WANSync® for UNIX and Linux

Operation Guide

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Chapter 1: Getting Started

This document is intended for experienced UNIX system administrators interested in implementing and deploying WANSync disaster recovery solution in their environment. The document provides all the details necessary to install and uninstall WANSync, create a simple DR (Disaster Recovery) scenario, manage the scenario and recover lost data.

Supported Platforms

The following UNIX platforms are supported:

- Red Hat Enterprise Linux version 3, 4 and 5 (i386 and x86-64)
- Novell SUSE Linux Enterprise Server 9 and 10 (i386 and x86-64)
- IBM AIX 5.2 and 5.3
- SUN Solaris 9 (sparc) and 10 (sparc, x86_64)

System Requirements

In order to implement the WANSync procedures, you will need to have or install the following:

- The number of instances of WANSync corresponding to the number of servers.
- WANSync GUI Manager or Command Line Interface (CLI) (included with WANSync installation package).

WANSync Software Modules

WANSync is comprised of the following modules:

- **XOsoft Engine** - installed on each host that participates in the replication process (it supports Master and Replica functionality).
- **WANSync Manager** - Management GUI installed on any Windows 2000/2003/XP workstation that has a network connection to the hosts participating in the replication scenario.
- **WANSync CLI Client** - provides command line access to all WANSync Manager functions

The following sections describe each of the WANSync software modules.

XOsoft Engine

XOsoft Engine is the executable file that lies at the heart of the WANSync system. It is installed on every host participating in the replication process and must be running before any replication scenario may run. Each Engine may assume a Master or Replica functional role with respect to each replication procedure or tree. It may also participate in more than one replication tree, as long as the file system directories, to which the different replication procedures are applied, don't overlap one another. WANSync runs as a daemon on UNIX and communicates via TCP port 25000 by default.

WANSync Manager

The WANSync Manager is a GUI application that controls all Replication hosts, both in the definition and operation (running) of replication services. The Manager allows you to define replication scenarios. Once a replication scenario is sent to the participating hosts, the Manager also provides the means for online control (running, synchronizing, etc.) and monitoring (i.e. node status, log files, etc.). The WANSync Manager may be operated from any location from which connections can be established to WANSync hosts. The Manager connects as a TCP client to Master and Replicas defined in the Replication scenario. Once a replication process is running, the Manager is no longer required for the process to continue.

Note: Connection to Replica hosts is not mandatory – it is required only in order to enable selection of destination directories via browsing, instead of manually. Connection to the Master host is mandatory.

WANSync CLI Client

The WANSync CLI Client is available as an alternative to the WANSync Manager GUI, using a text-based command-line interface. Before using the CLI, it is important to understand some basic concepts.

CLI Modes

There are two modes available to the CLI:

- Non-interactive mode – this mode executes commands taken from the command line. It enables you to manage scenario using scripts or batch files.
- Interactive mode – this mode is similar to a UNIX shell, displaying a UNIX-like prompts. It enables you to perform all the functions that exist on the Manager GUI, besides generating and displaying reports (except for the Difference Report, which you can generate but not view).

There are 2 sub-modes of WS CLI running in interactive mode: *Edit* mode and *Run* mode.

- In Edit mode, you can create and update replication scenarios. In this mode, WS CLI uses "`Edit:WS>`" prompt.

  The Edit mode enables you to:

  – Create new replication scenarios

  – Specify servers (Master and Replica) either by their server name or by their IP address

  – Add directory/files to be replicated from Master to Replica(s)

  – Set appropriate directories on Replicas

  – Set replication properties

  – Run recovery

  – Schedule synchronization to take place on specific dates and hours

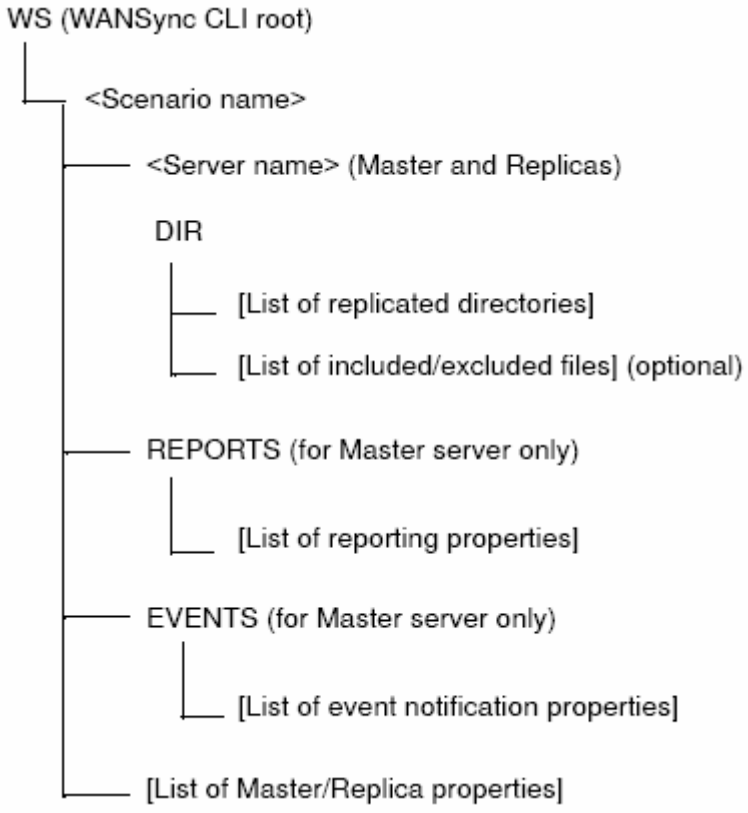
  – Start replication (and move to Run mode).

  Note: In order to work with the CLI, you need root credentials or to be a member in wansync group

- In Run mode, you can operate and monitor replication scenarios. In this mode, WS CLI uses "Run:WS>" prompt. The Run mode enables you to:
  - Stop a replication (and move to Edit mode) or suspend it
  - Synchronize servers
  - Monitor the replication process
  - Display events and error messages
  - Generate statistics and Difference report
  - Set bookmarks

CLI Hierarchic Model

The CLI uses a hierarchic model to display the structure of replication scenarios. It uses a similar paradigm to a file system (each scenario can be thought of as a tree):



Note: For more details on using the CLI, see *WANSync User Guide*

Chapter 2: Installing and Uninstalling WANSync

This chapter explains how to install and uninstall WANSync Replication Engine and Manager.

The WANSync installation includes:

- XOsoft Engine and CLI for UNIX/Linux

- and/or -

- WANSync Manager and CLI for Windows

Installing the XOsoft Engine and CLI

WANSync installation bundle consists of packages for all supported platforms and a common installation script.

To install XOsoft Engine and CLI

1. Become "superuser" (root).
2. Change the working directory to the directory that contains installation files
3. Run install.sh script.
4. Follow the instructions until the end of the installation.

Security Delegation

During the installation process, an administrative group called *wansync* is created. The *wansync* group allows non-root users to run CLI and change various parameters in WANSync configuration files. Any user who has membership in WANSync group is allowed to perform these actions.

Installing WANSync Manager

Note: WANSync Manager can be installed on Windows platforms only.

Installing WANSync components on a Windows platform is very straightforward. The installation package contains a file called Setup.exe that runs a standard MSI wizard.

- This (soft) installation does not require reboot or application shutdown.
- The required level of instmsi.exe is 2.0.2600.2 or higher. If you do not meet this minimum requirement, WANSync installation automatically upgrades the Windows installer for you. However, upgrading the installer requires a reboot.

Standard prompts facilitate the installation. Your only major decision is on which server(s) to install the applications (WANSync Manager and WANSync CLI are installed together):

- Install WANSync Manager on any Win2000, Win2003, or XP computer that has network access to the machines that you intend to manage.
- The default installation directory (INSTALLDIR) is: \Program Files\XOsoft\WANSync. All executables, DLLs and configuration files are located in INSTALLDIR.
- A Windows user running the WANSync GUI Manager requires Read-Write permission to the installation directory.

Managing XOsoft Engine

After the installation, WANSync is automatically managed by the OS: it is started during OS boot sequence, and stopped during OS shutdown process. These procedures are done automatically through **.rc** scripts.

However, if you need to manually stop the engine and then start it again, follow instructions described below:

- **On Linux:**

  To start an Engine

  /etc/init.d/WANSync start

  To stop an Engine

  /etc/init.d/WANSync stop

- **On Solaris:**

To start an Engine

/etc/init.d/WANSync start

To stop an Engine

/etc/init.d/WANSync stop

- **On AIX:**

  To start an Engine:

  /opt/WANSync/bin/WANSync.rc start

  To stop an Engine:

  /opt/WANSync/bin/WANSync.rc stop

Upgrading WANSync

When upgrading WANSync, it is recommended to uninstall the previous version before installing the new one. For information about uninstalling WANSync, see the following section.

Uninstalling WANSync

The uninstalling procedure is different for different operating systems, as described in the sections below.

Important! Before uninstalling WANSync, you should stop all running scenarios and verify that there are no directories mounted by xofs.

To verify there are no directories mounted by xofs, make sure that the /etc/xofs_mnttab file is empty. If it is not empty, perform the steps described in the *Unloading xofs Driver* section below.

Note: You may skip the verification process by simply rebooting your computer at the end of uninstall procedure.

Unloading xofs Driver

If during the uninstall procedure some of the directories were inadvertently left under xofs control (the scenario was running and the directory was mounted by xofs), the uninstall procedure will not be able to unload xofs driver.

In this case, you may simply reboot the computer or unload xofs driver manually.

To unload xofs driver manually

1. Check if there are any xofs mount points:
   #cat /etc/xofs_mnttab
2. Stop all the processes that hold your directory. Use fuser command to discover processes that have open files in your directory.
   For example:
   - #fuser -c <dir_from_xofs_mnttab> (AIX & Solaris)
   - #fuser -u <dir_from_xofs_mnttab> (Linux)
3. Use umount command for the directory discovered in step 1.
   For example:
4. #umount <dir_from_xofs_mnttab>
5. Check that no process is using xofs driver and manually unload it.
   On each platform follow the appropriate instructions:
   - **On Linux:**
     - Use /sbin/lsmod to verify that the reference counter of xofs driver is 0.

       Run the following command:
       /sbin/lsmod|grep xofs
     - Use /sbin/rmmod to manually unload xofs driver.

       Run the following command:
       /sbin/rmmod xofs.*
   - **On Solaris:**
     - Use *modinfo* to check whether the driver is loaded into memory.

       Run the following command:
       modinfo|grep xofs
     - Use *modunload* to manually unload xofs driver.

       Run the following command:
       modunload –i <xofs ID>

- **On AIX**
  - To check whether xofs is loaded into kernel,Run as root the following command:
    echo lke | kdb| grep xofs
  - To unload xofs driver run as root the following command:
    /opt/WANSync/bin/xoctl u /opt/WANSync/bin/xofs.ext

Uninstalling WANSync from Red Hat and Novel SUSE Enterprise Linux

To uninstall WANSync from Red Hat or SUSE

1. Become "superuser".
2. Make sure that all the replication scenarios have been stopped.
3. Issue the following command as root user: #rpm -e wansync

   WANSync will be stopped; xofs driver will be unloaded from the memory.

Uninstalling WANSync from IBM AIX and SUN Solaris

To uninstall WANsync from AIX and Solaris

1. Become "superuser".
2. Make sure that all the replication scenarios have been stopped.
3. Run the uninstall script: /opt/WANSync/bin/uninstall.sh.

   You are prompted to confirm the uninstall procedure. For example: Uninstall WANSync59? (y/n)
4. Type **y** and press **Enter**.
5. [Optional] Reboot.

Chapter 3: Creating a Scenario

This chapter explains how to register, create and configure a basic scenario using the WS CLI Client and Manager.

Important! WANSync is best suited for replicating data files. It is not recommended to replicate executable files and libraries using WANSync, since it can reduce the application performance.

Registering WS CLI

Before you can start working with WS CLI, you have to register it. To register WS CLI and run it, you need a valid key. After obtaining a valid key from technical support or sales, install the key.

To register the CLI

1. Save the file that contains the license no. in /opt/WANSync/bin.

   Note: If you have a license no. without a file, save the no. in a file called ws_license**,** and save it in /opt/WANSync/bin**.**

   For Example**:**
   echo "<license_key>" > /opt/WANSync/bin/ws_license

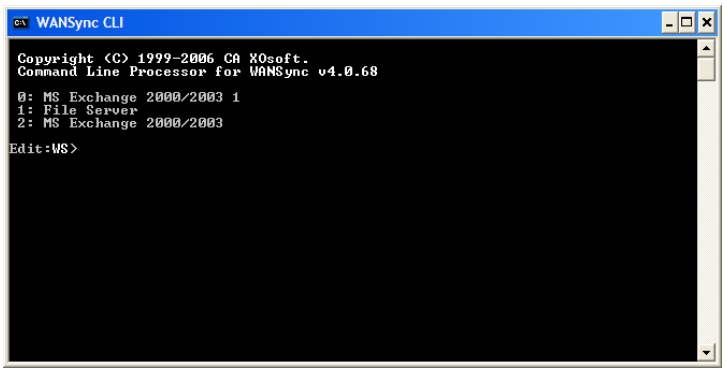
2. Change your current working directory to - cd /opt/WANSync/bin.

3. Run ws_cli executable**.**

Creating a Scenario Using the CLI

To create a basic scenario using the CLI

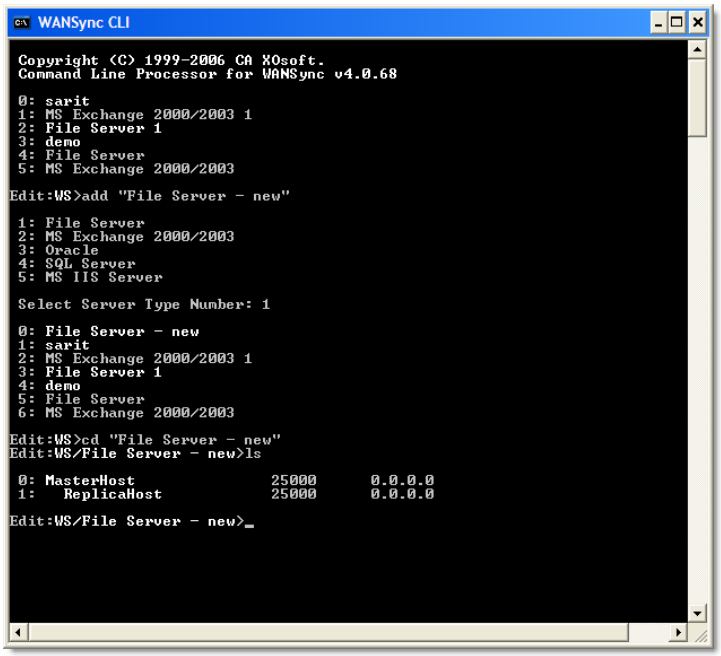
1. Open the CLI.
2. The session starts in Edit mode and prompts you to create a scenario:



3. Add a new replication scenario:
   `Edit:WS>` **`add "scenario name"`**
4. [Optional] Depending on your license, you may be asked to `Select Server Type Number`.

   According to the displayed server list, enter the desired server no.
5. Change location to the scenario level.
   `Edit:WS>` **`cd "scenario name"`**

   When a new scenario is added, a default Master host and a Replica host are automatically created:



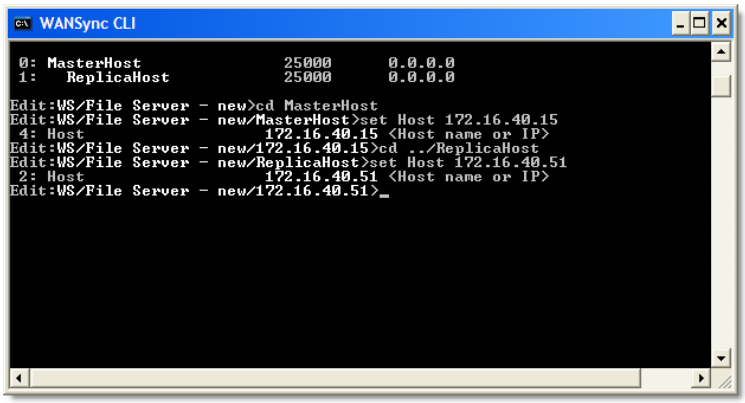
6. Rename the default Master by using a valid host name or IP address:

   Edit:WS/"scenario name"> **cd MasterHost**

   Edit:WS/"scenario name"/MasterHost> **set Host "IP address or FQDN"**

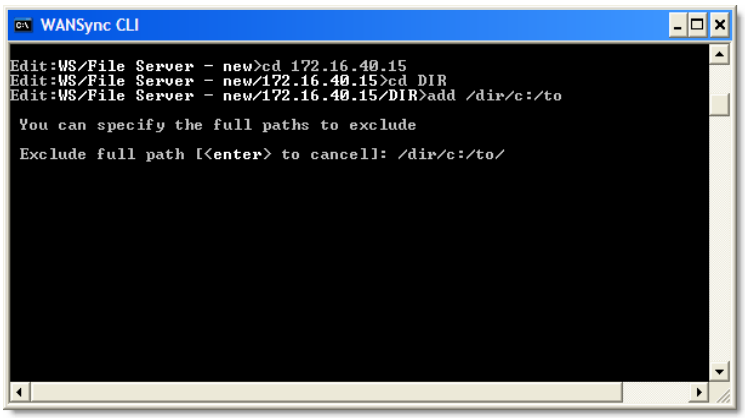
7. Rename the default Replica by using a valid host name or IP address:

   Edit:WS/"scenario name"/"MasterHost IP"> **cd ../ReplicaHost**
   Edit:WS/"scenario name"/ReplicaHost> **set Host "IP address or FQDN"**

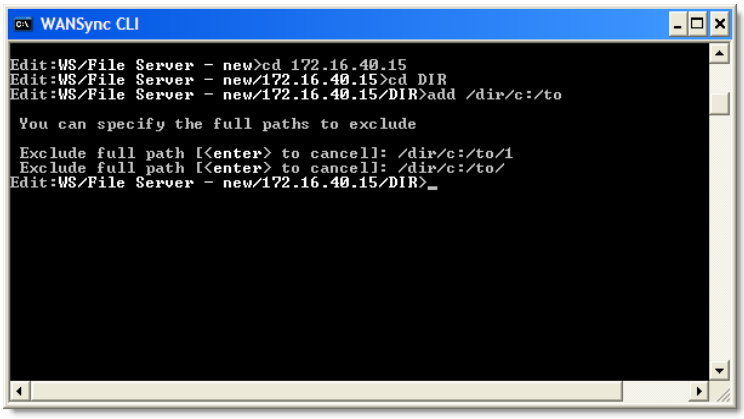


8. Change the current location to the Master server level:
   Edit:WS/"scenario name"> **cd ../"MasterHost name"**

9. Specify the Master directories and files to replicate:
   Edit:WS/"scenario name"/"MaterHost name"> **cd DIR**
   Edit:WS//"scenario name"/"MaterHost name"/DIR> **add /dir/"directories and files to replicate"**



10. Exclude files from the Replica process:
    Exclude full path [<enter> to cancel]: /dir/ "directories and files to replicate"/ **"directories and files to exclude"**



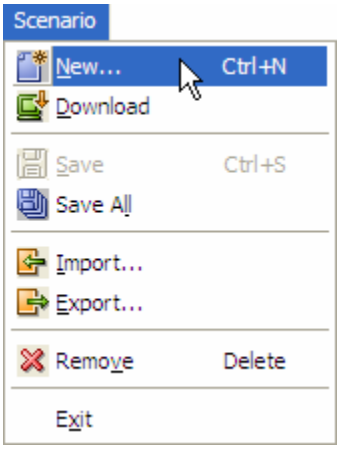
You are now prepared to start the scenario.

Creating a Scenario Using the GUI Manager

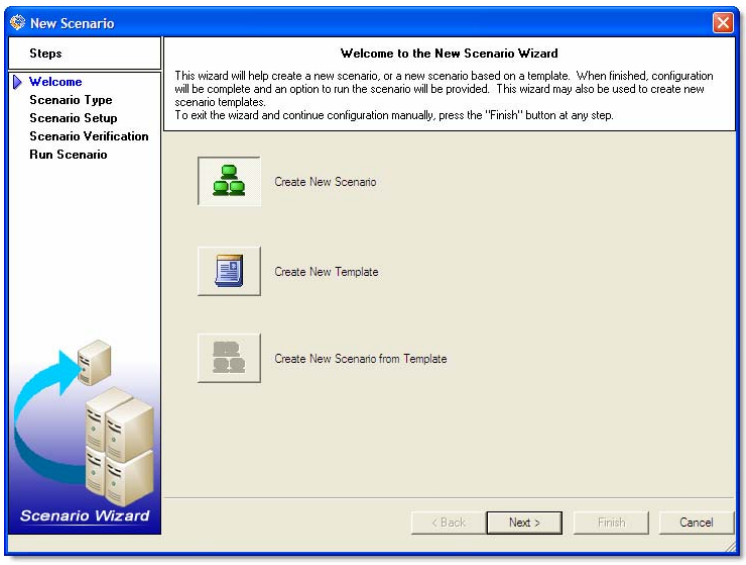
Note: This section demonstrates configuration of a File Server disaster recovery scenario. For more detailed instructions involving other applications, please reference the appropriate operations guide.

To create a scenario using the GUI Manager

1. Open the WANSync Manager and select Scenario, New:

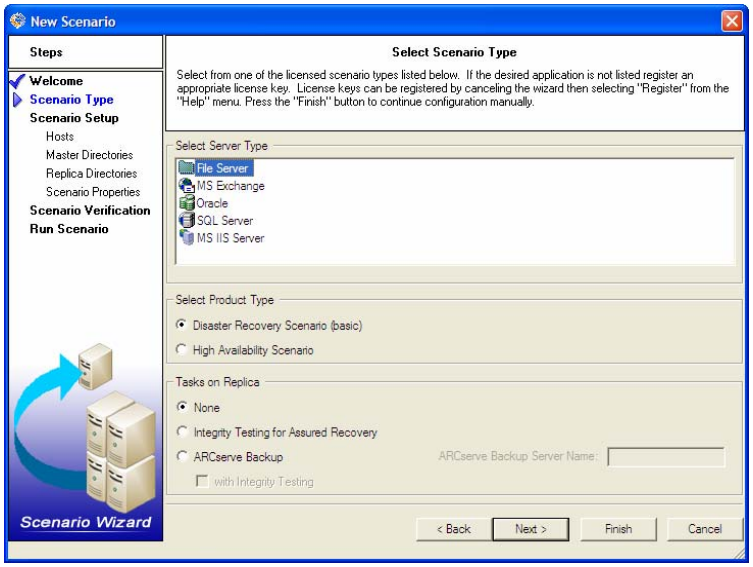


The New Scenario Wizard is displayed:



2. Select Create New Scenario, and click Next.

   The Select Scenario Type page is displayed:



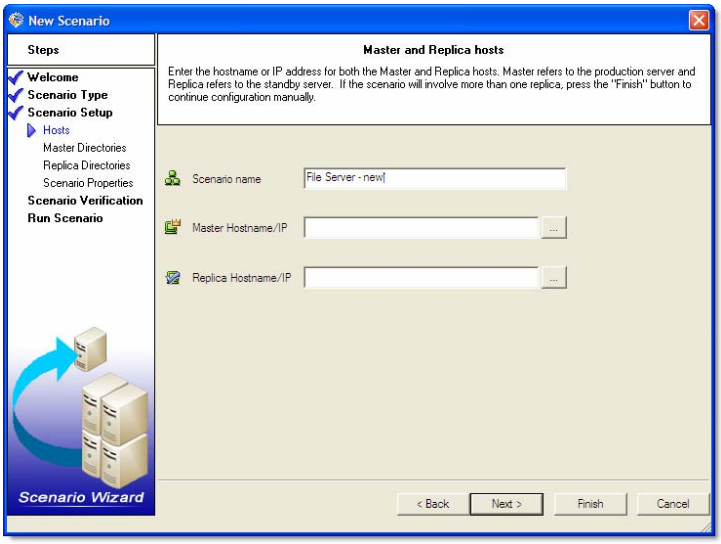
3. Select the required scenario options, as follows:

   - From the Select Server Type list, select the type of scenario you want to create.

     Note: Currently, only File Server is supported for Linux. For AIX and Solaris, Oracle is supported as well.

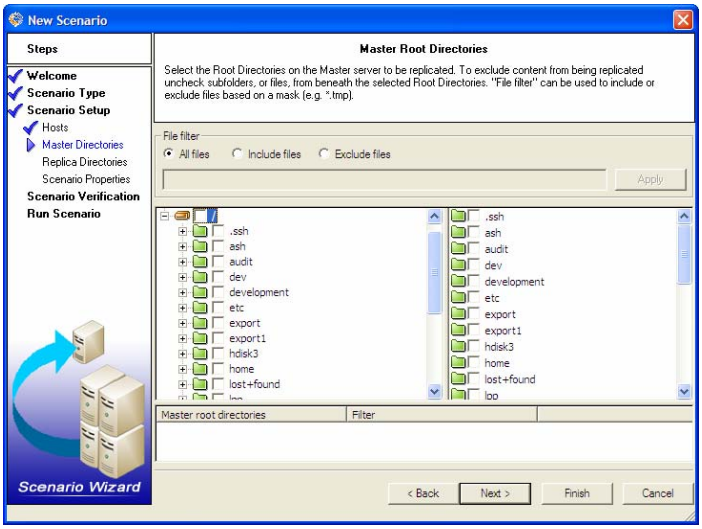
   - From the Select Product Type options, select Disaster Recovery Scenario.

4. Click Next. The Master and Replica hosts page is displayed:



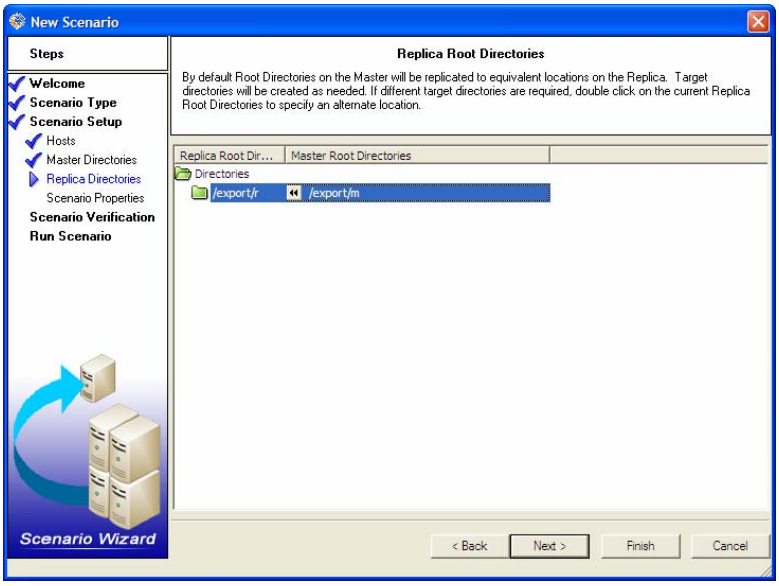
5. Enter the name or IP of the Master and Replica servers for the scenario, and click Next.

   The Master Root Directories page is displayed:



6. Select the files and/or directories to be replicated from the Master, and click Next.

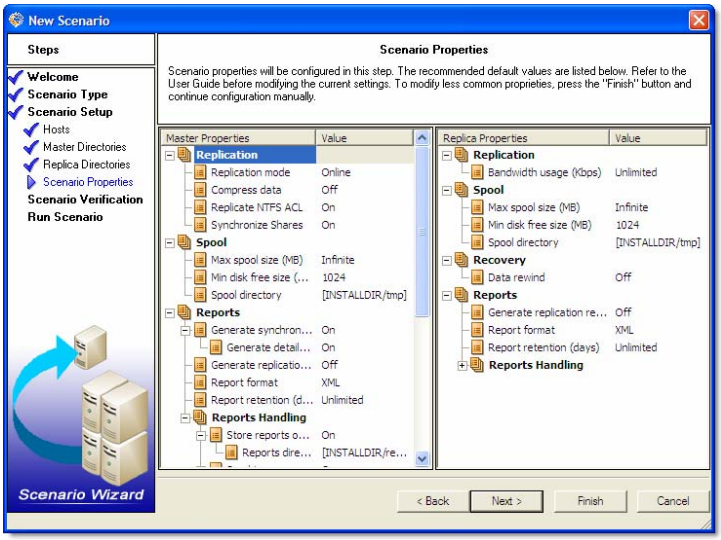
   The Replica Root Directories page is displayed:



7. Select the files and/or directories on the Replica in which the replicated data will be stored, and click Next.

   Note: If the same directory structure exists on the Replica server, the wizard automatically selects it as the directory to which to replicate.

   The Scenario Properties page is displayed:



8. The Scenario Properties page enables you to configure the Master and Replica properties. Typically the default values are sufficient.

Notes:

If you want to activate the Data rewind option, so you can later recover lost data from the Replica by using rewind points (for further details see Data Rewind, page 32), on the Replica Properties pane, set the Data rewind option to On.

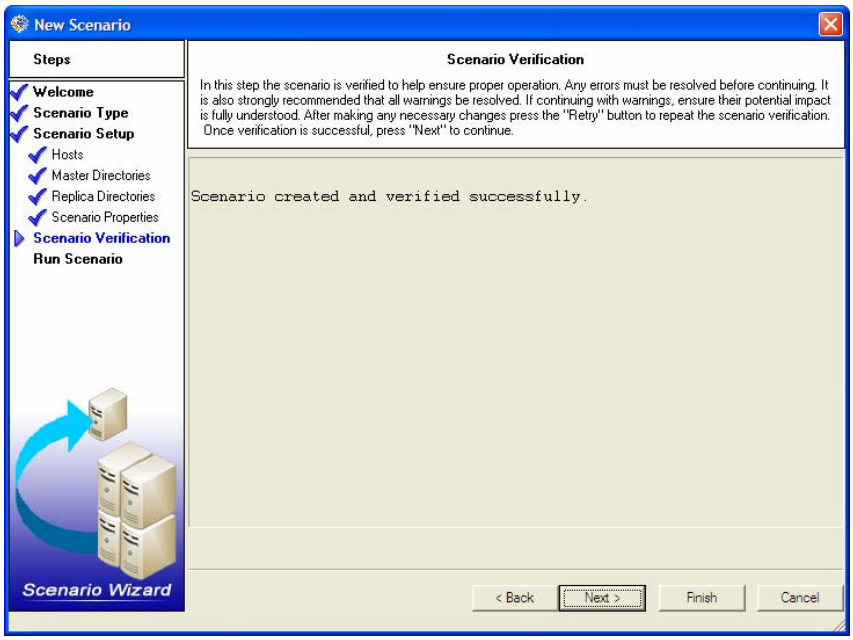
You can modify all the settings in this pane after the scenario is created. However, before changing any Spool properties (which are configured here), please review the following *Spool Settings* info for configuration details.

Spool Settings

The WANSync spool is a folder on disk where data to be replicated is temporarily stored (that is, spooled). The spool parameters, located in the properties tab (on both Master and Replica) or set with the New Scenario Wizard, determines how much disk space is available for the spool. In most cases the default values are sufficient. However, if you choose to change this value, it should be at least 10% of the total dataset size.

Once you're satisfied with the Master and Replica properties, click Next.

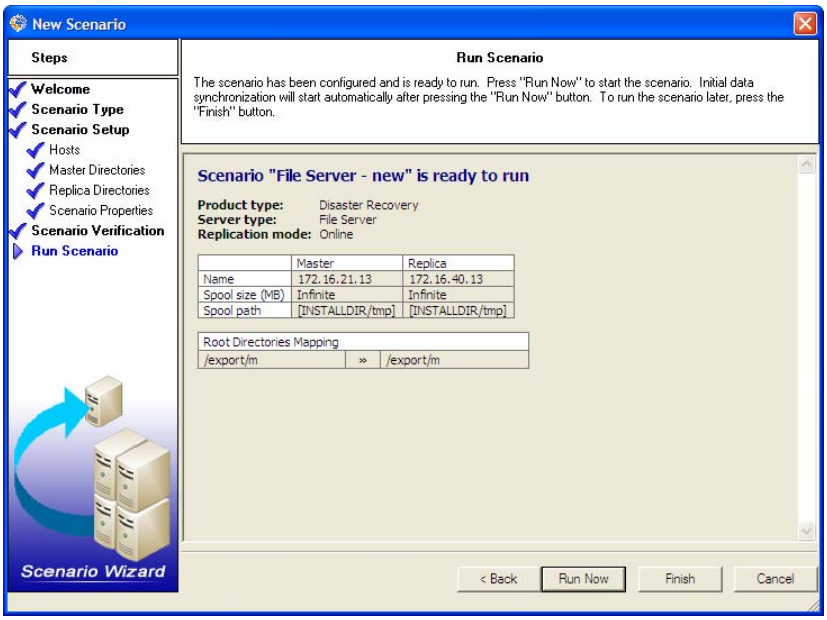
The Scenario Verification page is displayed:



9. After setting the properties, the wizard verifies the scenario configuration:

   - If errors appear, it's recommended to click Back, and correct the scenario settings.
   - If the scenario is verified successfully, click Next.

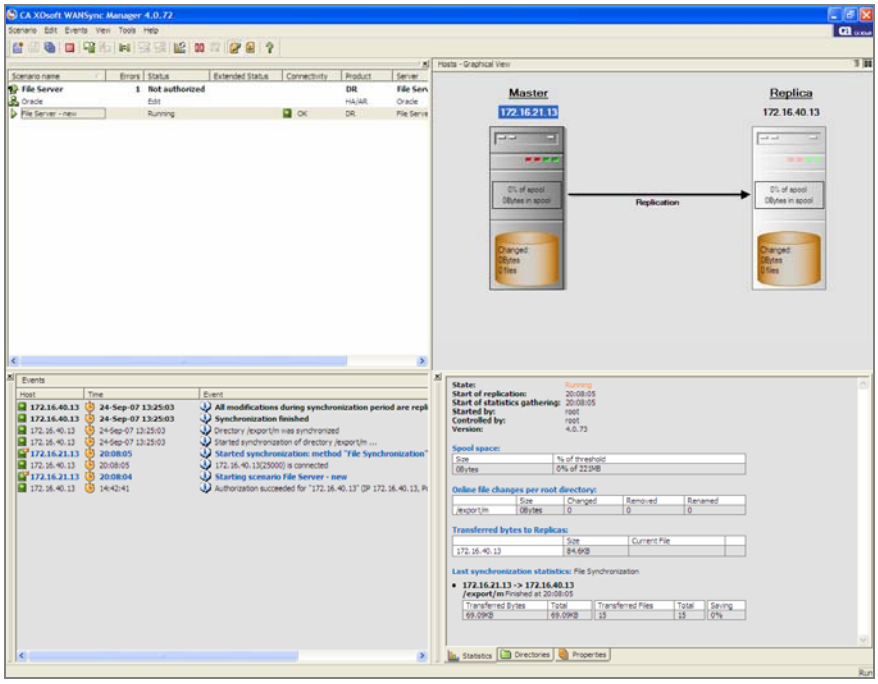
   The Run Scenario page is displayed:



10. After the scenario is verified, you're prompted to run it. Running the scenario starts the data synchronization process.

    - To finish the scenario creation and run it later, select Finish.
    - To run the scenario, click Run Now.

    The synchronization process starts:



Chapter 4: Managing a Scenario

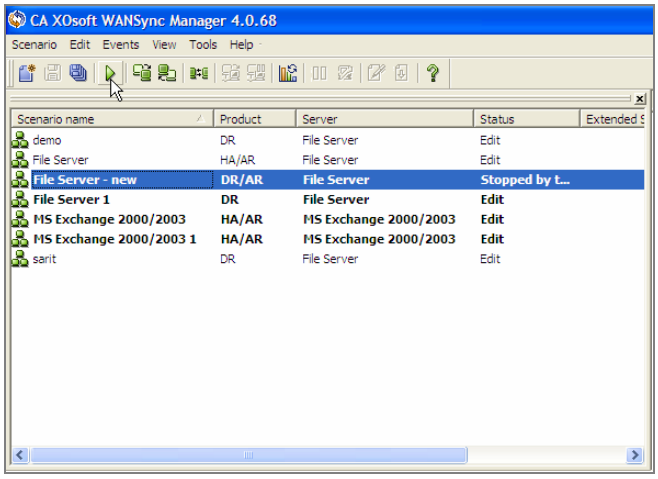
This chapter describes how to manage a scenario using the WS CLI and Manager.

Starting and Stopping a Scenario Using the GUI Manager

Start a Scenario Using the GUI

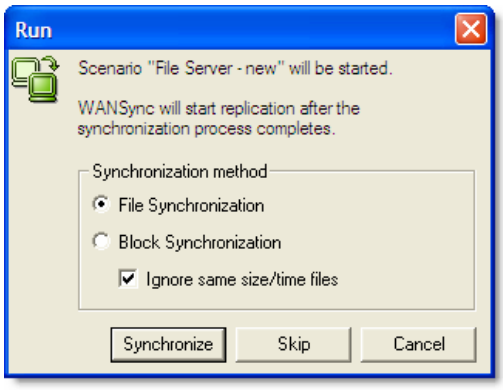
To start a scenario from the GUI Manager

1. From the Scenario pane, select the scenario you want to run.
2. To run the scenario, click the Run button on the tool bar:



A confirmation message appears prompting you to approve the scenario running.

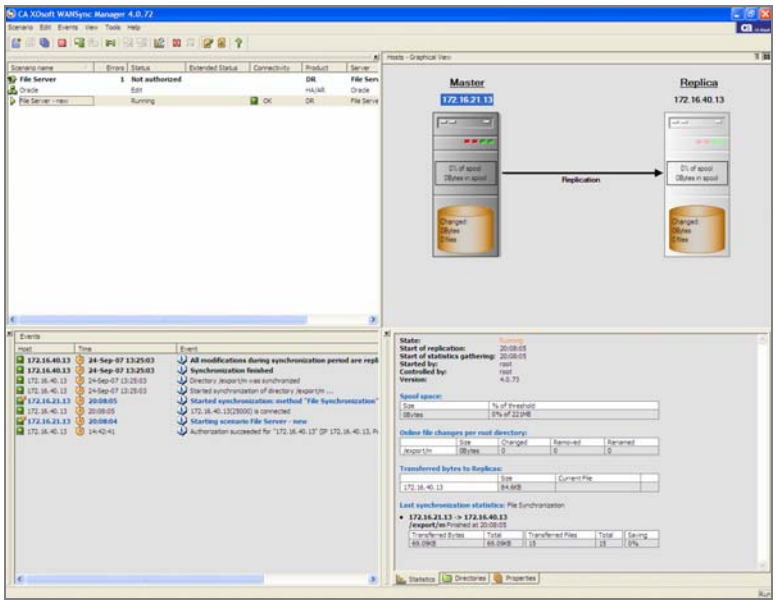
3. Click OK in the confirmation message. The Run dialog appears:



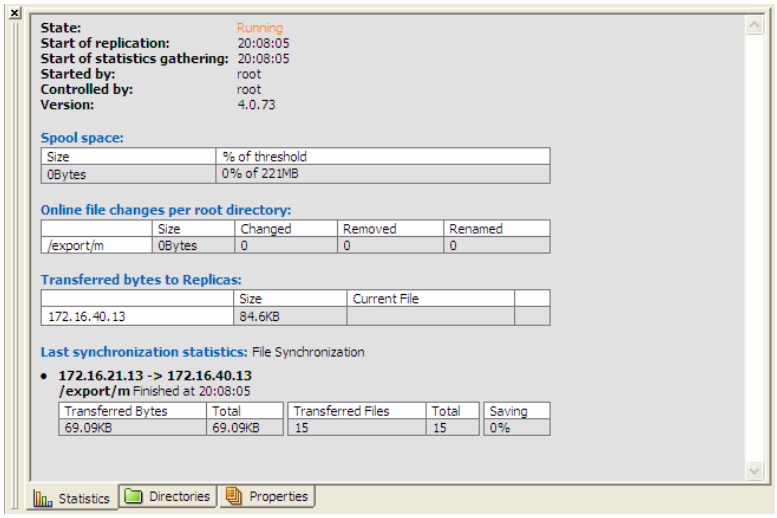
4. Choose File synchronization and click the Synchronize button.

   Note: If you're running a scenario for Oracle server, remove the check from the Ignore same size/time files check box and select Block Synchronization.

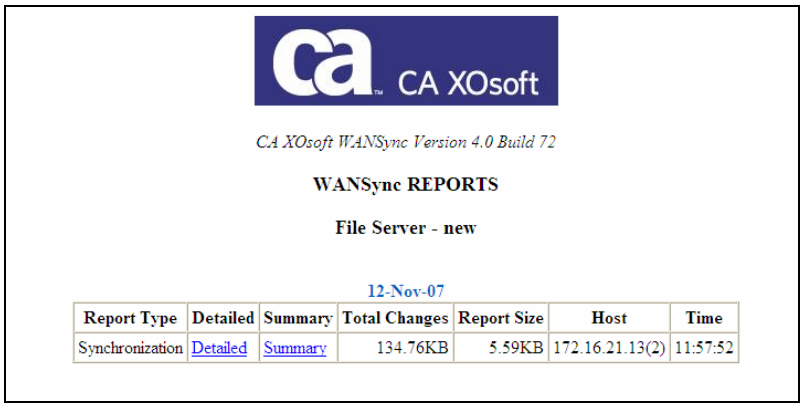
   The Manager now indicates that the scenario is running via the green play symbol to the left of the scenario:



   Once a scenario is running, a statistics tab appears (on the bottom of the far right pane):



In addition, by default once synchronization occurs a Report is generated:



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WANSync REPORTS

File Server - new

12-Nov-07

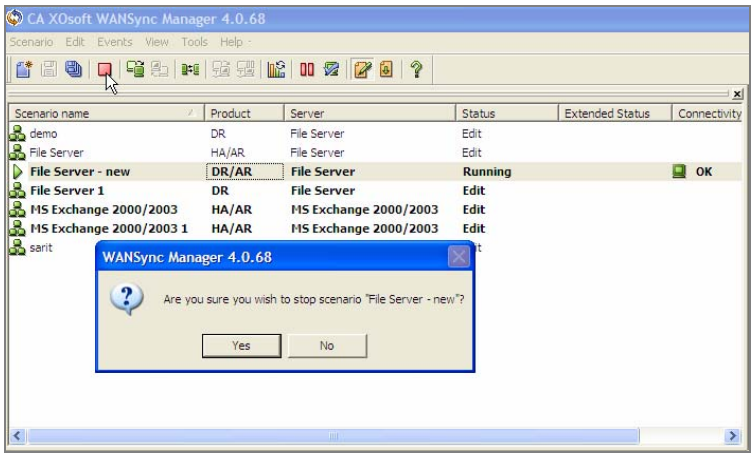
Report Type	Detailed	Summary	Total Changes	Report Size	Host	Time
Synchronization	Detailed	Summary	134.76KB	5.59KB	172.16.21.13(2)	11:57:52

Stop a Scenario Using the GUI

To stop a scenario from the GUI

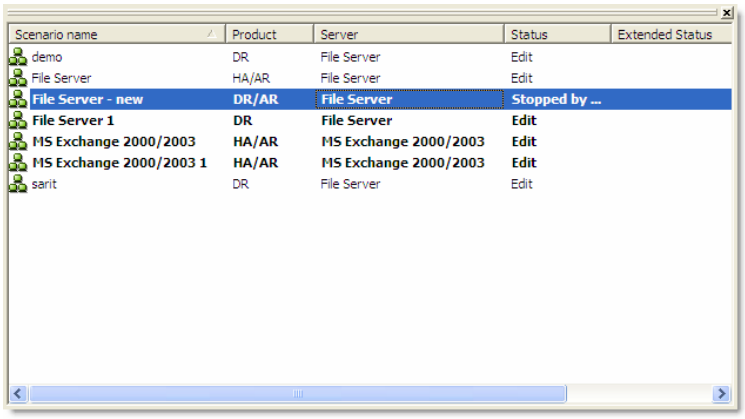
1. To stop the scenario using the WANSync Manager, click the Stop button on the tool bar.

   A confirmation message appears prompting you to approve the scenario stopping:



2. Click Yes in the confirmation message**.** The scenario stops.

After stopping the scenario, you'll see that the Manager no longer shows the green play symbol to the left of the scenario and the statistics tab is no longer available:



Starting and stopping a scenario using the CLI

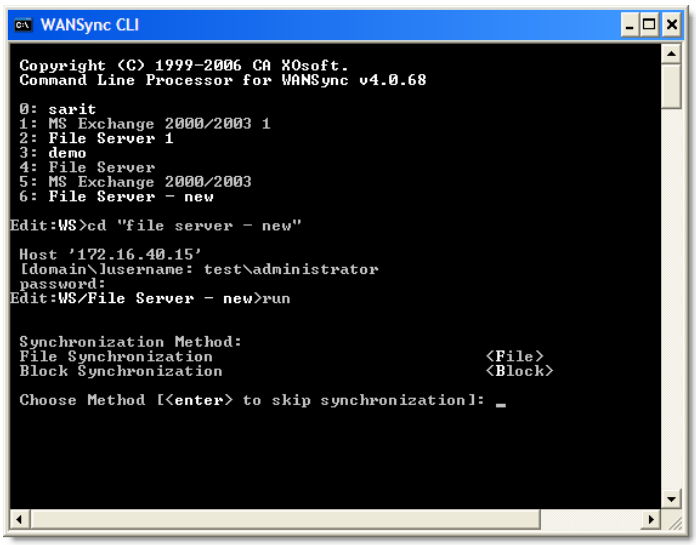
After configuring a scenario, you can start the scenario using the run command.

Start a Scenario using the CLI

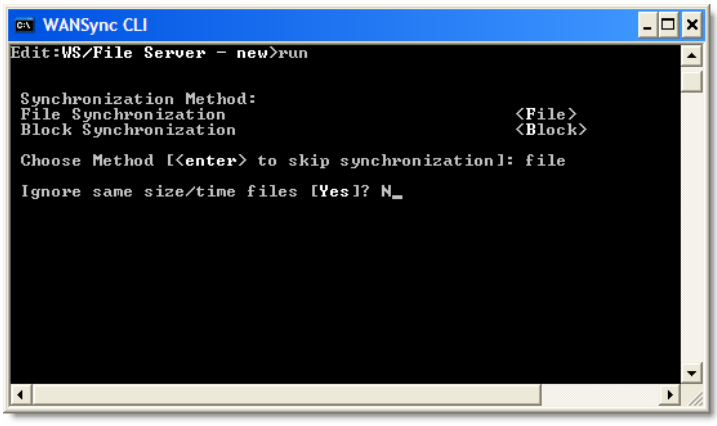
To run a scenario from the CLI

1. Change location to the level of the scenario you want to run.
   Edit:WS> **cd "scenario name"**
2. If needed, enter **user name** and **password**.
3. Run the scenario:
   Edit:WS>scenario name>**run**

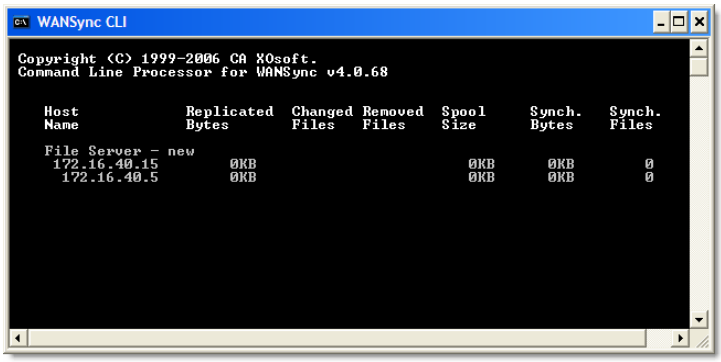
   The following prompt appears:



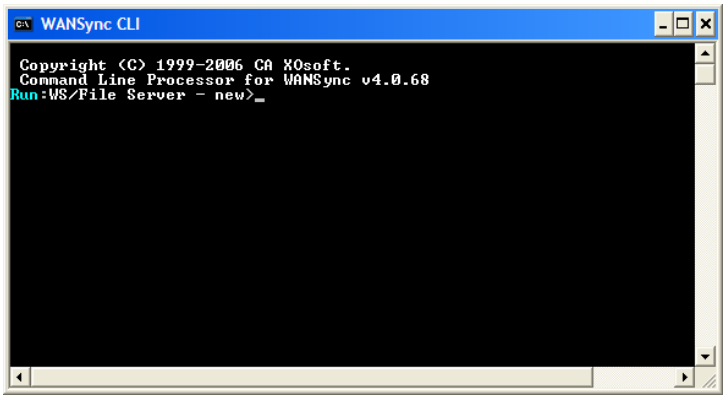
4. Type **File** as the synchronization method, and press **Enter**.
5. Type **Y** for Ignore same size/time files:



6. Press **Enter** to run the scenario. The synchronization begins and the following monitor display appears:



7. You may exit the monitor session by pressing **Enter** or typing **q**. Quitting the monitor display brings you back to the CLI prompt in Run mode:



Stop a Scenario Using the CLI

To stop a scenario from the CLI

- To stop the scenario and return to the Edit mode, type **stop**.

Chapter 5: Recovering Data

This chapter describes how to restore lost data using the Manager GUI and CLI, how to set bookmarks and how to rewind data.

When an event causes loss of Master data, the data can be restored from any Replica. The recovery process is in fact a synchronization process in the reverse direction - from a Replica to the Master.
WANSync enables you to either recover all lost data from the Replica to the Master, or to recover data only from a certain action or point in time. The other option, called Rewind Data, is similar to an undo action. It is useful in cases in which corrupted data on the Master was replicated to the Replica, and you want to restore the data to its previous state before the corruption occurred. The rewind process is done using time-stamped check-points and user-defined bookmarks.

Note: This section demonstrates recovering data of a File Server. For more detailed instructions involving other applications, please reference the appropriate operations guide.

Recover Data using the GUI

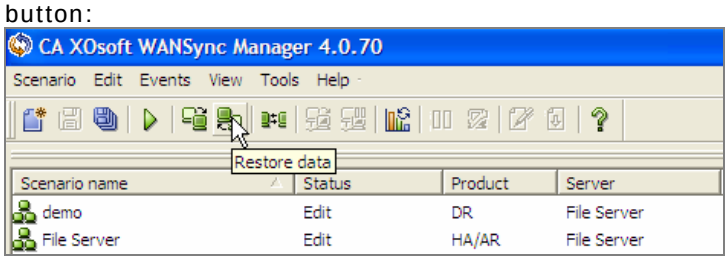
The Manager GUI enables you to recover all lost data from a Replica to the Master, to set bookmarks and to restore data to a previous valid state by rewinding it back in time.

Recover Lost Data from Replica

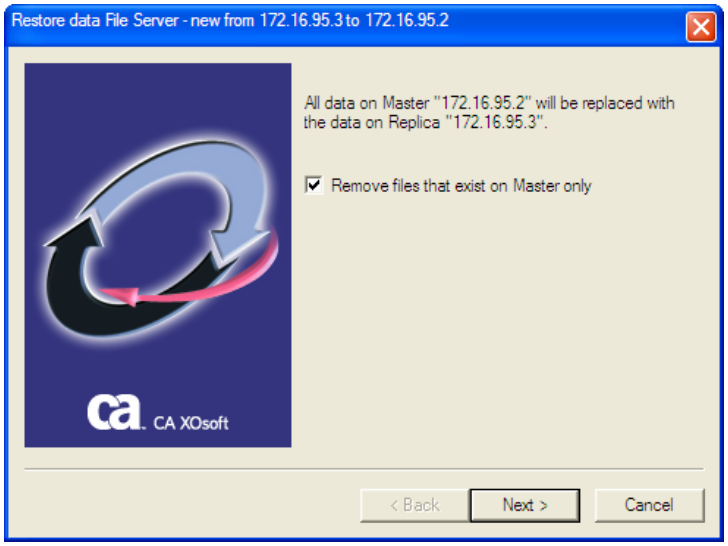
Recover all lost data from a Replica using the GUI

1. On the WANSync Manger GUI, from the Scenario pane select the desired scenario and stop it.
2. If multiple Replica servers participate in the required scenario, from the Host - Replication Tree pane select the Replica from which you want to recover data.

3. Select Tools, Restore Data, or click the Restore data button:

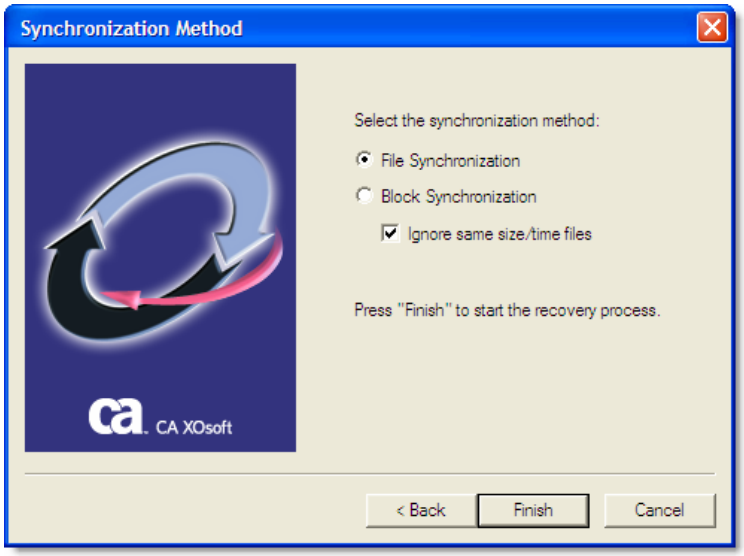


The Restore data wizard appears:



Note: If the Data Rewind property is set to On (see page 21) another Restore Data dialog will appear (see step 3, page 32). In this case, select the first option – Replace all data on Master with the data on Replica.

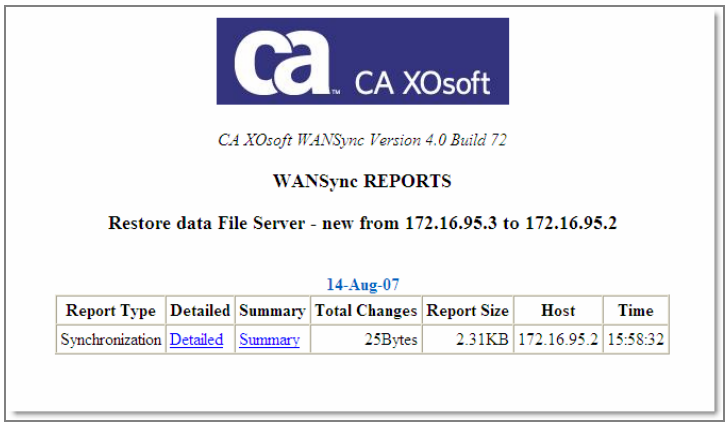
4. Click Next. The Synchronization Method page appears:



5. Make sure that the File Synchronization is selected, and click Finish.

   WANSync Manager builds a temporary reverse tree using the selected Replica as the root, and the Master as the terminating node. After the Master recovery process ends, the temporary scenario is deleted, and you receive the following message in the Event pane: *Recovery process has finished*.

6. By default, once a data recovery occurs a Synchronization Report is generated:



   Now, the Replication process can be restarted on the original scenario.

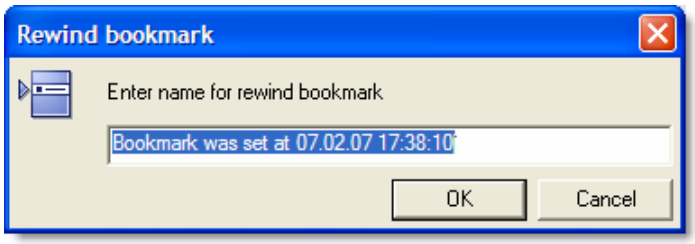
Setting Bookmarks

A *bookmark* is a checkpoint that is manually set to mark a state that you may want to rewind back to. It is recommended to set a bookmark 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 using the GUI

1. When the required scenario is running, select Tools, Set Rewind Bookmark.

   The Rewind bookmark dialog appears:



The text that appears in the Rewind bookmark dialog will appear in the Rewind Points Selection dialog as the bookmark's name (see step 6, page 33). The default name includes date and time.

2. Accept the default name, or enter a new name for the bookmark. It is recommended to give a meaningful name that will later help you recognize the required bookmark. Then, click OK.

   The bookmark is set.

Data Rewind

This recovery method allows you to rewind data to a point in time before it was corrupted. The rewind process takes place on the Replica server before the reverse synchronization process starts. The data rewind method uses rewind points or bookmarks that enable you to reset the current data back to a previous state.

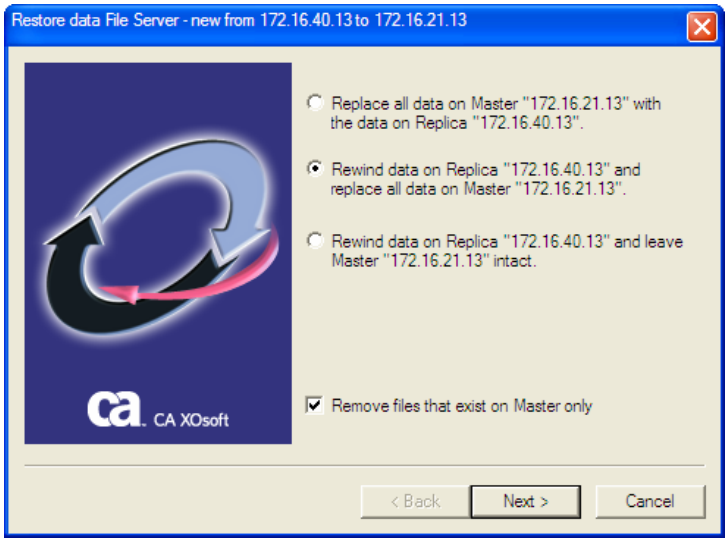
You can only use this option if you set the Recovery – Data rewind option to On (see page 21). If this option is set to Off, the system will not register data rewind points.

Important! The data rewind process operates in one way only – 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.

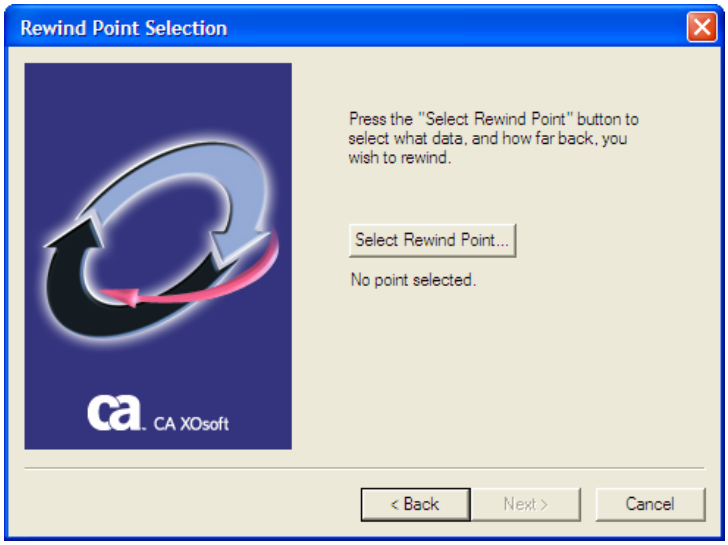
Recovering lost data using rewind points

1. On the WANSync Manger GUI, from the Scenario pane select the desired scenario and stop it.
2. If multiple Replica servers participate in the required scenario, from the Host - Replication Tree pane select the Replica from which you want to recover data.
3. Select Tools, Restore Data, or click the Restore data button.

The Restore data wizard appears:

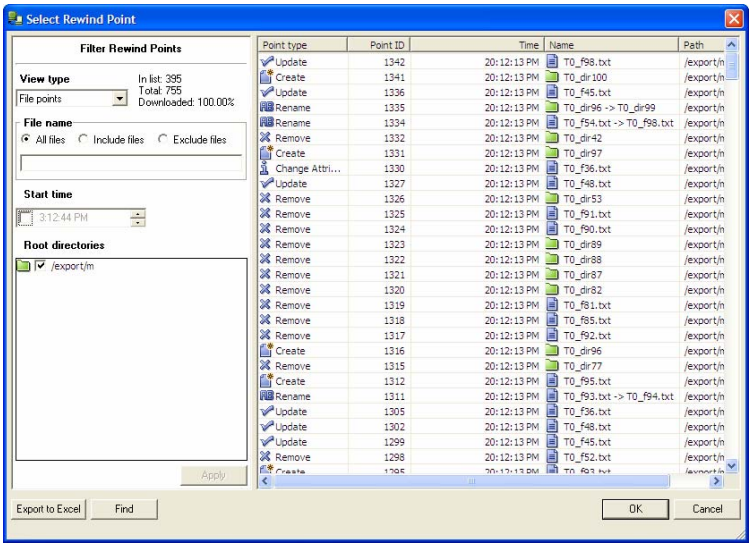


4. Select one of the Rewind data options, depending on whether you want the rewind data synchronized back to the Master (option 2) or left on the Replica only (option 3).
5. Click Next. The Rewind Point Selection page is displayed:



6. Click the Select Rewind Point button to view the existing rewind points.

The Select Rewind Points dialog appears:



The Select Rewind Points dialog displays a list of all rewind points. These include: folder and file creations, modifications, removals; bookmarks.

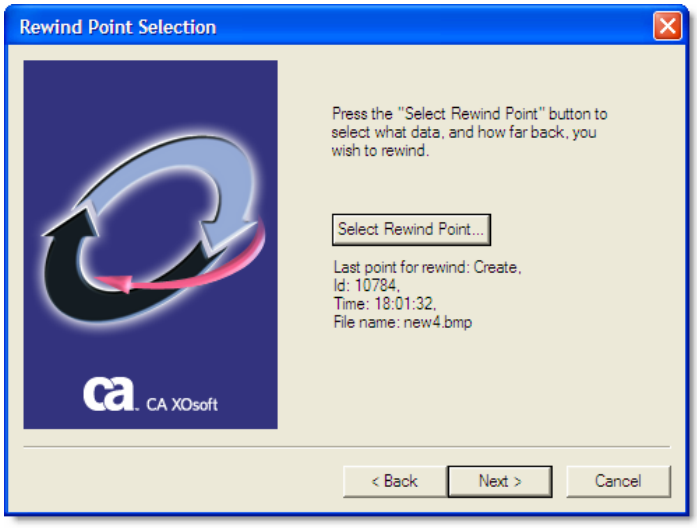
The list can be filtered according to the rewind point type or other criteria, using the Filter Rewind Points pane on the left.

Note: The entire list can be exported to an Excel file by clicking the Export to Excel button on the bottom-right corner.

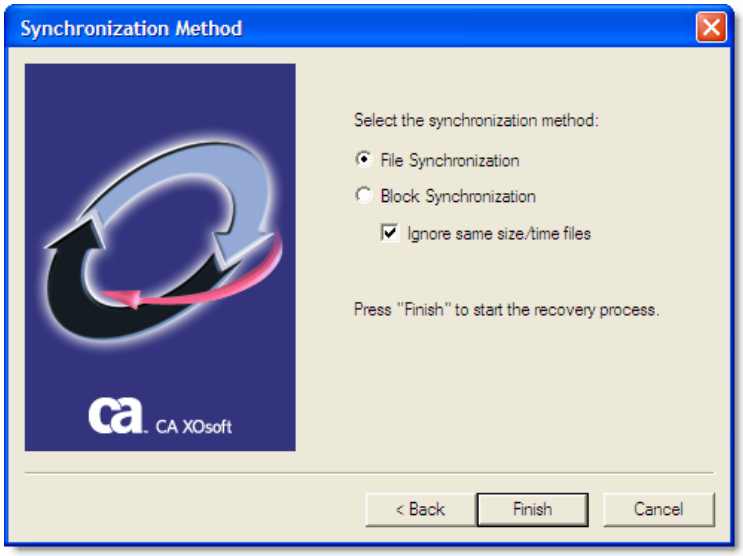
7. Select the required rewind point, and click OK.

   Note: If you want to use a Bookmark as the rewind point, it is best practice to use the closest point that indicates an actual event.

   You return to the Rewind Point Selection page, now displaying information about the rewind point you selected:



8. Click Next. The Synchronization Method page is displayed:

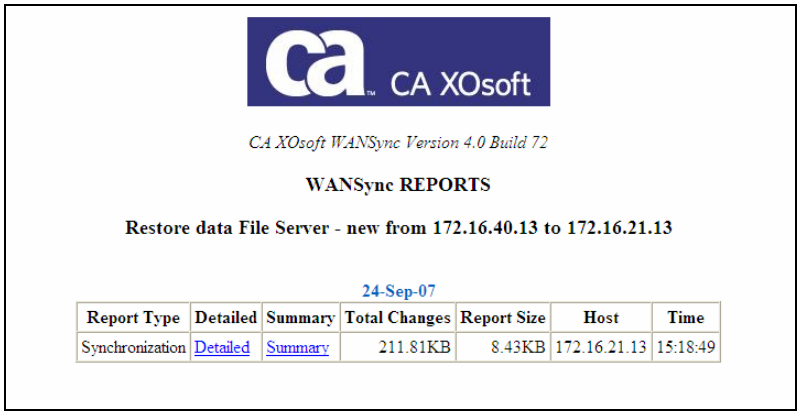


9. Select the File Synchronization method and click Finish.

   WANSync Manager rewinds the data to the point you selected. After the rewind process ends, you receive the following message in the Event pane: *Rewinding finished successfully*.

   If you chose to replace the data on the Master with the data on the Replica, WANSync starts a synchronization process from the Replica to the Master. Once the process ends, the following message appears in the Event pane: *Recovery process has finished*.

10. By default, once a data recovery occurs a Synchronization Report is generated:



CA XOsoft

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WANSync REPORTS

Restore data File Server - new from 172.16.40.13 to 172.16.21.13

24-Sep-07

Report Type	Detailed	Summary	Total Changes	Report Size	Host	Time
Synchronization	Detailed	Summary	211.81KB	8.43KB	172.16.21.13	15:18:49

   Now, the Replication process can be restarted on the original scenario.

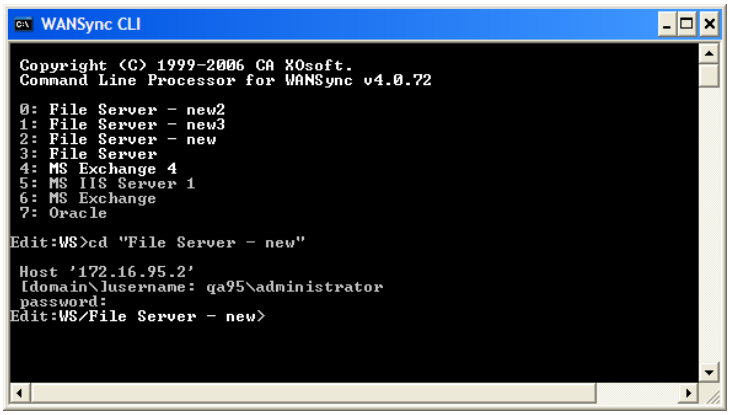
Recover Data using the CLI

Recovering lost data from the Replica to the Master using the CLI is similar to recovering data using the Manager. Similarly, the CLI enables you to either recover all lost data or to recover data only from a certain point in time. However, when rewinding data using the CLI, you can only use user-defined bookmarks as the rewind points.

Recover Lost Data from Replica

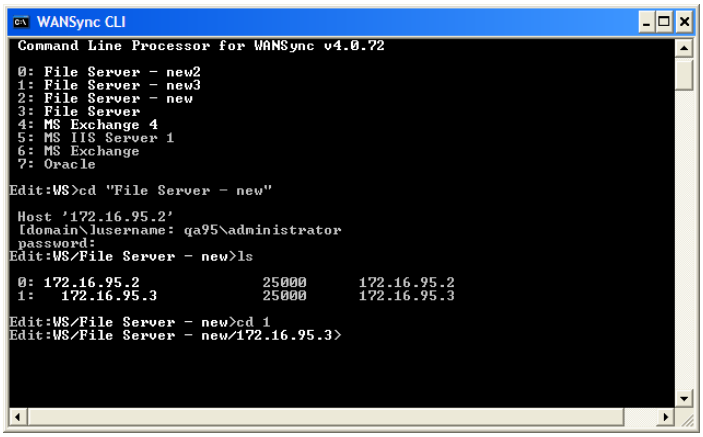
To recover lost data using the CLI

1. On the WS CLI, select the required scenario:
   `Edit:WS>cd "scenario_name"`
2. Enter the **user name** and then the **password:**

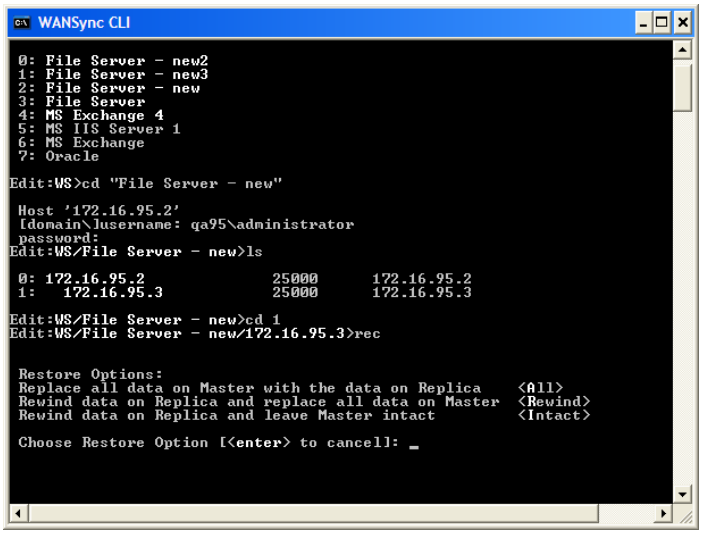


3. Make sure that the scenario is stopped. If the scenario is in Run mode, enter **Stop** to switch to Edit mode.
4. Display the list of the Master and Replica servers that are defined in the scenario:
   `Edit:WS>cd "scenario_name">ls`

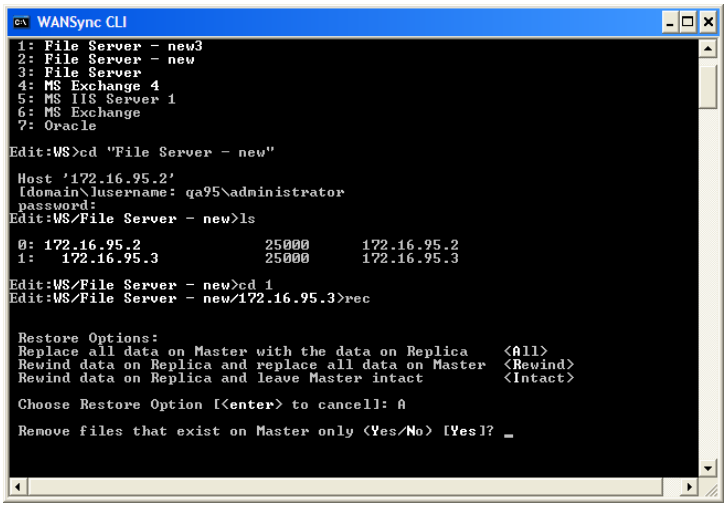
5. Select the Replica from which you want to recover data:
   Edit:WS>cd "scenario_name">**cd "Replica_no"**



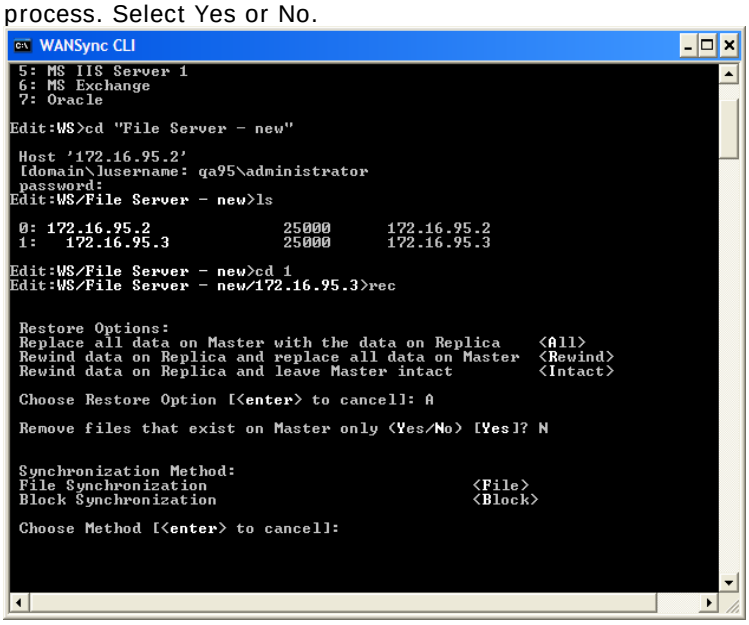
6. Display the data recovery options:
   Edit:WS>cd "scenario_name">cd "Replica_no">**rec**



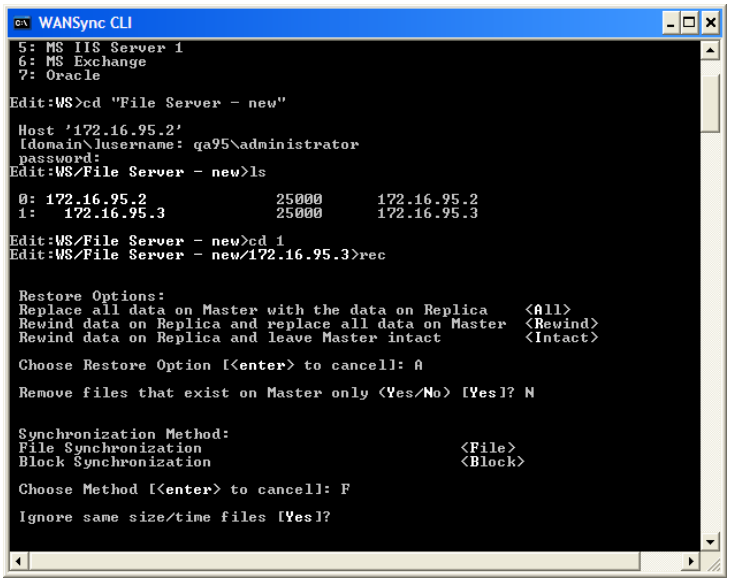
7. To restore all lost data, select the first option by entering **A**:



8. You're prompted to choose whether the files that exist only on the Master will be removed during the recovery process. Select Yes or No.

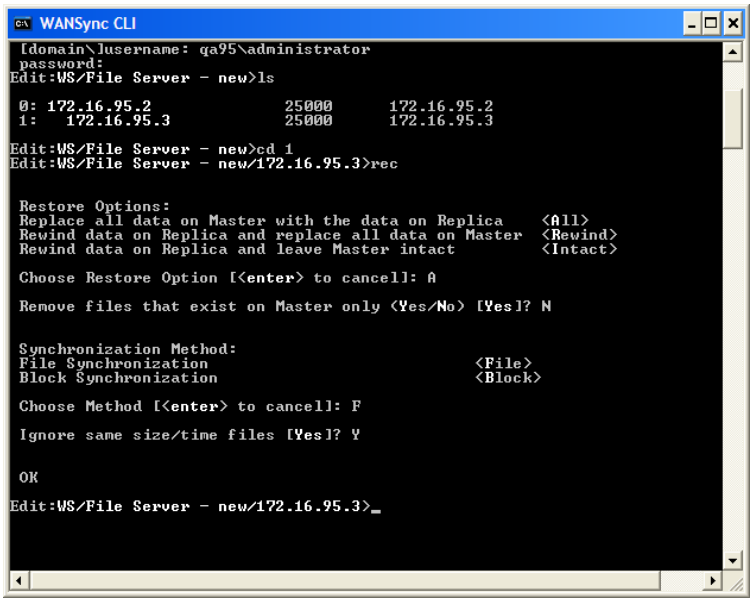


9. You're prompted to select the synchronization method. Select the File synchronization method by entering **F**:



10. You're prompted to choose whether to Ignore same size/time files. If you are working with a File Server scenario, select Yes.

11. If you didn't define the Timeout parameter (for further information, see *WANSync User Guide*), you'll see an OK message, indicating that recovery process has finished successfully:



Setting Bookmarks

Setting bookmarks through the CLI is similar to setting bookmarks through the GUI. The only difference is that after you define the bookmark's name, the CLI prompts you to define its type – either Regular or Backup. This definition is designed to help you organize your bookmarks and facilitate their selection during the rewind data process.

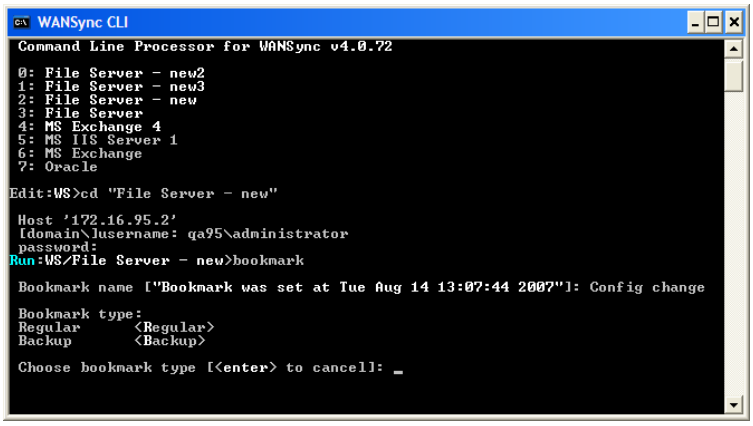
To set a bookmark

1. When the required scenario is running, enter **bookmark**.

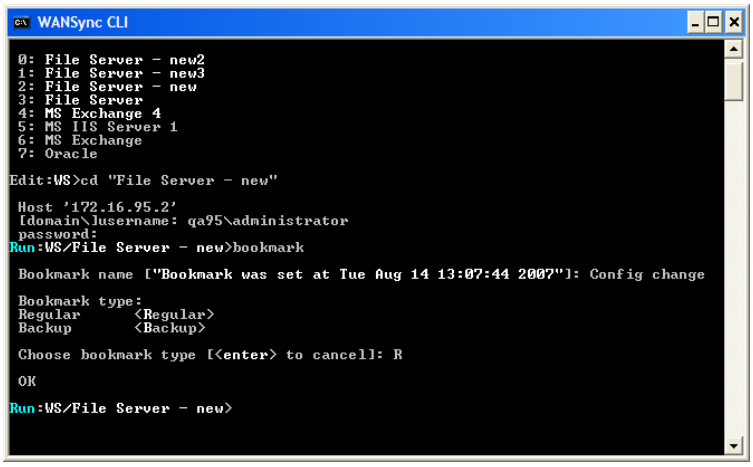
   The default bookmark name appears. This name includes the date and time of the bookmark setting.

2. Accept the default name by clicking **Enter**, or enter a new name for the bookmark.

3. You're prompted to select the bookmark type. Select the type that represents the action the bookmark indicates – Regular or Backup:



4. An OK message appears, indicating that the bookmark was set successfully:

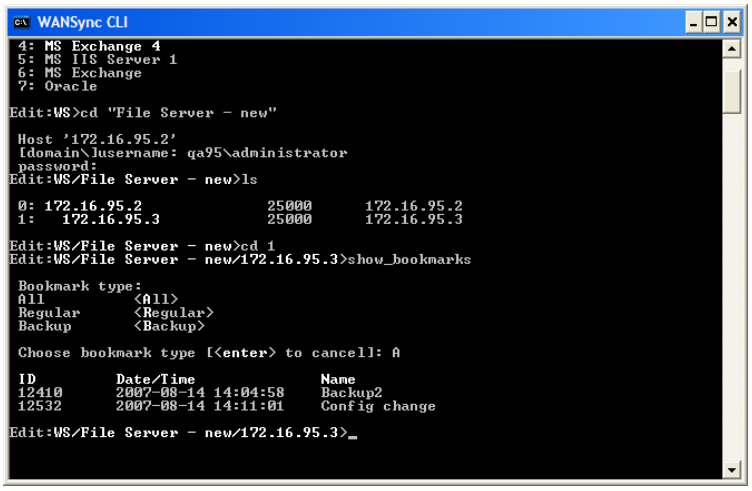


Rewind Data Using the CLI

The major difference between rewind data using the GUI and the CLI, is that the CLI enables you to use only bookmarks as the rewind points. Therefore, before starting the recovery process you need to display all defined bookmarks, so you could see and later enter the ID of the required bookmark.

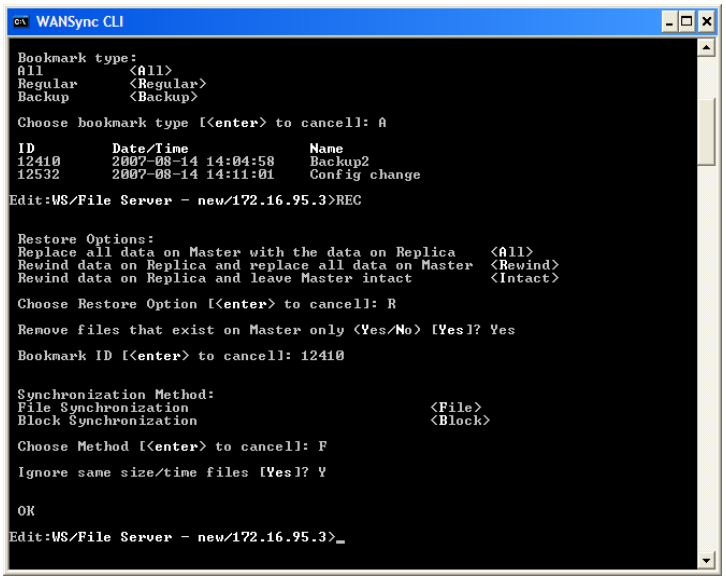
Recovering lost data using a bookmark

1. On the WS CLI, select the required scenario:
   `Edit:WS>cd "scenario_name"`
2. Enter the **user name** and then the **password.**
3. Make sure that the scenario is stopped. If the scenario is in Run mode, enter **stop** to switch to Edit mode.
4. Display the list of the Master and Replica servers that are defined in the scenario:
   `Edit:WS>cd "scenario_name">ls`
5. Select the Replica from which you want to recover data:
   `Edit:WS>cd "scenario_name">cd "Replica_no"`
6. Display the list of existing bookmarks:
   `Edit:WS>cd "scenario_name">cd "Replica_no">show_bookmarks`
7. Select the bookmark type you want to display. For displaying bookmarks of all types, enter **A**.
8. The list of selected bookmarks is displayed:



9. Display the data recovery options:
   `Edit:WS> cd "scenario_name">cd "Replica_no">rec`
10. To rewind data using a bookmark, select the second option by entering **R**.
11. You're prompted to choose whether you want during the recovery process to remove files that exist only on the Master or to leave them intact. Select Yes or No.

12. You're prompted to select a bookmark ID. Enter the required bookmark ID according to the bookmark list you previously displayed.
13. You're prompted to select the synchronization method. Select the File synchronization by typing **F**.
14. You're prompted to choose whether to Ignore same size/time files. If you're working with a File Server scenario select Yes.
15. If you didn't define the Timeout parameter (for further information, see *WANSync User Guide*), you'll see an OK message, indicating that the rewind process has finished successfully:



Appendix A: Installed WANSync Files

During the WANSync installation, different files are installed for different operating systems, as described in the following sections.

Files Installed on Red Hat and Novell SUSE Enterprise Linux

On Linux platforms, the following files are installed:

Installed File	Description
/opt/WANSync/bin/ws_rep	XOsoft Engine operates in user mode as a daemon. Its primary responsibility is to collaborate with the xofs kernel module (filtering file system), in order to track file system changes and to propagate these changes according to the replication scenario.
[For RHEL3] /opt/WANSync/bin/xofs.o.up and xofs.o.smp [For RHEL4 and SUSE] /opt/WANSync/kernel/fs/xofs.*	A proprietary file system - xofs. Implemented in the form of a loadable kernel module. The primary purpose of xofs is to track file system changes and to notify the Engine of these changes. Loaded during system start up (through /etc/init.d/WANSync). Note: .up is for uniprocessor while smp is for symmetric multiprocessor.
/etc/init.d/WANSync	Startup script used to start up and shut down XOsoft Engine.
/etc/pam.d/ws_rep	Needed by WANSync in order to authenticate management connections from the GUI.

Installed File	Description
/opt/WANSync/README	Release notes for the product.
/opt/WANSync/bin/ws_rep.cfg	WANSync configuration file.

Files Installed on IBM AIX

On AIX platforms, the following files are installed:

Installed File	Description
/opt/WANSync/bin/ws_rep	XOsoft Engine operates in user mode as a daemon. Its primary responsibility is to collaborate with the xofs kernel module (filtering file system) in order to track file system changes and to propagate these changes according to the replication scenario.
/opt/WANSync/bin/xofs.ext	A proprietary file system - xofs. Implemented in the form of a loadable kernel extension. The primary purpose of xofs is to track file system changes and to notify the Engine of these changes. Loaded during system start up (through /opt/WANSync/bin/WANSync.rc).
/opt/WANSync/bin/xoctl	XOsoft's auxiliary utility (file system helper). Preloads xofs during system start-up.
/opt/WANSync/bin/xoumount	XOsoft's auxiliary utility (umounts xofs). Analog of standard umount command line utility. (In current release standard umount command will not work for xofs.)
/opt/WANSync/bin/WANSync.rc	Startup script used to start and shut down XOsoft Engine.
/opt/WANSync/bin/uninstall.sh	Uninstalls WANSync software.

Files Installed on Solaris

On Solaris platforms, the following files are installed:

Installed File	Description
/opt/WANSync/bin/ws_rep	XOsoft Engine operates in user mode as a daemon. Its primary responsibility is to collaborate with the xofs kernel module (filtering file system) in order to track file system changes and to propagate these changes according to the replication scenario.
/usr/kernel/fs/xofs and /usr/kernel/fs/sparcv9/xofs	A proprietary file system - xofs. Implemented in the form of a loadable kernel module. The primary purpose of xofs is to track file system changes and to notify the Engine of these changes. Loaded on demand during replication scenario start up.
/opt/WANSync/bin/uninstall.sh	Uninstalls WANSync software.

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