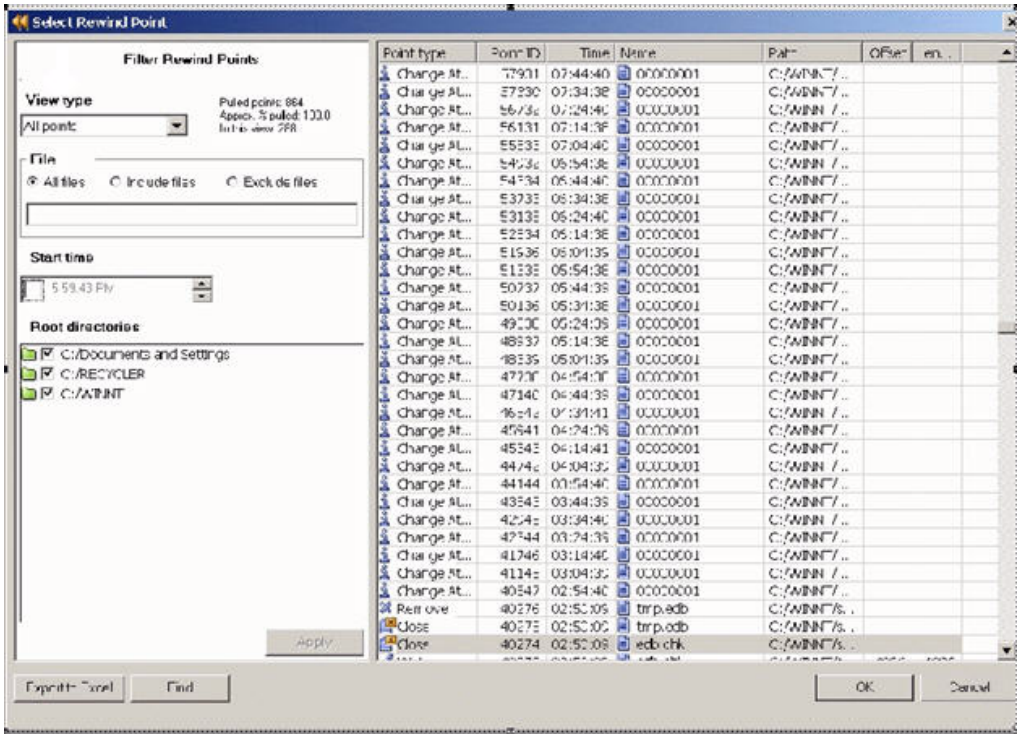


Initiate Rewind

To initiate a rewind:

1. Click the Rewind icon or select Tools > Rewind.
2. An application-dependent message is displayed: *Unable to perform rewind: Database...mounted. Press OK to unmount and mount databases automatically; or press Cancel, unmount manually, and perform rewind again*.

   For databases, click OK to automatically unmount stores (Exchange) or stop services (SQL and Oracle), or cancel and do manually before rewinding. For file server scenarios, you will be warned that all updates must be stopped on directories to be rewound.
3. The Select Rewind Point window will open. This window contains a list of all rewind points. These are file modifications, removals, etc., as a function of time. Bookmarks that were set will also appear in this list. Additionally, the entire list can be exported to an Excel file by clicking the Export to Excel button.



Note: The View Rewind Data window and the Select Rewind Point window are virtually the same and have the same function. The only difference is, that in the Select Rewind Point window you can select a point, and click OK to start the rewind process.

4. To rewind only certain files you can apply the same filtering options as for filtering root directories (see *Filter Root Directories*).
5. Click Find to see the rewind points of the filtered files.
6. Click Apply to implement the filtering.
7. Select the rewind point and click OK. A warning message appears asking for final confirmation before carrying out the rewind (since data can be lost).
8. Click OK to continue rewind or Cancel to abort.

Once the files have been rewound, recording is resumed automatically.

Chapter 5: Monitoring Recording and Rewinding

The recording process can be monitored from the Enterprise Rewinder Manager once a scenario is running. Monitoring enables viewing state information, statistics and events. Connection status appears beside each host in the Scenarios window.

The Statistics tab provides information about the total amount of data recorded for a possible rewinding of a root directory.

The Events window displays information about significant events, warnings, and errors received from the host. This information includes the host name, the event time, and a brief explanation.

Enterprise Rewinder has a number of monitoring tools to enable easy control and monitoring of rewind events in real-time. In addition, Enterprise Rewinder can store all events in its log. Once a scenario is loaded and running, you can monitor:

- State information
- Live statistics
- Events
- Server log files

State Information

State information is displayed beside each scenario name and beside each server in the replication tree, whenever a synchronization process has been started or completed, and whenever a replication process is underway.

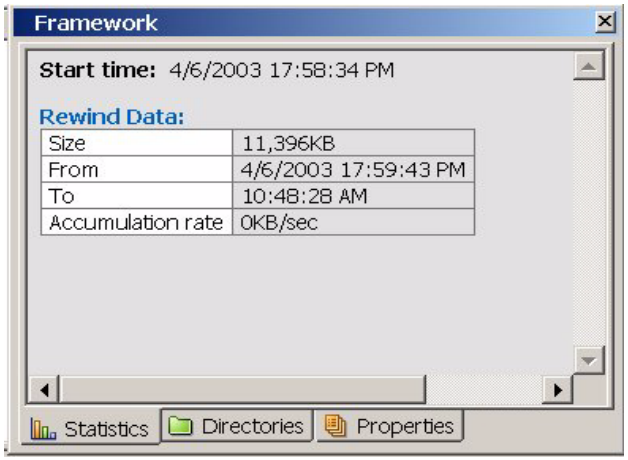
The state information includes:

1. A graphic indication next to the scenario name of whether the scenario is running or idle.
2. The number of significant events and errors displayed next to each scenario.

3. A graphic indication of whether servers are connected or not: When the connection to the host is lost for any reason, the host appears with a large red X marked over it.

Live Statistics

Live information is displayed in the top right window of the Statistics tab.



The information includes:

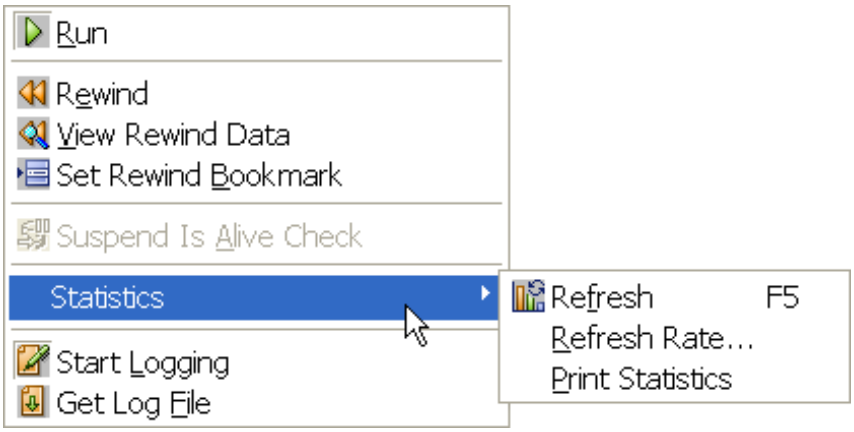
1. The time at which the recording process was initiated.
2. Various process statistics:
   - Number of kilobytes of data currently in the rewind journal
   - Start of first recorded activity
   - End of last recorded activity
   - Average rate of data accumulation in the journal
3. During a rewind, the Statistics area shows the progress of the rewind.

Refresh the Statistics Display

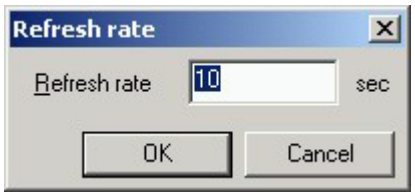
You can set a default frequency for automatically updating the state information and live statistics display by defining the refresh rate.

To refresh the statistics display:

1. Select Tools > Statistics > Refresh Rate to open the Refresh rate window.



2. Enter the desired refresh rate in seconds. The Scenarios window will update accordingly. Enterprise Rewinder Manager receives state information from all servers participating in the current scenario.

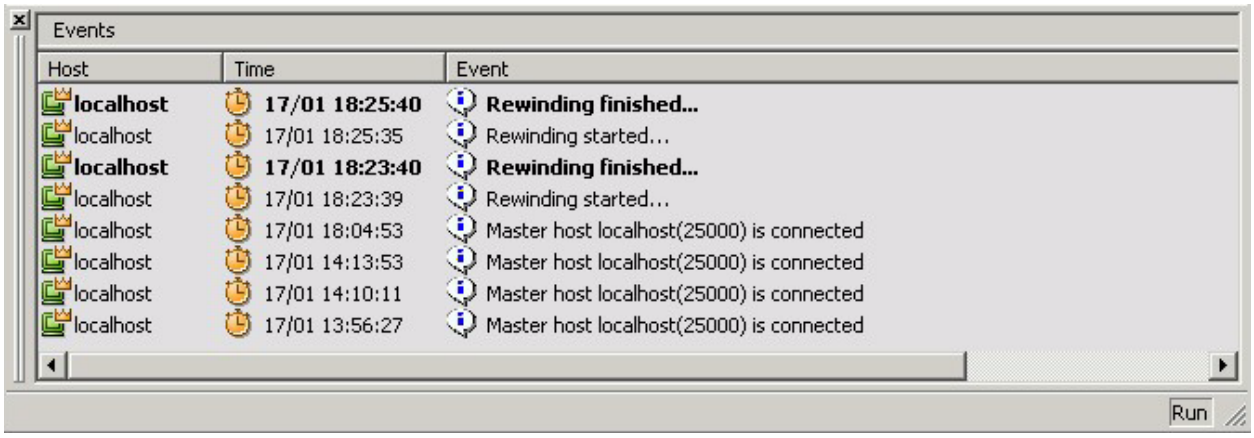


Refresh Manually

You can manually initiate a refresh of the displayed information: Select Tools > Statistics > Refresh, or the Refresh Statistics icon, or click F5.

Events Management

The Events area (bottom window) displays messages and general information (host is connected, rewinding started/finished, etc.) received from the scenario host that is running. The information includes the host name and time, and shows important events or error messages in bold letters.



Copy Events

It is possible to copy the text of the events for use in other programs:

1. Mark any number of events using Windows conventions.
2. Right click in the Events area and select Copy, or select Events > Copy, or click ctrl+C.

You can paste the copied events texts into any program you wish.

View Event In Separate Window

To display a single event in a separate window:

1. Mark an event.
2. Double click or right click the marked event and select View event in other window, or select Events > View event in other window.
3. A pop-up window displays details of the selected event.

Freeze Events List

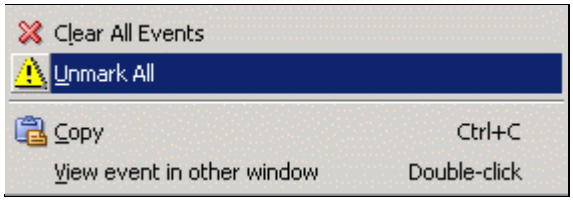
You can freeze the list of displayed events so that you can view them without the disturbance of new events arriving and shifting the display screen. The events continue to be accumulated in the background. Once you unfreeze the list, all events received during the freezing period are immediately displayed.

- To freeze the event list, select Events > Freeze Events List
- To unfreeze the event list, select Events > Freeze Events List

Validate Events (Marking as Read)

To mark events as read:

1. Select an event by clicking on the appropriate line in the list (once it is marked, it will no longer be displayed in bold).
2. Right click the desired event. A popup menu appears.



3. Select Unmark All. The bold formatting for the current event disappears. This can help to distinguish new (unread) events from old ones.

Delete Events

Select the events to be deleted and press the Delete key on your keyboard.

Purge All Events From List

Select Clear All Events from the Events area popup menu (from right click), or from the Events menu. All currently displayed events are cleared.

Enterprise Rewinder Engine Server Log Files

Log files are generated as a debugging mechanism, in order to trace the recording and rewinding procedure on the scenario host. When required, the Enterprise Rewinder Engine will log its activities in detail, i.e., every file received and every executed rewinding event. The generated log file is for CA XOsoft use only.

This may downgrade Enterprise Rewinder performance. Therefore, log files should be generated only in particular cases.

Generate a Log File

To generate a log file:

1. Select the appropriate scenario.
2. Click the Start Logging icon on the toolbar, or select Tools > Start Logging.

View a Log File

To view a log file:

1. Select the appropriate scenario.
2. Select Tools > Get Log File or click the Get Log File icon. The last log file opens in Notepad.

Chapter 6: Managing Users

Windows manages all issues dealing with authentication (identification of users), and authorization privileges, security levels, etc.

Hierarchy, User Levels, and Communication Protocol

User privileges are for communication between the Manager and the master host, or between the Manager and the master and the replicas on its replication tree.

Note: The Manager, master, and the replica hosts, may reside in the same domain or different ones, and a Domain Trust Relationship between them is not mandatory.

The following rights are available:

- **Read-only** - permits viewing current status; viewing statistics; accessing and printing out synchronization and replication reports.
- **Read/Write** - permits the above, plus full control: ability to create, modify and delete scenarios; ability to start and stop scenarios.

The Manager uses the current Windows user rights. If an action is attempted, and the user logged into the Manager does not have the correct authorization level, then a window will pop up and ask for a username and password entry.

Authorization

Regular Windows domain users and the NTLM security provider are used for authentication and authorization.

Every connection between the Manager and one of the hosts (Manager-Master, Manager-Replica, or Manager-Replica of a replica) is authorized individually, with either a read/write or read-only privilege.

In determining the Manager's rights to a host, the user is not immediately prompted for a user name and password.

Instead, one of the following possible scenarios occurs:

- The Manager first attempts to authorize connection to a host using the current Windows user rights
- The connection is authorized with read/write rights, if the user has administrator rights on the computer on which the master/replica is set up
- Master/replica host is set up under the user account
- The connection is authorized with read-only rights if the user is a known user in the domain on which the master/replica is set up
- The user is a known local user on the machine on which the master/replica is set up

In other cases, the connection is not authorized, and the following occurs:

- The question mark icon appears on the left-hand side of the scenario, indicating that this is a master/replica for which the user does not have authorization.
- If a scenario is selected, and it cannot be authorized with the current user, a window pops up and requests a username/password to be provided. When the new user and password is entered, the Manager again tries to authorize the connection with the master/replica.
- The Manager maintains a stack of all user names/passwords entered during running and tries to authorize a connection by first trying each of them (one-by-one). If the connection is still not authorized, then a window pops up and requests a username/password to be provided

  Note: Enter the user name as domain\username.

When the Manager starts or stops a scenario, it will authorize, based on the license, using the following two models:

- With master host only. A single authorization is made.
- With master and all replica hosts, authorization must be established for each host separately. This is done by stepping from one host to the next (through the tree hierarchy), and establishing authorized connections one at a time. This means, that:
  - No direct connection to a replica is established
  - No connection to a replica is established if the connection to the higher-level host (master or higher-level replica) has not been authorized

Chapter 7: Autodiscovering Servers

The Enterprise Rewinder autodiscovery function automatically locates all database files (MS Exchange 2000, and MS SQL v7 and 2000), related files and directories on your database or mail server — whether local or on a network.

When creating a new scenario, if you choose the Exchange or SQL server type, the autodiscovered database file icon appears in the Root directories column of the Framework window (see *Autodiscover Database Files for All Databases*).

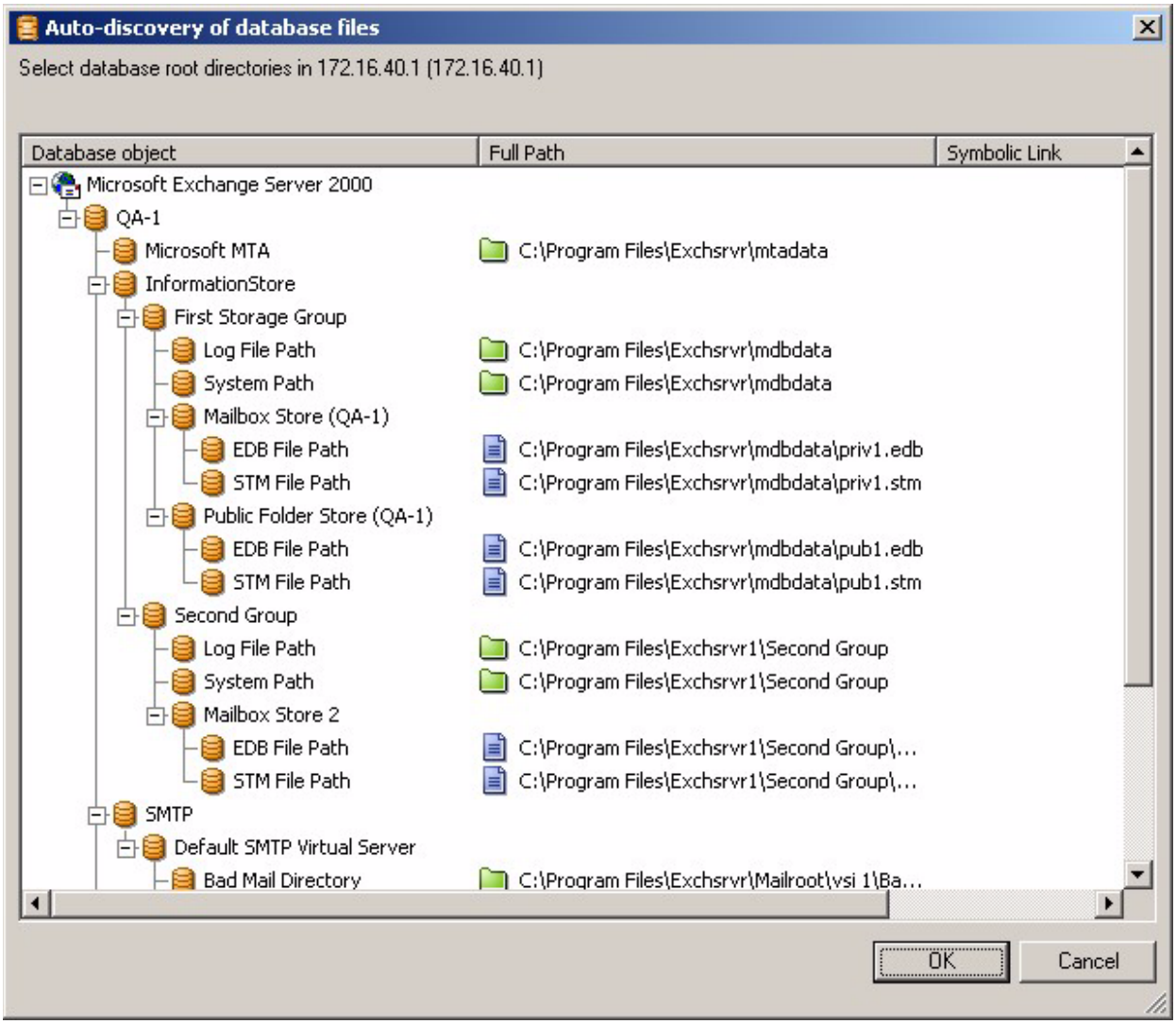
Directory selection and operations are the same as for non-database files, and use the same easy and powerful tools. To start, double click the Autodiscovered database files icon.

Exchange 200x Servers

To autodiscover Exchange 200x servers:

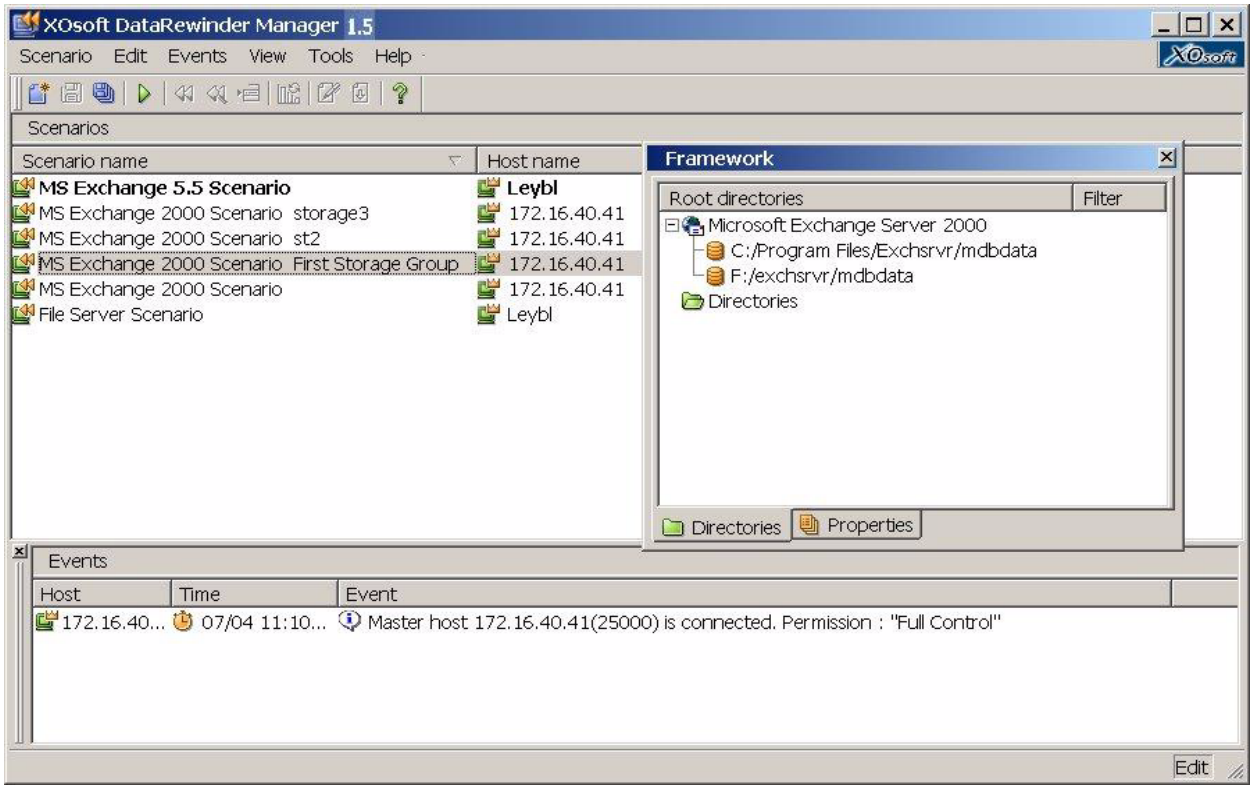
1. Double click the autodiscovered Exchange 2000/2003 icon.

Enterprise Rewinder automatically locates all Exchange 2000/2003 directories and files.

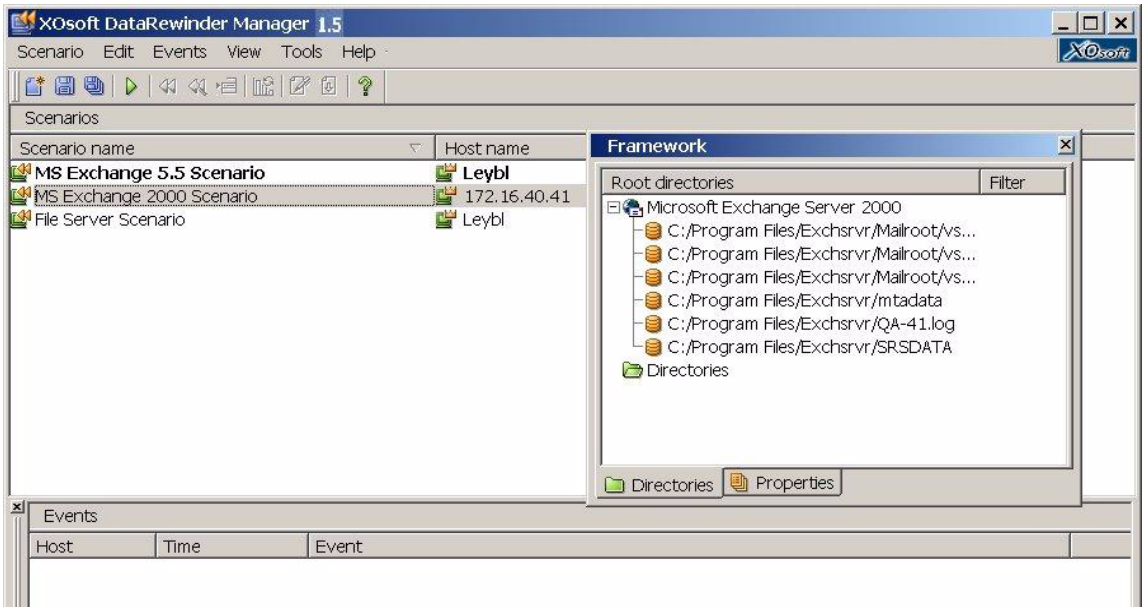


2. Click OK to continue.
3. If a single storage group is located, it is placed in the existing rewinding scenario together with the common files.
4. If there is more than one storage group, Enterprise Rewinder creates a separate scenario for each group, plus one scenario for all common files. This allows administrators, for example, to perform maintenance on a storage group without stopping recording on the others. A message informs you that multiple storage groups have been detected.

5. If you click Yes, separate scenarios will be created. You can then manage each scenario (storage group) separately, or remove any one of them.



6. If you click No, all storage groups will be included in the one existing scenario.



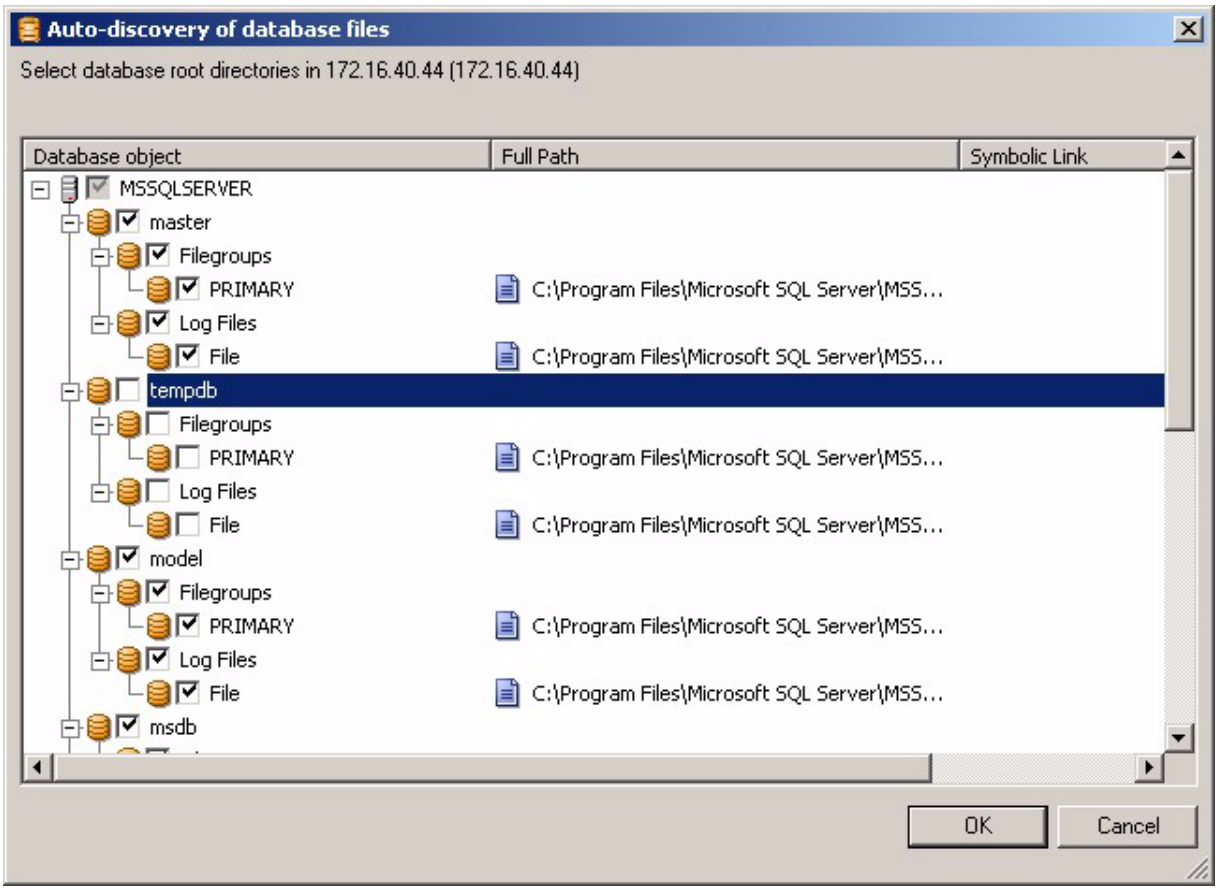
SQL 2000 Servers

To autodiscover SQL 2000 servers:

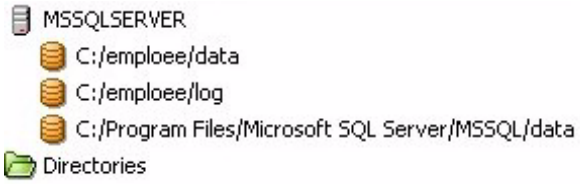
1. Double click the autodiscovered MSSQL database file icon in the Framework window, Root directories column. The Connect to SQL Server window will open.

2. There are two authentication schemes for Microsoft SQL (MSSQL). Use the one appropriate to your server's configuration.No connection to a replica is established if the connection to the higher-level host (master or higher-level replica) has not been authorized.
   - **Windows authentication:** Leave the login parameters and password blank. Click OK. Your Windows login will be enough. It is recommended but not required that you log in as ADMIN (assuming you have appropriate permissions).
   - **SQL server authentication:** Enter your SQL server authentication login parameters. Click OK.

Enterprise Rewinder automatically locates all SQL database files and directories.



3. Select the SQL directories and files you require.
4. Click OK to place them into the scenario.



Appendix A: Disk I/O Best Practices

Enterprise Rewinder offers CA ARCserve customers the ability to quickly recover from data corruption caused by viruses, software errors, and user errors by providing the ability to rewind your data back in time to a point before the corruption occurred. The industry term for the technology is Continuous Data Protection (CDP).

About Continuous Data Protection

This option is most certainly better than the alternative of restoring from previous backups; it allows for rapid recovery as well as minimal data loss. ER is designed for single server environments where rapid granular recovery is essential and can help small business avoid costly downtime or disruption to their business.

Single Server Environments

ER data recovery software allows you to rewind individual files, individual databases or the entire protected data set to any point in the past regardless of the total size of the data. Thus, it requires careful consideration when setting up in single server environments where I/O activity is high and physical disk storage allocations is limited. When setting up databases (SQL, Exchange, Oracle), file allocations of separating data, index and recovery/checkpoint logs on separate physical disk or LUN is the accepted best practice; this is also true for ER.

Data Placement

ER synchronously captures all changes, including backup events, significant application-specific events, such as checkpoints or log rotations, points in time at which the database is known to be in a consistent state – Rewind Logs must be located on separate LUNs than databases to avoid I/O contention. Consult with your Sales Engineer regarding disk performance best practices to avoid performance degradation and elongated response times due to I/O queuing.

Data placement best practices should be followed regardless of ER – as with Oracle or similar systems; they recommend the "SAME" practice for disk log allocations.

Consult your Sales Engineer to determine if ER is right for your needs and discuss other CA XOsoft WANSync products with integrated CDP to determine the best data protection strategy for your environment that meet your needs and budget.

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